POSSIBLE UNINTENDED EFFECTS OF PENSION REFORMS: PROGRAM SUBSTITUTION, HEALTH AND EQUITY CONCERNS

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BACKGROUND

The ageing population has led to increasing concerns about pensions and their future sustainability.

Much of the dominant policy discourse around ageing and pension provision over the last decade has focused on postponing retirement and prolonging employment.

Almost all western countries have been raising pension age (OECD 2015)

- People stay in labor force and contribute longer
- People claim for shorter duration
BACKGROUND – NO. OF PENSION REFORMS IN EUROPE

Amato
BACKGROUND – NO. OF PENSION REFORMS IN EUROPE

[Graph showing the number of pension reforms in Europe from 1990 to 2006 with labels for Amato and Dini.]
BACKGROUND – NO. OF PENSION REFORMS IN EUROPE

...a never ending pension reform (Franco D., 2004)
Italy is among the countries with highest current and expected pension age.
Life Expectancy, Healthy Life Expectancy & Minimum Pension Age

Work ability decreases with age.

At 60-65 years old in the employed or formerly employed population:
- >30% suffer from functional limitations
- >25% has a mental disorder

(Ardito & d’Errico 2018, Multiscopo Salute 2013)

Note: Life expectancy & healthy life expectancy at birth. Italy, men. Source: Eurostat 2015
Health declines with age but work-related risks don’t.

% Persons in good health by AGE and Education

% Persons exposed to work-related physical and psychosocial risks by AGE

Source: ISTAT 2016

Source: Ardito and d’Errico (2018) on EWCS 2010. Exposed indicates at least 1h/day
Hence, there is the concern that to force persons with poor health or/and employed in poor working conditions to stay longer at work may generate unintended effects:

1. **Increased welfare dependency** (e.g. disability insurance) (contemporaneous effect)
2. **Negative effect on health** for those who continue to work (contemporaneous and long-term effect)
**Some Unintended Consequences of Increased Pension Age**

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DiD estimate of the effect of Amato reform (increased NRA from 60 to 65) on prevalent LM status by wage level

More disadvantaged workers display:
- Higher sensitivity to increased NRA
- Higher risk of unemployment and to loose work ability

Source: analysis based on INPS sample data, men retirees, birth cohorts 1931-1936. All estimates significant at 5%
MECHANISMS

• Labour Market:
  • Labour demand adjustments (Bovini and Paradisi 2018; Boeri and Garibaldi 2017)
  • Outdated skills, high firing costs might limit the employability of older workers (Wanberget al. 2016)

• Opportunistic behaviour:
  • Disability and unemployment as economically convenient alternative to normal retirement (Gruber and Wise 1999)

• Health:
  • Natural age-related decline increases “mechanically” the proportion of ill-health persons
  • Physically demanding work demands (e.g. awkward body posture) have a stronger negative impact on health among older compared to younger employees (Burr et al. 2017)
  • Injuries: at older ages injuries are less frequent but more severe (Bena et al. 2008)
INJURY RISK IN AGEING WORKFORCE

Total injury rate decreases with age (experience) but severe injury rate increases (events that led to death, permanent or temporary incapacity) (Hale & Hale 1986, Bena et al. 2011; Salminen 2004)

Figure: Total and Severe Injury rate x100 person-years (male, by age)

Source: Giraudo Massimiliano, analysis on WHIP-Health 2001-2012. Unadjusted rates
Some Unintended Consequences of Increased Pension Age

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THEORETICAL PREDICTIONS: DOES RETIREMENT AFFECT HEALTH?

Work as good
  o Retirees no longer have an incentive to invest in health to maintain work productivity (Grossman, 1972)
  o Retirement implies loss of material (income) and immaterial work-related resources (cognitive, social and physical stimuli) (Warr 1987, Jahoda 1982)

Work as bad
  o Retirement as a relief from work-related stress, physical and psychosocial risk (Karasak 1987; Siegrist, 1996, 2006)
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Work as bad
- Retirement as a relief from work-related stress, physical and psychosocial risk (Karasak 1987; Siegrist, 1996, 2006)

⇒ It’s an empirical matter (complicated by endogeneity issues)
⇒ The effect of retirement on health is likely to depend on the quality of job
Empirical Findings: Does Retirement Affect Health?

Causal studies (IV, RDD, DID) exploiting exogenous variation in Retirement (R):

• **+ effect of R on mental well being and healthy behaviors** (Charles 2004; Johnson and Lee 2009; Eibnich 2015; Vahtera et al. 2009; Lang et al. 2007)

• **− effect of R on cognitive abilities (e.g. memory, verbal fluency and numeracy)** (Dave et al. 2008 and Bonsang 2012 for USA; Mazzonna & Peracchi 2017; Celidoni et al. 2017 EU)

• **Mixed effect of R on physical health** (Van dei Heide 2013; Charles 2004; Mathiews 2014; Coe et al. 2011; Hernaes et al., 2013; Mazzonna and Peracchi 2017). Why?
  • Longer latency
  • Different definitions of retirement (mix of exposures)
  • Age and time spent in retirement matters (Lalive and Staubli 2015)
  • Heterogeneous effects across occupations (hidden by aggregate estimate)
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  - Longer latency
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My project will:
- Shed light on the **causal** effect of retirement on **physical health**
- Adopt a specific definition of **exposure**
- Focus also on the possible heterogeneities across **occupations** and **age at retirement**
**Exposure Data**

INPS data offers the opportunity to estimate on the population of Italian retirees if there is a causal link between work-life extension and health and to assess if this varies between socio-economic groups exposed to different career-risk profile.

- **X = Retirement from work / Age at retirement / Years of work**
  
  Source: Pensions Files, Uniemens, Estratti Conto

- **Retirement (0/1):** effect of the transition from work to non-work (only regular R, i.e. old age and seniority) (in line with all previous literature)

- **Years of work:** proxy of the intensity of the exposure (accumulation of risks hypothesis, Kuh & Ben-Schlomo, 1997)

- **Retirement or Years of work at given ages:** aimed at assessing if exposure acting during a specific period of life has differential health effects (critical period hypothesis, Kuh & Ben-Schlomo, 1997)
Health Data

• **Y = Mortality**: available for both retirees and insured workers. Source: anagrafica comuni
  Potential concern: precisely measured for retirees only.

Other possible health outcomes:
• **Y = Loss of work capacity due to severe injury or professional disease.**
  Source: rendita INAIL, pensions file
• **Y = Invalidity and Inability benefits** (due to permanent incapacity or temporary disability reducing work capacity by at least 70%). Source: pensions file
A vast literature on social determinants of health show that differences between socio-economic groups exist in terms of health, exposure to risks and vulnerability to the exact same risk (Mackenbach et al., 2008; Costa et al. 2014; Wilkinson 2006)

• **Occupations** as proxy of work-related exposures (source: Uniemens + Estratti conto)
  
  Currently available: Self-employed, blue-collar, white-collar and manager

  • Possible caveat: Very broad categories. Previous studies on differential mortality show how crucial is the level of disaggregation: longevity gap between occupation with the lowest and highest life expectancy at 60-65: 1.9 (4 cat.), 2.95 (8 cat.), 5 (22 cat.) (d’Errico et al. 2017)

  • To use data on occupation from COB (ISCO 3 digit) or secondary data on professions (e.g. IT-SILC, Census..) would improve substantially the heterogeneity analysis
Life Expectancy at 60 Years Old, Men

Source: D’Errico et al. 2017. Dati SLT
METHODS

• **Endogeneity of retirement**: selection into retirement (healthy workers effect, McMichael 1976) and unobservable heterogeneity would bias the OLS estimate.

• The many **pension reforms** implemented in the last decades offer a wide range of quasi-natural experiments in which work-life has been “exogenously” extended for some workers while left unchanged for the others.

• IV, RDD or DID to compare cohorts / workers / ages assigned to different treatment.
This sharp discontinuities in the probability of retirement can be exploited in several ways:

• DID between cohorts comparison (Hearneas 2013, Lalive and Staubli 2015, Hagean 2018)

• RDD / IV in a Fuzzy design with age as running variable (Mazzonna and Peracchi 2017, Coe and Zamarro 2011, Kampfen & Maurer 2016; Eibich, 2015)

• Limitations: effect estimated on the subpopulation of compliers only → yet, subpopulation of interest for policy purposes

• (Alternative instrument: birth month (Ardito et al. 2016))

Source: analysis based on INPS sample data, men retirees, birth cohorts 1931-1936.
CONCLUSIONS AND IMPLICATIONS FOR PUBLIC POLICY

Italian pension reforms have contributed substantially to achieve a more equal redistribution of resources among generations and actuarial equity with respect to population as a whole.

However, there are potential public health and equity concerns for the risk that increasing retirement age might hamper health for the most vulnerable workers.

Since pension age is expected to increase further in the future, it is crucial to assess whether it has implications on health for several reasons:

- Orient work-organizations and policy interventions toward those more vulnerable to work-life extension.
- Assess the contribution of increased work-life extension to difference in life expectancy across occupations.
- Inform the current discussion about “strenuous jobs” and “actuarial fairness”, as systematic differential mortality between occupations generates unfair (regressive) redistribution of life-course resources.
Thank you
THE MORTALITY EFFECTS OF RETIREMENT: EVIDENCE FROM COHORTS COMPARISON AFTER CHANGE IN ERA OR NRA

Other common strategy is to use RDD or TSLS to compare birth cohorts assigned to different ERA or NRA

• Lelive and Staubli (2015): exploit a Swiss pension reform to estimate the effect of increase NRA on women from 62 to 63 and from 63 to 64 → marginally significant (p<0.1) increase in mortality at 70-75 years old only with the tighter increase 63 to 64

• Hernær (2013): exploits Norway reform on ERA → claim early retirement one year later increases (not sig.) mortality at age 70 by 0.2pp

• Hagen (2018): exploits Swedish reform increasing NRA from 63 to 65 → claim normal retirement one year later increases (not sig.) mortality at age 70 by 0.34pp
The Mortality Effects of Retirement: Evidence from Social Security Eligibility at Age 62 [Fitzpatrick and Moore, 2018 J. Public Econ]

- Eligibility age for social security creates **sharp discontinuities** in the probability of retirement at eligibility ages (e.g. one third of Americans retire* at 62 in USA)

- As long as no other factors influence health at the eligibility age, RDD or TSLS estimate the causal effect of Social Security eligibility on mortality comparing the deaths of those newly eligible to those who are nearly eligible

- \( R \) at 62 increases mortality at 62 by 2.4pp
- \( R \) includes all components of SS (i.e., Disability, Retirement and Survivors Insurance)
- LATE: effect on the low skilled, low educated, poor health
- Other factors changing at 62 in USA: no health insurance
Prevalence of Suboptimal Health Approaching Retirement (Wusterland et al. 2009; The Lancet)

High skilled workers didn’t change at all pre-and post-retirement if they were working in good working conditions but people’s health if they were working in bad conditions, the red line, was really affected by approaching retirement age. You can see that their decreased wellbeing scores increased dramatically upon reaching retirement and decreases steeply at retirement age.
Differenze nella speranza di vita (Sdv.), speranza di vita con disabilità (Sdv. c.d) e speranza di vita libera da disabilità (Sdv. s.d) tra il più basso e più alto livello di istruzione. 30 – 79 anni, 8 popolazioni europee.

<table>
<thead>
<tr>
<th></th>
<th>Uomini</th>
<th>Donne</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finlandia</td>
<td>4.6</td>
<td>2.5</td>
</tr>
<tr>
<td>Norvegia</td>
<td>4.2</td>
<td>2.3</td>
</tr>
<tr>
<td>Belgio (Bruxelles)</td>
<td>3.4</td>
<td>2.7</td>
</tr>
<tr>
<td>Austria</td>
<td>3.8</td>
<td>4.1</td>
</tr>
<tr>
<td>Francia</td>
<td>4.3</td>
<td>2.6</td>
</tr>
<tr>
<td>Spagna (Madrid &amp; Barcellona)</td>
<td>2.5</td>
<td>2.1</td>
</tr>
<tr>
<td>Italia (Torino &amp; Toscana)</td>
<td>2.3</td>
<td>1.7</td>
</tr>
<tr>
<td>Lituania</td>
<td>9.2</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Example: The Italian 1992 Pension Reform as a Quasi Natural Experiment

Workers were assigned “randomly” to different treatment level (increased NRA from 60 to 65) according to their birth date.
Econometric Specification

Diff-in-Diff to estimate the effect of becoming ineligible for old age pension (Staubli and Zweimuller 2013, *J Public Ec*)

- First difference over **cohorts**: younger vs older cohorts
- Second difference over **ages**: ages [60-64] vs the other ages [55-59 & 65]
- Multiple level treatment: **ineligibility treatment** at 60, 61, 62, 63 and 64

\[
y_{it} = \alpha + \beta I(\text{Age} < \text{MPA})_{it} + \gamma_a + \delta_c + X_t + \varepsilon_{it} \quad \text{(Eq. 1)}
\]

- \(\gamma_a\) and \(\delta_c\): age and semester birth cohorts dummies net out pre-reform difference in mean outcomes between older and younger cohorts
- \(X_t\): year-semester dummies improve estimate by capturing time specific shocks (e.g. the crisis)
- \(\beta\) average effect of becoming ineligible due to the increase in MPA
- Robust Standard Error, clustered at semester of birth
PREVIOUS LITERATURE ON PROGRAM SUBSTITUTION

• Growing international literature: AUT (Staubli and Zweimuller 2012; Manoli and Weber 2016); USA (Mastrobuoni 2009; Duggan et al. 2007; Behaghel & Blau 2012); AUS (Atalay and Barrett 2015); DE (Geyer and Welteke 2017); GBR (Cribb et al. 2016); SWZ (Lalive and Staubli 2015); FRA (Rabaté and Rochut 2017)…

• Standard strategy: between groups comparison exploiting pension reform as quasi-natural experiment in a RDD or DID set up

• Average increase in the retirement age of about half as much as the increase established by the rule (Manoli et al. 2016; Mastrobuoni, 2009; Behaghel and Blau, 2012; Brown, 2013; Lalive and Staubli 2015)

• Spillover: in USA, one third of disability growth explained by increased NRA (Duggan et al. 2007); in Austria (Staubli and Zweimuller 2013) and in Australia (Atalay and Barrett 2015) the effect on employment was lower than the effect on unemployment and disability, respectively

Italy:

• Amato reform (Ardito 2017): one year increase in NRA lead only limited labour supply response; the bulk was spillover onto unemployment and disability payroll.

• Monti-Fornero Reform (Bovini and Paradisi 2018): significant increase in welfare dependency among affected workers; yet savings on pension payments are five times total extra outlays
Fraction of persons in different economic status by age: Pre vs Post Reform cohorts

A. Retirement benefit

B. Employment

C. Non-employment

D. Disability benefit

E. Unemployment benefit

NRA=60 (1931-1933)
NRA=61 (1934, 1° sem)
NRA=62 (1934, 2° sem)
NRA=63 (1935, 1° sem)
NRA=64 (1935, 2° sem)
NRA=65 (1936)
**Heterogeneity**

- Null effects on workers with high labour market attachment → seniority pension escape
- Stronger labour supply effect among workers with bad health, manual occupations, low wage between 55-59 years old
- Higher the NRA (i.e. the intensity of the treatment) lower the labour supply and higher the disability take up → ability to work reduce with ageing
## Program Substitution Effects after the 1992 Amato Reform

Table 1: Effects of rising NRA on the probability of being in a given economic state

<table>
<thead>
<tr>
<th></th>
<th>Receiving Regular Pension</th>
<th>Employed</th>
<th>Unemployed</th>
<th>Receiving Disability Pension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ages &lt; MPA</td>
<td>-0.20***</td>
<td>0.068***</td>
<td>0.103***</td>
<td>0.034***</td>
</tr>
<tr>
<td></td>
<td>(0.017)</td>
<td>(0.007)</td>
<td>(0.007)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Adj. R²</td>
<td>0.33</td>
<td>0.20</td>
<td>0.06</td>
<td>0.01</td>
</tr>
<tr>
<td>#Persons</td>
<td>58,975</td>
<td>58,975</td>
<td>58,975</td>
<td>58,975</td>
</tr>
<tr>
<td>#Obs.</td>
<td>1,297,450</td>
<td>1,297,450</td>
<td>1,297,450</td>
<td>1,297,450</td>
</tr>
</tbody>
</table>

Pre-reform mean:

- Regular Pension: 0.90
- Employed: 0.06
- Unemployed: 0.03
- Disability Pension: 0.01

% change:

- Regular Pension: -22%
- Employed: 113%
- Unemployed: 343%
- Disability Pension: 340%

Notes: The table displays the estimated DD coefficients (SE) of Equation (1) separately for each of the outcomes (columns). SE clustered at the semester of birth cohort level. All regressions include dummies for age, year-semesters and year-semester birth cohorts. Pre-reform means computed on the before-reform cohorts (1931-1933) at 60–64 years old. Significance levels: *** = 1%, ** = 5%, * = 10%.
Eligibility conditions before the reform (male private employees):

- **Seniority pension**: no age limit, 35 years of contributions
- **Old age pension**: minimum pension age 60 + 15 years of contributions

The 1992 reform increased the Minimum Pension Age (MPA) for OLD AGE pension by 5 years:

- Seniority pension: unchanged → easy escape route
- New rules: immediately effective for all
- Subsequent reforms (e.g. Dini): binding **only** for those with <15/18 years of contributions
  
  → Good news for policy evaluation: Over50s were exposed only to the 1992 reform
- 1992 Amato reform: Block of seniority pensions in 1993
- La legge Finanziaria 1994: Compulsory retirement windows: Jan & Jul
- 1995 Dini reform: +2 windows: Jan & Jul & Apr & Oct
- 1998 Prodi: 4 months delay
- 2004 Maroni reform: -2 windows: Jan & Jul (never applicable)
- 2007 Damiano Reform: again 4 windows
Italian Challenges

Long Lasting Challenges

High expenditure in pension expenditure.

Low fertility

High incentive to early exit the LM

Employment rate 1977-2011, Italy

Data extracted on Jan, 16th 2017, from I.Stat (http://dati.istat.it)
Probability to Survive by SES

Survival (%) by low vs high education (men, 2002-2012)

Data extracted on Jan, 31th may 2018, from I.Stat (http://dati.istat.it)
**Disability Take-up as Health Outcome**

• Increased disability take-up rate among workers affected by a pension reform is generally “read” as unintended externality due to moral hazard and gaming behaviour.

• However, ill-health pensions and allowance are conditioned on a certified severe health limitation: loss of at least 70% of work capacity.

• Access to disability pension has being tightened, since 2010 assessment of the health condition is under the INPS (rather than ASL) and the possibility to cumulate income and benefits reduced.

• Moreover INPS data offers the possibility to distinguish between applications received, denied or accepted → information useful to assert whether an increase in denied application in the aftermath of the reform exists.

• Good idea?
1. What is the impact of postponing retirement on physical health (death, permanent incapacity or temporary disability)?

2. Does the effect vary between different groups of workers?

3. What is the contribution of tightening age for retirement on health inequalities?
A NEW INSTRUMENT FOR RETIREMENT: MONTH OF BIRTH

In a previous work analysing the effect of pension age on Cardio-Vascular Diseases (CVD) among Italian retirees I proposed to use BIRTH MONTH (Ardito et al. 2016)

- Relevant: Month of birth predicts pension age (negative correlation)
- Exogenous: Month of birth does influence health only through pension age
- More compliers: not bound to specific ages (social security eligibility), nor to pre-post reform cohorts, neither on individual sensitivity to social security incentives (LATE=ATT?)
MECHANISM:
STANDARDIZATION OF LM TRANSITIONS

A: Job contracts and pensions start by calendar month

B: Labor Market entry age by birth month

Born in Jan
Start School
Start Work
Start Pension

Born in Dec

## Effect of Pension Age on the Incidence of CVD (TSLS)

Results from this research show that retiring one year later increases the incidence of CVD at 68-70 years old only among retirees who were exposed to more physically demanding occupations and low paid jobs

<table>
<thead>
<tr>
<th>Pension age ($\beta_{IV}$)</th>
<th>0.20*</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Stage coeff.</td>
<td>0.269***</td>
</tr>
<tr>
<td>First Stage F-test</td>
<td>47</td>
</tr>
<tr>
<td>#Observations</td>
<td>41,070</td>
</tr>
</tbody>
</table>

Notes: Each column presents IV estimate and p-value from separate regressions. All models include region and year of birth dummies; average wage, sick leave, firm size weighted by length of job spells. QUAD1 is the first birth quadrimester; F-test is the Kleibergen-Paap test for weak identification. Secondary sector includes Manufacturing and Constructions. Legend: * $p<.10$, ** $p<.05$, *** $p<.01$
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<table>
<thead>
<tr>
<th>Pension age (βTV)</th>
<th>All</th>
<th>Blue collar</th>
<th>White collar</th>
<th>Secondary sector</th>
<th>Tertiary sector</th>
<th>Low wage</th>
<th>High wage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.20*</td>
<td>0.026**</td>
<td>-0.005</td>
<td>0.022**</td>
<td>0.008</td>
<td>0.029*</td>
<td>0.01</td>
</tr>
<tr>
<td>First Stage coeff.</td>
<td>0.269***</td>
<td>0.342***</td>
<td>0.294***</td>
<td>0.318***</td>
<td>0.356***</td>
<td>0.258***</td>
<td>0.366***</td>
</tr>
<tr>
<td>First Stage F-test</td>
<td>47</td>
<td>40</td>
<td>17</td>
<td>35</td>
<td>24</td>
<td>17</td>
<td>43</td>
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<tr>
<td>#Observations</td>
<td>41,070</td>
<td>28,054</td>
<td>13,016</td>
<td>27,079</td>
<td>13,991</td>
<td>20,535</td>
<td>20,535</td>
</tr>
</tbody>
</table>

Notes: Each column presents IV estimate and p-value from separate regressions. All models include region and year of birth dummies; average wage, sick leave, firm size weighted by length of job spells. QUAD1 is the first birth quadrimester; F-test is the Kleibergen-Paap test for weak identification. Secondary sector includes Manufacturing and Constructions. Legend: * p<.10, ** p<.05, *** p<.01