Online Appendix of:

How Social Security Reform Affects Retirement and Pension Claiming

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A Survival Rates and Social Security Wealth

A.1 Calculating Survival Rates

Survival rates are a key input when calculating the social security wealth (SSW). This section describes how we predict survival rates using the Swiss Social Security Database (SSSD). We calculate these rates for the average woman as well as for the average single woman in each AIE-quintile and the average married woman in each AIE-quintile. We closely follow Chetty *et al.* (2016) who predict survival rates for different demographic groups in the United States.

From the SSSD, we extract all women born between 1935 and 1938 and, based on whether they are single or married and their AIE-quintile, assign them to one of ten subgroups. Since we can observe women up to age 76, we use the empirical mortality rates to predict survival rates until age 76. Between age 77 and age 86, we predict survival rates using a Gompertz extrapolation, based on a regression of log mortality m_a on a linear trend in age a:

$$\log m_a = \alpha + \beta age_a + \varepsilon_a. \tag{A.1}$$

We run separate regressions for the full sample and for each of the ten subgroups defined above. Beyond age 87, we predict survival rates using mortality rates for the average women from the Swiss Federal Statistical Office.

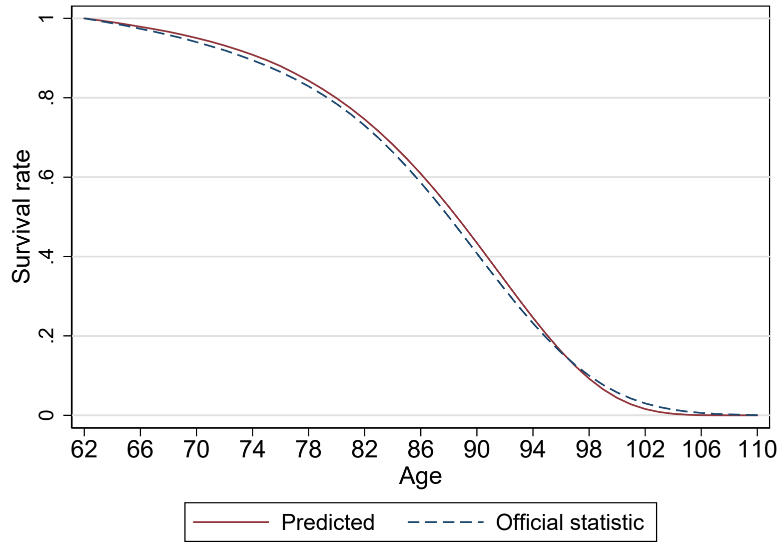
Figure A.1 shows the predicted survival rates for the average woman in our sample together with the survival rates for women from the Swiss Federal Statistical Office. Our predicted survival rates closely align with the survival rates from the Statistical Office. If at all, our survival rates are slightly above the official rates, implying that our estimated SSW gain from delaying claiming is too high. The SSW for early claiming would be higher using the survival rates from the Statistical Office.

Figure A.2 shows the predicted survival rates for each of the ten subgroups defined by marital status and AIE-quintile. The figure shows substantial heterogeneity in survival rates. For each AIE-quintile, we observe that survival rates are higher for married women (dashed lines) relative to single women (solid lines). Moreover, we observe that women with a higher AIE tend to live longer than women with a lower AIE, consistent with evidence showing that life expectancy is highly correlated with income (Chetty *et al.*, 2016).

A.2 Alternative Ways of Calculating Social Security Wealth

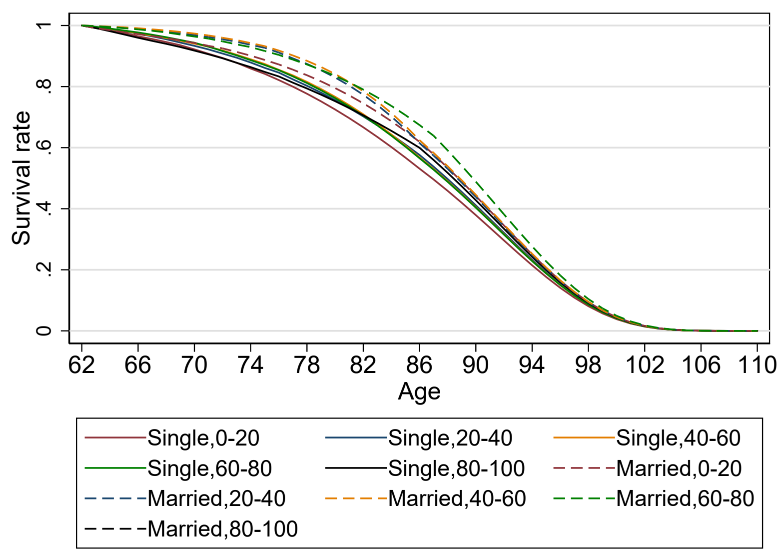
In this section, we present estimates for alternative ways of calculating social security wealth (SSW). In the paper, we use a discount factor $\beta = 0.98$ throughout. Figure A.3 shows SSW estimates by claiming age and pension regime when we set the discount factor to $\beta = 0.99$ (panel a) and $\beta = 1$ (panel b). A higher discount factor makes delaying more attractive, as future benefits become more important, but for

Figure A.1: Comparison of Estimated and Official Survival Curves for Women



Notes: The figure shows predicted female survival rates using the SSSD and female survival rates from the Swiss Federal Statistical Office. For the prediction, we use female birth cohorts born between 1935 and 1938. Until the age 76, we predict survival rates using empirical mortality rates in the data. Between age 77 and age 86, we predict survival rates using a Gompertz extrapolation, based on a regression of log mortality on a linear trend in age. Beyond age 87, we predict survival rates using mortality rates from the Swiss Federal Statistical Office.

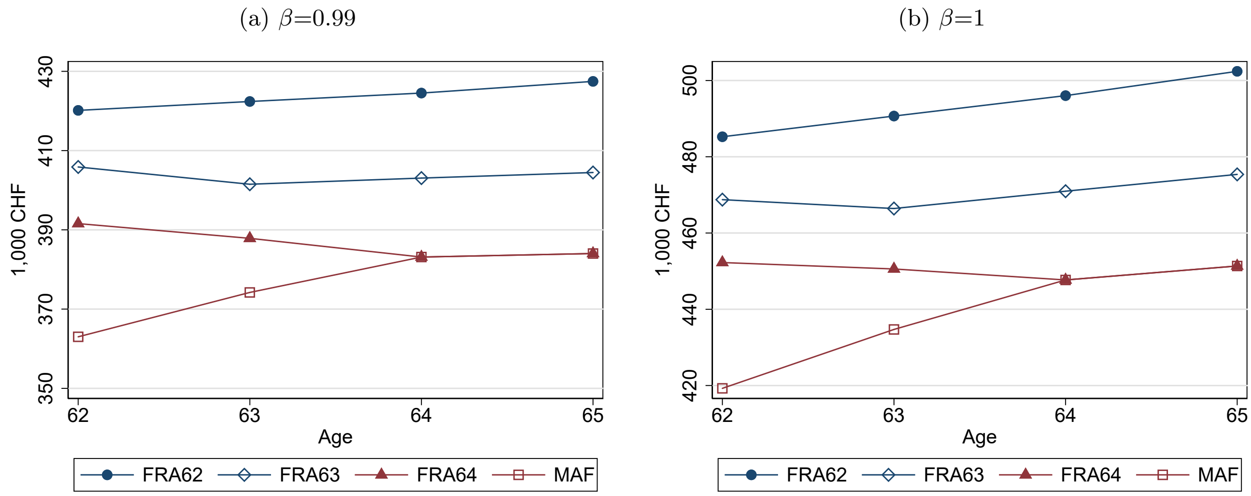
Figure A.2: Estimated Survival Curves for Women by Marital Status and Income



Notes: The figure shows predicted female survival rates using the SSSD data for ten subgroups defined by marital status and AIE-quintile. For the prediction, we use female birth cohorts born between 1935 and 1938. Until age 77, we predict survival rates for each subgroup using empirical mortality rates in the data. Between age 77 and age 86, we predict survival rates for each subgroup using a Gompertz extrapolation, based on a regression of log mortality on a linear trend in age. Beyond age 87, we predict survival rates for each subgroup using mortality rates from the Swiss Federal Statistical Office.

FRA63 and FRA64 claiming early, as opposed to delaying to the FRA, still yields a higher SSW. Delaying claiming to the FRA increases SSW only for MAF.

Figure A.3: Social Security Wealth for Different Discount Factors



Notes: The figure shows the social security wealth (SSW) as a function of the claiming age and pension regime for discount factors $\beta = 0.99$ (panel a) and $\beta = 1$.

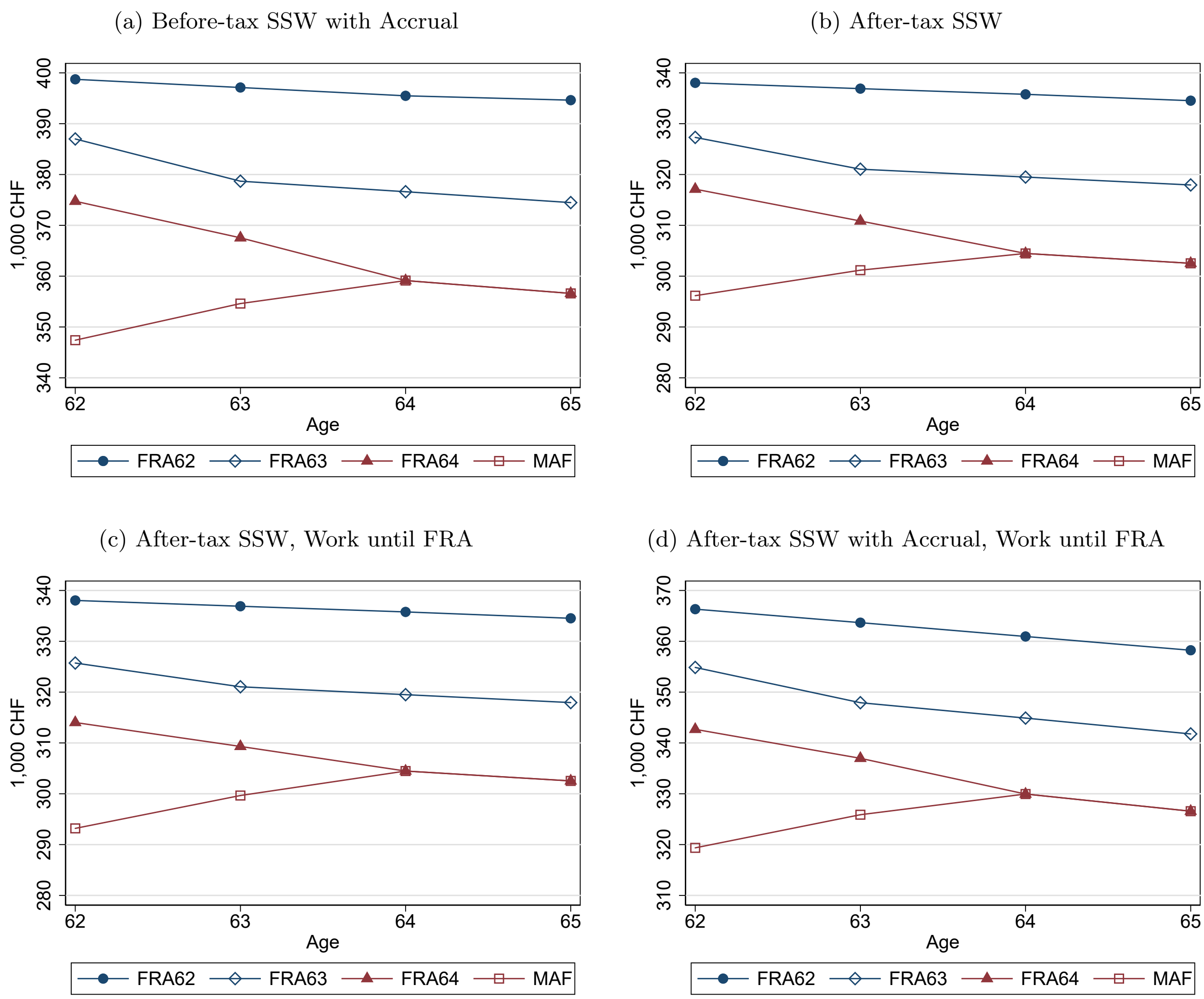
Figure A.4 graphically shows the SSW for different assumptions about income taxes and labor supply behavior (reports the corresponding numbers). Our conclusions remain always the same: FRA63 and FRA64 are actuarially unfair, incentivizing women to claim early, while MAF is more than actuarially fair, incentivizing women to delay claiming to the FRA.

The baseline SSW in Figure 1(b) is before income taxes and ignores the effect of working on OASI benefits through changes in the AIE (the pension accrual). Figure A.4(a) shows the SSW with the pension accrual, assuming that women continue to work until the FRA. If a woman has already retired before the FRA, we take her earnings in the last job before retirement to calculate the accrual. The figure shows that for all reform steps claiming early becomes less attractive relative to the baseline case. Since older women are often past their peak earning years, continuing to work reduces their AIE and hence their OASI benefits.

Figure A.4(b) shows the SSW after income taxes. We observe that the SSW after taxes is actuarially more unfair than the SSW before taxes. Since the tax schedule is progressive, the gain in OASI benefits from delaying is taxed at a higher rate, making it less attractive to delay claiming.

Figure A.4(c) shows the SSW after tax if women would continue to work until the FRA. We observe that the SSW at the early claiming ages is lower relative to the case when women do not work until the FRA (A.4b). This finding is intuitive: Since Switzerland taxes OASI pension and earnings together, women who claim early and continue to work enter a higher tax bracket. But even with this additional tax burden, we see that FRA63 and FRA64 incentivize early claiming. The incentive for early claiming becomes stronger if we additionally account for the pension accrual (Figure A.4(d)).

Figure A.4: How the Reform Affects Social Security Wealth



(a) Before-tax SSW with Accrual

(b) After-tax SSW

(c) After-tax SSW, Work until FRA

(d) After-tax SSW with Accrual, Work until FRA

Notes: The figure shows the social security wealth (SSW) as a function of the claiming age and pension regime under different assumptions about income taxes, work behavior, and calculation of benefits. Figure (a) shows the SSW before (income) taxes taking into account the effect of additional earnings on OASI benefits (the accrual), figure (b) shows the SSW after taxes, figure (c) shows the SSW after taxes assuming people continue to work until the FRA, and figure (d) shows the SSW after taxes and with the accrual assuming people continue to work until the FRA.

A.3 Optimal Claiming and Retirement Responses with Heterogenous Mortality

Table A.2 compares the claiming and retirement age responses in the data (first column) with simulated claiming and retirement responses for different discount factors, when we allow for heterogenous life expectancies that vary by AIE-quintile and marital status. Section 4.4 describes how we calculate the simulated claiming age and retirement age responses.

The simulation results with heterogenous life expectancies are very similar to those with average life expectancies (Table 5). We find that the empirical claiming age responses, relative to the simulated responses assuming pension wealth maximizing individuals, are larger for FRA63 and FRA64 and smaller for MAF. Similarly, the empirical retirement age responses are much larger for FRA63 and FRA64 compared

Table A.1: Change in Social Security Wealth at Different Ages

	FRA62	FRA63	FRA64	MAF
A. SSW63 – SSW62				
Before tax	-320	-5,970	-5,343	7,771
Before tax with accrual	-1,608	-8,307	-7,197	7,209
After tax	-1,141	-6,253	-6,265	5,022
After tax, work until FRA	-1,141	-4,675	-4,710	6,469
After tax with accrual, work until FRA	-2,657	-6,943	-5,699	6,521
B. SSW64 – SSW63				
Before tax	-423	-810	-6,152	5,708
Before tax with accrual	-1,634	-2,075	-8,412	4,524
After tax	-1,118	-1,549	-6,382	3,291
After tax, work until FRA	-1,118	-1,549	-4,841	4,814
After tax with accrual, work until FRA	-2,719	-3,025	-7,028	4,070
B. SSW65 – SSW64				
Before tax	263	-945	-1,285	-1,285
Before tax with accrual	-853	-2,137	-2,527	-2,527
After tax	-1,250	-1,558	-1,943	-1,943
After tax, work until FRA	-1,250	-1,558	-1,943	-1,943
After tax with accrual, work until FRA	-2,713	-3,114	-3,318	-3,381

Notes: The table shows the difference in social security wealth (SSW) between two adjacent claiming ages underlying Figure A.4. “Before tax” calculates the SSW before (income) taxes, “before tax with accrual” is before (income) taxes and accounts for the effect of additional earnings on OASI benefits (the accrual), “after tax” is the SSW after taxes, “after tax, work until FRA” is the SSW after taxes assuming people continue to work until the FRA, and “after tax with accrual, work until FRA” is the SSW after tax, accounting for the accrual and assuming people continue to work until the FRA. We assume a discount factor β of 0.98 and average death hazard.

to the simulated retirement age responses, we would expect based on the implied pension wealth shocks. Only for MAF we find that the empirical and simulate retirement age responses align.

B Validity of Empirical Design and Robustness

This section presents evidence supporting the validity of the RD design, explores the sensitivity of the estimates to the functional form, and studies whether the abolishment of the supplementary pension affect the robustness of our estimates.

Density Test. Figure B.5 shows that the number of women born per weeks is smooth around the cutoff dates. Table B.3 shows the corresponding RD estimates at the cohort cutoffs when the outcome is the number of observations per week of birth (following McCrary, 2008). The point estimates are small and statistically insignificant for bandwidths of 12 weeks and the optimal bandwidth using the Calonico *et al.* (2014) procedure (CCT), independent of whether we include a linear or a quadratic trend on either side of the cutoff. The point estimates are statistically significant for the linear specification with a bandwidth of 30 weeks. Figure B.5 shows that the number of births is seasonal; the linear specification does not capture

Table A.2: Claiming and Retirement Age Responses with Heterogeneous Mortality: Data vs Simulation

A. Claiming age (years)

	RD-Estimate	Lifetime budget constraint model		
		$\beta = 0.98$	$\beta = 0.99$	$\beta = 1$
FRA63	0.71	0.25	0.45	0.55
		(0.01)	(0.01)	(0.01)
FRA64	0.67	0.17	0.37	0.49
		(0.01)	(0.01)	(0.01)
MAF	0.33	0.96	0.62	0.44
		(0.02)	(0.02)	(0.01)

B. Retirement age (years)

	RD-Estimate	Lifetime budget constraint model					
		$\beta = 0.98$		$\beta = 0.99$		$\beta = 1$	
		CLNÖ	GIS	CLNÖ	GIS	CLNÖ	GIS
FRA63	0.63	0.06	0.13	0.05	0.12	0.05	0.11
		(0.01)	(0.03)	(0.01)	(0.03)	(0.01)	(0.03)
FRA64	0.53	0.06	0.12	0.05	0.11	0.06	0.14
		(0.01)	(0.03)	(0.01)	(0.03)	(0.01)	(0.03)
MAF	0.01	0.01	0.02	0.01	0.02	<0.01	0.01
		(0.01)	(0.03)	(0.01)	(0.03)	(0.01)	(0.02)

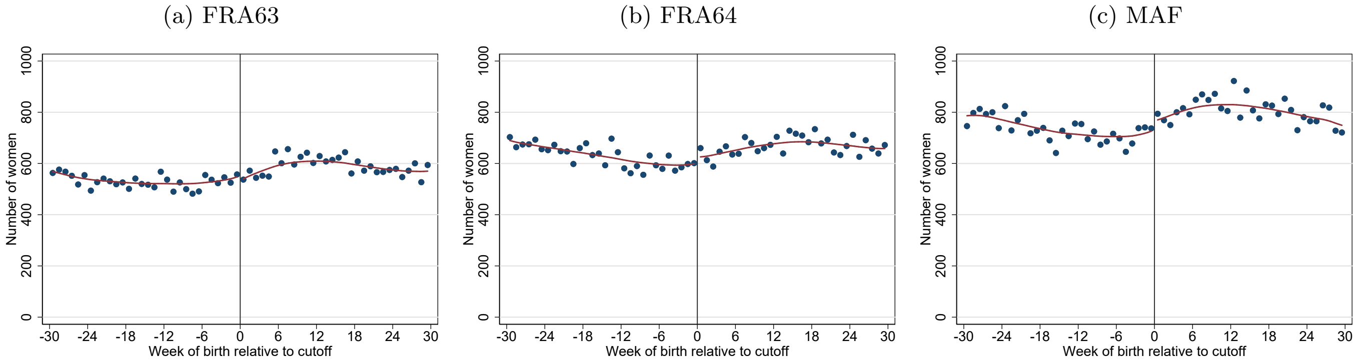
Notes: The table compares the RD-estimates for the claiming age and the retirement age responses (first column) with the optimal claiming age and retirement age responses for different discount factors. The optimal claiming age response is the response when women claim at the age that maximizes social security wealth. The optimal retirement age response is the response when women change their retirement date based on the wealth shock implied by the reform step. We use estimates for the retirement elasticities with respect to wealth from Cesarini *et al.* (2017) (CLNÖ) as well as Gelber *et al.* (2016) (GIS). Bootstrapped standard errors are shown in parentheses.

this seasonality when the bandwidth is large.

Smoothness of Predetermined Characteristics. We next explore whether predetermined characteristics change discontinuously at the cohort boundary; evidence for significant discontinuities would cause doubt that the assignment of women around the cutoff is random. Table B.4 shows separate RD estimates for a rich set of characteristics. We find little evidence for manipulation around the cohort cutoffs. When using a bandwidth of 12 weeks around the cutoffs, we find that point estimates are always statistically insignificant and small. When using a bandwidth of 30 weeks, we find that 5 out of 33 point estimates are statistically significant at the 10%-level.

Sensitivity of Estimates to Changes in Bandwidth. We also explore the sensitivity of our main estimates in Table 3 with respect to bandwidth choice. Figure B.6 reports RD estimates of the effects on the retirement and claiming age when varying the bandwidth from 4 to 38 weeks. The effects are broadly robust for different bandwidth choices.

Figure B.5: Number of Women per Week of Birth



Notes: The figures show the mean number of women per week of birth around the cutoff separating the 1939 and 1938 birth cohorts (FRA63), the 1941 and 1942 birth cohorts (FRA64), and the 1947 and 1948 birth cohorts (MAF). The solid red line plots the best local linear fit to the actual data above and below the reform cutoff.

Table B.3: Number of Women per WOB

	linear			quadratic		
	local	CCT	global	local	CCT	global
A. FRA63						
Number of individuals	-17	-19	52***	-23	-23	-9
	(14)	(17)	(18)	(20)	(20)	(15)
Bandwidth (weeks)	12	8	36	12	12	36
B. FRA64						
Number of individuals	25	30	58***	39	27	23
	(23)	(27)	(15)	(30)	(30)	(23)
Bandwidth (weeks)	12	9	36	12	14	36
C. MAF						
Number of individuals	33	20	112***	7	9	39*
	(21)	(21)	(21)	(28)	(26)	(22)

Notes: The table presents RD-estimates corresponding to equation (), where the dependent variable is the number of women per week-of-birth (WOB). The linear (quadratic) specification includes a linear (quadratic) trend of the running variable (WOB) on either side of the cutoff. The local and global specifications use a bandwidth of 12 and 30 weeks. The CCT specification uses the optimal bandwidth using the Calonico *et al.* (2014) procedure. Observations are weighted using a triangular kernel. ***Significant at the 1% level. **Significant at the 5% level. *Significant at the 10% level.

Sensitivity of Estimates to Functional Form. We also test the sensitivity of our main estimates in Table 3 by including a quadratic trend on either side of the cohort cutoff instead of a linear trend (Table B.5). We find that the RD estimates for the quadratic specification are similar to the linear specification. If at all, the point estimates appear slightly larger, but we cannot reject the null hypothesis that they are statistically the same as in the linear specification.

While in each reform step women to the left and right of the birth date cutoff are comparable in observable characteristics, the same may not be true when comparing women *across* reform steps, limiting

Table B.4: Selection on Observable Characteristics

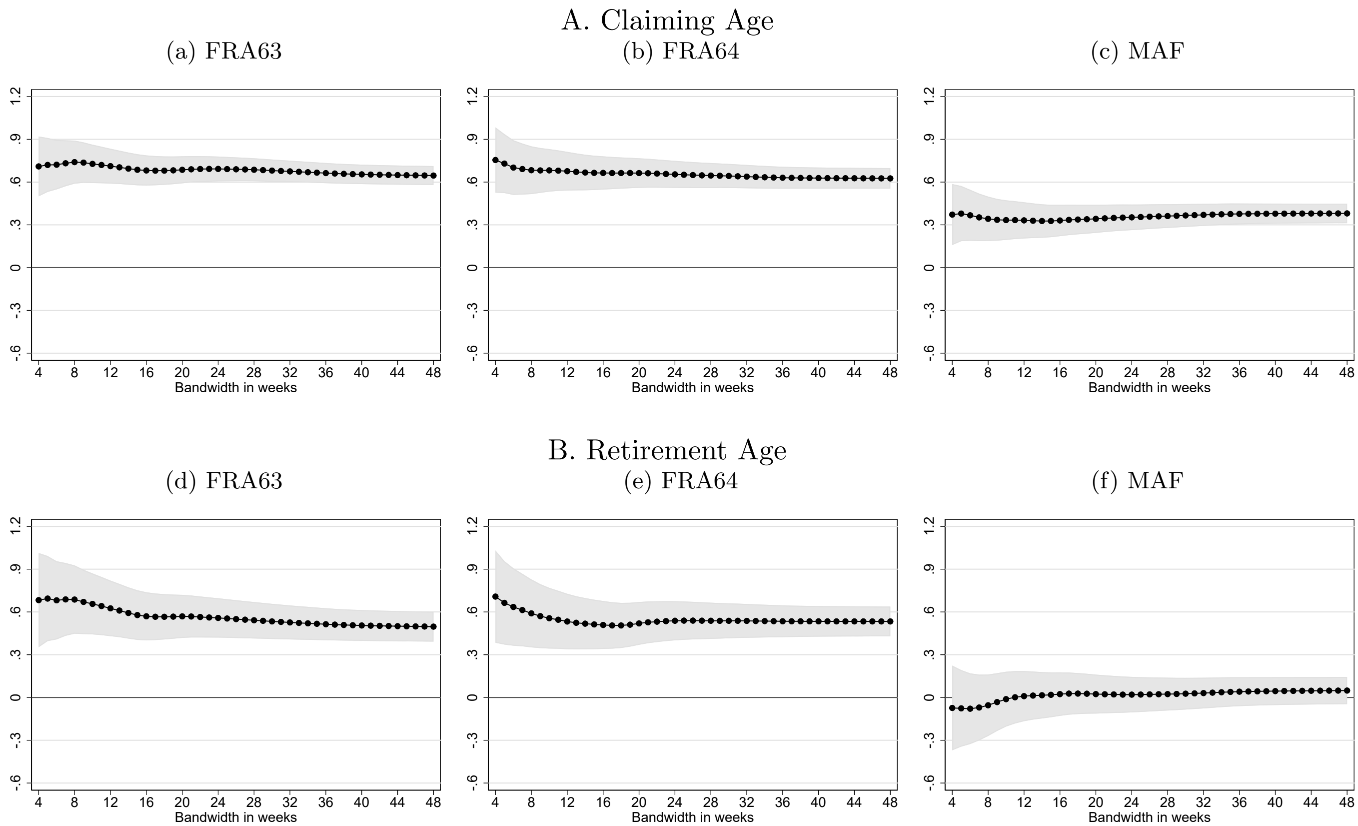
	FRA 63		FRA 64		MAF	
	local (1)	global (2)	local (3)	global (4)	local (5)	global (6)
% Foreign	0.7	-1.2	1.6	0.9	1.5	0.7
	(1.5)	(1.0)	(1.3)	(0.8)	(1.2)	(0.7)
% German-speaking region	0.3	-0.8	-2	0.5	1.8	1.5⋆
	(1.5)	(1.0)	(1.4)	(0.9)	(1.3)	(0.8)
% Married	2	1.2	-2.4	-1.4	0.5	-0.1
	(1.7)	(1.1)	(1.7)	(1.1)	(1.5)	(1)
% Husband born 1933	0.7	0.1	-0.8	-0.2	0.2	0.2
	(0.8)	(0.5)	(0.5)	(0.3)	(0.2)	(0.1)
% Husband born 1938	-0.7	-0.7	0.4	-0.4	-0.5	-0.1
	(1.0)	(0.6)	(0.9)	(0.6)	(0.4)	(0.2)
% Self-employed	-0.1	-0.5	-0.1	1.2⋆	0.5	0.8
	(1.0)	(0.6)	(1.0)	(0.7)	(1.0)	(0.6)
% Public sector	1.2	0.6	-2.1	-1.4⋆	-1.5	0.0
	(1.4)	(0.9)	(1.3)	(0.8)	(1.1)	(0.7)
Months employed until age 55	-0.85	-0.52	-0.60	-0.30	-0.19	-0.28
	(0.62)	(0.39)	(0.61)	(0.38)	(0.53)	(0.33)
Months unemployed until age 55	0.04	0.02	-0.04	-0.11	-0.05	-0.04
	(0.11)	(0.07)	(0.18)	(0.11)	(0.15)	(0.09)
Average annual indexed earnings	-529	-68	-1,524	-1,226⋆	-605	-256
(2016 CHF)	(1,111)	(687)	(1,110)	(693)	(910)	(577)
Annual earnings at age 55	94	32	-673	-1,401⋆	1,743	1,048
(2016 CHF)	(1,222)	(767)	(1,194)	(809)	(1,193)	(757)
Obs	14,494	36,564	16,131	42,357	19,868	50,344

Notes: The table presents RD-estimates corresponding to equation (), where the dependent variable are different predetermined characteristics. The local (global) specification uses a bandwidth of 12 (30) weeks and includes a linear trend of the running variable on either side of the cutoff. Observations are weighted using a triangular kernel. ***Significant at the 1% level. **Significant at the 5% level. *Significant at the 10% level.

the comparability of estimates across reform steps. We address this concern using a reweighting approach. Specifically, we estimate a probit model of the probability of being born in 1938 as a function of predetermined characteristics (number of months employed between 50-55, number of months unemployed between 50-55, number of months receiving disability benefits between 50-55, earnings at age 55, marital status, indicator for foreign-born, and a vector of canton fixed effects). We estimate the model separately for each birth cohort 1939, 1941, 1942, 1947, and 1948, including always the 1938 birth cohort as well. We then use the coefficient estimates to predict a propensity score p and re-weight observations using as weights $w = 1/p$ if born in 1938 and $w = 1/(1-p)$ if not born in 1938.

Table B.6 presents estimates of equation B.4 when we re-weight observations based on the propensity score. For each panel, we also report the main estimates from Table 3 for comparison. The table shows that for all reform steps the re-weighted estimates are very similar to the main estimates, suggesting that changes in sample composition across reform steps are negligible.

Figure B.6: Sensitivity to Changes in Bandwidth



Notes: The figure shows RD-estimates of the impacts of different reform steps on the claiming age (panel A) and the retirement age (panel B) when varying the bandwidth from 4 to 48 weeks. The shaded area denotes the 95% confidence interval. The specification includes a linear trend on either side of the cutoff and observations are weighted using a triangular kernel.

Addressing the Abolishment of Supplementary Pensions. The 1997 reform also abolished the supplementary pension for retired husbands whose wives were born in 1942 or after. This change could affect our analysis of the FRA64 reform step, because the cohort cutoff for both changes is January 1, 1942. Figure B.7(a) shows that the percent of women in our sample who receive a supplementary pension drops from 30 to 10 percentage points at the cohort cutoff. The percent does not drop to zero, because women born in 1942 or after still qualify for supplementary benefits if the husband draws a disability pension.

Our strategy to isolate the impact of FRA64 is to focus on women who are single or whose husband is at most three years older. This age restriction guarantees that married women become eligible for OASI benefits before the husband reaches his FRA of 65. Figure B.7(b) shows that for this sample of women there is no jump in supplementary benefit receipt at the cohort cutoff. Yet, we still observe clear jumps in the claiming age (Figure B.7c) and the retirement age (Figure B.7d).

Table 3 in the paper reports the corresponding RD estimates for this sample of women. The point estimates are always similar to the full sample; we can never reject the null hypothesis that the point estimates are the same for the full sample and the sample of women who are single or whose husband is at most three years older. From this analysis, we conclude that the claiming and retirement responses capture primarily the impact of FRA64, while the abolishment of supplementary pensions appears to have

Table B.5: Main Estimates with a Quadratic Trend

	FRA63		FRA64		MAF	
	local	global	local	global	local	global
A. Claiming age (years)						
Full sample	0.75***	0.70***	0.70***	0.68***	0.35***	0.33***
	(0.09)	(0.06)	(0.10)	(0.06)	(0.10)	(0.06)
Single/age balanced	0.73***	0.63***	0.70***	0.70***	0.33***	0.34***
	(0.12)	(0.07)	(0.12)	(0.08)	(0.11)	(0.07)
Exit by age 62	0.70***	0.64***	0.47**	0.52***	0.48**	0.45***
	(0.18)	(0.11)	(0.21)	(0.13)	(0.23)	(0.15)
B. Effects on benefits (CHF)						
Annual pension benefits	-553	-311	-334	-621***	96	107
	(373)	(235)	(342)	(216)	(312)	(193)
SSW	-25168***	-20642***	-21986***	-26165***	-4990	-4732
	(7057)	(4445)	(6161)	(3908)	(5477)	(3390)
C. Retirement age (years)						
Full sample	0.72***	0.60***	0.64***	0.52***	-0.08	0.01
	(0.15)	(0.09)	(0.14)	(0.09)	(0.13)	(0.08)
Single/age balanced	0.816***	0.58***	0.67***	0.56***	-0.01	0.04
	(0.17)	(0.11)	(0.17)	(0.11)	(0.15)	(0.10)

Notes: The table presents RD-estimates on the impact of the different reform steps on the claiming age (panel A), pension benefits (panel B), and the retirement age (panel C). The local (global) specification uses a bandwidth of 12 (30) weeks and includes a linear trend of the running variable on either side of the cutoff. Observations are weighted using a triangular kernel. Single/age balanced includes women who are single or whose husband is at most three years older. ***Significant at the 1% level. **Significant at the 5% level. *Significant at the 10% level.

a minimal impact.

Additional Evidence on Claiming and Retiring. Figure B.8 shows the share of women claiming and not retiring in the same year for the three different policy cohorts. We find that claiming moves in lockstep with the increase in the FRA. In contrast, we find that retiring does not move in lockstep with the increase in the FRA among women who do not claim and retire in the same year (Figure 7D). Figure B.8 and Figure 7D together provide further evidence that the effect of the reform on retirement is driven by women who claim and retire in the same year (Figure 7C).

C Effects of the 1997 Reform on Husbands, Mortality, and the Claiming of Occupational Pensions

In this section, we provide evidence on the effect of the 1997 reform on husbands' claiming and retirement behavior, mortality, and women's claiming behavior of occupational pensions.

Table B.6: Estimates when Reweighting Each Cohort to the 1938 Cohort Using the Propensity Score

	FRA63		FRA64		MAF	
	local	global	local	global	local	global
A. Claiming age (years)						
Main estimate	0.71***	0.68***	0.68***	0.64***	0.33***	0.37***
	(0.06)	(0.04)	(0.07)	(0.04)	(0.07)	(0.04)
Reweighted estimate	0.71***	0.68***	0.68***	0.65***	0.33***	0.37***
	(0.06)	(0.04)	(0.07)	(0.05)	(0.07)	(0.04)
B. SSW (CHF)						
Main estimate	-21276***	-18322***	-25162***	-23735***	-3389	-5608**
	(4809)	(3052)	(4245)	(2673)	(3684)	(2304)
Reweighted estimate	-21095***	-18256***	-25220***	-23940***	-2982	-5192**
	(4831)	(3062)	(4490)	(2821)	(3894)	(2437)
C. Retirement age (years)						
Main estimate	0.63***	0.53***	0.53***	0.54***	0.01	0.03
	(0.10)	(0.06)	(0.10)	(0.06)	(0.09)	(0.06)
Reweighted estimate	0.64***	0.55***	0.55***	0.53***	0.01	0.04
	(0.10)	(0.06)	(0.10)	(0.06)	(0.09)	(0.06)

Notes: The table presents RD-estimates on the impact of the different reform steps on the claiming age (panel A), pension benefits (panel B), and the retirement age (panel C). Main estimates correspond the estimates shown in Table 3. For the reweighting, we estimate a probit model of the probability of being born in 1938 as a function of pre-determined characteristics (number of months employed between 50-55, number of months unemployed between 50-55, number of months receiving disability benefits between 50-55, earnings at age 55, marital status, indicator for foreign-born, and a vector of canton fixed effects). We estimate the probit model separately for each birth cohort 1939, 1941, 1942, 1947, and 1948, including always the 1938 birth cohort as well. We use the coefficient estimates to predict the propensity score p and re-weight observations using as weights $w = 1/p$ if born in 1938 and $w = 1/(1-p)$ if not born in 1938. The local (global) specification uses a bandwidth of 12 (30) weeks and includes a linear trend of the running variable on either side of the cutoff. ***Significant at the 1% level. **Significant at the 5% level. *Significant at the 10% level.

Husband's Retirement and Claiming Response. It is plausible that the reform encourages husbands to work longer if they want to retire together with their wives. Since our data contain spousal identifiers, we can estimate the reform's effect on husbands' retirement and claiming decision. We find no evidence that husbands change their decision when to retire or when to claim their OASI pension.

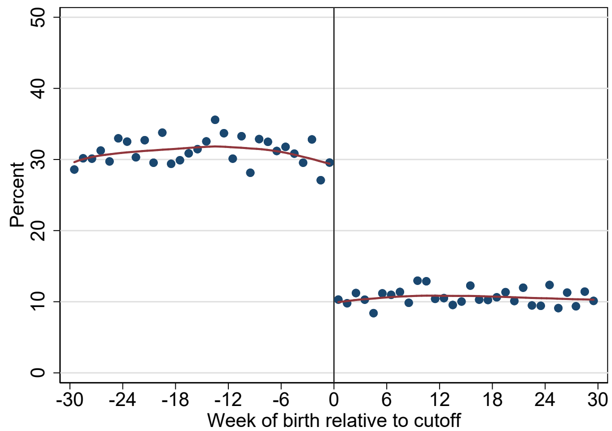
Figure C.9 shows husbands' retirement and claiming age as a function of their wives' birthdate around the reform cutoffs. None of the graphs shows a visible jump in the husband's retirement age (Figures C.9a-c) or the claiming age (Figures C.9d-f) around the wife's cohort cutoff. The corresponding RD estimates are also insignificant, as Table C.7 shows.

Husbands in our data are on average three years older than their wives and may simply not respond, because they reach age 65 (where most men retire and claim) before wives reach their FRA. We can test this hypothesis by limiting our sample to wives whose husbands is less than a year older, so that the wife reaches her FRA before the husband reaches his. Even for this limited sample we find no significant change in husbands' retirement or claiming behavior.

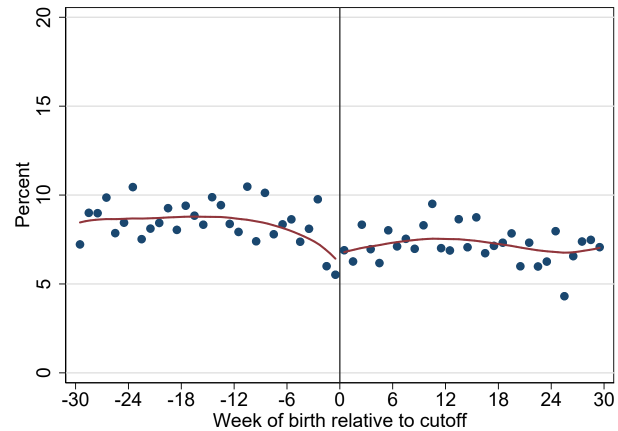
Figure B.7: Sensitivity of FRA64 Estimates

A. Supplementary Pension Before 62

(a) Full Sample

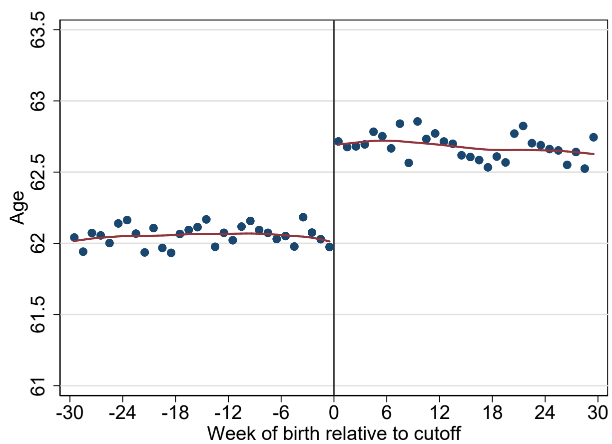


(b) Single or Age Balanced

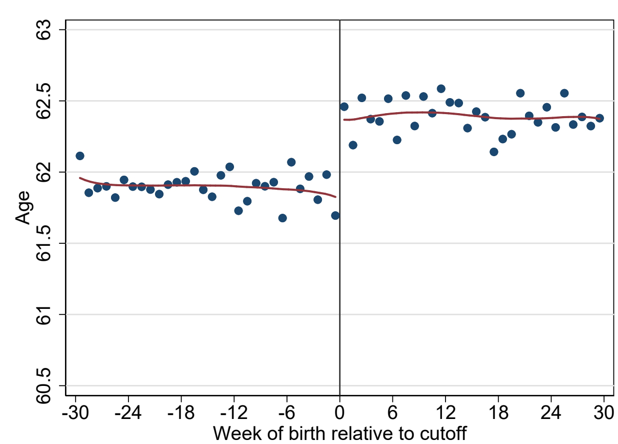


B. Retirement and Claiming Age for Single or Age Balanced Sample

(c) Claiming Age



(d) Retirement Age



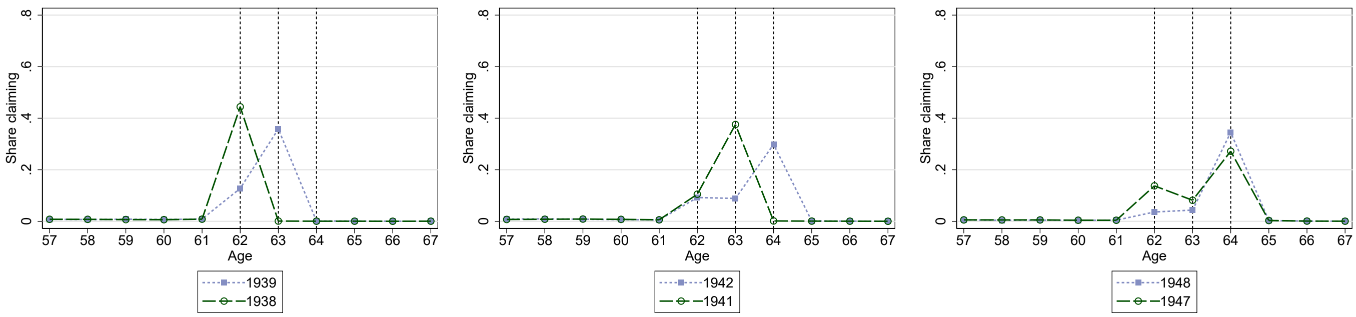
Notes: Women born in 1942 were not eligible anymore for spousal supplementary pensions whereas those born in 1941 were still eligible (figure (a) in Panel A). To see whether the effects are sensitive to the abolishment of supplementary pensions, we focus on women who are single or whose husband is at most three years older (age balanced). These women are not affected by the policy change (figure (b) in panel A). Note that women are still eligible for a spousal supplementary pension if their husband is receiving a disability pension. Claiming and retirement for single women or women living in age-balanced couples respond similar to FRA64 as the entire sample (figures in panel B).

Mortality. A large literature studies whether retiring early shortens your life or prolongs it. The 1997 reform offers a clean setting to tackle this question. Since our data end in 2016, we can track cohorts for six years (for MAF) to fifteen years (for FRA63) after they reached age 62. We define two outcomes related to mortality. The first is an indicator for whether a woman dies before the last age, we observe her in the data: age 77 for FRA63, age 74 for FRA64, and age 68 for MAF. The second is the age at death (in year-months). We set the age at death to the last age if a woman is still alive at that age.

In Figure C.10 we observe no clear discontinuity at the cohort boundaries for neither of the mortality outcomes. The RD estimates confirm the absence of any mortality effect (Table C.10). Out of twelve

Figure B.8: Claiming a Pension and not Retiring from Work in same Year

(a) FRA63 (b) FRA64 (c) MAF

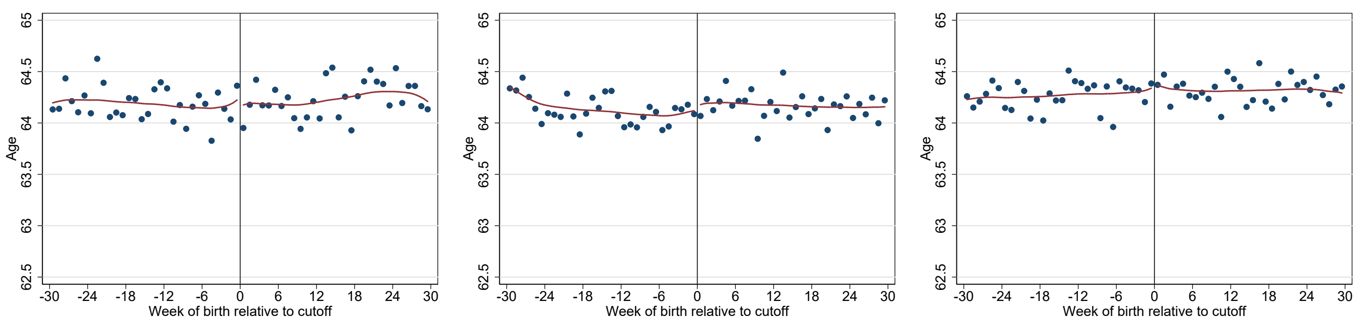


Notes: The figures show the share of women claiming and not retiring in the same year between age 57 and 67 by cohorts who were born just before or just after the reform steps FRA63, FRA64, and MAF were enacted.

Figure C.9: Husbands' Retirement and Claiming Age

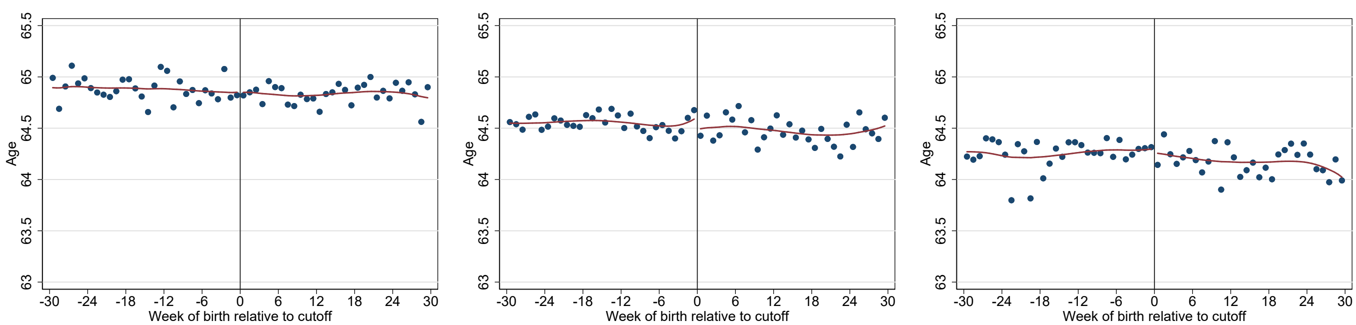
A. Husbands' Retirement Age

(a) FRA63 (b) FRA64 (c) MAF



B. Husbands' Claiming Age

(d) FRA63 (e) FRA64 (f) MAF



Notes: The figures show husbands' retirement age (panel A) and husbands' claiming age (panel B) around wives' cutoff separating the 1939 and 1938 birth cohorts (FRA63), the 1941 and 1942 birth cohorts (FRA64), and the 1947 and 1948 birth cohorts (MAF). The solid red line plots the best local linear fit to the actual data above and below the reform cutoff.

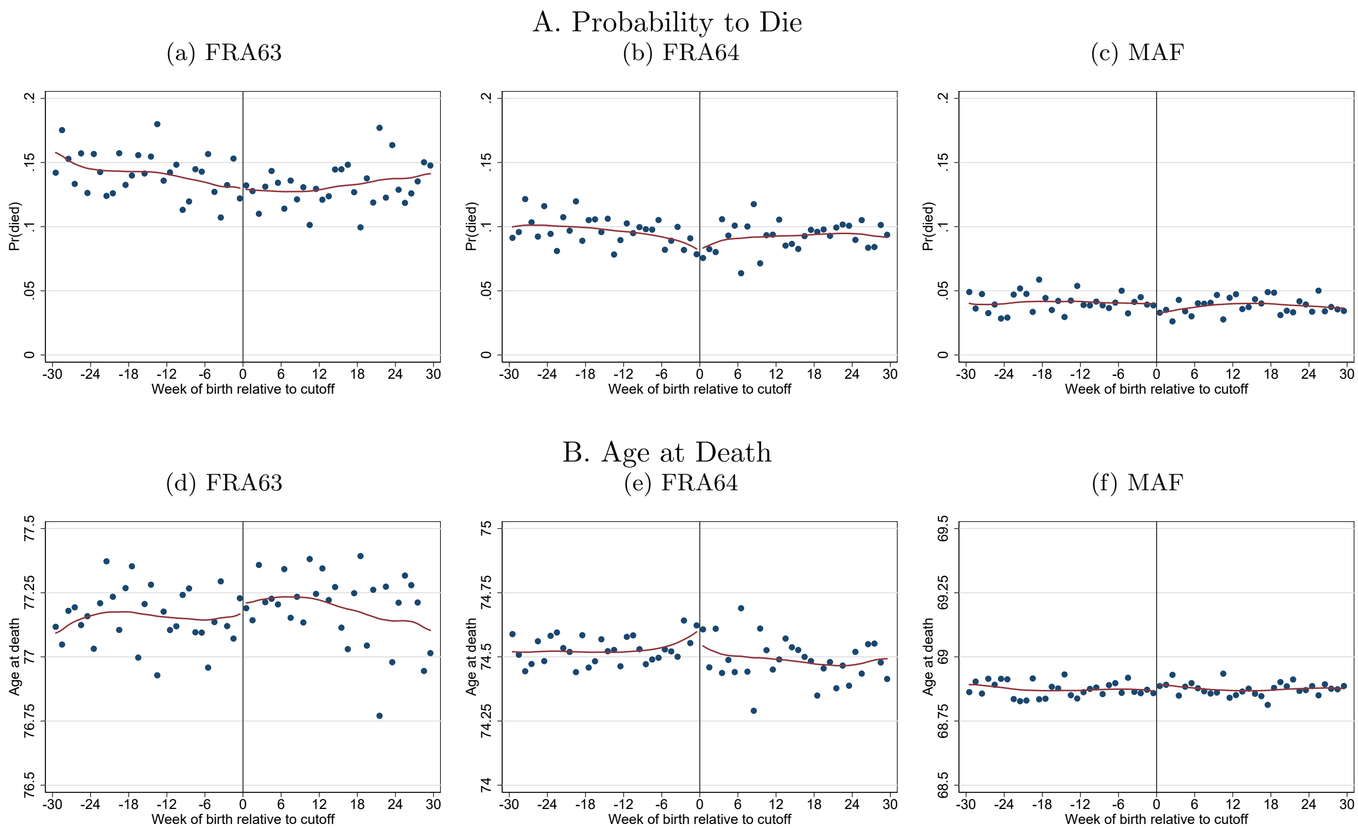
estimates, only one is statistically significant at the 10%-level: the age at death for FRA63 increases by 0.1 years, but the effect disappears if we narrow the bandwidth around the cutoff. The absence of a significant effect on mortality is consistent with recent evidence by Kuhn *et al.* (2020) and Fitzpatrick and Moore

Table C.7: Husband's Response

	FRA63		FRA64		MAF	
	local	global	local	global	local	global
Claiming age (years)	<0.01	-0.03	-0.11	<0.01	-0.04	-0.09
	(0.09)	(0.06)	(0.09)	(0.06)	(0.10)	(0.07)
Retirement age (years)	-0.07	-0.01	0.05	0.13	0.03	0.01
	(0.14)	(0.09)	(0.13)	(0.08)	(0.12)	(0.07)
No. observations	7,869	19,710	8,665	22,850	10,395	26,156

Notes: The table presents RD-estimates on the impact of the different reform steps on husbands' claiming and retirement age. The local (global) specification uses a bandwidth of 12 (30) weeks and includes a linear trend of the running variable on either side of the cutoff. Observations are weighted using a triangular kernel. ***Significant at the 1% level. **Significant at the 5% level. *Significant at the 10% level.

Figure C.10: Probability to Die and Age at Death



Notes: The figures show the probability to die before the last age we observe a woman in the data (panel A) and the age at death (panel B) around the cutoff separating the 1939 and 1938 birth cohorts (FRA63), the 1941 and 1942 birth cohorts (FRA64), and the 1947 and 1948 birth cohorts (MAF). The solid red line plots the best local linear fit to the actual data above and below the reform cutoff.

(2018). They also focus on mortality as an outcome and find that retirement increase mortality among men but has no effect on women.

Table C.8: Effects on Probability to Die and Age at Death

	FRA63		FRA64		MAF	
	local	global	local	global	local	global
Died by last age	-0.001	-0.005	0.001	0.001	-0.008	-0.005
	(0.012)	(0.008)	(0.010)	(0.006)	(0.006)	(0.004)
Age at death	0.038	0.105*	-0.058	-0.036	0.029	0.011
	(0.099)	(0.063)	(0.061)	(0.040)	(0.023)	(0.014)
No. observations	13,731	34,653	15,443	40,544	19,084	48,374

Notes: The table presents RD-estimates on the impact of the different reform steps on whether a woman died before the last age, we observe her in the data (age 77 for FRA63, age 74 for FRA64, and age 68 for MAF) and the age at death (censored above at age 77 for FRA63, age 74 for FRA64, and age 68 for FRA). The local (global) specification uses a bandwidth of 12 (30) weeks and includes a linear trend of the running variable on either side of the cutoff. Observations are weighted using a triangular kernel. ***Significant at the 1% level. **Significant at the 5% level. *Significant at the 10% level.

Occupational Pensions. In addition to an OASI pension, women who have earned around 20,000 CHF or more per year also qualify for an occupational pension. In this section, we study whether the 1997 reform changed when women claim their occupational pension and how much pension benefits, they get. The 1997 reform affected only OASI pensions and had no direct effect on occupational pensions. The reform could have an indirect effect on occupational pensions if women tend to claim OASI and occupational pensions jointly, or if the delayed retirement caused by the reform increases occupational pension amounts.

Because in the social security data, we cannot observe occupational pension benefits or contributions, we use tax records from the Canton of Berne, covering about one eight of the Swiss population. We have access to tax records for the period 2001 to 2015, prohibiting us to study the effects of FRA63 and instead we focus on FRA64 and MAF. We use the same regression discontinuity design as for the main analysis. Our two outcomes of interests are the claiming age of an occupational pension and the level of an occupational pension.

Figure C.11 shows how the claiming age and the benefit level evolve around the cohort cutoffs for FRA64 and MAF. The distribution is noisier, because of the smaller sample size, but we do not see a clear discontinuity in either outcome at the cohort cutoff. Table C.9 shows that the corresponding RD estimates are statistically insignificant, although the standard errors are also large because of the small sample size.

D Survey Evidence on Claiming and Retirement

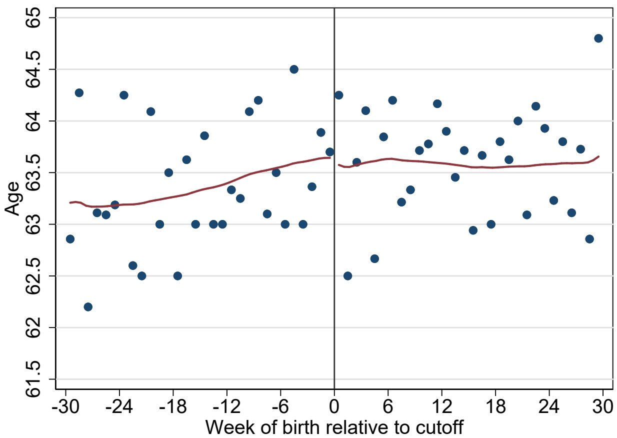
To better understand women's rational for retirement and claiming, we complement the evidence from the administrative data with survey evidence from the Survey of Health Aging and Retirement in Europe (SHARE) and an original survey. SHARE is a bi-annual, cross-national panel of about 140,000 individuals aged 50 or older in 27 countries, including Switzerland. SHARE has seven survey waves and the first wave was collected in 2003/2004. While SHARE does not ask about the reasons underlying the claiming decision, it contains detailed information on the reasons underlying the retirement decision, which we show in Figure 6 of the paper.

To learn how women gather information about the OASI pension and how they decide when to claim,

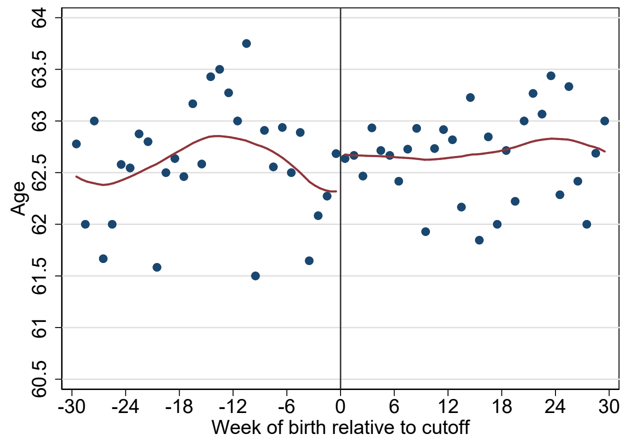
Figure C.11: Effects on Occupational Pension

A. Claiming Age of Occupational Pension

(a) FRA64

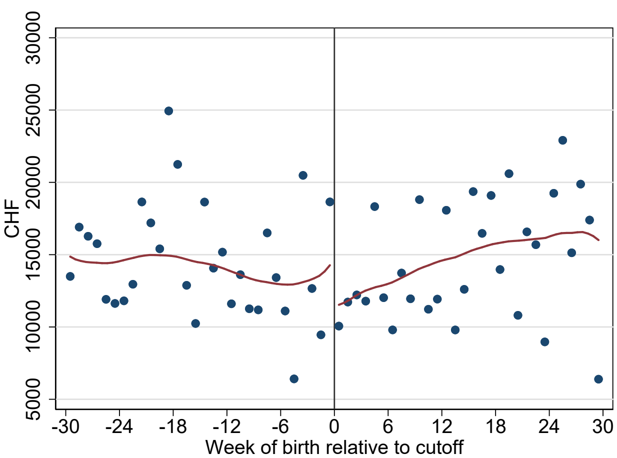


(b) MAF

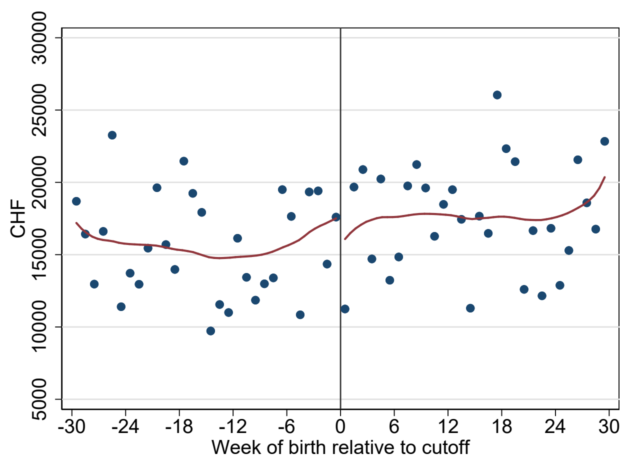


B. Level of Occupational Pension

(c) FRA64



(d) MAF



Notes: The figure shows the claiming age of occupational pensions (panel A) and the annual level of occupational pensions in Swiss Francs (panel B) around the cutoff separating the 1939 and 1938 birth cohorts (FRA63), the 1941 and 1942 birth cohorts (FRA64), and the 1947 and 1948 birth cohorts (MAF). The solid red line plots the best local linear fit to the actual data above and below the reform cutoff.

we fielded an original survey within the LINK Internet Panel, a representative internet panel of the Swiss population with 115,000 respondents. Our survey was sent to 5,000 women aged 60 to 65 and respondents were paid 4 Swiss Francs to complete the survey. Of the 5,000 contacted women, 2,916 women opened the survey and 1,223 women completed it, resulting in a response rate of 25%. Table D.10 reports estimates when regressing an indicator for completing the survey on a set of characteristics we can measure for all women who opened the survey. The results show that women from the French-speaking region and women with missing or low wealth were less likely to complete the survey. On the other hand, women who are renting a house, women with higher education, and women who are slightly older were more likely to complete the survey.

Table C.9: Effects on Occupational Pension Claiming Age and Benefit Level

	FRA64		MAF	
	local	global	local	global
Claiming age (years)	-0.07	-0.05	0.37	0.09
	(0.60)	(0.35)	(0.49)	(0.30)
Annual amount (CHF)	-3,108	-1,087	-1,848	1,072
	(2,996)	(1,876)	(3,001)	(2,046)
No. observations	221	553	310	771
Bandwidth (weeks)	12	30	12	30

The table presents RD-estimates on the impact of the different reform steps on the claiming age of occupational pensions and the annual amount of occupational pensions in Swiss Francs. The local (global) specification uses a bandwidth of 12 (30) weeks and includes a linear trend of the running variable on either side of the cutoff. Observations are weighted using a triangular kernel. ***Significant at the 1% level. **Significant at the 5% level. *Significant at the 10% level.

Of the 1,223 women who completed the survey, 389 women were receiving an OASI pension and 834 were expecting to receive an OASI pension in the future. We asked both groups when they claimed their OASI pension, or when they were expecting to claim their pension if they were not receiving one at the time of completing the survey. Figure D.12 shows that the claiming age distribution for women who have and have not claimed already is nearly identical. About 85% of women indicate that they have claimed or are planning to claim at age 64. Age 64 is the FRA for women in our sample, because they are all born after 1947 and thus face the same incentives as the women in the MAF cohort of our study. Women who have not claimed yet are more likely to claim at age 65 than those who have already claimed, but the difference is small (about 5%).

We also asked women how important the OASI pension is or will be (for women who have not claimed yet), for the total retirement income, ranging from “not important” to “very important”. Figure D.13 shows the percent distribution across the different importance categories, splitting the sample into women who claimed/plan to claim early, at the FRA, and after the FRA. Independent of when women claim, we find that the OASI pension is very important for 55 to 60% of women, important for 30% of women, and fairly important for 10% of women. Only few women, less than 2%, respond that the OASI pension is not important. Overall these results underscore the importance of the OASI pension for retirement income.

Figure D.14 shows the percent of women who say that they can or could afford to retire early. This question is intended to capture whether liquidity constraints play a significant role in the timing of when to claim OASI. Figure D.14(a) distinguishes between women who claim/plan to claim before the FRA, at the FRA, and after the FRA, while Figure D.14(b) distinguishes between women with financial wealth below and above the median. As Figure D.14(a) shows, women who claim after the FRA are less likely to afford early claiming compared to women who claim at or before the FRA. Figure D.14(b) shows that financial wealth is highly correlated with whether a woman can afford early claiming. Only 30% of low-wealth women can afford early claiming, while almost 70% of high-wealth women can.

To better understand women’s level of information about OASI pensions, we asked how they gathered information to decide when to claim their OASI pension. They had to choose at least one and up to three

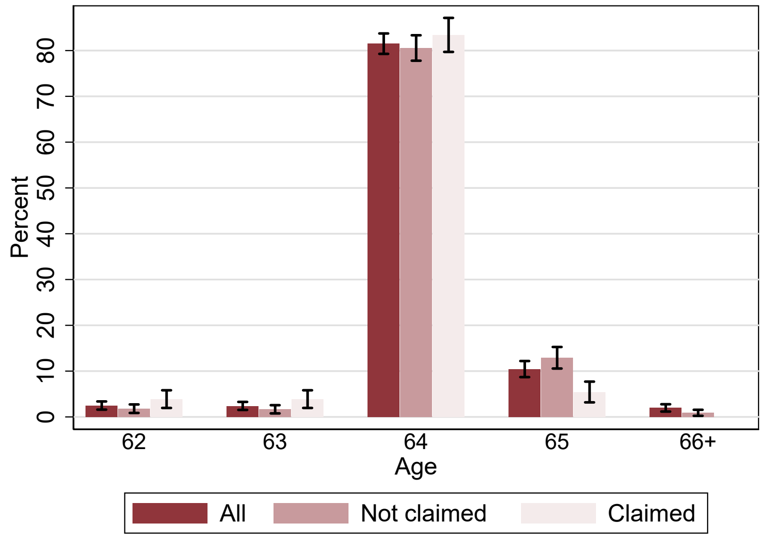
Table D.10: Analysis of Probability to Complete the Survey

French-speaking region	-.060***
	(.019)
Wealth missing	-.070***
	(.023)
Wealth below median	-.059***
	(.022)
Housing: rent	.117***
	(.018)
Middle education	.100***
	(.032)
High education	.089***
	(.034)
Age 61	.028
	(.029)
Age 62	.078**
	(.030)
Age 63	.105***
	(.031)
Age 64	.106***
	(.031)
Age 65	.086***
	(.031)
Constant	.280***
	(.042)
No. observations	2,916
R^2	.037

Notes: The table shows which characteristics correlate with the probability to complete the survey. The dependent variable is an indicator, which is 1 if a woman completed the survey and 0 otherwise. The estimates for the indicators "middle education" and "high education" are relative to the reference category "low education." The reference category for the age dummies is "Age 60." ***Significant at the 1% level. **Significant at the 5% level. *Significant at the 10% level.

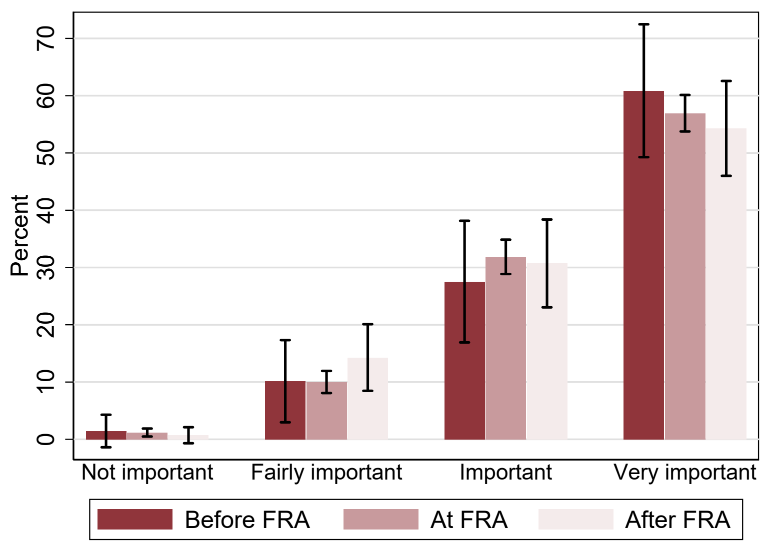
of the following options: sought advice from a financial advisor, sought advice from an employee at the OASI office, sought advice from friends or family, searched online or attended a workshop (for example at the workplace), thought about it myself, or did not think about it. Figure D.15 that a relatively small fraction (< 20%) of women responded that they "did not think" about the claiming decision beforehand. The vast majority of women do gather information; about 25-30% of women selected each of these options, independent of the claiming age. Early claimers, late claimers and women who claimed at the FRA were all (roughly) equally likely to get their information from a financial advisor, from family and friends and online or at a workshop. A very small fraction (< 10%) thought through it themselves. The one information source that systematically differed between women who claim at the FRA and women who do not is the OASI office: Women who claim before the FRA, compared to women who claim at the FRA, are significantly more likely to seek advice from the OASI office.

Figure D.12: Claiming Age Distribution



Notes: The figure shows the distribution of claiming ages, distinguishing between women who have claimed an OASI pension already ("claimed") and women who still have to claim ("not claimed"). The length of the vertical lines at the end of the bar denotes the 95% confidence interval.

Figure D.13: Importance of OASI Pension for Total Retirement Income

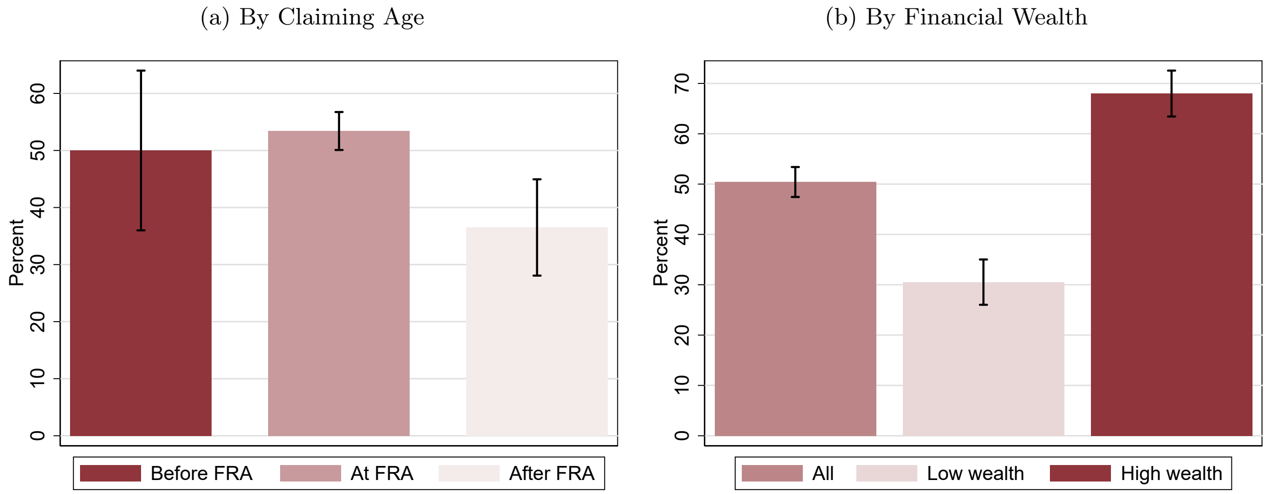


Notes: The figure shows how important the OASI pension is for the total retirement income for women who claimed/plan to claim early, claimed/plan to claim at the FRA, and delayed/plan to delay claiming.

E The Introduction of Early Claiming for Men

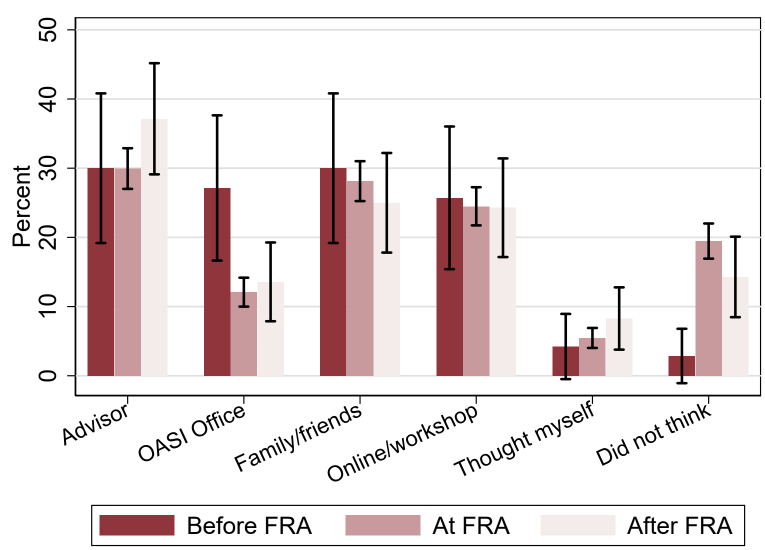
Another element of the 1997 reform was the introduction of early claiming for men at age 63 and age 64, while keeping the FRA fixed at age 65. Specifically, men born after 1932 could claim OASI benefits already at age 64. We call this reform step ERA64. Men born after 1937 could claim as early as age 63. We call this reform step ERA63. The price for early claiming was set to 6.8% of full benefits per year of

Figure D.14: Afford Early Retirement



Notes: The figure shows the percent of women who say that they can or could afford to retire early. Figure (a) distinguishes between women who claim/plan to claim before the FRA, at the FRA, and after the FRA. Figure (b) distinguishes between women with financial wealth below and above the median. The length of the vertical lines at the end of the bar denotes the 95% confidence interval.

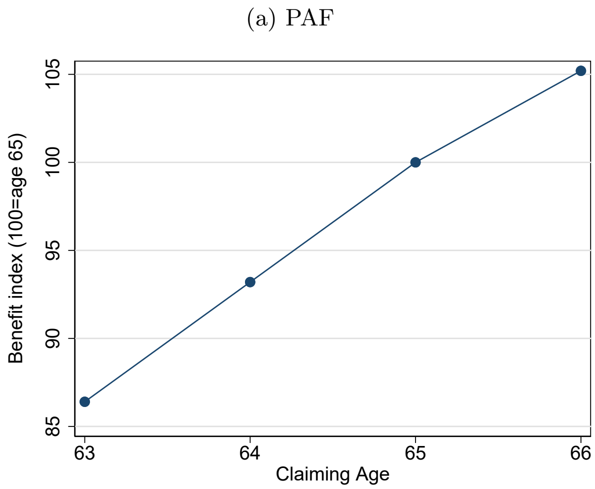
Figure D.15: Evidence on Gathering Information

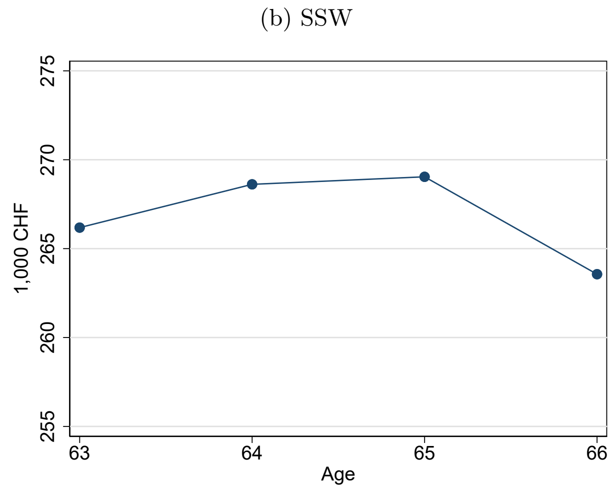


Notes: The figure shows how women gathered information to make their claiming decision, distinguishing between women who have and have not claimed already. The height of the bar is the percent of women who choose an option. The options are "sought advice from a financial advisor (advisor)", "sought advice from an employee at the OASI office (OASI office)", "sought advice from friends or family (family/friends)", "searched online or attended a workshop (online/workshop)", "thought about it myself (thought myself), or "did not think about it (did not think)." The length of the vertical lines at the end of the bar denotes the 95% confidence interval.

early claiming; the same price women born after 1947 have to pay. While our study focuses on women, because we can estimate how many are passive given the variation in both the FRA and the early claiming price, estimating how the introduction of early claiming affects men's claiming and retirement behavior is interesting on its own.

Figure E.16: Pension Adjustment Factors and Social Security Wealth at Different Claiming Ages, Men





Notes: Graph (a) shows how the Swiss social security system adjusts men's old age pensions as a function of the claiming age. Base pension amount, 100, is the pension for a man claiming a pension at the FRA of 65. Graph (b) shows the discounted social security wealth as a function of the claiming age. We assume a discount factor β of 0.98 and average death hazard.

Figure E.16 shows the pension adjustment factors (PAF) and the social security wealth (SSW) for men when claiming at different ages. The male SSW is significantly lower than the female SSW for two reasons: Men tend to die earlier and they only qualify for a full OASI pension at age 65, while women do so at age 64 or earlier, depending on their date of birth. The blue circles give the PAF and SSW for men born in different years. The reform does not shift the PAF or SSW profile but extends the claiming choice set to include age 64 and age 63.

The SSW profile shows that the introduction of early claiming is actuarially unfair: men who claim early will lose SSW. The optimal claiming age that maximizes pension wealth is the FRA, before and after the reform. Men who are eligible for early claiming should therefore not change the claiming date, and consequently they also should not change the retirement date. Moreover, claiming early is an active decision: Men who want to claim early have to inform the local OASI agency at least one day before they reach the respective early claiming age.

We estimate the effect of the introduction of early claiming using an analogous regression discontinuity design as for women. For each reform step, we contrast the first birth cohort of men who is eligible for early claiming to the last birth cohort who is not and estimate the change in an outcome variable at the cohort boundary. We include a linear trend on either side of the cutoff and present estimates for two different bandwidths, a "local" one (20 weeks) and a "global" one (50 weeks). These bandwidths are about one and a half times larger than the bandwidths for women. The reason is that, while we observe full population of women in Switzerland, for men we only observe a 25% random sample, resulting in a smaller sample size and less precise estimates.

Figure E.17 illustrates the claiming age and the retirement age around the cohort cutoffs. We observe no change in the claiming age at the cohort cutoff for ERA63 (Figure E.17a) or ERA64 (Figure E.17b).

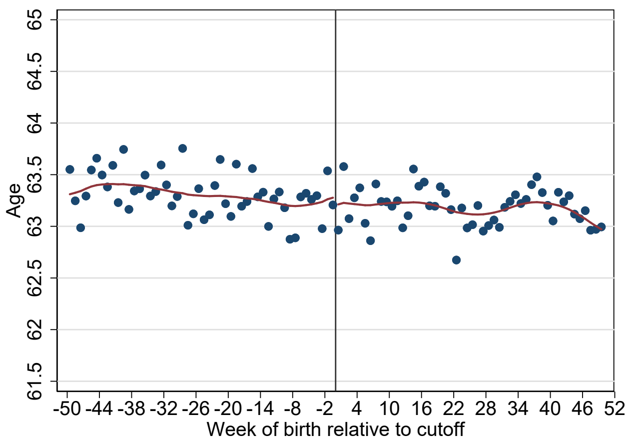
The corresponding RD estimates, shown in the first row of Table 3, point in the same direction: They are small and statistically insignificant for both reform steps. As Figures E.17(c) and E.17(d) show, the retirement age also displays no visible jump at the cohort boundaries and the corresponding RD estimates are statistically insignificant (second row of Table 3).

The introduction of early claiming for men could potentially influence our estimates for women, for example if couples prefer to retire together. This concern is unfounded given that men do not change their claiming or retirement behavior. Moreover, as we have shown in Table B.4, the percent of women whose husband is eligible for early claiming does not change significantly at the female cohort cutoffs.

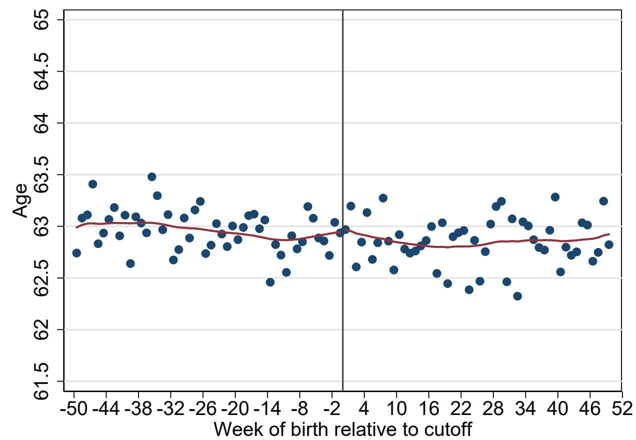
Figure E.17: Claiming and Retirement Age, Men

A. Claiming Age

(a) ERA64

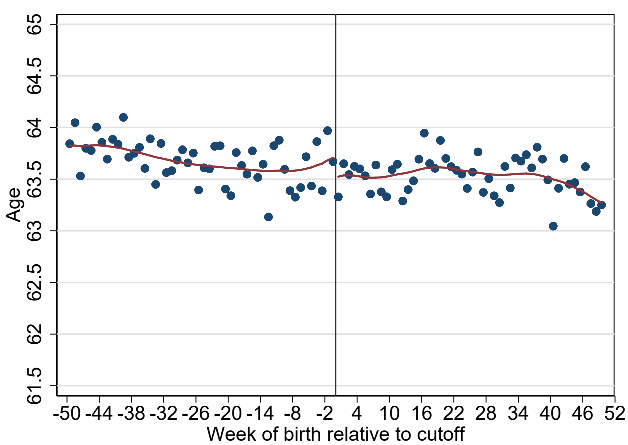


(b) ERA63

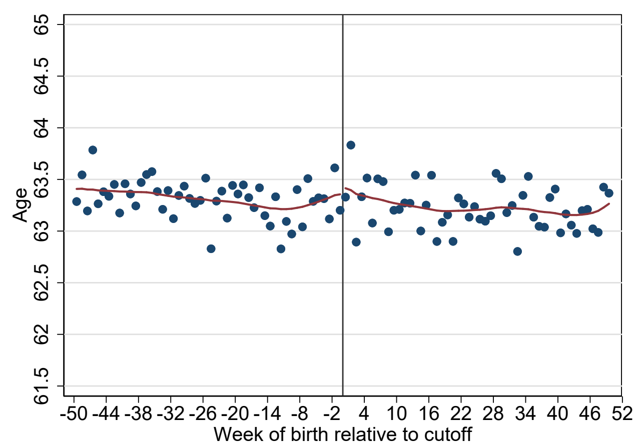


B. Retirement Age

(c) ERA64



(d) ERA63



Notes: The figures show the claiming age (panel A) and the retirement age (panel B) around the cutoff separating the 1932 and 1933 birth cohorts (ERA64) and the 1937 and 1938 birth cohorts (ERA63). The solid red line plots the best local linear fit to the actual data above and below the reform cutoff.

Table E.11: Effects on Pension Claiming and Retirement Age, Men

	ERA64		ERA63	
	local (1)	global (2)	local (3)	global (4)
Claiming age (years)	-0.03	0.04	0.03	0.03
	(0.14)	(0.09)	(0.14)	(0.09)
Retirement age (years)	-0.16	-0.03	0.06	0.10
	(0.12)	(0.08)	(0.13)	(0.08)
No. observations	10,792	27,192	12,753	31,780
Bandwidth (weeks)	20	50	20	50

Notes: The table presents RD-estimates on the impact of the different reform steps on the claiming age and the retirement age. The local (global) specification uses a bandwidth of 20 (50) weeks and includes a linear trend of the running variable on either side of the cutoff. Observations are weighted using a triangular kernel. ***Significant at the 1% level. **Significant at the 5% level. *Significant at the 10% level.