



Retirement and Cognitive Function

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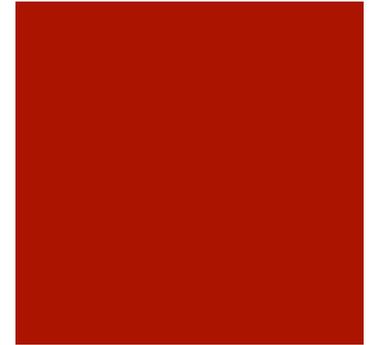
Why the effect of retirement on cognitive function is of interest (1)



■ Two key reasons:

1. understanding of the effect of prolonging working life at older ages on well-being
2. policy implications these effects could have on countries dealing with underfunded retirement plans and aging populations

Why the effect of retirement on cognitive function is of interest (2)



- If staying longer in the labor market is thought to be protective of memory capacity, encouraging workers to stay longer in the labor market:
 1. Would support the financial sustainability of pension systems.
 2. Could reduce health care related expenditures and long-term care expenditures, assuming that implied memory loss is related to an increased risk of dementia and increases in disability.
 3. Would aid autonomy and the capacity for sound financial decisions, including savings decisions.
 4. Could enhance well-being and quality of life at later ages.

Our Study



1. We review the literature on retirement and cognitive functioning
2. We attempt to replicate the results we find in the literature using the same datasets
3. We explore the extent of the variation in results found in the literature

Data



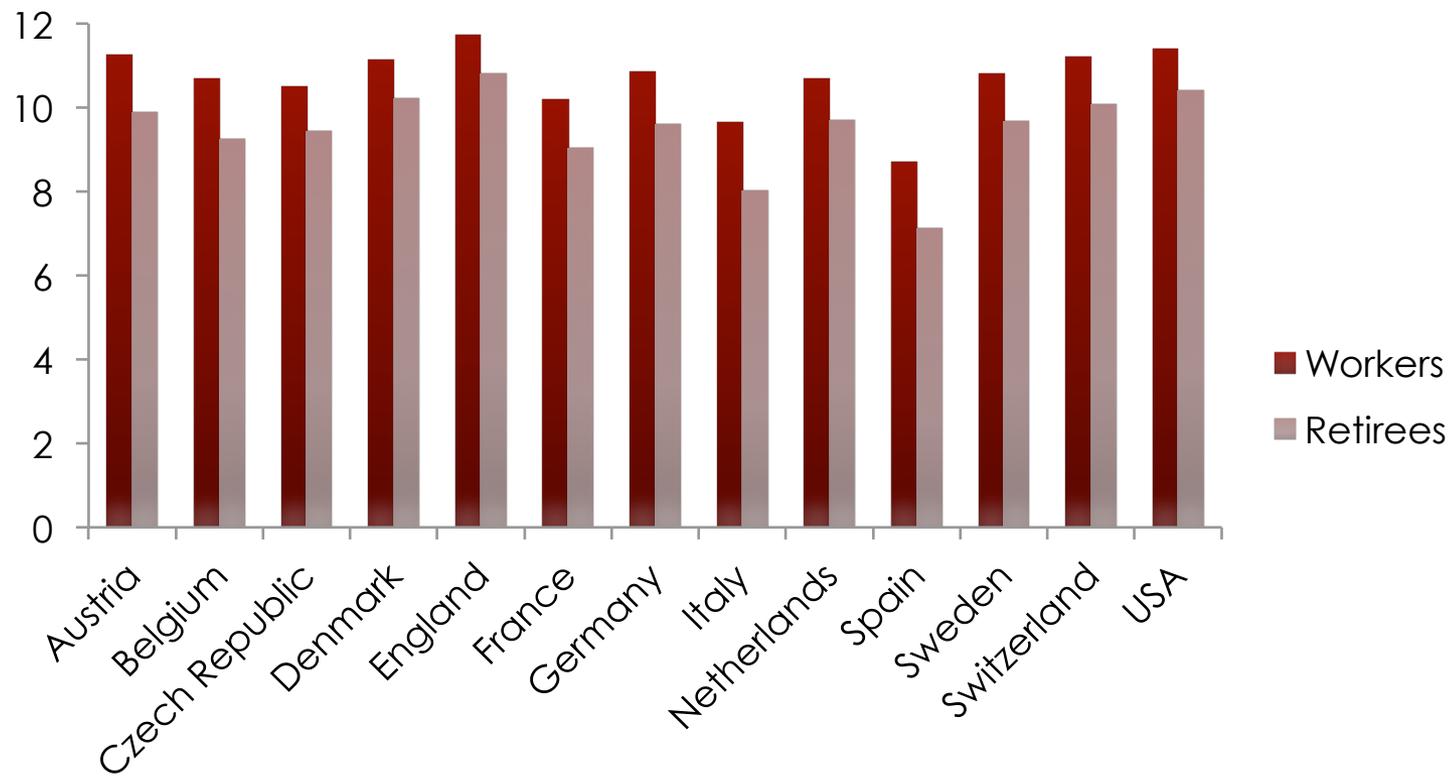
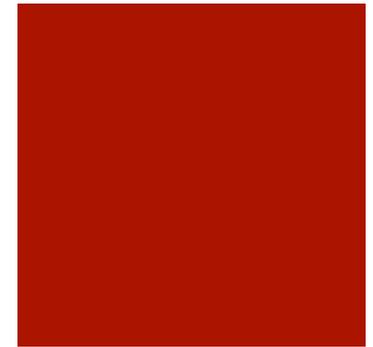
- 3 similar surveys:
 - Health and Retirement Study (**HRS**) – US
 - English Longitudinal Study of Ageing (**ELSA**) – England
 - Survey of Health, Ageing and Retirement (**SHARE**) – Europe
- Similar questions on cognition: **Recall summary score** of a max. of 20 words (10+10)
 - **Immediate Word Recall:** interviewer reads a list of 10 nouns (e.g., lake, car, army, etc.) to the respondent, and individuals are asked to recall as many words as possible
 - **Delayed Word Recall:** after approximately 5 minutes, respondents are asked to recall the list of 10 nouns again in any order

Determinants of Cognition



- **Cognitive abilities decline with age**
- Demographic variables such as **gender and marital status** are correlated with cognitive functioning
- Several studies also emphasize the importance of **childhood experiences and parental background** on cognition
- **Health status** (e.g. chronic conditions) may affect cognitive functioning
- **Behavioural variables:** some studies relate personality traits like patience and risk aversion to cognition
- Some evidence that **education, activities and occupation** could affect an individual's cognitive reserve (Stern 2002, 2003)

Retirement and Cognitive function



Source: Own computations. Pooled Data from HRS, ELSA and SHARE 2004-2012. Individuals aged 50 to 70. Weighted data.

The retirees' definition as Rohwedder and Willis 2010

Does retirement Affect Cognitive Functioning? A Review



- We review papers that all use similar measures of cognitive functioning; in particular they focus on the previously explained immediate and delayed recall abilities
- They use 1 or more of the same 3 data sets: HRS, ELSA and SHARE
- Most of the papers reviewed find a **negative relationship** between retirement and cognitive capability despite using varying measures of retirement and cognitive functioning

Retirement and Cognitive Function: Causal or Not?



- Possible alternative mechanisms:
 - Reverse causation
 - Endogeneity due to common, unobserved determinants
- The studies we reviewed have attempted to disentangle the causal mechanisms by using plausible sources of exogenous variation in retirement
 - They analyze the effect of retirement on cognition using **“instrumental variables” (IV) approaches**.
 - They use **similar instrumental** variables, e.g. eligibility age for early and for full pension benefits.

AUTHORS	DATA and IV METHODS	KEY RESULTS
Rohwedder, S. and R.J. Willis (2010)	HRS, ELSA, SHARE – 2004 IV → Eligibility age for early and for full pension benefits	-4.666***
Coe, N. and G. Zamarro (2011)	SHARE – 2004 IV → Eligibility age for early and for full pension benefits	-0.0390
Coe et al. (2012)	HRS – 1996-2008 IV → Offering of an early retirement window	0.37845*** (Blue Collars) 0.00521 (White Collars)
Bonsang et al. (2012)	HRS – 1998-2008 IV-FE → Eligibility age for early and for full pension benefits	-1.021***
Mazzonna, F. and F. Peracchi (2012)	SHARE – 2004-2006 IV → Eligibility age for early and for full pension benefits	M: -0.025*** (i), 0.009 (d) F: -0.055*** (i), -0.029*** (d)
Celidoni et al. (2013)	SHARE – 2004-2010 IV- FE → Eligibility age for early and for full pension benefits	-0.1967***
Bingley, P. and A. Martinello (2013)	HRS, ELSA, SHARE – 2004 IV → Eligibility age for early and for full pension benefits	-3.014*** (ALL) -5.485*** (MEN) -1.607** (WOMEN)
Mazzonna, F. and F. Peracchi (2014)	SHARE – 2004-2006 IV-FE → Eligibility age for early and for full pension benefits	-0.06*** (ALL) -0.069*** (MEN) -0.057*** (WOMEN)
Bianchini, L. and M. Borella (2014)	SHARE – 2004-2010 IV-FE → Eligibility age for early and for full pension benefits	0.3919***

No Clear Consensus in the Literature



- Richer specifications (i.e., including fixed effects, dynamic specifications, or alternative specifications of instrumental variables) often lead to large changes in the size and significance of the estimated effects of retirement on cognition.
 - Some papers find a **negative effect** of retirement on cognition (e.g. Rohwedder and Willis 2010; Bonsang et al. 2012, Mazzonna and Peracchi 2012, 2014)
 - Other studies find a **positive effect**, especially when these are disaggregated by type of occupation (e.g. Coe et al. 2012, Bianchini and Borella 2014)
 - Still others find **no significant** effects for men (Coe and Zamarro 2011)

Our Results

- Using the same datasets, we replicate the main approaches adopted in the literature using similar instrumental variables

We keep data from 2004 to 2012 and countries with at least 3 survey waves (13 countries)

- We pool data from HRS, ELSA and SHARE and estimate possible effects of retirement on cognitive ability using: OLS, IV methods, FE, IV-FE methods.
 - We estimate for all countries and surveys combined, and for different surveys (HRS, ELSA and SHARE) separately
- When **controlling by age**, retirement has **a negative** effect on cognitive function
 - The **more controls** we add, **the lower the estimated effect**. Size of the effect varies depending on the definition of retirement used.
 - Results using HRS, ELSA, and SHARE show an enormous variation.
 - Our results show that **outcomes are very sensitive to econometric specifications**. In particular, the use of country fixed effects tends to reduce the estimated effect of retirement on cognition dramatically.

Our Results: Heterogeneity Across Individuals (1)



- Retirement and Cognitive Abilities by Gender
 - **Men recall 9.6** words while **women recall 10.4** words
 - Men: IV-FE estimates are **statistically insignificant**
 - Women: IV-FE estimates of effects of retirement on cognition are **negative and mostly statistically significant**, even when country fixed effects and covariates are included

Our Results: Heterogeneity Across Individuals (2)



■ Role of Occupations

- We define two kinds of variables that capture physically demanding occupations.
 - One asks for the physical effort in the current job directly.
 - The second is constructed using recorded occupational categories.
- Individuals working in **physically demanding jobs recall about 10 words**, while the ones with **less physically demanding jobs recall about 11**. We find similar differences when comparing blue-collar jobs and white-collar jobs.
- Once we control for country fixed effects and apply instrumental variable estimation, the effects for both groups become **generally insignificant**.

The Road Ahead

- We know it is likely that retirement has a negative effect on cognitive function
- We know much less about the size of this effect and which groups to target in our policies

Conclusion

- We have reviewed the empirical literature on aging and cognitive function
 - In particular, the empirical literature on the effect of retirement on episodic memory
- Apparent upshot of our work: results found in the literature are very sensitive to the methods used and vary a lot between sub-groups
 - they should be considered quite fragile