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

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Aim and research question

- Aging is major concern for OECD countries. Pension reforms increasing legal retirement age widely adopted
- Literature mostly focused on the LS response by older individuals close to eligibility (direct effect)
- **This paper**: effects on individuals far from the eligibility, whose working horizon increases$\rightarrow$ e.g., retiring in 7 rather than 2 years

  Any forward looking effect on their LS?

Why do we expect an effect?

- Non-myopic individuals, possible channels:
  1. Pension wealth $\downarrow \rightarrow$ LS $\uparrow$
  2. Need to work longer but expecting worse conditions when old $\rightarrow$ LS $\uparrow$
  3. Working period $\uparrow \rightarrow$ returns to work $\uparrow$, search and LS $\uparrow$

- Participation rates particularly low for women $\rightarrow$ Unutilized capacity

Scant literature on forward looking behaviour

- Hairault et al. (2010): French reform ↑ FRA by 1 year; men 57+
- Geyer and Welteke (2019): German reform ↑ ERA by 3 years; 58-59 y.o. women
- We look at a bigger reform implemented in Italy
  1. sizeable ↑ in FRA up to 7 years
  2. unexpected and well-understood
  3. FRA ↑ heterogeneously depending on observable dimensions

What do we do?

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

- **Forward looking effect**: LS responses of middle aged individuals
- **Spillover effects on the their partner's LS**
- Well-known **direct effect** on close-to-eligibility individuals and their partners

Preview of the main findings

- Forward looking effect:
  - **Positive on LS for middle-aged women** not for men
  - Stronger for lower educated women
  - Positive spillovers into husbands' LS
- Direct effect: positive on LS, comparable with other studies

The Treatment and the Data

The institutional framework

- Two types of pension schemes in Italy for full retirement:
  1. Old age: minimum age required
  2. Seniority: given # of years of paid contribution to the Social Security system

The 2011 pension reform

- Stricter eligibility requirements for both schemes
  1. Old age: RA ↑ from 60 to 67 y.o. for women, from 65 to 67 for men
  2. Seniority:
     - Before: i) quota (60 y.o. + 35 years of contribution) or ii) 40 years of contribution
     - After: i) quota abolished; ii) 42 (women), 43 (men) years of contribution

Distance to retirement and its change

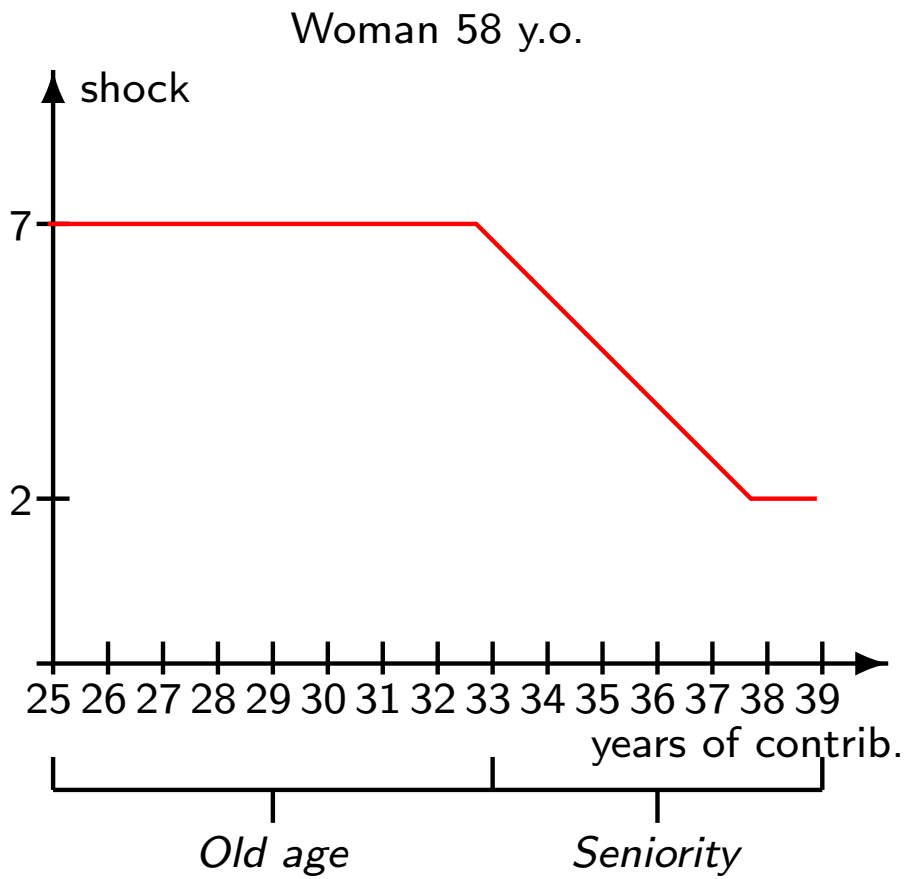
- $MRA_t = min(OLD\ AGE_t,\ SENIORITY_t)$; rules at t. Hp: from t onward assume individuals work every period

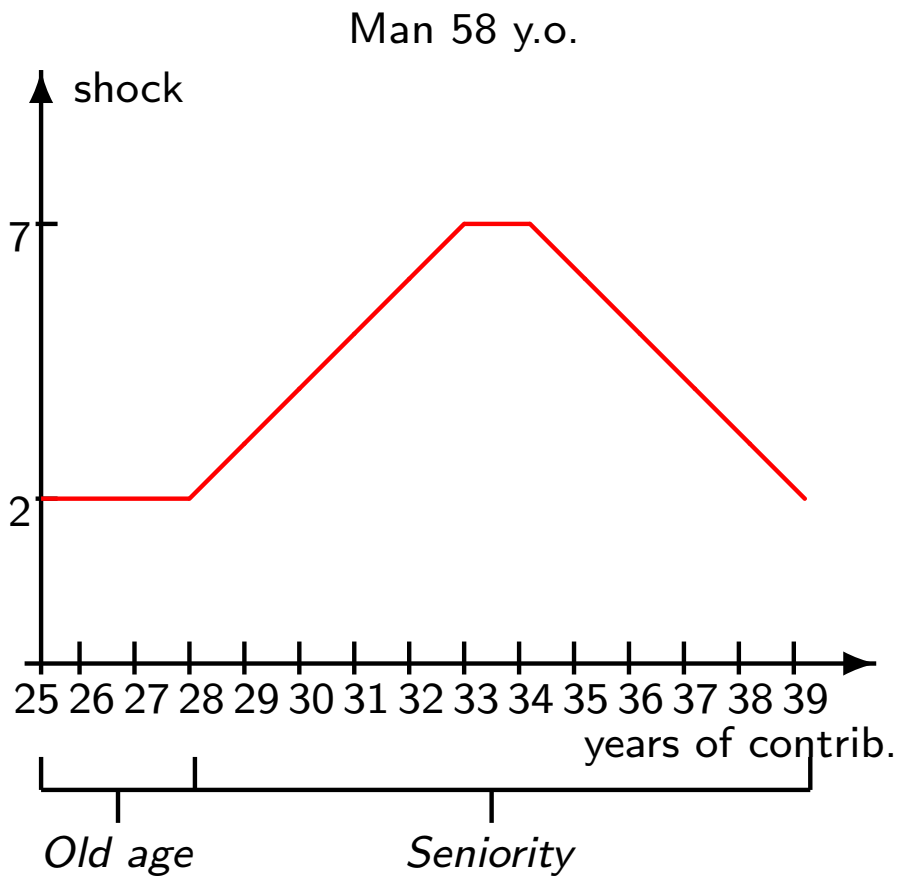
	2014	
	Seniority	Old
Women, 58 years old		
Maria, $C = 38$	**62**	67
Valeria, $C = 26$	73	**67**

- MRA changes depending on: **age, accrued years of contribution, gender**; each combination is a given **cell** q
- **Time invariant** measure of policy shock defined at cell q level:

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

Heterogeneous change in MRA, years of contribution

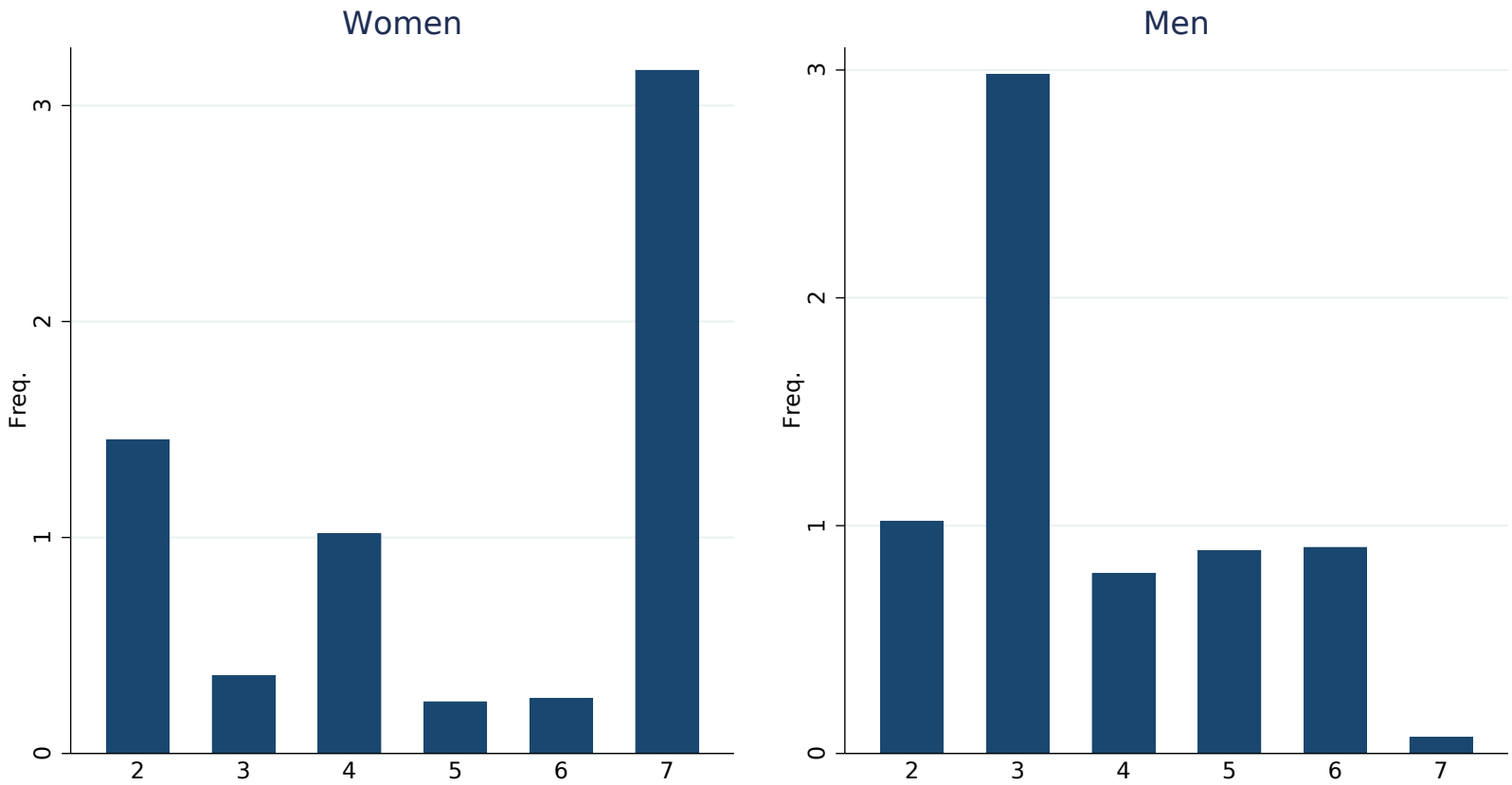




Data

- 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 all different source of income
  - information on expected retirement age
- More results with administrative data from Social Security accounts

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.

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

The Forward Looking Effect: individual level analysis

Main regression equation, individual level analysis

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

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

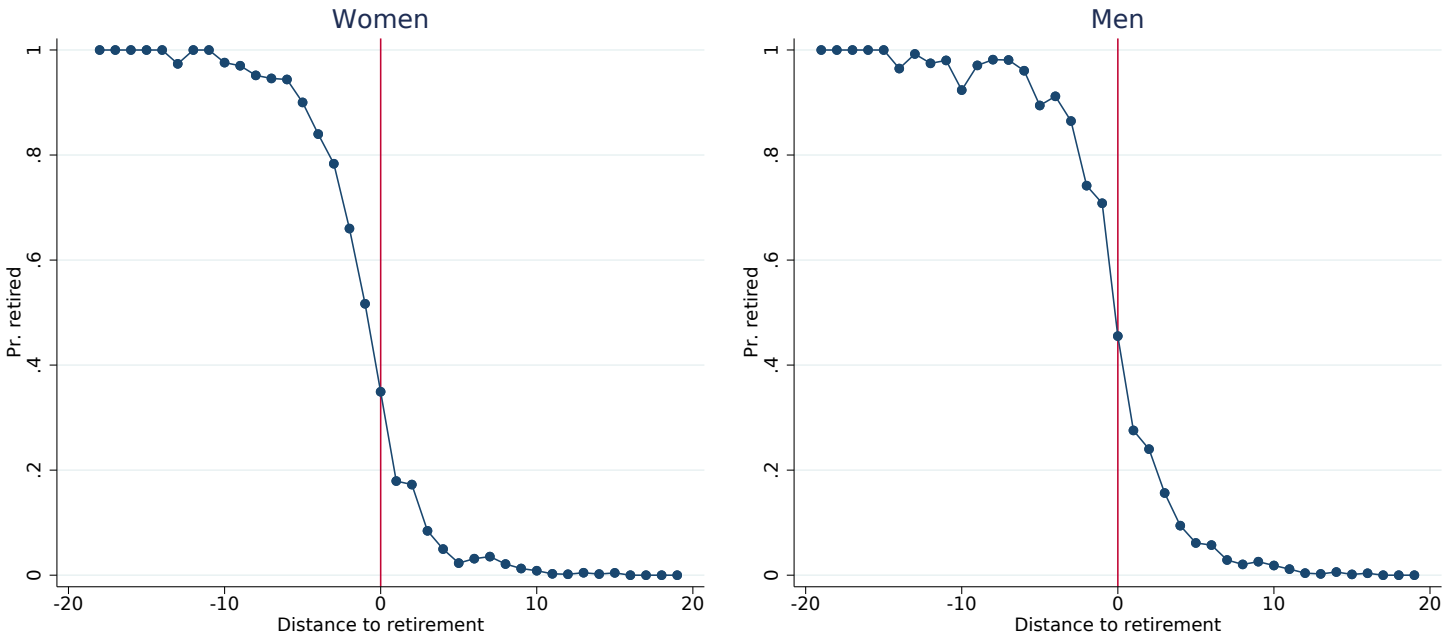
- Y_{iqt} dummy $= 1$ if the individual i in cell q is active at t
- T_q time invariant measure of policy shock: the cross-sectional variation in MRA occurs at level q (age, # years of contribution)
- α_q cell q-fixed effects; α_t year-fixed effects
- X_{iqt} are controls (marital status, region, sector)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

Three identifying assumptions

1. MRA defines the length of the working horizon

Prob. of retiring and distance to MRA ($DMRA = MRA_t - age_t$)

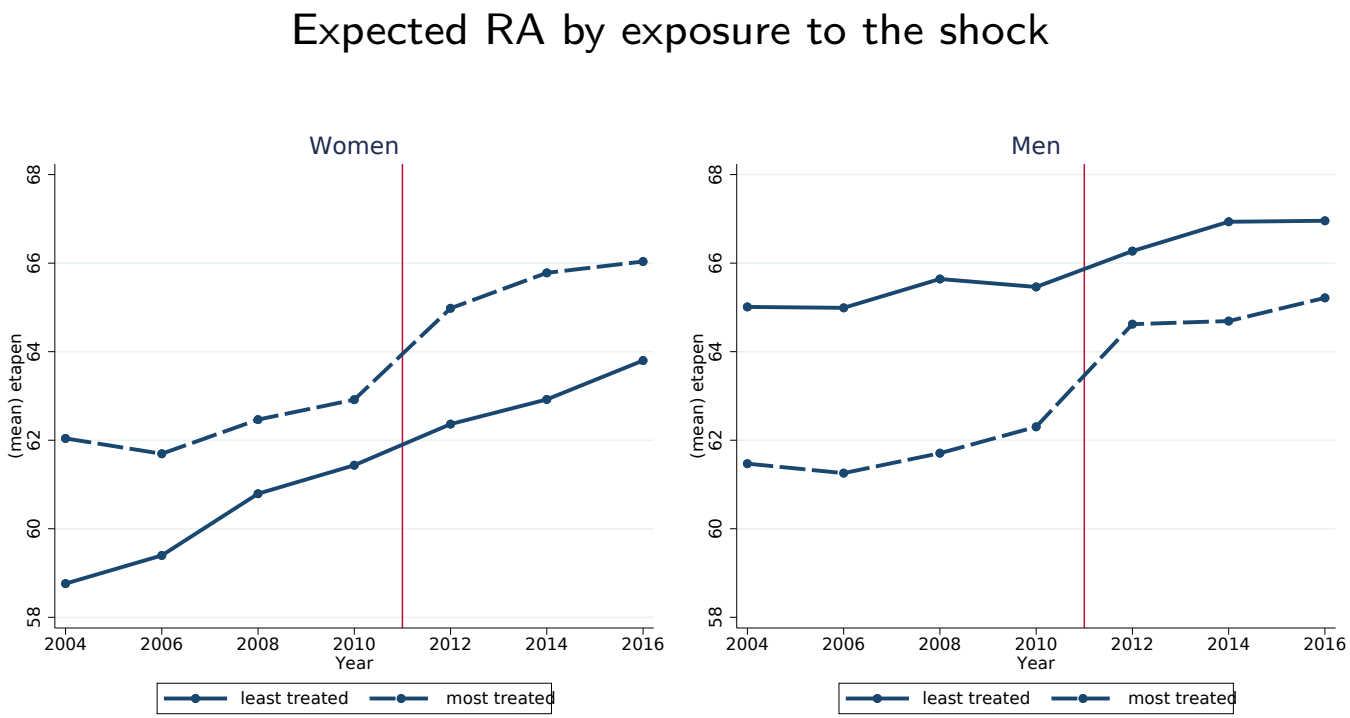


Source: SHIW, 2008-2016.

Three identifying assumptions

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

Expected RA increases more for treated than for control individuals



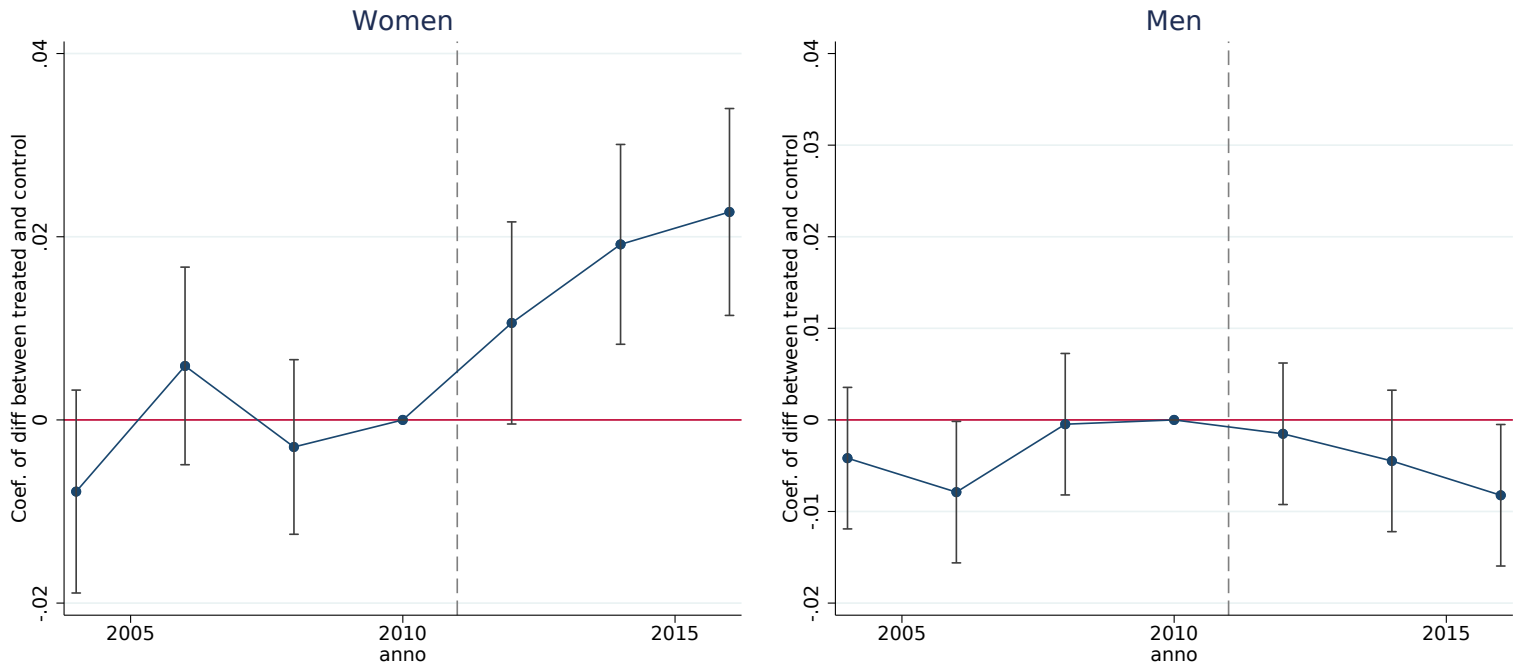
Source: SHIW, 2008-2016. **Note**: most treated are those whose shock to MRA is larger than 4 years.

Three identifying assumptions

3. Parallel trends in the outcome

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

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



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)
			Participation			
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)
			Unemployment			
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)
			Employment			
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

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 ▸ type
- Income and savings ↑ for women 55-59 y.o. ▸ income

Heterogeneity

- Stronger effects for low educated individuals ▸ education
- Unemployment effects also in high demand regions ▸ high vacancy

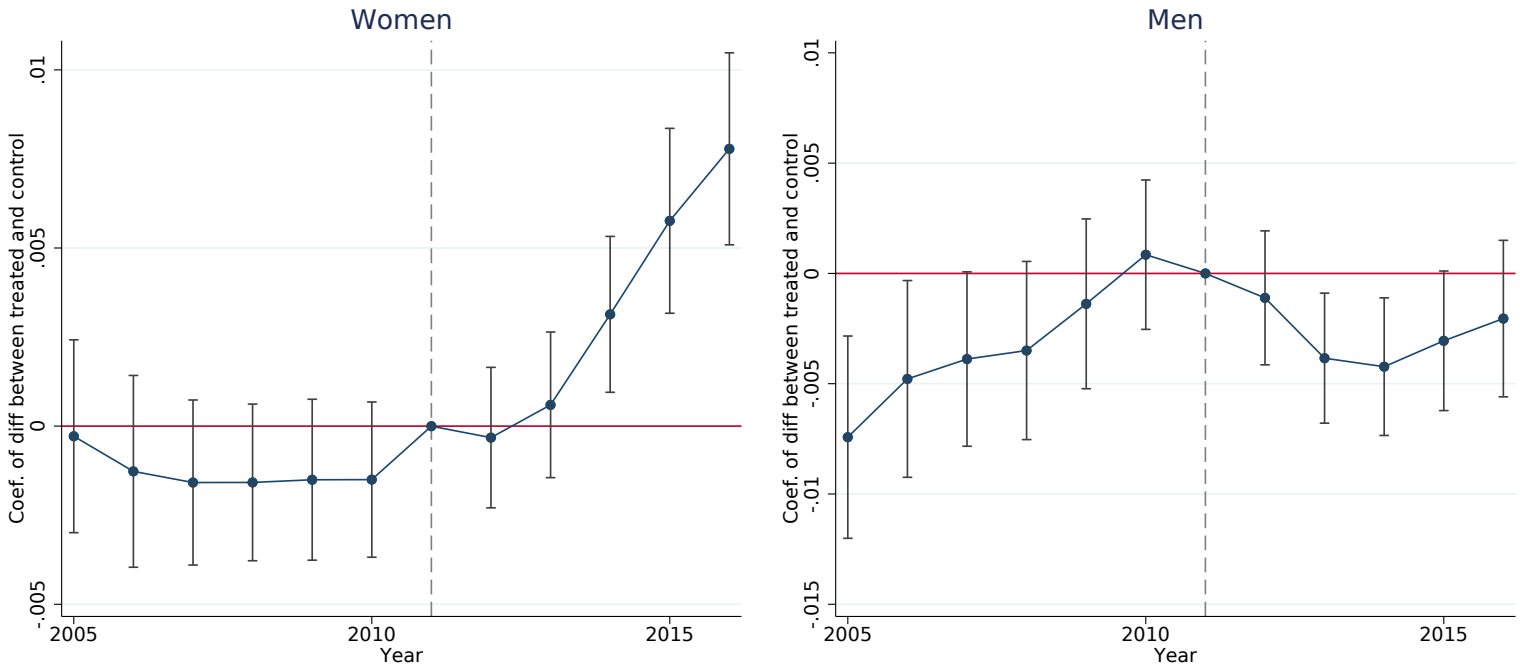
More results with the use of administrative panel data

Administrative data

- Social Security Records: 6.6% random sample of employees in the private sector
  1. Employer-employees data (wages, contract, occupation), 2005 to 2016
  2. Accrued years of contribution recorded since the first year of work
  3. Information on retirees (year of retirement)

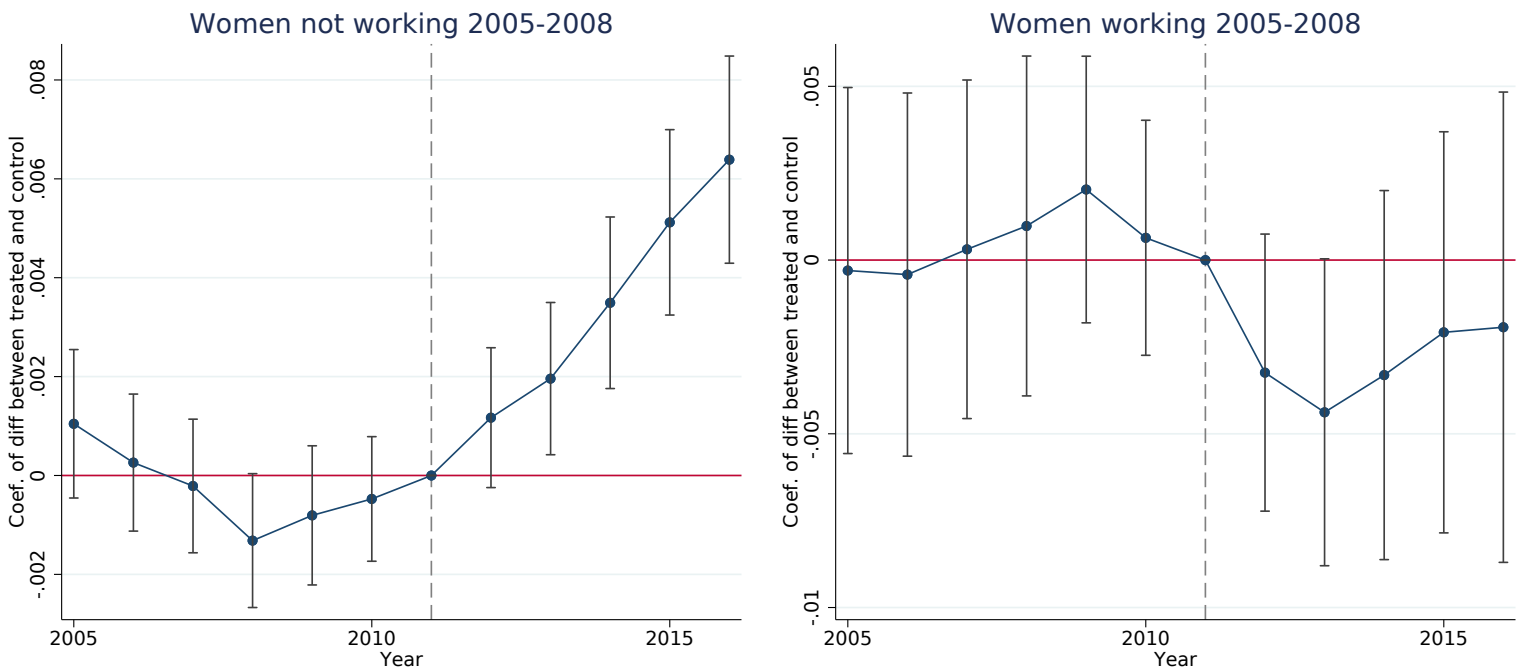
- Analysis run as before
  - Pros:
    1. Recorded number of years of contribution - no self-reported as in SHIW
    2. Drivers of employment: more newly employed or less separated?
  - Cons:
    1. No family dimension
    2. Only employment

Similar employment effects



Source: Social security administrative records.
Note: Pre-reform years: 2005-2011, post-reform years: 2012-2016. The omitted year is 2011. Sample: individuals with at least 10 (for women) or 20 (for men) and less than 40 accrued years of contribution; women aged 50-59; men aged 55-64, not eligible to retire either before or after the 2012 pension reform.

More newly employed or less separated?



Source: Social security administrative records.
Note: Pre-reform years: 2005-2011, post-reform years: 2012-2016. The omitted year is 2011. Sample: individuals with at least 10 (for women) or 20 (for men) and less than 40 accrued years of contribution; women aged 50-59; men aged 55-64, not eligible to retire either before or after the 2012 pension reform.

▸ More results

Spillover effects on partners

Main regression equation, family level analysis

We estimate the following equation for husbands and wives in 2004-2014:

$$Y^s_{jq_sq_{s'}t} = \beta^s_1 T^{s'}_{q_{s'}} * post2011_t + \beta^s_2 T^s_{q_s} * post2011_t + \beta^s_2 W_{jt} + \alpha^s_{q_{s'}} + \alpha^s_{q_s} + \alpha^s_t + u^s_{jq_sq_{s'}t}$$

- $Y^s_{jq_sq_{s'}t}$ dummy $= 1$ if spouse s in household j belonging to cell q_s, whose partner s' belongs to the age-contribution cell $q_{s'}$
- $T^{s'}_{q_{s'}}$ time invariant measure of the policy shock for partner s'
- $T^s_{q_s}$ time invariant measure of the policy shock of individual s
- $\alpha^s_{q_{s'}}$ and $\alpha^s_{q_s}$ fixed effects for cell $q_{s'}$ and q_s; α^s_t year-fixed effects
- W_{jt} controls at individual and household level
- $u^s_{jq_sq_{s'}t}$ 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

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 $Y^s_{iq_{s'}t} = \sum_{r=2004}^{2014} \zeta_r^s \left(T_{q_{s'}} * \alpha_r^s\right) + \beta^s W_{iq_{s'}t} + \alpha^s_{q_{s'}} + \alpha^s_t + \alpha^s_{q_s t} + u^s_{iqt}$. Pre reform years: 2004-2006-2008-2010, post-reform years: 2012-2014-2016.

Cross elasticities among partners

	Shock to wife MRA		Shock to husband MRA	
	on wife	on husband	on husband	on wife
	(1)	(2)	(3)	(4)
		Participation		
T wife*post2011	0.022***	0.018**		
	(0.003)	(0.007)		
T husb*post2011			-0.002	-0.011
			(0.003)	(0.010)
		Unemployment		
T wife*post2011	0.013***	0.006		
	(0.003)	(0.004)		
T husb*post2011			-0.001	-0.008
			(0.005)	(0.006)
		Employment		
T wife*post2011	0.010**	0.012		
	(0.004)	(0.008)		
T husb*post2011			-0.001	-0.003
			(0.006)	(0.011)
N	5326	5326	3819	3819

Notes: Additional controls: year and cell $q_{s'}$ 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. ▸ full specification

Results

- Husbands respond to their wives' shock
  1. **The effect comes from men eligible to retire but postpone retirement**
  2. Stronger effects for low educated ▸ education

- Wives do not respond since men are not reacting to begin with

The Direct Effect

The direct effect on individuals eligible before the reform

- Look at individuals close to the eligibility threshold before the reform: $\rightarrow$ RDD framework
- Diff-in-disc: 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, no cross-partner effects ▸ Individuals ▸ Partners

Summing up on the magnitude

- Coefficient of the direct effect is about 8 times larger than that of forward-looking effect (0.24 against 0.03 for women)
- But:
  - Within household spillovers stronger for forward looking (FL) effect than for direct effect (labour supply of older men less elastic, most of them already retired)
  - Share of individuals affected by the FL much larger
- FL effect contributed by one third to the increase in Italian female LFPR after 2012

Conclusion

- Effects of delaying MRA on labour supply go beyond those individuals eligible to retire under the previous rules
- Positive effects on women participation at different age, not on men
- The effect on wives has spillovers on their husbands' participation
- Effect stronger for women less attached to the labour market
- Forward looking effects are quantitatively large; need to be considered when evaluating 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
Before Fornero reform				
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
After Fornero reform				
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	51.335	50.802	51.721	53.877	52.107	52.172	52.019
	(4.280)	(4.108)	(3.815)	(4.267)	(5.728)	(4.626)	(4.925)	(4.179)
Y. contrib.	15.853	23.950	30.476	19.227	28.120	28.707	29.502	27.617
	(13.343)	(7.696)	(4.257)	(5.986)	(11.331)	(5.195)	(5.401)	(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	9.560	9.669	9.450	9.799	9.848	9.838	9.860
	(0.568)	(0.548)	(0.425)	(0.629)	(0.480)	(0.428)	(0.413)	(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 minimum 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: type of employment

	Women			Men		
	55-59	50-54	45-49	55-64	50-54	45-49
	(1)	(2)	(3)	(4)	(5)	(6)
			Full-time employment			
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)
			Part-time employment			
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)
			Permanent employment			
T*post2011	0.014*	0.002	0.002	0.004	-0.010	-0.020
	(0.007)	(0.006)	(0.006)	(0.007)	(0.008)	(0.014)
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 benefit calculation

	Women			Men		
	55-59	50-54	45-49	55-64	50-54	45-49
	(1)	(2)	(3)	(4)	(5)	(6)
			Participation			
T*post2011	0.020*	0.019**	0.017**	-0.006	-0.005	-0.001
	(0.011)	(0.009)	(0.008)	(0.009)	(0.004)	(0.008)
T*post2011*DB	0.053	-	-	0.001	0.001	-
	(0.040)	-	-	(0.008)	(0.013)	-
			Unemployment			
T*post2011	0.013	0.018**	0.010	0.001	0.003	0.006
	(0.014)	(0.008)	(0.006)	(0.016)	(0.015)	(0.019)
T*post2011*DB	-0.003	-	-	-0.011	-0.026	-
	(0.028)	-	-	(0.015)	(0.027)	-
			Employment			
T*post2011	0.006	0.002	0.007	-0.007	-0.008	-0.006
	(0.015)	(0.010)	(0.011)	(0.018)	(0.014)	(0.023)
T*post2011*DB	0.056*	-	-	0.012	0.027	-
	(0.032)	-	-	(0.016)	(0.029)	-
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. *** $p<0.01$, ** $p<0.05$,

Results: by education level

	Women			Men		
	55-59	50-54	45-49	55-64	50-54	45-49
	(1)	(2)	(3)	(4)	(5)	(6)
			Participation			
T*post2011	0.053***	0.027***	0.017**	-0.005	-0.005	0.005
	(0.009)	(0.007)	(0.008)	(0.007)	(0.003)	(0.007)
T*post2011*high edu	-0.041***	-0.023***	-0.009	0.009	0.005	-0.001
	(0.010)	(0.009)	(0.009)	(0.009)	(0.005)	(0.008)
			Unemployment			
T*post2011	0.020**	0.021***	0.010	-0.006	-0.001	0.008
	(0.010)	(0.007)	(0.006)	(0.011)	(0.010)	(0.018)
T*post2011*high edu	-0.011	-0.018**	-0.005	0.005	0.000	0.001
	(0.012)	(0.007)	(0.007)	(0.012)	(0.011)	(0.020)
			Employment			
T*post2011	0.033***	0.006	0.007	0.001	-0.004	-0.004
	(0.012)	(0.009)	(0.010)	(0.012)	(0.009)	(0.020)
T*post2011*high edu	-0.029**	-0.005	-0.004	0.004	0.005	-0.001
	(0.013)	(0.011)	(0.012)	(0.015)	(0.011)	(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	50-54	45-49	55-64	50-54	45-49
	(1)	(2)	(3)	(4)	(5)	(6)
			Participation			
T*post2011	0.037***	0.010	0.011	0.001	-0.000	0.005
	(0.010)	(0.008)	(0.008)	(0.006)	(0.004)	(0.005)
T*post2011*high lambda	-0.004	0.011	-0.000	-0.009	-0.006	0.000
	(0.013)	(0.011)	(0.009)	(0.009)	(0.005)	(0.007)
			Unemployment			
T*post2011	0.006	0.011	0.014*	-0.006	-0.007	0.000
	(0.009)	(0.008)	(0.008)	(0.009)	(0.008)	(0.014)
T*post2011*high lambda	0.002	-0.002	-0.011	0.007	0.011	0.016
	(0.012)	(0.009)	(0.010)	(0.010)	(0.012)	(0.013)
			Employment			
T*post2011	0.030***	-0.001	-0.003	0.007	0.007	0.004
	(0.011)	(0.011)	(0.009)	(0.010)	(0.009)	(0.016)
T*post2011*high lambda	-0.006	0.012	0.011	-0.016	-0.017	-0.015
	(0.014)	(0.013)	(0.011)	(0.012)	(0.012)	(0.014)
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. 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	50-54	45-49	55-64	50-54	45-49
	(1)	(2)	(3)	(4)	(5)	(6)
			Labour income			
T*post2011	461.679***	-117.927	156.931	37.509	-133.892	-275.212
	(172.064)	(165.291)	(119.276)	(289.677)	(277.224)	(447.801)
			Total income			
T*post2011	578.846***	-17.615	138.773	-103.342	-275.824	136.327
	(219.123)	(190.717)	(143.599)	(335.452)	(406.235)	(597.895)
			Savings			
T*post2011	752.686*	273.928	139.661	382.444	-317.404	280.112
	(389.635)	(220.401)	(231.913)	(272.291)	(336.174)	(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.

More results on employment in INPS

	Employed	wage growth	full time	part time	temp contract	perm contract	change firm	av wage firm
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
					Women			
T*post2011	0.005***	-0.000	0.002**	0.003***	-0.001	0.004***	0.001	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
N	485180	174904	485093	485180	190719	485180	173849	190695
					Men			
T*post2011	0.000	-0.001	-0.002	0.002***	-0.001	-0.002	0.004***	-0.001
	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.002)
N	822984	414407	822977	822984	446020	822984	396664	445700

Notes: *** p<0.01, ** p<0.05, * p<0.

Descriptive statistics at the family level

	Family level analysis							
		Treated Wives				Treated Husbands		
	All wife 45-59 [1]	Sample not elig [2]	Control $T_q^w < 7$ [3]	Treated $T_q^w \geq 7$ [4]	All husb 45-64 [5]	Sample not elig [6]	Control $T_q^h < 4$ [7]	Treated $T_q^h \geq 4$ [8]
Age w	51.654	51.761	51.051	52.349	50.240	50.499	50.240	50.846
	(4.264)	(4.026)	(3.781)	(4.127)	(6.752)	(3.663)	(3.669)	(3.628)
Age h	55.089	55.286	54.524	55.917	54.052	52.984	52.545	53.569
	(5.702)	(5.149)	(4.926)	(5.245)	(5.682)	(3.912)	(4.145)	(3.494)
Y. contrib w	15.128	24.715	30.813	19.668	14.581	24.434	24.584	24.235
	(13.447)	(7.663)	(4.204)	(6.036)	(13.519)	(7.492)	(7.522)	(7.449)
Y. contrib h	30.286	33.839	33.934	33.759	29.026	30.734	31.651	29.510
	(10.517)	(6.415)	(5.826)	(6.864)	(10.698)	(4.486)	(4.708)	(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
Log(wage net) w	9.510	9.563	9.662	9.435	9.490	9.583	9.542	9.633
	(0.592)	(0.555)	(0.447)	(0.646)	(0.608)	(0.546)	(0.554)	(0.531)
Log(wage net) h	9.841	9.927	9.969	9.886	9.829	9.933	9.920	9.948
	(0.470)	(0.420)	(0.379)	(0.453)	(0.461)	(0.420)	(0.415)	(0.425)
Observations	11843	5510	2566	2944	15204	3825	2166	1659

Couples, full specification interacting for husbands' eligibility

Couples where:	**wives not eligible to retire 2010**			**husb. not eligible to retire 2010**		
	Active husb. (1)	Unemp. husb. (2)	Employed husb. (3)	Active wife (4)	Unemp. wife (5)	Employed wife (6)
T wife*post2011	0.015*	0.007	0.007	0.006	0.010**	-0.004
	(0.008)	(0.005)	(0.008)	(0.006)	(0.004)	(0.006)
T wife*post*elig husb	0.012	-0.005	0.016			
	(0.021)	(0.012)	(0.021)			
T husb*post2011	-0.011	-0.002	-0.009	-0.011	-0.008	-0.003
	(0.010)	(0.010)	(0.014)	(0.010)	(0.006)	(0.011)
T husb*post*elig husb	0.160***	0.054**	0.107**			
	(0.047)	(0.024)	(0.048)			
N	5326	5326	5326	3819	3819	3819

Notes: Most of the husbands' response to their wives' perspective effect comes from husbands already eligible to retire, who decide to postpone retirement. T wife*post 2011 is the estimated difference-in-differences coefficient of the wife's longer working horizon (perspective effect); T husband*post 2011 is the estimated difference-in-differences coefficient of the husband's longer working horizon (both direct and perspective effect). Additional controls: year and cell $q_{s'}$ and q_s fixed effects (separately for each dimension; each cell is defined by age, gender number of years of accrued contribution and sector of employment), region and sector fixed effects, age difference across partners (also squared) and difference in distance to retirement across partners (also squared), partner s change in distance to retirement. The sample of columns 1-3 (4-6) consists of all husbands (wives) older than 45, belonging to couples where the wives (husbands) are not eligible for a public pension either before and after the reform and have accrued a number of years of contribution of at least 10, and smaller than 40. Elig is a dummy equal to one if the husband is eligible at time t to a public pension. Columns 4 to 6 do not distinguish whether the wife is eligible for a public pension or not because there are too few wives eligible for a public pension whose husband is in the sample (is not eligible for a public pension).

Robust standard errors clustered at the cell $q_{s'}$ level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Couples, results by education level

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

Notes: Additional controls: year and cell $q_{s'}$ 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. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

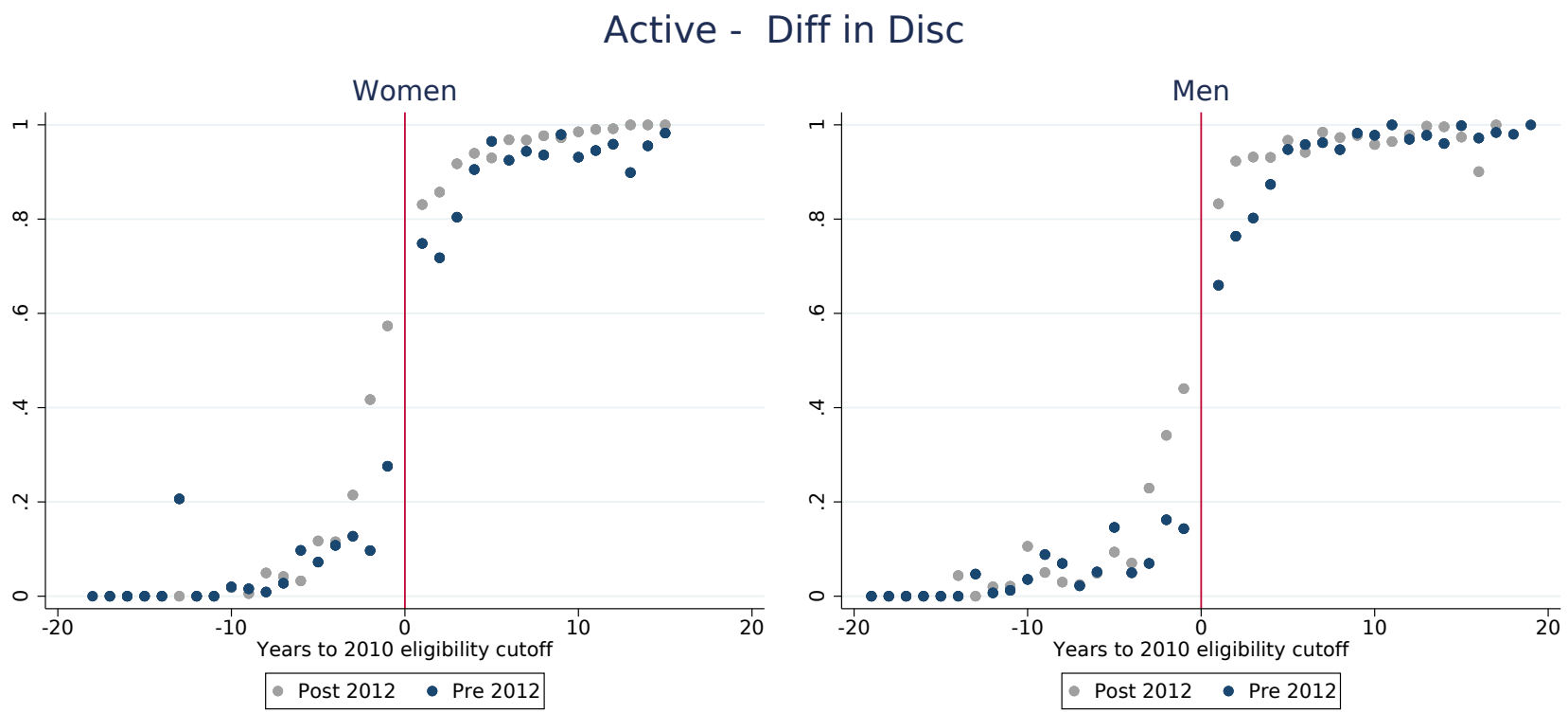
The direct eligibility effect - estimating equation

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

- 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 minimum retirement age according to the 2010 pension rules (that is the difference between the minimum retirement age under 2010 rules and the age at the interview). The blue (grey) dots are observations in years pre-2012 (post-2012). The Figure shows that after 2012 individuals eligible to retire under the previous pension rules have a higher probability of being active in the labour market and that the discontinuity around zero (which means that the individual would have reached the pension eligibility according to the 2010 rules) does not longer hold.

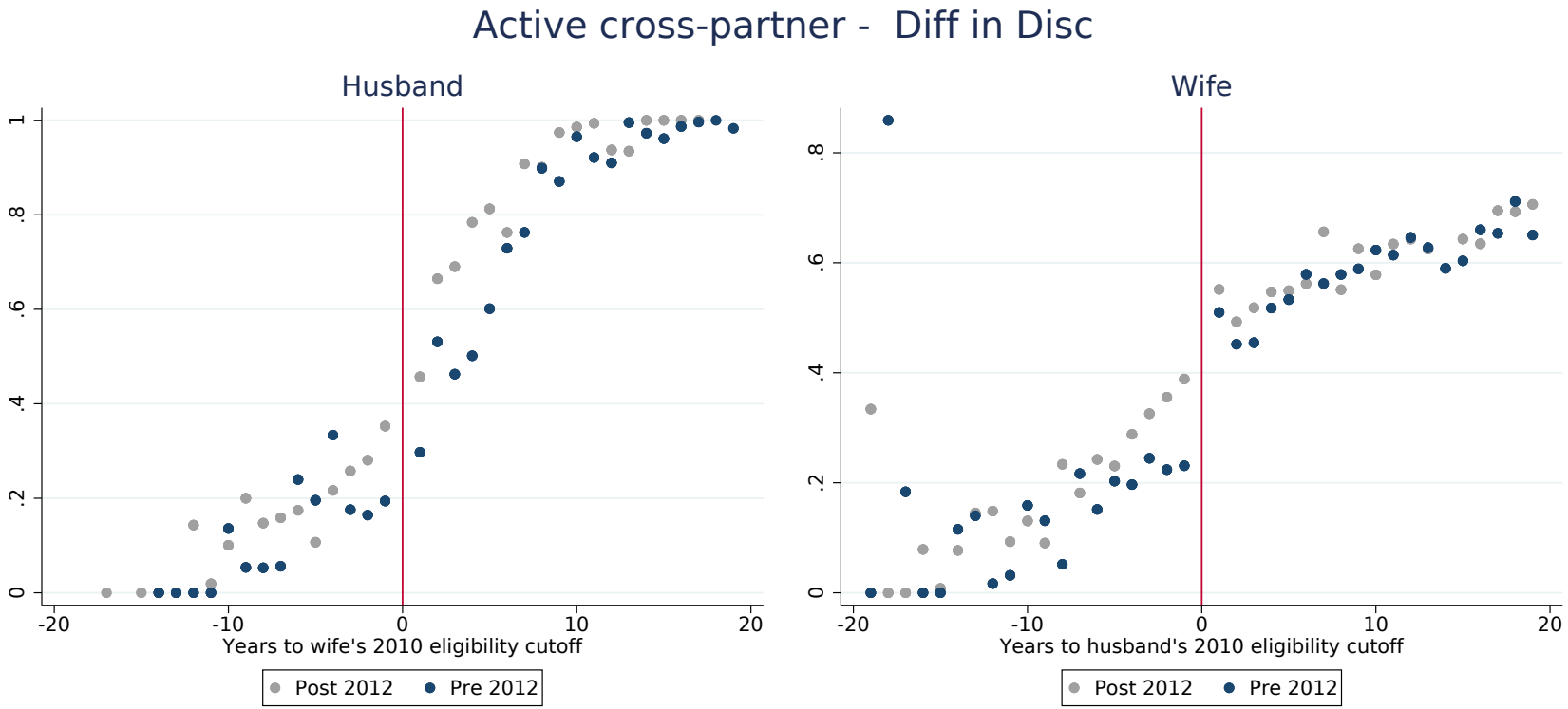
At the individual level: effects both on women and on men

	Women			Men		
	linear	quadratic	cubic	linear	quadratic	cubic
	(1)	(2)	(3)	(4)	(5)	(6)
Individual effect						
			Participation			
E_{2010}*post2011	0.213***	0.273***	0.250***	0.105***	0.101***	0.081
	(0.037)	(0.052)	(0.068)	(0.027)	(0.039)	(0.051)
			Unemployment			
E_{2010}*post2011	0.027**	0.007	-0.021	0.002	0.006	-0.047
	(0.013)	(0.021)	(0.032)	(0.012)	(0.020)	(0.030)
			Employment			
E_{2010}*post2011	0.185***	0.266***	0.270***	0.103***	0.095**	0.128**
	(0.038)	(0.055)	(0.075)	(0.028)	(0.042)	(0.057)
N	9902	9902	9902	18784	18784	18784

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.

Women's response is about four times larger at the eligibility threshold

Diff-in-disc: graphical representation for couples



Source: SHIW, from 2010 to 2016.
Note: The Figure displays the probability of being active as a function of own partner's distance to retirement according to the 2010 pension rules. The blue (grey) dots are observations in years pre-2012 (post-2012). It shows that after 2012 partners of those individuals would have been eligible to retire according to the 2010 rules do not have a higher probability of being active.

The direct eligibility effect: no effects across partners

	on husbands (wives' shock)			on wives (husbands' shock)		
	linear	quadratic	cubic	linear	quadratic	cubic
	(1)	(2)	(3)	(4)	(5)	(6)
			Participation			
$E^{s'}_{2010}$*post2011	-0.022	-0.044	-0.031	0.065**	0.012	-0.031
	(0.036)	(0.054)	(0.075)	(0.028)	(0.042)	(0.059)
			Unemployment			
$E^{s'}_{2010}$*post2011	0.013	0.001	0.030	-0.011	-0.004	-0.011
	(0.016)	(0.024)	(0.032)	(0.010)	(0.015)	(0.021)
			Employment			
$E^{s'}_{2010}$*post2011	-0.034	-0.045	-0.062	0.076***	0.017	-0.020
	(0.037)	(0.055)	(0.077)	(0.029)	(0.042)	(0.057)
N	5924	5924	5924	14375	14375	14375

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.