A clash of generations? Increase in Retirement Age and Labor Demand for Youth

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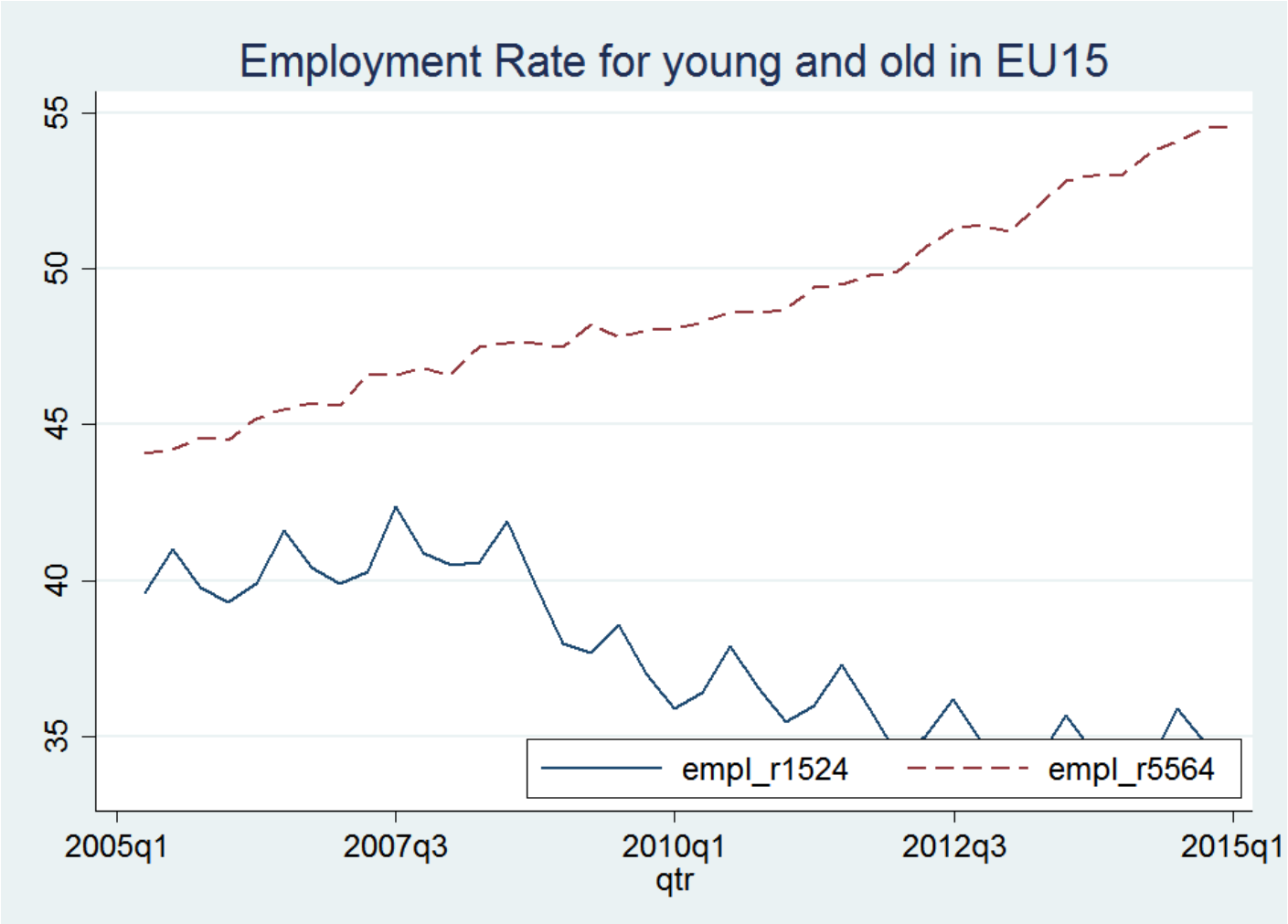
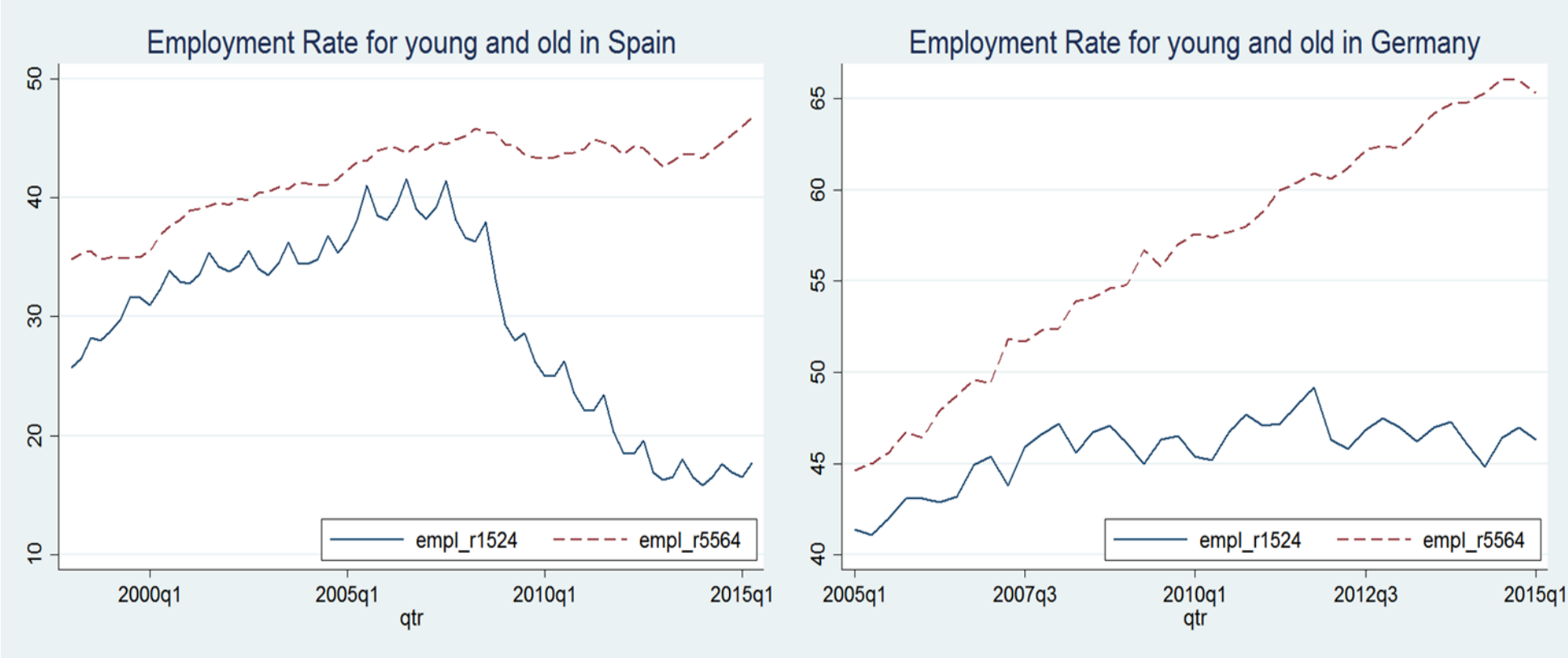
Young and older workers: divergent dynamics in the EU

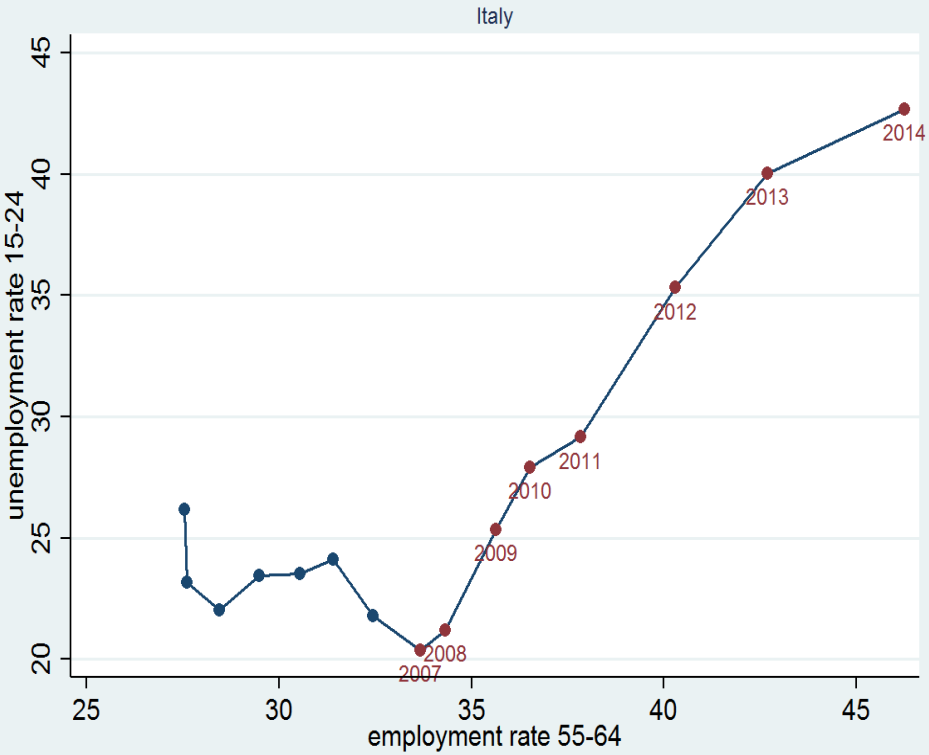
Figura: Employment rate for youth (15-24) and older (55-64) workers in EU15

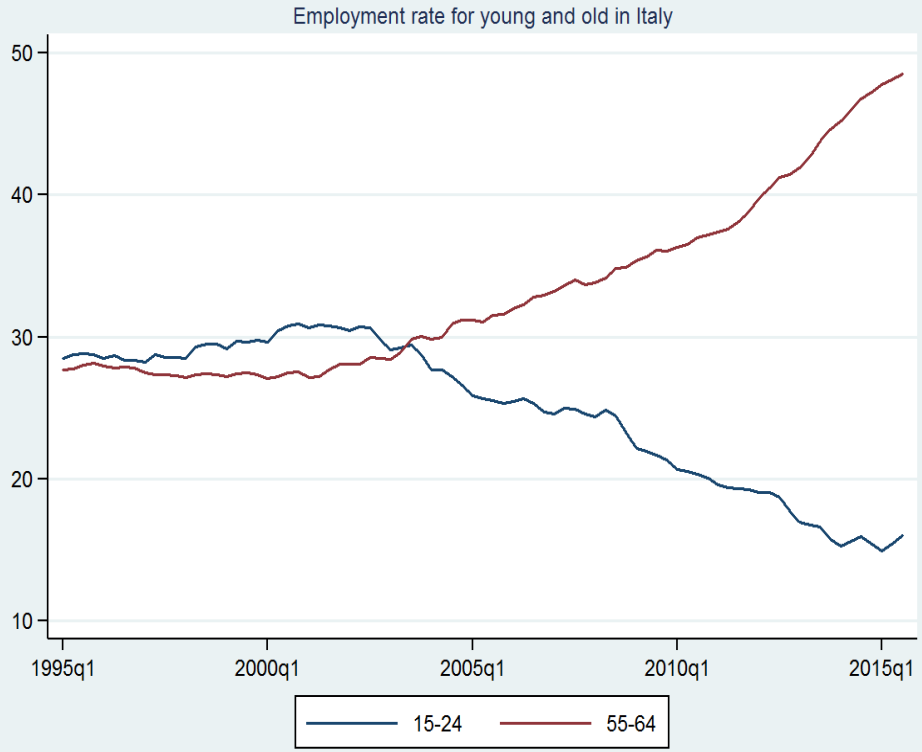


Old-in Young-out in Spain, but not in Germany



Dramatic old-in young-out in aggregate Italian data

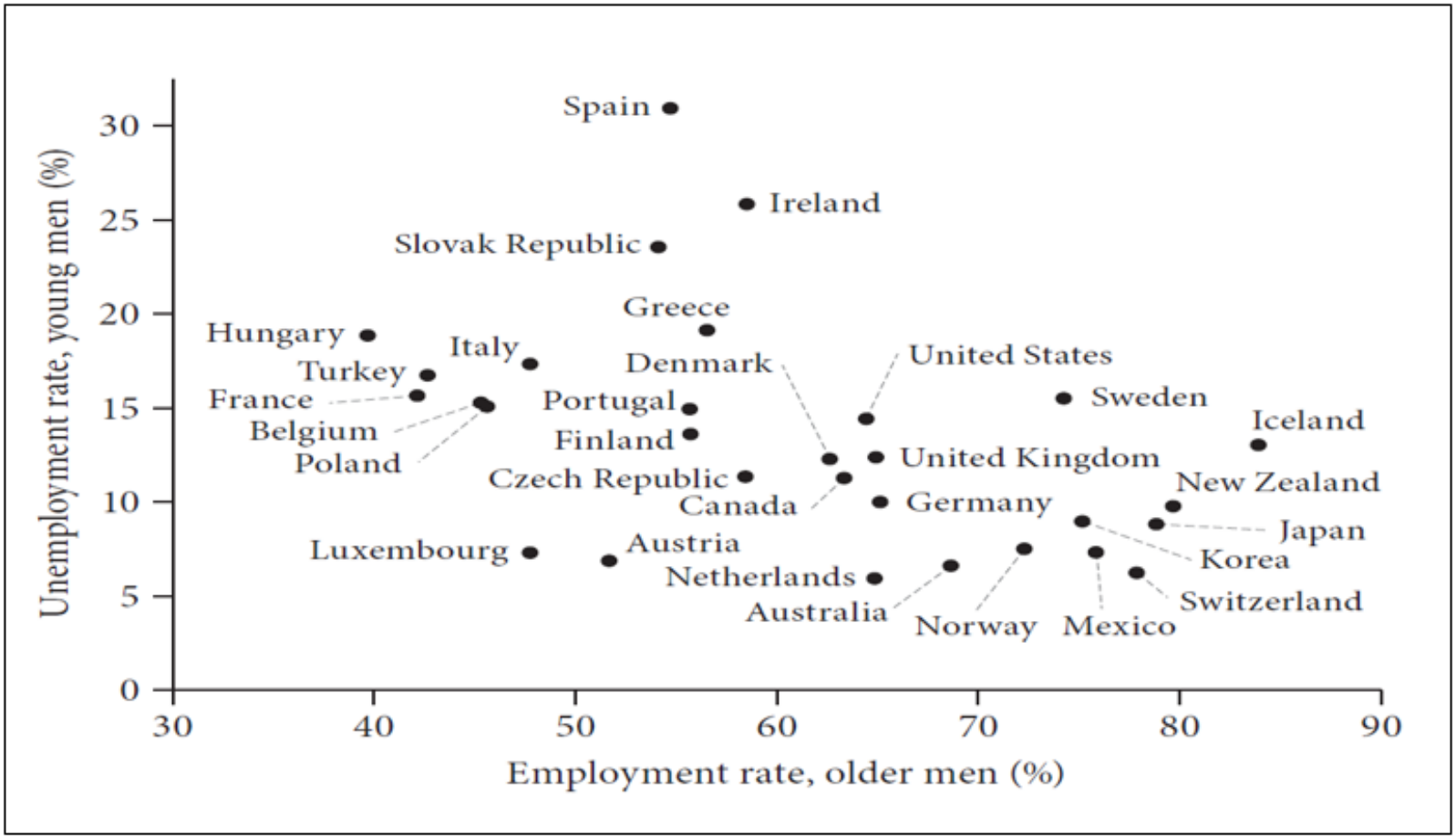




Cyclical and structural reasons behind older / young divergence

- Cohort effects (increase in female participation) and increase in retirement age can account for increase in employment rates of the over 55
- The Great recession and dual labor market partially account for increase in youth unemployment (Boeri and Garibaldi, The Honeymoon Effect of Temporary Reforms, 2007)
- Any connection between the two phenomena?

In the long run: no lump of labor ...



Fonte: Boeri, Van Ours, 2013. *The economics of imperfect labor markets*.

Yet, in the short run, during a recession...

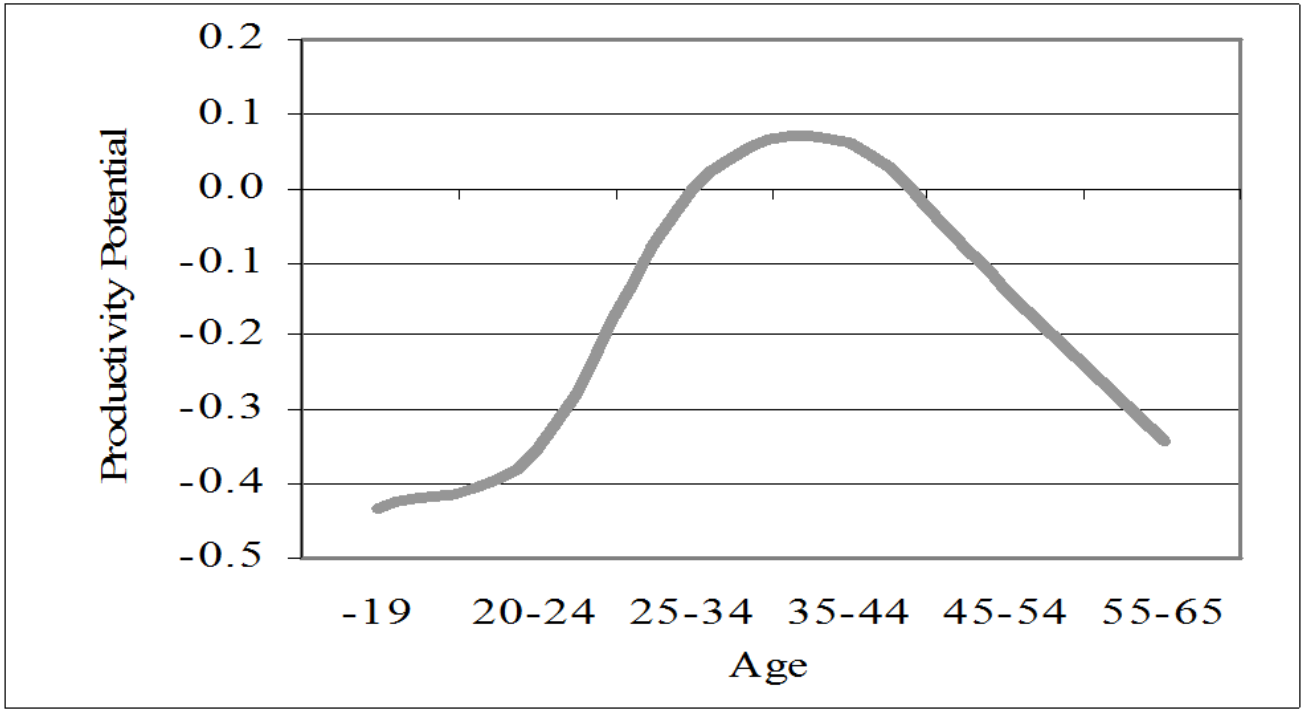
- A sudden increase in retirement age in a labor market characterized by strong employment protection may have short run (negative) effects on youth employment
- This happens even when there is complementarity in production between young and older workers

- Motivation
- **Conceptual framework**: Labor demand with heterogeneous age groups
- Minimalist model with unexpected temporary change in retirement
- The 2011 Monti-Fornero reform as a natural experiment
- Data
- Results and Robustness

Production Technologies: A Standard Production FUnction

- two inputs, labor N and capital K
- in the long run, both N and K are flexible, and $F(N, K)$ is quasi-concave and exhibits constant returns to scale
- we focus on labor demand and abstract from capital, hence we assume that $y = f(N) \equiv F(N, K)$ for some K.
- then $f'(N) > 0$, $f''(N) < 0$
- considering Cobb-Douglas $y = AN^{\alpha}$, with $A = K^{1-\alpha}$.
- N is a **composite index** for total labor

Age distribution and productivity hump shaped: general skills



Source: Garibaldi et al. *Health and employment, OUP*.

Marginal product of different cohorts

- The labor force consists of young, prime-age, and older workers, L_1, L_2 and L_3
- the number of efficiency units of labor they produce is given by

$$N = g(L_1, L_2 + aL_3)$$

  g exhibits constant returns to scale
- Hence the prime-age and the older workers are perfect substitutes, but supply different numbers of efficiency units of labour
- $a < 1$, in order to be coherent with the evidence on the age productivity profiles
- older and prime-age workers closer substitutes than older and young.
- $g_{12} > 0$ young old complementarity; $g_{12} = 0$ substitutes

Overlapping generations

- In each period, a unit mass of workers is born and die
- Workers are risk neutral and maximize the present discounted value of their income stream
- Workers who are young in period t, are prime-age in period $t+1$ and older in period $t+2$. Thereafter they die.

Labor Demand and Market Equilibrium: Representative Firm

- In the initial equilibrium, all older workers retire and individuals spend at most 2 periods in the employment relationship.
- A young worker who is hired in period t will be prime-age in period $t+1$.
- If there are no adjustment costs nor employment protection legislation (EPL), the firm can adjust L_1 and L_2 freely in each period, and the problem is static.
- If EPL is extreme- as we assume - the firm faces the constraint that $L_2^{t+1} \geq L_1^t$.
- Hence the firm's problem is inherently dynamic, and can be solved as a Kuhn-Tucker problem with a set of complementary slackness conditions.

Youth Demand pre reform

- Solving using Kuhn-Tucker the firm's dynamic problem, we have

$$f'(N)g_1(L_1, L_2) = w_1 \quad (1)$$
$$f'(N)g_2(L_1, L_2) = w_2 \quad (2)$$

- where

$$N = g(L_1, L_2) \quad (3)$$

Pre-reform equilibrium

- Market clearing requires that $L_1 = L_2 = 1$, and this determines wages w_1 and w_2
- in any period, the representative firm's stock of prime workers are the young employees in the previous period
- Since wages of prime-age workers are equal to their productivity, the representative firm on the margin is indifferent between retaining them or not, and will retain them
- Hence the representative firm only hires young workers.
- As prime age workers cannot be fired, the firm will have to renew the contract to all the workers who were young in the previous period. In the pre-reform period, this constraint does not bind.

Employment effects of Pension reforms

- A reform that increases the retirement age for one period only.
- the government, unexpectedly, and for one period only, labeled T, requires that the firm employs ΔL older workers.
- the retirement age of the youth will thus not change and they will retire regularly after 2 periods
- more subtle than a temporary increase in labor supply since most of the individuals involved are already employed and can not be easily fired
- a pension reform increasing the retirement age involves a *forced expansion at the firm level.*
- With flexible wages, wages of both young and prime aged workers will adjust so that demand again equals supply.
- Wages for prime age workers will certainly fall, while the wages for young workers may fall or increase

The employment effects with fixed wages

- wages are fixed in the period the shock occurs, but are flexible in period $T+1$. Hence the marginal productivity of prime age workers in that period is equal to his wage
- As a result, the continuation value of hiring a young worker in period T in period $T+1$ is zero.

Youth Labor Demand with Forced expansion of Old

- The effect of ΔL on dL_1

$$\begin{aligned} \frac{dL_1}{d\Delta L} &= -\frac{f'(N)g_{12} + f''(N)g_1 g_2}{f''(N)g_1^2 + f'(N)g_{11}} \\ &= k\left[f'(N)g_{12} + f''(N)g_1 g_2\right] \end{aligned} \tag{4}$$

where $k = -1/(g_1^2 f''(N) + f'(N)g_{11}) = -1/\tilde{f}_{11} > 0$.

- Thus, a forced expansion has two effects.
  1. the *degree of complementarity* between young and older workers: if $g_{12} > 0$, more older workers increase the marginal productivity of young workers, increasing hires of new workers
  2. *decreasing returns to scale in production* reduce hiring of young workers.

Examples with specific production functions

1. case where young and older workers are **perfect substitutes**: $g(L_1, L_2) = a_1 L_1 + a_2 L_2$. Hence $g_1 = a_1, g_2 = a_2, g_{12} = g_{11} = g_{22} = 0$. Thus $\frac{dL_2}{\Delta L} = -a_2/a_1$ more older workers employed reduce young workers, one by one.
2. with **Leontief technology**, more older workers implies more young
3. Suppose that $f(N) = AN^{\alpha}$ and g is a **CES** , $g(L_1, L_2) = (L_1^{\rho} + L_2^{\rho})^{\frac{1}{\rho}}$. Let $I = L_0/L_1$,

$$\frac{dL_1}{\Delta L} = -\frac{I(\rho - \alpha)}{1 - \rho + (1 - \alpha)I^{\rho}} \tag{5}$$

   Hence, young workers decreases with ΔL whenever $\rho > \alpha$.

4. Suppose that g is **Cobb-Douglas**, $g(L_1, L_2) = L_1^{\beta} L_2^{1-\beta}$

$$\frac{dL_1}{d\Delta L} = \frac{\alpha\beta}{1 - \alpha\beta} I > 0 \tag{6}$$

   An increase in L_2 always increases L_1.

Heterogeneity

- Firms have the same production technology, but vary in terms of their capital stock K. Since both F and g exhibit constant returns to scale, so does the composite function. Hence the first order conditions are functions of K and the intensities, $l_i = Li/K$, $i = 1, 2, 3$,

$$F_1(g, 1)g_1(l_1, l_2) = w_1 \quad (7)$$
$$F_1(g, 1)g_2(l_1, l_2) = w_2 \quad (8)$$

- l_1 and l_2 are independent of k
- suppose that the reform forces the firm to increase its labor force by ΔL_2 units. Since $\Delta l_2 = \frac{\Delta L_2}{K}$, it follows that l_2 increases by $\Delta L_2/K$ units.

The question is Empirical

- if we have a cross section of firms i subject to a forced expansion driven by a temporary pension reform, we want to estimate the following relationship

$$\Delta L_0^i = \gamma \Delta L_2^i \tag{9}$$

where $\Delta^i L_2$ is the number of locked-in workers in firm i.

- The sign of γ can be positive or negative, depending on the relative size of the complementarity effect and the scale effect.
- We also consider the variation in youth employment at given wages, and other firm specific variables, a more general relationship is

$$\Delta L_0^i = \gamma \Delta L_2^i + \beta X^i \tag{10}$$

where X^i is a vector of firm specific variables.

- Note that a negative sign of the γ coefficient implies a short run crowding out youth labor demand by the pension reform.

The 2011 Monti Fornero Reform

- In November 2011, Italy experienced a financial crisis. There is a run on the Italian public debt. Spread over German bonds rise above 500 basis points
- Forced by international institutions (the Euro is at risk), the centre right government headed by Berlusconi resigns in November 2011
- A technocrat government headed by Mario Monti (Elsa Fornero as labor minister) takes immediately office and avoids intervention of the Troika (IMF, ECB EU) by approving tough austerity reform
- In December 2011, the *Decreto Salva Italia* is enacted, including a large temporary increase in retirement age

Immediate and tough response from the Monti Government

The Content of the Reform

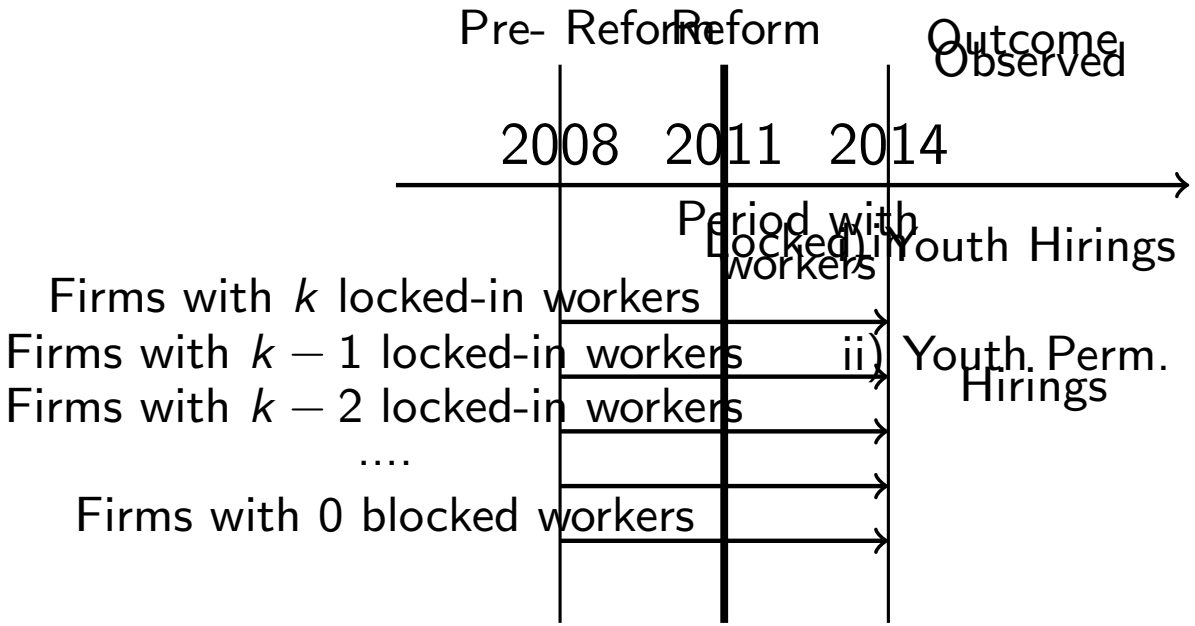
- Large tightening of **Early Retirement** as of January 1 2012
  - Before the reform, 40 years of contributions were sufficient for early retirement
  - After the reform, female workers private sector need 41 years and 1 months of contributions. With a further one month increase in 2014 and 2015
- Immediate increase of **Regular Retirement** of one year for man and two years for women hired before 1996
  - Furhter increases up to 2020
- **No basic changes in rules for those hired after 1996** No changes for the youth

The Monti Fornero Reform of 2011: private sector workers

	Requirements ante reforms			Requirements post reform Fornero	
year	age limit men	age limit women	mobile window	age limit men	age limit women
2011	65	60	12 mesi		
2012	65	60	12 mesi	66	62
2013	65 e 3 mesi	60 e 3 mesi	12 mesi	66 e 3 mesi	62 e 3 mesi
2014	65 e 3 mesi	60 e 4 mesi	12 mesi	66 e 3 mesi	62 e 9 mesi
2015	65 e 3 mesi	60 e 6 mesi	12 mesi	66 e 3 mesi	62 e 9 mesi
2016	65 e 7 mesi	61 e 1 mesi	12 mesi	66 e 7 mesi	65 e 7 mesi
2017	65 e 7 mesi	61 e 5 mesi	12 mesi	66 e 7 mesi	65 e 7 mesi
2018	65 e 7 mesi	61 e 10 mesi	12 mesi	66 e 7 mesi	
2019	66	62 e 9 mesi	12 mesi	67	
2020	66	63 e 3 mesi	12 mesi	67	

The Temporary Change in Retirement at time t

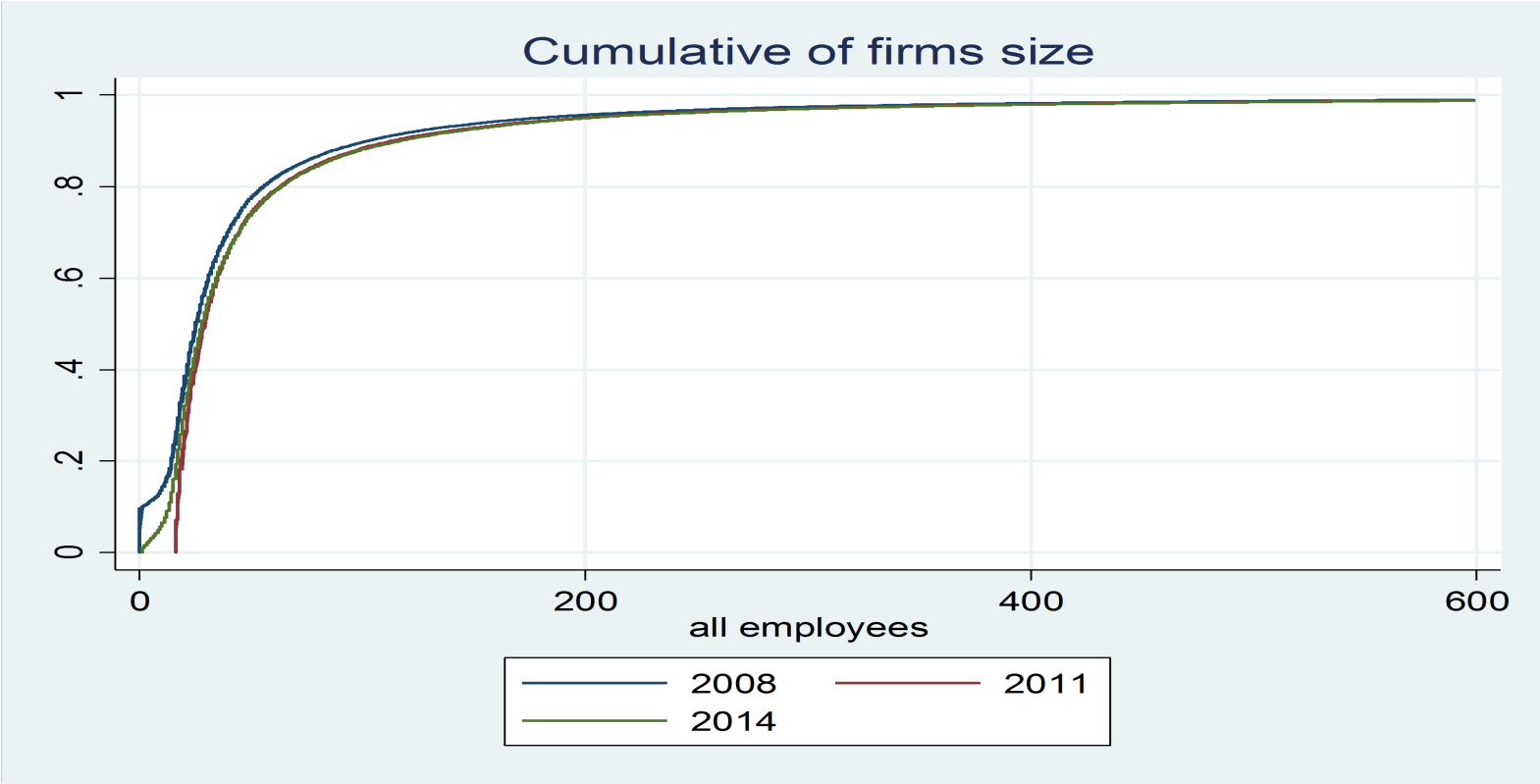
Figura: Fornero Monti Reform as a natural experiment



Data and Sample

- Continuing Private sector firms with more than 15 employees active between 2008 and 2014 (approximately 80.000 firms)
- We observe worker characteristics and whether retirement has been postponed by the reform (reconstruction from social security records). We know how many workers are locked-in (*bloccati*) from the reform and for how many years.
- We define (and measure) *locked_in_years* as number of workers-years locked-in by the reform.
- We can also divide firms in two groups: those with at least one worker locked-in (*treatment group*) and firms without locked-in workers (*control group*)

Firm Size


Cumulative of firms size
0
.2
.4
.6
.8
1
0
200
400
600
all employees
2008
2011
2014

Outcome: employment changes of workers below age of 30

- Basic Definition

$$young_{i,t+1} = young_{i,t}(1 - \delta_i) + h_{i,t} - s_{i,t}$$

where h_{it} is gross hirings between t and $t-1$, $s_{i,t}$ is gross separations, and $\delta_i * young_{i,t}$ are the number of youth workers that pass the age threshold between time t and time $t+1$.

- gross change $dyoung_{i,t+1}$, as the change in youth employment between t and $t+1$

$$dyoung_{i,t+1} = h_{i,t} - s_{i,t} - \delta_i * young_{i,t}$$

- When we restrict the analysis to permanent workers, the variable is labelled $dyoungperm_{i,t+1}$.

Firms with locked-in workers in December 2011

Tabella: Share of Firms with locked-in workers in December 2011

locked-in	Freq.	Percent	Cum.
0	50,954	64.42	64.42
1	16,164	20.44	84.86
2	5,667	7.16	92.02
3	2,496	3.16	95.18
4	1,202	1.52	96.70
5	710	0.90	97.60
6	452	0.57	98.17
7	304	0.38	98.55
8	214	0.27	98.82
9	180	0.23	99.05
10	136	0.17	99.22
11	112	0.14	99.37
12	84	0.11	99.47
13	82	0.10	99.58
..	...	....	....
24	9	0.01	100.00
Total	79,093	100.00	

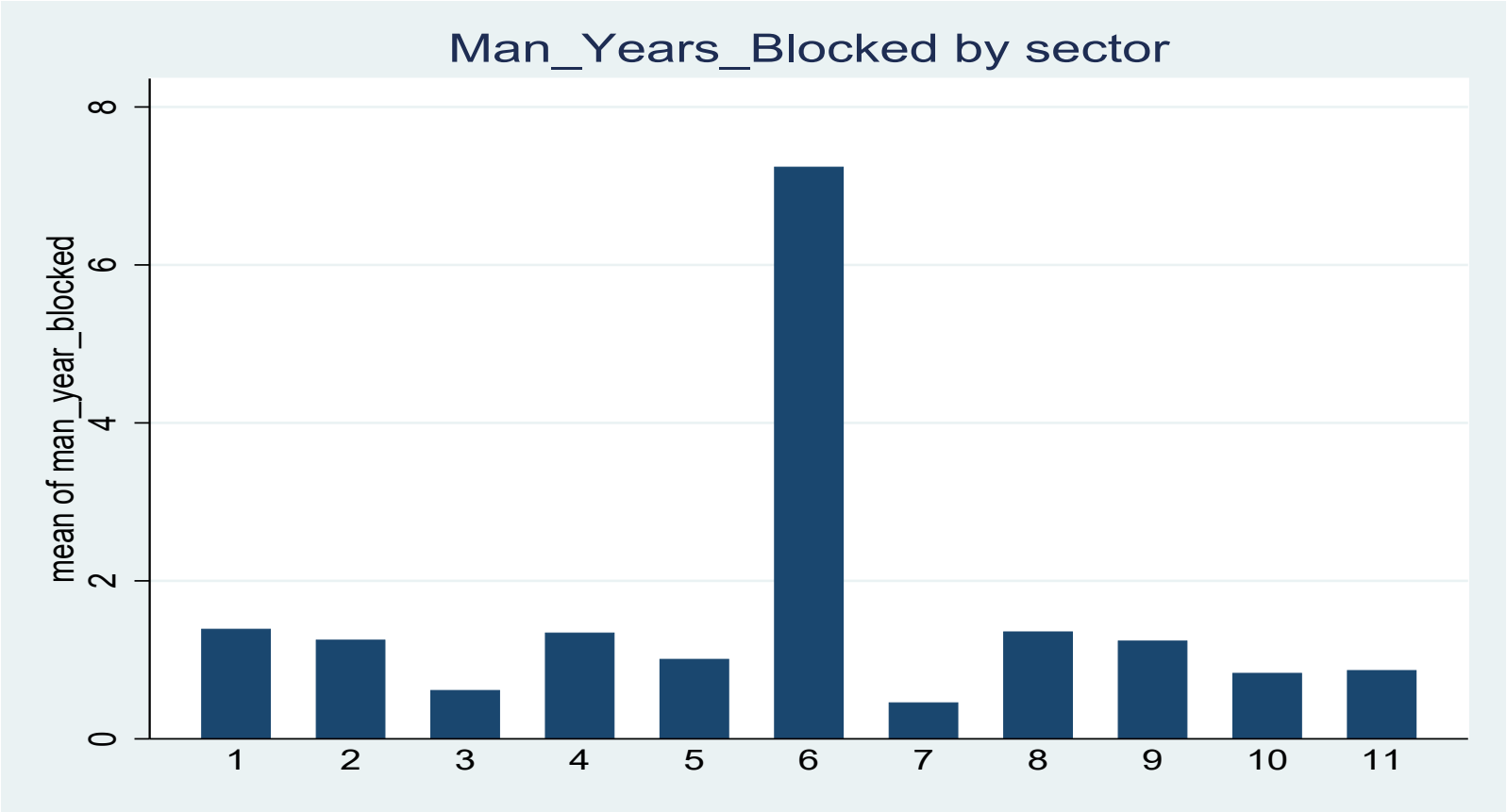
- We limit size up to 99th percentile (670 employees). For large firms probability of being in the treatment is one.

Descriptive Statistics
Firms with locked-in labor force are Larger and Pay More

Tabella: Descriptive Statistics for Outcome

	Pre-Treat 2008-2011	Pre-Control 2008-2011	Post-Treat 2011-2014	Post-Control 2011-2014
totworkers	134.1	33.85	141.7	37.70
menshare	0.630	0.579	0.651	0.615
womshare	0.338	0.362	0.349	0.385
blueshare	0.557	0.532	0.556	0.560
whiteshare	0.348	0.342	0.376	0.377
w	26647.4	21948.8	29509.5	25071.9
wperm	25866.4	20763.8	28893.2	24225.5
wyperm	16498.6	14149.0	15397.1	13333.3
woperm	30351.3	15922.8	32894.0	22603.4
wyoungold	0.646	0.804	0.542	0.609
N	28439	50954	28439	50954

locked_in_years by sector



1= agriculture and fishing; 2= manufacturing 3= constructions 4= transportation and trade, accommodation and food service activities; 5= information and communication; 6= financial and insurance activities; 7= real estate 8= professional, scientific, technical activities 9= public defence, education, human health and social work; 10= arts and recreational activities

Descriptive statistics
Destruction of Youth Jobs Also in 2008-2011

Tabella: Average Change in Youth Employment and Durata

	Pre-Treat 2008-2011	Pre-Control 2008-2011	Post-Treat 2011-2014	Post-Control 2011-2014
dyoung	-1.75	0.46	-3.25	-1.42
dyyoungperm	-1.55	0.11	-2.84	-1.01
dyoungtemp	-0.21	0.35	-0.42	-0.42
durata	0	0	10.98	0
N	28439	50954	28439	50954

Regression Analysis: Measure the Intensity of Block

- *locked_in_years* are year-workers locked-in for firm i in December 2011
- Baseline Specification

$$dyoung_i = \alpha + \beta X_i' + \gamma * locked\_in\_year_i + \epsilon_i$$

  - X_i' vector of variables for firm i

$$dyoung_{it} = \alpha + \beta X_{it}' + \delta t + \gamma * locked\_in\_year_{it} + \epsilon_{it} \quad (11)$$

* γ is coefficient of interest. $\gamma < 0$ implies that blocks reduce youth hiring

$$young_{it} = \alpha_i + \beta X_{it} + \gamma * locked\_in\_year_{it} + \epsilon_{it} \quad (12)$$

Outline

- Motivation
- Conceptual framework: Labor demand and retirement age with heterogeneous (and non essential) labor
- Minimalist model with unexpected temporary change in retirement age
- The 2011 Monti-Fornero reform as a natural experiment
- Data
- **Preliminary Results and Robustness**

Tabella: Basic Specification on *dyoung*

VARIABLES	(1) dyoung	(2) dyoung	(3) dyoung	(4) dyoung	(5) dyoung
locked_in_year	-0.119***	-0.124***	-0.137***	-0.134***	-0.134***
	(0.0295)	(0.0389)	(0.0435)	(0.0433)	(0.0432)
totworkers		0.0146***	0.0144***	0.0129***	0.0133***
		(0.00327)	(0.00331)	(0.00332)	(0.00331)
totworkers2		-3.23e-05***	-3.11e-05***	-2.87e-05***	-2.92e-05***
		(8.59e-06)	(8.62e-06)	(8.64e-06)	(8.65e-06)
oldshare			3.262***	3.625***	3.531***
			(0.644)	(0.643)	(0.639)
dwageo				1.54e-05***	1.57e-05***
				(2.11e-06)	(2.12e-06)
dwagey				3.99e-05***	4.03e-05***
				(2.73e-06)	(2.77e-06)
Lblueshare					2.551***
					(0.666)
Lwhiteshare					2.520***
					(0.732)
Lwomshare					0.272***
					(0.103)
Constant	-1.362***	-1.841***	-2.093***	-2.075***	-4.557***
	(0.0724)	(0.0822)	(0.0914)	(0.0916)	(0.639)
Observations	78,540	78,540	78,540	78,540	78,540
R-squared	0.009	0.012	0.013	0.016	0.017

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Tabella: Basic Specification on *dyoung* with 2008 observations

VARIABLES	(1) dyoung	(2) dyoung	(3) dyoung	(4) dyoung	(5) dyoung	(6) dyoung
locked_in_year	-0.119***	-0.0993***	-0.0958***	-0.0792***	-0.0782***	-0.0786***
	(0.0295)	(0.0306)	(0.0309)	(0.0284)	(0.0284)	(0.0284)
t_2014	-1.234***	-1.271***	-1.271***	-0.292***	-0.302***	-0.248***
	(0.0812)	(0.0798)	(0.0787)	(0.0739)	(0.0739)	(0.0785)
totworkers		0.00563*	0.00571*	0.000322	0.000303	0.000206
		(0.00337)	(0.00336)	(0.00334)	(0.00337)	(0.00333)
totworkers2		-2.40e-05**	-2.42e-05**	-2.42e-05**	-2.42e-05**	-2.41e-05**
		(1.16e-05)	(1.16e-05)	(1.16e-05)	(1.16e-05)	(1.16e-05)
oldshare			-0.995***	1.511***	1.581***	1.432***
			(0.362)	(0.354)	(0.347)	(0.339)
dwageo				1.17e-05***	1.20e-05***	1.20e-05***
				(1.44e-06)	(1.45e-06)	(1.45e-06)
dwagey				4.60e-05***	4.62e-05***	4.63e-05***
				(2.14e-06)	(2.23e-06)	(2.27e-06)
Lblueshare					1.221	
					(0.879)	
Lwhiteshare					1.252	
					(0.951)	
Lwomshare					0.886***	
					(0.0760)	
blueshare2008						0.173
						(0.259)
whiteshare2008						0.128
						(0.295)
womshare2008						0.811***
						(0.0761)
Constant	-0.128***	-0.236**	-0.160	-1.105***	-2.582***	-1.540***
	(0.0394)	(0.109)	(0.119)	(0.119)	(0.919)	(0.315)
Observations	157,107	157,107	157,107	149,436	149,436	149,436
R-squared	0.009	0.011	0.011	0.014	0.015	0.014

Robust standard errors in parentheses

Tabella: Panel Specification on *young*, Fixed Effects

VARIABLES	(1) young	(2) young	(3) young	(4) young
locked_in_year	-0.222***	-0.195***	-0.178***	-0.160***
	(0.00888)	(0.0104)	(0.0103)	(0.0101)
totworkers		0.179***	0.179***	0.186***
		(0.00419)	(0.00419)	(0.00503)
totworkers2		-4.71e-05***	-4.68e-05***	-5.45e-05***
		(1.38e-05)	(1.38e-05)	(1.49e-05)
oldshare			-6.910***	-5.772***
			(0.258)	(0.257)
woperm				-1.31e-05***
				(1.39e-06)
wyperm				-5.98e-06***
				(1.95e-06)
Constant	7.305***	-1.255***	-0.759***	-0.771***
	(0.00706)	(0.149)	(0.150)	(0.171)
Observations	235,794	235,794	235,794	228,057
R-squared	0.015	0.370	0.373	0.341
Number of id	78,807	78,807	78,807	78,754

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Tabella: Panel Specification on *youngperm*, fixed effects

VARIABLES	(1) permy	(2) permy	(3) permy	(4) permy	(5) permy
locked_in_year	-0.147***	-0.189***	-0.170***	-0.157***	-0.147***
	(0.00840)	(0.00767)	(0.00848)	(0.00844)	(0.00840)
totworkers	0.125***		0.123***	0.123***	0.125***
	(0.00398)		(0.00321)	(0.00321)	(0.00398)
totworkers2	-2.83e-05**		-2.62e-05**	-2.60e-05**	-2.83e-05**
	(1.14e-05)		(1.07e-05)	(1.07e-05)	(1.14e-05)
oldshare	-4.396***			-5.174***	-4.396***
	(0.201)			(0.200)	(0.201)
woperm	-1.11e-05***				-1.11e-05***
	(1.15e-06)				(1.15e-06)
wyperm	9.39e-06***				9.39e-06***
	(1.69e-06)				(1.69e-06)
Constant	0.117	5.699***	-0.239**	0.133	0.117
	(0.135)	(0.00610)	(0.114)	(0.114)	(0.135)
Observations	228,057	235,794	235,794	235,794	228,057
R-squared	0.267	0.018	0.298	0.301	0.267
Number of id	78,754	78,807	78,807	78,807	78,754

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Tabella: Basic Specification on *dyoungpermnet*

VARIABLES	(1) dpermy	(2) dpermy	(3) dpermy	(4) dpermy	(5) dpermy
locked_in_year	-0.103***	-0.0924***	-0.100***	-0.0981***	-0.0972***
	(0.0258)	(0.0305)	(0.0336)	(0.0335)	(0.0334)
totworkers		0.00724***	0.00711***	0.00565**	0.00599**
		(0.00253)	(0.00255)	(0.00256)	(0.00255)
totworkers2		-2.28e-05***	-2.20e-05***	-1.97e-05***	-2.01e-05***
		(6.46e-06)	(6.48e-06)	(6.49e-06)	(6.49e-06)
oldshare			2.053***	2.392***	2.284***
			(0.490)	(0.486)	(0.481)
dwageo				1.12e-05***	1.15e-05***
				(1.57e-06)	(1.58e-06)
dwagey				4.13e-05***	4.20e-05***
				(1.85e-06)	(1.92e-06)
Lblueshare					3.002***
					(0.622)
Lwhiteshare					3.096***
					(0.678)
Lwomshare					0.302***
					(0.0818)
Constant	-1.050***	-1.264***	-1.422***	-1.388***	-4.346***
	(0.0631)	(0.0625)	(0.0688)	(0.0692)	(0.594)
Observations	78,540	78,540	78,540	78,540	78,540
R-squared	0.012	0.014	0.015	0.019	0.021

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Size of the Effect

- For an average firm (*durata* 2.7 anni e *dyoung* -2.1) an increase in 1 % of length of the block there is a reduction of 0,2 % of youth hiring
- 5 years block in a firm induce a lost job for a youth
- For private firms with more than $>$ 15 employees, the block destroyed 36745 youth jobs
- Total number of employees locked-in is 90000 in the sample
- The number represent 22 % of total employment losses for under 30 in the 2011-14 period

Robustness: Propensity Score and Placebo

- Block is clearly exogenous in december 2011. Yet firms that are locked-in are different than control groups (typically larger)
- These (observed and unobserved) differences across firms may be correlated with the probability of reducing youth employment in 2011-2014
- Three robustness tests
  1. Propensity Score: Matching control and treatment group on observable variables
  2. Rolling Regressions: Divide sample into cells of similar size/sector of at least 100 cells and check effects
  3. Placebo regression: Running regressions on 2008/2011 when reform was not in place (falsification)

Propensity Score

- Use observable variables to create two homogeneous sample of firms
- The two sample of firms (treated and non treated) should not differ in terms of average size, sector of operation, share of blue collar, share of women in the labor force and share of white collar
- Use the two generated samples by estimating the effect of durata on youth employment

Is Matching Successful?
(null hypothesis=mean of the two groups do not differ after matching)

	Mean			Test		
Variable	Treated	Control	bias	t	$p > \|t\|$	$V(T)/V(C)$
sizecat	1.8094	1.8812	-9,1	283.74	0.000	0.99
settore	4.0871	3.952	5.2	40.69	0.000	1.09
oldshare	.10921	.09957	11.3	141.16	0.000	0.81*
blueshare	.51012	.5758	-19.0	-40.21	0.000	1.11*
womshare	.46205	.35721	36.5	-21.52	0.000	0.99
whiteshare	.42269	.36722	17.5	14.65	0.000	1.08*
* if variance ratio outside [0.93; 1.07]						
Ps R2	LR chi2	p¿chi2	MeanBias	MedBias	B	R
0.079	2903.67	0.000	16.5	14.4	2.0	1.03
* if $B > 25\%$, R outside [0.5; 2]						

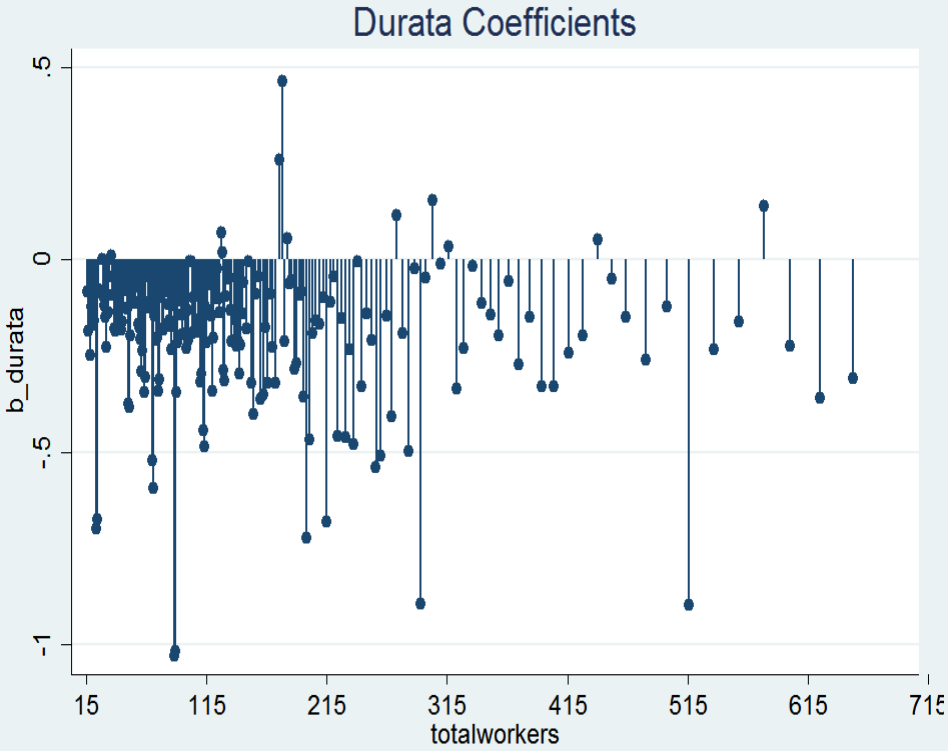
Regression with Matched sample by Propensity Score

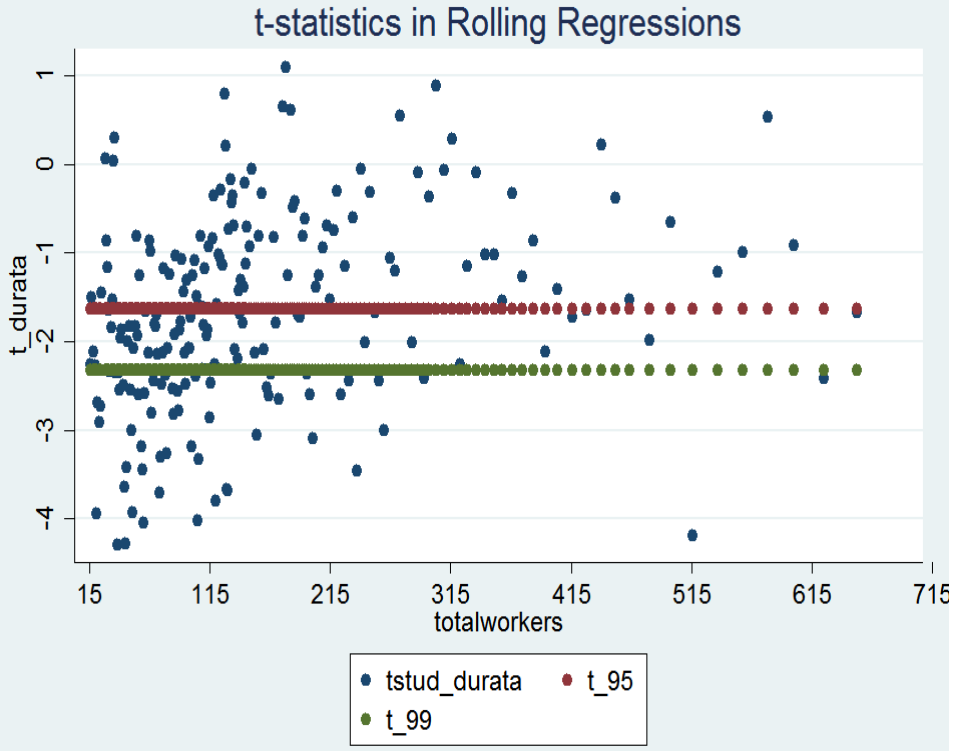
VARIABLES	(1) dyoung
locked_in_year	-0.142***
	(0.00166)
sizecat	-0.826***
	(0.0325)
settore	0.273***
	(0.0108)
oldshare	9.958***
	(0.245)
blueshare	-0.712***
	(0.188)
womshare	0.398***
	(0.103)
whiteshare	-3.038***
	(0.214)
Constant	0.0337
	(0.201)
Observations	462,566
R-squared	0.031

Dependent variable is change in youth employment, r
regardless of contract
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Rolling Regressions
Coefficients on Durata for groups of firms with similar size

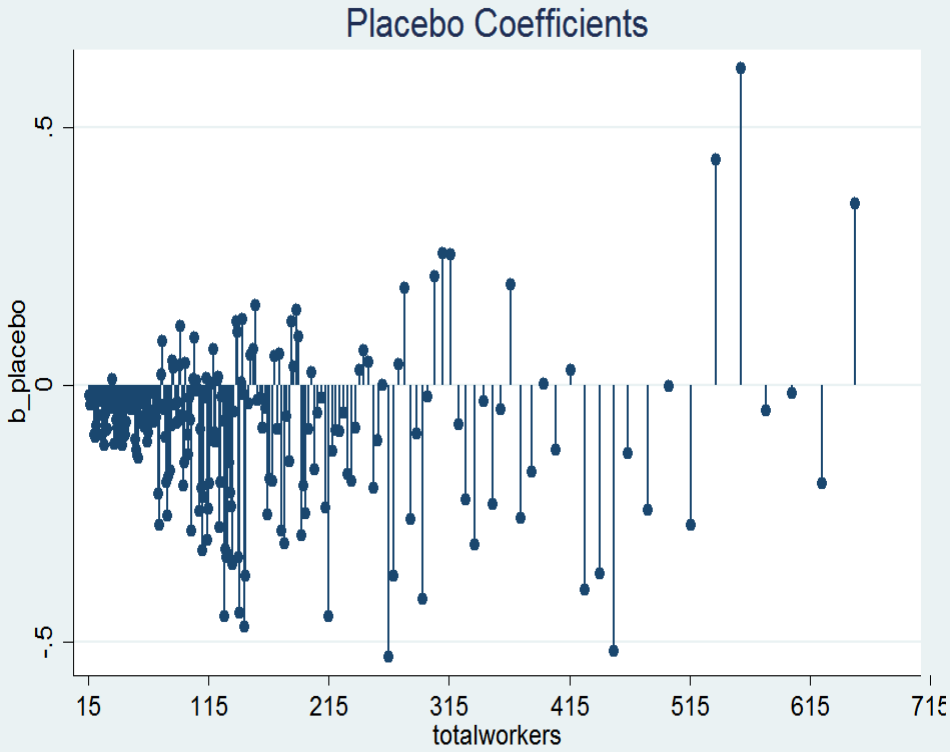
- Controls: blueshare, whiteshare,oldshare, womshare, totworkers

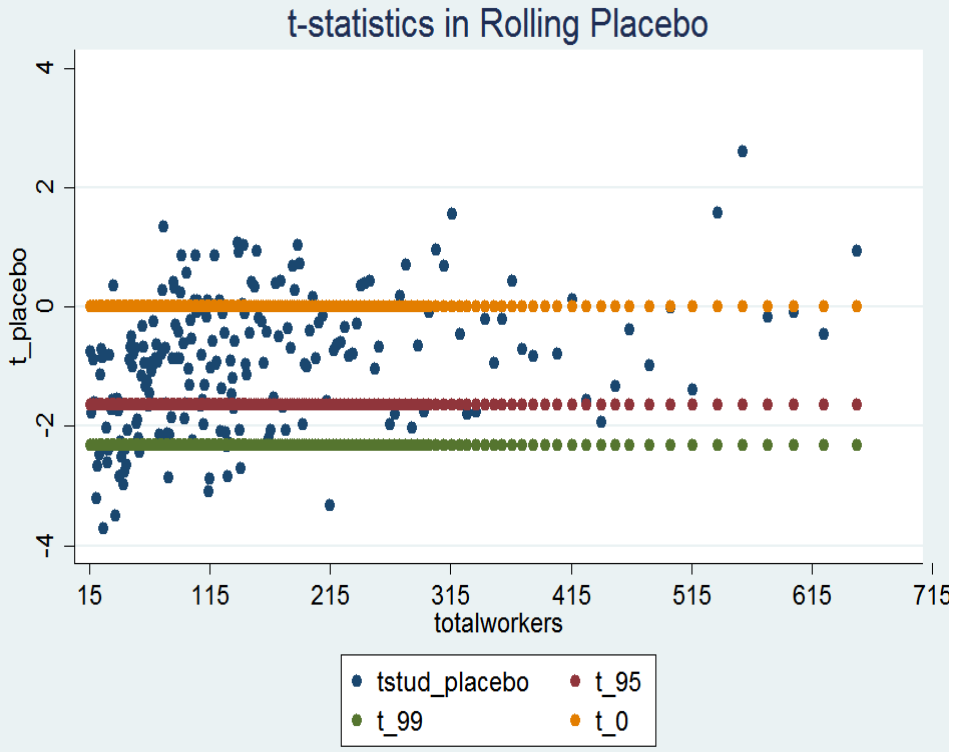




Placebo Rolling Regressions
Coefficients on Durata for group of firms with similar size

- Controls: blueshare, whiteshare,oldshare, womshare, totworkers





Summary on Rolling

Tabella: Summary Statistics on Rolling Regressions

Variable	Regressions	Mean	Std. Dev.	Min	Max
$\gamma_{locked\_in\_year}$	212	-.1950317	.1898069	-1.029677	.4631037
$\gamma_{placebo}$	212	-.0900956	.1550128	-.5286243	.6158376

- *locked-in-year* in 200 out of 212 regressions has negative coefficient (in 65 per cent of cases significant at 10 per cent
- *placebo* in 78 out of 212 regressions has negative and significant coefficient

Conclusions

- Across most European countries, increase in older employment is associated to increase in youth unemployment
- The paper evaluates whether increase in minimum retirement age contributed to this development
- We exploit a unique data set from Italy and a quasi experiment setting from the steep and unexpected increase in legal retirement age in Italy (Monti Fornero reform)
- Results are significant and quantitatively sizeable
  - For private firms with more than $>$ 15 employees, the block destroyed 36745 youth jobs
  - The number represents 22 % of total employment losses among youngsters between 2011-14
- Plans for increasing (sustainable) flexibility in retirement should be taken seriously