

Working Horizon and Labour Supply: the Effect of Raising Full Retirement Age on Middle-aged Individuals

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Motivation: aging and pension reforms

- ▶ Ageing is one of the major challenges that developed economies are facing
- ▶ Many countries reacted by implementing reforms to delay the legal retirement age

→ Crucial to estimate the magnitude of the labour supply response

The *Direct effect*: on older workers

The most direct labour supply response comes from older workers, who would have been eligible to retire before the reform and are not eligible anymore afterwards

- ▶ Main focus of the previous literature
- ▶ Overall positive effects but in some cases small (Mastrobuoni, 2009; Staubli and Zweimuller, 2013; Manoli and Weber, 2016), depending on:
 - ▶ the presence of other income-support program
 - ▶ the availability of private pension schemes

The *Forward looking effect*: on middle-aged individuals

Labour supply may change also for younger individuals, who **would not have been eligible to retire even before the reform** (life-cycle models of labour supply)

→ retiring in 7 rather than 2 years

Why?

1. *Wealth effect*: Pension wealth $\downarrow \rightarrow$ LS \uparrow
2. *Inter-temporal substitution effect*: Need to work longer but expecting worse conditions when old \rightarrow LS \uparrow

What do we do

- ▶ Few existing empirical papers on anticipatory LS effects, because difficult to find compelling quasi-experimental variation
- ▶ We look at a big pension reform implemented in Italy
 - ▶ sizeable \uparrow in FRA up to 7 years
 - ▶ unexpected and well-understood
 - ▶ FRA \uparrow heterogeneously depending on observable dimensions

Research question

Exploiting the heterogeneity in the increase in FRA we estimate (DD framework):

- ▶ **Forward looking effect**: LS responses of younger individuals
- ▶ **Spillover effects on the their partner's LS**
- ▶ Well-known **direct effect** on close-to-eligibility individuals and their partners (*not shown in this presentation*)

Related literature and contribution

On the forward looking effect on middle-aged individuals:

- ▶ Of \uparrow RA on labour supply: Hairault et al. (2010): positive but not significant effects; Geyer and Welteke (2019): no effects.
- ▶ Change in way benefits are computed (to DB to NDC): Bovini (2019); French et al. (2021)
- ▶ On other outcomes:
 - ▶ on health (Bertoni et al. (2017)) and training (Brunello and Comi (2015))
 - ▶ on savings and private wealth (Attanasio Brugiavini, 2003; Bottazzi et al., 2006; Etgeton et al. 2020)
 - ▶ on sick leaves (Coda Moscarola et al. (2016); Bruello et al. (2021))

The Treatment and the Data

The institutional framework, before the reform

- ▶ Three options in Italy to claim full retirement benefits:
 1. **Minimum age requirement** (Old age pension scheme)
 - ▶ 60 for women, 65 for men [at least 15 years of contribution]
 2. **Seniority requirement**: given number of years of paid contribution to the Social Security system (Seniority pension scheme)
 - ▶ 40 years of contribution
 3. **Quota system** (seniority pension scheme)
 - ▶ for instance 59 years old and 35 years of contribution
- ▶ Early retirement in general not possible or very penalized

The 2011 pension reform

- ▶ Stricter eligibility requirements for all schemes
 1. Old age:
 - ▶ RA ↑ 67 y.o. for women and men
 2. Seniority:
 - ▶ at least 42 (women), 43 (men) years of contribution
 3. Quota abolished

Full Retirement Age and its change

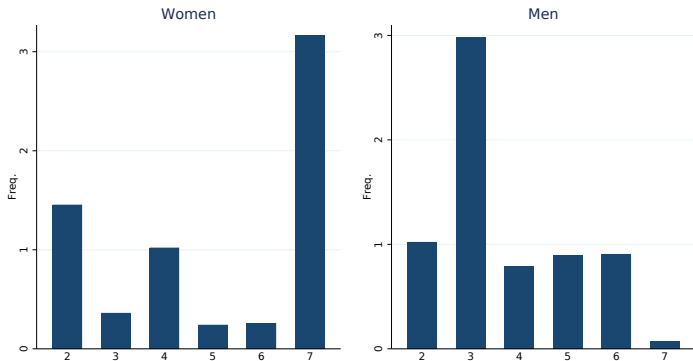
- ▶ FRA is determined on the basis of: age, accrued years of contribution, gender
- ▶ We define cells (q) based on the full interaction of these characteristics to figure out the change in the FRA
 - ▶ Assumption: continuity of working life (robust for individuals 45+)
- ▶ Time invariant measure of policy shock defined at cell q level:

$$T_q = FRA_q^{post} - FRA_q^{pre}$$

Data

- ▶ The Italian Survey of Household Income and Wealth (SHIW) from 2004 to 2016
 - ▶ biannual survey on 8,000 households per wave
 - ▶ information on accrued years of contribution
 - ▶ information on partners (family level analysis)
 - ▶ information on expected retirement age
- ▶ More results with administrative data from Social Security accounts (in progress)

Distribution of the shock T_q , by gender



Source: SHIW, 2012-2016.

Note: women (men) aged between 45 and 59 (45-64), with at least 10 (20) accrued years of contribution, eligible to retire neither before nor after the reform. Data are at the individual level.

- ▶ Different change in rules for old age scheme
- ▶ Women have less years of paid contribution than men

The Forward Looking Effect: individual level analysis

Main regression equation, individual level analysis

Separately for men and women by age groups in 2004-2016:

$$Y_{iqt} = \beta_1 T_q * post2011_t + \beta_2 X_{iqt} + \alpha_t + \alpha_q + \epsilon_{iqt}$$

- ▶ Y_{iqt} dummy = 1 if the individual i in cell q is active at t
- ▶ T_q time invariant measure of policy shock: the cross-sectional variation in FRA occurs at level q (age, # years of contribution)
- ▶ α_q cell q -fixed effects; α_t year-fixed effects
- ▶ X_{iqt} are controls (marital status, region, sector)
- ▶ ϵ_{iqt} error term
- ▶ standard errors clustered at the q level

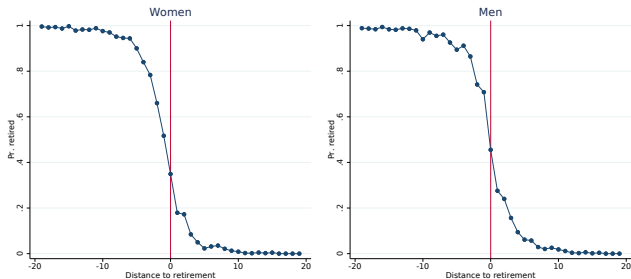
for individuals **not eligible to retire even before the reform but reasonably close to retirement**

▶ Descriptive statistics

Two identifying assumptions

1. FRA defines the length of the working horizon

Figure: Prob. of claiming retirement benefits and distance to FRA
($DFRA = FRA_t - age_t$)



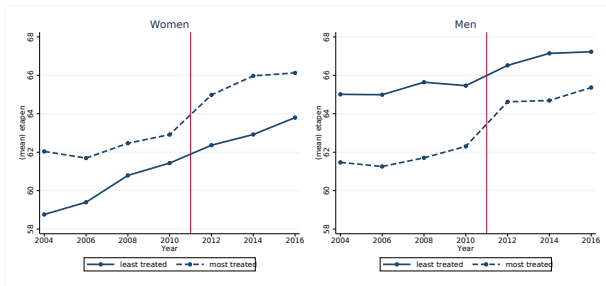
Source: SHIW, 2008-2016.

Two identifying assumptions

2. Expected retirement age changes according to the rules in place

Expected RA increases more for treated than for control individuals

Figure: Expected RA by exposure to the shock

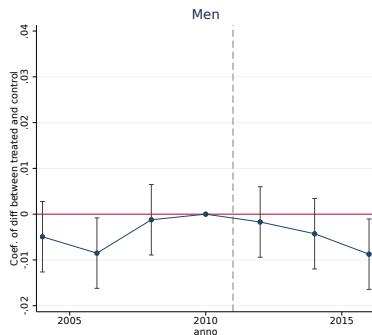
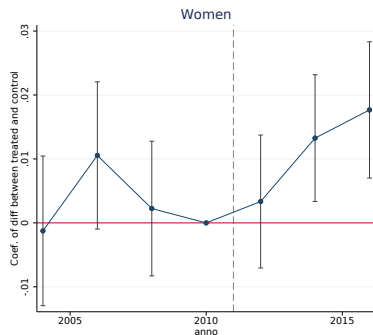


Source: SHIW, 2008-2016. Note: most treated are those whose shock to FRA is larger than 4 years.

Results

Evolution of the difference in the probability of being active between more and less exposed individuals

$$Y_{igt} = \sum_{r=2004}^{2016} \gamma_r (T_q * \delta_r) + \gamma_1 X_{igt} + \delta_q + \delta_t + \eta_{igt}$$



Note: The graphs plots the coefficients γ_r and the corresponding 95% confidence intervals.

Positive effects on female participation at all ages

	Women				Men	
	55-59	50-54	45-49	55-64	50-54	45-49
	(1)	(2)	(3)	(4)	(5)	(6)
	<i>Participation</i>					
T*post2011	0.033***	0.015***	0.011***	-0.002	-0.003	0.005*
	(0.006)	(0.004)	(0.004)	(0.004)	(0.002)	(0.003)
N	2456	3332	3091	3577	3856	3194
	<i>Unemployment</i>					
T*post2011	0.012**	0.009***	0.006**	-0.004	-0.001	0.009
	(0.006)	(0.004)	(0.003)	(0.006)	(0.005)	(0.008)
N	2456	3332	3091	3577	3856	3194
	<i>Employment</i>					
T*post2011	0.022***	0.006	0.004	0.001	-0.002	-0.004
	(0.006)	(0.004)	(0.005)	(0.007)	(0.006)	(0.009)
N	2456	3332	3091	3577	3856	3194
	<i>Full-time employment</i>					
T*post2011	0.024***	0.015**	0.018**	-0.000	0.004	-0.010
	(0.008)	(0.007)	(0.008)	(0.007)	(0.007)	(0.012)
N	2456	3332	3091	3577	3856	3194
	<i>Part-time employment</i>					
T*post2011	-0.003	-0.009	-0.016**	-0.001	0.000	0.004
	(0.007)	(0.006)	(0.007)	(0.003)	(0.004)	(0.006)
N	2456	3332	3091	3577	3856	3194

Notes: Additional controls: year and cell q fixed effects, region and sector fixed effects, time fixed effects, marital status. Only individuals with at least 10 and less than 40 accrued years of contribution. Robust standard errors clustered at the cell q level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

► More full-time less part-time

► income

Heterogeneity

- ▶ Effect also among women whose pension wealth did not change (those under the DC scheme) ▶ wealth effect
- ▶ No heterogeneity depending on labour demand in different regions ▶ high vacancy

Spillover effects on partners

Main regression equation, family level analysis

We estimate the following equation for husbands and wives in 2004-2016:

$$Y_{jq_s q_{s'} t}^s = \beta_1^s T_{q_{s'}}^{s'} * post2011_t + \beta_2^s T_{q_s}^s * post2011_t + \beta_2^s W_{jt} + \alpha_{q_{s'}}^s + \alpha_{q_s}^s + \alpha_t^s + u_{jq_s q_{s'} t}^s$$

- ▶ $Y_{jq_s q_{s'} t}^s$ dummy = 1 if spouse s in household j belonging to cell q_s , whose partner s' belongs to the age-contribution cell $q_{s'}$
- ▶ $T_{q_{s'}}^{s'}$ time invariant measure of the policy shock for partner s'
- ▶ $T_{q_s}^s$ time invariant measure of the policy shock of individual s
- ▶ $\alpha_{q_{s'}}^s$ and $\alpha_{q_s}^s$ fixed effects for cell $q_{s'}$ and q_s ; α_t^s year-fixed effects
- ▶ W_{jt} controls at individual and household level
- ▶ $u_{jq_s q_{s'} t}^s$ is an error term

Partner s' not eligible to retire under pre-reform rules; partner s no restrictions

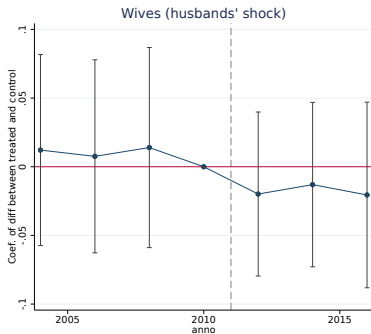
▶ Descriptive statistics

Evolution of the difference in the spouse's probability of being active between more and less exposed individuals

hh with middle aged wives



hh with middle aged husbands



Source: SHIW, from 2004 to 2016.

Note The graphs test the parallel trend assumption by plotting the coefficients ζ_r^S and the corresponding 95% confidence interval obtained from estimating equation $Y_{iq_s, t}^S = \sum_{r=2004}^{2014} \zeta_r^S (T_{q_s, t} * \alpha_r^S) + \beta^S W_{iq_s, t} + \alpha_{q_s, t}^S + \alpha_{iqt}^S + u_{iqt}^S$. Pre reform years: 2004-2006-2008-2010, post-reform years: 2012-2014-2016.

Cross elasticities among partners

	<i>Participation</i>		<i>Unemployment</i>		<i>Employment</i>		<i>Retirement</i>	
	own [1]	partner [2]	own [3]	partner [4]	own [5]	partner [6]	partner [7]	
a) Spillover effects of wife's FL response: couples with middle-aged wives	on wife	on hubs	on wife	on hubs	on wife	on hubs	on hubs	
T wife*post2011	0.022*** (0.003)	0.018** (0.007)	0.013*** (0.003)	0.006 (0.004)	0.010** (0.004)	0.012 (0.008)	-0.017** (0.007)	
N	5326	4060	5326	4060	5326	4060	3865	
b) Spillover effects of husb's FL response: couples with middle-aged husb	on hubs	on wife	on hubs	on wife	on hubs	on wife	on wife	
T husb*post2011	-0.011 (0.010)	-0.002 (0.003)	-0.008 (0.006)	-0.001 (0.005)	-0.003 (0.011)	-0.001 (0.006)	0.000 (.)	
N	3565	3819	3565	3819	3565	3819	3610	

Notes: Additional controls: year and cell $q_{s,t}$ and q_s fixed effects, region and sector fixed effects, age difference across partners (also squared) and difference in distance to retirement across partners, partner s change in distance to retirement. The sample in columns 1 and 2 (3 and 4) consists of couples where the wives (husbands) are not eligible for a public pension either before and after the reform and have accrued more than 9 (19) and less than 40 years of contribution. Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Interpreting the household spillover results

- ▶ Husbands respond to their wives' shock
 - ▶ Sample of older men, more elastic labour supply
 - ▶ The effect comes from men eligible to retire but postpone retirement
- ▶ Wives do not respond since men are not reacting to begin with

Conclusion

- ▶ Effects of delaying FRA on labour supply go beyond those on older individuals, eligible to retire under the previous rules
 1. FL effect is smaller in magnitude than the direct effect but affects a much larger share of individuals ▶ Direct effect
 2. FL effect contributed by one third to the increase in Italian female LFPR after 2012
- ▶ Positive effects on women not on men
- ▶ The FL effect on wives has spillovers on their husbands' LS
- ▶ FL effects are quantitatively large; need to be considered when evaluating the labour supply effects of a pension reform

Thanks for the attention

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Seniority/early pension eligibility

Year	Private & Public		Self-employed	
	A, C, Q	only C	A, C, Q	only C
<i>Before Fornero reform</i>				
2007	57, 35	39	58, 35	40
2008	58, 35	40	59, 35	40
2009-2010	59, 35, 95	40	60, 35, 96	40
2011	60, 35, 96	40	61, 35, 97	40
2011-2012	60, 35, 96	40	61, 35, 97	40
2013 onwards	61, 35, 97	40	62, 35, 98	40
<i>After Fornero reform</i>				
2012- (men)		43		43
2012- (women)		42		42

Notes: A stands for age, C for number of years of contribution, $Q = A + C$ is the so-called "quota", the sum of age and years of contribution must be larger or equal than Q to have retirement eligibility. Independently from actual age, retirement eligibility is also granted when the number of years of contribution is sufficiently high (39 in 2007, 40 in the following years).



Descriptive statistics

	Individual level analysis							
	Women				Men			
	All 45-59 [1]	Sample not elig [2]	Control $T_q < 7$ [3]	Treated $T_q \geq 7$ [4]	All 45-64 [5]	Sample not elig [6]	Control $T_q < 4$ [7]	Treated $T_q \geq 4$ [8]
Age	51.665 (4.280)	51.335 (4.108)	50.802 (3.815)	51.721 (4.267)	53.877 (5.728)	52.107 (4.626)	52.172 (4.925)	52.019 (4.179)
Y. contrib.	15.853 (13.343)	23.950 (7.696)	30.476 (4.257)	19.227 (5.986)	28.120 (11.331)	28.707 (5.195)	29.502 (5.401)	27.617 (4.685)
Married	0.762	0.718	0.729	0.710	0.830	0.840	0.836	0.845
High edu	0.497	0.616	0.663	0.582	0.484	0.538	0.467	0.636
If children	0.660	0.632	0.605	0.651	0.640	0.617	0.626	0.605
Active	0.583	0.881	0.976	0.812	0.795	0.979	0.973	0.989
Unempl	0.043	0.044	0.022	0.060	0.071	0.050	0.052	0.048
Part time	0.102	0.147	0.144	0.150	0.022	0.017	0.017	0.018
Perm. contr	0.401	0.641	0.806	0.521	0.500	0.674	0.655	0.700
Log(wage net)	9.522 (0.568)	9.560 (0.548)	9.669 (0.425)	9.450 (0.629)	9.799 (0.480)	9.848 (0.428)	9.838 (0.413)	9.860 (0.446)
Observations	16157	9037	3853	5184	19313	10732	6178	4554

Notes: Men and women with at least 35 year old and 8 years of accrued contributions. Women (men) are treated if experienced a shock to distance to full retirement of ≥ 7 (≥ 4) years after 2012 reform. Years 2004 and 2010. Continuity w.l.=y. contrib/age. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.



Results: by benefit calculation

	Women			Men		
	55-59	50-54	45-49	55-64	50-54	45-49
	(1)	(2)	(3)	(4)	(5)	(6)
By type of benefit computation (DB or NDC)						
<i>Participation</i>						
T*post2011	0.009 (0.006)	0.009** (0.004)	0.011*** (0.004)	0.004 (0.005)	0.000 (0.003)	0.002 (0.003)
T*post2011*DB	0.072* (0.038)	-	-	-0.004 (0.007)	-0.002 (0.012)	-
N	2456	3332	3091	3577	3856	3194
<i>Unemployment</i>						
T*post2011	0.007 (0.006)	0.007** (0.004)	0.006** (0.003)	0.000 (0.008)	-0.002 (0.008)	0.008 (0.007)
T*post2011*DB	0.007 (0.022)	-	-	-0.007 (0.012)	-0.026 (0.025)	-
N	2456	3332	3091	3577	3856	3194
<i>Employment</i>						
T*post2011	0.002 (0.007)	0.001 (0.005)	0.004 (0.005)	0.004 (0.009)	0.003 (0.008)	-0.007 (0.009)
T*post2011*DB	0.064** (0.030)	-	-	0.003 (0.013)	0.023 (0.026)	-
N	2456	3332	3091	3577	3856	3194

Notes: Additional controls: year and cell q fixed effects, region and sector fixed effects, time fixed effects, marital status. Only individuals with at least 10 and less than 40 accrued years of contribution. High edu is a dummy equal to 1 if individuals obtained at least the secondary school degree. Robust standard errors clustered at the cell q level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Results: by education level

	Women			Men		
	55-59 (1)	50-54 (2)	45-49 (3)	55-64 (4)	50-54 (5)	45-49 (6)
	<i>Participation</i>					
T*post2011	0.053*** (0.009)	0.027*** (0.007)	0.017** (0.008)	-0.005 (0.007)	-0.005 (0.003)	0.005 (0.007)
T*post2011*high edu	-0.041*** (0.010)	-0.023*** (0.009)	-0.009 (0.009)	0.009 (0.009)	0.005 (0.005)	-0.001 (0.008)
	<i>Unemployment</i>					
T*post2011	0.020** (0.010)	0.021*** (0.007)	0.010 (0.006)	-0.006 (0.011)	-0.001 (0.010)	0.008 (0.018)
T*post2011*high edu	-0.011 (0.012)	-0.018** (0.007)	-0.005 (0.007)	0.005 (0.012)	0.000 (0.011)	0.001 (0.020)
	<i>Employment</i>					
T*post2011	0.033*** (0.012)	0.006 (0.009)	0.007 (0.010)	0.001 (0.012)	-0.004 (0.009)	-0.004 (0.020)
T*post2011*high edu	-0.029** (0.013)	-0.005 (0.011)	-0.004 (0.012)	0.004 (0.015)	0.005 (0.011)	-0.001 (0.022)
N	2453	3332	3090	3576	3856	3193

Notes: Additional controls: year and cell q fixed effects, region and sector fixed effects, time fixed effects, marital status. Only individuals with at least 10 and less than 40 accrued years of contribution. High edu is a dummy equal to 1 if individuals obtained at least the secondary school degree. Robust standard errors clustered at the cell q level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Results: demand or supply?

	Women				Men	
	55-59 (1)	50-54 (2)	45-49 (3)	55-64 (4)	50-54 (5)	45-49 (6)
<i>Participation</i>						
T*post2011	0.033*** (0.010)	0.006 (0.008)	0.010* (0.006)	0.001 (0.006)	0.001 (0.004)	0.003 (0.004)
T*post2011*high lambda	0.003 (0.012)	0.013 (0.010)	0.002 (0.007)	-0.007 (0.009)	-0.008 (0.005)	0.003 (0.006)
N	2456	3332	3091	3577	3856	3194
<i>Unemployment</i>						
T*post2011	0.010 (0.007)	0.011 (0.007)	0.011* (0.006)	-0.008 (0.008)	-0.009 (0.008)	-0.001 (0.012)
T*post2011*high lambda	-0.001 (0.010)	-0.001 (0.009)	-0.008 (0.007)	0.010 (0.009)	0.016 (0.011)	0.018 (0.012)
N	2456	3332	3091	3577	3856	3194
<i>Employment</i>						
T*post2011	0.022** (0.010)	-0.005 (0.010)	-0.000 (0.007)	0.009 (0.010)	0.010 (0.009)	0.004 (0.013)
T*post2011*high lambda	0.004 (0.013)	0.014 (0.011)	0.009 (0.010)	-0.017 (0.012)	-0.023** (0.011)	-0.014 (0.012)
N	2456	3332	3091	3577	3856	3194

Notes: Additional controls: year and cell q fixed effects, region and sector fixed effects, time fixed effects, marital status. Only individuals with at least 10 and less than 40 accrued years of contribution. Robust standard errors clustered at the cell q level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.



Results: by household wealth

	Women				Men	
	55-59	50-54	45-49	55-64	50-54	45-49
	(1)	(2)	(3)	(4)	(5)	(6)
By household wealth						
<i>Participation</i>						
T*post2011	0.042*** (0.010)	0.023*** (0.007)	0.010** (0.005)	-0.007 (0.006)	-0.007 (0.004)	0.005 (0.005)
T*post2011*rich	-0.015 (0.011)	-0.013 (0.009)	0.000 (0.006)	0.008 (0.007)	0.007 (0.005)	-0.000 (0.006)
N	2456	3332	3091	3577	3856	3194
<i>Unemployment</i>						
T*post2011	0.013 (0.012)	0.012** (0.006)	0.012** (0.005)	-0.002 (0.009)	-0.008 (0.009)	0.014 (0.010)
T*post2011*rich	-0.003 (0.012)	-0.006 (0.007)	-0.010 (0.006)	-0.000 (0.011)	0.012 (0.013)	-0.011 (0.010)
N	2456	3332	3091	3577	3856	3194
<i>Employment</i>						
T*post2011	0.029** (0.013)	0.010 (0.008)	-0.002 (0.006)	-0.004 (0.010)	0.001 (0.010)	-0.009 (0.013)
T*post2011*rich	-0.012 (0.015)	-0.007 (0.010)	0.011 (0.008)	0.009 (0.012)	-0.005 (0.015)	0.011 (0.012)
N	2456	3332	3091	3577	3856	3194

Notes: Additional controls: year and cell q fixed effects, region and sector fixed effects, time fixed effects, marital status. Only individuals with at least 10 and less than 40 accrued years of contribution. Robust standard errors clustered at the cell q level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.



Effects on income (no self-employed)

	Women			Men		
	55-59 (1)	50-54 (2)	45-49 (3)	55-64 (4)	50-54 (5)	45-49 (6)
	<i>Labour income</i>					
T*post2011	461.679*** (172.064)	-117.927 (165.291)	156.931 (119.276)	37.509 (289.677)	-133.892 (277.224)	-275.212 (447.801)
N	1831	2730	2548	2708	2967	2470
	<i>Total income</i>					
T*post2011	578.846*** (219.123)	-17.615 (190.717)	138.773 (143.599)	-103.342 (335.452)	-275.824 (406.235)	136.327 (597.895)
N	1831	2730	2548	2708	2967	2470
	<i>Savings</i>					
T*post2011	752.686* (389.635)	273.928 (220.401)	139.661 (231.913)	382.444 (272.291)	-317.404 (336.174)	280.112 (322.087)
N	1831	2730	2548	2708	2967	2470

Notes: Additional controls: year and cell q fixed effects, region and sector fixed effects, time fixed effects, marital status. Only individuals with at least 10 and less than 40 accrued years of contribution. Robust standard errors clustered at the cell q level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Descriptive statistics at the family level

	Family level analysis							
	Couples with treated Wives				Couples with treated Husbands			
	All	Sample	Control	Treated	All	Sample	Control	Treated
	wife 45-59	not elig	$T_q^w < 7$	$T_q^w \geq 7$	husb 45-64	not elig	$T_q^h < 4$	$T_q^h \geq 4$
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	
Age w	51.654 (4.264)	51.761 (4.026)	51.051 (3.781)	52.349 (4.127)	50.240 (6.752)	50.499 (3.663)	50.240 (3.669)	50.846 (3.628)
Age h	55.089 (5.702)	55.286 (5.149)	54.524 (4.926)	55.917 (5.245)	54.052 (5.682)	52.984 (3.912)	52.545 (4.145)	53.569 (3.494)
Y. contrib w	15.128 (13.447)	24.715 (7.663)	30.813 (4.204)	19.668 (6.036)	14.581 (13.519)	24.434 (7.492)	24.584 (7.522)	24.235 (7.449)
Y. contrib h	30.286 (10.517)	33.839 (6.415)	33.934 (5.826)	33.759 (6.864)	29.026 (10.698)	30.734 (4.486)	31.651 (4.708)	29.510 (3.846)
High edu w	0.486	0.603	0.672	0.545	0.501	0.664	0.615	0.729
High edu h	0.483	0.558	0.599	0.523	0.493	0.627	0.548	0.732
If children	0.705	0.690	0.665	0.712	0.678	0.654	0.654	0.654
Active w	0.523	0.841	0.971	0.733	0.508	0.859	0.838	0.886
Active h	0.768	0.777	0.820	0.741	0.794	0.987	0.984	0.991
Unempl w	0.035	0.039	0.019	0.055	0.037	0.037	0.037	0.036
Unempl h	0.058	0.025	0.020	0.030	0.060	0.030	0.034	0.024
Observations	11842	5510	2566	2944	15204	3825	2166	1659

Notes: Sample restrictions are imposed only on the treated spouse. Men and women with at least 35 year old and 8 years of accrued contributions. Women (men) are treated if experienced a shock to distance to full retirement of ≥ 7 (≥ 4) years after 2012 reform. Years 2004 and 2010. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.



Couples, results by education level

	Shock to wife MRA on wife (1)	Shock to wife MRA on husband (2)	Shock to husband MRA on husband (3)	Shock to husband MRA on wife (4)
<i>Participation</i>				
T wife*post2011	0.047*** (0.007)	0.062*** (0.022)		
T husb*post2011			-0.005 (0.005)	-0.070 (0.060)
T wife*post 2011*own high edu	-0.023*** (0.008)	-0.066** (0.030)		
T husb*post 2011*own high edu			0.002 (0.006)	0.103 (0.069)
<i>Unemployment</i>				
T wife*post2011	0.023*** (0.006)	0.002 (0.016)		
T husb*post2011			-0.010 (0.013)	-0.010 (0.035)
T wife*post 2011*own high edu	-0.011* (0.006)	-0.010 (0.023)		
T husb*post 2011*own high edu			0.009 (0.014)	-0.004 (0.039)
<i>Employment</i>				
T wife*post2011	0.024*** (0.008)	0.060** (0.029)		
T husb*post2011			0.005 (0.014)	-0.060 (0.064)
T wife*post 2011*own high edu	-0.012 (0.009)	-0.056 (0.036)		
T husb*post 2011*own high edu			-0.006 (0.015)	0.107 (0.074)
N	5142	5142	3646	3646

Notes: Additional controls: year and cell $q_{s,t}$ and q_s fixed effects, region and sector fixed effects, age difference across partners (also squared) and difference in distance to retirement across partners, partner s change in distance to retirement. The sample in columns 1 and 2 (3 and 4) consists of couples where the wives (husbands) are not eligible for a public pension either before and after the reform and have accrued more than 9 (19) and less than 40 years of contribution. High edu is a dummy equal to 1 at least the secondary school degree. Robust standard errors

. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.



The direct effect on individuals eligible before the reform

- ▶ Diff-in-disc: Look at individuals close to the pre-reform eligibility threshold, comparing the probability of being active in the pre- and in the post-reform period of individuals around the 2010 eligibility threshold [▶ Specific.](#)
- ▶ Direct effect: in post-reform years larger proportion of active individuals around the 2010 eligibility threshold than in pre-reform years
- ▶ Positive effects both for women and for men [▶ Individuals](#) [▶ Partners](#)

[▶ Back](#)

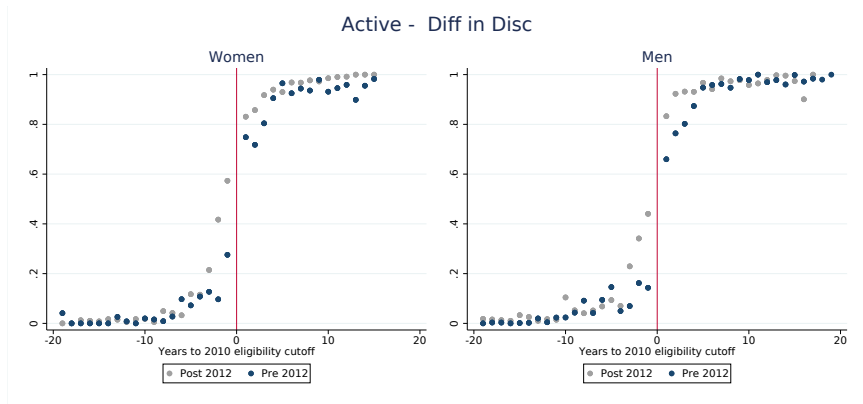
The direct eligibility effect - estimating equation

$$Y_{it} = post2011_t [E_i(\beta + f_r(d_{2010i})) + (1 - E_i)f_l(d_{2010i})] + E_i(\delta + f_r^P(d_{2010i})) + (1 - E_i)f_l^P(d_{2010i}) + \psi_t + v_{it}$$

- ▶ Y_{it} represents labour supply of individual i in year t ;
- ▶ $post2011_t$ is an indicator for the post reform period;
- ▶ E_i indicates whether individual i was eligible to retire under the pre-reform rules;
- ▶ d_{2010i} is distance to retirement under the pre-reform rules (our running variable);
- ▶ f_r, f_l, f_r^P and f_l^P are some polynomials of d_{2010i} ;
- ▶ ψ_t represent year fixed effects and v_{it} is an error term, which we cluster at the individual level

Only for women in the control group (not affected by perspective effect off of the eligibility threshold) 

Diff-in-disc: graphical representation for individuals



Source: SHIW, from 2010 to 2016.


Note: The Figure shows the evolution of the probability of being active in the labour market as a function of the distance to the full retirement age according to the 2010 pension rules (that is the difference between the full retirement age under 2010 rules and the age at the interview).



At the individual level: effects both on women and on men

	Women			Men		
	linear (1)	quadratic (2)	cubic (3)	linear (4)	quadratic (5)	cubic (6)
Individual effect						
<i>Employment</i>						
$E_{2010}^{*post2011}$	0.216*** (0.049)	0.250*** (0.079)	0.255** (0.112)	0.105*** (0.039)	0.129** (0.062)	0.178* (0.094)
N	6417	6417	6417	12320	12320	12320
<i>Participation</i>						
$E_{2010}^{*post2011}$	0.215*** (0.047)	0.249*** (0.072)	0.239** (0.100)	0.083*** (0.036)	0.107* (0.056)	0.111 (0.083)
N	6417	6417	6417	12320	12320	12320
<i>Unemployment</i>						
$E_{2010}^{*post2011}$	-0.002 (0.019)	-0.000 (0.034)	-0.016 (0.053)	-0.022 (0.019)	-0.021 (0.034)	-0.067 (0.054)
N	6417	6417	6417	12320	12320	12320

Notes: Additional controls: year fixed effects. The sample consists of individuals whose distance to retirement according to the pre-reform rules (d_{i2010}) was between 20 and -20. Robust standard errors clustered at the cell q level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Larger response among women (more elastic) 

At the family level: effects both on women and on men

	Women			Men		
	linear (1)	quadratic (2)	cubic (3)	linear (4)	quadratic (5)	cubic (6)
Cross-partner effect						
	on husbands (wives' shock)			on wives (husbands' shock)		
	<i>Employment</i>					
$E_{2010}^{s'}$ *post2011	-0.064*	-0.057	-0.066	0.044**	-0.002	-0.028
	(0.034)	(0.053)	(0.075)	(0.022)	(0.034)	(0.046)
N	7808	7808	7808	18146	18146	18146
	<i>Participation</i>					
$E_{2010}^{s'}$ *post2011	-0.061*	-0.061	-0.049	0.032	-0.007	-0.037
	(0.033)	(0.051)	(0.073)	(0.022)	(0.034)	(0.048)
N	7808	7808	7808	18146	18146	18146
	<i>Unemployment</i>					
$E_{2010}^{s'}$ *post2011	0.003	-0.004	0.017	-0.012	-0.005	-0.009
	(0.014)	(0.021)	(0.029)	(0.009)	(0.014)	(0.020)
N	7808	7808	7808	18146	18146	18146

Notes: Additional controls: year fixed effects. The sample consists of individuals whose distance to retirement according to the pre-reform rules (d_{i2010}) was between 20 and -20. Robust standard errors clustered at the cell q level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Little cross-partners effects (imprecise) 