Effects of Increased Elderly Employment on Other Workers' Employment and Elderly's Earnings in Japan

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Overview

- Starting from April 2006, employers in Japan have to offer their incumbent workers opportunities to continue working until pension eligibility age

⇒ Any effects on employment of other age group?

⇒ Any adjustment through elderly worker's wages?

- Preview of the results
  - No negative effect on young full-time workers
  - Female part-time workers may have been replaced with re-employed elderly workers
  - Substantial decline in post-60 wages only in large firms

Literature

- Mixed evidence about the substitutability between elderly workers and younger workers
  - No tradeoff between elderly employment and youth employment: Gruber, Milligan and Wise (2010), Munnel and Wu (2012), etc.
  - Delayed retirement reduces job opportunities for youth: Vestad (2012), Novo and Portugal (2009)
  - Earlier studies in Japan tend to support the first view: Oshio, Shimizutani and Sato Oishi (2010), Nagano (2014)
- The direct effect of the EESL revision in 2006 on elderly employment in Japan: Kondo and Shigeoka (2015)

Institutional Background

EESL revision in 2006

- Elderly Employment Stabilization Law (EESL): Law to protect employment of older workers.
- Before 2006 revision
  - The EESL prohibited firms to set mandatory retirement age younger than 60
  - Until 2001, eligibility age for full pension benefit was also 60 => most people can work until they can start to receive full pension benefit
  - But, since pension eligibility age started to rise in 2001, people can no longer receive full pension benefit right after mandatory retirement
- The EESL revision in 2006 intended to fill this gap between mandatory retirement and pension eligibility age
- The revised EESL mandated employers to offer their incumbent workers opportunities to continue work until the pension eligibility age

“Re-employment” after “Mandatory Retirement”

- Mandatory retirement = the termination of regular employment contract
  - “regular employment”: stable full-time employment with increasing age-earnings profile
- It is common in Japan to “re-employ” workers who reached the mandatory retirement age (60 in most case) as non-regular employees with much lower wages, and often shorter working hours.
- “Opportunities to continue work” in the revised EESL include this sort of re-employment

- Re-employed workers tend to be assigned jobs with lower burden and responsibilities => may not substitute younger regular employees

“Year 2007 Problem”

- Baby boomers: those born in 1947-1949
- Sharp increase in population reaching 60, the mandatory retirement age, from 1.34m in 2006 to 2.15m in 2007 = “year 2007 problem”
- Could have affected employers’ behavior through 2 channels
  - the actual increase in the number of employees whom the employers have to offer continued employment => wages and employment of other workers may have been adjusted accordingly.
  - the publicized image about “year 2007 problem” may have worked as a trigger of drastic changes in wage structure and employment scheme.

Effects on Employment of Different Age and Type of Contract

Data: Establishment Panel Constructed from the Employment Trend Survey

- Employment Trend Survey (ETS)
  - Establishment level survey. Cross section.
  - Number of employees in 5yr age range, by regular/non-regular status
  - All establishments w/ 500 or more employees are surveyed every year

⇒Match them over years using

  - Establishment ID for 2004-2011, and 2002-2003
  - To match 2003 and 2004 data, I use prefecture, the number of employees and 2-digit industries. Only 60% of the sample can be matched.

Variables

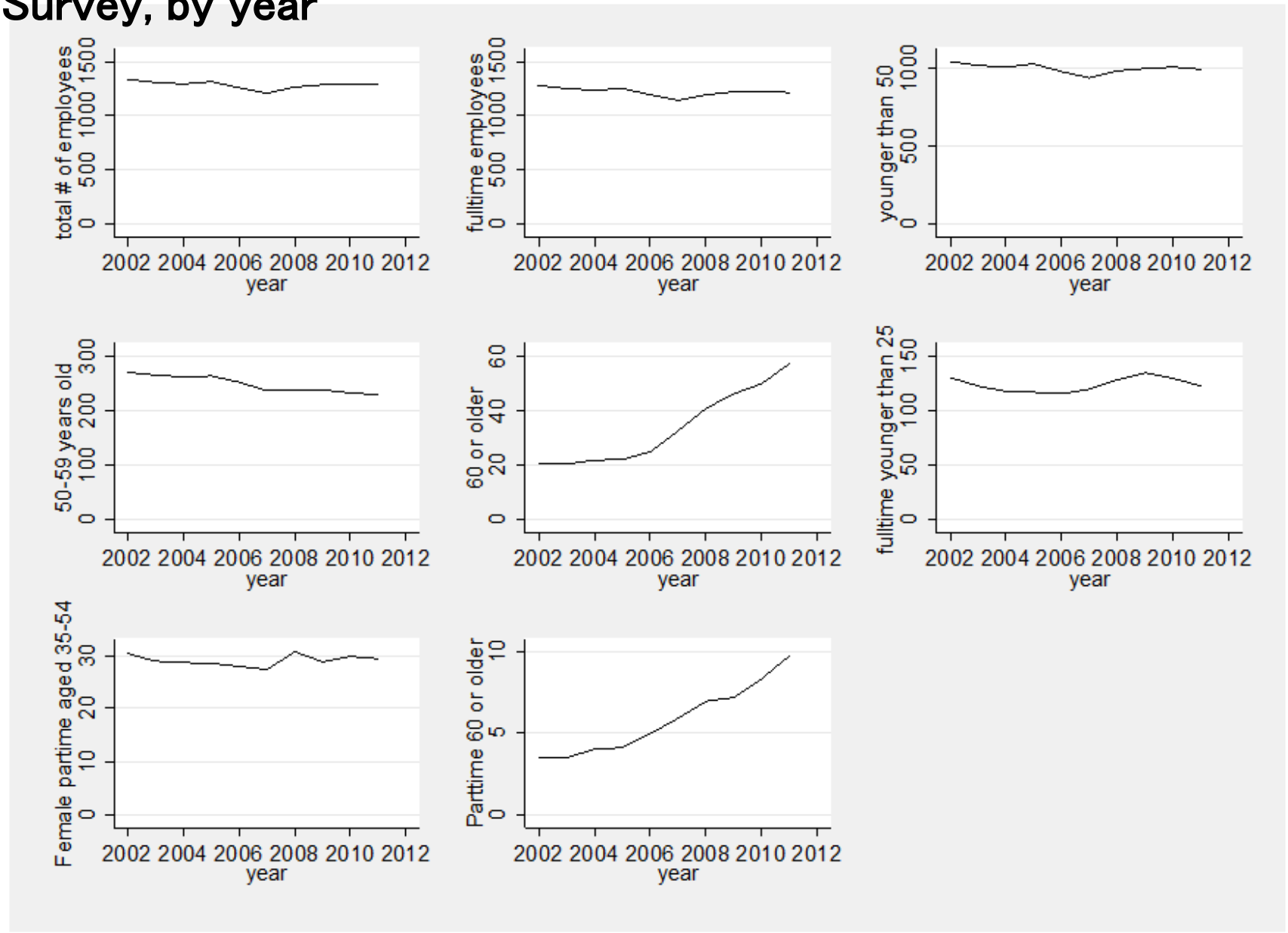
- Ratio of male full-time employee aged 55-59 as of June 2003: main explanatory variable; a proxy for the impact of the EESL revision in 2006
- Outcome variables: log number of employees (and the ratio in total employment) of the establishment for the following categories:
  - total number of employees, full-time employees: to see the effect on employment level, which could go either way
  - employees younger than 50, aged 50-59, aged 60 or older: to confirm the change in age composition
  - full-time employees younger than 25: to measure the degree of substitution or complementarity between young and old workers
  - female part-time employees aged 35-55, part-time employees aged 60 or older : to capture substitution or complementarity between elderly men on re-employment contract and married women on non-regular contract

Table 1. Summary statistics of the Employment Trade Survey

Establishments with 500 or more employees

	2002-2008, base year= 2003 (main sample)	2006-2011, base year=2007 (comparison)
Sample size in the base year	1021	835
Mean % of age 55-59 in male fulltime employees in the base year	9.0%	10.8%
Industry composition		
Manufacture	54.8%	57.5%
Information and communication	3.4%	3.2%
Trade	4.7%	4.3%
Finance	2.5%	1.8%
Medical and nursing	23.0%	21.4%
Other services	5.4%	7.3%
Other non-service industries	6.3%	4.4%

Figure 1: Mean of outcome variables in Employment Trade Survey, by year



Empirical Model

$$Y_{ijt} = \alpha + \sum_{\tau \neq 2003} \beta_\tau X_{ij} 1(t = \tau) + v_{jt} + u_i + \varepsilon_{ijt}$$

- Y_{ijt}: the outcome variable of establishment *i* in industry *j* observed in year t
- X_{ij}: the ratio of male full-time employees aged 55-59 among all male full-time employees in 2003.
  - β_τ varies with year and is normalized to 0 in 2003
- v_{jt}: industry-year effect
- u_i: establishment fixed effect.
- ε_{ijt} :the remaining error, which may be correlated within establishment over time => standard errors are clustered at the establishment level.

Empirical Model (continued)

$$Y_{ijt} = \alpha + \sum_{\tau \neq 2003} \beta_\tau X_{ij} 1(t = \tau) + v_{jt} + u_i + \varepsilon_{ijt}$$

- β_τ represents changes in the outcome variables for establishments that had more employees reaching age 60 under the legal obligation of continued employment until the pension eligibility age, relative to other establishments.
- If a plot of β_τ over τ shows some trend breaks around 2006, such a change in trend is likely to be attributable to the revision of the EESL implemented in 2006.
- If the plot of β_τ shows some secular trend, it may simply reflect a dynamic pattern of employee's age composition which is not related to the EESL.
  - To check this, I also estimate the same equation replacing the base year with 2007, one year after implementation of the revised EESL.

Summary of the Results

- Higher ratio of male full-time employees in their late fifties before the EESL revision has
  - Slightly negative effect on total employment
  - Insignificant effect on full-time employees younger than 50
  - Positive effect on full-time employees younger than 25 => Hiring of new graduates increases as more workers reach the mandatory retirement age, even if firms have to re-employ them.
  - Negative effect for female part-time workers aged 35-54: re-employed elderly workers and female part-time workers may be substitutes.
- Similar result with base year = 2007, except for no effect on female part-time workers
  - may imply that once the adjustment to the revised EESL was done, the number of female part-time workers stopped to decrease.

Table 2 The effect of the ratio of 55-59 years old in male fulltime workers in 2003 on log number of various type of employees

Ratio of age 55-59 in 2003	(1) Total # of employees	(2) Full-time employees	(3) Younger than 50	(4) 50-59 years old	(5) 60 or older
×2002	0.060	0.030	0.154**	0.012	-0.433*
×2004	-0.026	0.054	0.009	-0.251***	0.551**
×2005	-0.120*	-0.017	-0.052	-0.613***	1.035***
×2006	-0.238***	-0.101	-0.115	-1.007***	1.437***
×2007	-0.245	0.164	0.082	-1.836***	1.318*
×2008	-0.415***	-0.206	-0.107	-2.098***	1.328***

Table 2 The effect of the ratio of 55-59 years old in male fulltime workers in 2003 on log number of various type of employees (cntd)

Ratio of age 55-59 in 2003	(6) Full-time younger than 25	(7) Female part-time 35-54 years old	(8) Part-time 60 or older
×2002	0.074	-0.042	-0.178
×2004	0.705***	-0.143	0.474**
×2005	0.995***	-0.137	0.574**
×2006	1.365***	-0.331	0.987***
×2007	2.404***	-0.999**	0.783*
×2008	1.648***	-0.570*	1.147**

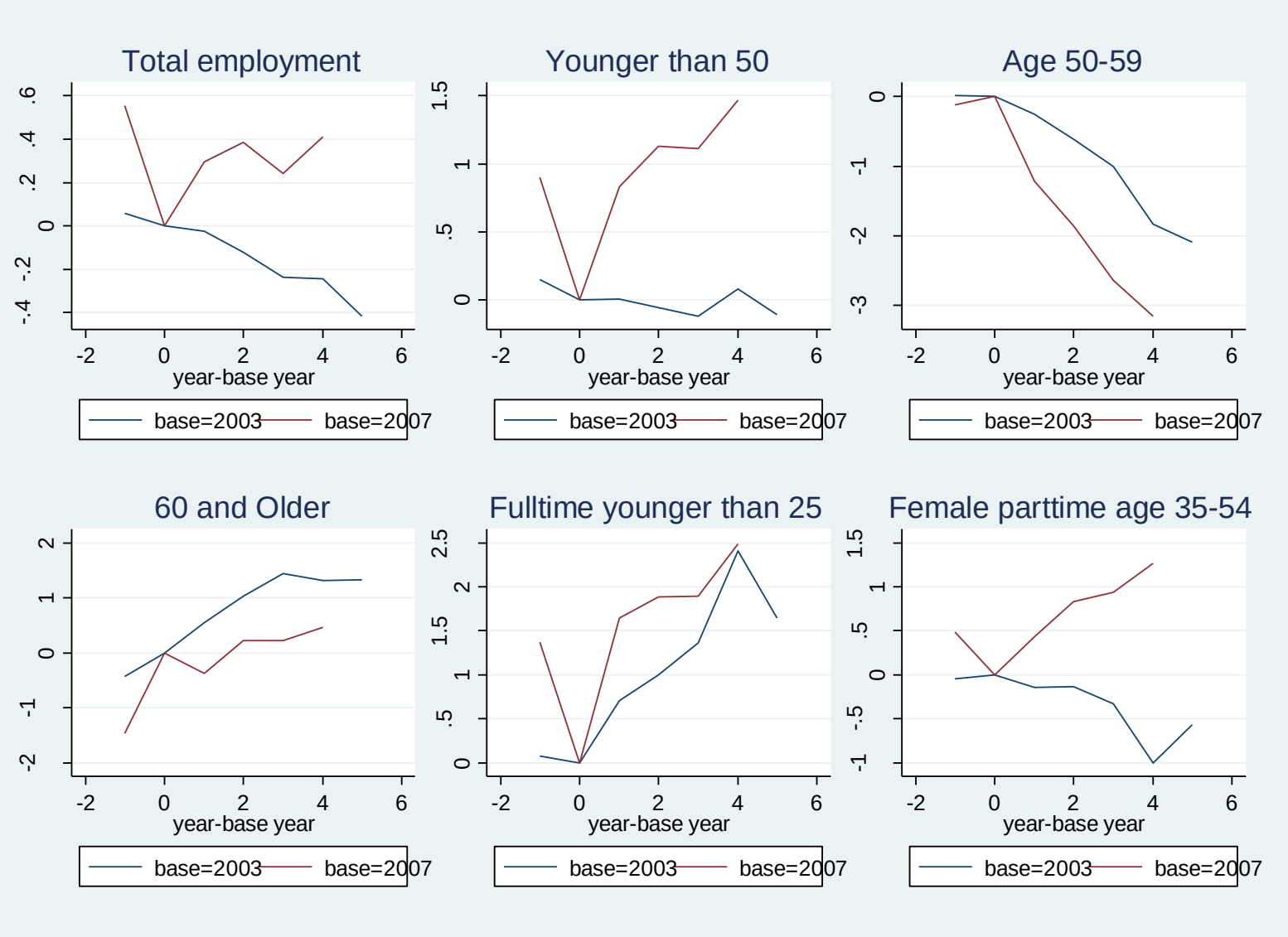
Table 4 The effect of the ratio of 55-59 years old in male fulltime workers in 2007 on log number of various type of employees

Ratio of age 55-59 in 2003	(1) Total # of employees	(2) Full-time employees	(3) Younger than 50	(4) 50-59 years old	(5) 60 or older
×2006	0.553***	0.614**	0.900***	-0.122	-1.467***
×2008	0.295*	0.307	0.831***	-1.222***	-0.367
×2009	0.384*	0.371	1.130***	-1.859***	0.228
×2010	0.384*	0.371	1.130***	-1.859***	0.228
×2011	0.411*	0.395	1.468***	-3.156***	0.411*

Table 4 The effect of the ratio of 55-59 years old in male fulltime workers in 2007 on log number of various type of employees (cntd)

Ratio of age 55-59 in 2003	(6) Full-time younger than 25	(7) Female part-time 35-54 years old	(8) Part-time 60 or older
×2006	1.374***	0.484	-0.590
×2008	1.641***	0.431	0.542
×2009	1.887***	0.827	0.576
×2010	1.895***	0.942	1.073**
×2011	2.485***	1.268	1.213**

Figure 2 The effects of the ratios of 55–59 years old in male fulltime workers in 2003 and 2007 on selected outcomes (log number of employees)



Effects on Elderly's Earnings

Data: Basic Survey of Wage Structure

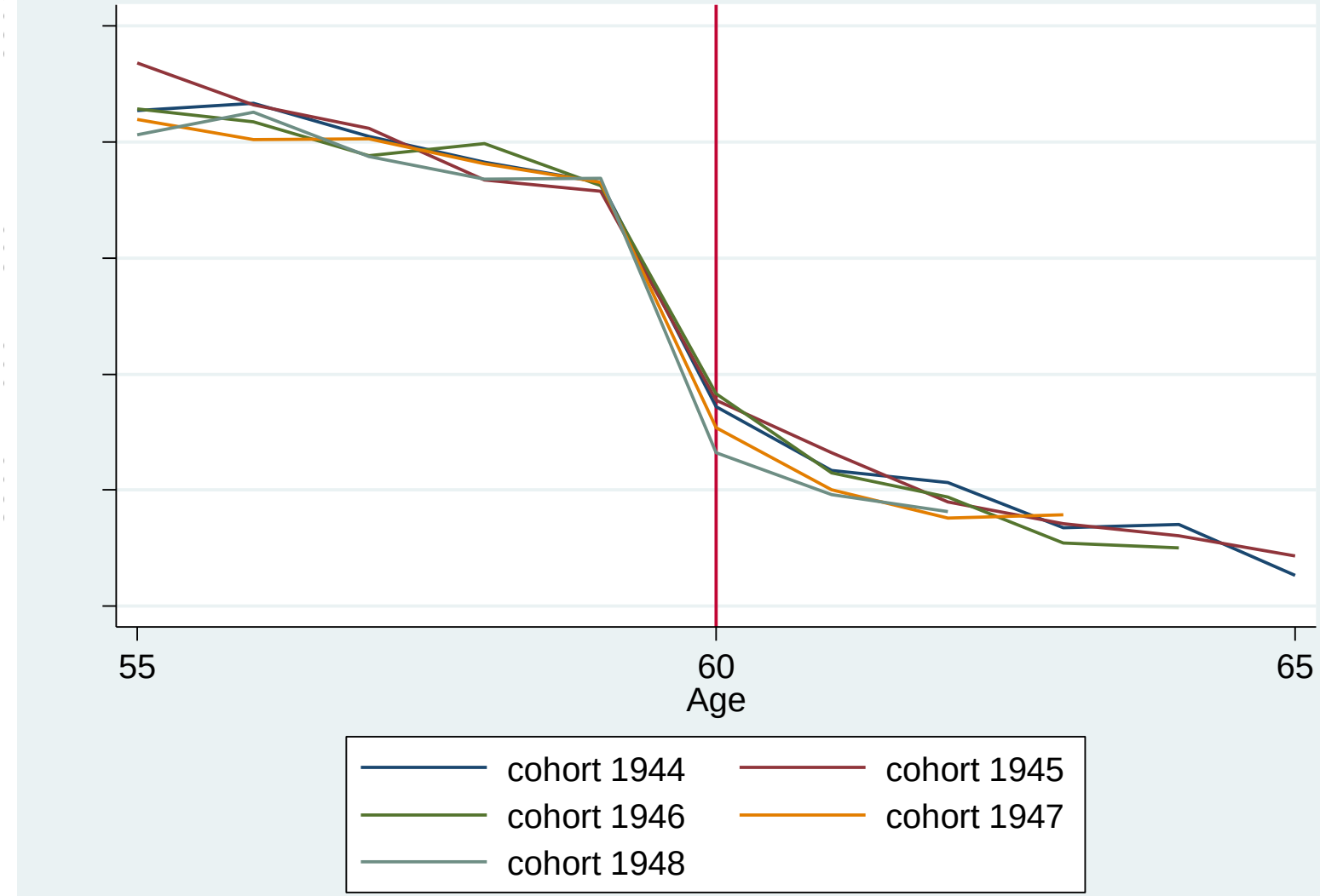
- Cross-sectional survey of establishments
  - Detailed information of salaries, employment status, gender, age, and educational background of randomly chosen employees
  - Establishment level information such as industry and firm size
- Outcome variable: log (annual earnings excluding bonus)
- Sample is limited to male regular employees aged 48-65 and born in 1943-1949

Table 5 Summary Statistics of the Basic Survey of Wage Structure

Male regular employees 48–65 years old, born in 1943–1949

Sample size (total)	1,357,477
Annual earnings excluding bonus (thousand yen)	4984.0
Log annual earnings	8.42
Education	
Junior high school	19.8%
High school	55.6%
Tech/Junior college (2 year)	3.7%
4yr College and more	20.9%
Firm size	
Large (500 or more)	38.8%
Medium (100–499)	23.5%
Small (less than 100)	37.7%

Figure 3 Earnings profile of age 55-65, by cohort



Empirical Model

$$\log \mathrm{Y}_{cti} = \beta_0 a_{cti} + \beta_1 a_{cti}^2 + 1(a_{cti} \geq 60)\left(\beta_2 + \beta_3 a_{cti} + \beta_4 a_{cti}^2\right)$$

Approximate the shape of earnings profile around age 60

$$+ \sum_{\theta \neq 1945} \gamma_\theta \, 1(\mathrm{c} = \theta) \times 1(a_{cti} \geq 60) + \delta \mathrm{X}_{cti} + \varepsilon_{cti} \quad \ldots(2)$$

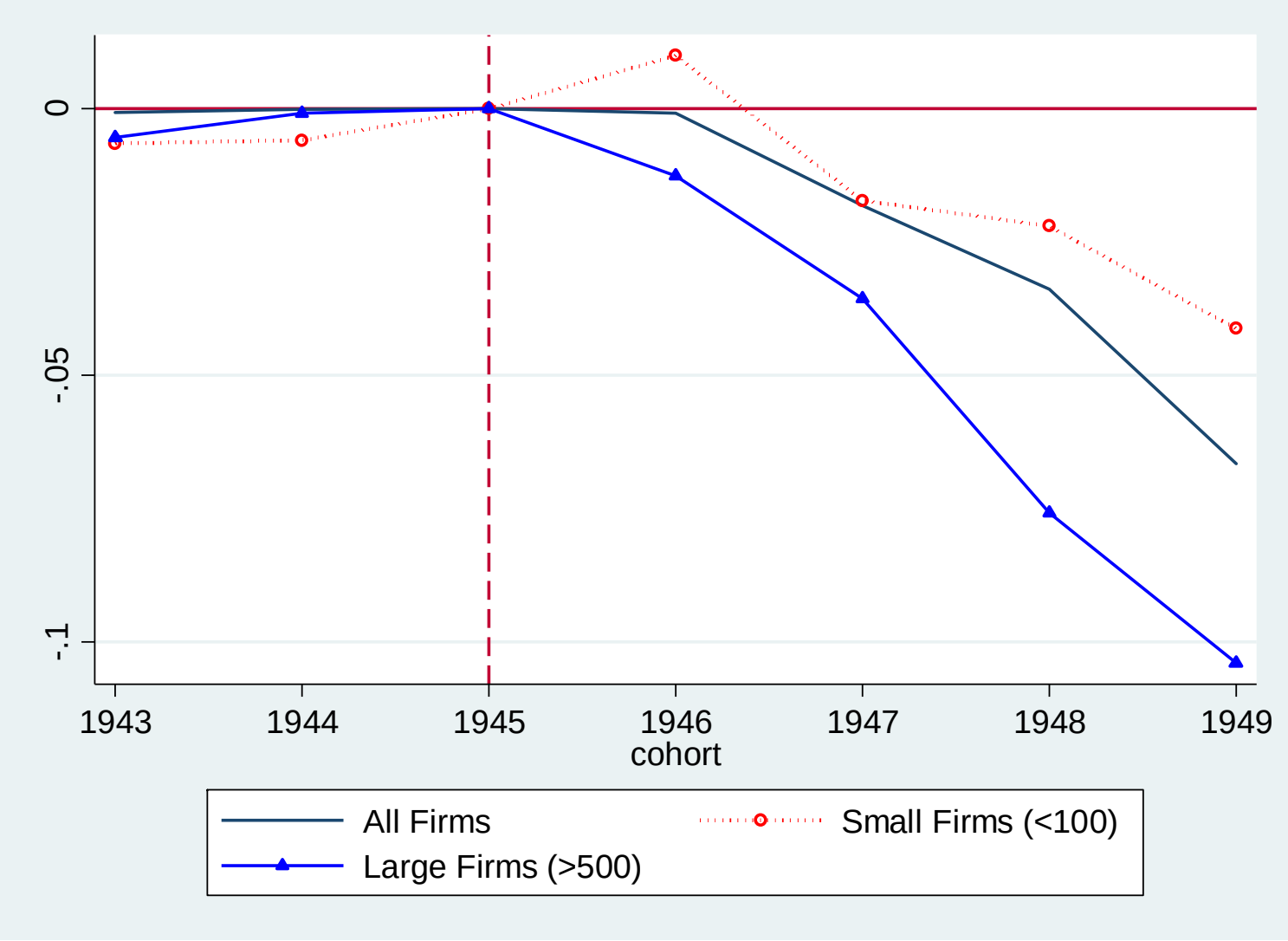
Interaction between cohort dummy and over 60 dummy

- Y_{cti} : earnings of individual i born in year c and surveyed in year t
- a_{cti} : age
- γ_θ captures the differences in the drop in earnings at age 60 across cohorts.
- X_{cti} includes education, cohort dummies and calendar year dummies.
- Baseline cohort: 1945

Table 6 The estimated drop in earnings at age 60 by cohort, relative to 1945 cohort

Sample	(1) All	(2) All	(3) Large firm (emp>500)	(4) Small firm (emp<100)
Cohort 1943	−0.001	0.004	−0.005	−0.006
Cohort 1944	0	0.004	−0.001	−0.006
Cohort 1946	−0.001	−0.012	−0.013	0.01
Cohort 1947	−0.018*	−0.031***	−0.036*	−0.017
Cohort 1948	−0.034***	−0.045***	−0.076***	−0.022
Cohort 1949	−0.066***	−0.077***	−0.104***	−0.041**
Control for Industry and firm size	No	Yes	No	No
Observations	1,357,477	1,307,879	526,316	512,090

Figure 4 The estimated drop in earnings at age 60 relative to 1945 cohort, by cohort and firm size



Result

- Cohort born in 1947 and later experience larger declines in the earnings at age 60.
  - The timing is one year later than the EESL revision, and coincides to the so-called "year 2007 problem."
  - robust to controls for industry and firm size.
- The decline in relative earnings of baby boomers is much greater in large firms.
  - Consistent with the results of Kondo and Shigeoka (2015) that the increase in elderly employment due to the EESL is concentrated to large firms, because the mandatory retirement policy was implemented more strictly at large firms.

Conclusion

- No evidence for substitution between young full-time workers and elderly workers.
- Modest negative effect on the employment of middle-aged female part-time workers
- Substantial decline in earnings of baby boomers, who reach 60 after 2006, in their early sixties.

⇒Firms primarily cut wages of elderly workers, and some firms reduced the number of female part-time workers, in response to the mandated continued employment of elderly workers.