

Increasing the Legal Retirement Age: The Impact on Wages, Hours, Worker Flows and Firm Performance

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Agenda

- 1 Introduction
- 2 The 1993 retirement law reform
- 3 Identification
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Motivation

- Population ageing (lower fertility, higher life expectancy) challenges the sustainability of defined benefit, PAYG systems
- Many countries have raised the legal retirement age (LRA) - at least 17 countries, between 1992 and 98 - and others are considering doing so
- Age discrimination laws are becoming more common
- Little is known about the labour demand/labour market effects of such policy [unions views] - almost all research focuses on labour supply issues

Theoretical background

Labor demand perspective:

- Wages may be above marginal productivity for older workers
- Interactions with firing costs

Literature

- Ashenfelter and Card (AER, 2002): US defined contributions setting end of exemption to university professors from age discrimination laws; decline in retirement rates
- Ichino et al. (IZA DP, 2007): employability of older workers; evidence from displacements; no differences wrt younger workers; but limited evidence about wider impacts

The 1993 retirement law reform

- Law published in September 1993 (*Decreto-Lei* 329/93) determined that the legal retirement age for women (62, at the time) should converge to the same level as men (65), with effect from 1 Jan 1994
- Every year the retirement age would increase by 6 months: e.g. in 1994, women would be entitled to retire only when aged 62 years and 6 months; convergence achieved in 1999
- Quasi-natural experiment: can assess impact of reform by comparing different outcomes between firms similar in all respects except in terms of presence or not of older women

Treatment groups, before and after reform

		Treatment groups by age sets (Before=1992)					
Year:	1992	1994	1995	1996	1997	1998	1999
LRA:	62	62.5	63	63.5	64	64.5	65
	[57.5, 58)						[64.5, 65)
	[58, 58.5)					[64, 64.5)	
	[58.5, 59)				[63.5, 64)		
	[59, 59.5)			[63, 63.5)			
	[59.5, 60)		[62.5, 63)				
	[60, 60.5)	[62, 62.5)					

Evaluation framework

- Y_{it}^D = potential outcome of interest for firm i at time t had they been in state D
- $D = 1$ if exposed to the treatment
- Fundamental identification problem: can't observe individual i in both states, at time t
- However, with appropriate control group, can estimate ATT
- Difference-in-differences (DID) estimator

$$\hat{\alpha}_{\text{DID}} = \{E[Y_{it} | D = 1] - E[Y_{it} | D = 0]\} - \{E[Y_{it'} | D = 1] - E[Y_{it'} | D = 0]\} \quad (1)$$

DID

- Requires time-invariance assumption:

$$E[Y_{it}^0 - Y_{it'}^0 \mid D = 1] = E[Y_{it}^0 - Y_{it'}^0 \mid D = 0], \quad (2)$$

- Time-invariance assumption can be too stringent if treated and control groups are not balanced in covariates that are believed to be associated with the outcome variable (Ashenfelter, AER 1978)
- DID setup can be extended to accommodate a set of covariates:

$$Y_{it} = \lambda D + \tau_t + \theta' Z_{it} + \alpha_D D \tau_t + \varepsilon_{it}, \quad (3)$$

- However, this estimator does not impose common support on the distribution of the Z 's across the cells defined by the D-in-D approach.

DID PSM 1

- We complement the estimator with a matching framework (Rosenbaum & Rubin, *Biometrika* 1983): DDM (Heckman *et al*, *REStud* 1997, Heckman *et al*, *REStud* 1998)
- DDM can eliminate some sources of bias present in non-experimental settings, improving the quality of evaluation results significantly (Smith & Todd, *Jnl Ectrics* 2005)
- DDM particularly appropriate if: 1) rich set of covariates; 2) data compiled by same agency; and 3) can use data for comparison groups from same local labor market (Heckman *et al*, *REStud* 1997). All conditions met here

DID PSM 2

- DDM with panel data: 1) calculate differences over time in dependent variable for each observation; and 2) match treatment and control units using propensity score estimates based on 'before'-period characteristics:

$$\hat{\alpha}_{DDM} = E \left[(Y_t^1 - Y_{t'}^1) - \hat{E} (Y_t^0 - Y_{t'}^0 | P) \right], \quad (4)$$

where $\hat{E}(Y|P)$ represents the expected outcome of individuals in the control group matched with those in the treatment group.

- Requires a conditional mean independence assumption:

$$E [Y_{it}^0 | X, D = 1] = E [Y_{it}^0 | X, D = 0] = E [Y_{it}^0 | X], \quad (5)$$

- Requires a nonparticipant analogue for each participant:
 $\Pr(D = 1 | X) < 1$.

Quadros de Pessoal

- Annual census of all firms with at least one employee, conducted by Ministry of Employment
- All employees of each firm
- Unique identifiers for both firms and employees
- Several variables describing firms (industry, region, sales, equity, no. of workers, ownership type, etc)...
- ... and workers (age, gender, schooling, tenure, occupation, job level, wages, etc)
- Coverage: 1982-... (this paper: 1991-1999)
- Census month: March up to 1993, October from 1994

Inquérito ao Emprego

Labour Force Survey:

- Quarterly rotating panel
- Includes information on the inactive, self-employed, etc
- Period considered: 1992-2000

Compliance analysis (1)

Table: Labor Force Status 1992-2000 (Logit results)

	Labor Force Status:	
	Employment	Inactivity
Female	-1.242 (0.010)	1.333 (0.010)
Age Group	-0.047 (0.028)	0.072 (0.028)
Treated Group	0.272 (0.031)	-0.327 (0.031)
Number of observations	229,066	229,066
Wald test	28,553.6	31,525.4

Source: *Inquérito ao Emprego*. The specification includes 17 age and 8 year dummies. Standard errors in parenthesis.

Compliance analysis (2)

Table: Transition from Employment into Inactivity (Cox Hazard Model with Time-Varying Covariates)

Male	0.309
	(0.069)
Age Group	0.338
	(0.298)
Age Group × Female	-0.311
	(0.177)
Age Group × After	-0.220
	(0.210)
Age Group × After × Female	0.724
	(0.309)
Number of observations	1,167
Wald test	47.3

Source: *Inquérito ao Emprego*. The specification includes 8 year dummies. Standard errors in parenthesis.

Individual wages, hours and absence

- DDM estimates of effects based on comparison of affected women with men of the same age or younger women
- No significant differences found in any variable
- Results robust to use of balanced or unbalanced data

Empirical approach

- Take the percentage of women aged 59-60, 57-60 or 55-60 in 1992 in each firm: if > 0 then the firm is assigned to the treatment group (6k firms); all other firms: control group (74k firms) continuing/all firms
- Compare different flows between 1992 across the two groups
- Kernel matching on firm characteristics in 1992 (size, industry, region, foreign/domestic; worker averages: wages, hours, % women, % older men)
- Approximately 1.2 older women per firm (treatment group)

Job flows - Predicted N (Poisson)

<i>Flow</i>	<i>Year</i>	<i>ATT</i>	<i>SE(ATT)</i>	<i>Treated</i>	<i>Control</i>
H	1995	-0.04	0.18	1394	75675
H	1995-97	-1.23	0.26	3083	54395
H	1995-99	-3.51	0.48	4015	40214
S	1995	-0.30	0.22	1394	75675
S	1995-97	-0.85	0.27	3083	54395
S	1995-99	-2.42	0.39	4015	40214
NJC	1995	0.26	0.24	1394	75675
NJC	1995-97	-0.38	0.20	3083	54395
NJC	1995-99	-1.09	0.25	4015	40214

Hirings, by age-gender groups (1)

<i>Year</i>	<i>ATT</i>	<i>SE(ATT)</i>	<i>AWpF</i>	<i>Treated</i>	<i>Control</i>
Hirings (men older than 25)					
1995	0.09	0.03	1.16	4092	72948
1995-96	-0.01	0.06	1.16	3532	61965
1995-97	-0.15	0.10	1.17	3083	54395
1995-98	-0.08	0.15	1.17	2706	47835
1995-99	-0.04	0.21	1.17	2334	41910
Hirings (women older than 25)					
1995	0.05	0.04	1.16	4092	72948
1995-96	-0.04	0.07	1.16	3532	61965
1995-97	-0.28	0.11	1.17	3083	54395
1995-98	-0.26	0.17	1.17	2706	47835
1995-99	-0.32	0.22	1.17	2334	41910

Hirings, by age-gender groups (2)

<i>Year</i>	<i>ATT</i>	<i>SE(ATT)</i>	<i>AWpF</i>	<i>Treated</i>	<i>Control</i>
Hirings (men 25 or younger)					
1995	-0.04	0.03	1.16	4092	72948
1995-96	-0.16	0.04	1.16	3532	61965
1995-97	-0.30	0.07	1.17	3083	54395
1995-98	-0.33	0.11	1.17	2706	47835
1995-99	-0.41	0.14	1.17	2334	41910
Hirings (women 25 or younger)					
1995	0.16	0.03	1.16	4092	72948
1995-96	-0.15	0.06	1.16	3532	61965
1995-97	-0.51	0.08	1.17	3083	54395
1995-98	-0.76	0.11	1.17	2706	47835
1995-99	-1.06	0.14	1.17	2334	41910

Performance - Predicted N (Poisson)

<i>Variable</i>	<i>Year</i>	<i>ATT</i>	<i>SE(ATT)</i>	<i>Treated</i>	<i>Control</i>
Sales	1995	-8.19	3.07	1293	79462
Sales	1995-97	-8.49	2.68	3364	65553
Sales	1995-99	-11.19	2.72	5324	57310
Net sales	1995	-7.99	2.95	1293	79462
Net sales	1995-97	-7.58	2.54	3364	65553
Net sales	1995-99	-9.19	2.55	5324	57310
Sales pw	1995	-0.35	0.23	1307	79086
Sales pw	1995-97	0.04	0.18	3392	65278
Sales pw	1995-99	-0.09	0.17	5379	57084
Net sales pw	1995	-0.35	0.23	1307	79086
Net sales pw	1995-97	0.04	0.18	3392	65278
Net sales pw	1995-99	-0.08	0.16	5379	57084

Conclusions

- Compliance with new retirement age: stocks and transitions of women forced to stay longer in labor market changed as expected
- No sizeable effects upon the wages and hours of work of those women forced to be retained by their firms
- Fewer hirings (specially among young women) between one and two fewer hirings per older woman retained in the firm
- Fewer separations (evidence from QP and IE)
- Smaller firms (hirings effect tends to be stronger than separations effect)
- Slight but significant decrease in firm performance