The effect on mental health of retiring during the economic crisis

Michele Belloni$^{123}$  Elena Meschi$^1$  Giacomo Pasini$^{13}$

$^1$Ca’ Foscari University of Venice

$^2$CeRP – Collegio Carlo Alberto

$^3$Netspar

January 27, Netspar Workshop Leiden
Sobocki et al (2006): depression economic cost in Europe estimated 118 billion €

Mental health correlates with ageing: growing literature on the effect of retiring on mental health

Our research question: what is the effect of retiring during the great recession?

As of now, it is possible to study only the short term / immediate effect of retirement

We propose that being in the labour force during an economic downturn increases stress, retirement perceived as a relief.
Identification issue: retirement is likely to be endogenous to mental health

Effect identified with panel FE
- Dave et al (2008 Southern Ec J)
no eff Lindeboom et al (2002, HE)

Panel + IV (pension reforms)
no eff Behncke (2012, HE)

No panel, IV (cross country variation in ret policy)
+ Coe, Zamarro (2011, JHE)
Our contribution

- “Fresh” data on the great recession (SHARE w5)
- 10 years long panel covering good and bad times
- Combine panel FE and cross country variation for IV
- Highlight heterogeneity across gender and occupation
- Use time and geographic variation on severity of the crisis to identify the mechanism driving the causal effect of retirement on mental health
Preview of the results

- Retiring improves mental health
- Once endogeneity is fully accounted for, the effect is strong for men and not significant for women. The effect is driven by blue collar workers.
- Exploiting the variation in the severity of the crisis
- The effect is much stronger for blue collar workers who were working in a region and a period severely hit by the crisis
Retiring improves mental health

Once endogeneity is fully accounted for, the effect is strong for men and not significant for women. The effect is driven by blue collar workers.

Exploiting the variation in the severity of the crisis

The effect is much stronger for blue collar workers who were working in a region and a period severely hit by the crisis.
SHARE panel waves

- Data from the panel Survey on Health, Ageing and Retirement in Europe (SHARE)
- Survey representative of the 50+ population. Extensive questionnaire on socio-economic status, health, health care and social network

- We use waves 1, 2, 4 and 5
- Ten countries: AT, DE, SE, NL, ES, IT, FR, DK, CH, BE
- We select respondent in the 55–70 age range who were working when entered the panel (as Eibich, 2015 and Behncke, 2012)
Key Variables

- **Dependent variable**: EURO–D depression score
  - 12 points standardized scale of depression
  - Designed specifically to be comparable across countries
  - Items: feel depressed, pessimism, death wish, guilt, sleep, interest, irritability, appetite, fatigue, concentration, enjoyment and tearfulness

  - 1 if self-report as retired, 0 if still in the labour force
  - Homemakers, sick & disabled, “other” discarded
  - Retirement considered as an absorbing state (less than 0.3% of the sample adjusted)
  - Results are all robust to different specification of this variable
Attrition

<table>
<thead>
<tr>
<th># waves resp participates to</th>
<th># obs</th>
<th>% of the sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 waves</td>
<td>1291</td>
<td>14.5</td>
</tr>
<tr>
<td>3 waves</td>
<td>2168</td>
<td>24.3</td>
</tr>
<tr>
<td>2 waves</td>
<td>5211</td>
<td>61.2</td>
</tr>
</tbody>
</table>

- Attrition is non negligible in SHARE
- Selective attrition? Resp may drop from the panel due to mental health problems.
- Informal test, similar to Lindeboom et al (2002)
  - regress EURO–D on probability of dropping from the sample (dummy which is 1 if i–th obs not in the sample at time t + 1) and key vars of our analysis and interactions
  - no statistical evidence of selective attrition
- We control for wave dummies
- Each wave includes a refreshment sample to preserve population representativeness
Descriptive evidence

- Linear predictions from Fixed Effects models
- Dependent: EURO–D
- regressors: full set of age dummies interacted with retired dummy
- standard errors by delta method
Estimation: Fixed Effects

\[ y_{it} = X'_{it}\beta_X + \beta_{RET}D^{RET}_{it} + \theta_t + \epsilon_i + u_{it} \] (1)

- Individual FE \( \epsilon_i \) to control for unobservable time invariant individual characteristics \( \epsilon_i \)
- Wave FE \( \theta_t \) to account for time varying shocks to mental health shocks common to all individuals
- \( X_{it} \) includes a polynomial in age: the effect of retirement is identified by changes in EURO–D at retirement, conditional on a non linear relation with age
- Additional time varying controls:
  - marital status, \# grandchildren
  - Income (country and wave specific quintile dummies)
  - Physical Health Index following Poterba, Venti and Wise (2011)
Estimation: FE + Instrumental Variables

- Still possible that unobservable transitory shocks in $u_{it}$ affect both timing of retirement and mental health
- the two instruments $z_{it}^{STAT}$, $z_{it}^{EARLY}$ are dummies that take value 1 if resp $i$ is (age) eligible for statutory / early retirement in wave $t$
- Identifying assumption: being age–eligible for retirement provides incentives to retire, but does not affect mental health directly
Still possible that unobservable transitory shocks in $u_{it}$ affect both timing of retirement and mental health.


The two instruments $z_{it}^{STAT}$, $z_{it}^{EARLY}$ are dummies that take value 1 if resp i is (age) eligible for statutory / early retirement in wave $t$.

Identifying assumption: being age–eligible for retirement provides incentives to retire, but does not affect mental health directly.
Incentives to retire

- Clear spikes at legal retirement ages
- Identification relies on the discontinuity of the probability of retiring at legal age, conditional on a smooth function of age
- Identification does not rely on a single change in retirement rules over time
## Baseline results

<table>
<thead>
<tr>
<th></th>
<th>Men</th>
<th>Women</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td></td>
<td>All sample</td>
<td>Blue collars</td>
<td>White collars</td>
<td>All sample</td>
<td>Blue collars</td>
<td>White collars</td>
</tr>
<tr>
<td>Retired</td>
<td>-0.174</td>
<td>-0.597*</td>
<td>0.028</td>
<td>0.164</td>
<td>0.045</td>
<td>0.168</td>
</tr>
<tr>
<td></td>
<td>(0.252)</td>
<td>(0.355)</td>
<td>(0.373)</td>
<td>(0.235)</td>
<td>(0.661)</td>
<td>(0.261)</td>
</tr>
<tr>
<td>Quadratic in age</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Additional controls</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Wave dummies</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

### First stage

<table>
<thead>
<tr>
<th></th>
<th>Men</th>
<th>Women</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td></td>
<td>All sample</td>
<td>Blue collars</td>
<td>White collars</td>
<td>All sample</td>
<td>Blue collars</td>
<td>White collars</td>
</tr>
<tr>
<td>Normal retirement age</td>
<td>0.246***</td>
<td>0.334***</td>
<td>0.199***</td>
<td>0.291***</td>
<td>0.266***</td>
<td>0.300***</td>
</tr>
<tr>
<td></td>
<td>(0.014)</td>
<td>(0.026)</td>
<td>(0.018)</td>
<td>(0.013)</td>
<td>(0.033)</td>
<td>(0.015)</td>
</tr>
<tr>
<td>Early retirement age</td>
<td>0.020*</td>
<td>0.038*</td>
<td>0.019</td>
<td>-0.004</td>
<td>0.050</td>
<td>-0.021</td>
</tr>
<tr>
<td></td>
<td>(0.012)</td>
<td>(0.022)</td>
<td>(0.015)</td>
<td>(0.012)</td>
<td>(0.032)</td>
<td>(0.013)</td>
</tr>
<tr>
<td>F test of excluded instruments</td>
<td>153.54***</td>
<td>87.13***</td>
<td>63.37***</td>
<td>255.96***</td>
<td>33.65***</td>
<td>202.51***</td>
</tr>
<tr>
<td>Observations</td>
<td>11,547</td>
<td>3,586</td>
<td>7,38</td>
<td>10,776</td>
<td>1,773</td>
<td>8,272</td>
</tr>
<tr>
<td>Number of id</td>
<td>4,604</td>
<td>1,546</td>
<td>2,959</td>
<td>4,313</td>
<td>747</td>
<td>3,331</td>
</tr>
<tr>
<td>Sargan-Hansen statistic</td>
<td>1.809</td>
<td>0.715</td>
<td>0.374</td>
<td>1.809</td>
<td>2.048</td>
<td>0.210</td>
</tr>
<tr>
<td>Hansen J p-value</td>
<td>0.1786</td>
<td>0.3977</td>
<td>0.5410</td>
<td>0.1786</td>
<td>0.1524</td>
<td>0.6466</td>
</tr>
</tbody>
</table>

---

**Notes:**
- ******* indicates statistical significance at the 1% level.
- **** indicates statistical significance at the 5% level.
- * indicates statistical significance at the 10% level.
Hidden heterogenous effects?

- We find evidence of a 10% significant positive effect on mental health only for blue collar males.
- Does poor significance point to limited effect of retirement or to hidden heterogenous effects?
- What is the mechanism driving the mental health-retirement relation, if any?
The crisis and work related stress

- We observe the 2004-2012 period: before, during and after the Great Recession
- Working during a recession may increase work-related stress, which is associated with depression.
  - higher unemployment risk. Older workers in particular have low re-employment rates even in good business cycles
  - Employers retrenched. Reduced career prospects, monetary incentives, non-monetary rewards
- Those who retire during a recession are “safe”: work-related stress goes to zero, depression scores improves.

Empirical implication
If work-related stress is the channel, then the effect should be stronger for those retiring where and when the crisis hit more dramatically.
The crisis and work related stress

- We observe the 2004-2012 period: before, during and after the Great Recession
- Working during a recession may increase work-related stress, which is associated with depression.
  - higher unemployment risk. Older workers in particular have low re-employment rates even in good business cycles
  - Employers retrenched. Reduced career prospects, monetary incentives, non-monetary rewards
- Those who retire during a recession are “safe”: work-related stress goes to zero, depression scores improves.

Empirical implication

If work-related stress is the channel, then the effect should be stronger for those retiring where and when the crisis hit more dramatically.
We build an individual 1/0 indicator “hit by the crisis”

It takes value 1 if the NUTS1 region where individual $i$ lives was severely hit by the crisis in the year of retirement of the individual

- Note we have retirement year, not limited to wave years

How to define “severely hit”?

- We consider real GDP regional series
- Apply Hodrick–Prescott filter and split GDP growth rate into trend and cyclical component
- A region is hit by the crisis in a given year if the cyclical component is negative
We build an individual 1/0 indicator “hit by the crisis”

- It takes value 1 if the NUTS1 region where individual $i$ lives was severely hit by the crisis in the year of retirement of the individual
  - Note we have retirement year, not limited to wave years

- How to define “severely hit”?
  1. We consider real GDP regional series
  2. Apply Hodrick–Prescott filter and split GDP growth rate into trend and cyclical component
  3. A region is hit by the crisis in a given year if the cyclical component is negative
Regions “hit by the crisis” are those in the negative domain.
Cross country and within country heterogeneity

Motivation
Data
Baseline estimation
Crisis
Robustness
Conclusion

year 2006

hit by the crisis = 0
hit by the crisis = 1

year 2010

hit by the crisis = 0
hit by the crisis = 1
## Results

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All sample</td>
<td>Blue collars</td>
</tr>
<tr>
<td>Retired</td>
<td>-0.0162</td>
<td>-0.260</td>
</tr>
<tr>
<td></td>
<td>(0.298)</td>
<td>(0.445)</td>
</tr>
<tr>
<td>Retired x hit by crisis</td>
<td>-0.324***</td>
<td>-0.624**</td>
</tr>
<tr>
<td></td>
<td>(0.0945)</td>
<td>(0.253)</td>
</tr>
<tr>
<td>Hit by the crisis</td>
<td>0.00558</td>
<td>0.0406</td>
</tr>
<tr>
<td></td>
<td>(0.0745)</td>
<td>(0.142)</td>
</tr>
<tr>
<td>Observations</td>
<td>11,377</td>
<td>3,399</td>
</tr>
<tr>
<td>Number of id</td>
<td>4,481</td>
<td>1,371</td>
</tr>
<tr>
<td>Sargan–Hansen statistic (p-value)</td>
<td>2.406(0.300)</td>
<td>1.432(0.489)</td>
</tr>
<tr>
<td>Weak identification: Sanderson-Windmeijer F statistic:</td>
<td>Retired</td>
<td>54.68***</td>
</tr>
<tr>
<td></td>
<td>Retired x hit by the crisis</td>
<td>145.64***</td>
</tr>
</tbody>
</table>
Comments on the results

- Retiring in a region/year not hit by the crisis has no effect on mental health
- Men retiring in a region/year hit by the crisis improve mental health: the effect is a 0.32 reduction in the EURO–D scale, i.e. a 20% reduction with respect to the unconditional mean value
- The effect on men is driven by blue–collar workers
- Women EURO–D score, if anything, worsens
- Women after retirement spend more time in Informal Care (Costa-i-Font et al, 2015), and this is associated with higher depression scores (Coe and van Houtven, 2009)
Retirement dummy

- Retired dummy is zero if the individual reports being in the labour force at the time of the interview and one if retired
- Defined two dummies: Retired from work and Retired from unemployment
- The effect reinforces if retired from work, disappears if retired from unemployment
- In line with a work-related stress mechanism
Crisis indicator

Definition of crisis indicator is crucial, we run a series of alternative specifications

1. Different parametrization of Hodrick–Prescott filtering. Virtually no changes

2. Cyclical component of log GDP as continuous indicator. Results in line

3. Use unemployment regional series and define dummy and continuous indicator as for GDP. No change.
Motivation

Data

Baseline estimation

Crisis

Robustness

Conclusion

Panel estimator

1. Estimated with Within estimator, that requires strict exogeneity.
2. FD needs only weak exogeneity: results unchanged.
3. If willing to assume unobserved time invariant fixed effect uncorrelated with covariates, RE more efficient. Interaction of interest significant, also retiring per se turns significant.
4. Pooled OLS requires RE assumption, but only contemporaneous exogeneity. Retirement dummy significant, interaction is not
   - unobserved individual characteristics driving both mental health and retirement decision drive the main effect significance in POLS and RE and coll for FE estimates to account for them.
Further robustness checks

- Age polynomial: spikes at legal retirement ages may capture country-specific age trends. We experimented with higher order and interacting with country dummies: no changes
- We tried different age selections: no changes
- Physical health may be simultaneously determined with respect to mental health. Results are unaffected dropping the health index from all specifications
Conclusion

- Retirement reduces depression scores for men
- We exploit the heterogeneous effect across gender, blue/white collars, and regional/time variation in the severity of the crisis
- Results are driven by blue collar male workers retiring in regions severely hit by the crisis
- The heterogenous effects shed light on the mechanism driving the causal relation between retirement and mental health: we propose an explanation based on work–related stress induced by the economic downturn
- Policy implication: postponing retirement age may increase health inequalities by affecting mental health of low skilled workers