Closing routes to retirement: how do people respond?

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Motivation

- Demographic change increases financial pressure on PAYG pension systems
- Policy reaction: delay benefit take-up by increasing the early retirement age
- Important to know if people delay employment exits
- Potential problem: people might move to other social support programs

Policy design and research questions

German pension reform, 1999: ERA increase from 60 to 63+ for women born after 1951

1. ERA increase: effective tool to increase employment of older women?
2. Did women move into other social security programs?
   $\Rightarrow$ *Program substitution*
3. How did the reform affect women in their late 50s?
   $\Rightarrow$ *Anticipation effects*
4. Which groups were affected most by the ERA increase?
5. Is it passive or active program substitution?

Summary

- This paper analyzes the **employment effects** of a large ERA increase (German pension reform, 1999)
- We exploit this cohort-based reform in a **linear regression discontinuity** framework to study the effects on employment and program substitution
- Using **administrative pension account data (VSKT)**
- **Results** suggest...
  1. Positive effects on employment and unemployment rates
  2. No evidence for active program substitution from employment
  3. We do not find anticipation effects before age 60
  4. Subgroups are affected heterogenously

Outline

The German pension system

- Majority of the working population is covered by the public pension system
- Public pensions are by far the largest source of income after retirement entry (about 65%)
- Pensions are based on a pay-as-you-go (PAYG) scheme
- Old-age pensions are designed to extend the standard of living achieved during working career; therefore they feature few redistributive properties
- Early retirement (before reaching the full retirement age) is possible and quite common; with benefit deductions

Paths into retirement

Old-age pensions:

1. Full old-age pension, full retirement age: $FRA = 65 \ldots 67$
2. Early retirement (age $\leq FRA$) with deductions
   - Early pension for women, **age 60** (up to 1951)
   - Early pension for individuals with long service history, **age 63**
   - Old-age pension for unemployed / after part-time work, **age 63**
   - Invalidity pension, **age 60...63**
3. Pensions are reduced by 0.3% per month/3.6% per year retiring before the FRA (maximum of 18%)

Other ways to exit employment:

1. Disability pension (Erwerbsminderungsrente) after medical examination
2. Unemployment (ALG I: max. 24 months)
3. Exit without social security benefits (unobserved)

The 1999 pension reform

Women born before 1952 can claim the early pension for women when they fulfill the following **eligibility criteria:**

1. age ≥ 60
2. min. 15 years pension insurance contributions
3. min. 10 contribution years after age 40

$\Rightarrow$ 60% of women fulfill eligible criteria[1]

$\Rightarrow$ about 30% of eligible women use the pension for women and retire at age 60 (with deductions of 18%)

[1] out of all women born in 1951, VSKT 2014, incl. sampling weights

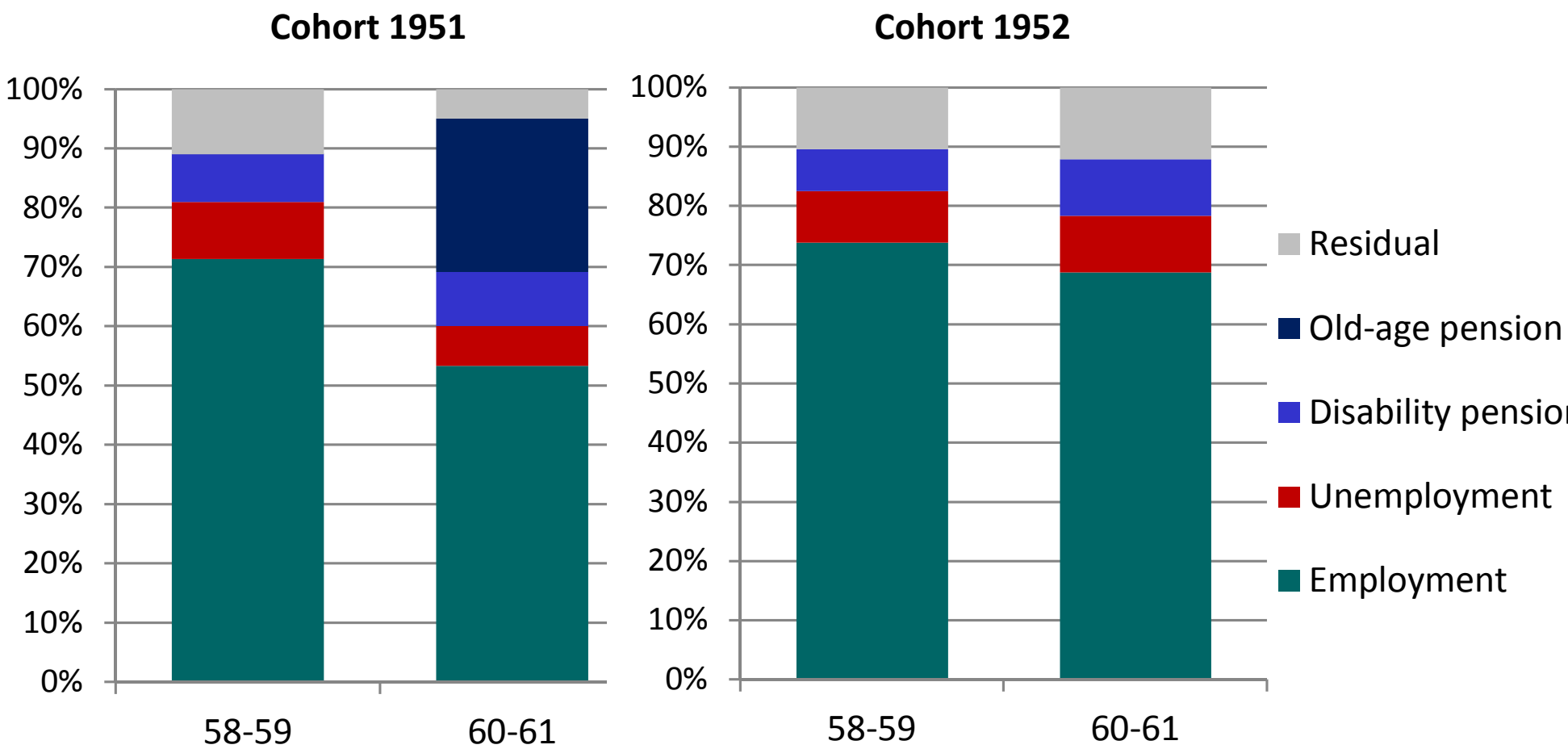
VSKT: Versicherungskontenstichprobe

- Administrative data from the Research Data Center of the Federal Pension Insurance (*Deutsche Rentenversicherung*)
- High quality data; **monthly process-produced information**
- Including pension-relevant information but lacks further information about the household
- Excluded are only people without a public pension insurance account
- **VSKT 2014** includes...
  - about 3,800 women per cohort
  - observed over 624 months (age 14 to 66)

Our sample

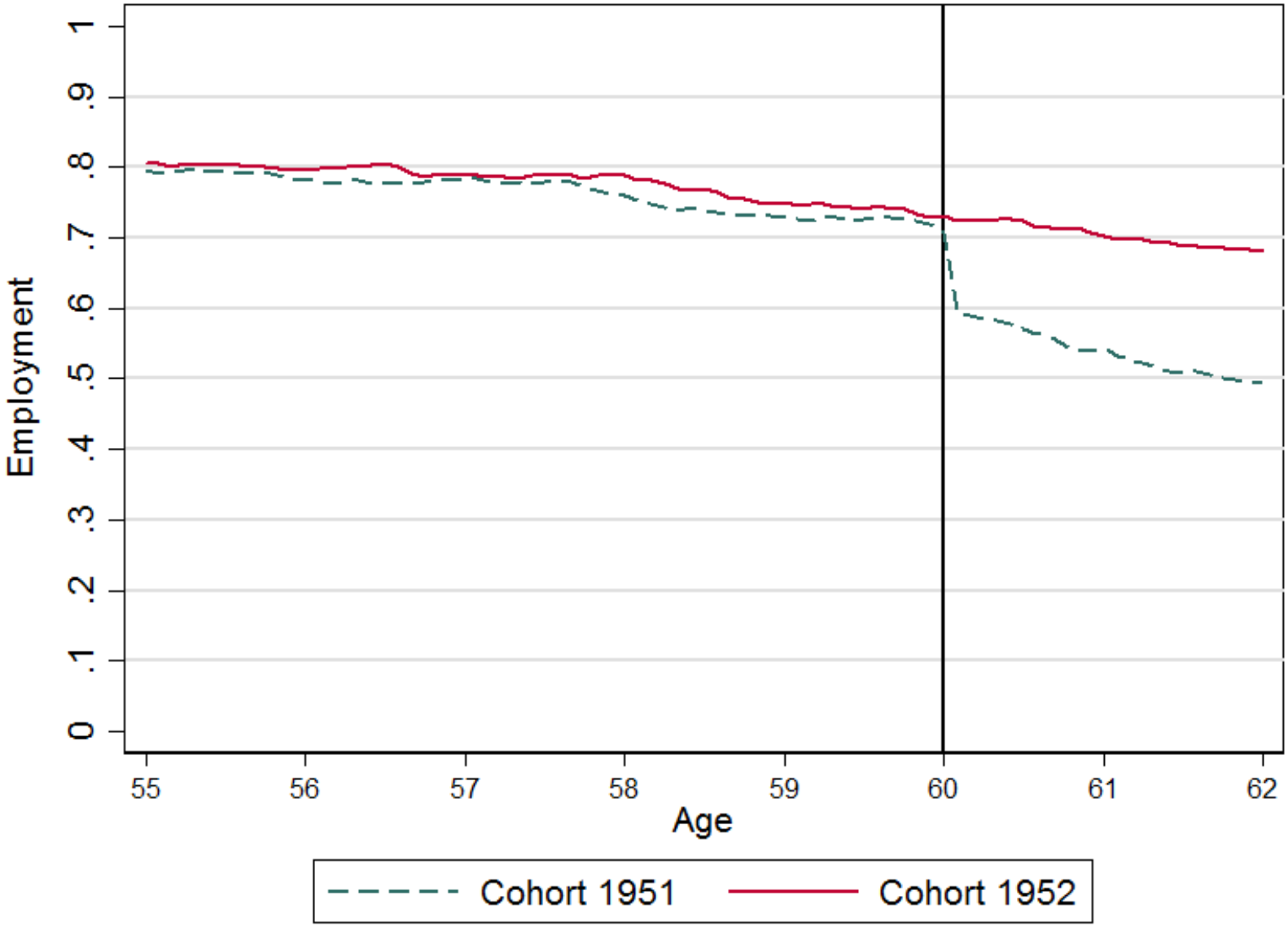
1. Women born in 1951 and 1952
2. Fulfill criteria for early pension for women
   Women born in 1951 who are eligible for early pension for women: 59% (52% in West and 84% in East Germany)
3. Excluding miners and women who receive an invalidity pension
4. 3,771 eligible women in final sample
5. Observed from 58th to 62st birthday (48 months)

Employment status by age, cohort 1951 and 1952



Averages over monthly observations. Only eligible women born 1951 and 1952. Own calculations using VSKT 2014.

Employment rate by age and cohort



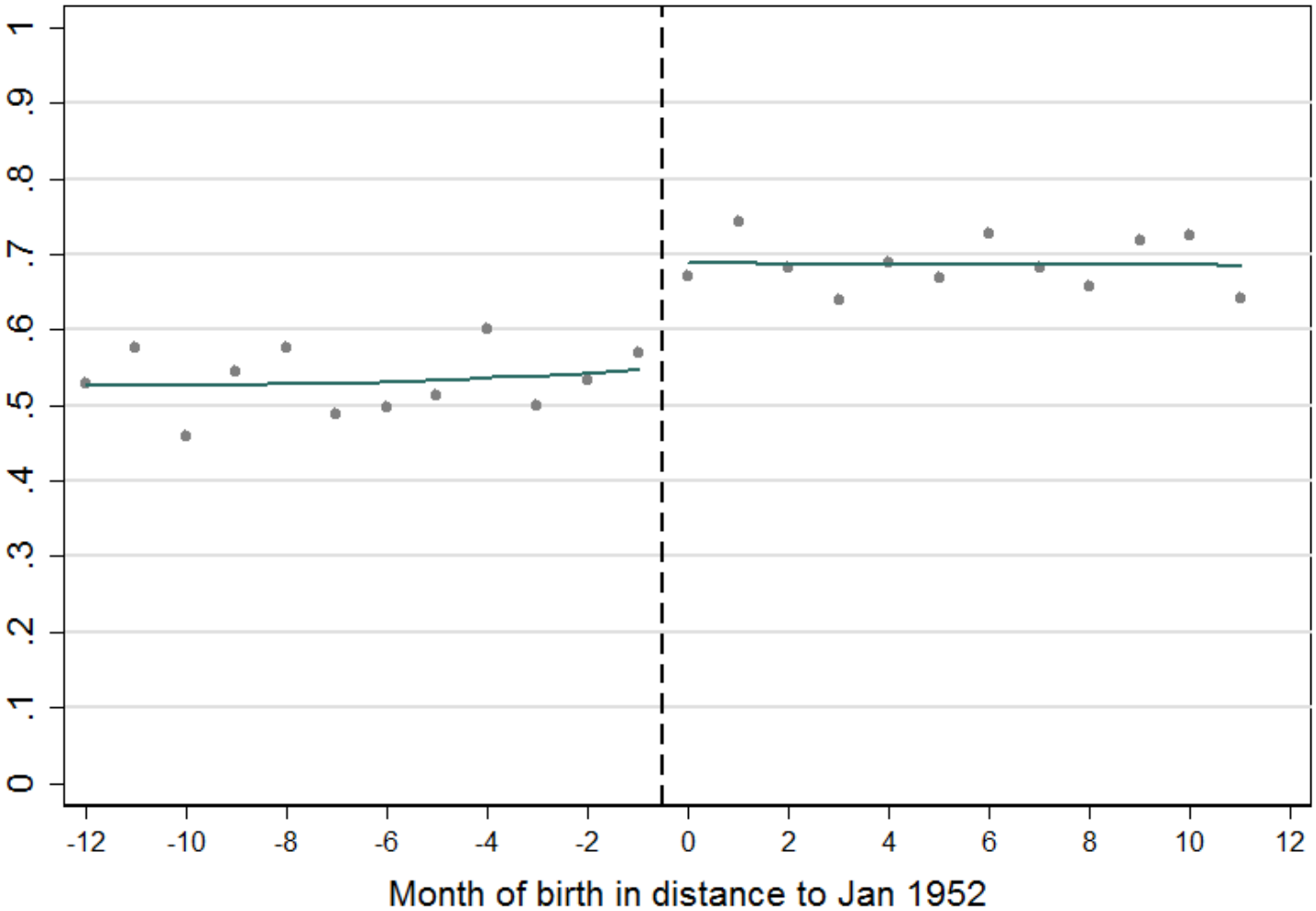
Empirical model: Regression Discontinuity Design

$$y_i = \alpha + \beta D_i + \gamma_0 f(z_i - c) + \gamma_1 D_i f(z_i - c) + X_i'\delta + \epsilon_i$$

- y_i = employment; unemployment; disability pension; inactivity
- z_i = month of birth, in difference to the last month of birth where the women's old-age pension was available
- $D_i = I[cohort \geq 1952]$
- X_i includes income groups, children, and a dummy for West Germany. We include calender month fixed effects
- Incl. linear (or quadratic trends) in running variable
- Clustered SE by month of birth

LLR: employment rate, age 60-61

Figure: Local linear regression plot



Linear RDD results, age 60-61

	Employment	Unemployment	Disability	Inactivity
D_i	0.144***	0.052***	-0.004	0.052***
	(0.0271)	(0.0111)	(0.0232)	(0.0123)
mob_i	0.002	-0.002	-0.001	0.001
	(0.0029)	(0.0013)	(0.0020)	(0.0010)
$D_i * mob_i$	-0.003	0.001	0.003	0.001
	(0.0040)	(0.0016)	(0.0029)	(0.0018)
West Germany	0.051**	-0.067***	0.022*	0.029**
	(0.0206)	(0.0125)	(0.0109)	(0.0114)
Constant	0.380***	0.181***	0.117***	0.074***
	(0.0328)	(0.0167)	(0.0278)	(0.0206)
N	3771	3771	3771	3771
R-squared	0.058	0.037	0.005	0.018

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

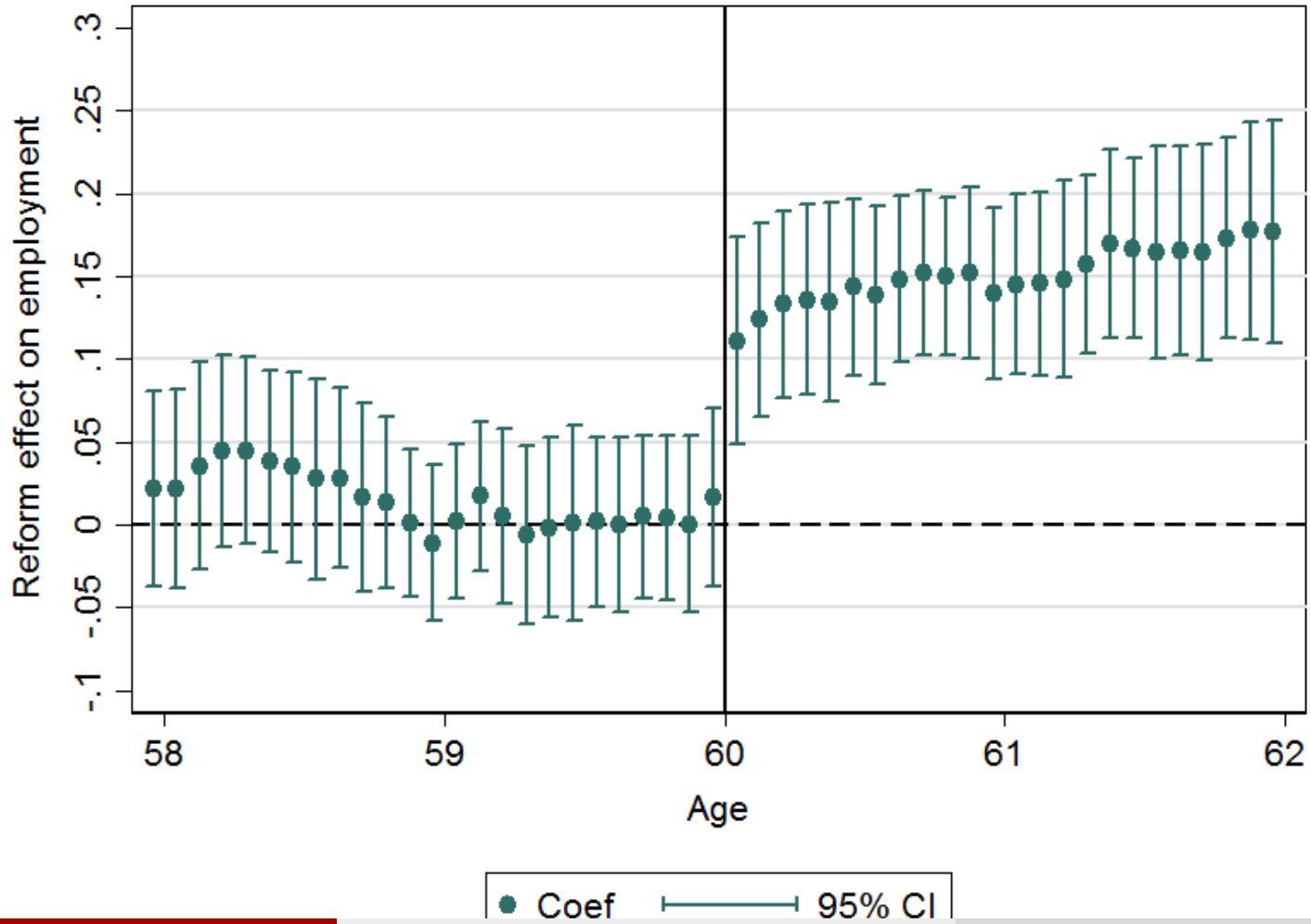
Linear RDD results, age 58-59

	Employment	Unemployment	Disability	Inactivity
D_i	0.015	0.004	-0.000	-0.017
	(0.0259)	(0.0099)	(0.0185)	(0.0169)
mob_i	0.000	-0.000	-0.002	0.000
	(0.0030)	(0.0011)	(0.0017)	(0.0020)
$D_i * mob_i$	0.000	-0.002	0.003	0.001
	(0.0041)	(0.0016)	(0.0024)	(0.0024)
West Germany	0.022	-0.078***	0.019*	0.026**
	(0.0174)	(0.0086)	(0.0101)	(0.0121)
Constant	0.579***	0.272***	0.085***	0.126***
	(0.0345)	(0.0165)	(0.0282)	(0.0264)
N	3771	3771	3771	3771
R-squared	0.033	0.053	0.004	0.006

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

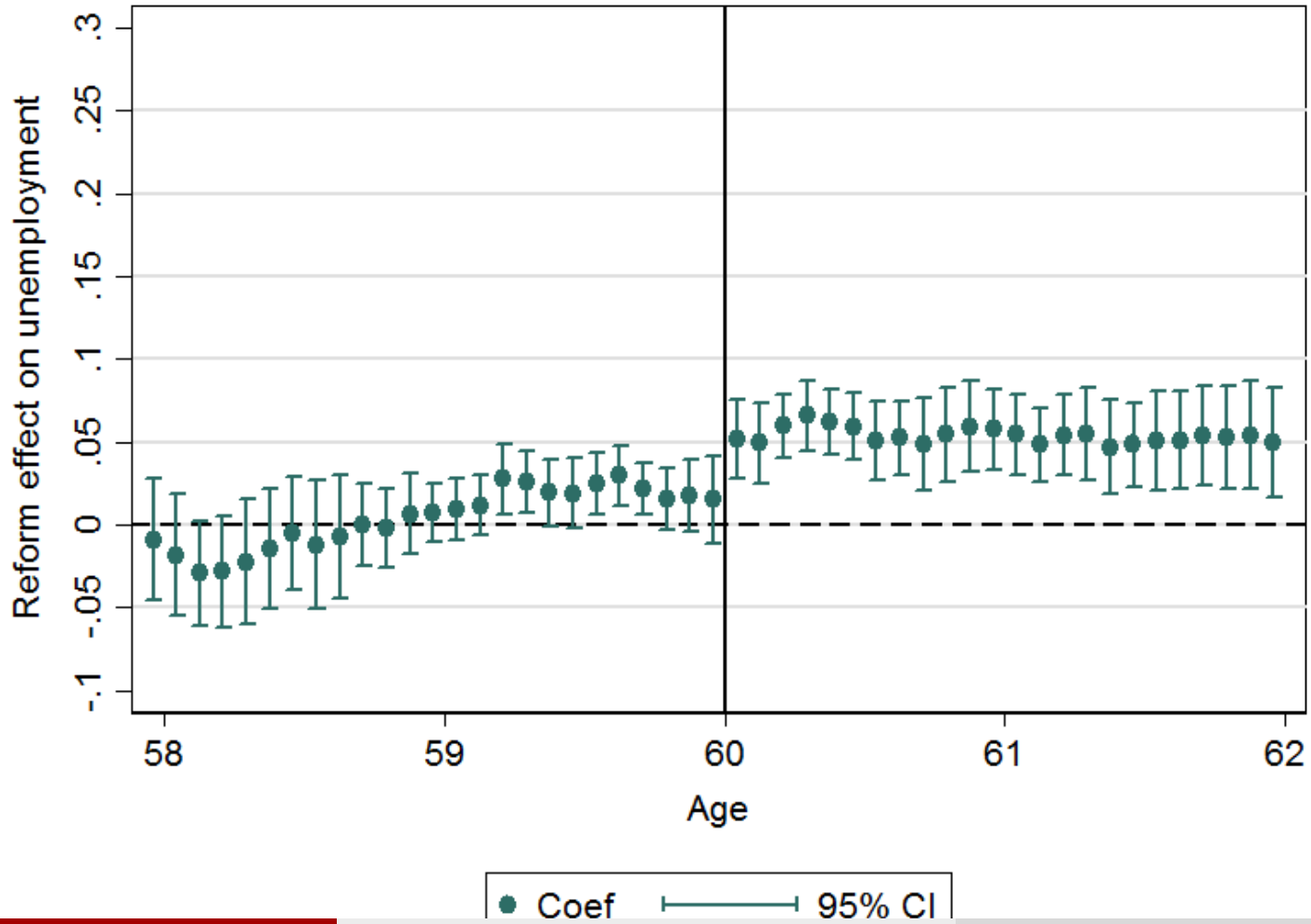
Effects on the employment rate

Figure: Coefficients by age in months. Pre-reform mean at age 60: 61%



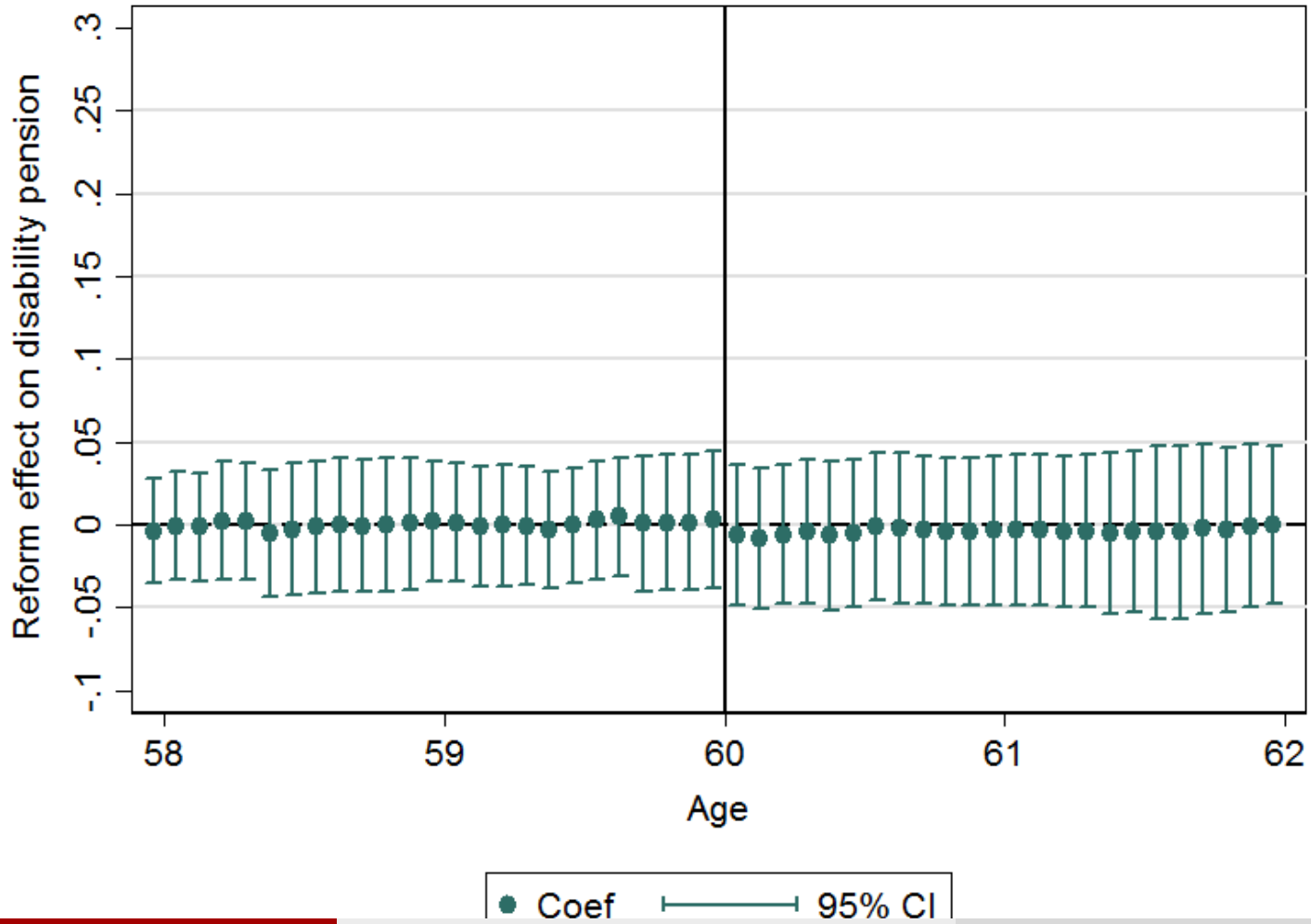
Effects on the unemployment rate

Figure: Coefficients by age in months. Pre-reform mean at age 60: 7%



Effects on the disability pension rate

Figure: Coefficients by age in months. Pre-reform mean at age 60: 10%



Interpreting the results (stock)

- Employment rate of 60-61 year-olds increased by about 14 percentage points
- Unemployment rate of 60-61 year-olds increased by about 5 pp
  $\Rightarrow$ mechanical or active program substitution?
- The fraction of 60-61 year old women out of the labor force increased by about 5 pp
- There is no effect on disability pension rates
- The reform had no effect on 58-59 year-olds

Linear RDD results on flow variables

	Employment exit		Unemployment entry		Disability entry	
Age	58-59	58-61	58-59	58-61	58-59	58-61
D_i	0.013	-0.206***	0.028*	0.023	0.011*	0.015
	(0.0189)	(0.0442)	(0.0136)	(0.0209)	(0.0063)	(0.0145)
mob_i	0.002	0.006	0.001	-0.000	-0.002**	-0.001
	(0.0021)	(0.0037)	(0.0010)	(0.0007)	(0.0009)	(0.0014)
$D_i * mob_i$	-0.003	-0.000	-0.002	0.003	0.002*	0.002
	(0.0025)	(0.0056)	(0.0017)	(0.0033)	(0.0011)	(0.0024)
West	-0.021	-0.064***	-0.051***	-0.068***	-0.009	-0.009
	(0.0154)	(0.0168)	(0.0130)	(0.0169)	(0.0055)	(0.0078)
Constant	0.258***	0.640***	0.154***	0.238***	0.016**	0.041***
	(0.0202)	(0.0397)	(0.0155)	(0.0159)	(0.0069)	(0.0101)
N	2447	2447	2732	2732	2732	2732
R-squared	0.022	0.057	0.020	0.028	0.003	0.002

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

Interpreting the results: flow variables

- No effect on employment exits before age 60
- Large decrease in probability to exit employment between age 58 and 61
- Small positive effect on unemployment and disability pension inflows of 58-59 year old women
  $\Rightarrow$ No evidence for bridging through unemployment
- No increase in unemployment entry for 60-61 year-olds
  $\Rightarrow$ Mechanic rather than active program substitution into unemployment

Interpretation

- Raising the ERA **increased employment** among 60-61 year-old women significantly
- We find **no program substitution** into disability pension
- We find **passive program substitution** into unemployment and inactivity
  - Positive reform effect on unemployment rate of 60-61 year-olds
  - No significant effects on unemployment inflow

$\Rightarrow$ **Net effects for the economy likely to be positive** but persistence of labor market status could increase inequality
(subject to further analysis)

Heterogeneity by subgroups

Linear RDD for different subgroups, outcomes age 60-61:

	Employment	Unemployment	Disability	Inactivity	N
Baseline	0.144***	0.052***	-0.004	0.052***	3771
	(0.0271)	(0.0111)	(0.0232)	(0.0123)	
West Germany	0.124***	0.015	0.007	0.062***	2727
	(0.0430)	(0.0147)	(0.0283)	(0.0197)	
East Germany	0.184**	0.149***	-0.028	0.026	1044
	(0.0675)	(0.0375)	(0.0381)	(0.0212)	
Low income	0.178***	0.028	-0.032	0.067**	1046
	(0.0443)	(0.0251)	(0.0304)	(0.0310)	
No children	0.152***	0.039	-0.075	0.099***	573
	(0.0446)	(0.0308)	(0.0472)	(0.0291)	
Poor health	0.159***	0.045**	-0.008	0.051*	988
	(0.0512)	(0.0206)	(0.0669)	(0.0252)	
All women	0.076***	0.035***	0.019	0.012	7289
	(0.0191)	(0.0067)	(0.0175)	(0.0202)	

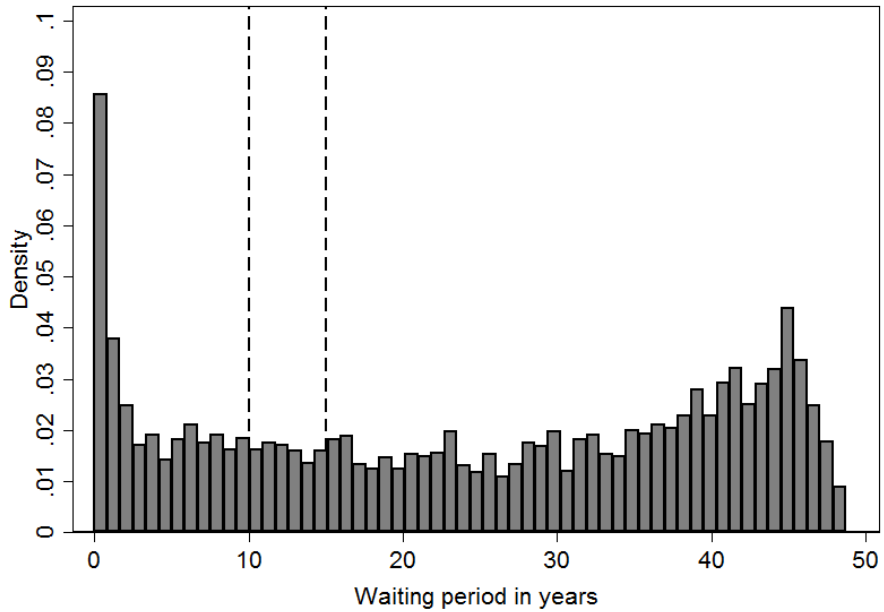
Clustered standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Validity of the empirical strategy

1. Selection bias due to eligibility criteria?
   - Distribution of contribution years ▷
   - Contribution months after age 40 ▷
   - Testing for discontinuity in eligibility criteria ▷
2. Discontinuities in sample covariates ▷
3. Placebo test ▷
4. Quadratic trends in RDD ▷

Selection bias due to eligiblity criteria?

Figure: Total contribution period in years, cohort 1951 and 1952



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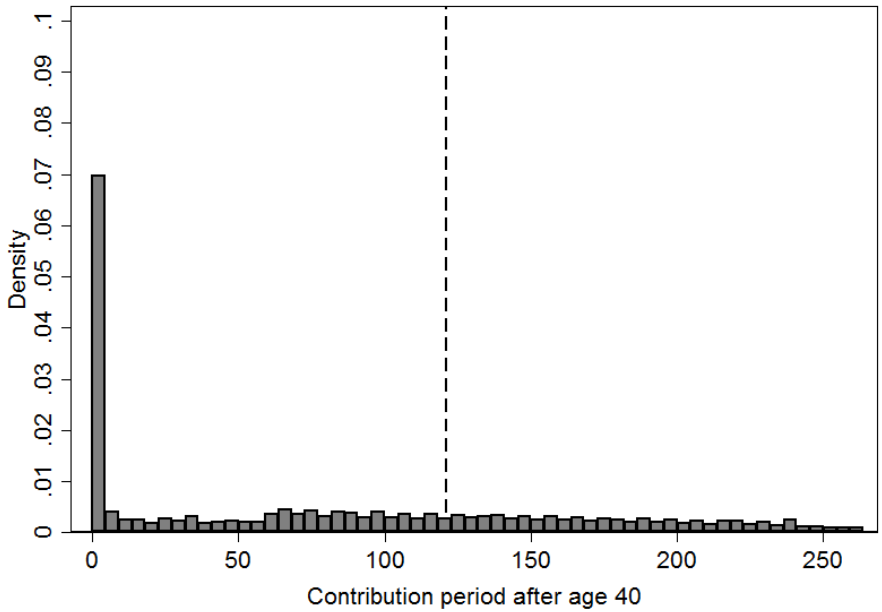
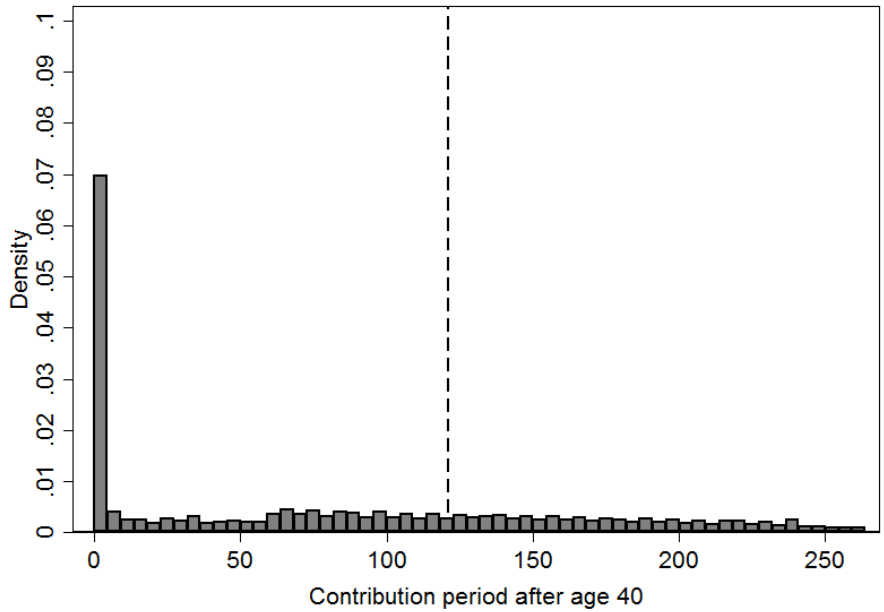
Selection bias due to eligiblity criteria?

Figure: Contribution months after age 40, cohort 1951 and 1952





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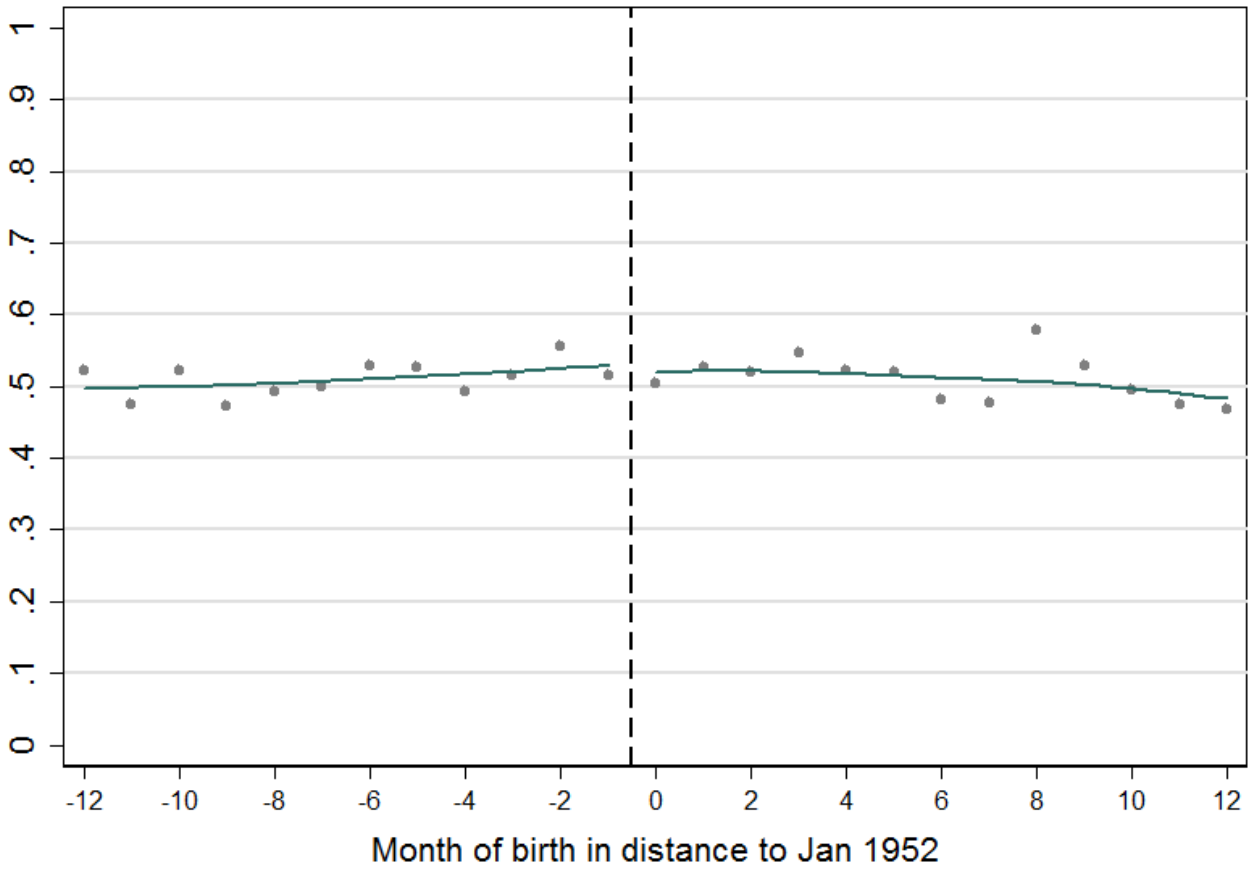
Discontinuity in fraction fulfilling eligibility criteria?

Figure: Local linear regression plot



Discontinuities in covariates?

Table: Test for discontinuities in covariates

Variable	Linear RDD		Quadratic RDD		Mean
Average points (month)	-0.000	(0.000)	0.001	(0.002)	0.064
Sum pension points	-0.444	(0.714)	0.009	(0.787)	31.66
Poor health status	0.015	(0.026)	0.004	(0.032)	0.262
At least one child	0.000	(0.032)	0.082	(0.065)	0.848
Contribution period	0.296	(0.353)	0.082	(0.445)	37.19
Contribution months 40+	-0.820	(2.204)	-1.724	(2.837)	213.2
Eligible long-term insured	-0.042**	(0.017)	-0.073***	(0.022)	0.878
Total years worked ($\leq$ 60)	-0.278	(0.427)	-1.157**	(0.447)	30.22

return

Placebo test using 1950 and 1951 cohorts

Age 60-61	Employment	Unemployed	Disability	Inactivity	Pension
D_i	-0.024	-0.003	0.027*	-0.021	0.024
	(0.0347)	(0.0137)	(0.0134)	(0.0140)	(0.0283)
mob_i	0.003	0.000	0.002*	0.001	-0.006**
	(0.0036)	(0.0016)	(0.0010)	(0.0016)	(0.0028)
$D_i * mob_i$	-0.001	-0.002	-0.003	-0.000	0.006
	(0.0047)	(0.0020)	(0.0023)	(0.0018)	(0.0040)
West	0.075***	-0.033***	0.021*	0.035***	-0.102***
	(0.0175)	(0.0102)	(0.0115)	(0.0082)	(0.0139)
Constant	0.378***	0.163***	0.103***	0.047***	0.360***
	(0.0524)	(0.0152)	(0.0199)	(0.0165)	(0.0373)
N	84360	84360	84360	84360	84360
R-squared	0.036	0.022	0.007	0.008	0.018

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

return

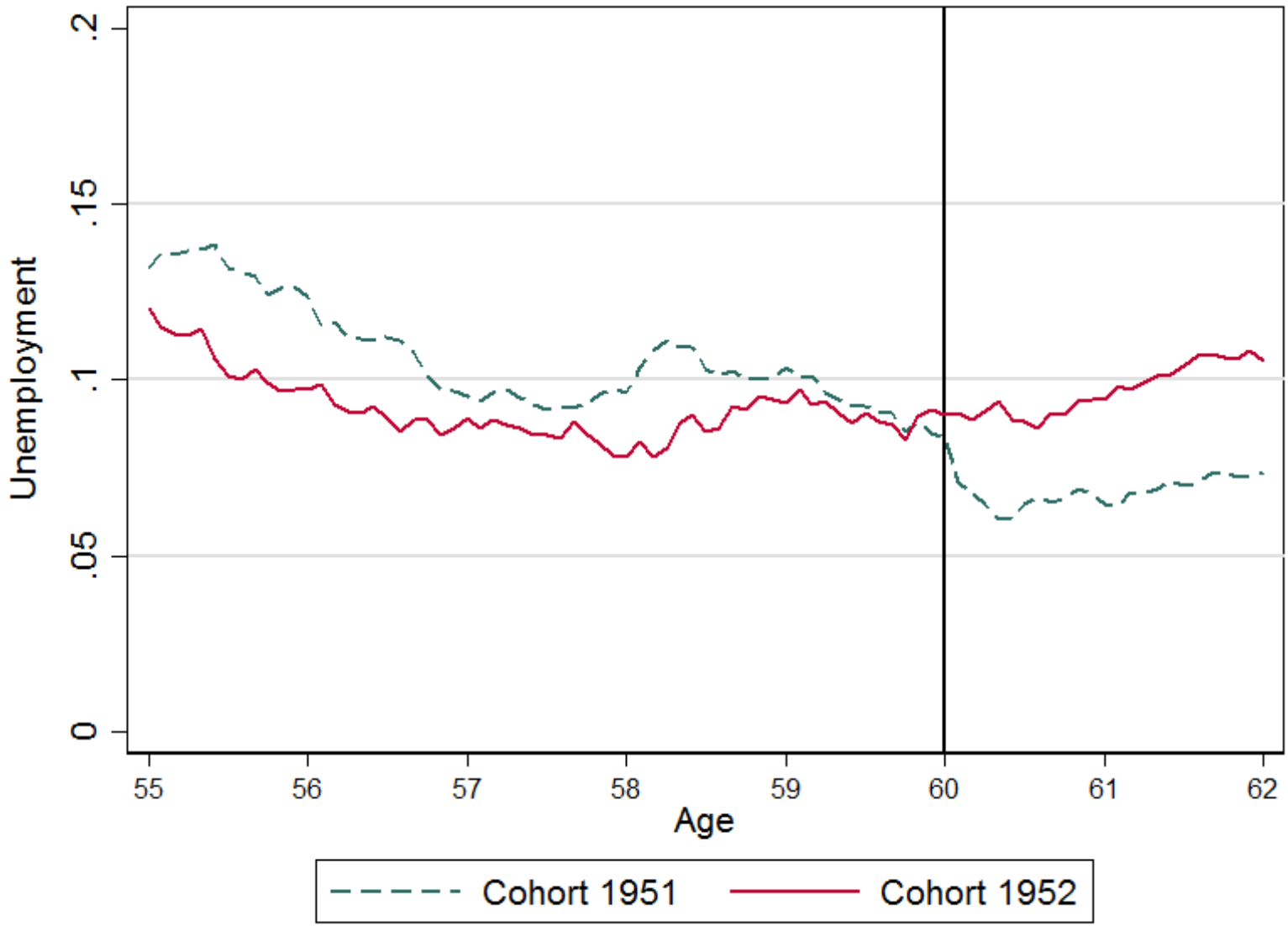
Quadratic trend in RDD

Age 60-61	Employment	Unemployment	Disability	Inactivity
D_i	0.125***	0.032**	-0.045	0.071***
	(0.0318)	(0.0156)	(0.0301)	(0.0152)
mob_i	0.010	0.006	0.013	-0.003
	(0.0101)	(0.0044)	(0.0098)	(0.0049)
mob_i^2	0.001	0.001*	0.001	-0.000
	(0.0008)	(0.0003)	(0.0007)	(0.0004)
$D_i * mob_i$	-0.012	-0.008	-0.007	-0.002
	(0.0127)	(0.0070)	(0.0122)	(0.0073)
$D_i * mob_i^2$	-0.001	-0.001	-0.002	0.001
	(0.0011)	(0.0006)	(0.0010)	(0.0006)
West	0.051**	-0.067***	0.021*	0.030**
	(0.0207)	(0.0124)	(0.0111)	(0.0114)
Constant	0.400***	0.201***	0.151***	0.066***
	(0.0366)	(0.0203)	(0.0339)	(0.0221)
N	3771	3771	3771	3771
R-squared	0.059	0.037	0.006	0.018

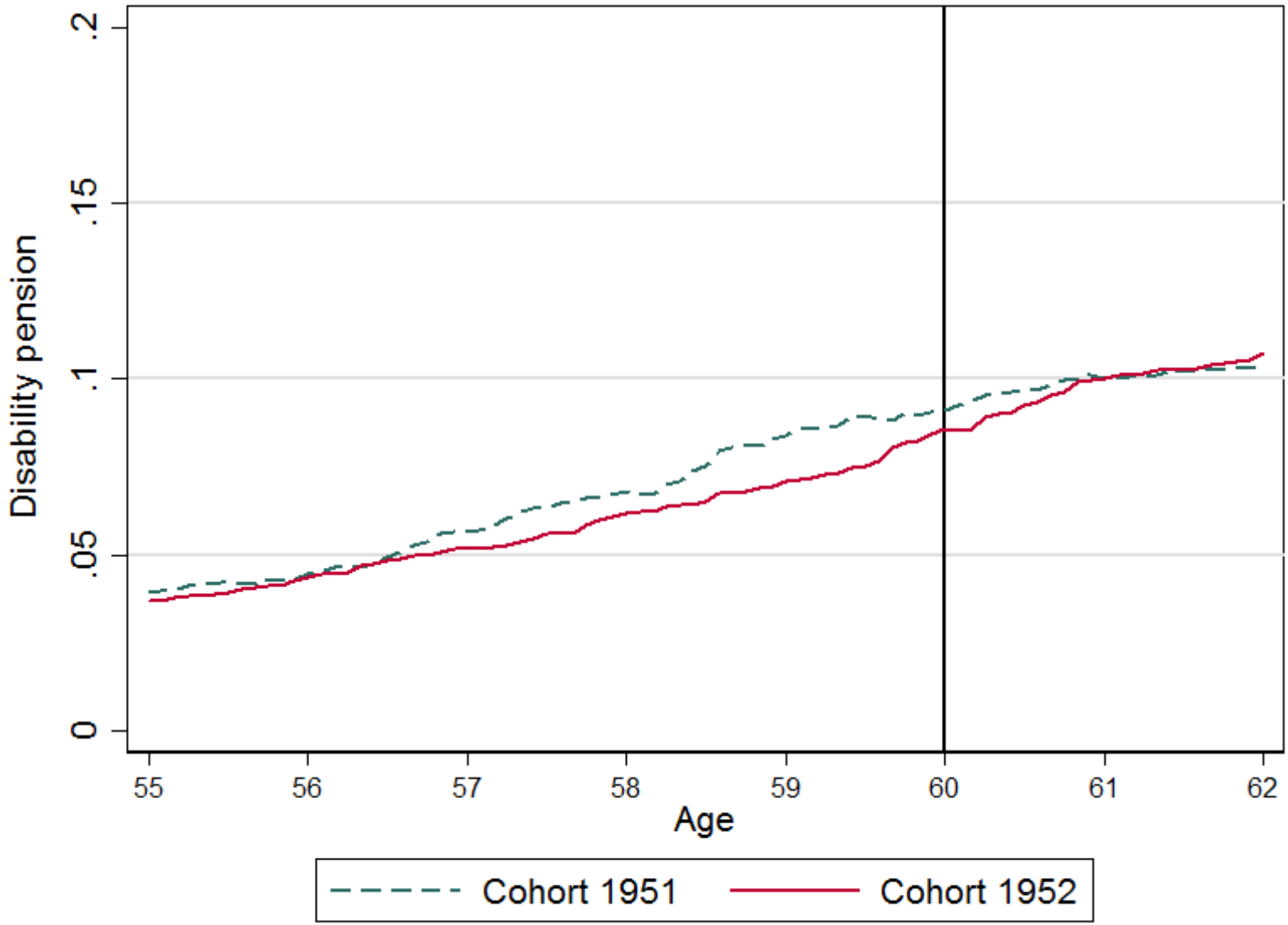
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

return

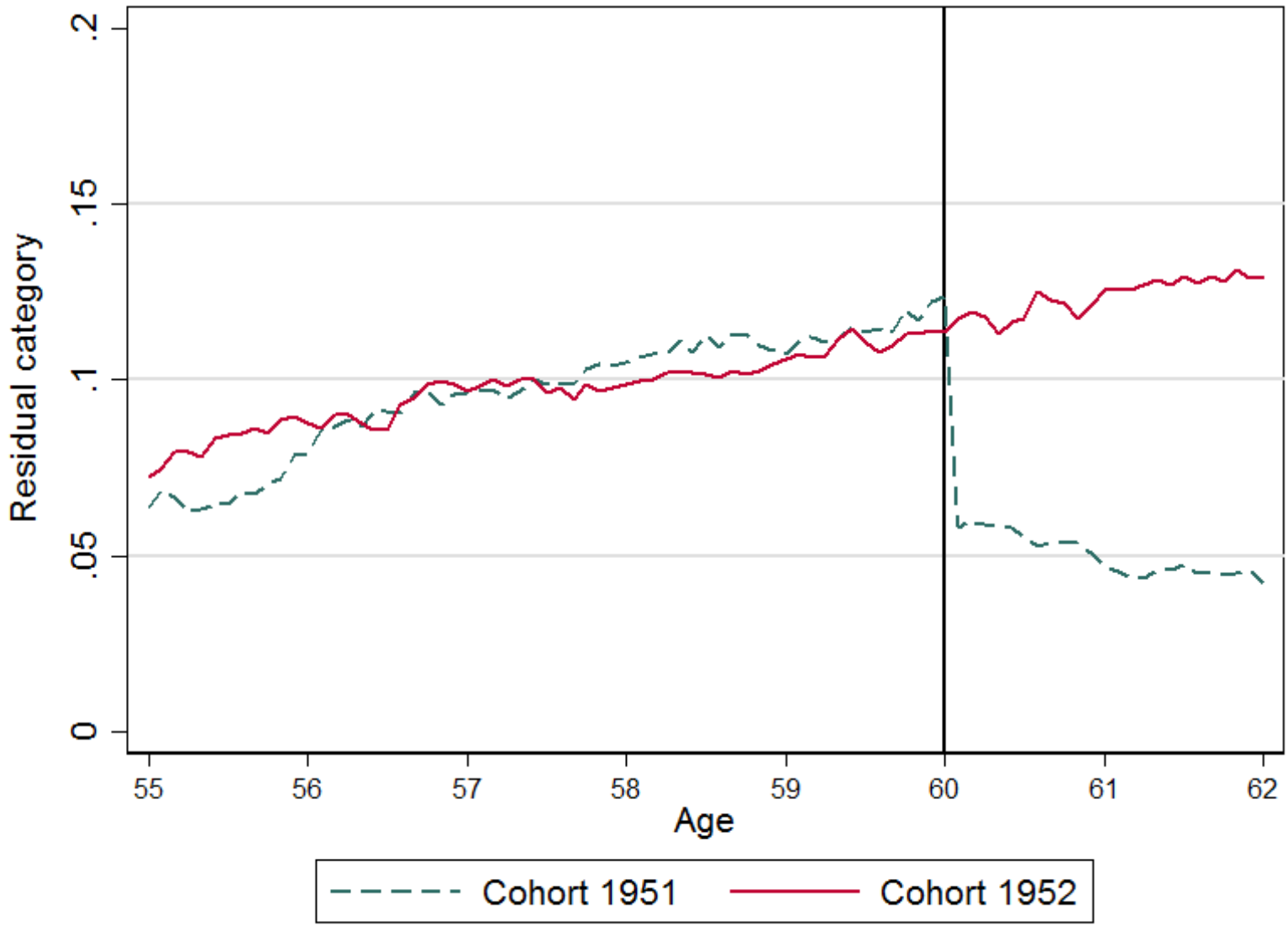
Unemployment rate by age



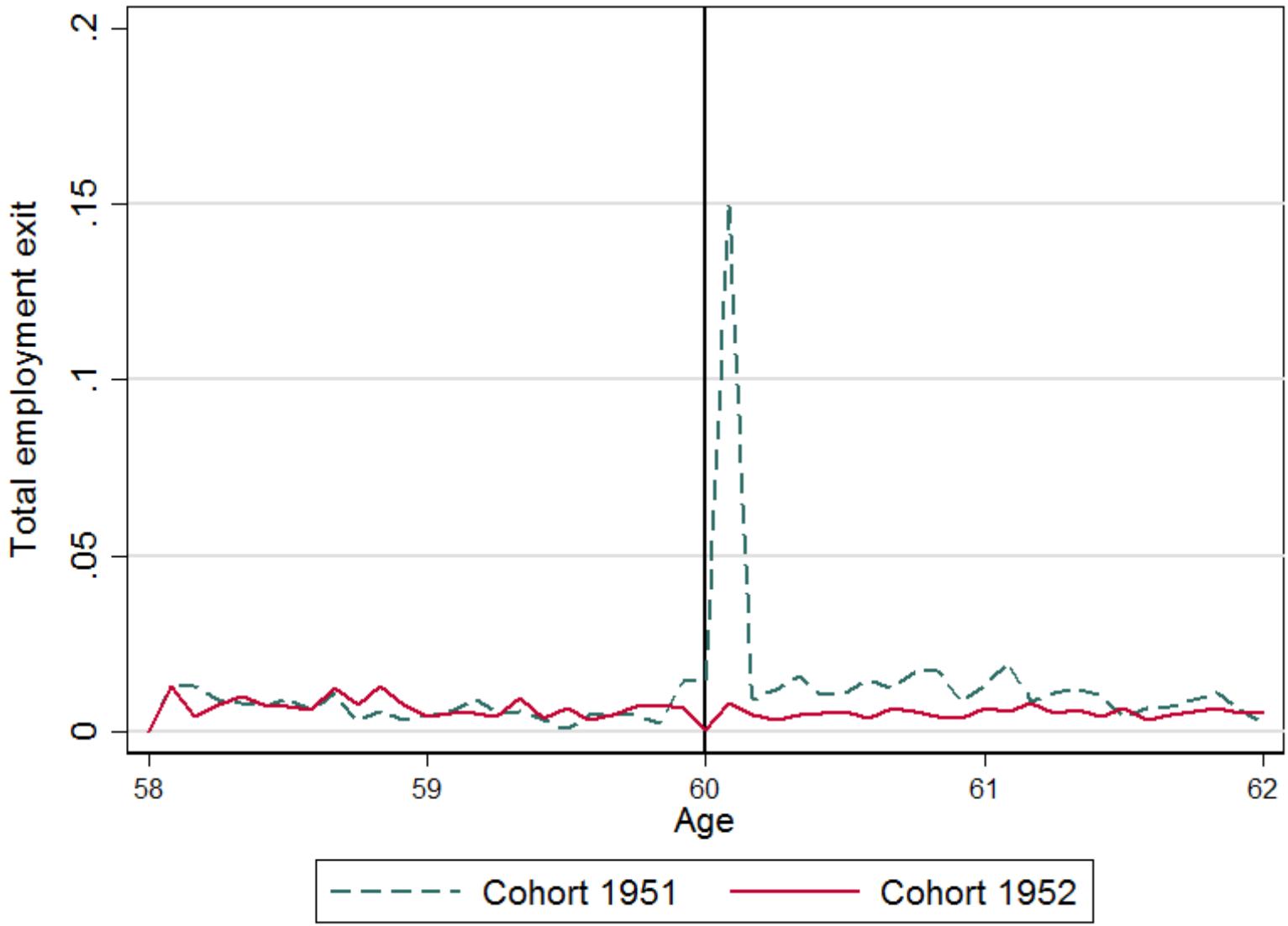
Disability pension recipient rate by age



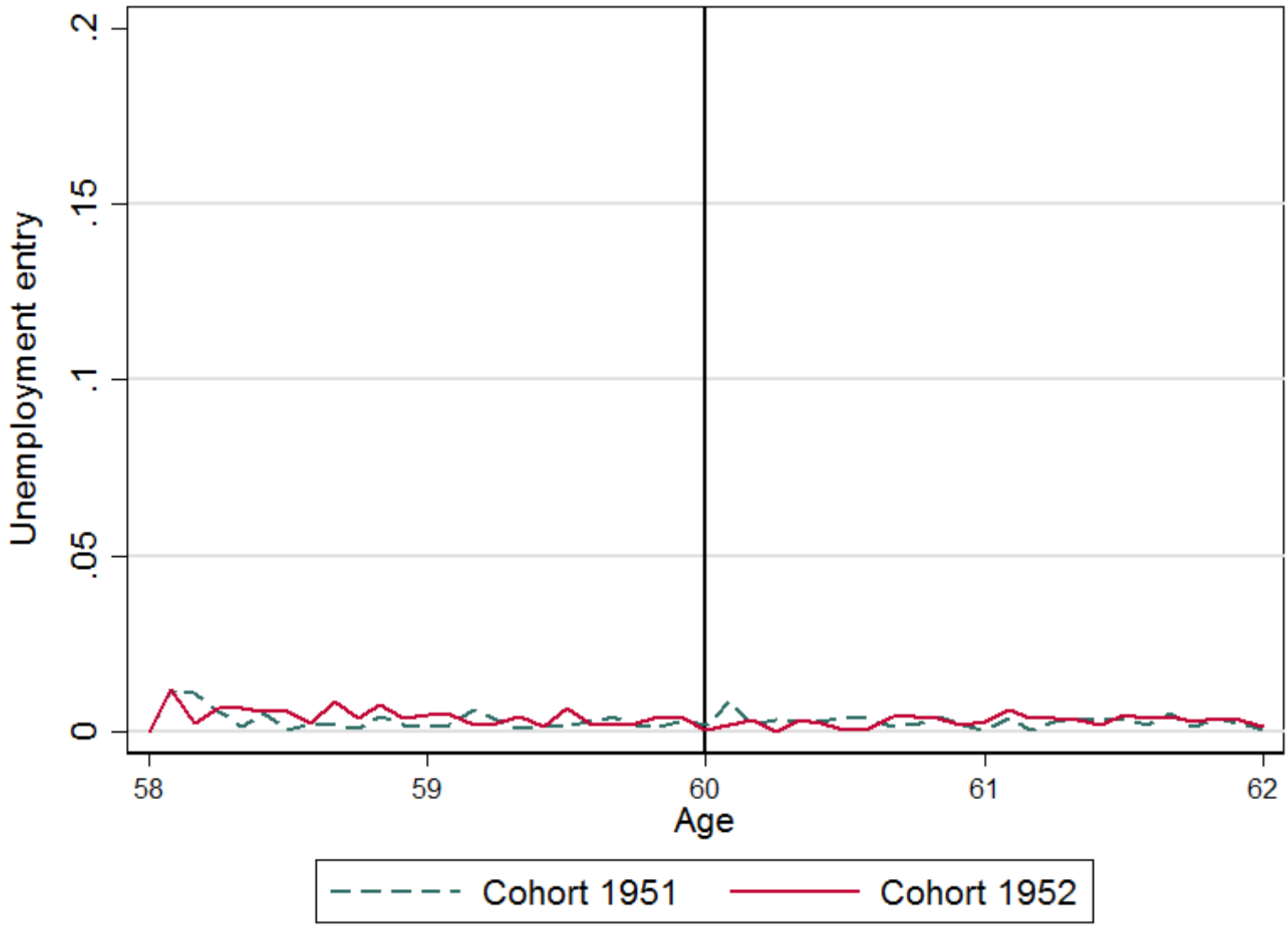
Inactivity rate by age



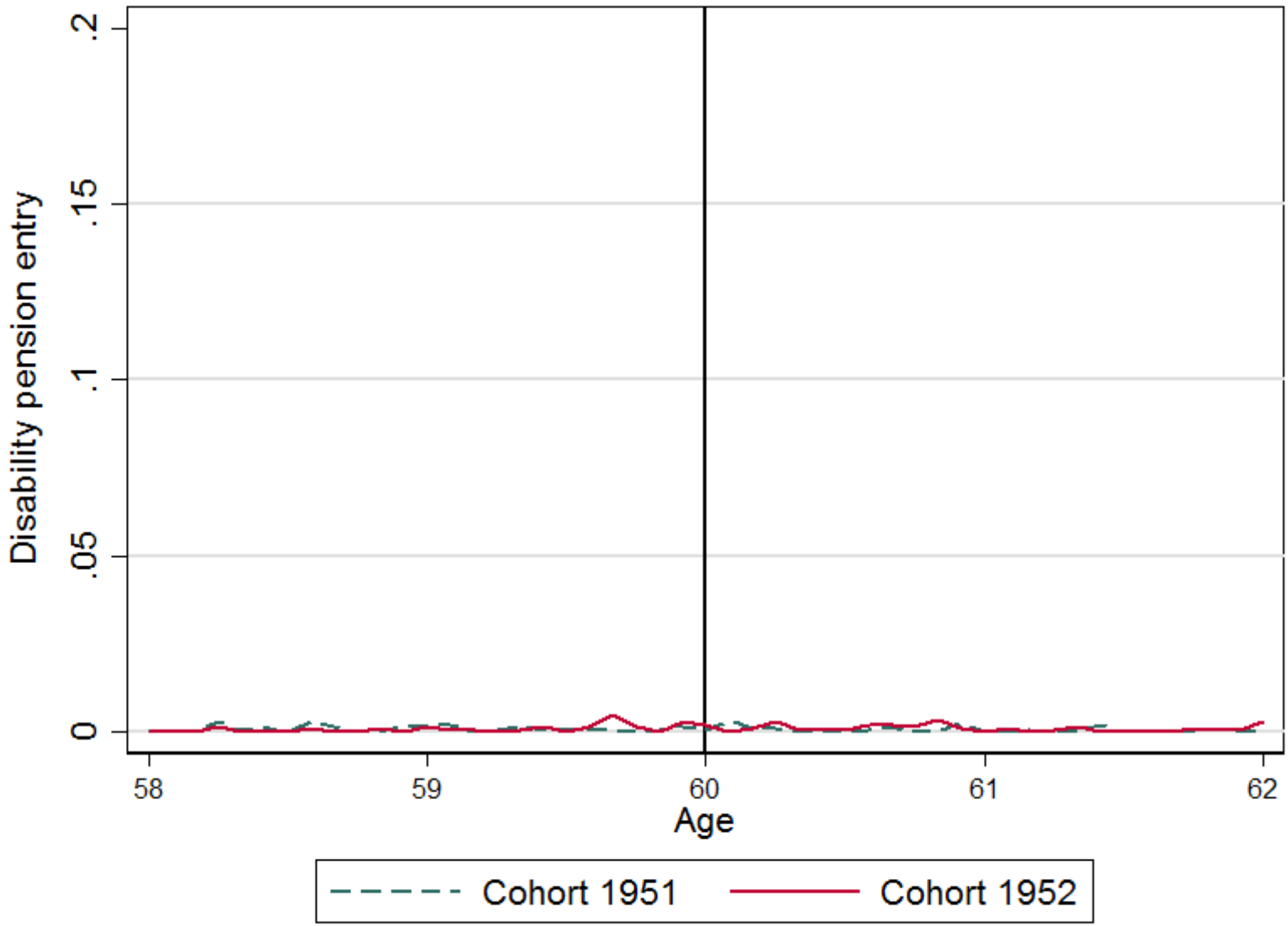
Employment exit rate by age



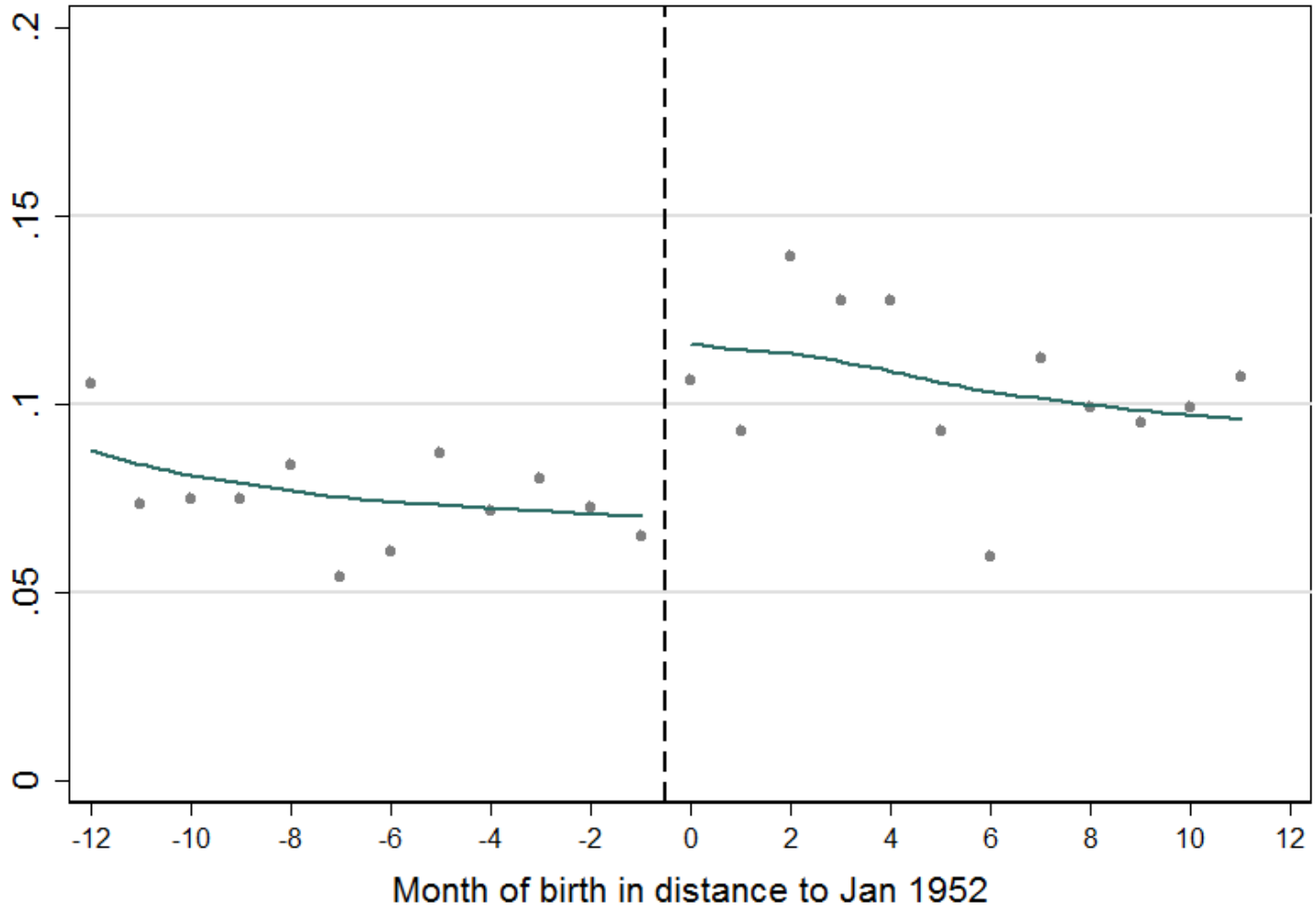
Unemployment entry rate by age



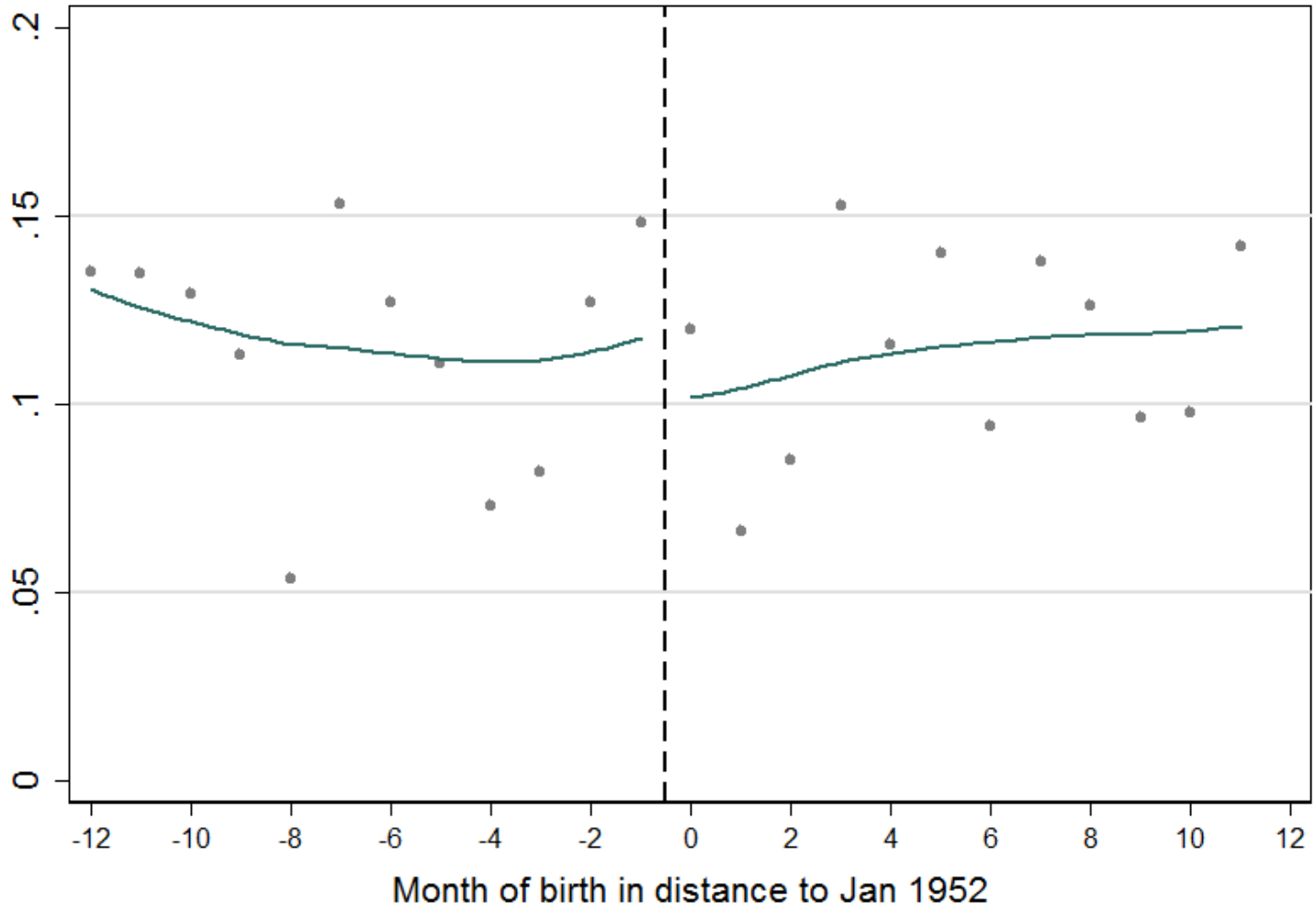
Disability pension entry rate by age



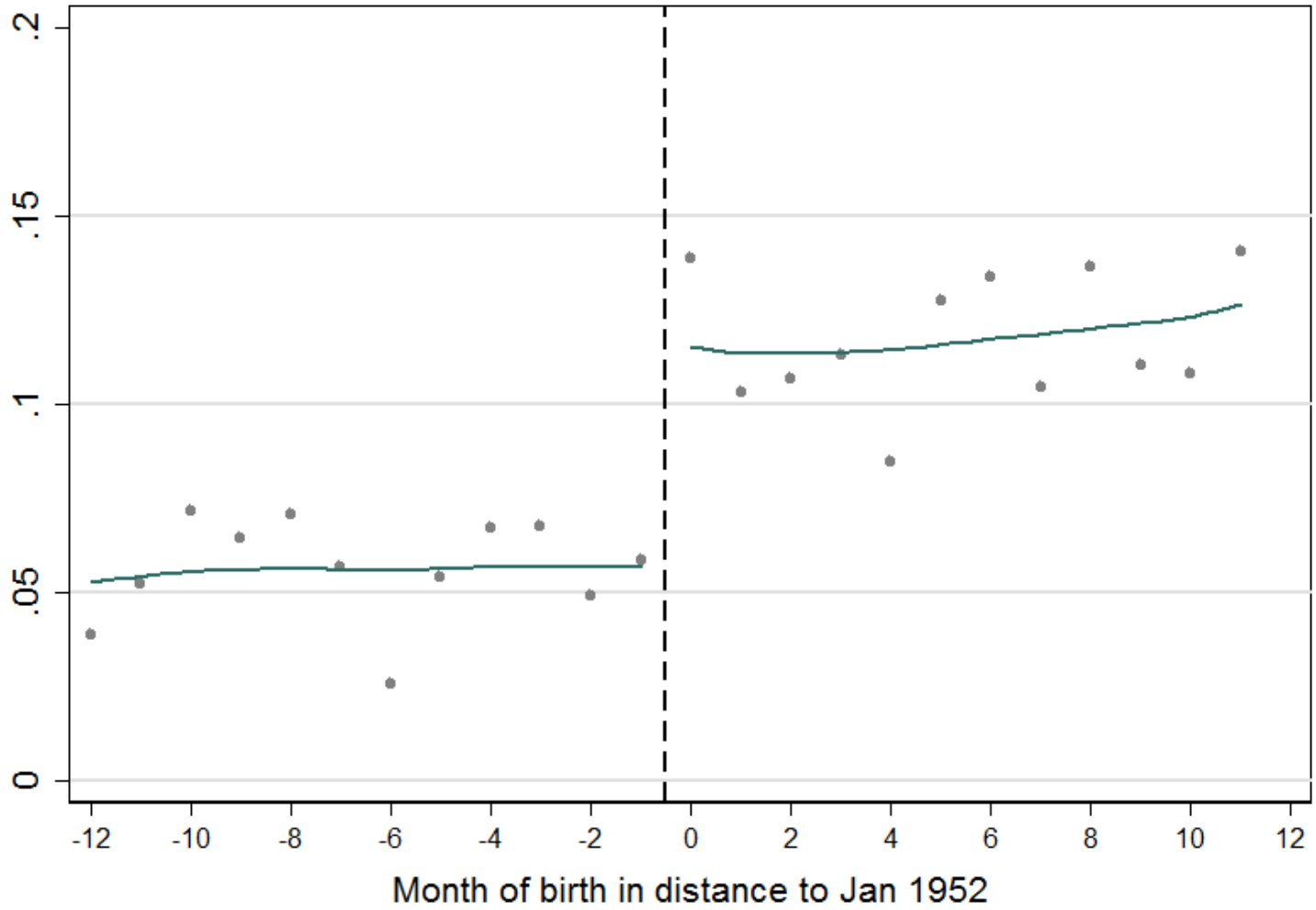
LLR: unemployment rate, age 60-61



LLR: disability pension rate, age 60-61



LLR: inactivity rate, age 60-61



Literature

Research on **ERA changes** and **program substitution**:

1. *Staubli & Zweimüller (2012):* 2000-2004 reforms increased ERA in Austria. Find program substitution into unemployment
2. *Manoli & Weber (2016):* study the same Austrian reforms. Find no evidence for *active* program substitution
3. *Atalay & Barrett (2015):* analyze 1993 Australian Age Pension reform. Find program substitution into disability pension
4. *Oguzoglu, Polidano, Vu (2016):* look at the same Australian reform. Distinguish between mechanic and active program substitution. Find no evidence for active program substitution