The Mortality Effects of Retirement: Evidence from Social Security Eligibility at Age 62

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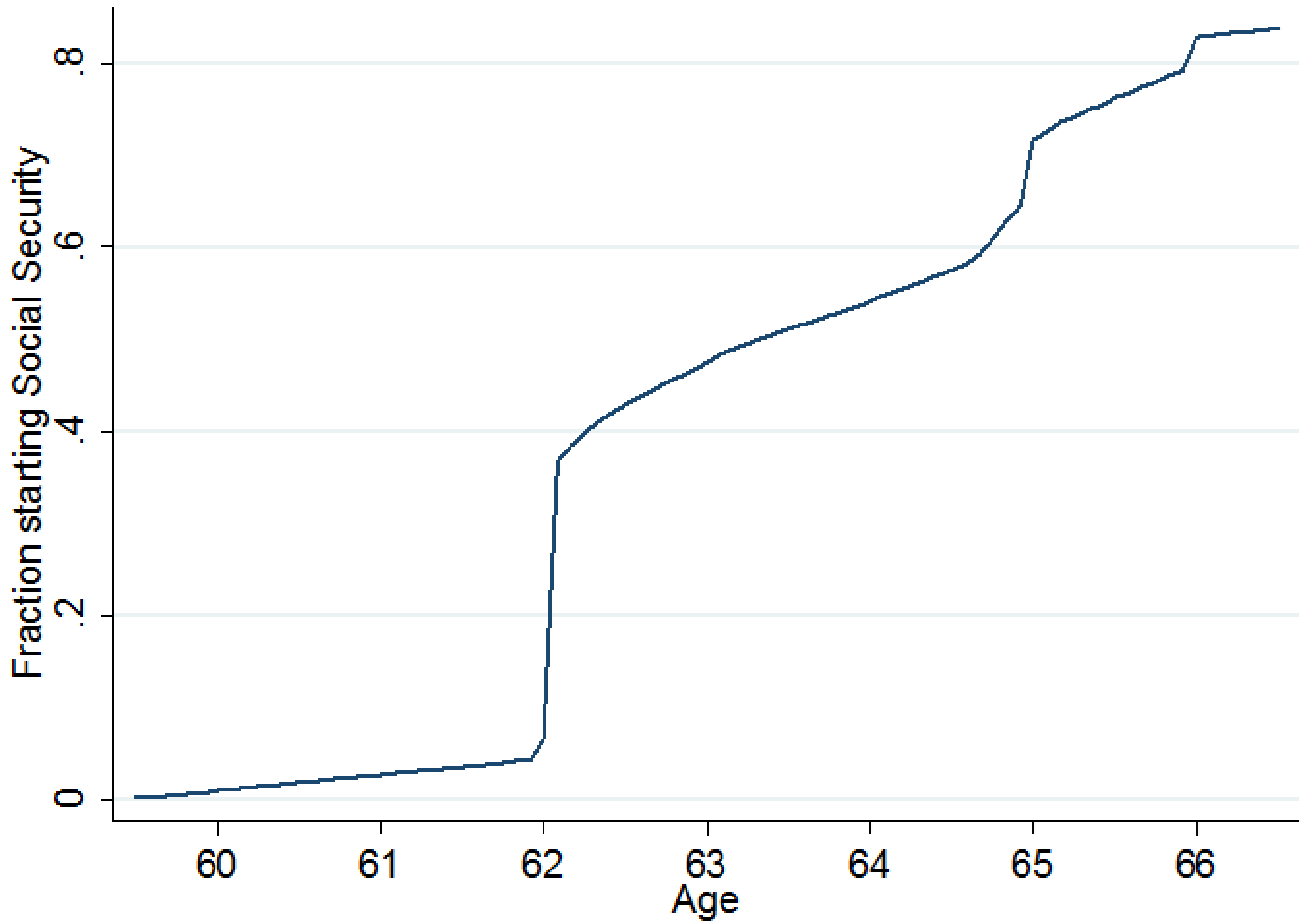
Introduction

- Huge interest in health effects of retirement
  - Understand implications of population aging
  - Evaluate proposed reforms to retirement policies
- Empirical challenge: health and retirement are jointly determined
  - Individuals in poor health are likely to retire earlier
- Our research question: Is mortality affected by the availability of Social Security at 62?

Social Security Eligibility at Age 62

- 62 is the earliest age for Retirement Insurance
- Workers claiming at 62 receive 75-80% of their Primary Insurance Amount (PIA)
  - Compared to 100% at Full Retirement Age (FRA)
  - Ave. monthly payments: ~$1200 (men), ~$900 (women)
- Large fraction of population claim at 62
  - Nearly 40% of people claim within 4 months of age 62

Cumulative Rate of New Social Security Claims, Ages 59 to 67



<u>Note:</u> We use birth cohorts from 1921 to 1948 and include new claims by both workers and dependents for the Disability, Retirement and Survivors components of Social Security. Sources are 1% extract of Master Beneficiary Record and population data from Current Population Survey.

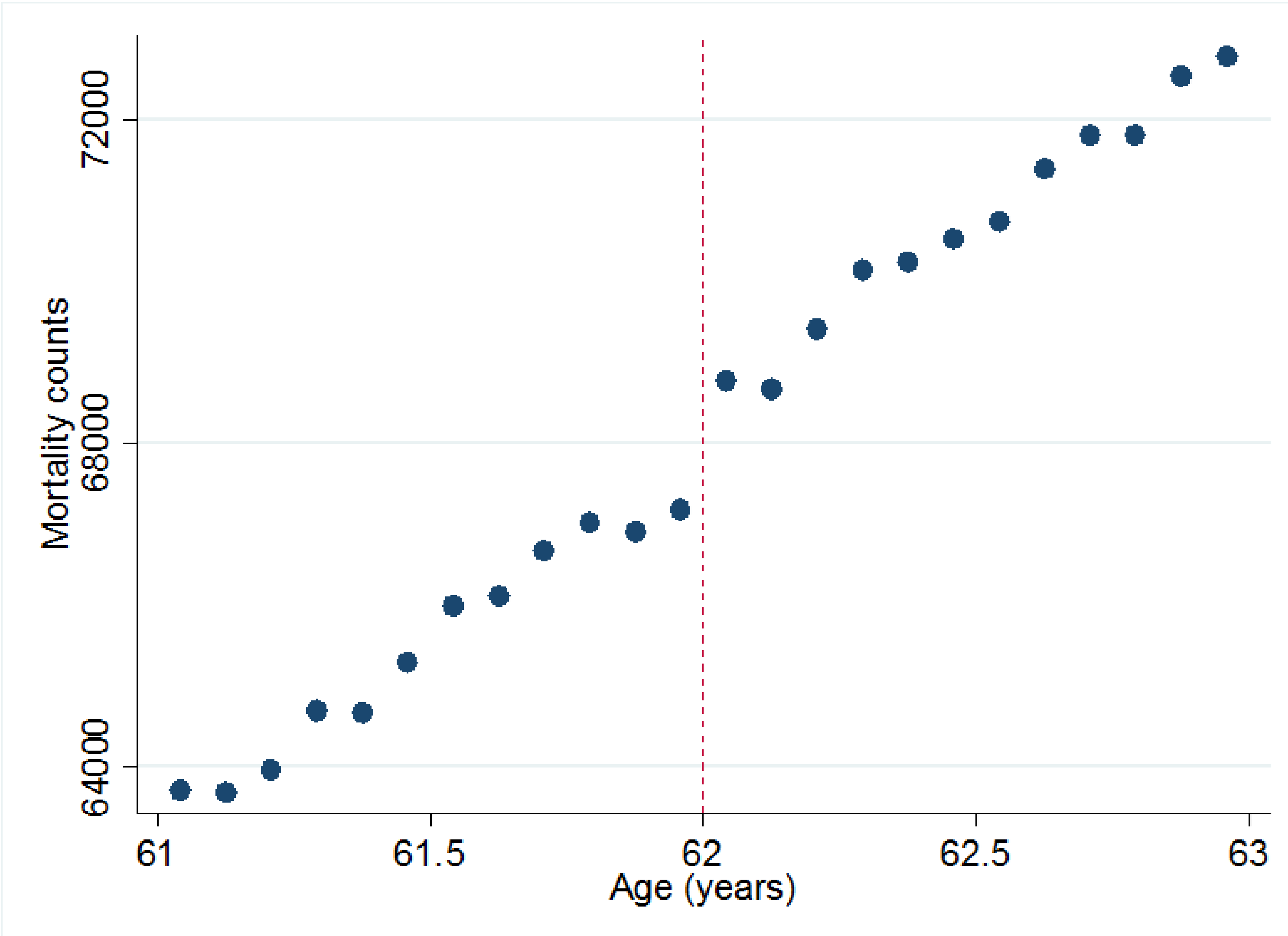
Mortality at Age 62

- Use Multiple Cause of Death (MCOD) data
  - Data covers whole population
  - Have exact dates of birth and death (restricted version)
- Examine mortality in relation to age 62
  - Regression discontinuity (RD) design using an age-based eligibility threshold
    - Follows, e.g., Card, Dobkin & Maestas (2009), Anderson, Dobkin & Gross (2014)
  - Estimating local average treatment effect of Social Security eligibility on mortality *if* no other changes at 62
  - Many concurrent changes: in retirement, work, level of activity, health insurance coverage

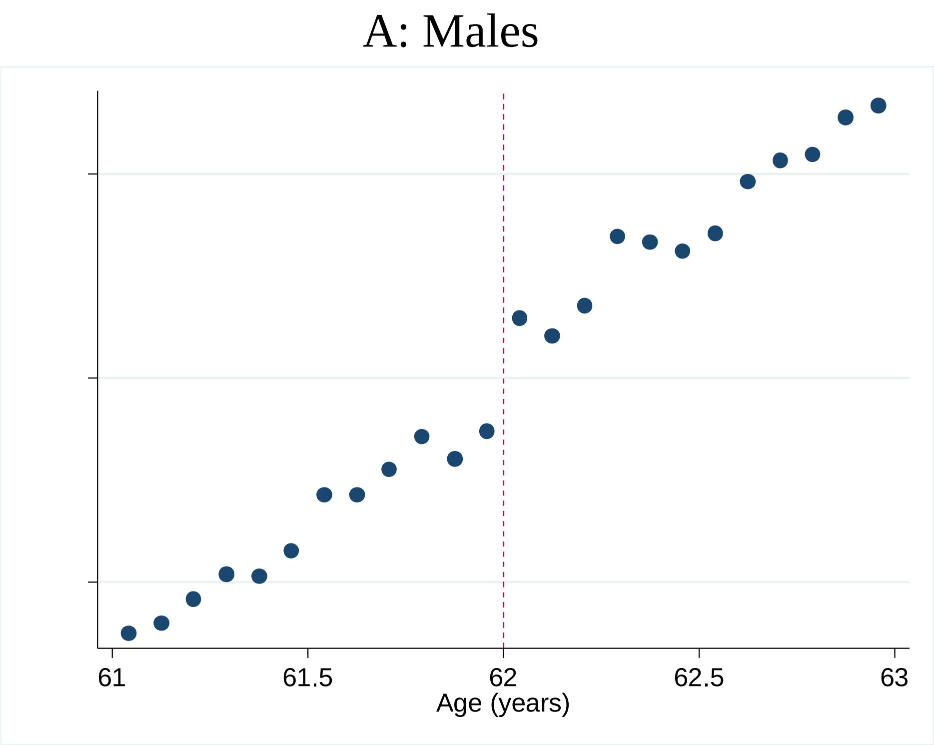
Preview of Results

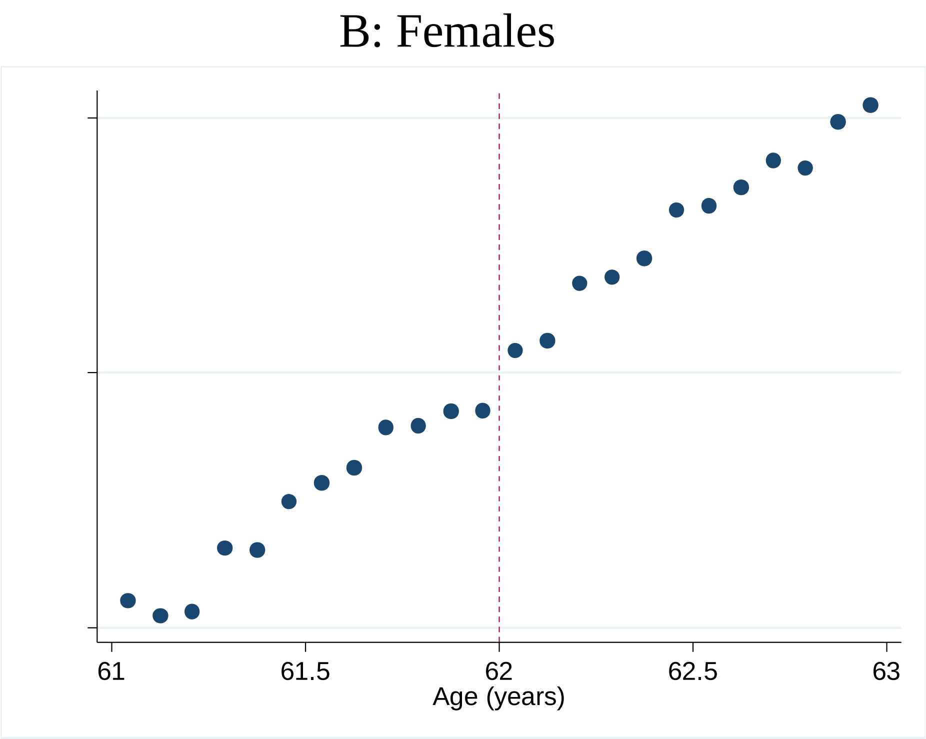
- Mortality increases at age 62 by ~1.5 percent
- Increase for males is ~2 percent
  - Estimates are statistically significant across local nonparametric and global parametric RD specifications
  - Robust to modeling choices, including bandwidth
- Increase for females is ~1 percent
  - Estimates are not robust across modeling choices

Mortality in Relation to Age 62



Mortality in Relation to Age 62, by Sex





Preview of Results

- Largest increases in male mortality occur for:
  - Males not married or with <high school educ.
  - Deaths outside of hospitals/institutions
  - Cause of death: external causes, lung cancer & COPD
- Male mortality increase present in different periods
  - Unaffected by Full Retirement Age rise from 65 to 66
- Suggestive evidence it may be other lifestyle changes rather than Social Security claiming per se

Existing Literature

- Variety of empirical strategies and many outcomes:
  - Cognitive functioning: e.g., Bonsang, Adam & Perelman (2012), Coe et al. (2012), Rohwedder & Willis (2010)
  - Self-reported health/subjective wellbeing: e.g., Charles (2004), Neuman (2008)
  - Mortality: Blake & Garrouste (2013), Coe & Lindeboom (2008), Hernaes et al. (2013), Kuhn, Wuellrich & Zweimuller (2010)
  - Other/multiple outcomes: e.g., Behncke (2012), Bound & Waidmann (2007), Coe & Zamarro (2011), Dave, Reshad & Spasojevic (2008), Insler (2014), Eibich (2015)
- Lack of consensus on direction of effects, especially for objective health outcomes
- Little information on heterogeneity, mechanisms

I. Data and Empirical Approach

Data

- MCOD data (National Center for Health Statistics)
  - Combine dates of birth and death to get exact age
  - Demographics: sex, age, race, marital status, education
  - Underlying cause and place of death
  - Create mortality counts for birth cohorts 1921-1948
- Complement with:
  - 1% extract of Master Beneficiary Record
  - Health and Retirement Study
  - NHANES

Empirical Framework

- RD Specification

$$\log(Mortality_a) = f(a) + Post62_a b + e_a$$

  - Dependent variable is log mortality at age of death (measured in months) in relation to age 62, *a*
  - Control for age-mortality relationship on either side of the discontinuity
  - $Post62_a$ is a dummy variable if $a \geq 62$
  - Use robust standard errors, ε_a
  - Coefficient of interest, β, represents change in mortality at age 62
  - Estimates are robust to both global parametric and local non-parametric methods

II. Main Results

Regression Estimates

Regression type	All (1)	Males (2)	Females (3)
Global parametric regressions (bandwidth = 12 months)			
Quadratic regression	0.0135***	0.0185***	0.0058
	(0.0043)	(0.0049)	(0.0049)
Cubic regression	0.0197***	0.0236***	0.0138***
	(0.0049)	(0.0060)	(0.0047)
Quartic regression	0.0193***	0.0243***	0.0116***
	(0.0051)	(0.0082)	(0.0043)
Polynomial minimizing AICc	Cubic	Quadratic	Quartic
Local nonparametric regressions			
Local linear using data-driven bandwidth	0.0142***	0.0215***	0.0103***
	(0.0036)	(0.0041)	(0.0030)
Data-driven bandwidth	10 months	7 months	6 months
Local quadratic using data-driven bandwidth	0.0194***	0.0233***	0.0131***
	(0.0039)	(0.0058)	(0.0026)
Data-driven bandwidth	7 months	7 months	8 months

Note: **p<0.05, ***p<0.01

Regression Estimates

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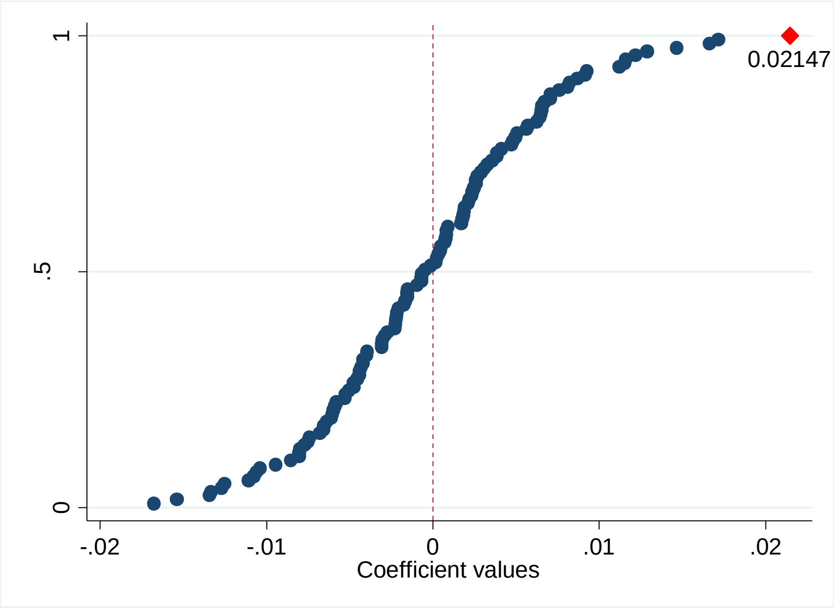
Additional Checks

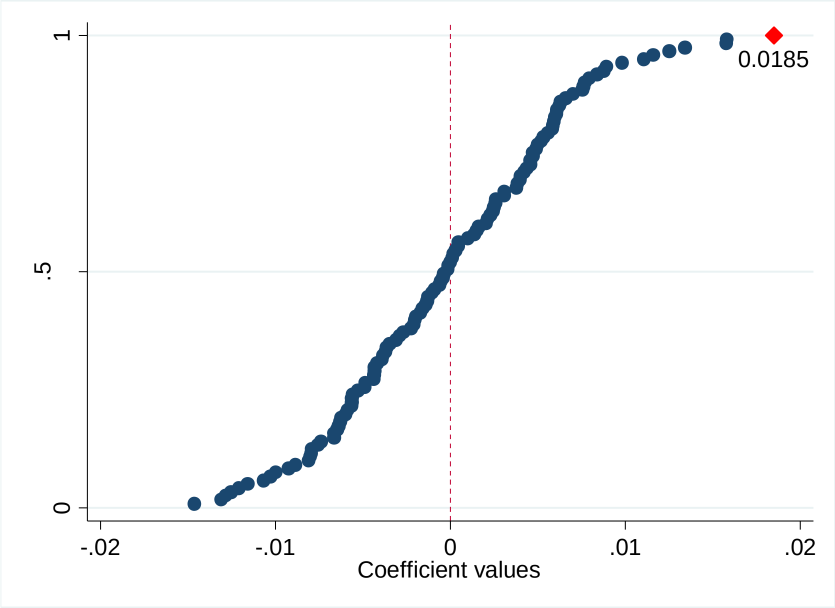
- Using daily or weekly counts
- In the parametric regressions:
  - Adding year-of-birth fixed effects
  - Adding month-of-death fixed effects
- Using Social Security eligibility dates
- Varying the bandwidth
  - Focus on local linear and global quadratic
- Donut-hole techniques
- Placebo techniques
  - No effect at ages 61 or 63
  - Estimate discontinuity at all ages between 57 and 67

Distribution of Placebo Male Mortality Estimates for +/- 60 Months of Age 62

A: Local linear specification using CCT-calculated bandwidths



B: Global quadratic specification using a bandwidth of 12 months



III. Heterogeneity and Potential Mechanisms

Demographics: Marital Status

	Local linear (1)	Global quadratic (2)	Fraction deaths (3)
Married	0.0130**	0.0081	65.1%
	(0.0058)	(0.0057)	
	6 months	12 months	
Not married	0.0415***	0.0377***	34.9%
	(0.0079)	(0.0107)	
	6 months	12 months	
- Single	0.0558***	0.0514***	9.9%
	(0.0056)	(0.0111)	
	6 months	12 months	
- Divorced	0.0305***	0.0337**	18.9%
	(0.0111)	(0.0137)	
	8 months	12 months	
- Widowed	0.0330	0.0262	6.2%
	(0.0202)	(0.0248)	
	11 months	12 months	

Demographics: Educ. Attainment

	Local linear (1)	Global quadratic (2)	Fraction deaths (3)
Did not complete high school	0.0303*** (0.0103) 8 months	0.0275** (0.0115) 12 months	27.6%
Completed high school, not college	0.0087 (0.0050) 7 months	0.0099 (0.0066) 12 months	56.5%
Completed college	0.0146 (0.0146) 8 months	0.0187 (0.0181) 12 months	15.9%

Heterogeneity: Place of Death

	Local linear (4)	Global quadratic (5)	Fraction deaths (6)
Out of hospital/ institution	0.0339***	0.0323***	34.6%
	(0.0074)	(0.0073)	
	12 months	12 months	
In hospital	0.0124	0.0130	58.5%
	(0.0064)	(0.0070)	
	11 months	12 months	
In nursing home/ institution	-0.0022	-0.0079	6.2%
	(0.0161)	(0.0194)	
	8 months	12 months	

Heterogeneity: Cause of Death

	Local linear (4)	Global quadratic (5)	Fraction deaths (6)
Heart and lung conditions	0.0250** (0.0106)	0.0135 (0.0119)	39.2%
- Heart attacks	0.0159 (0.0138)	0.0072 (0.0172)	19.4%
- COPD	0.0696*** (0.0089)	0.0496** (0.0180)	4.2%
- Not heart attacks or COPD	0.0064 (0.0106)	0.0118 (0.0115)	15.6%
Cancers	0.0262*** (0.0072)	0.0263*** (0.0084)	33.6%
- Lung cancer	0.0531*** (0.0097)	0.0510*** (0.0108)	13.1%
- Not lung cancer	0.0099 (0.0080)	0.0106 (0.0092)	20.6%
External causes	0.0314*** (0.0103)	0.0399** (0.0163)	5.0%
All other causes	0.0113 (0.0109)	0.0109 (0.0106)	22.1%

Potential Mechanisms

1. Income from Social Security ("Unhealthy" consumption)

- Payday effects
  - *Pattern of results isn't consistent with previous literature on payday effects (Evans and Moore 2014)*
- Effect of more resources
  - *Results are similar across cohorts with different levels of benefits*
  - *Patterns of claiming are similar across gender, but mortality patterns are not*
  - *Patterns of claiming across socioeconomic characteristics of males not consistent with patterns in mortality*

Potential Mechanisms

2. Retirement from labor force/decrease in work

- *Does heterogeneity in retirement match heterogeneity in mortality effects?*

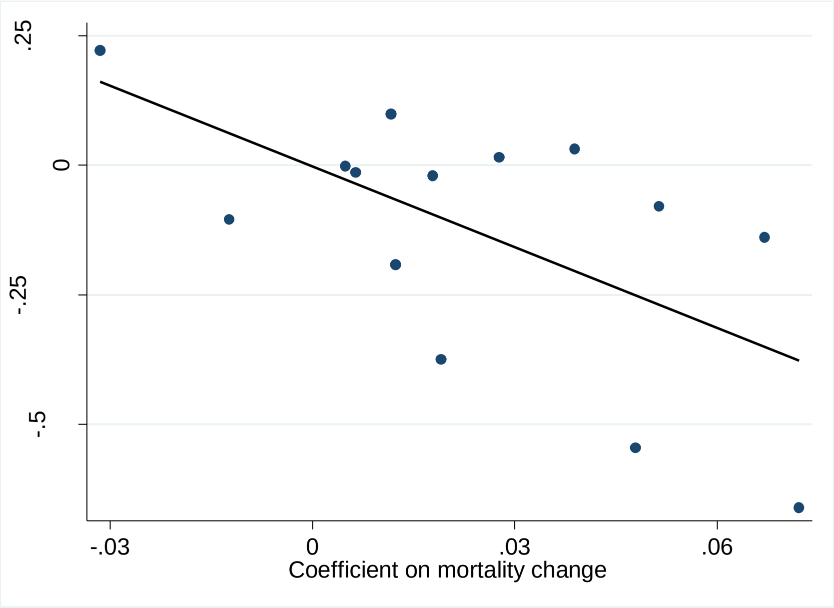
3. Change in health insurance status

- *Does heterogeneity in health insurance match heterogeneity in mortality effects?*

Workforce Outcomes

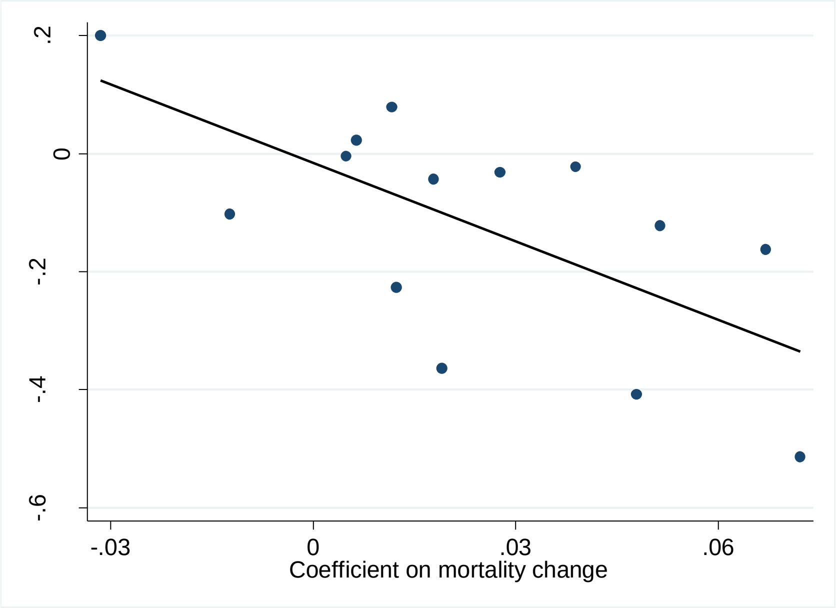
Labor Force Participation

Correlation is -0.6194



Currently Working for Pay

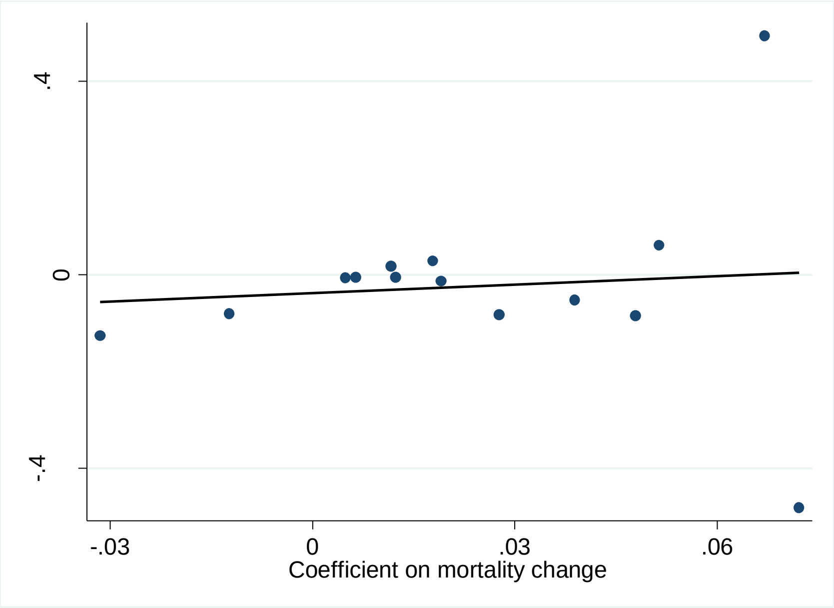
Correlation is -0.656



Health Insurance

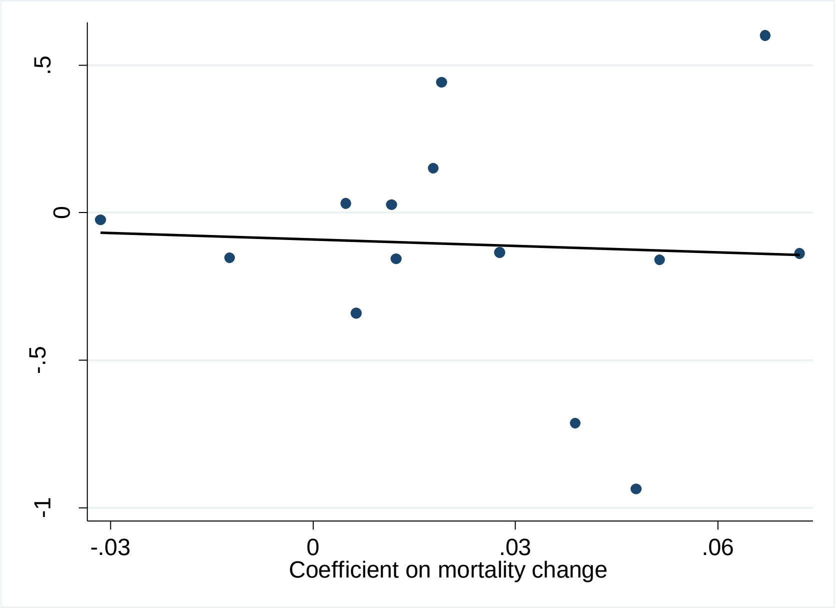
Has Health Insurance

Correlation is 0.0860



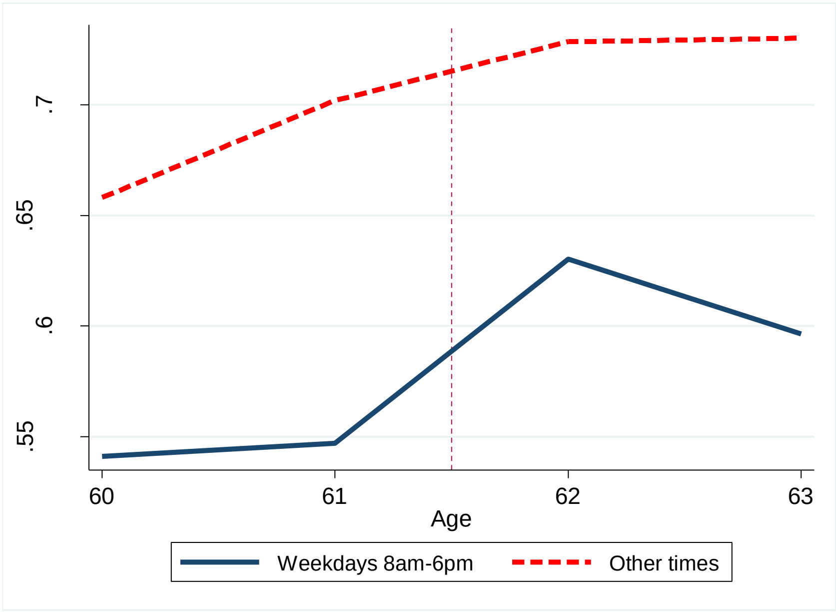
Number of Health Insurance Plans

Correlation is -0.0549

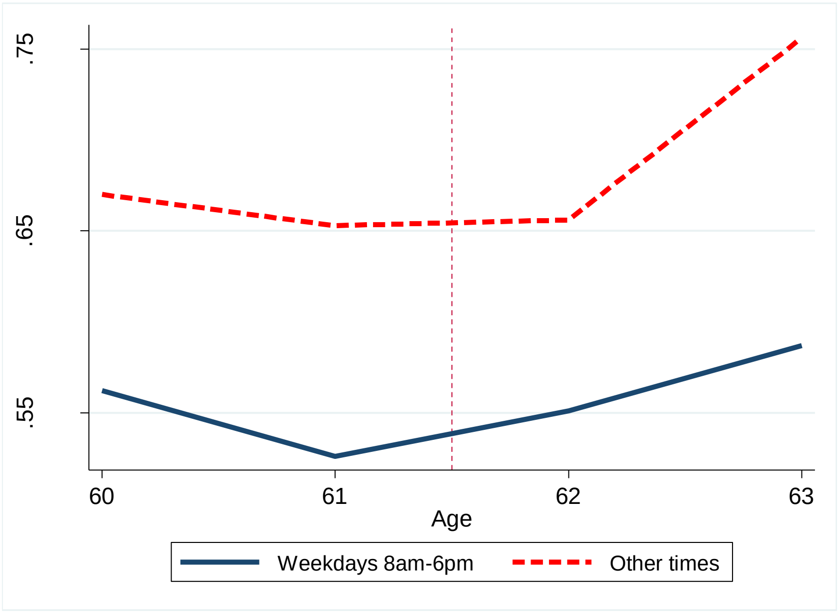


Mechanisms

Males, weekdays 8am-6pm vs. other times



Females, weekdays 8am-6pm vs. other times



Notes: These figures are based on Actigraph accelerometer data collected from National Health and Nutritional Examination Survey (NHANES) 2003/04 and 2005/06 participants. Sedentary is defined as less than 100 counts per minute and outcome measured is the fraction of sedentary time when the accelerometer was worn. Participants are included if they were aged 60 to 63 and wore their accelerometer between 8am and 6pm Monday and Friday. The sample consists of 92 males and 87 females.

Conclusion

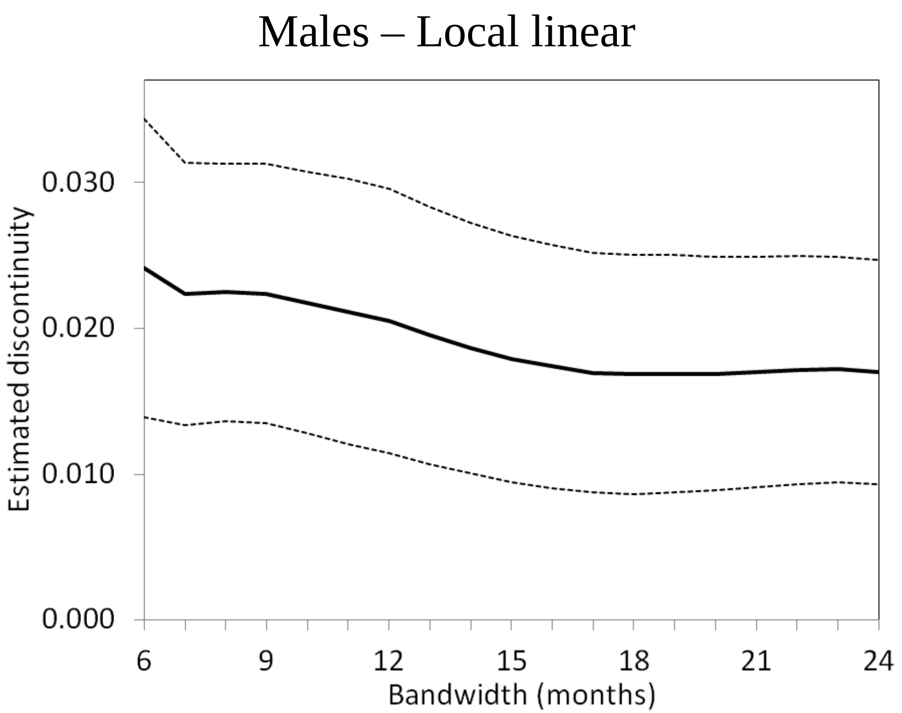
- Clear increase in male mortality at age 62
  - If attributed to Social Security eligibility, indicates negative health effects among age 62 claimants
- Suggestive evidence that may not be receipt of Social Security itself, but concurrent changes
- RD design makes it difficult to assess how local these mortality effects are

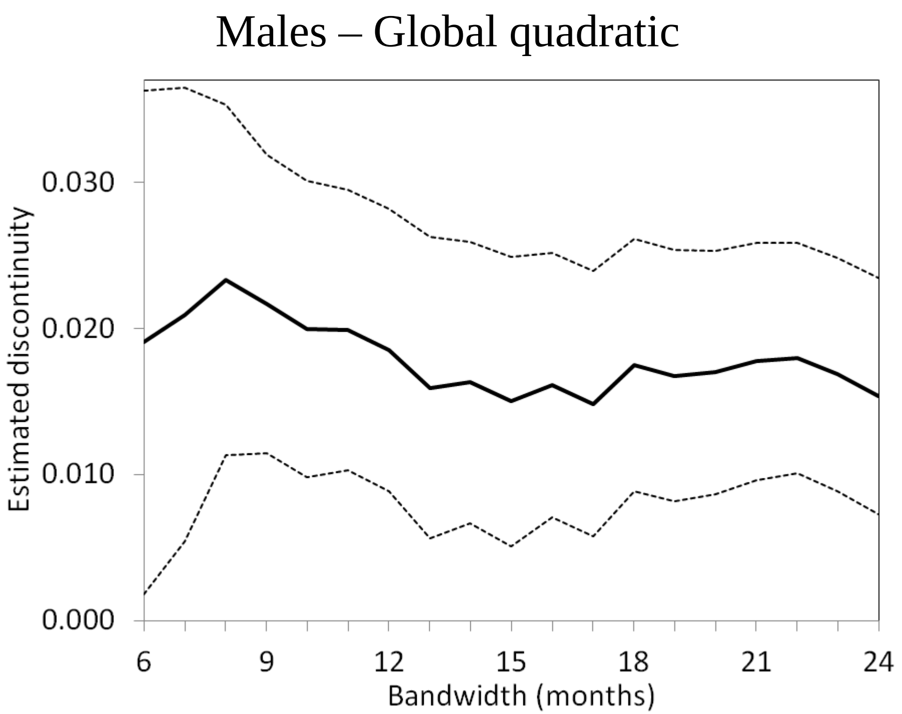
Thanks.

Extra Slides

Robustness of Estimates to Bandwidth

- Re-estimate at monthly intervals from 6-24 months





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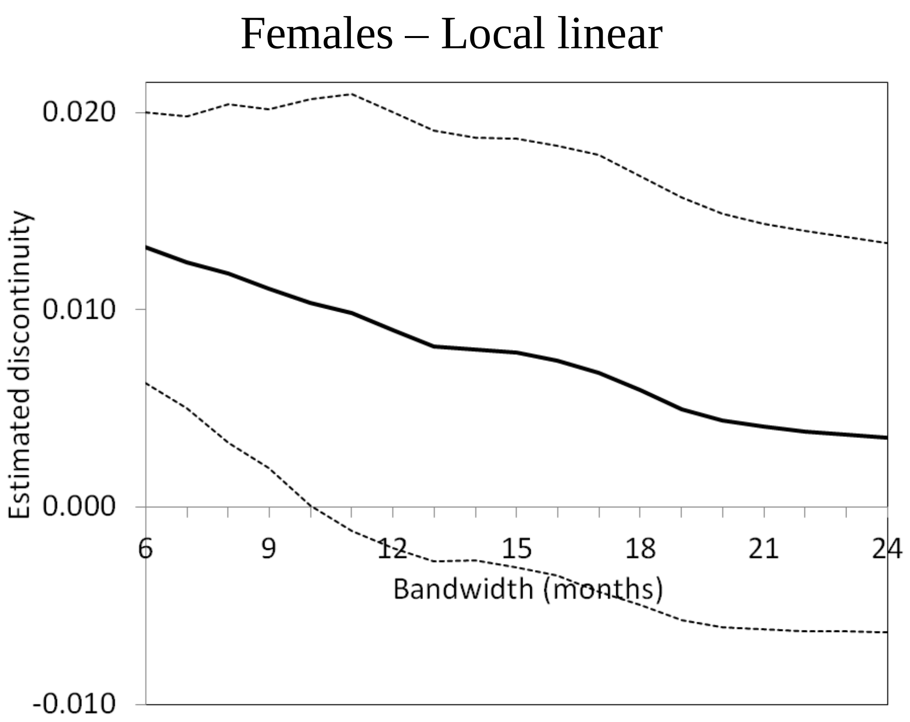
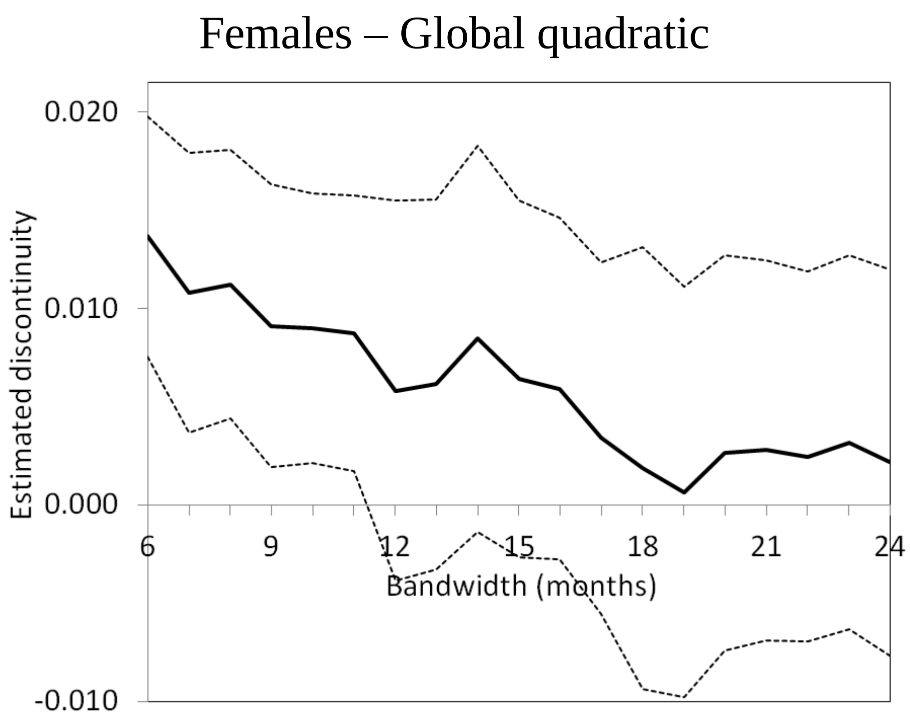




Effect of Extra Regression Controls

Regression type		Extra controls	
	Main estimate (1)	Year of birth FE (2)	Month of death FE (3)
Bandwidth = 12 months			
Global quadratic	0.0135***	0.0132***	0.0133***
	(0.0043)	(0.0039)	(0.0041)
	12 months	12 months	12 months
Global cubic	0.0197***	0.0195***	0.0213***
	(0.0049)	(0.0043)	(0.0039)
	12 months	12 months	12 months
Global quartic	0.0193***	0.0187***	0.0208***
	(0.0051)	(0.0043)	(0.0041)
	12 months	12 months	12 months

BACK

Using Daily and Weekly Counts

Regression type	Unit of observation		
	Main estimate (1)	Daily data (4)	Weekly data (5)
Global parametric regressions (bandwidth = 12 months)			
Global quadratic	0.0135***	0.0132***	0.0137**
	(0.0043)	(0.0049)	(0.0067)
	12 months	365 days	52 weeks
Global cubic	0.0197***	0.0204***	0.0200**
	(0.0049)	(0.0067)	(0.099)
	12 months	365 days	52 weeks
Global quartic	0.0193***	0.0224***	0.0235**
	(0.0051)	(0.0081)	(0.0114)
	12 months	365 days	52 weeks
Local nonparametric regressions			
Local linear	0.0142***	0.0135***	0.0223**
	(0.0036)	(0.0047)	(0.0105)
CCT bandwidth	10 months	305 days	18 weeks
Local quadratic	0.0194***	0.0221***	0.0239**
	(0.0039)	(0.0077)	(0.0115)
CCT bandwidth	7 months	218 days	27 weeks

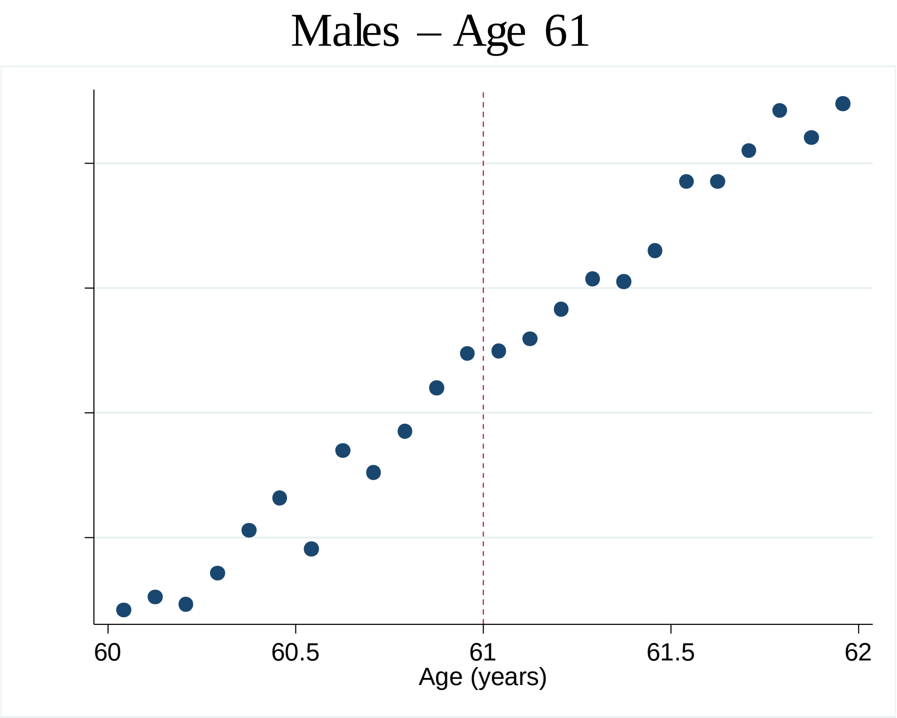
BACK

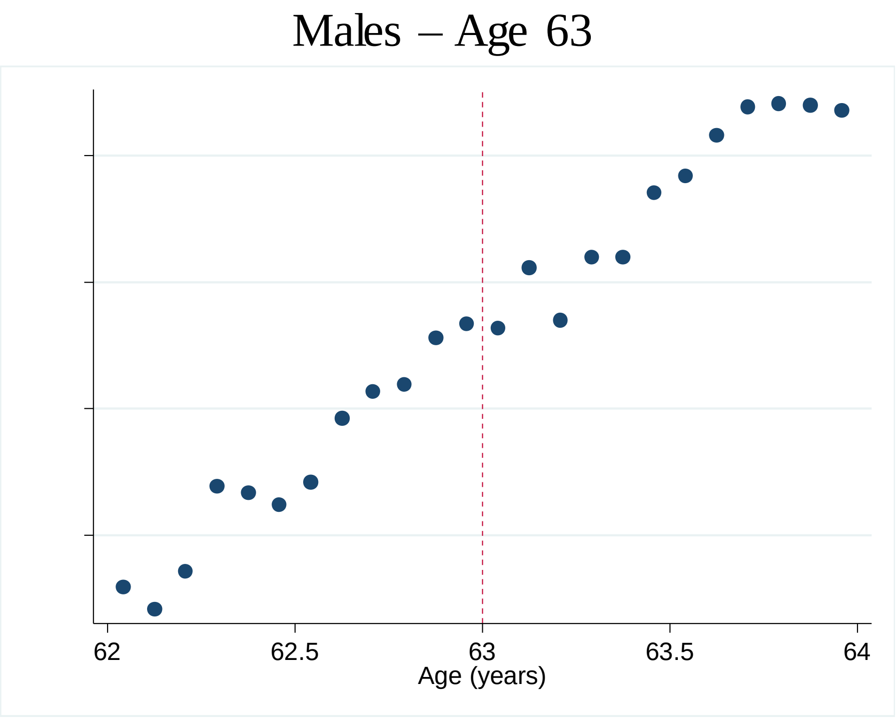
Using Social Security Eligibility Dates

Regression type	Main estimate (1)	Using SS eligibility date (6)
Global parametric regressions (bandwidth = 12 months)		
Global quadratic	0.0135***	0.0134
	(0.0043)	(0.0084)
	12 months	12 months
Global cubic	0.0197***	0.0254***
	(0.0049)	(0.0068)
	12 months	12 months
Global quartic	0.0193***	0.0333***
	(0.0051)	(0.0065)
	12 months	12 months
Local nonparametric regressions		
Local linear	0.0142***	0.0166**
	(0.0036)	(0.0074)
CCT bandwidth	10 months	8 months
Local quadratic	0.0194***	0.0359***
	(0.0039)	(0.0043)
CCT bandwidth	7 months	6 months

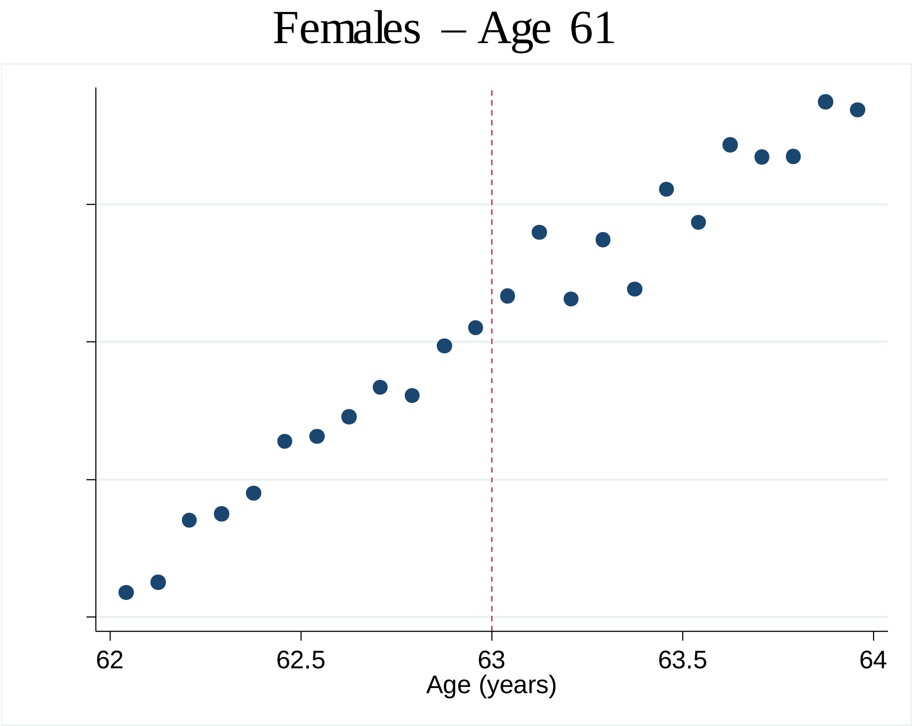
BACK

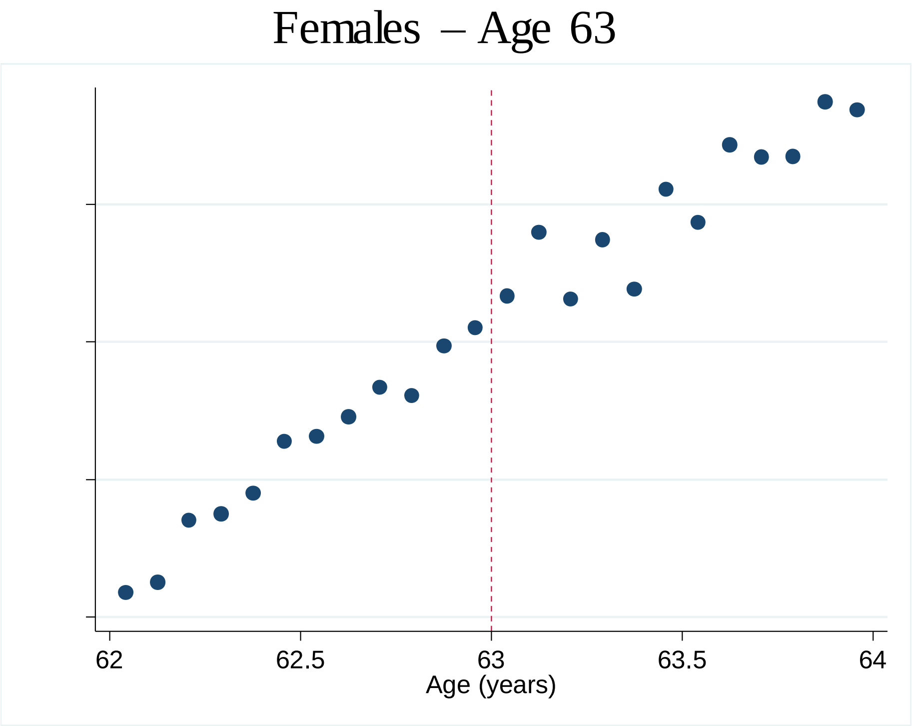
Mortality at Age 61 and 63 – Males





Mortality at Age 61 and 63 – Females





BACK

Changes to RD Specification

	Discontinuity Estimate
Global quadratic regression	0.0185*** (0.0049)
+ Dummies 1-3 months after 62	0.0219 (0.00114)
+ Dummies 1-3 months before 62	0.0247 (0.0126)

BACK

Model Fit using Placebo Locations, Quadratic