Payroll Taxes, Firm Behavior, Rent Sharing: Evidence from a Young Workers Tax Cut

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Motivation

Payroll taxes are a large component of OECD labor tax wedges

Cuts to payroll taxes discussed as way to reduce labor costs

Real world view:

Pros: Boosts employment and business activity

Cons: Giveaway to firm owners

Public economists' view:

Incidence falls on workers' wages $\Rightarrow$ No labor cost reduction

$\Rightarrow$ Small labor supply employment effects

We study a large, long-lasting employer payroll tax cut in Sweden for workers aged ≤ 26, tax rate cut from 31% down to 15%

Main Findings

A. **Worker-level diff-in-diff** contradicts canonical PF prediction:

Zero wage incidence (and hence **full** labor cost reduction)

Sizable employment effects

Concentrated in high youth unemployment areas

Due to lower separation rates

B. **Firms responses:**

Firms with more young workers expand and raise wages for **both young and old workers**, and more so for low earners

$\Rightarrow$ "Collective" incidence on workers, perhaps via rent-sharing

Related Literature

Work on our tax reform, on which we build:

Market-level analysis (DiD individual regression approach):

Bennmarker, Calmfors, and Seim (2013), Egebark (2016), Egebark and Kaunitz (2014, 2017).

Firm/industry perspective:

Skedinger (2014), Kaunitz (2017).

Firms & tax incentives:

No (real) firm-level responses to 2003 dividend tax cut. (Yagan 2017)

Firms did respond to investment subsidy during Great Recession. (Zwick 2017)

French short-term hiring subsidies for the unemployed were effective during Great Recession. (Cahuc, Carcillo and Le Barbanchon 2016)

Payroll tax incidence (market-level):

On workers' wages: Gruber 1997 for Chile, Anderson and Meyer 1997, 2000 for the US; Bohm and Lind 1993; Bennmarker, Mellander and Ockert 2009; Korkeamaki and Uusitalo 2009 in Sweden and Finland.

On firms' labor cost: Saez et al. 2012 for Greece; Bozio et al. 2017 for France.

Outline

1. **Institutional setting & data**

2. **Worker-level results**
   (a) Wage incidence
   (b) Employment

3. **Firm-level results**
   (a) Employment and other business outcomes
   (b) Wage spillovers

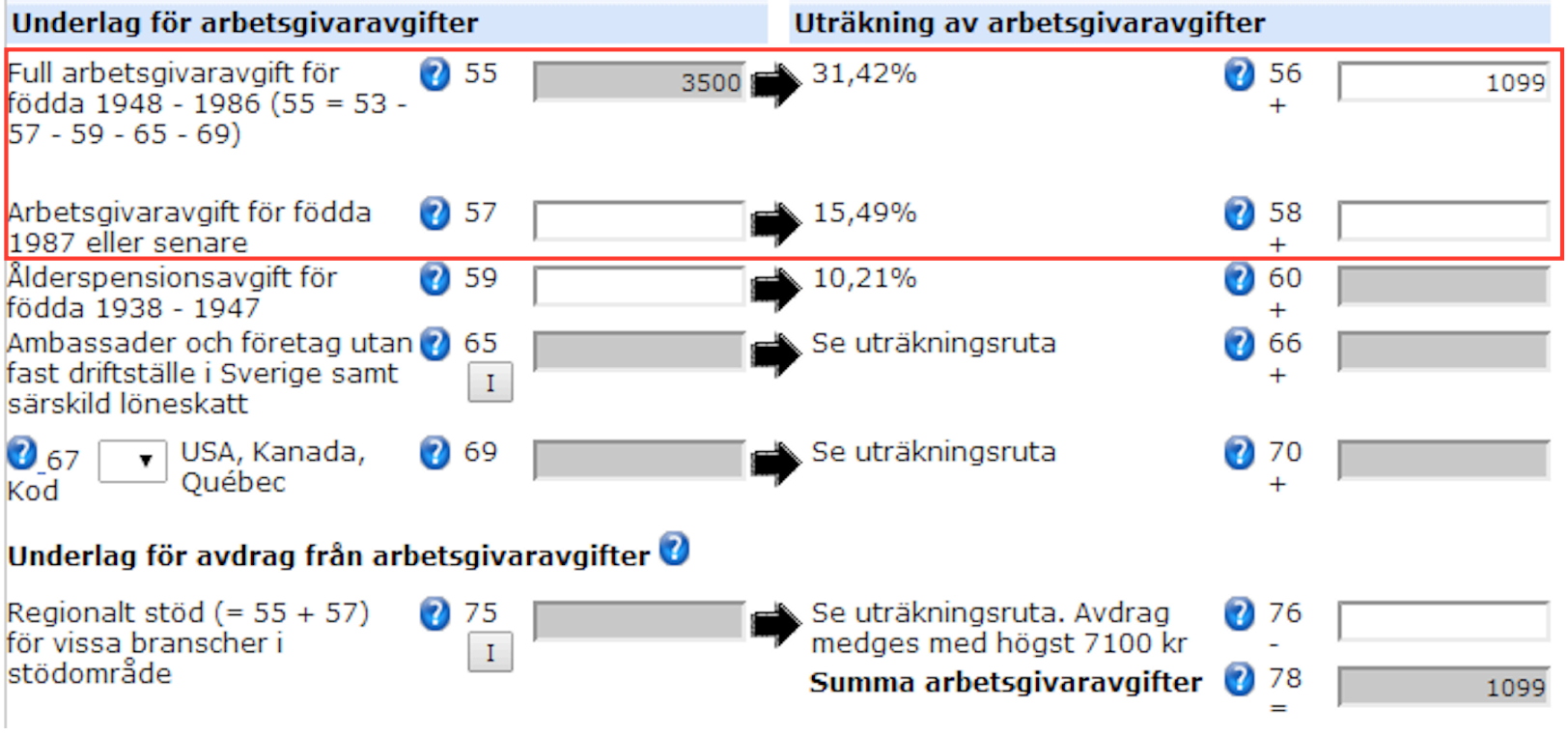
1 - Institutional Setting

Our Setting

Pre-reform setting:

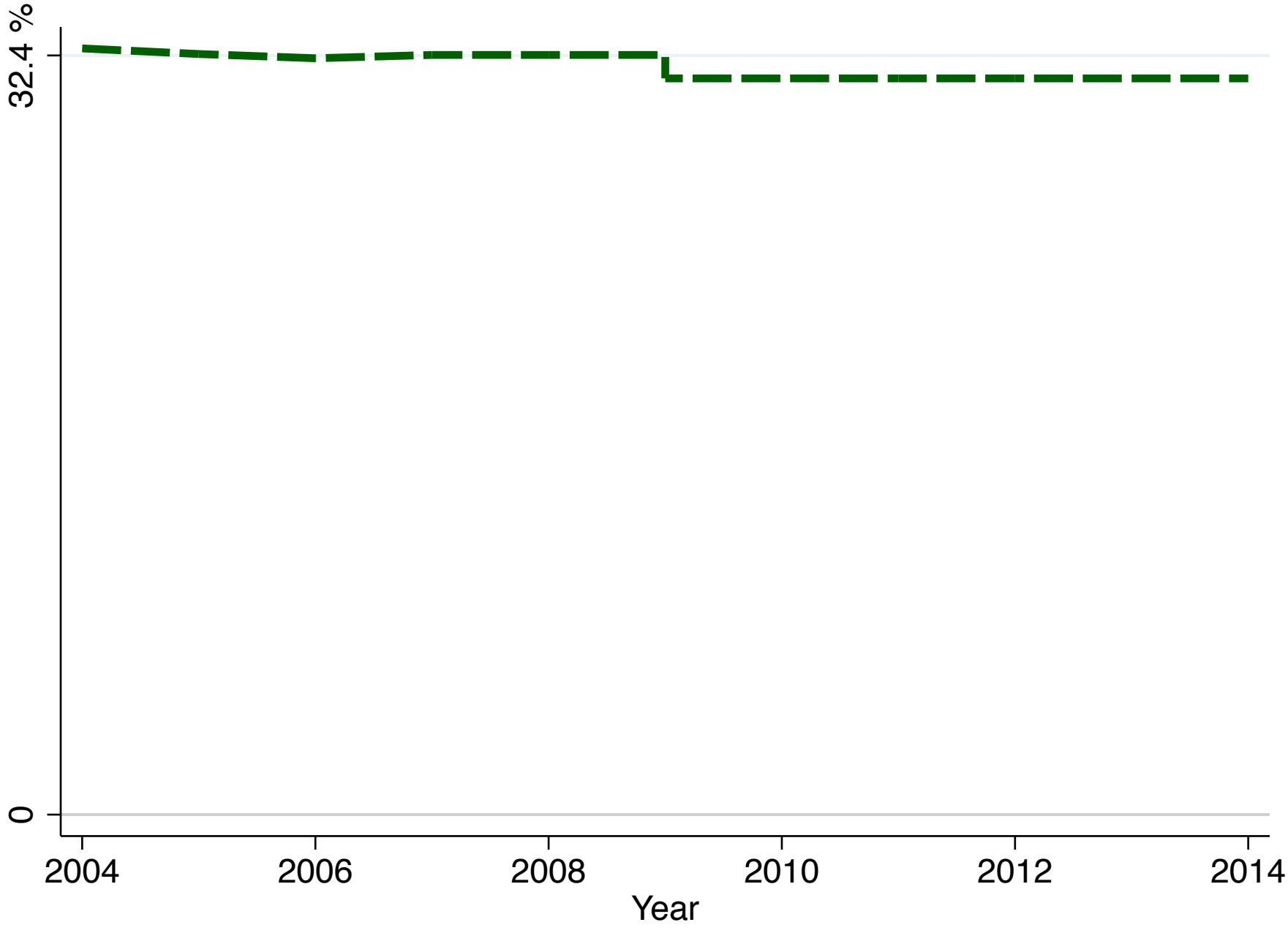
Payroll tax rate: 31.42%. Linear, no cap, no differentiation.

Nominally paid fully by employer.

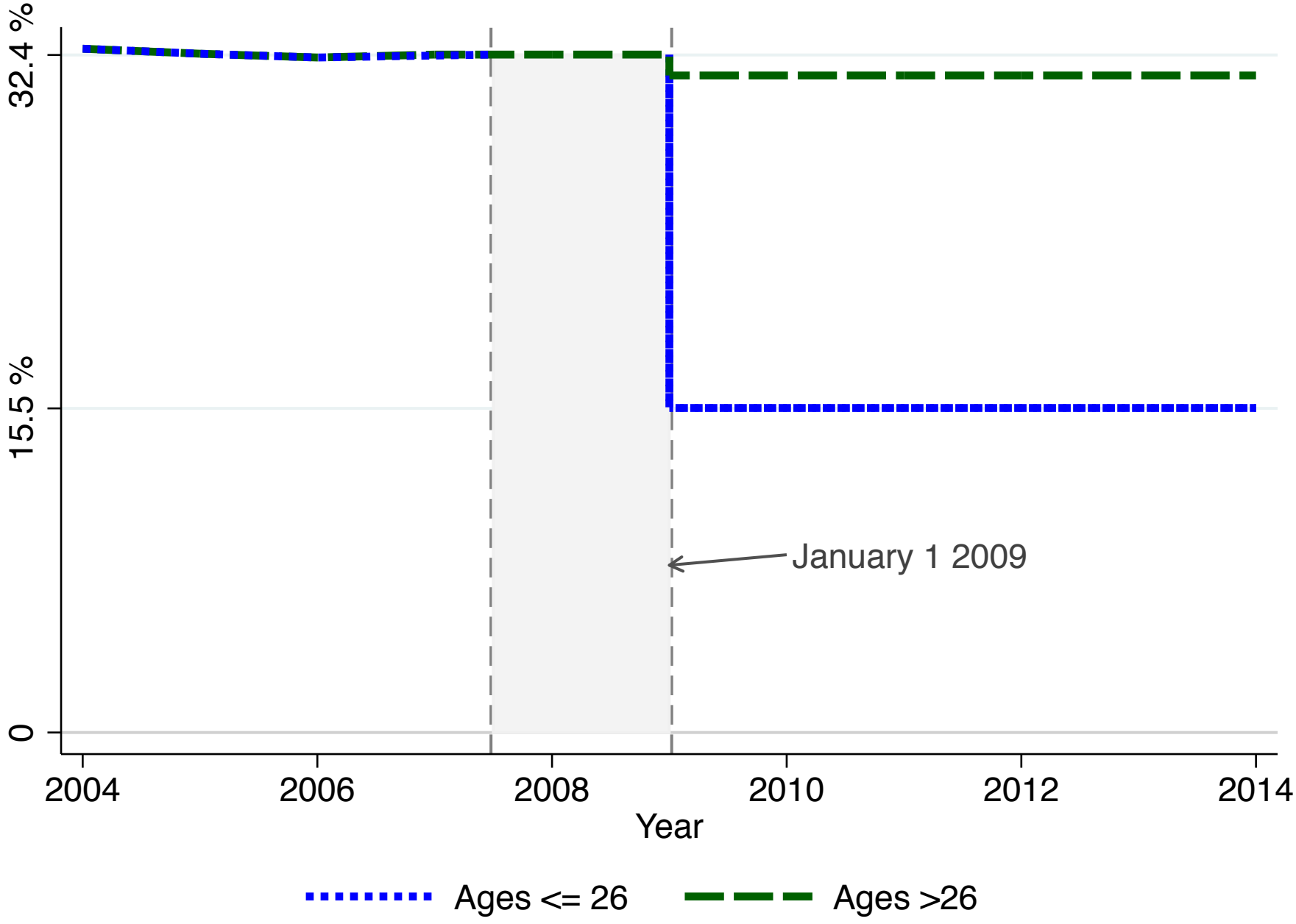


Underlag för arbetsgivaravgifter			Uträkning av arbetsgivaravgifter		
Full arbetsgivaravgift för födda 1948 - 1986 (55 = 53 - 57 - 59 - 65 - 69)	55	3500	31,42%	56 +	1099
Arbetsgivaravgift för födda 1987 eller senare	57		15,49%	58 +	
Ålderspensionsavgift för födda 1938 - 1947	59		10,21%	60 +	
Ambassader och företag utan fast driftställe i Sverige samt särskild löneskatt I	65		Se uträkningsruta	66 +	
67 Kod ▾ USA, Kanada, Québec	69		Se uträkningsruta	70 +	
Underlag för avdrag från arbetsgivaravgifter					
Regionalt stöd (= 55 + 57) för vissa branscher i stödområde I	75		Se uträkningsruta. Avdrag medges med högst 7100 kr	76 -	
			Summa arbetsgivaravgifter	78 =	1099

The Payroll Tax Cut



The Payroll Tax Cut



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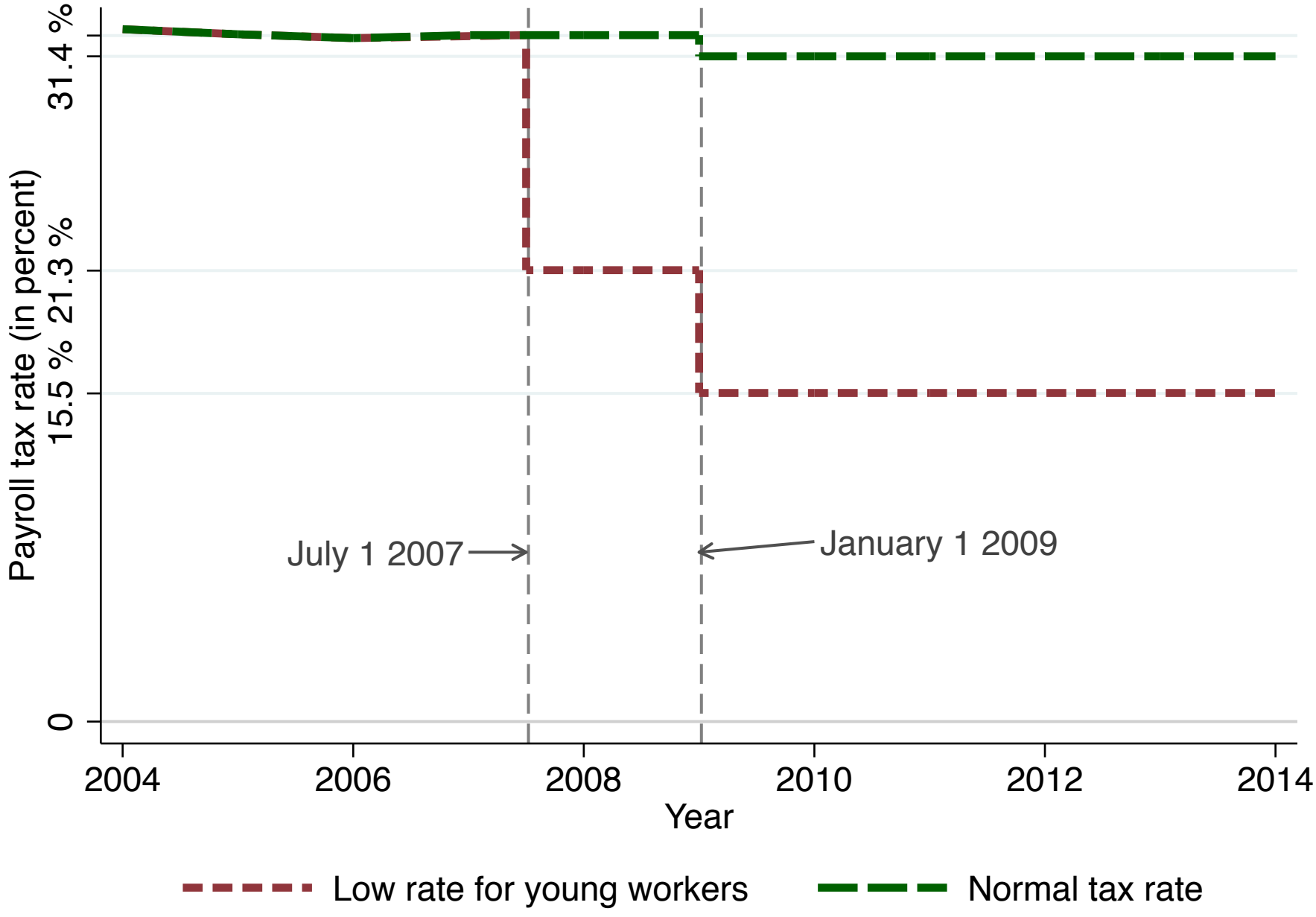

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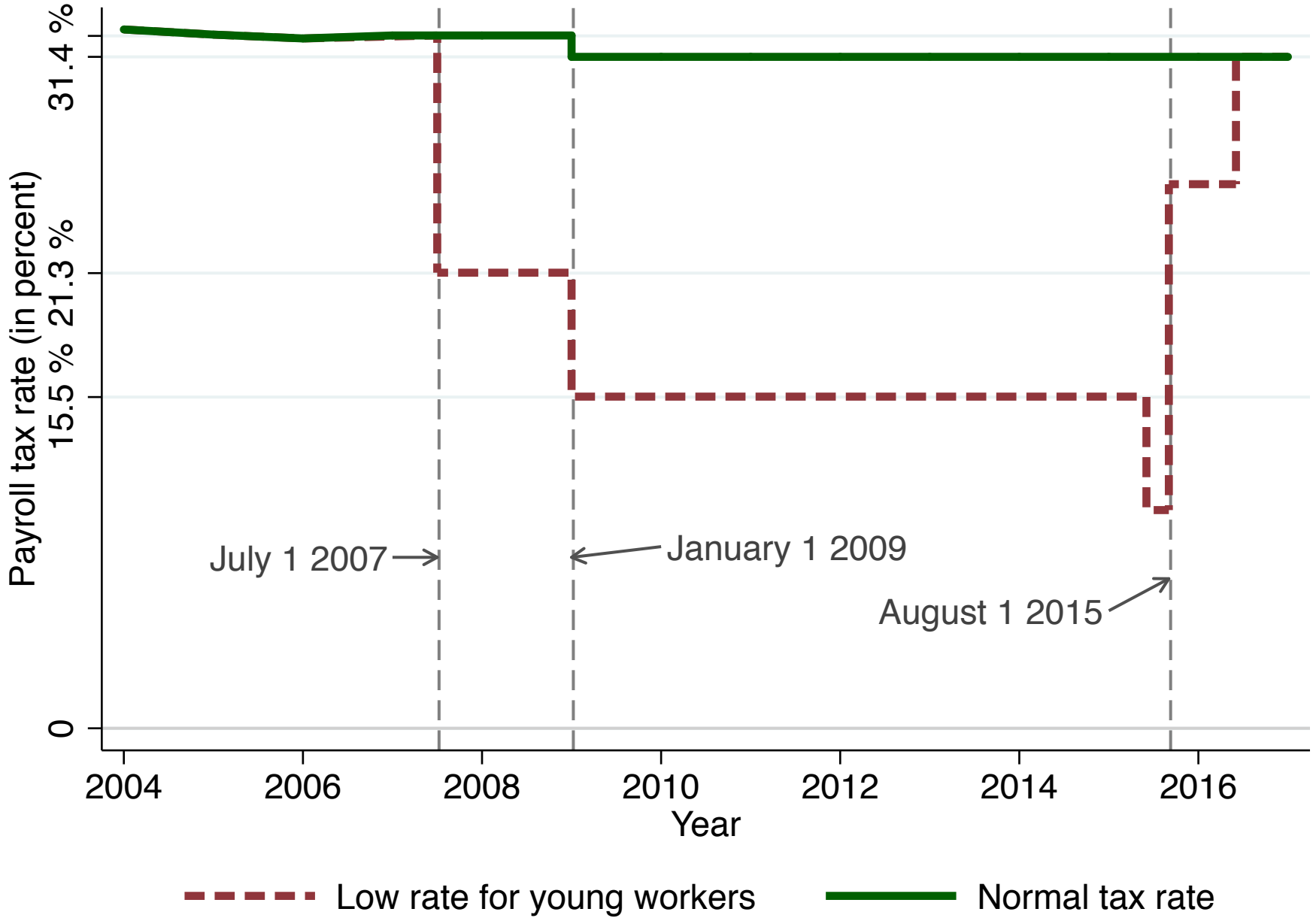

The payroll tax cut: Key features

Motivation: Fight high youth unemployment

First debated on October 2006 after right-wing coalition victory

Encompassing: both new hires and incumbent workers treated

No effects on social insurance benefits (pure tax cut)

Eligibility determined by cohort (not exact age):

Eligible if turning age 26 or less during calendar year for 2009+ (and 25 or less from July 1st, 2007 to end of 2008)

Perceived to be permanent

Close to perfect take-up given simple software administration

Data Sources

1) **Individuals:**

- Demographic information (age, gender, education), 1990-2013.
  (LISA; univ.)

- Matched employer-employee earnings data, 1985-2013.
  (RAMS; univ.)

- Wage and hours survey, 1995-2013.
  (Structure of Earnings Survey; 50%)

2) **Later: Firms:**

- Income statements and balance sheet information, 1990-2013.
  (FK data; univ.)

Source: Statistics Sweden.

Wage Measures

Statistics Sweden collects data on wages and hours worked through annual survey covering 100% of public sector workers and 50% of private sector worker.

Stratified random sampling of firms (100% of firms with 500+ workers)

$\geq$ 97% response rate in private sector.

Captures information for 1 month (typically September, October, or November)

Our focus:

Mean monthly real wages and labor cost by age groups at different periods (CPI deflated; converted to USD) [we get similar results with median; or with tax-reported actual annual earnings].

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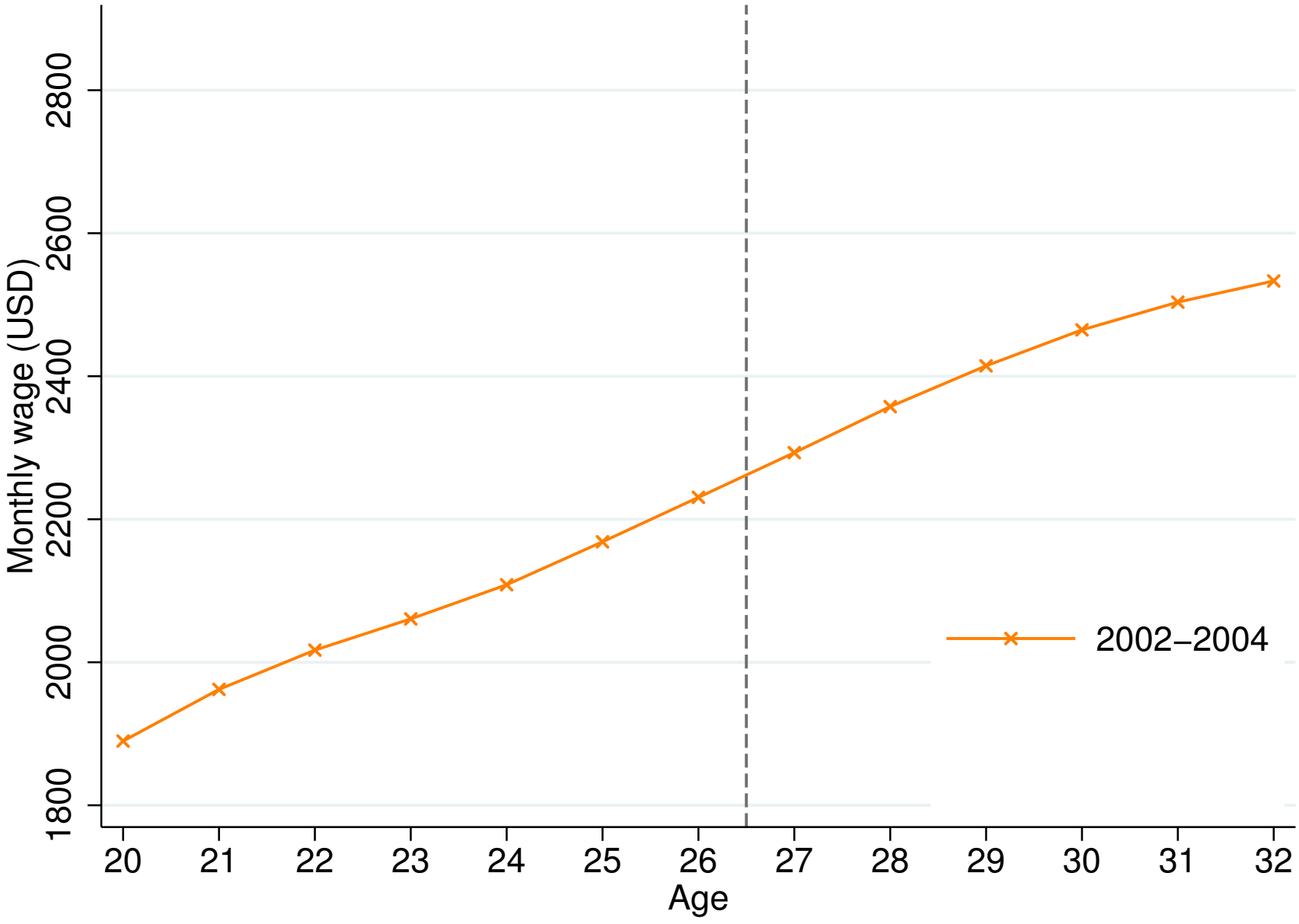
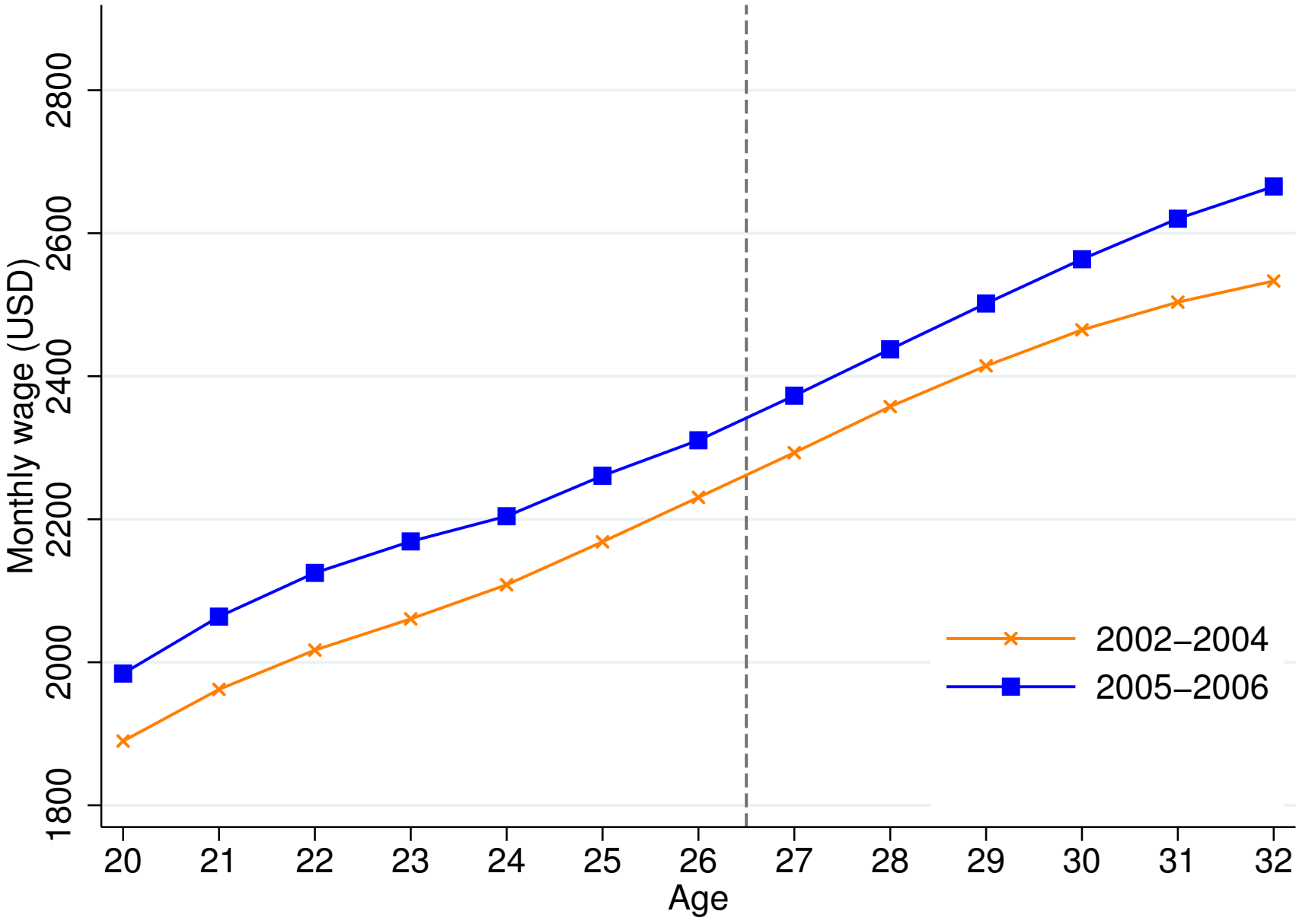
2 - **Worker-Level Results**

Wages

Wage Incidence

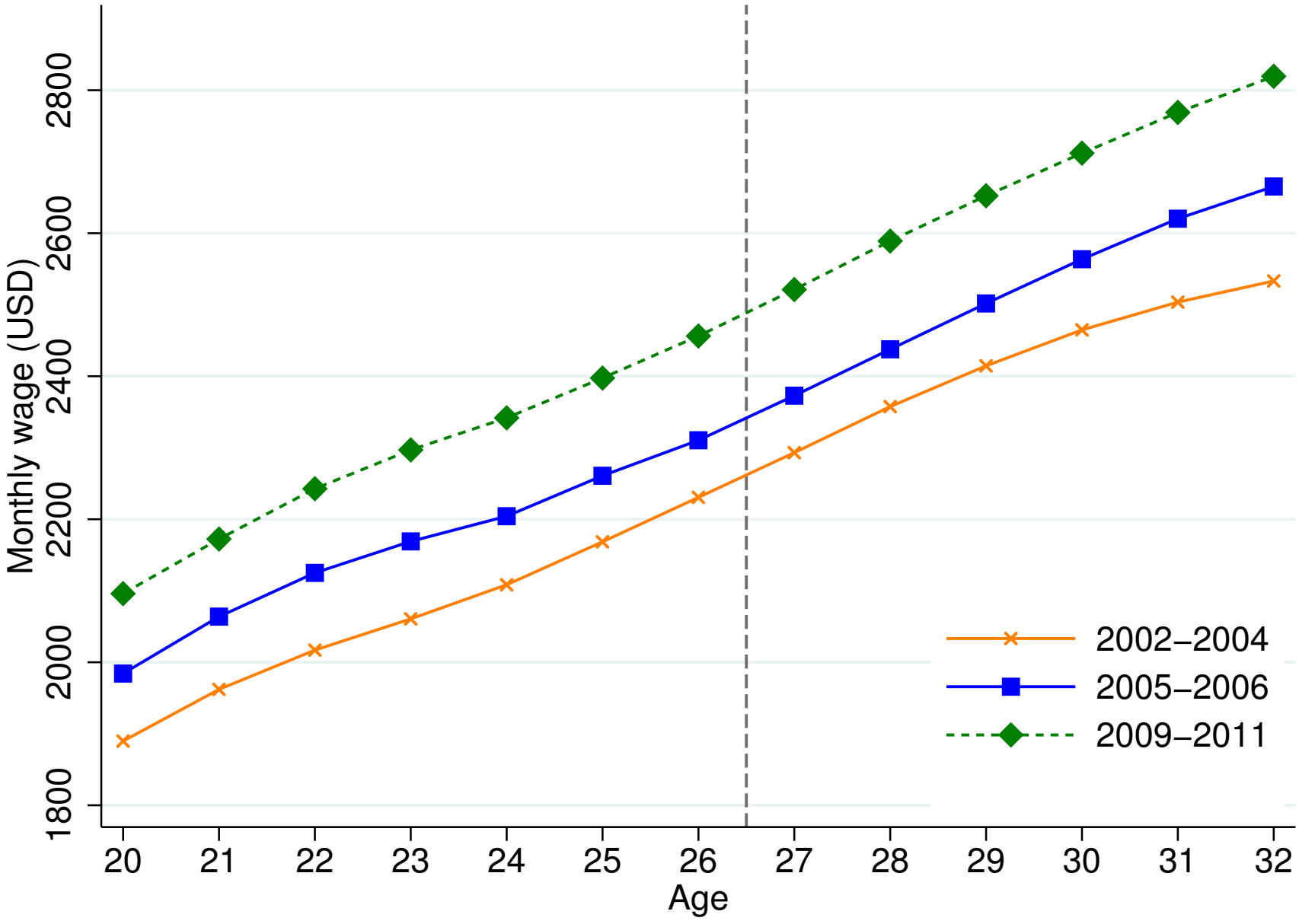


Wage Incidence

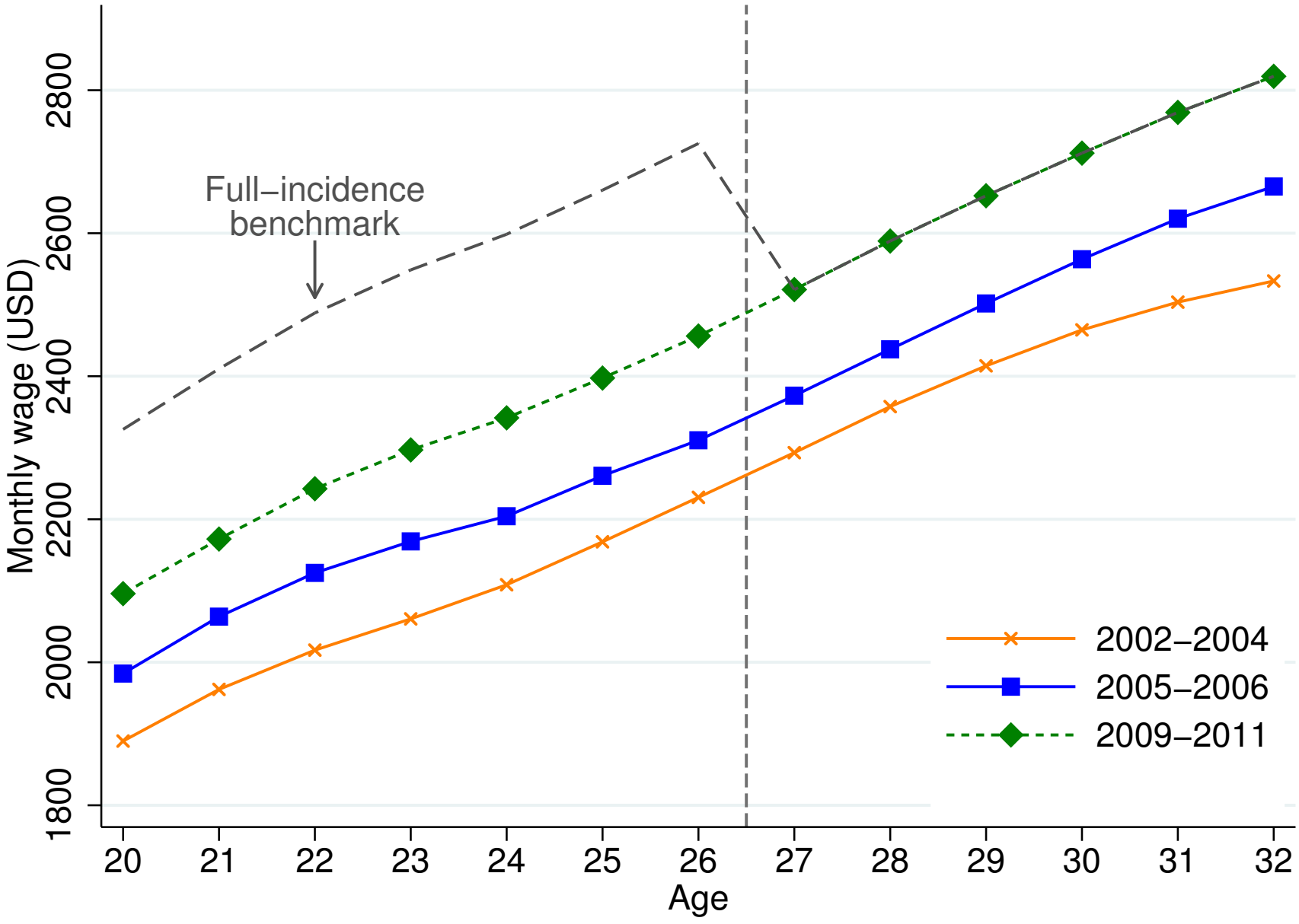


Wage Incidence

Cf. Egebark & Kaunitz (2014) Cf. Skedinger (2014)



Wage Incidence



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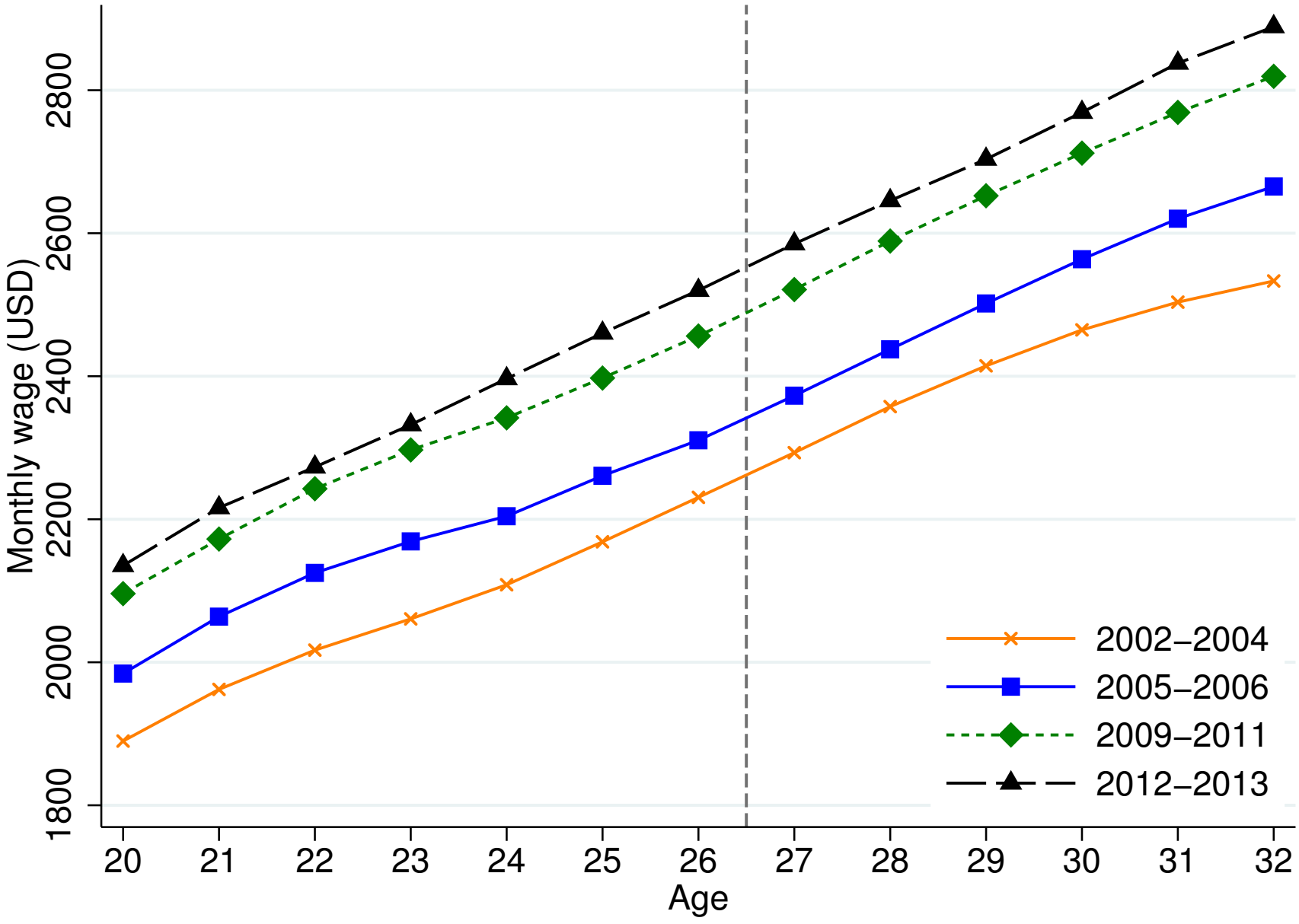
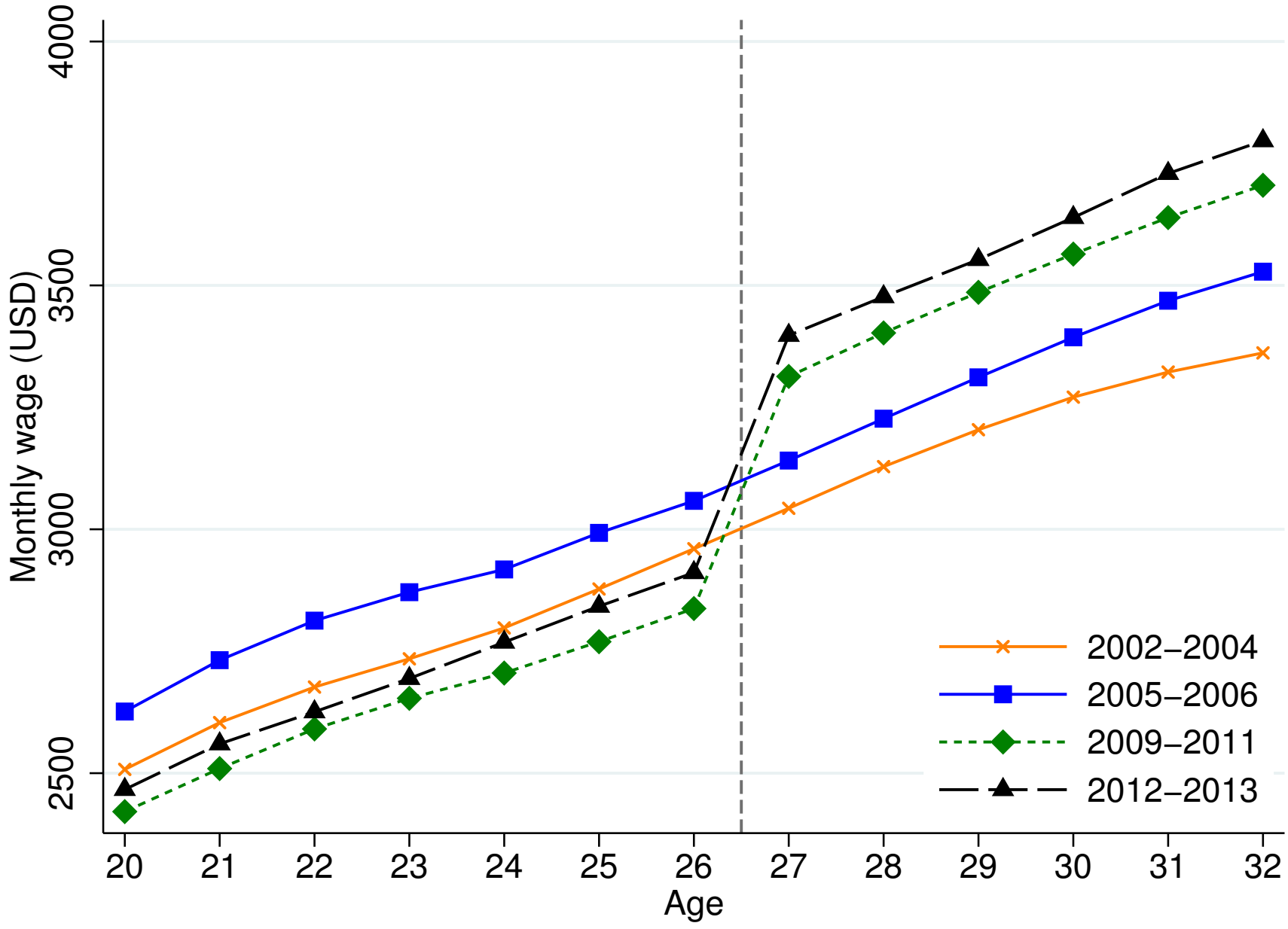
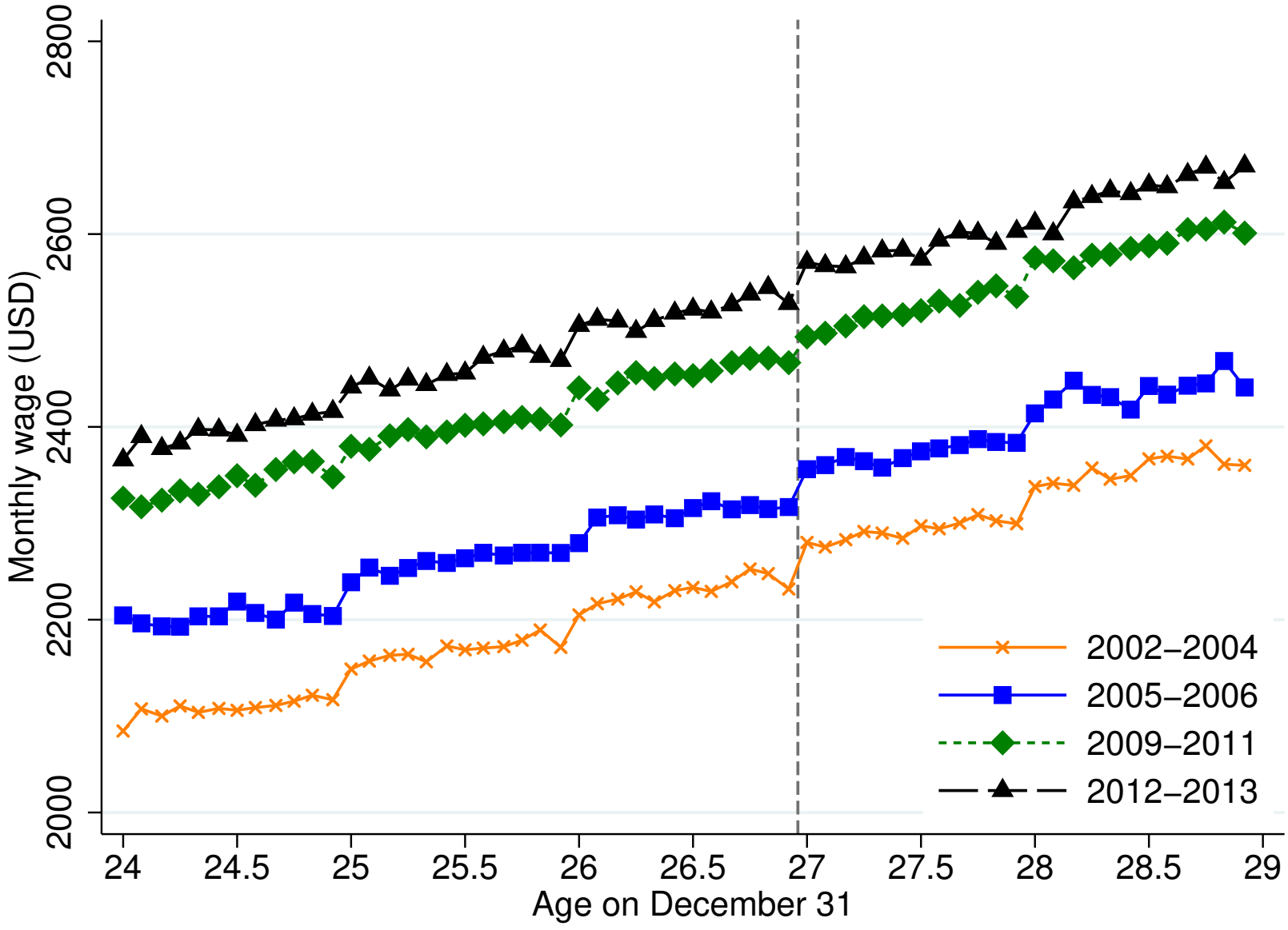


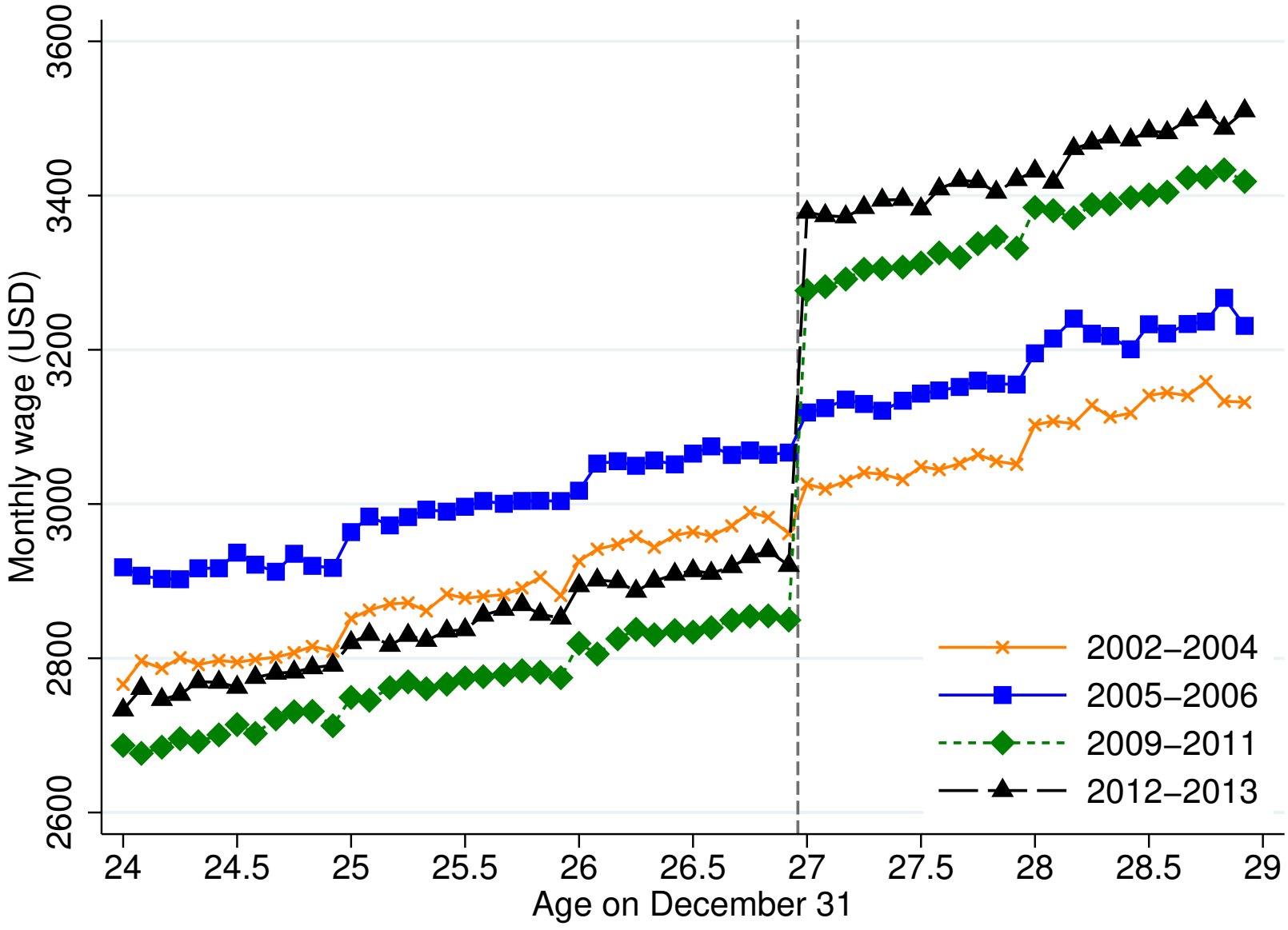
Labor Costs $(1 + \tau_{y,\text{age}}) \cdot w_{y,\text{age}}$



Wage Incidence (monthly cohorts)



Labor Costs (monthly cohorts)



Interpretation: Wages are constrained by CBAs

Collective bargaining agreements (CBAs) important in wage setting ($\approx$ 90% covered).

- CBAs define rules for wage negotiations.

36% : bilateral employer-employee negotiations

57% : firm-level labor cost determined centrally, but bargaining over allocation.

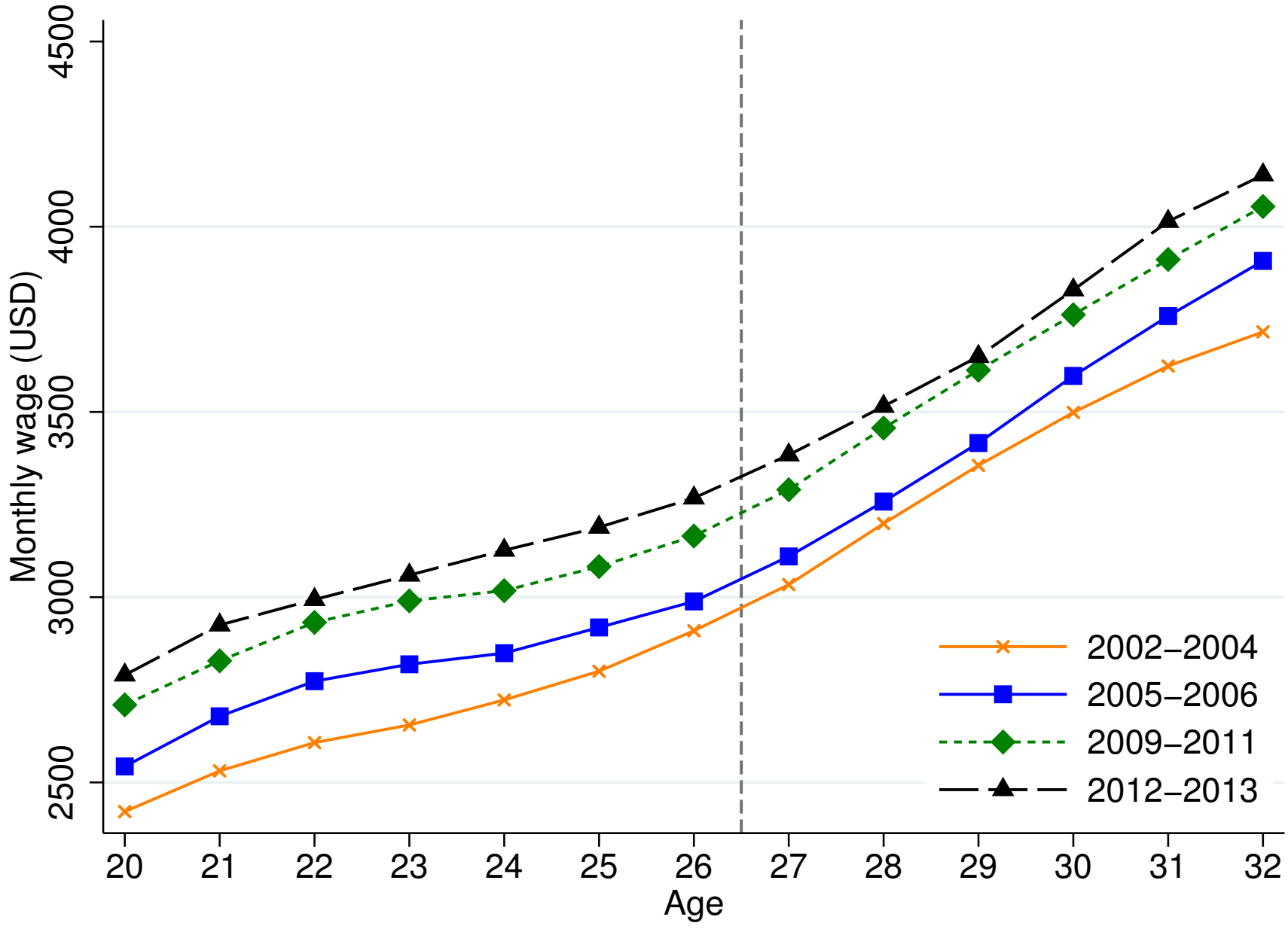
7% : centrally determined wages (incl. those at minimum wage).

- CBAs define wage floors.

Agreements define **wage floor** by occupation and industry [and sometimes by age].

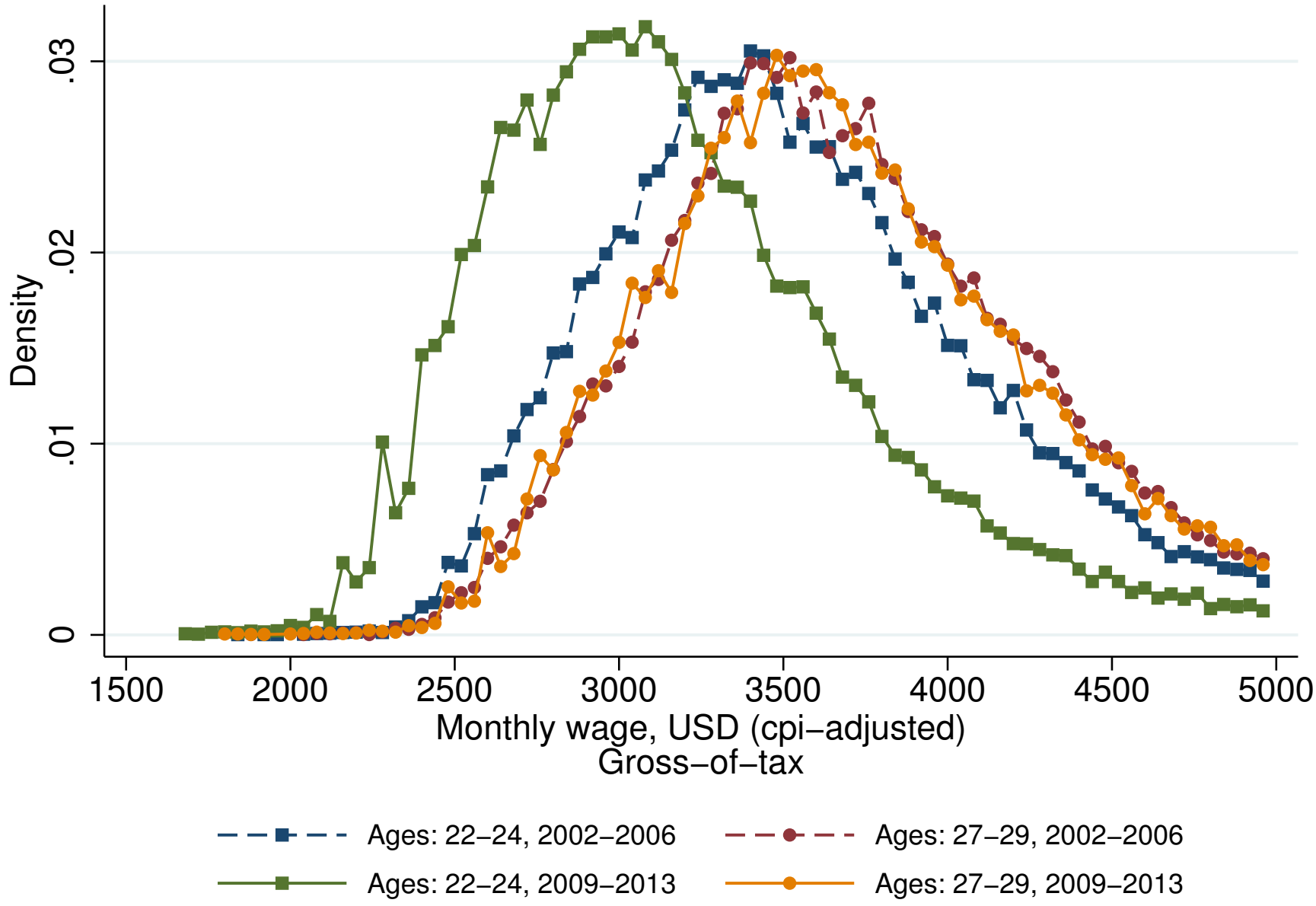
If wage floor above market clearing wage then payroll tax cut might not raise wage.

Top 20%% of the Wage Distribution



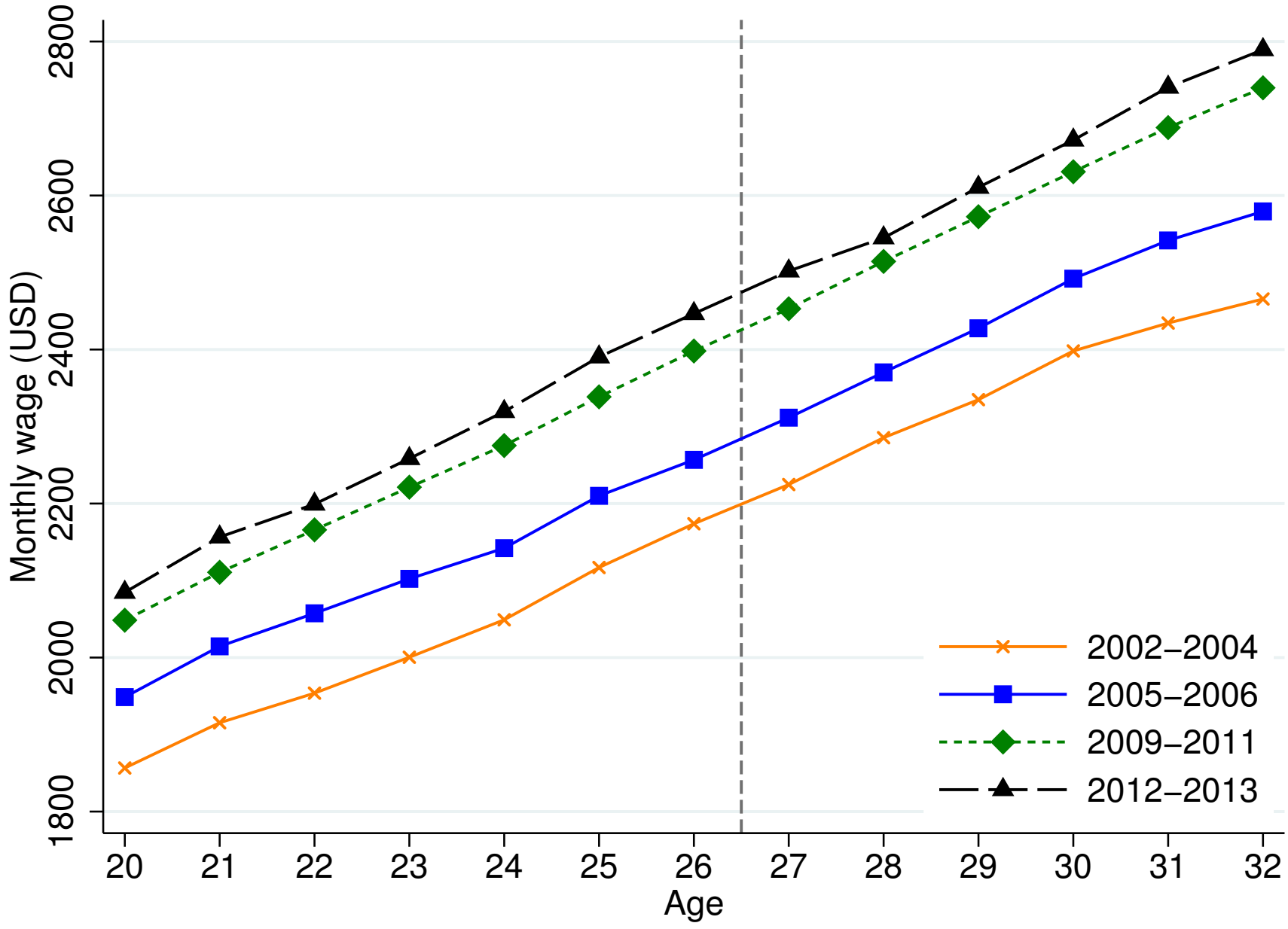
Monthly net wage

Monthly gross wage

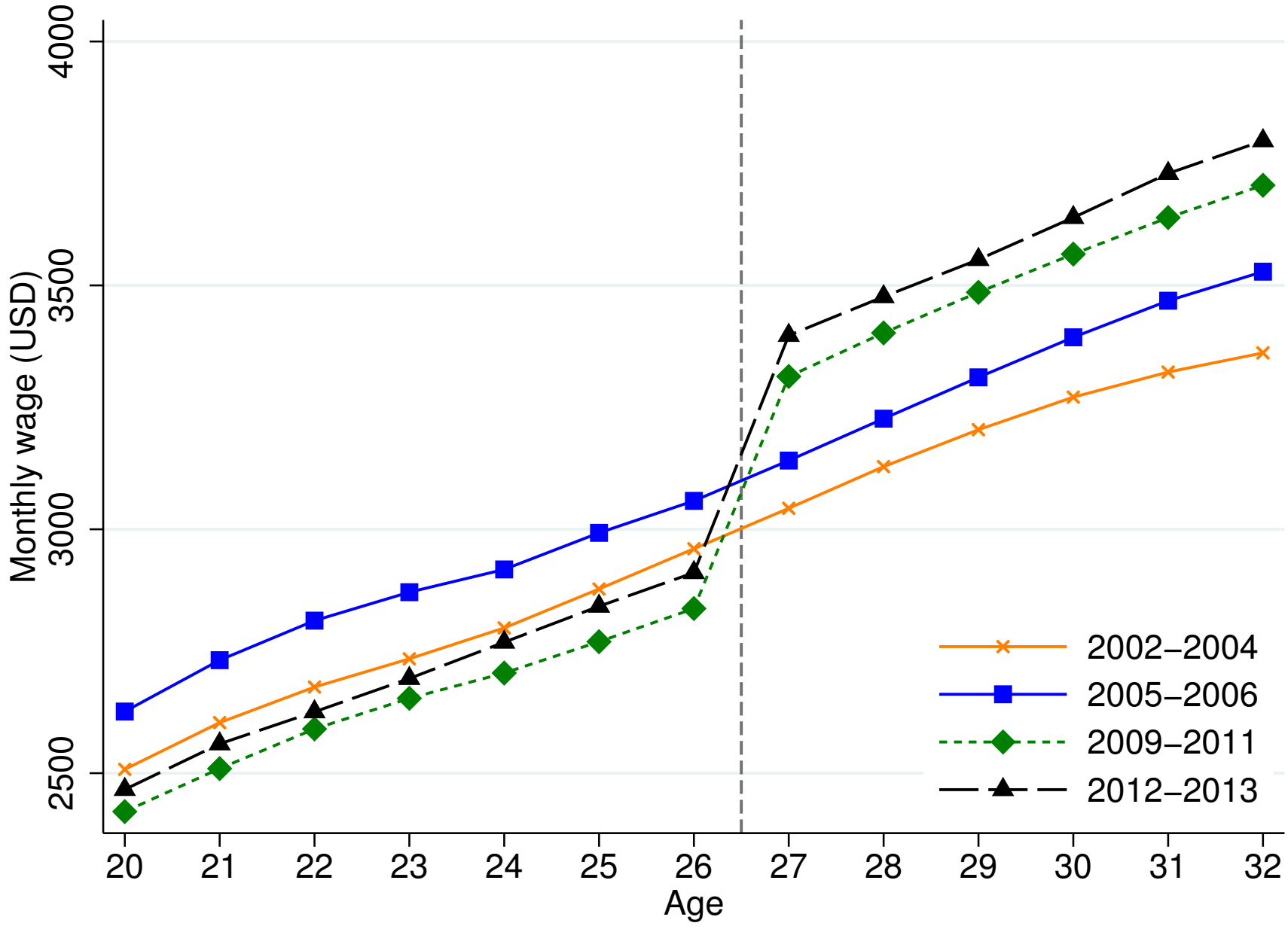


Wages in New Jobs Only

(Subsample: E-E & U-E transitions)



Labor Costs $(1 + \tau_{y,\text{age}}) \cdot w_{y,\text{age}}$



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2 - **Worker-Level Results**

Employment

Employment Outcomes

Admin. pop. data on labor market biographies & demographics:

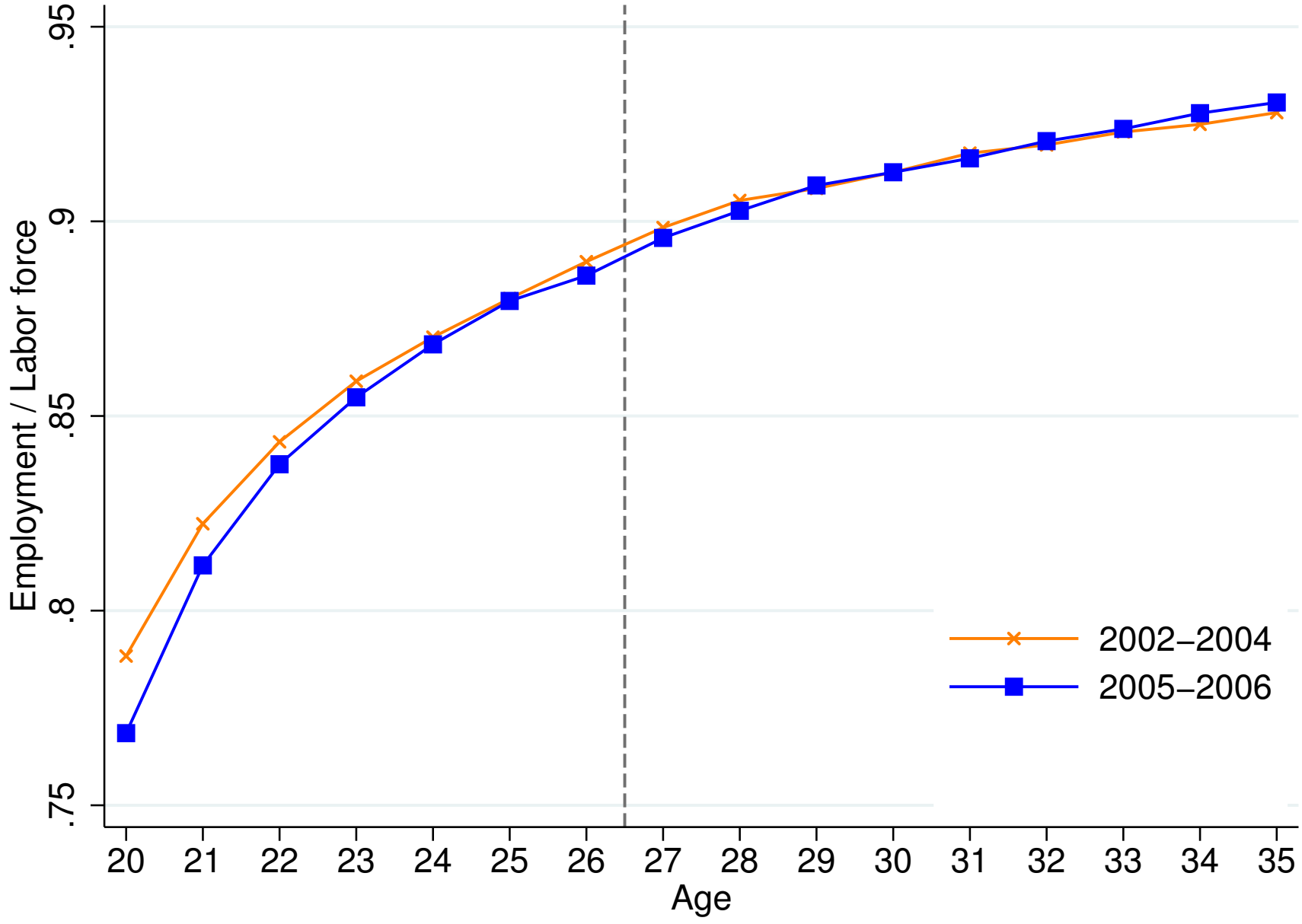
$$\text{EmploymentRate}_{y,\text{age}} = \frac{\#\text{Employed}_{y,\text{age}}}{\#\text{LaborForce}_{y,\text{age}}} = \frac{\#\text{Employed}_{y,\text{age}}}{\#\text{Employed}_{y,\text{age}} + \#\text{Unemployed}_{y,\text{age}}}$$

Unemployed: Not employed & registered as unemployed 1+ days during year.

Employed: Hold job with nontrivial annual earnings ($4.5K+).

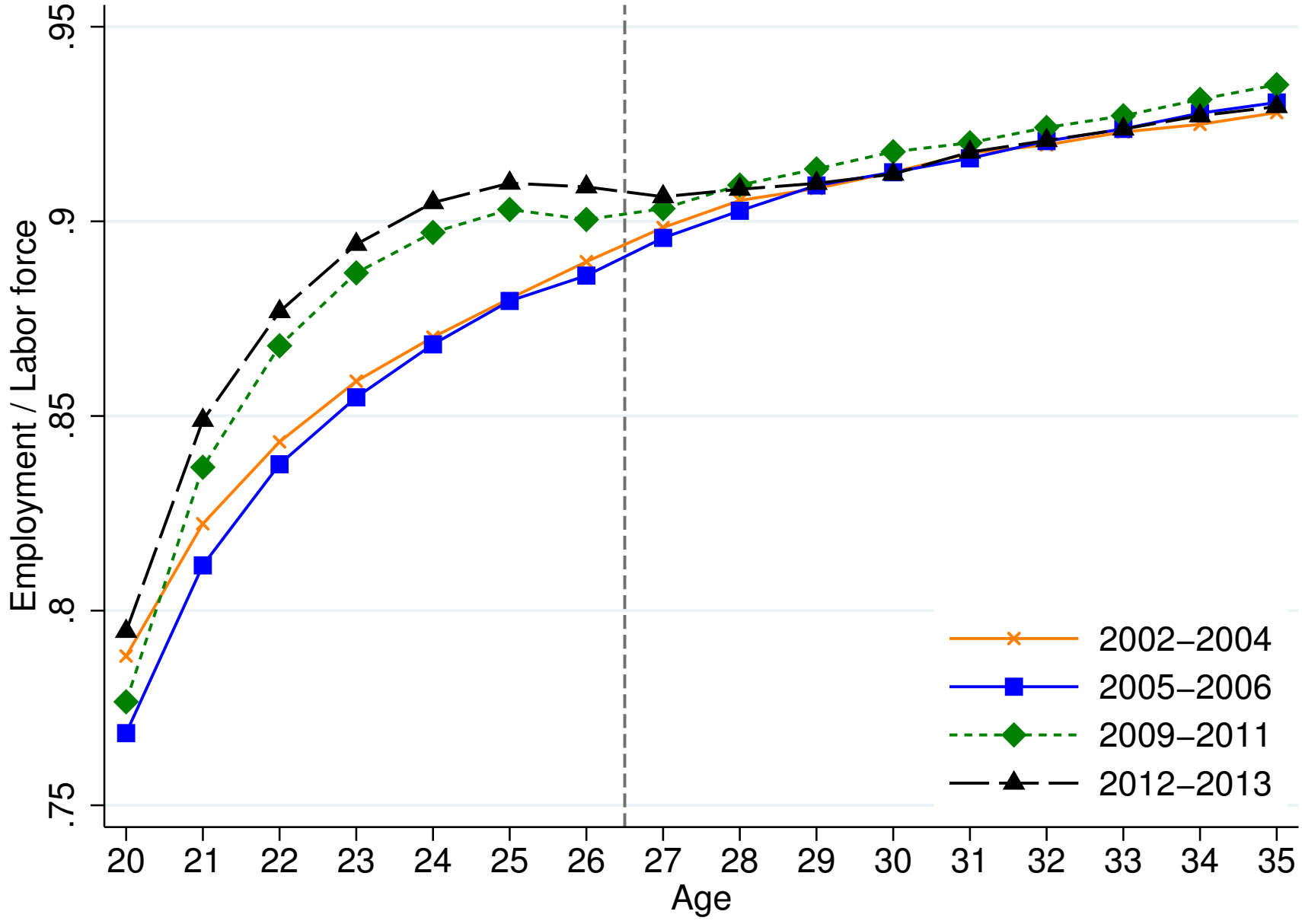
Results are robust to changing either threshold.

Employment Effects

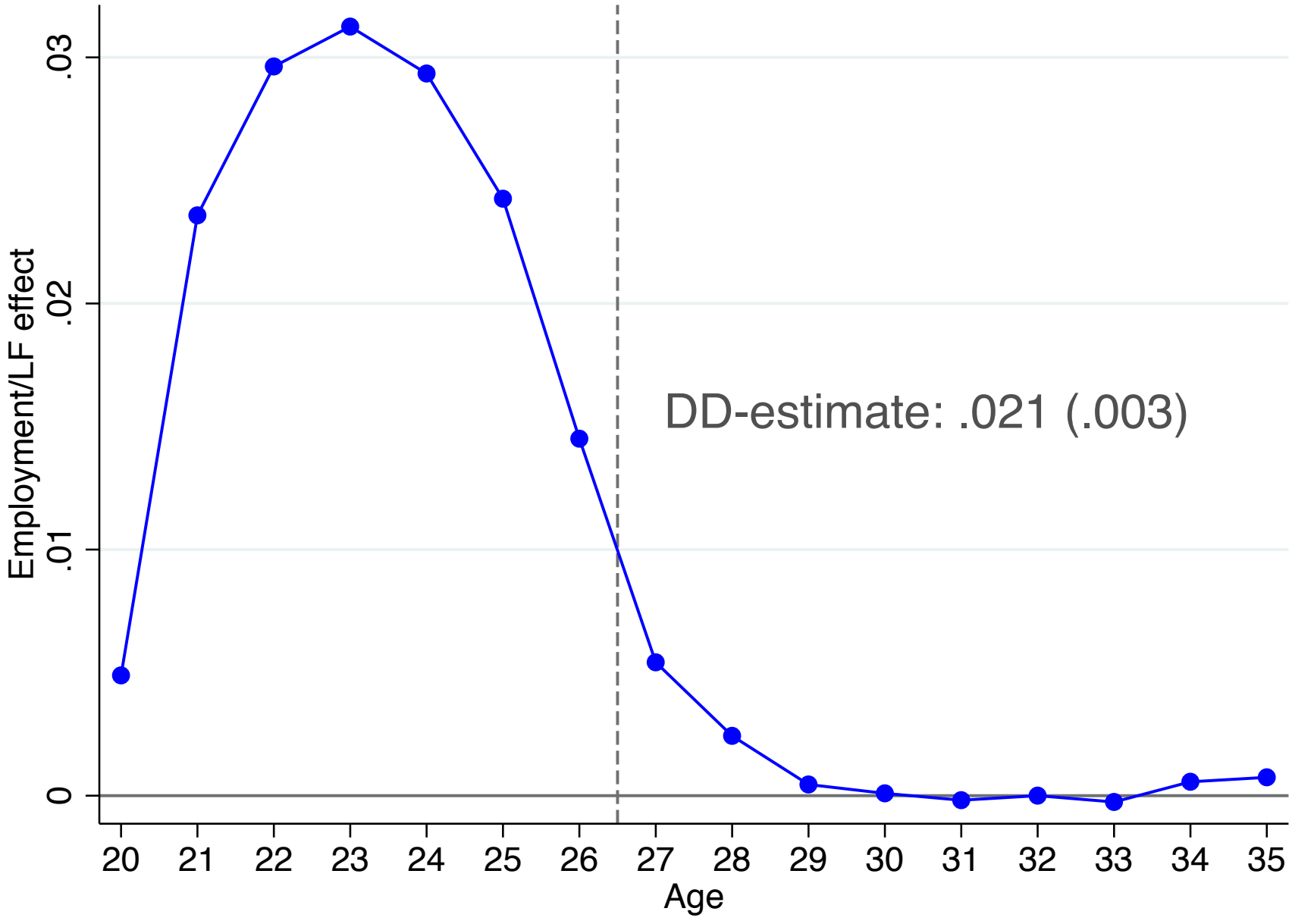


Employment Effects

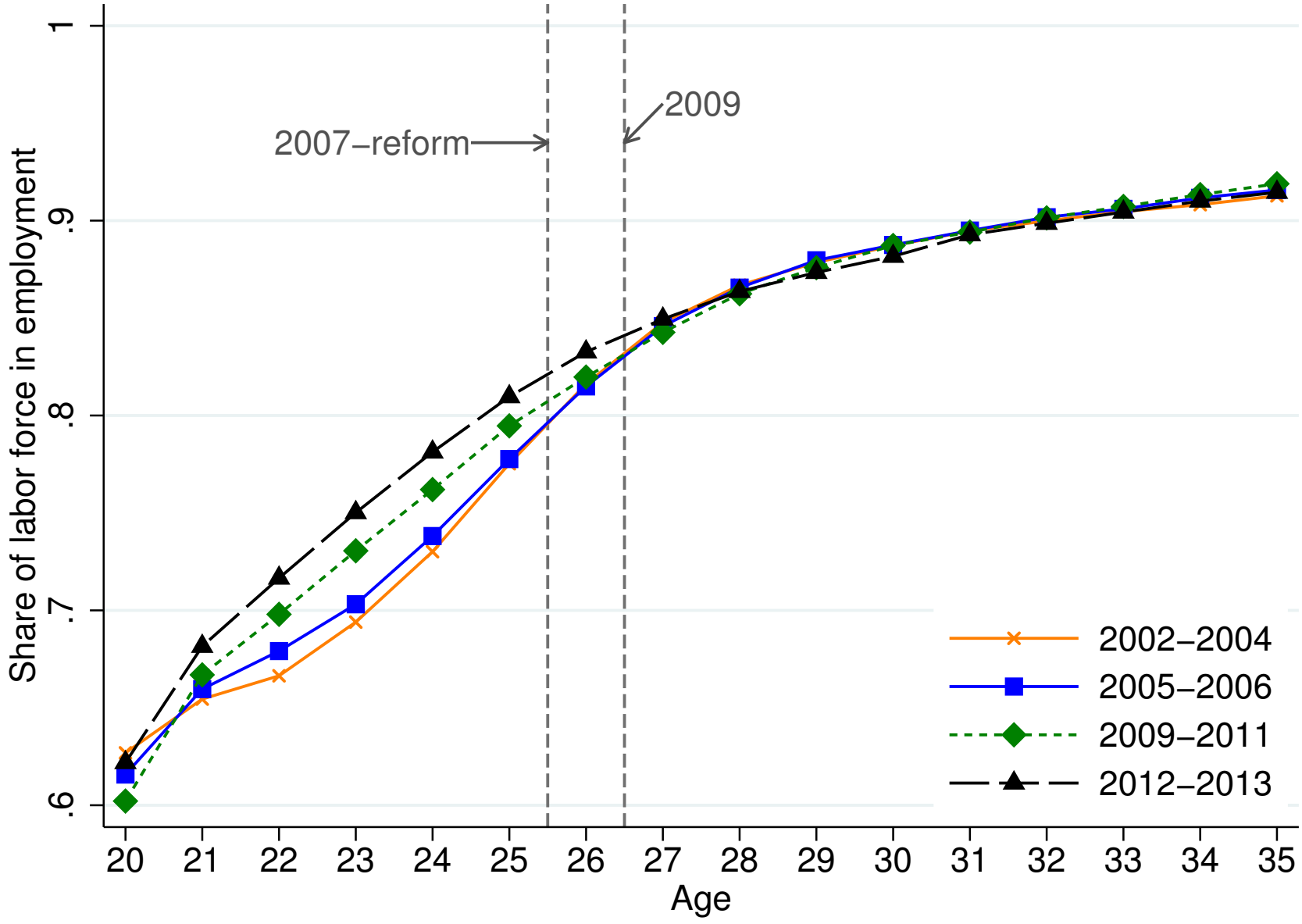
Appendix: LFP | Cf.: E&K (2014)



Employment Effects by Age



Adding Students to the Labor Force

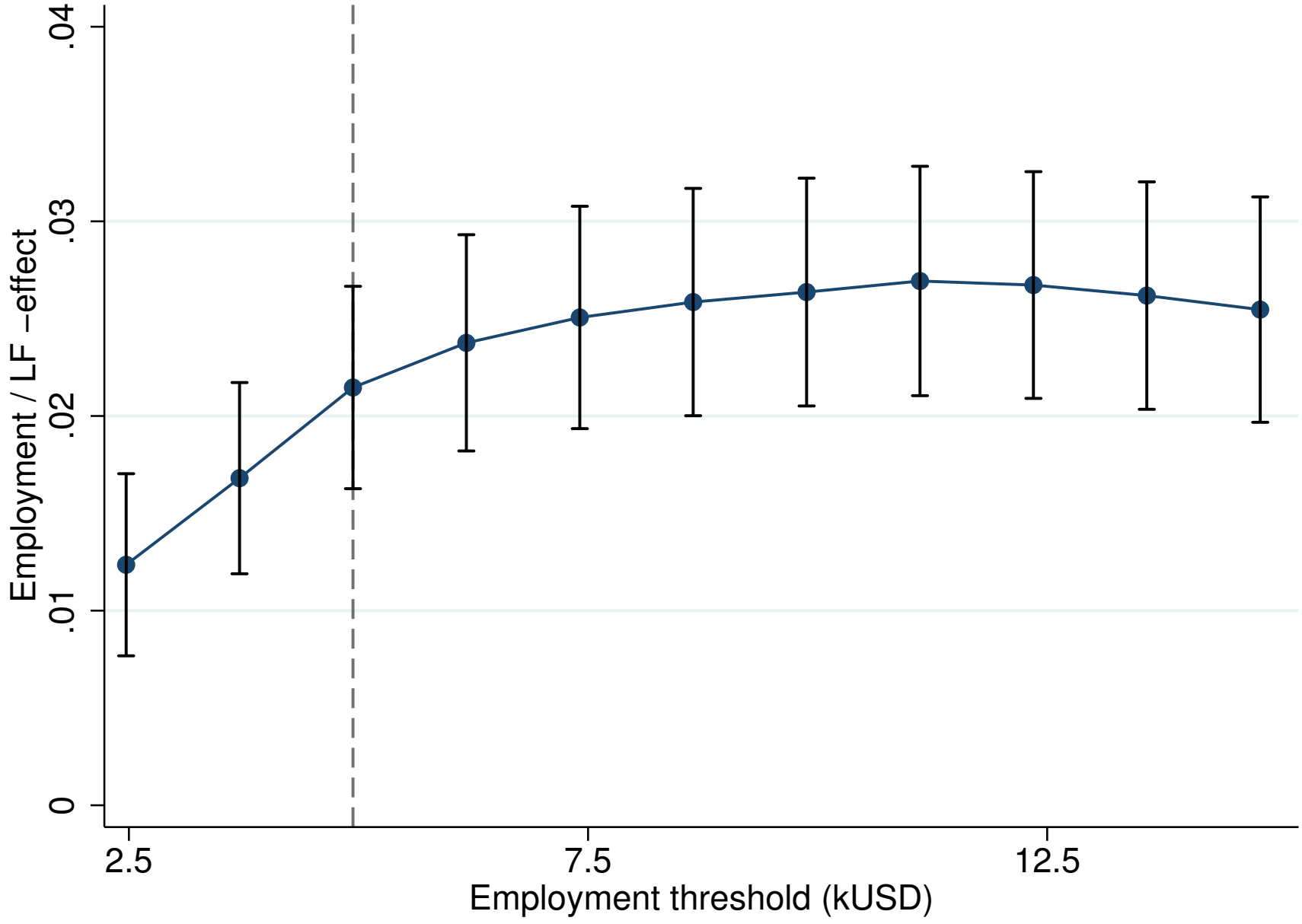


Effect of Payroll Tax Cut on Employment Measures

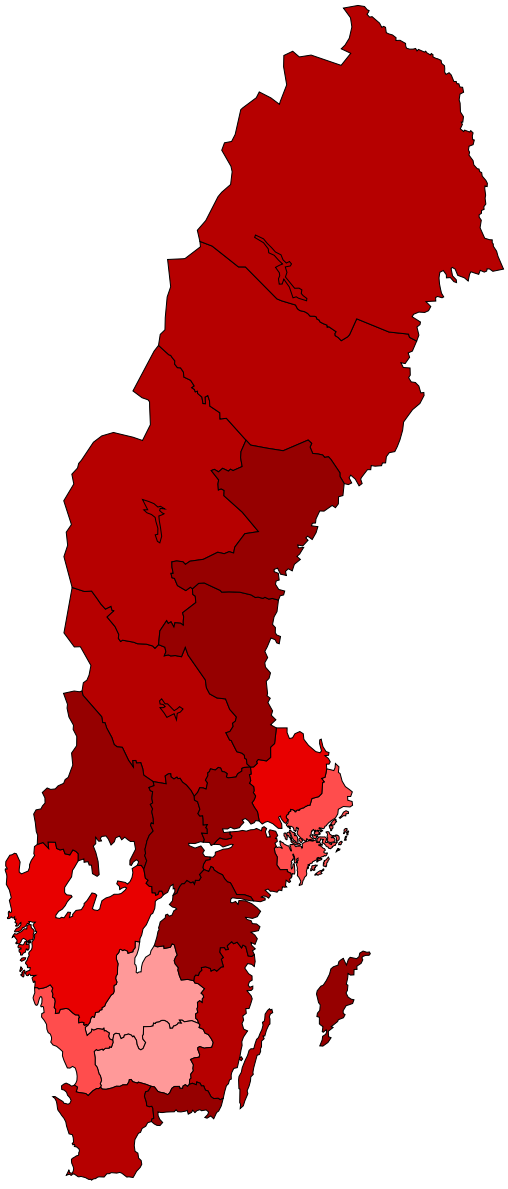
	(1) Effect (perc. points)	(2) Elasticity
Employment / Labor Force (LF)	0.021	0.21
	(0.0026)	(0.026)
Employment / (LF+students)	0.023	0.27
	(0.0040)	(0.047)
Employment / Population	0.014	0.23
	(0.0039)	(0.066)
Labor force / Population	-0.0096	-0.11
	(0.0034)	(0.038)
N	64	64

Notes: DD estimates based on OLS regression using the aggregated times series by age and time periods displayed in the figures.

Varying the earnings threshold to define employment

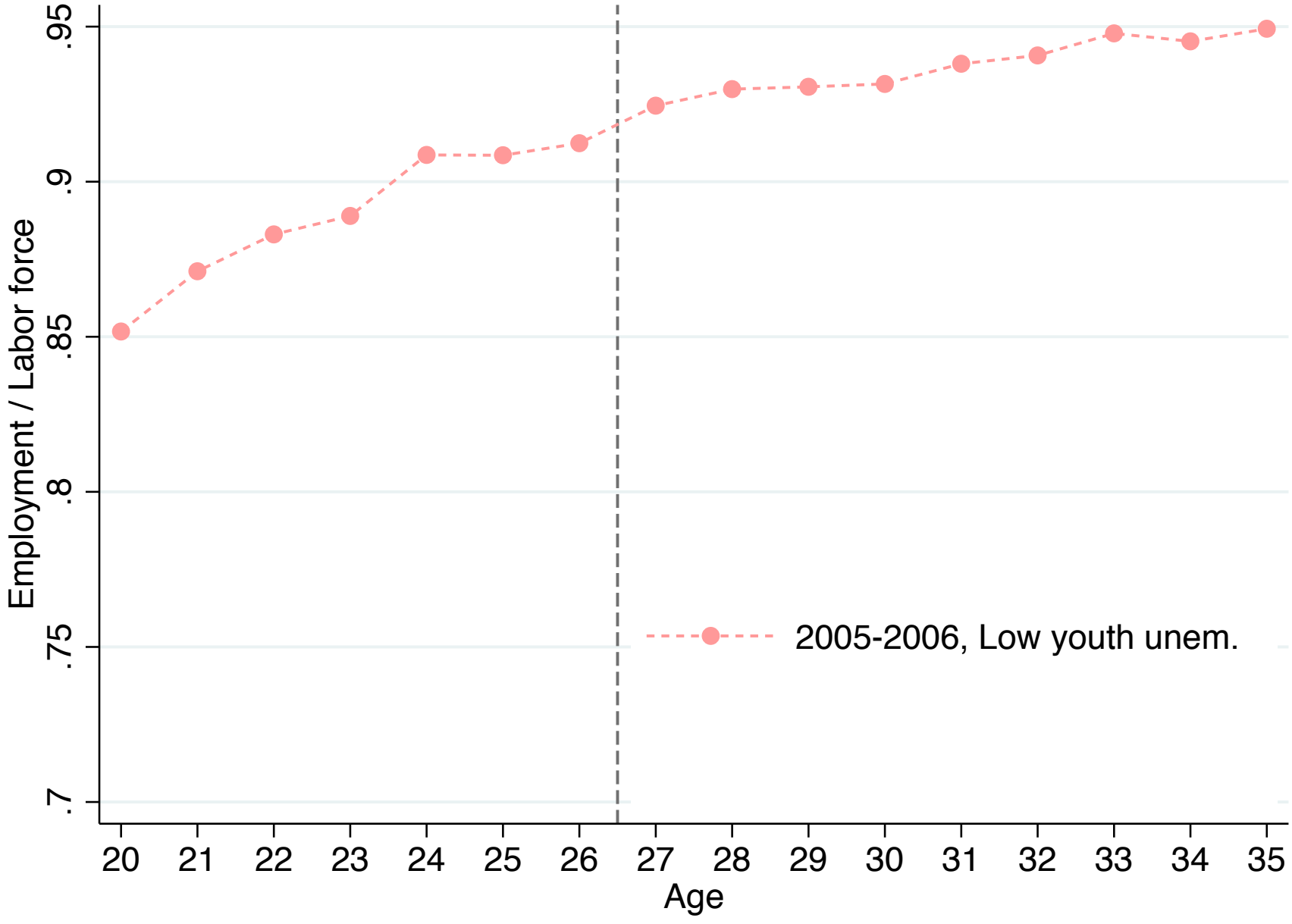


Regional Variation in 2006 Youth Unemployment



Q5:	20 – 23.3%
Q4:	17.8 – 20%
Q3:	14.9 – 17.8%
Q2:	12.4 – 14.9%
Q1:	10.5 – 12.4%

Regional Effects by 2006 Youth Unemployment



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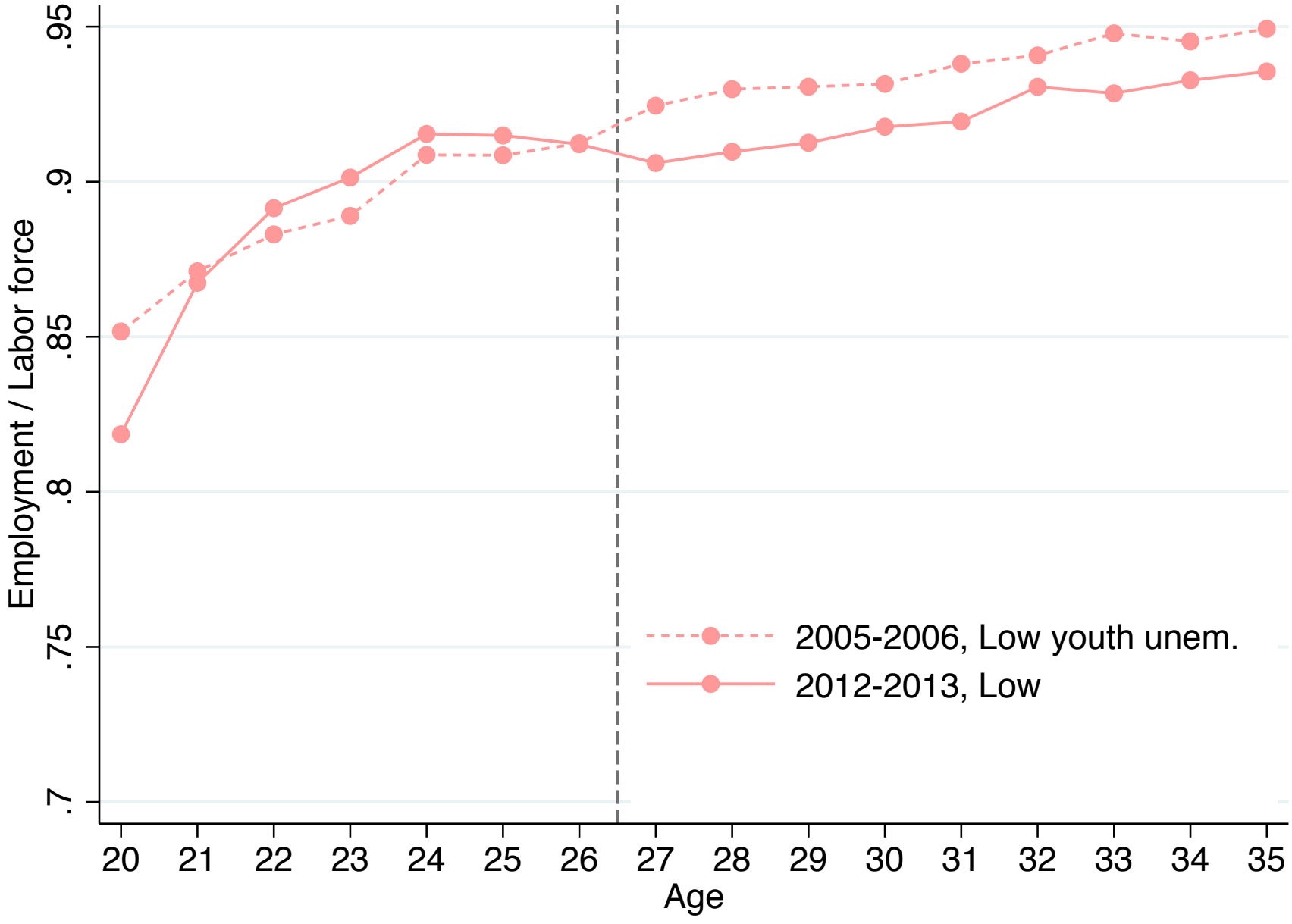

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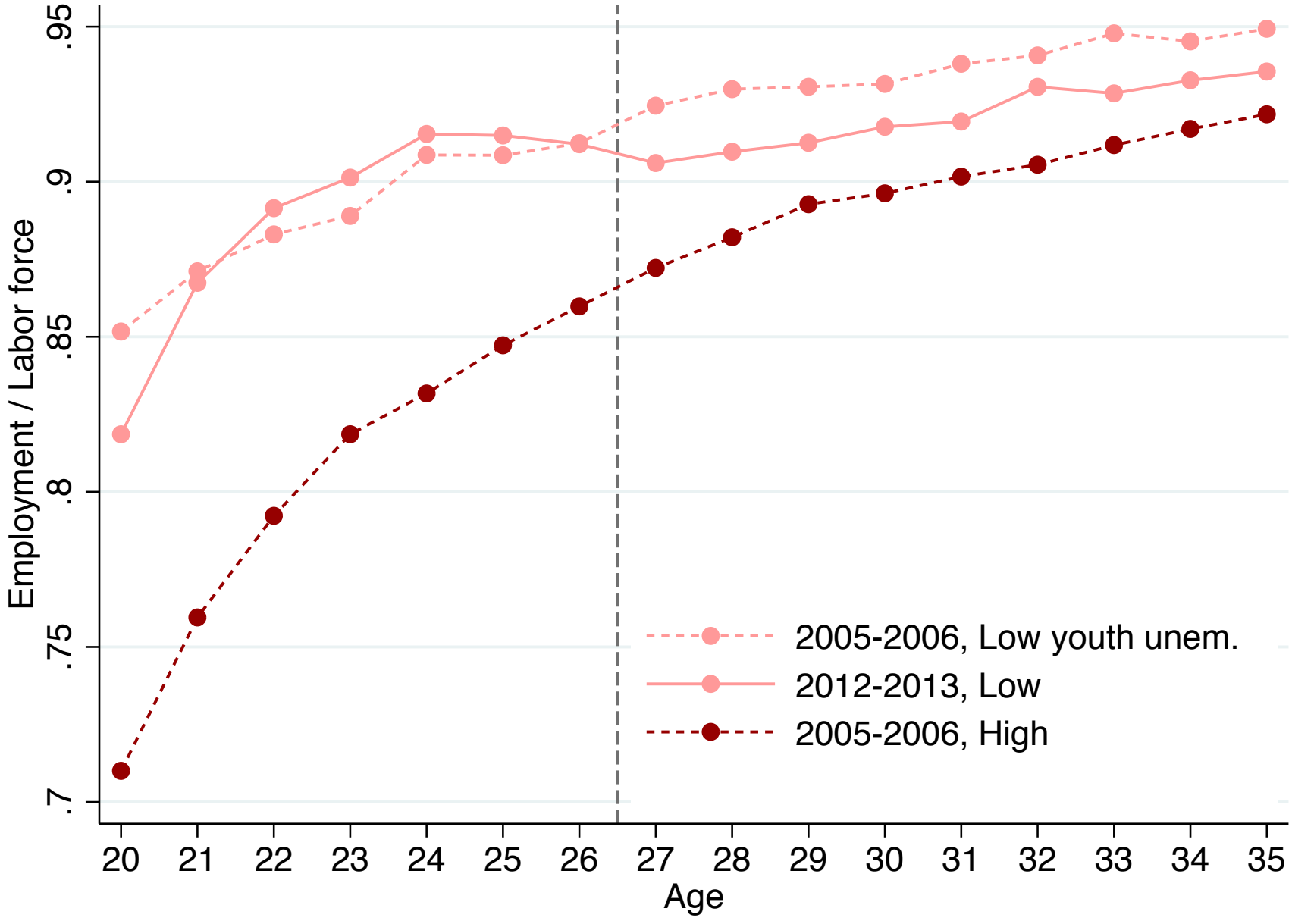
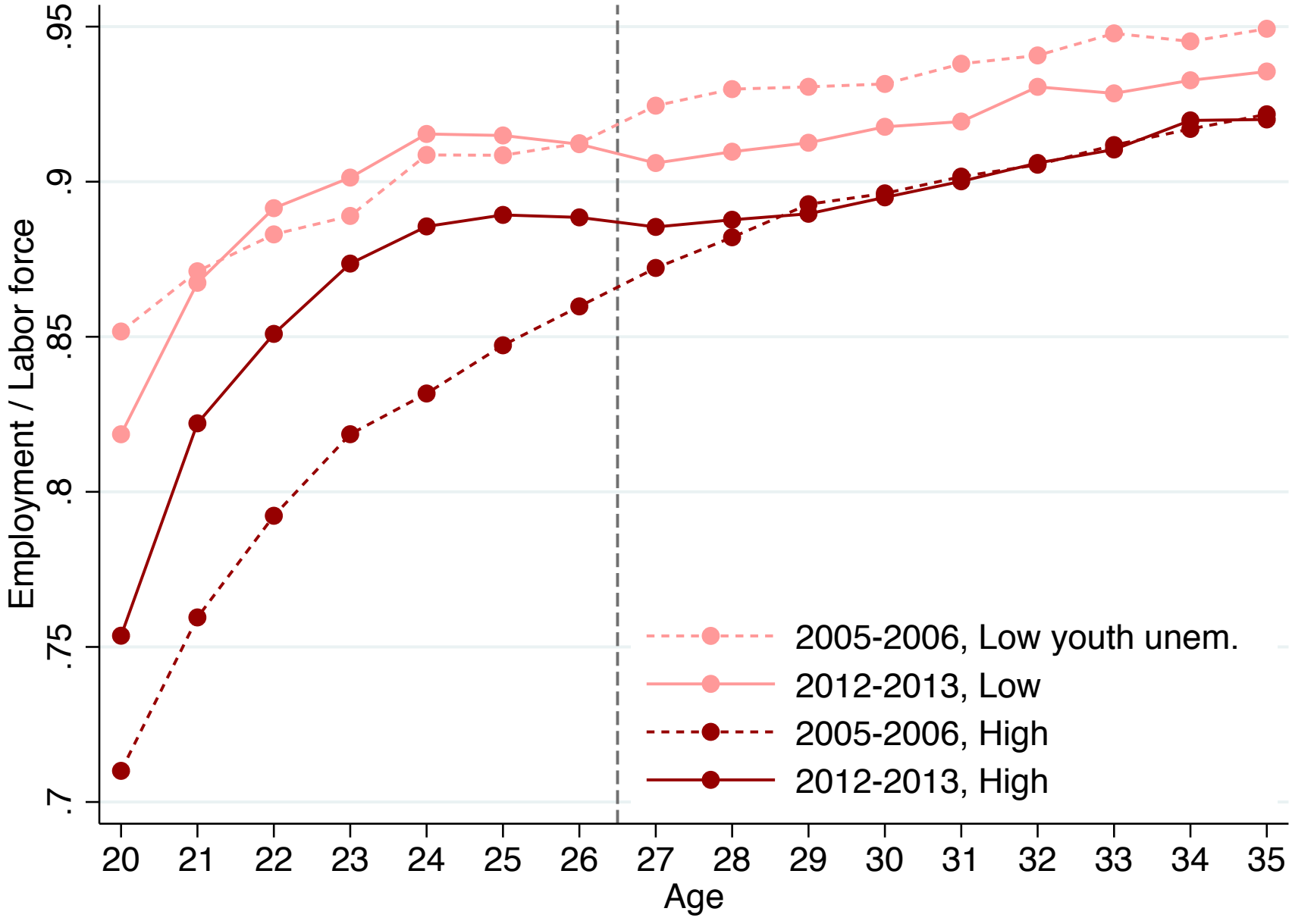
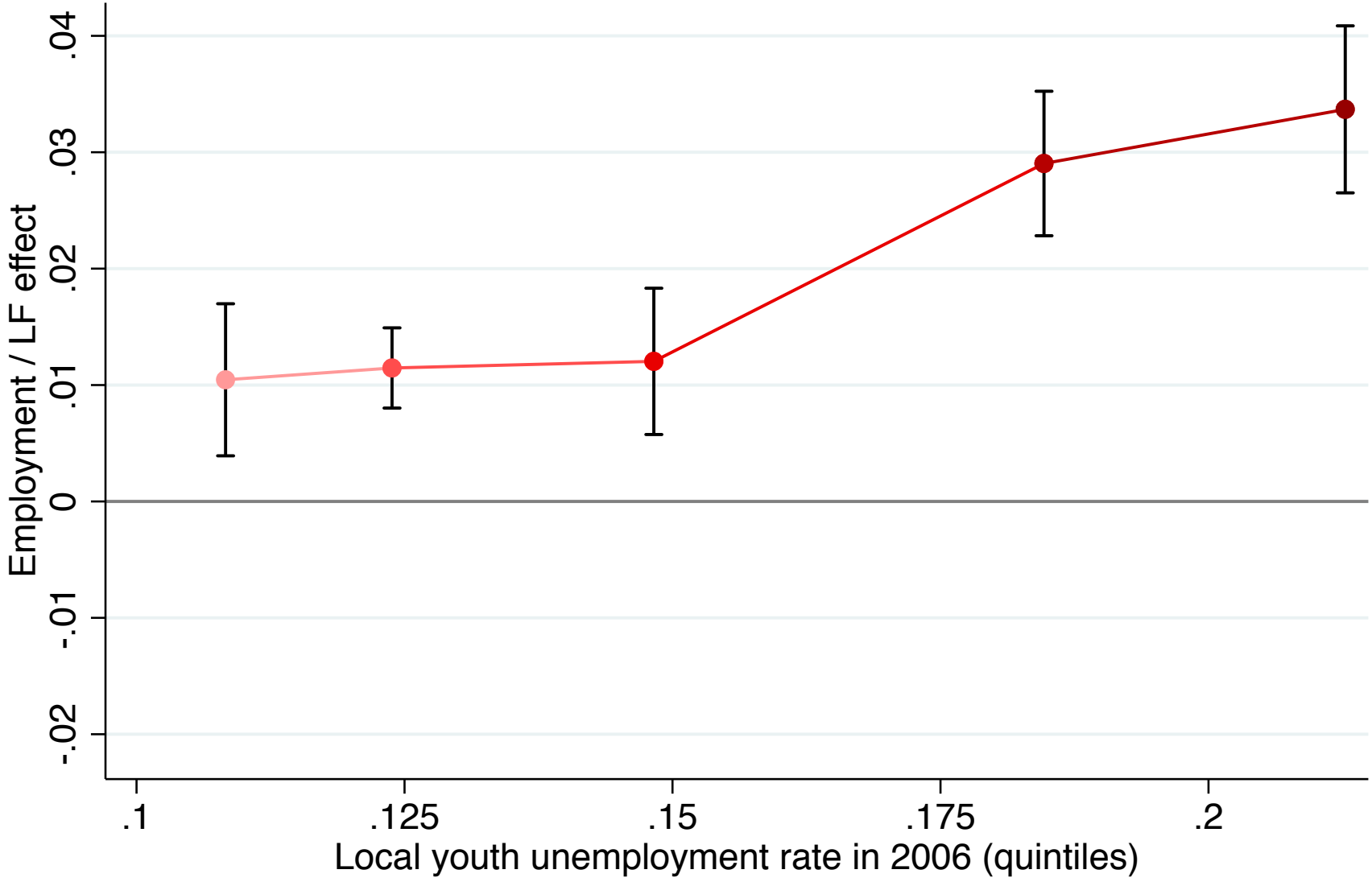


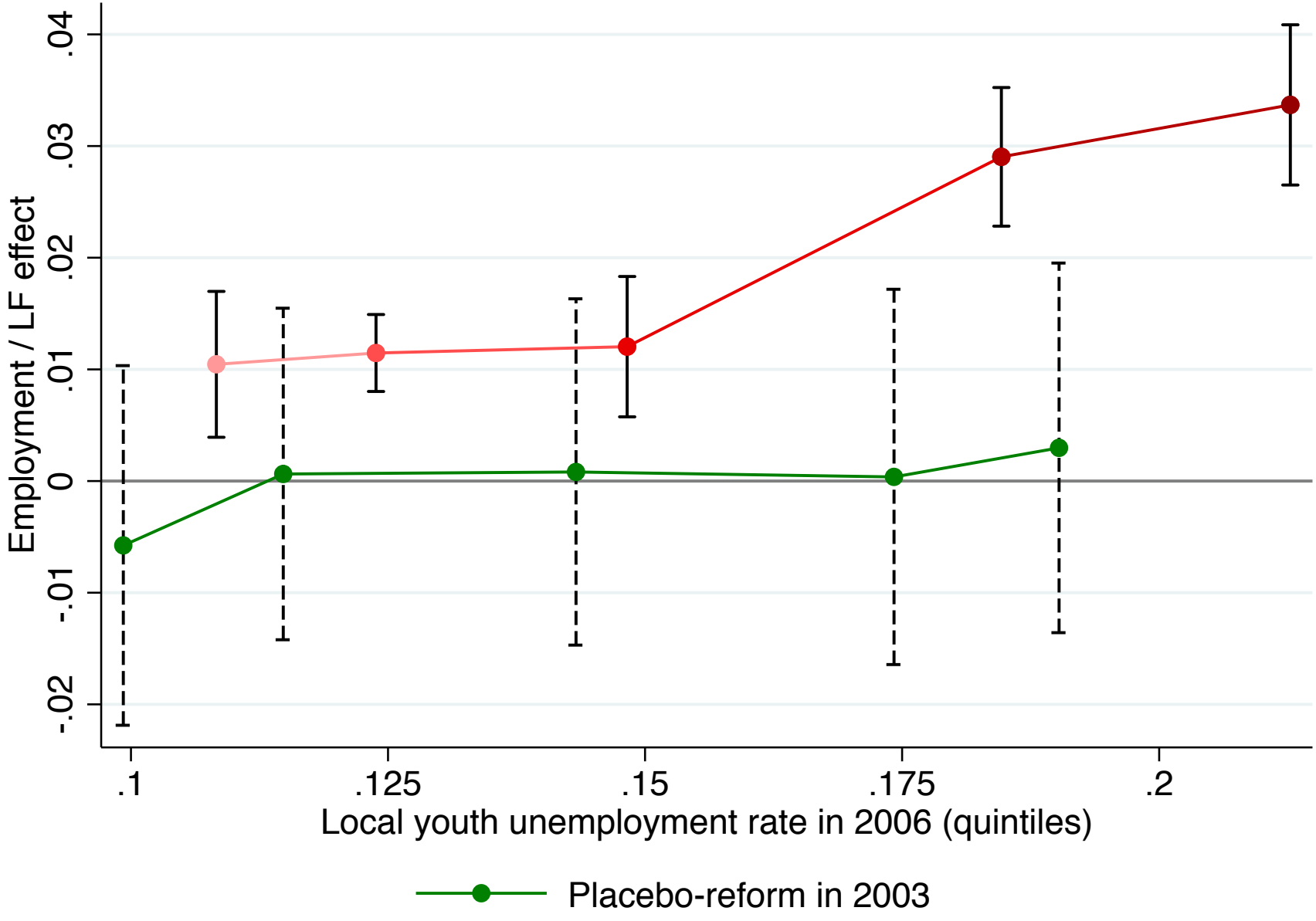
Regional Effects by 2006 Youth Unemployment



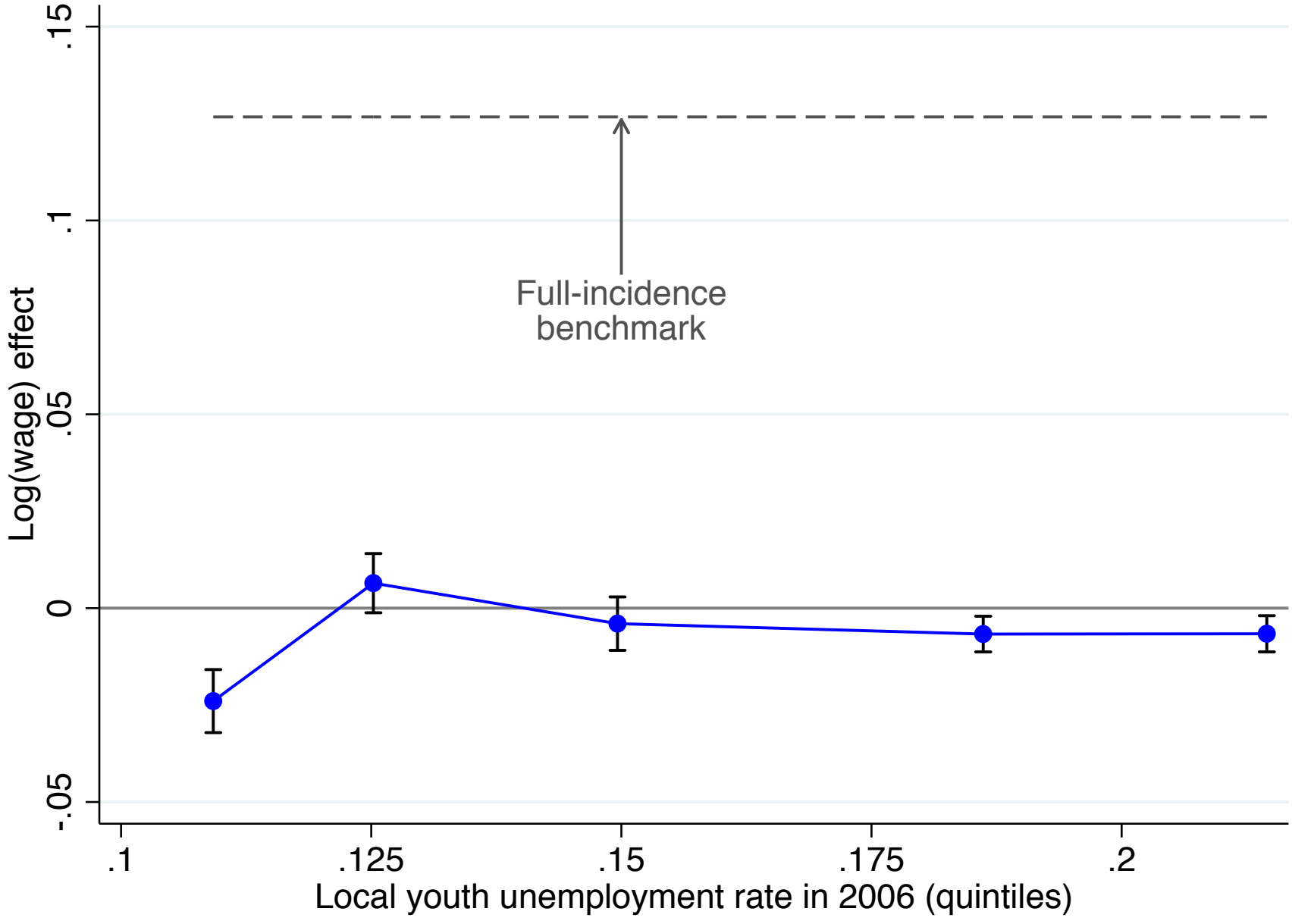
DD Regional Effects by 2006 Youth Unemployment



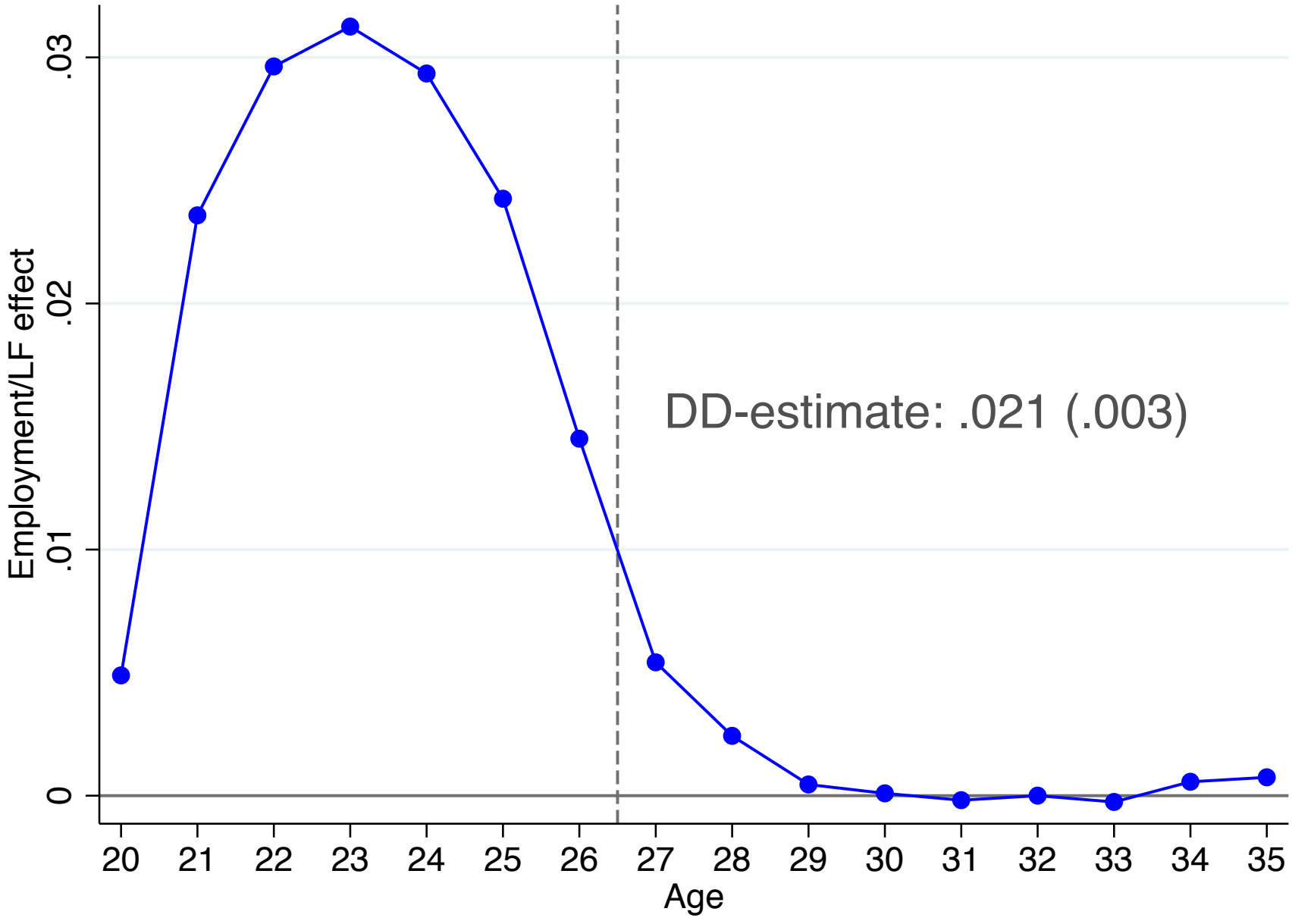
Regional Effects by 2006 Youth Unemployment



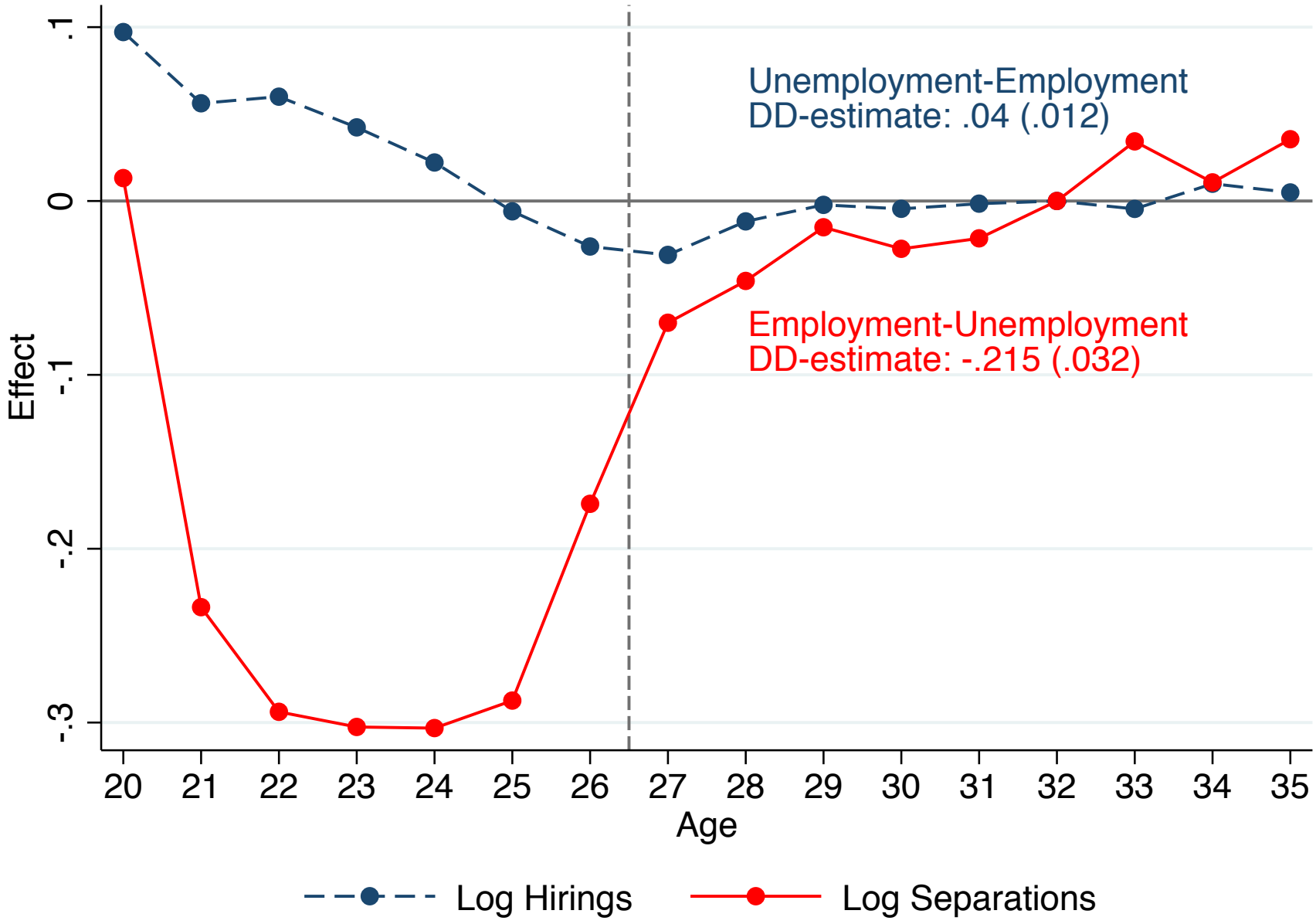
Regional **Wage** Effects by 2006 Youth Unemp.



Employment Effects by Age



Employment Effects: Worker Transition Rates



Worker-Level Findings

Worker-level results **contradict** canonical PF incidence predictions:

- **Zero** wage incidence,
- **Full** labor cost reduction,
- **Large** employment effects.
  - Concentrated in high-unemployment areas.

⇒ **Payroll tax cut is a business tax cut:** Do firms use payroll tax cut to expand business? Or do firms "pocket" the tax windfall?

(And, how else does payroll tax incidence then work, if not through market equilibrium?)

Reform generates second, **firm-level** experiment: Literature

- Longitudinal analysis based on firm's **pre-reform share of young workers**.

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2 - **Firm-Level Results**

Scale Outcomes

Firm Data

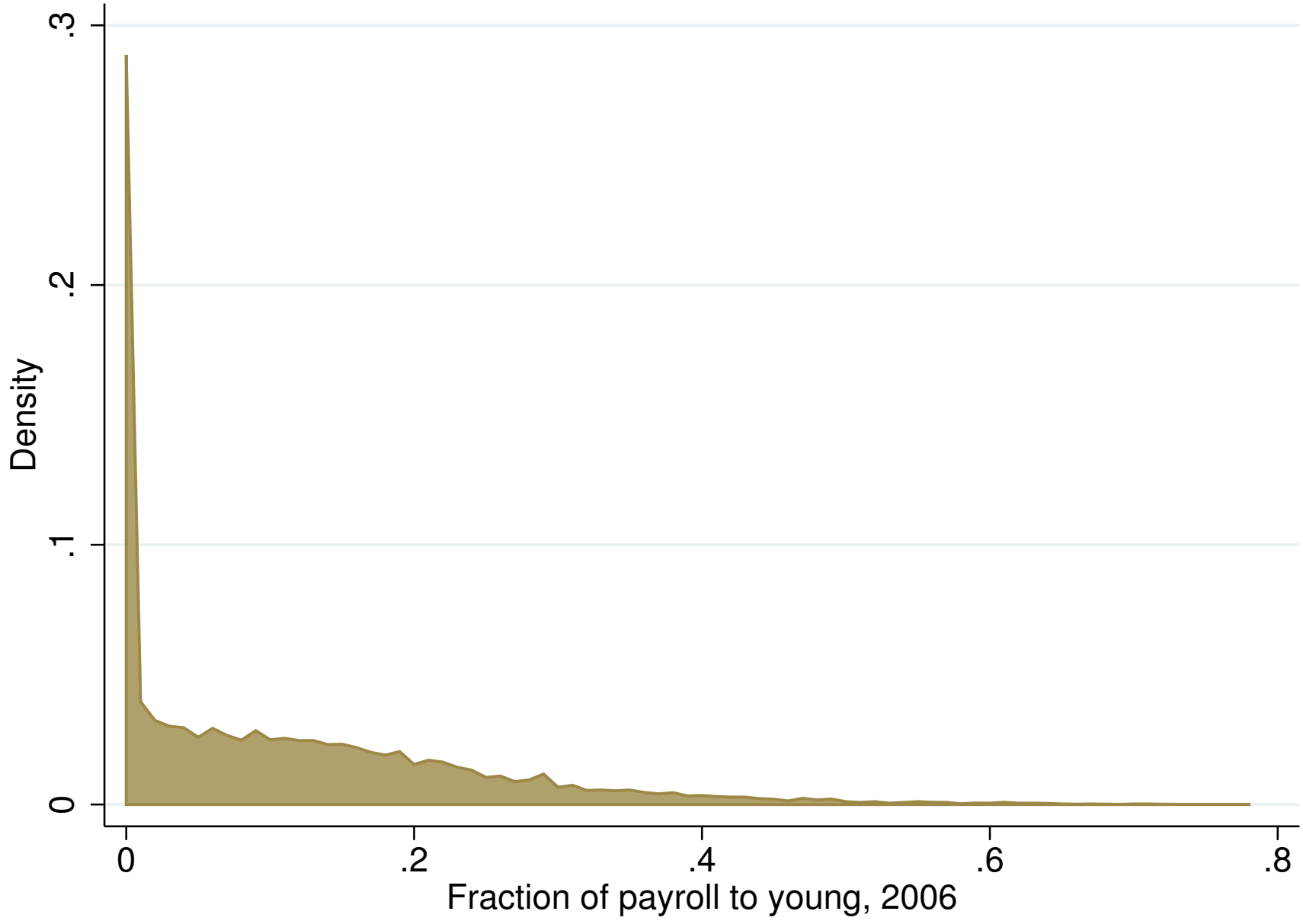
Merged data:

- Our micro worker data from part A
- Firm-level income statements and balance sheets (FK data, Statistics Sweden)

Sample:

- Private-sector, domestic firms
- > 3 employees.
- Balanced panel 2003–2013

Firm Heterogeneity in Exposure: $\frac{\text{Treated Wage Bill}_{f,2006}}{\text{Total Wage Bill}_{f,2006}}$



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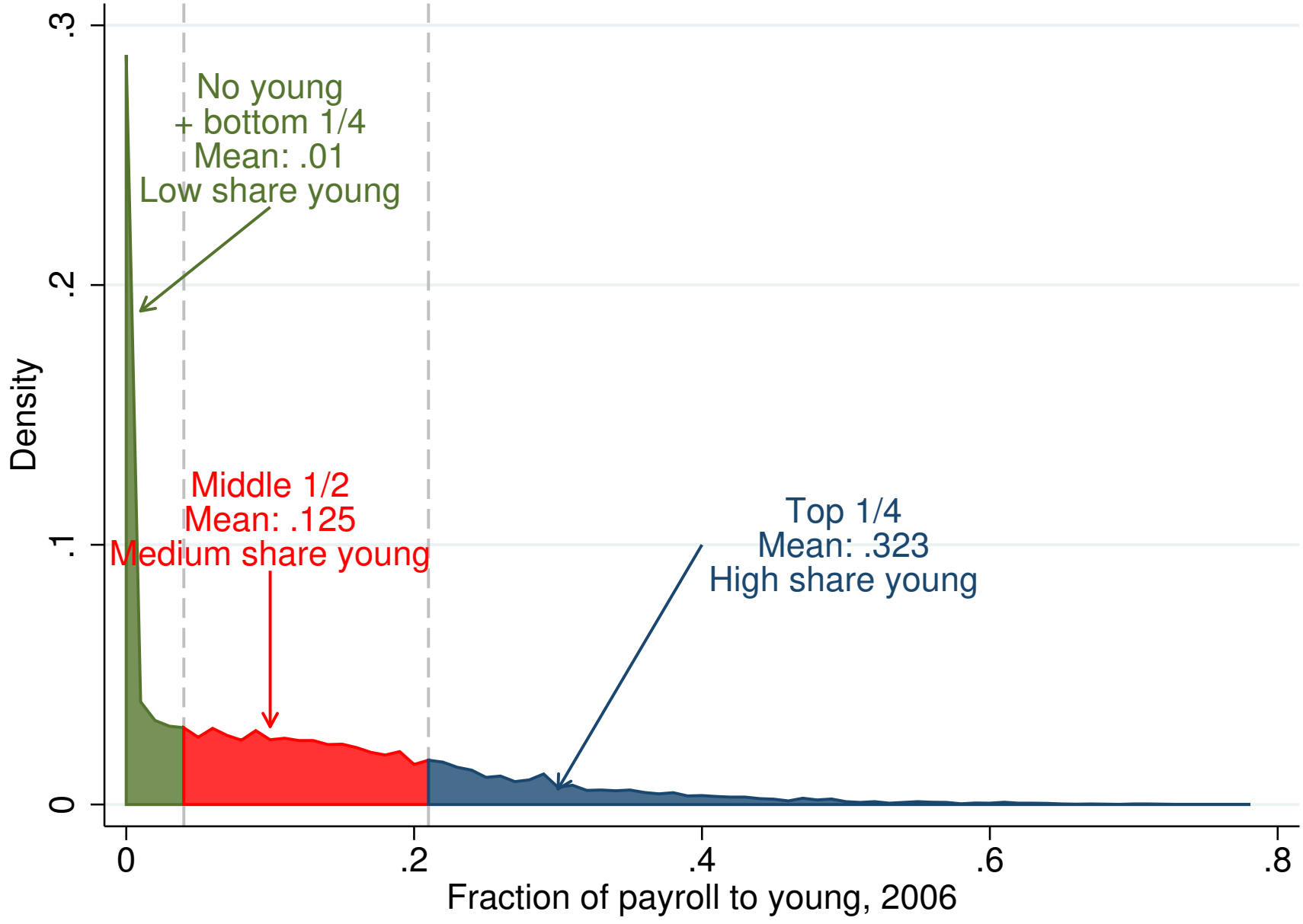

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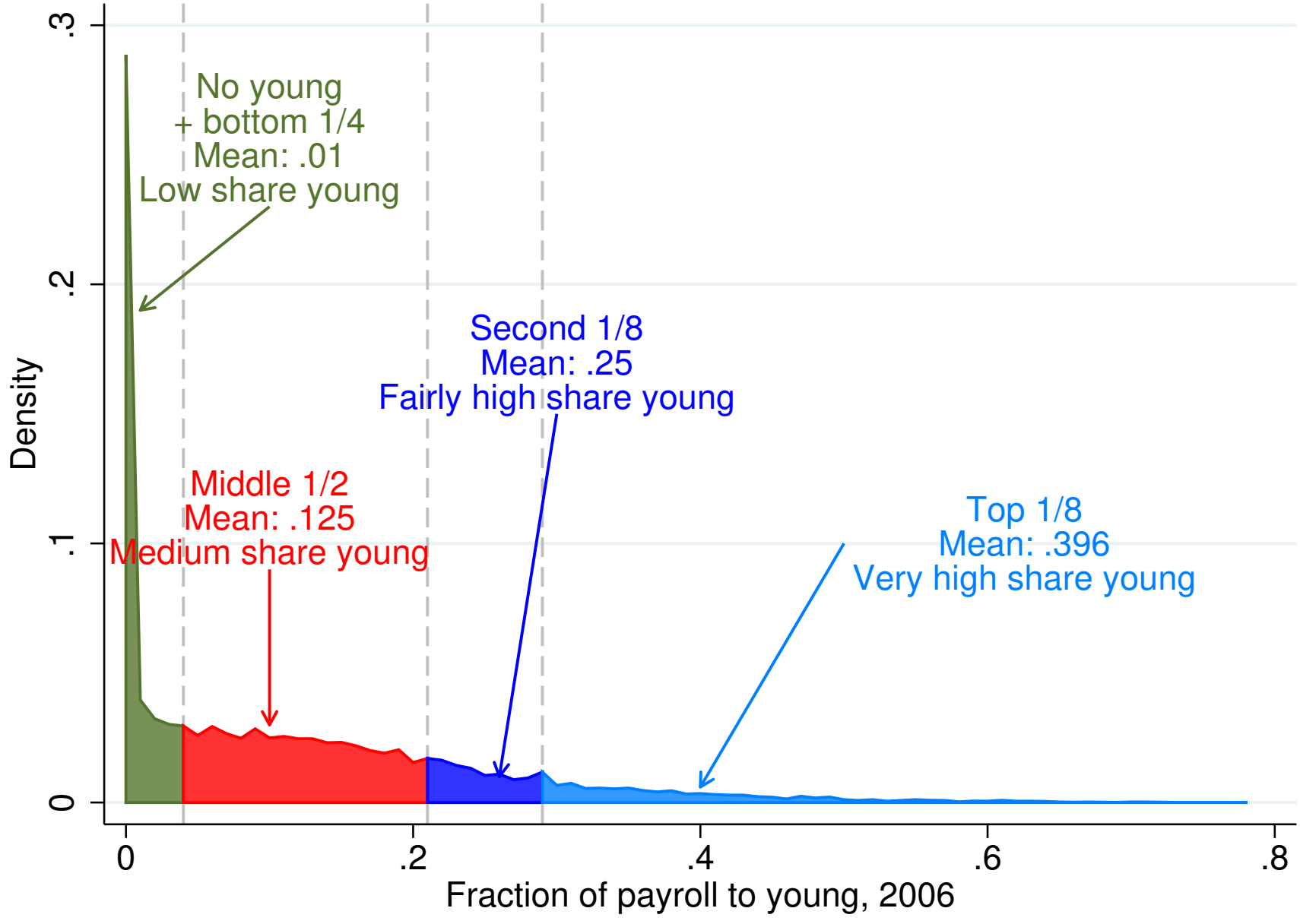
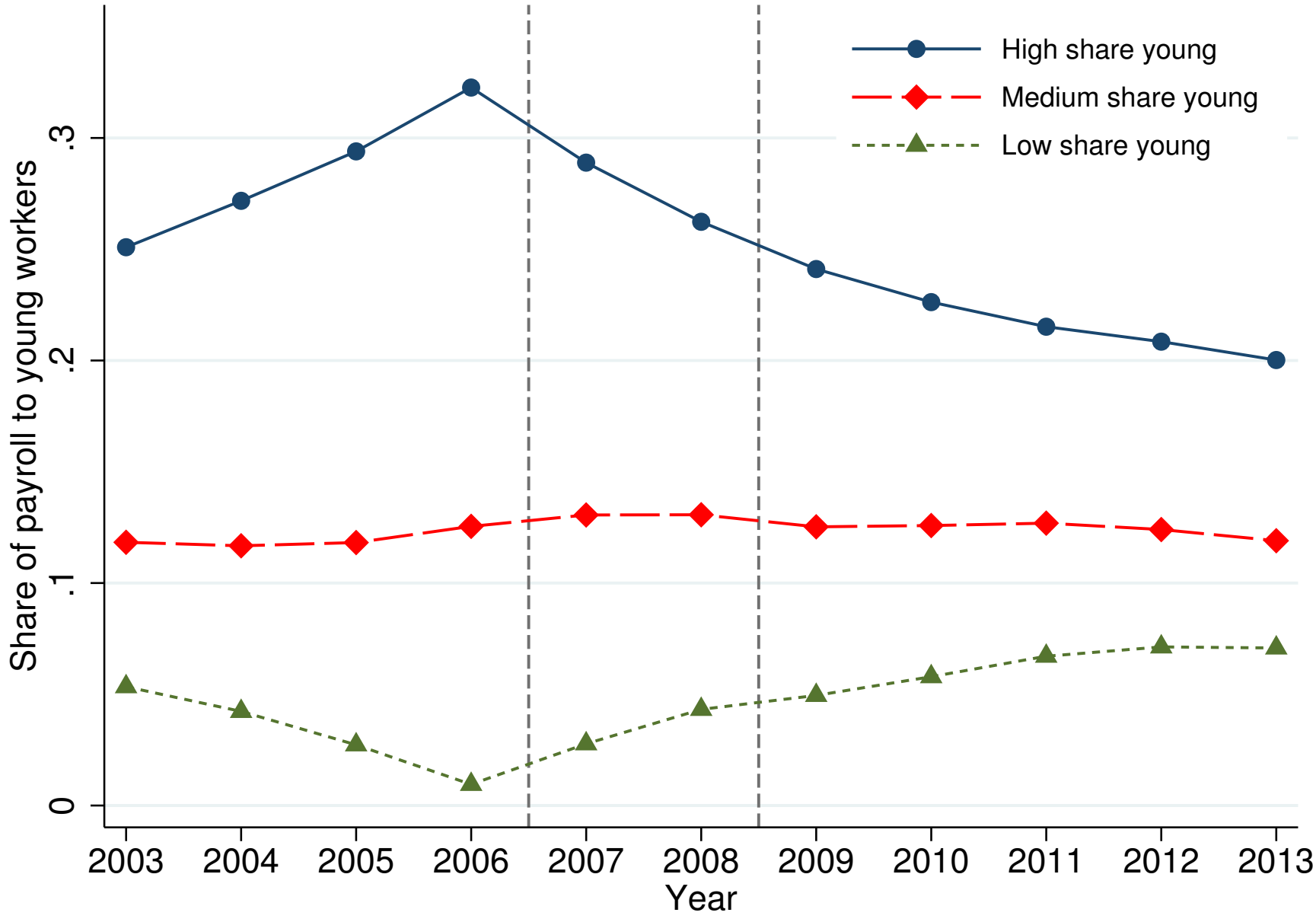


Payroll Share of Treatment-Age Workers, by 2006 Share



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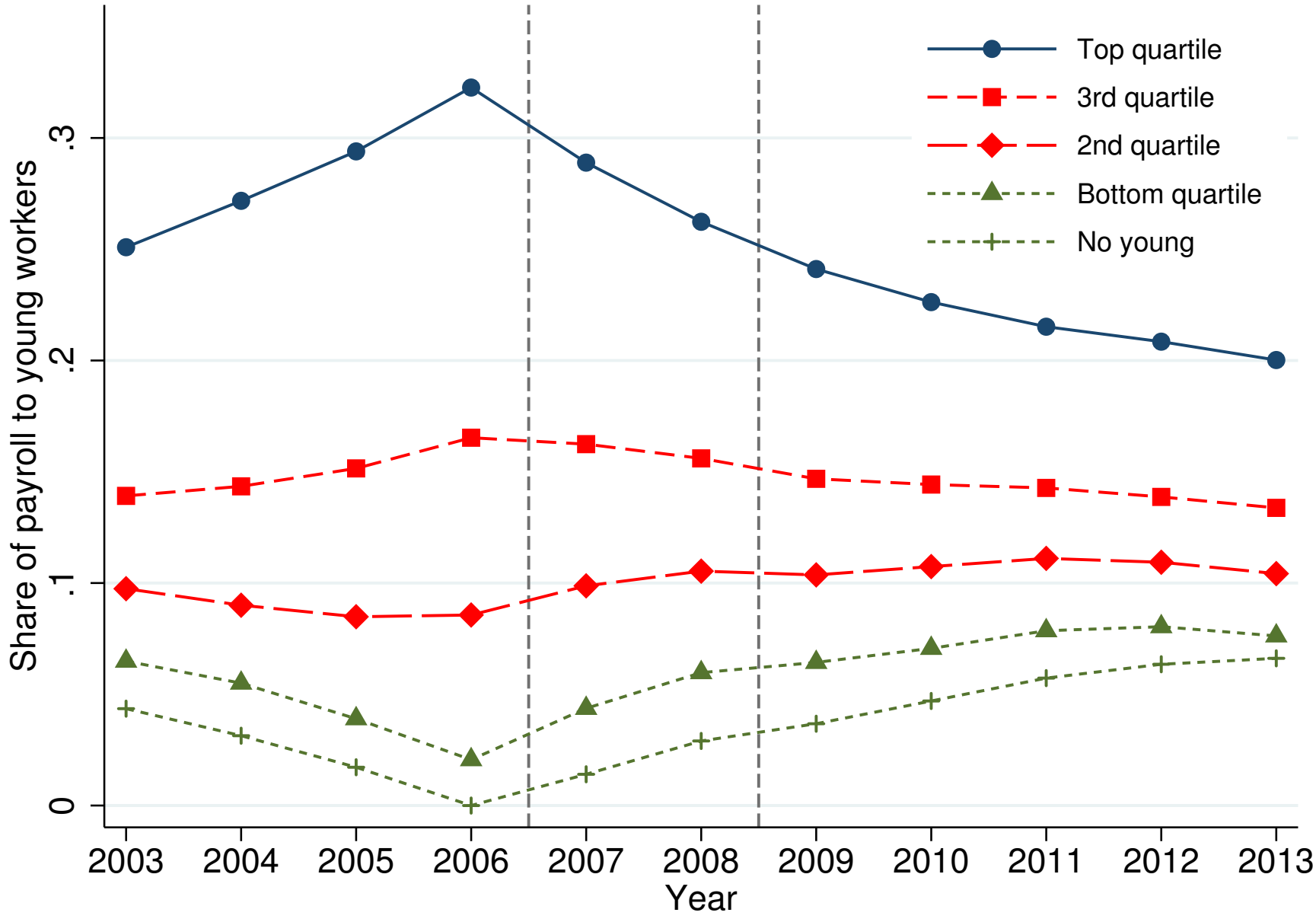


Firm Descriptives in 2006

Share young:	**Low**	**Medium**	**High**
	No young + bottom 1/4	Middle 1/2	Top 1/4
Fraction young	0.01	0.13	0.32
Full-time employees	9.46	14.06	13.46
Employee cost (incl. payroll tax)	35.23	31.46	27.99
Value added	701.27	887.57	743.94
Sales	1249.69	1827.04	1821.04
Operating profit	68.73	83.79	66.13
Financial constraints			
FC: below median liquid assets / TA	0.47	0.53	0.50
FC: below median sales	0.58	0.42	0.49
FC: below median firm age	0.45	0.46	0.55
Industries			
Agriculture and mining	0.04	0.05	0.07
Manufacturing	0.19	0.18	0.11
Construction	0.15	0.21	0.16
Wholesale and retail	0.23	0.27	0.34
Hotel and restaurants	0.02	0.05	0.13
Transport and communication	0.11	0.11	0.07
Property management, B2B	0.16	0.08	0.06
Education	0.02	0.02	0.01
Healthcare (not pharmaceutic firms)	0.05	0.02	0.00
Public services	0.02	0.03	0.05
Observations	5698	5265	2632

Firm-Level Employment

Firm-level employment: firm f, year y

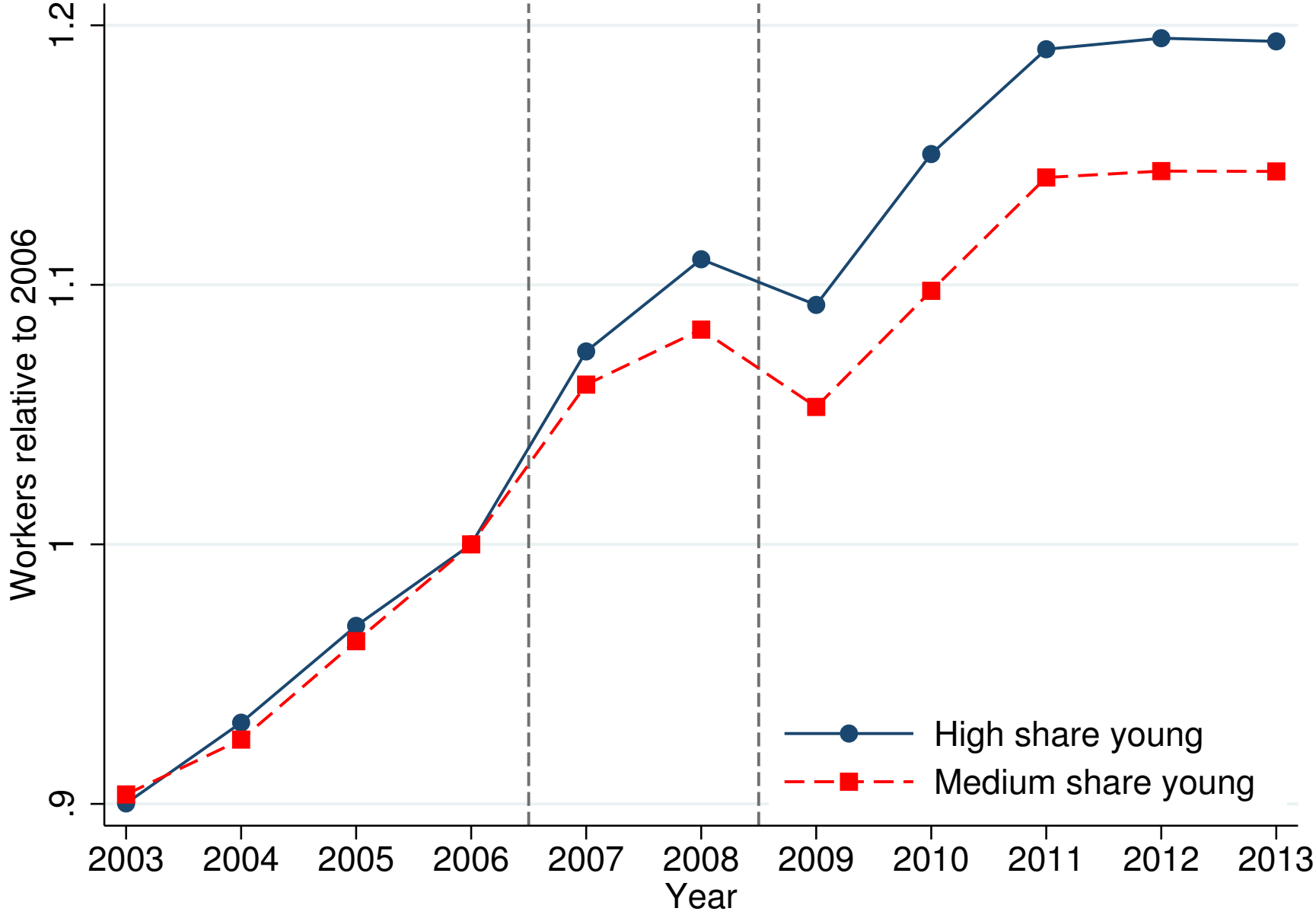
$$\frac{\text{Employees}_{f,y}}{\text{Employees}_{f,2006}}$$

Plot time series of unweighted average for each group

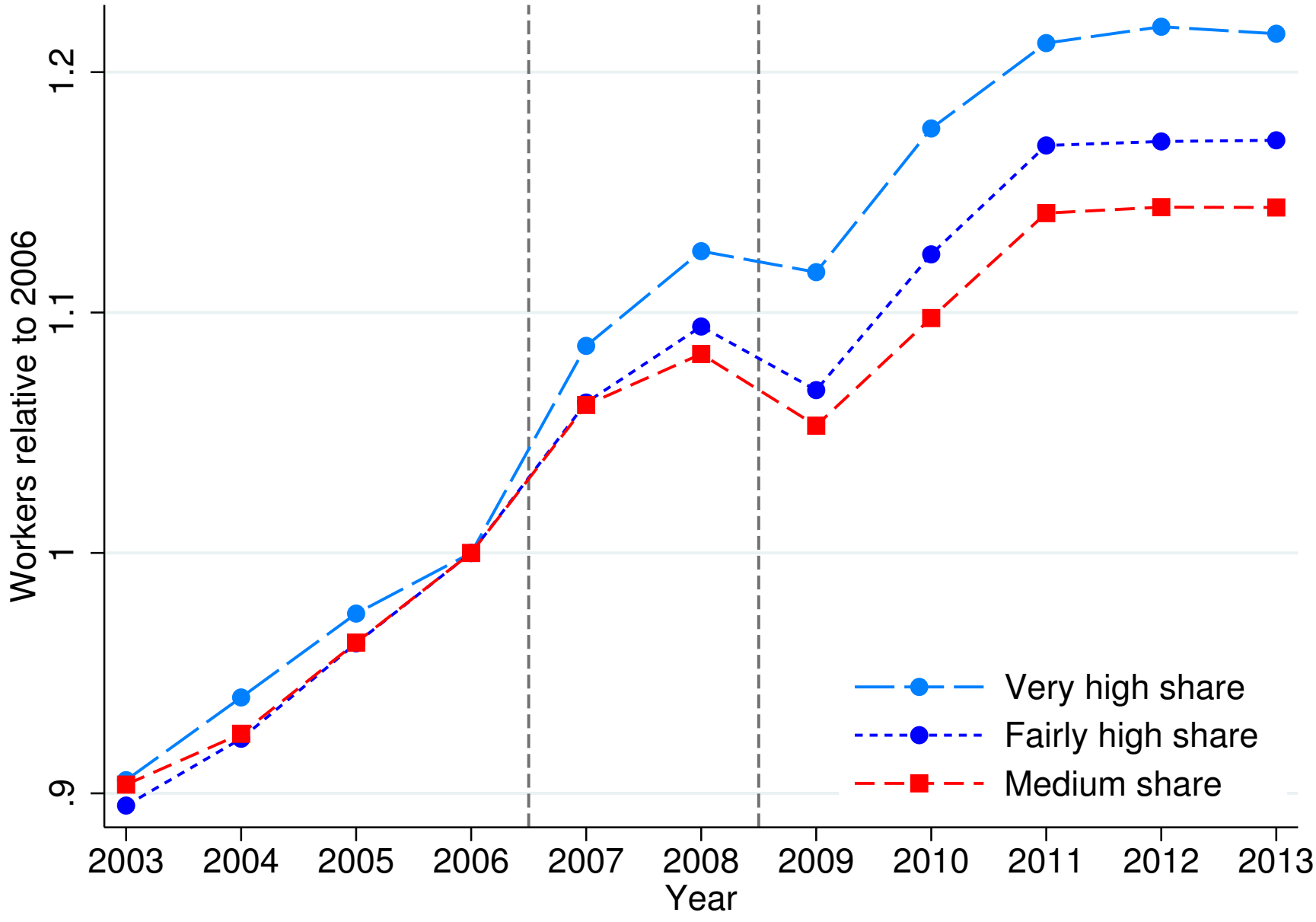
Definition: Full-time-equivalent workers, i.e. annual earnings above (small) earnings index provided by social insurance benchmark ($>$ \$4.5K in 2013)

Results are robust to changing threshold and considering cumulative wage bill instead of bodies

Firm-Level Employment: $\frac{\text{Emp}_{f,t}}{\text{Emp}_{f,2006}}$



Dose Treatment: Splitting the Top-Group in Two

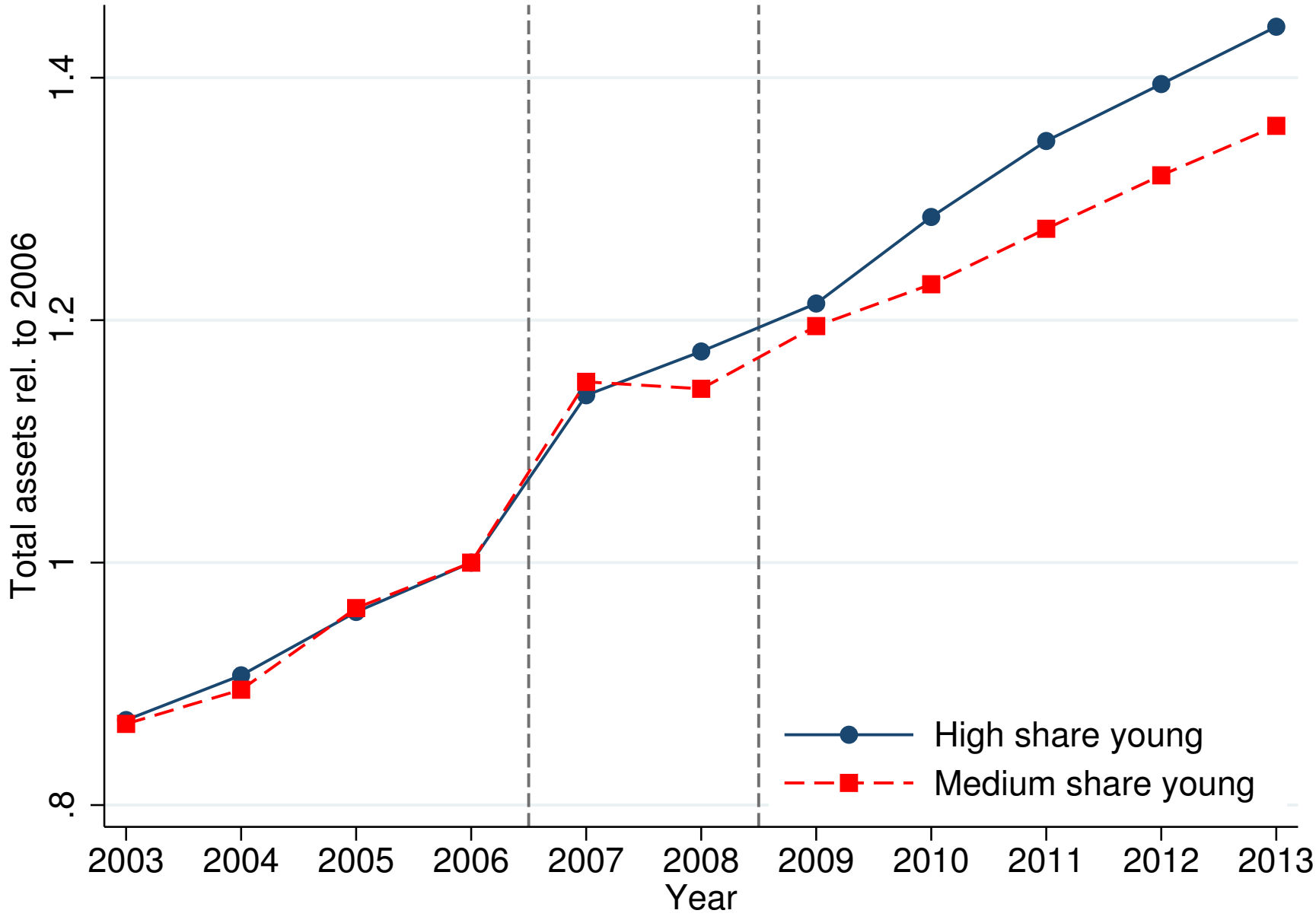


Other Firm Outcomes

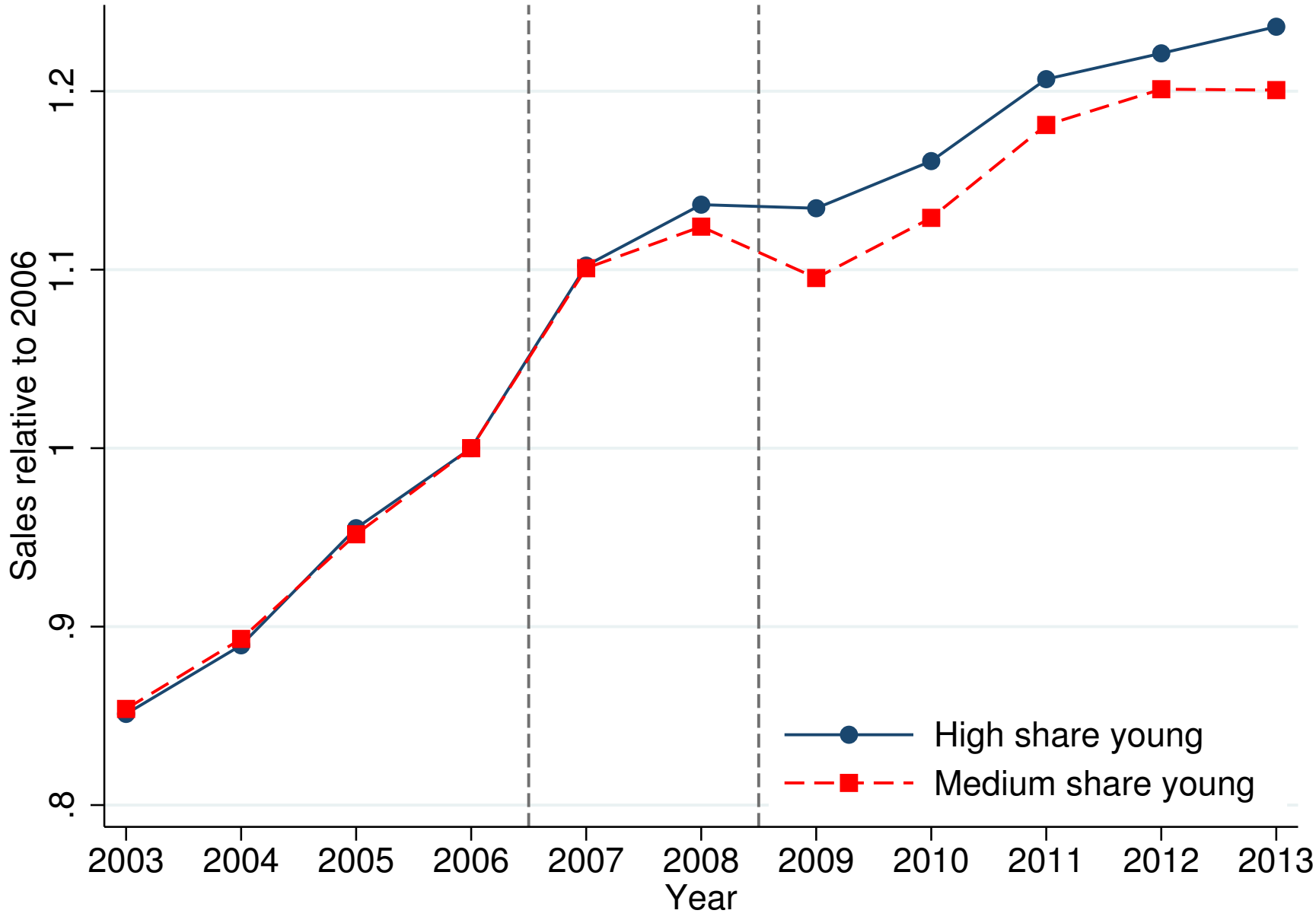
1) Employment ✓
2) Capital (assets)
3) Sales
4) Value added
5) Profits

Then: wages, rent sharing.

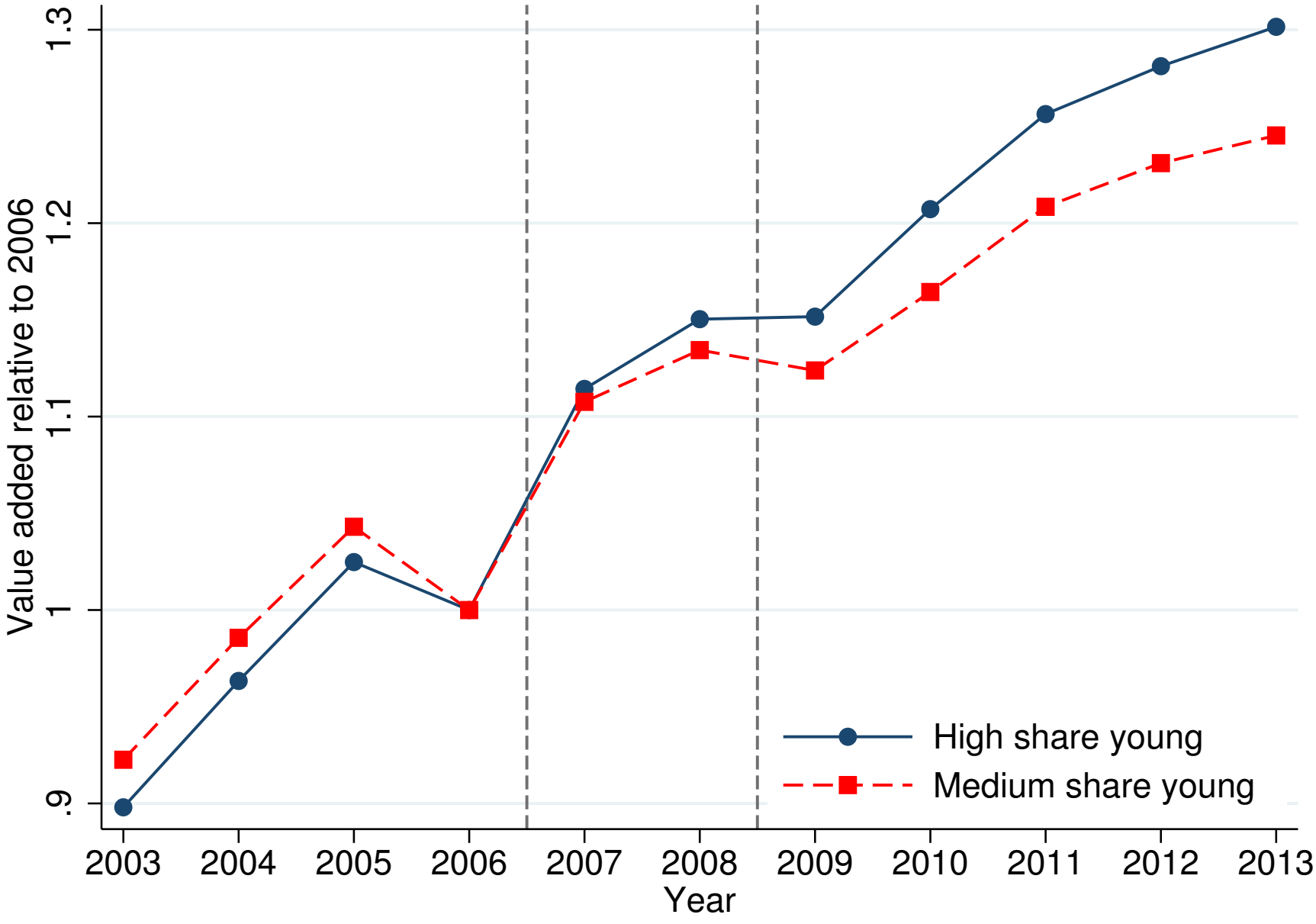
Capital: Total Assets



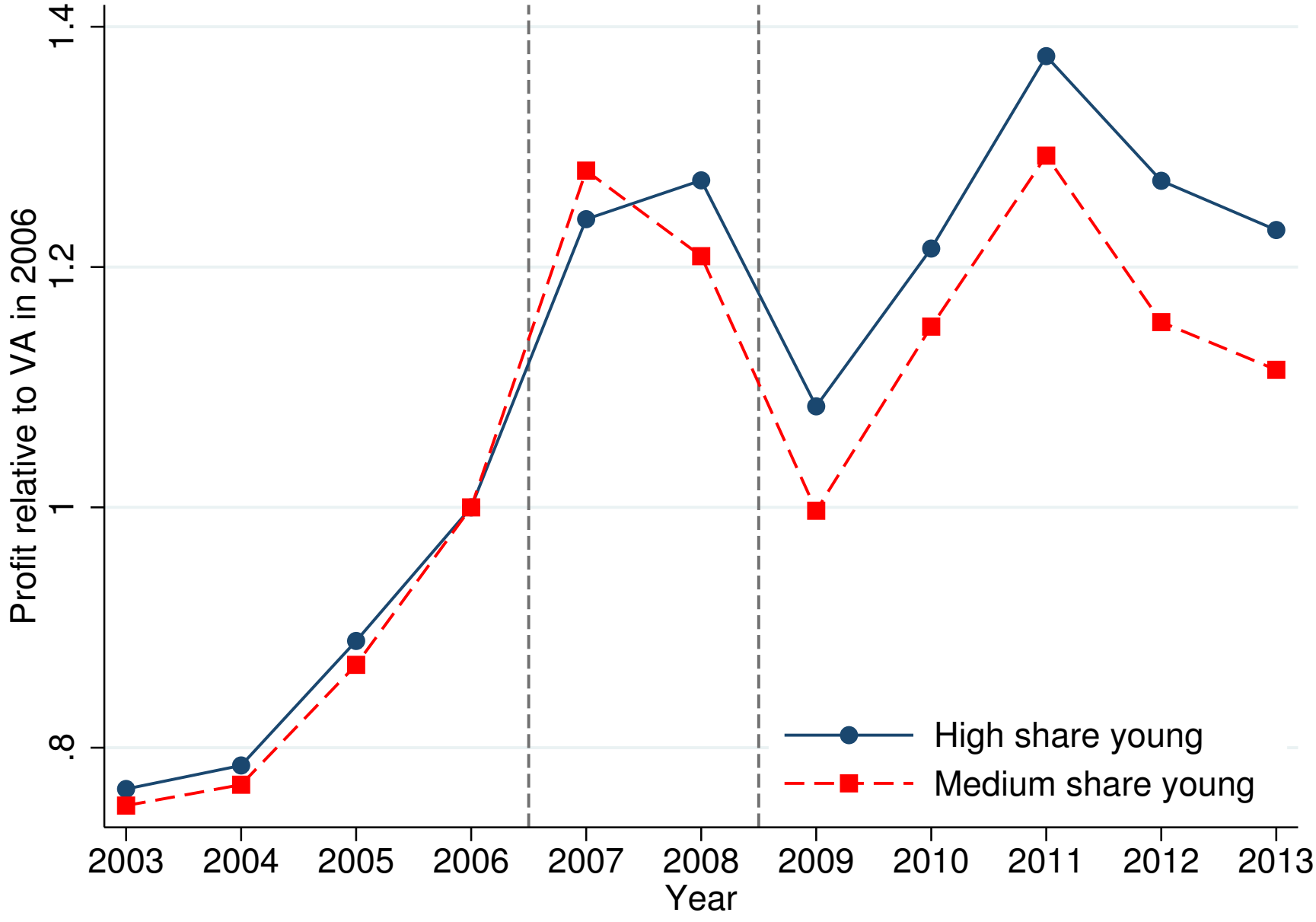
Sales


Sales relative to 2006
.8
.9
1
1.1
1.2
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
High share young
Medium share young

Value Added


Value added relative to 2006
.9
1
1.1
1.2
1.3
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
High share young
Medium share young

Profits

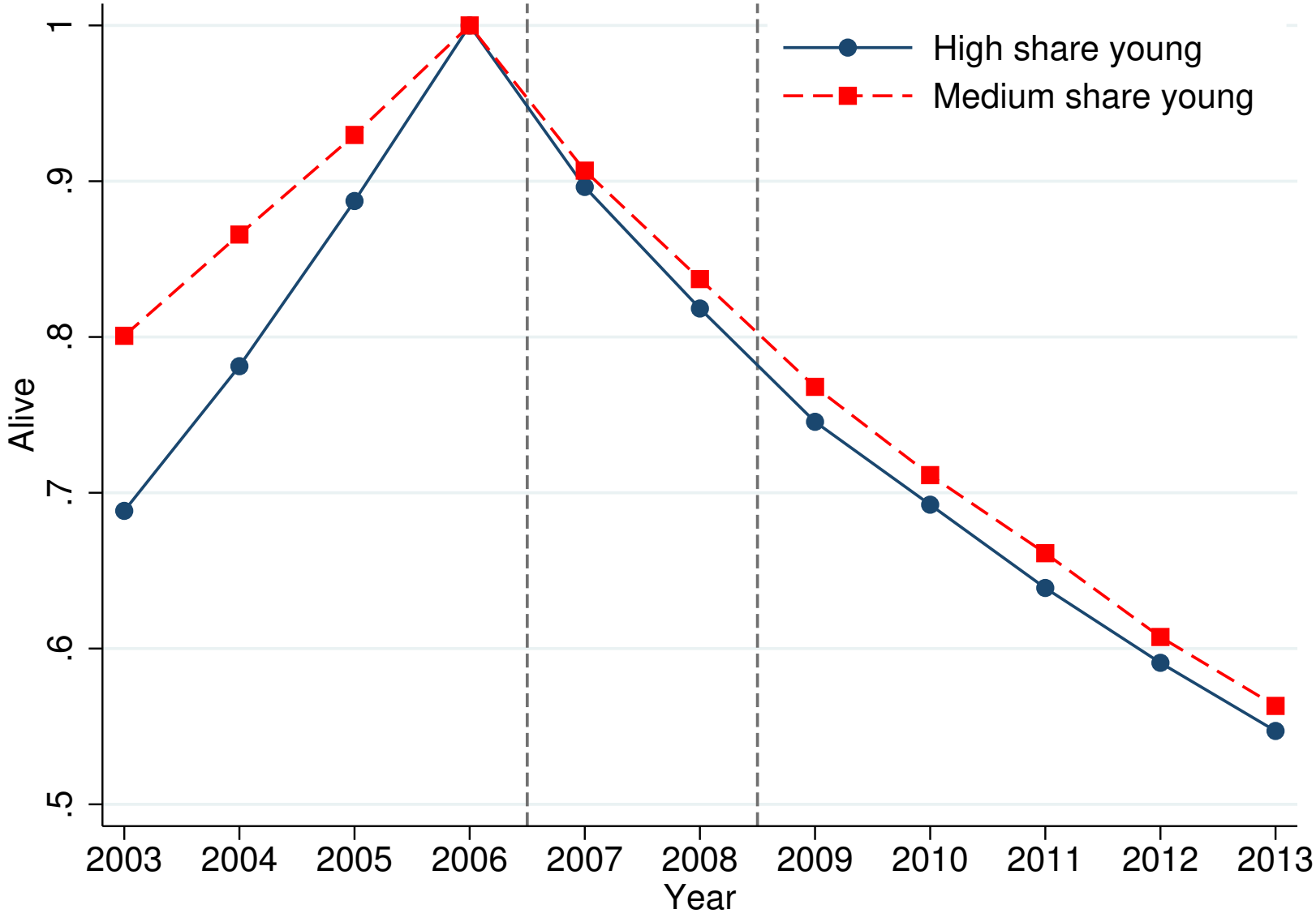

Profit relative to VA in 2006
.8
1
1.2
1.4
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
High share young
Medium share young

Effect of Payroll Tax Cut on Firm Outcomes

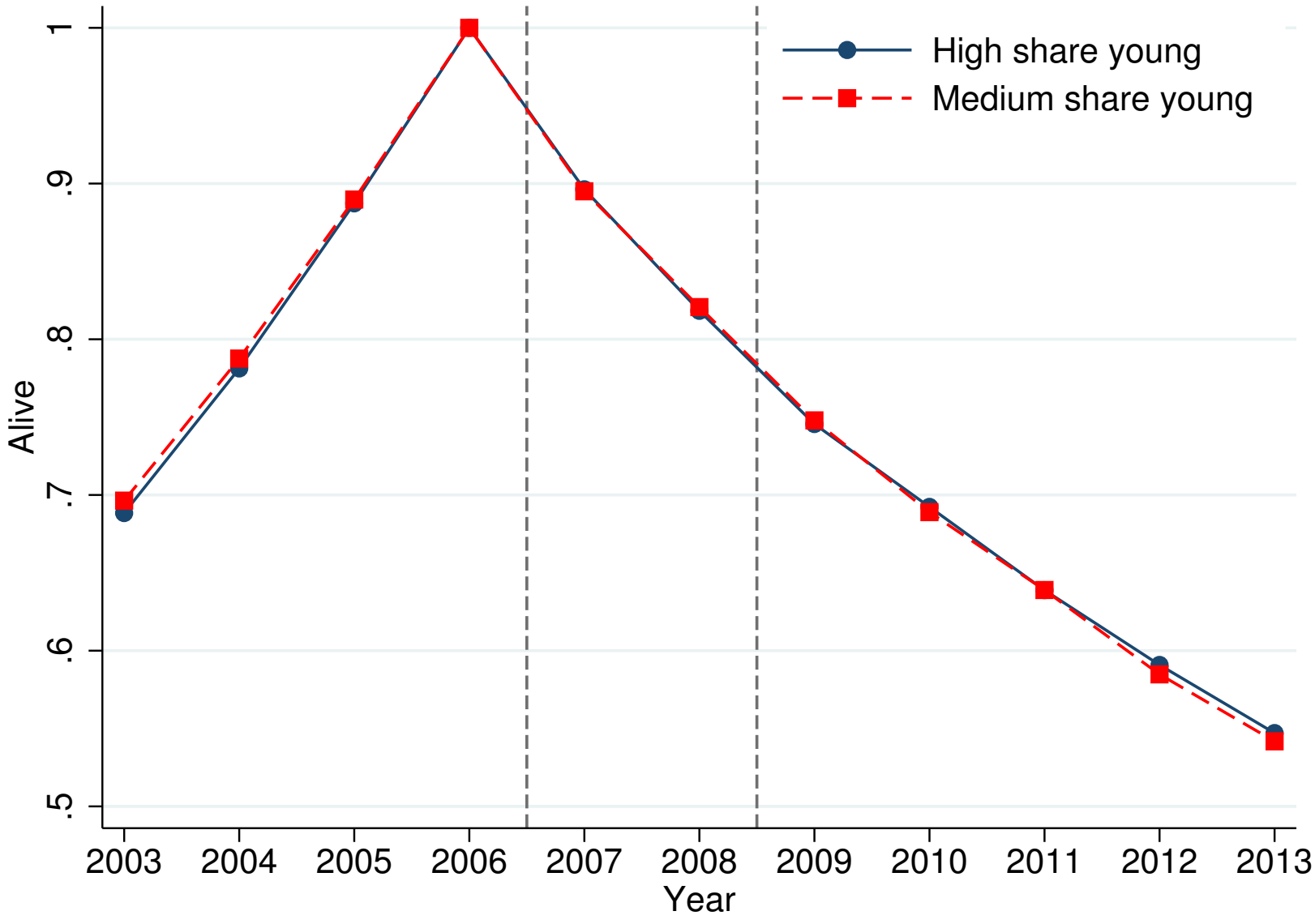
	(1) Benchmark: high vs. medium share young	(2) Fairly high vs. medium share young	(3) Very high vs. medium share young
Number of Workers	0.046	0.028	0.065
	(0.0034)	(0.0034)	(0.0043)
Total assets	0.058	0.039	0.077
	(0.013)	(0.015)	(0.012)
Sales	0.031	0.021	0.041
	(0.0041)	(0.0029)	(0.0064)
Value Added	0.061	0.040	0.082
	(0.0073)	(0.0072)	(0.0081)
Profits (EBIT)	0.081	0.046	0.12
	(0.012)	(0.019)	(0.019)

Notes: DD estimates based on OLS regression using the aggregated times series by year and groups displayed in the figures.

Robustness: Fraction of firms operating (unweighted)



Fraction operating after DFL reweighting by age in 2006



Why Do Businesses Expand?

1) Cash windfall might alleviate credit constraints.

   $\Rightarrow$ We split firms by proxies for financial constraints (in 2006)

   (a) age (young firms: more likely constrained)

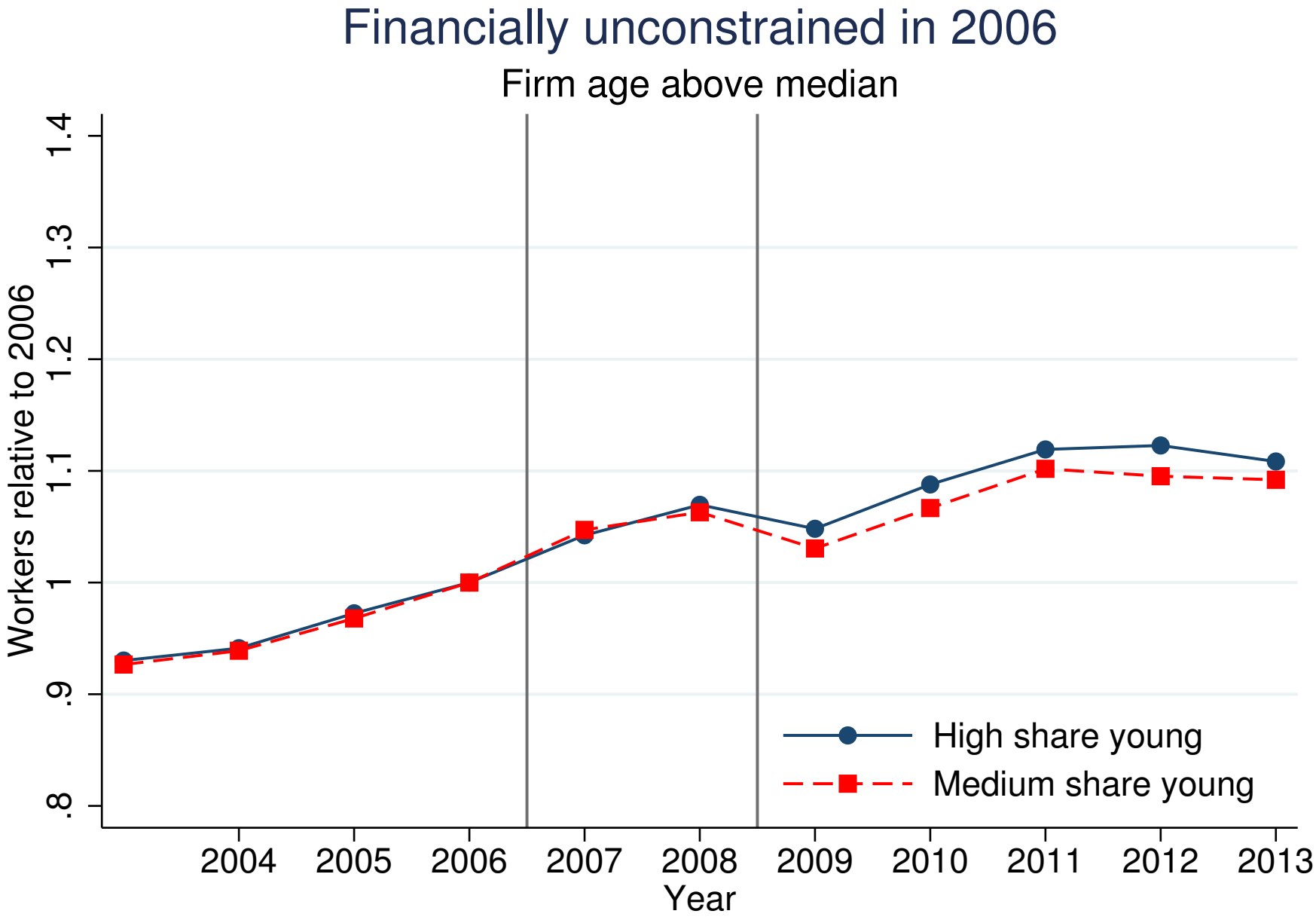
   (b) liquid assets / total assets (low: more likely constrained)

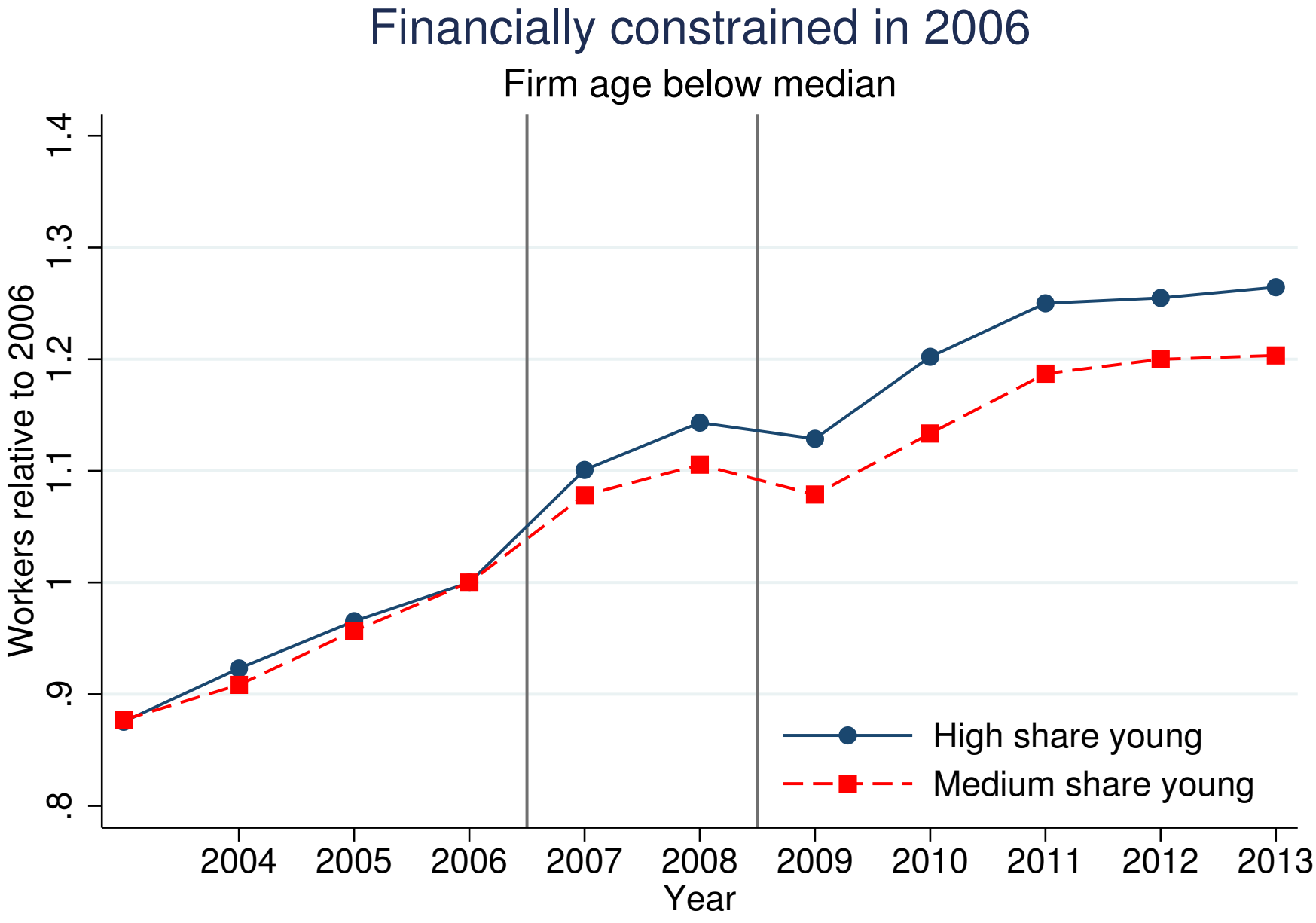
   (c) sales (size) (low: more likely constrained)

2) Standard scale effect:

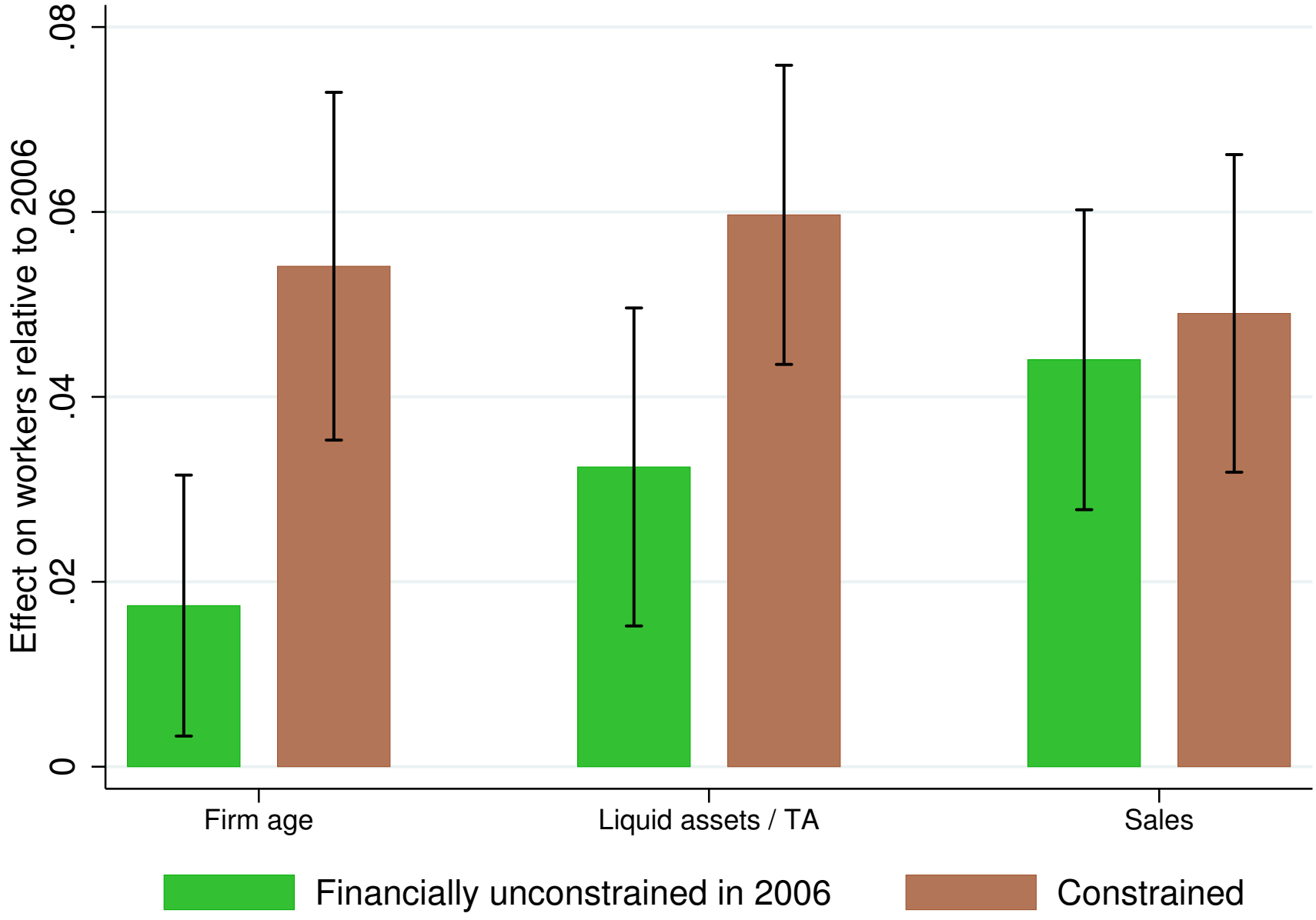
   marginal cost of production reduced for firms which can use lots of young workers

Our empirical analysis captures the sum of these two effects

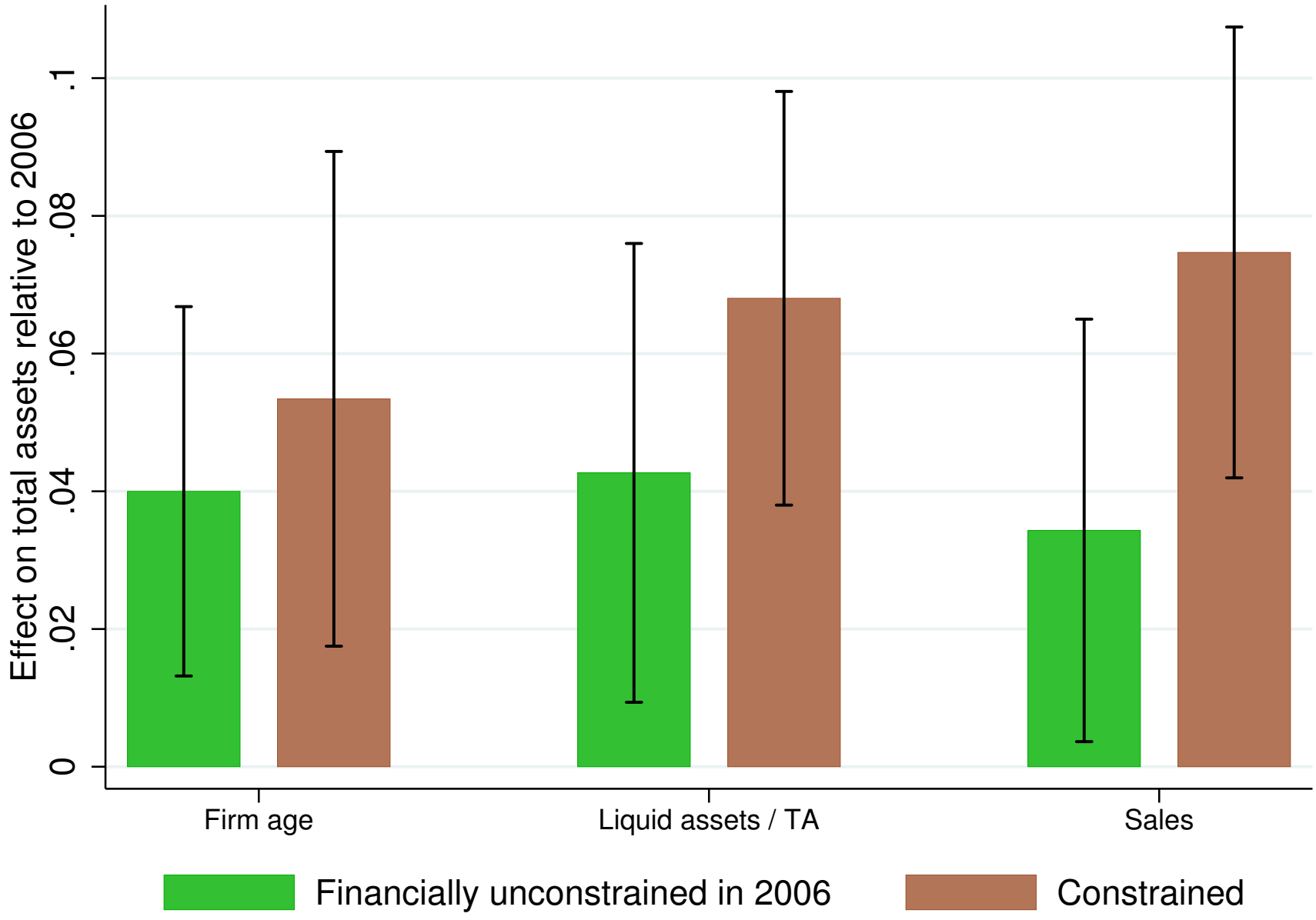

Financially unconstrained in 2006
Firm age above median
Workers relative to 2006
.8
.9
1
1.1
1.2
1.3
1.4
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
High share young
Medium share young


Financially constrained in 2006
Firm age below median
Workers relative to 2006
.8
.9
1
1.1
1.2
1.3
1.4
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
High share young
Medium share young

Effects on Employment by Financial Constraints



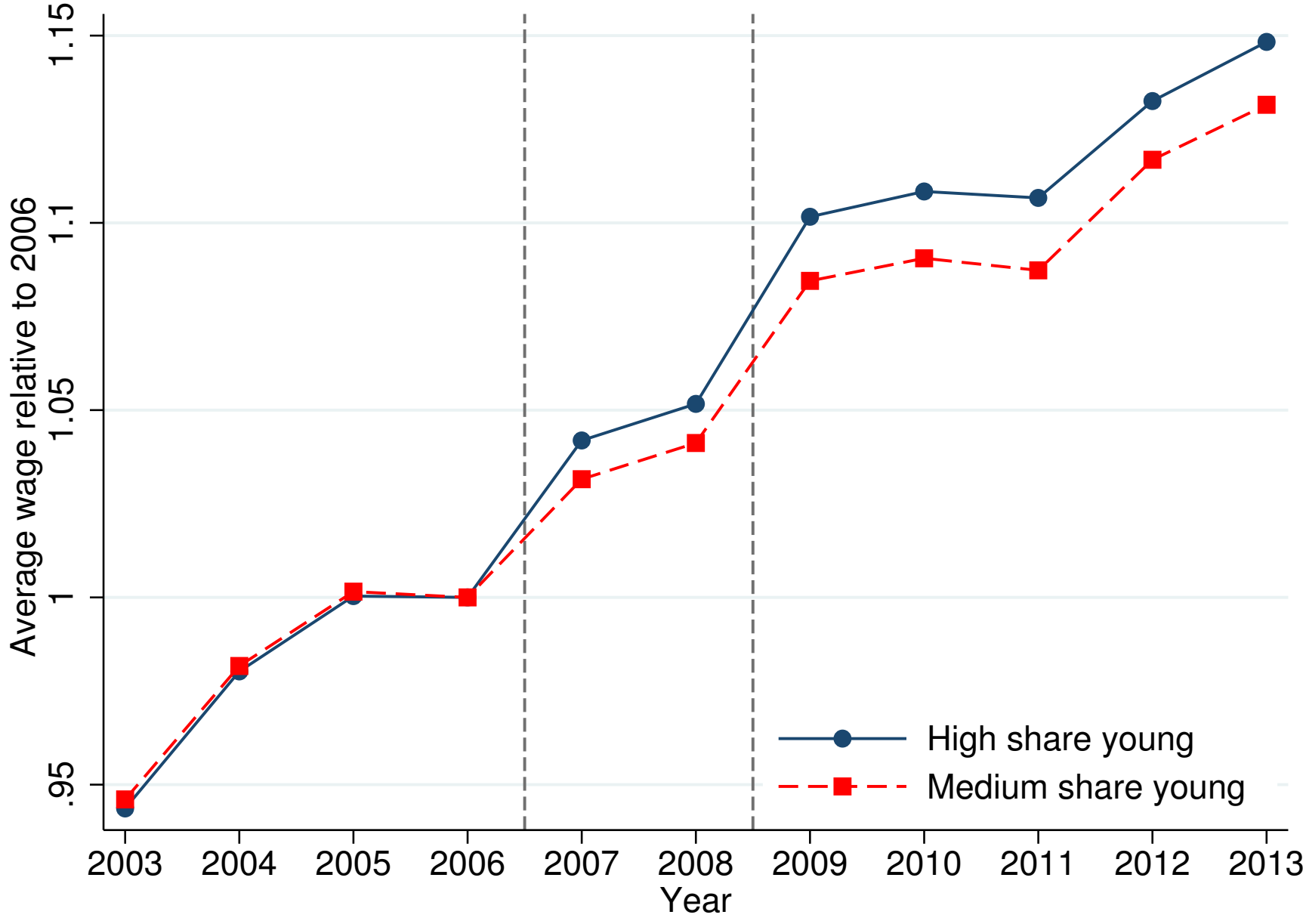
Effects on Total Assets by Financial Constraints



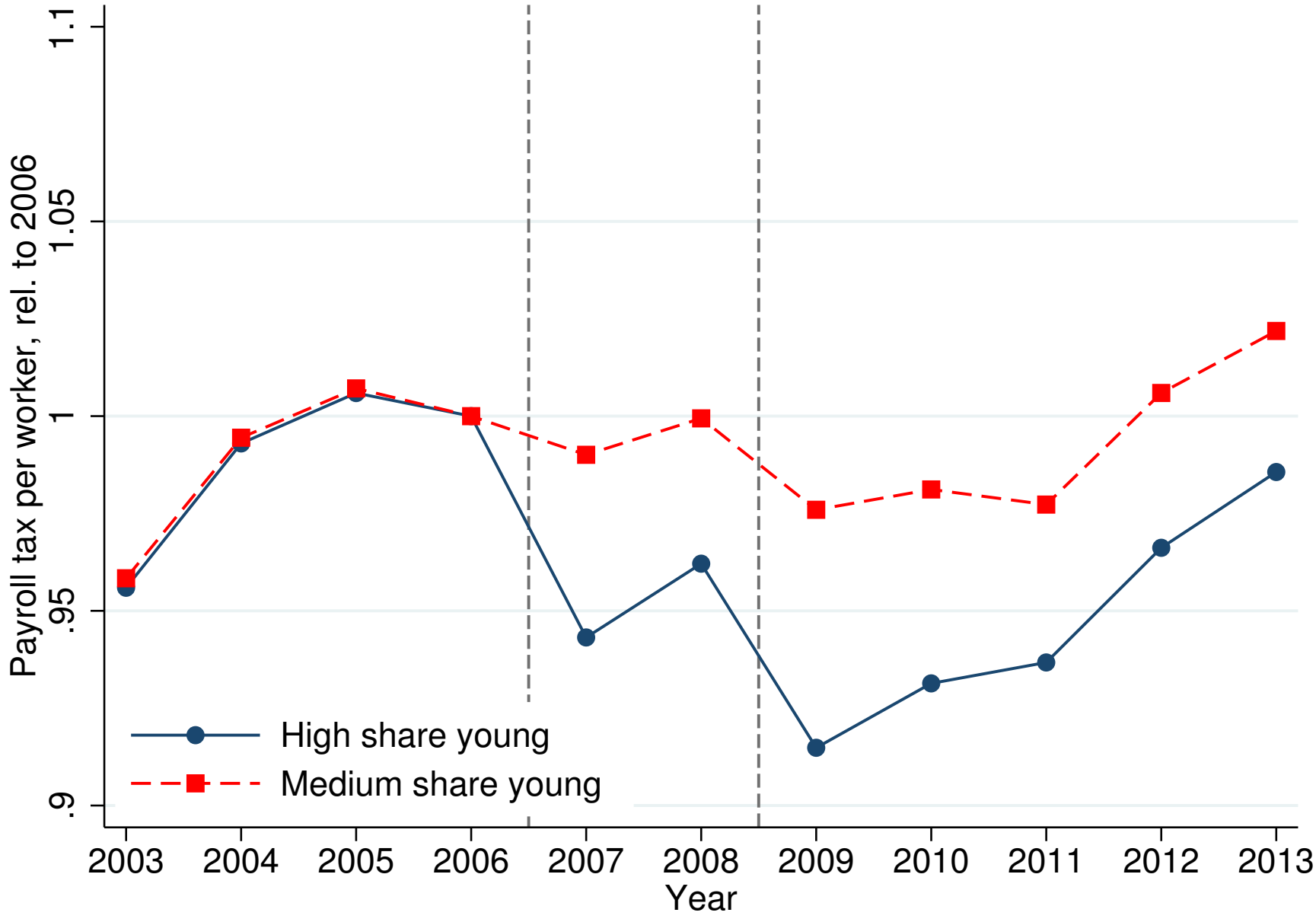
2 - **Firm-Level Results**

Wages & Rent Sharing

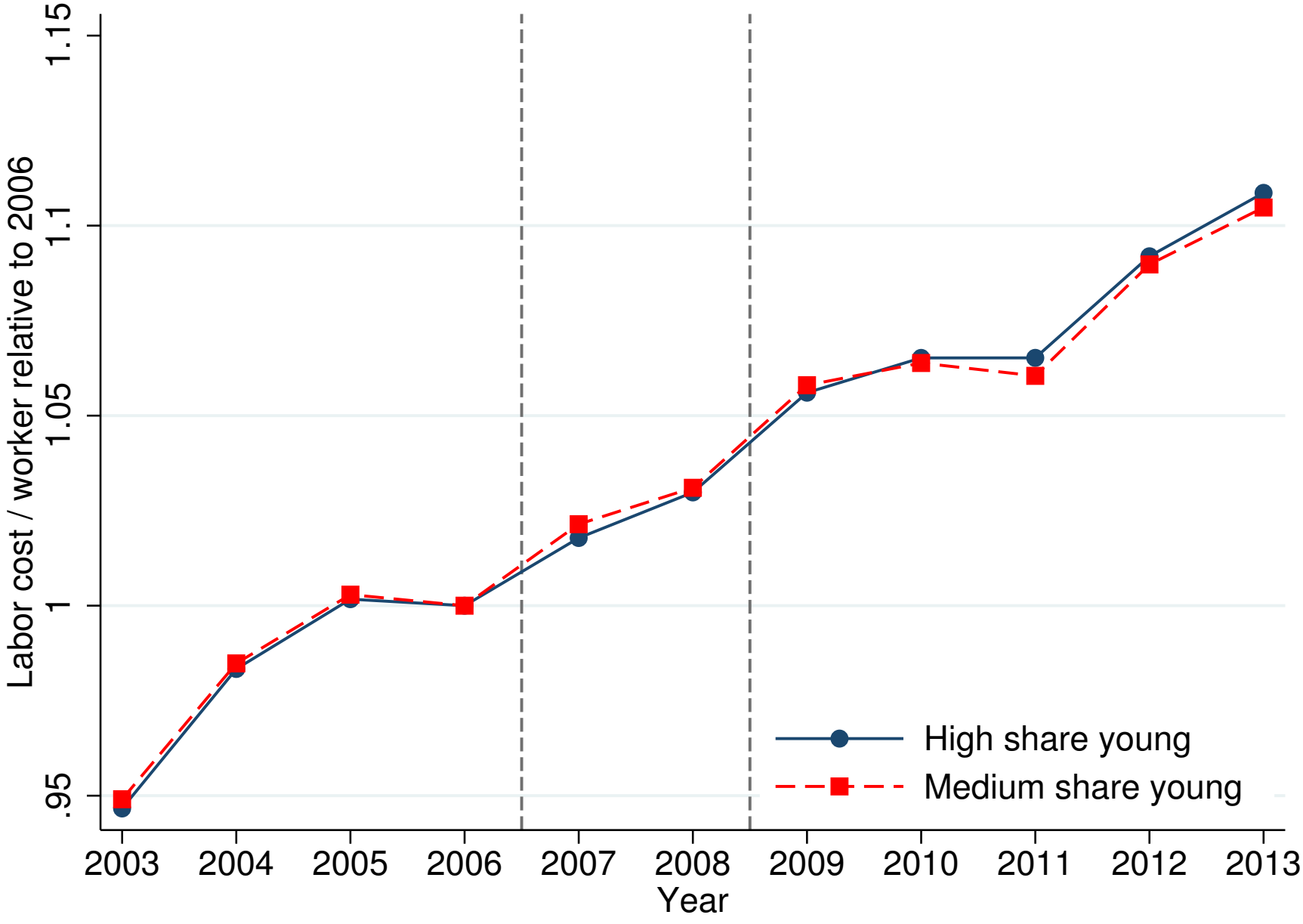
Average Wage per Worker: w



Average Payroll Tax per Worker $w \cdot \tau$



Average Labor Cost per Worker: $w \cdot (1 + \tau)$



Effect of Payroll Tax Cut on Wages per Worker

	(1) Benchmark: high vs. medium share young	(2) Fairly high vs. medium share young	(3) Very high vs. medium share young
Payroll tax per worker	-0.044	-0.025	-0.063
	(0.0051)	(0.0036)	(0.0068)
Labor cost per worker	0.0033	0.0035	0.0031
	(0.0014)	(0.0013)	(0.0019)
Average wage per worker	0.019	0.013	0.024
	(0.00082)	(0.0013)	(0.00077)

Notes: DD estimates based on OLS regression using the aggregated times series by year and groups displayed in the figures.

Individual-Level Wages

Average wage dynamics may be confounded by composition shifts.

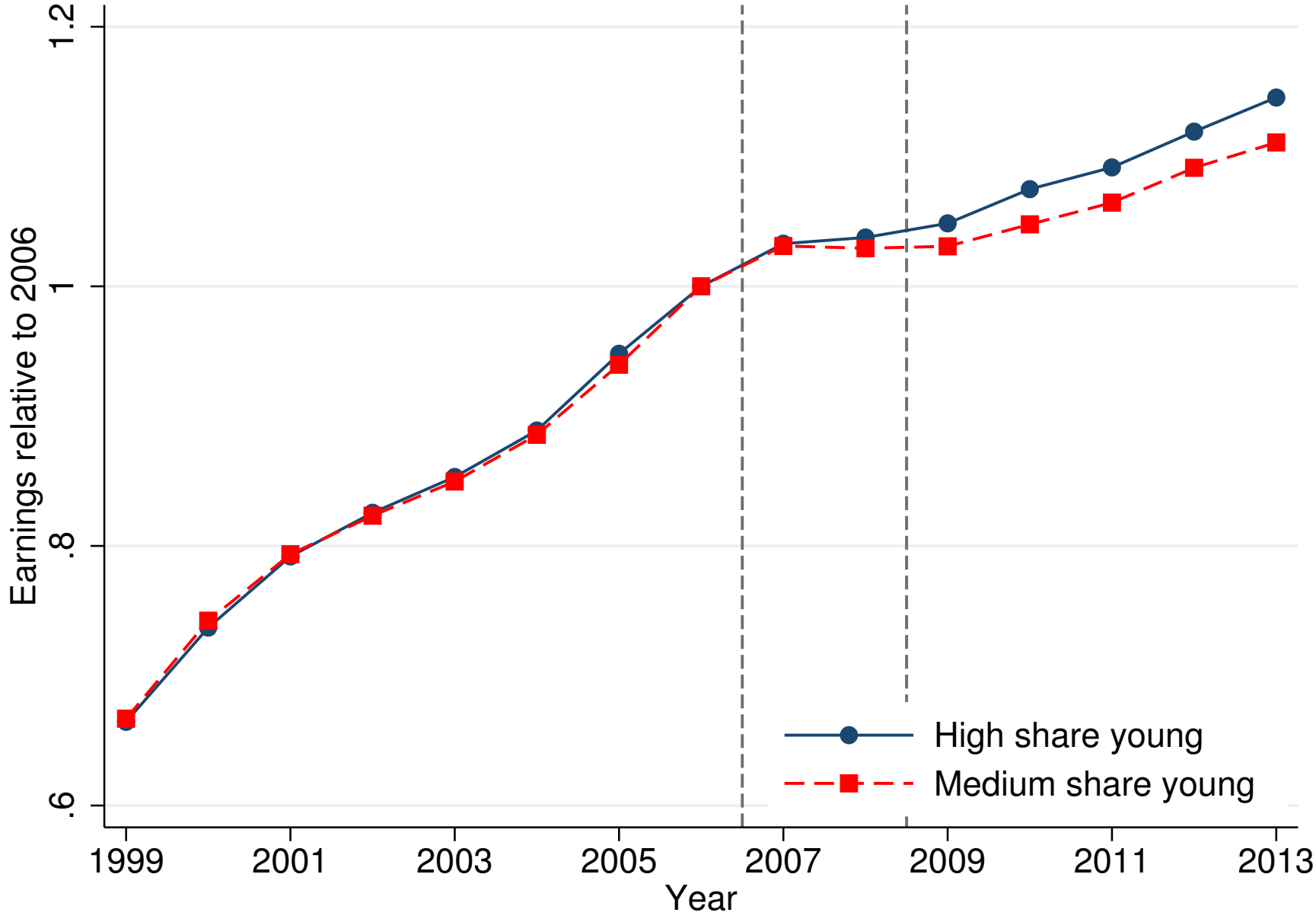
$\Rightarrow$ Follow cohort of **individuals** based on their 2006 firm.

Sample: **untreated** workers aged 25-60 in 2006 (to have pre-trends and uncover spillovers)

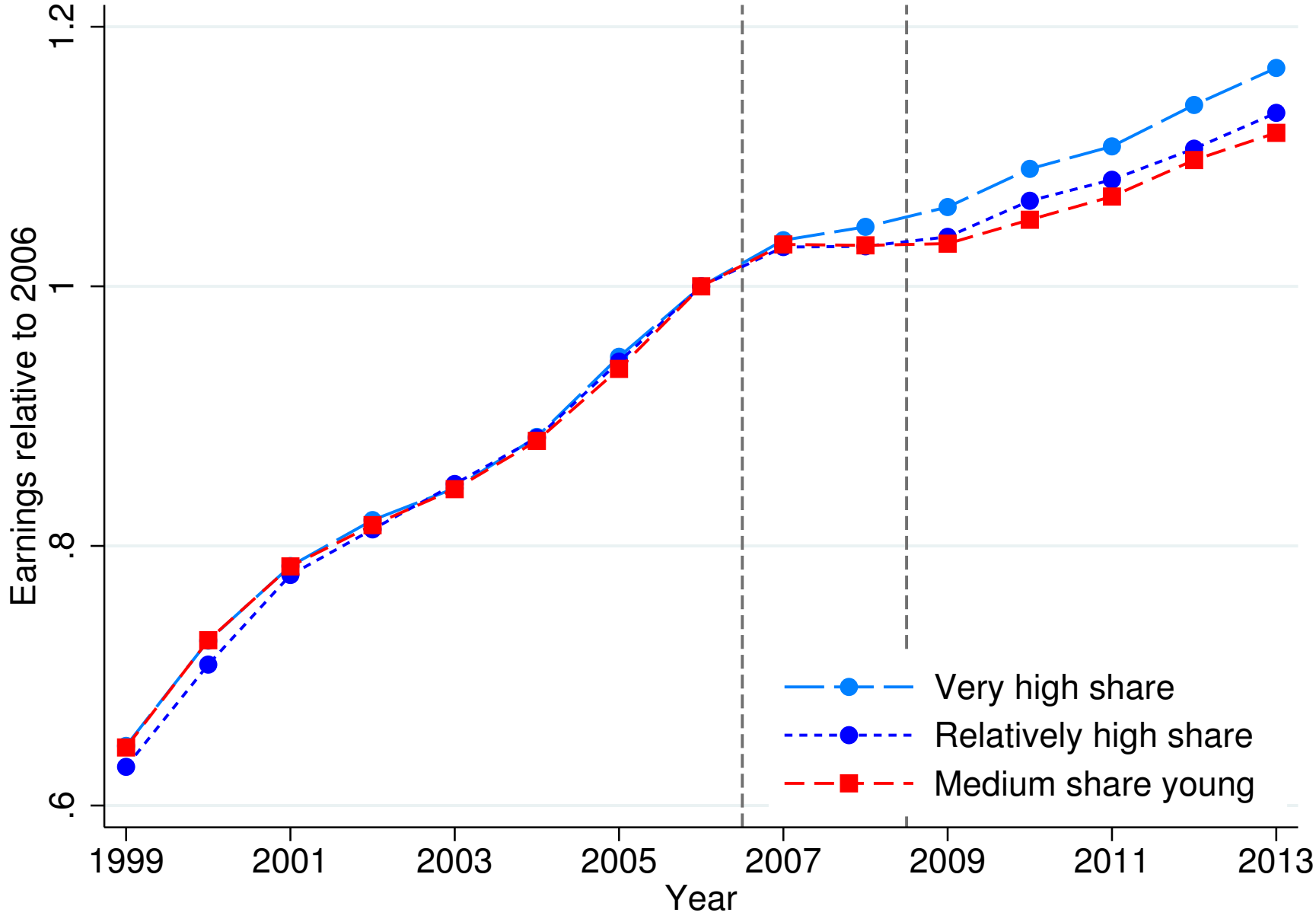
Details:

- DFL-reweight wage series to keep 2006 cohort's age composition constant within firm groups (5-year age groups 25-29,30-35,...).
- Allow for firm mobility.

Worker Earnings: Aged 25-60 in 2006



Dose Treatment: Splitting the Top Group in Two



Individual vs. Collective Tax Incidence on Labor

Standard frictionless benchmark predicts 100% incidence on directly affected worker beneficiary group.

Our evidence shows that workers benefit from the payroll tax cut – but collectively in specific firms, not only the treated workers.

Hence, at the macro level, our evidence is consistent with part of the incidence falling on workers – young and old workers in the "treated firms".

$\Rightarrow$ Possible that insensitivity of labor income share to payroll taxation is due more to rent sharing than Cobb-Douglas production function.

Who Benefits from Collective Tax Incidence?

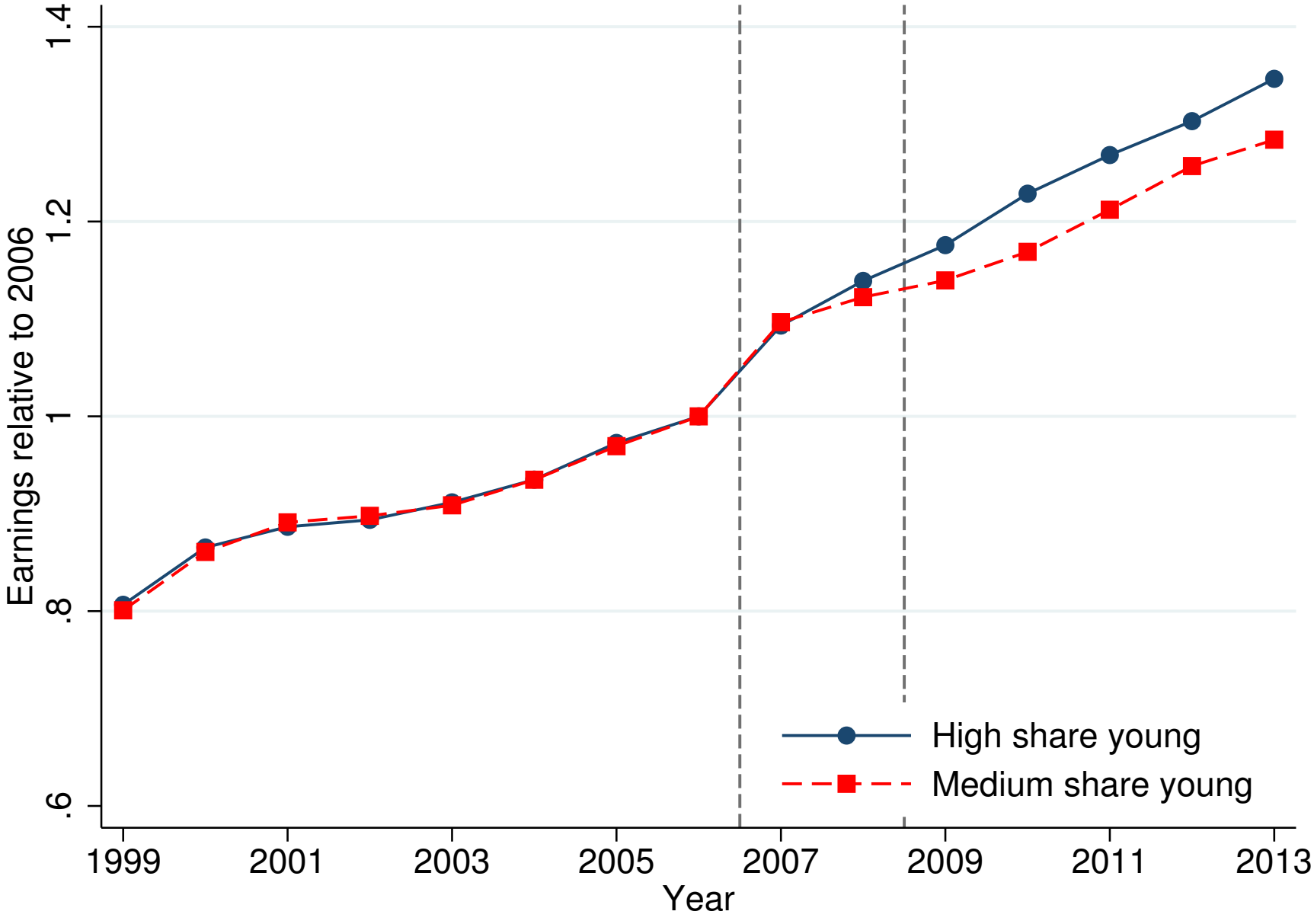
Rent sharing / bargaining?

$\Rightarrow$ We split workers by earnings level:

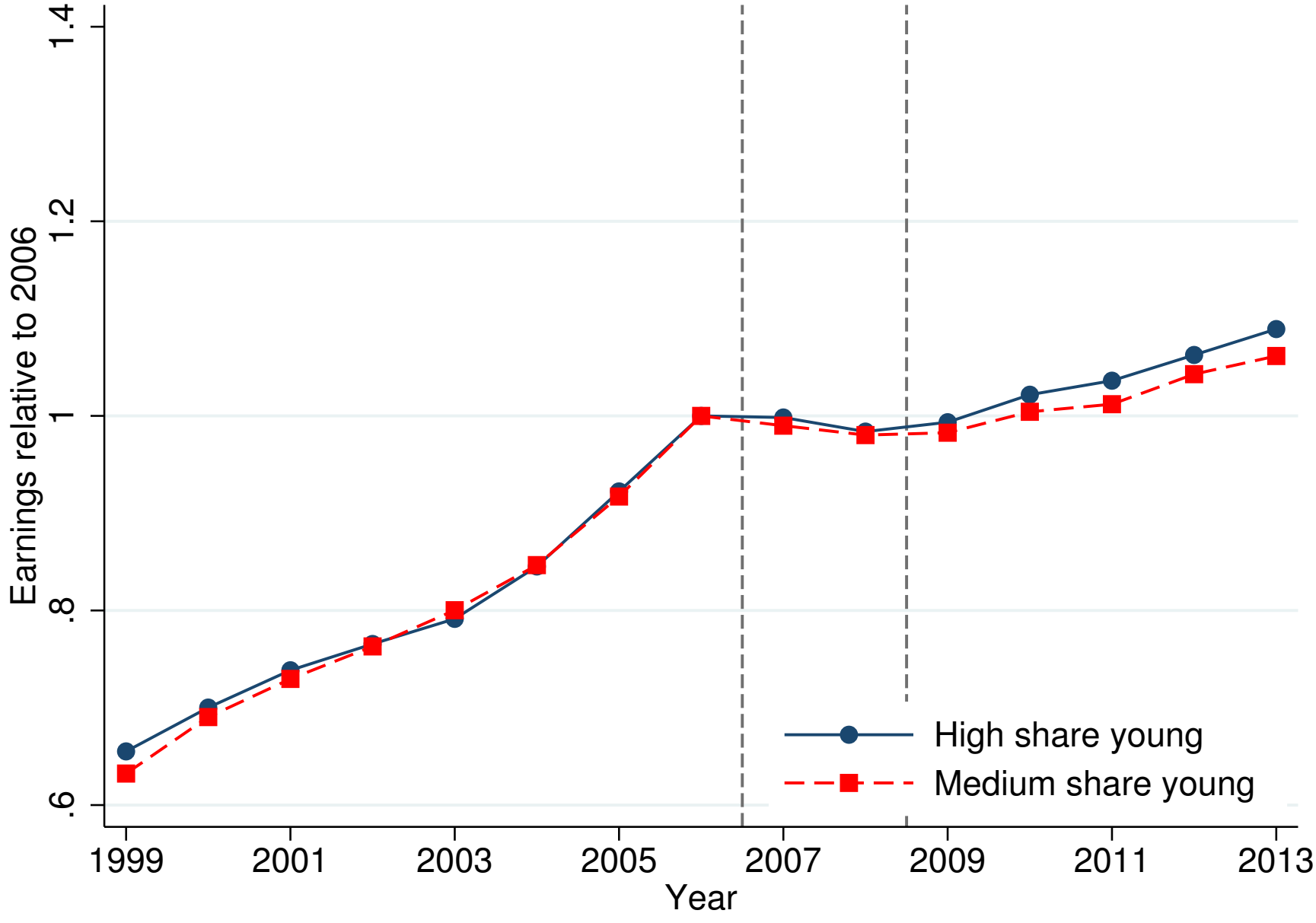
- **Within firms:** Workers below vs. above median
- **By percentiles:** We look at effects on wage earnings percentiles (instead of firms)

Alternative mechanism: production complementarities

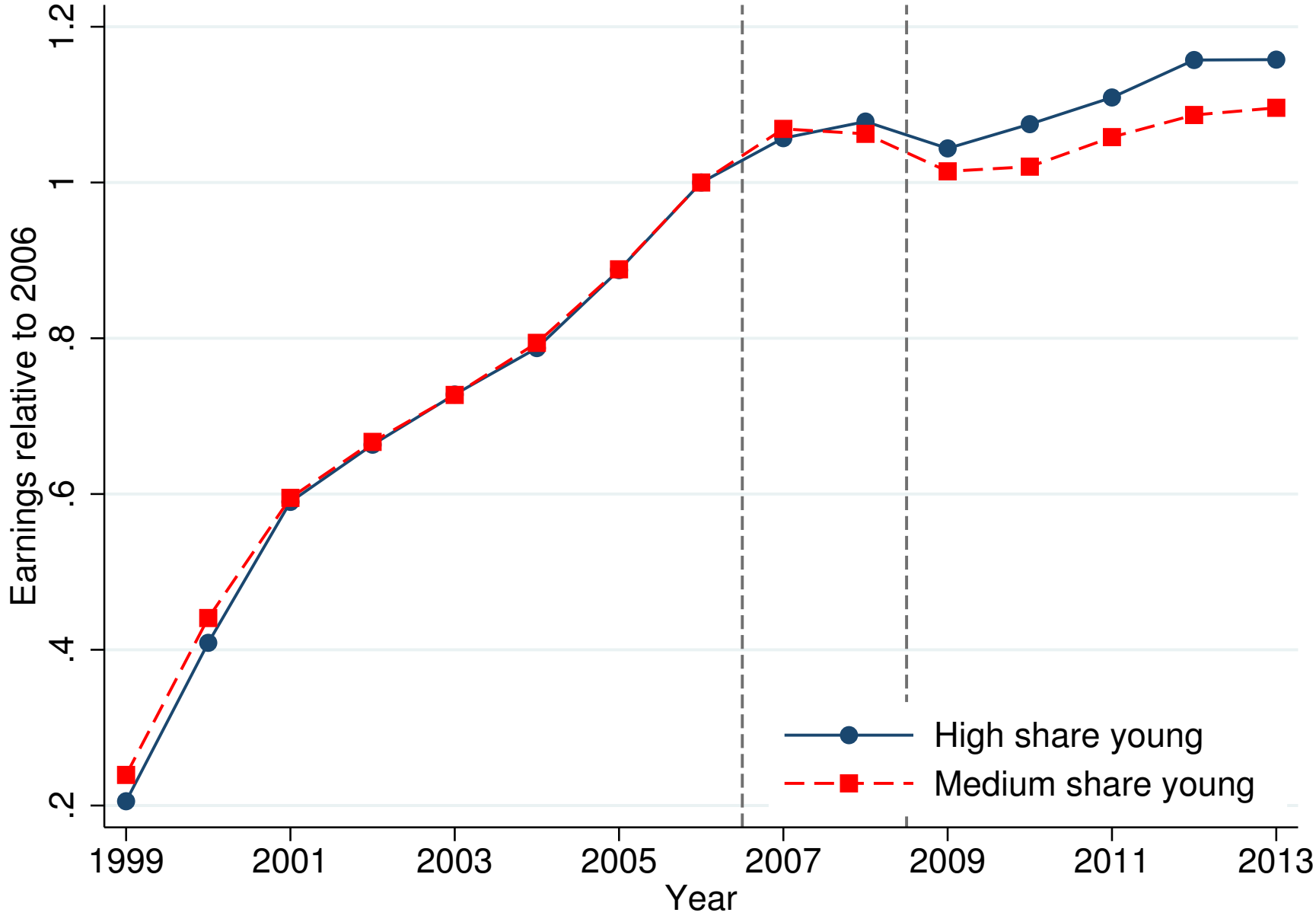
Earnings: **Below Firm Median** in 2006



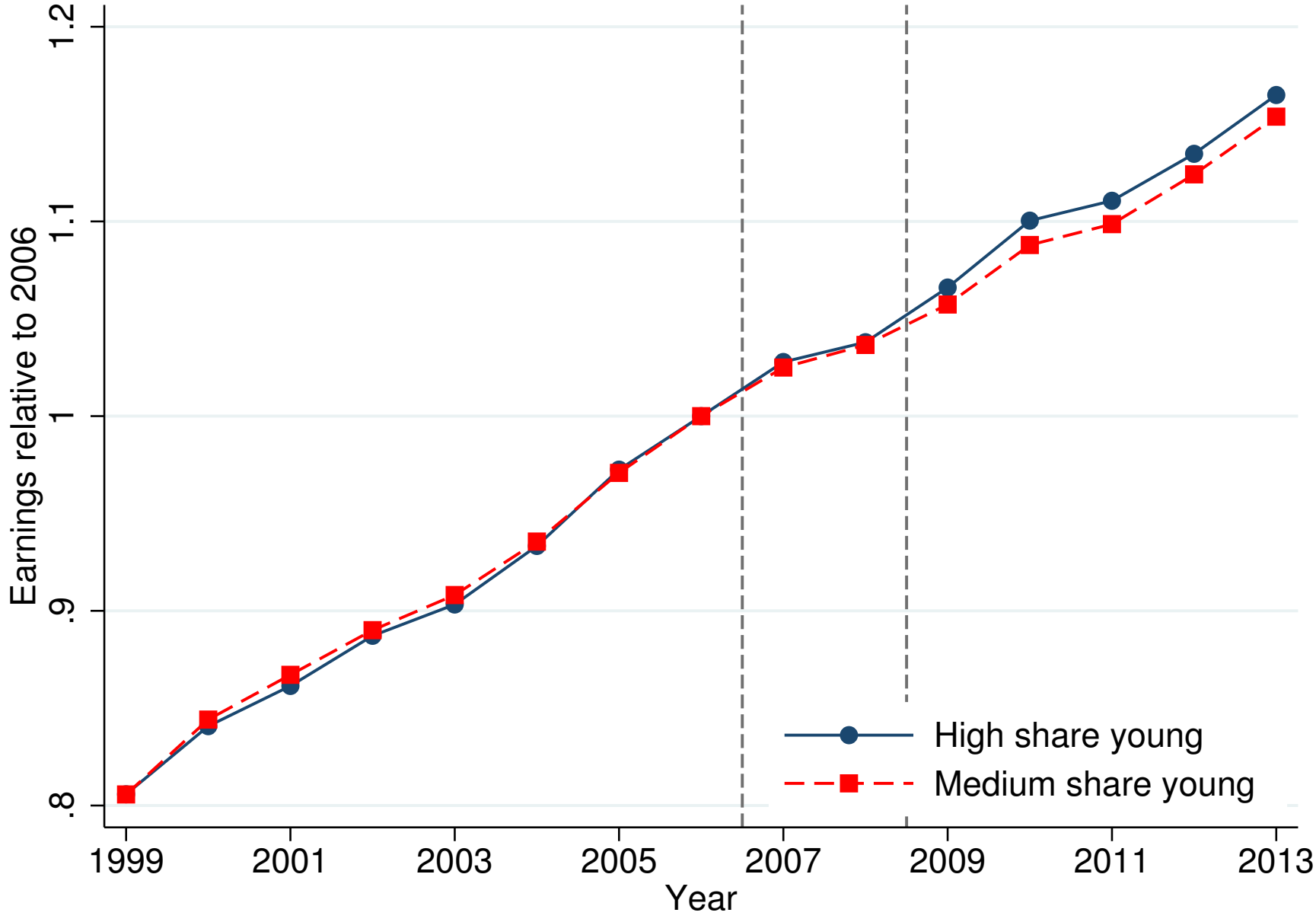
Earnings: **Above Firm Median** in 2006



Earnings Growth: P-20

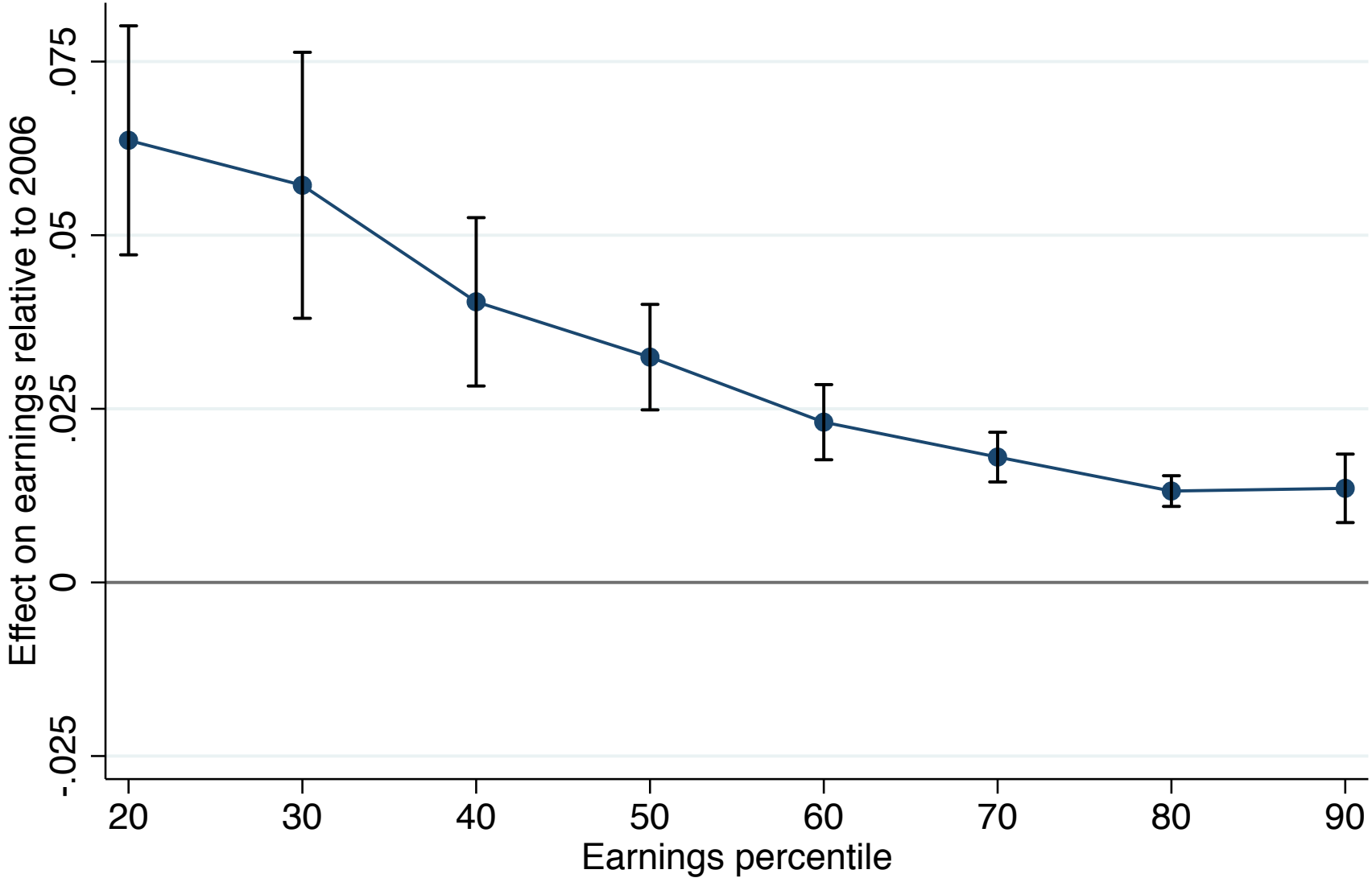


Earnings Growth: P-80

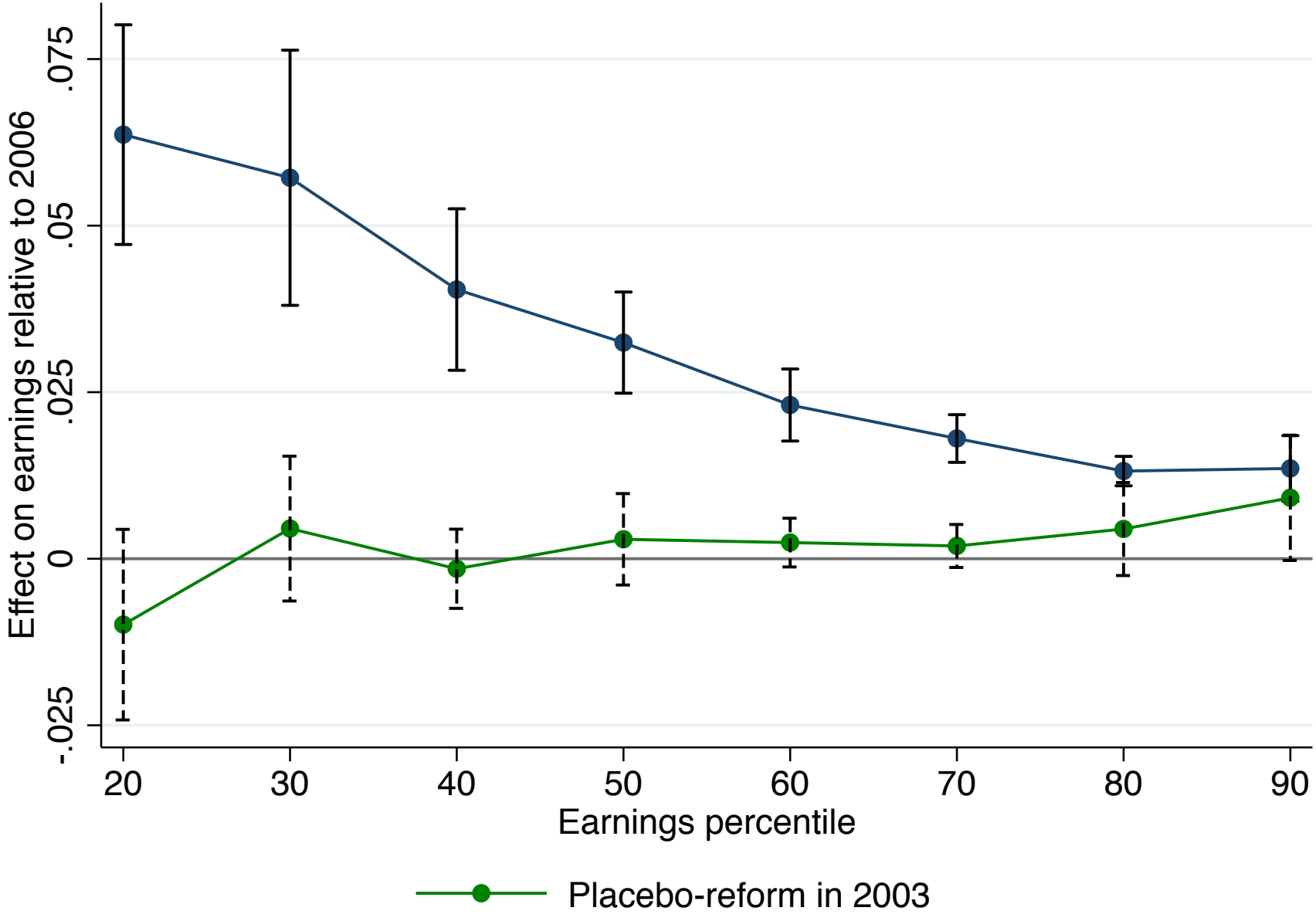


Earnings Effects Across various Percentiles

Appendix: Pre-Trends



Earnings Effects Across the Distribution



The Transmission of Payroll Tax Incidence

Standard view: Payroll tax split between **market-level** wage of directly treated workers and employers' profits.

Our findings: Transmission of payroll tax wage incidence may work through **firm-level** rent-sharing.

⇒"Collective" incidence on all workers' wages – incl. "untreated" ones.

⇒ Less of a "give-away" to firm owners than aggregate evidence suggests.

Rent-sharing is consistent with "macro incidence" falling on workers' wages.

Related evidence:

Rent sharing and "firm fixed effects".

Wage-setting norms may shield targeted workers from incidence.

(Bewley 1999)

Which Model is Consistent with Our Results?

Neo-classical model with wage equity constraint:

Standard model with young (Y) vs. old (O) labor inputs

If in equilibrium $w_Y < w_O$, then wage equity constraint $\Rightarrow$ Classical unemployment among young

Young payroll tax cut alleviates constraint, no incidence on wages, and reduction in unemployment

With 2 types of firms, firms hiring mostly young workers will expand production, hire more, and pay higher wages on all their workers

Targeted employer payroll tax cuts are the ideal tool to restore efficiency

Neo-classical model is parsimonious but does not have **rent sharing** and hence is likely unrealistic

Conclusion

A. **The payroll tax cut "worked":**

Clear zero effect on market wages

$\Rightarrow$ Full reduction in labor costs (12%)

$\Rightarrow$ Sizable reduction in youth unemployment: 2.2ppt

Concentrated in high-unemployment areas

Due to lower separation rates

B. **Firm-level responses were crucial in incidence:**

Targeted firms actively respond to stimulus, expanding along all dimensions

"Collective incidence" on wages through rent-sharing: Firms raise wages for all workers (more so for low-paid workers)

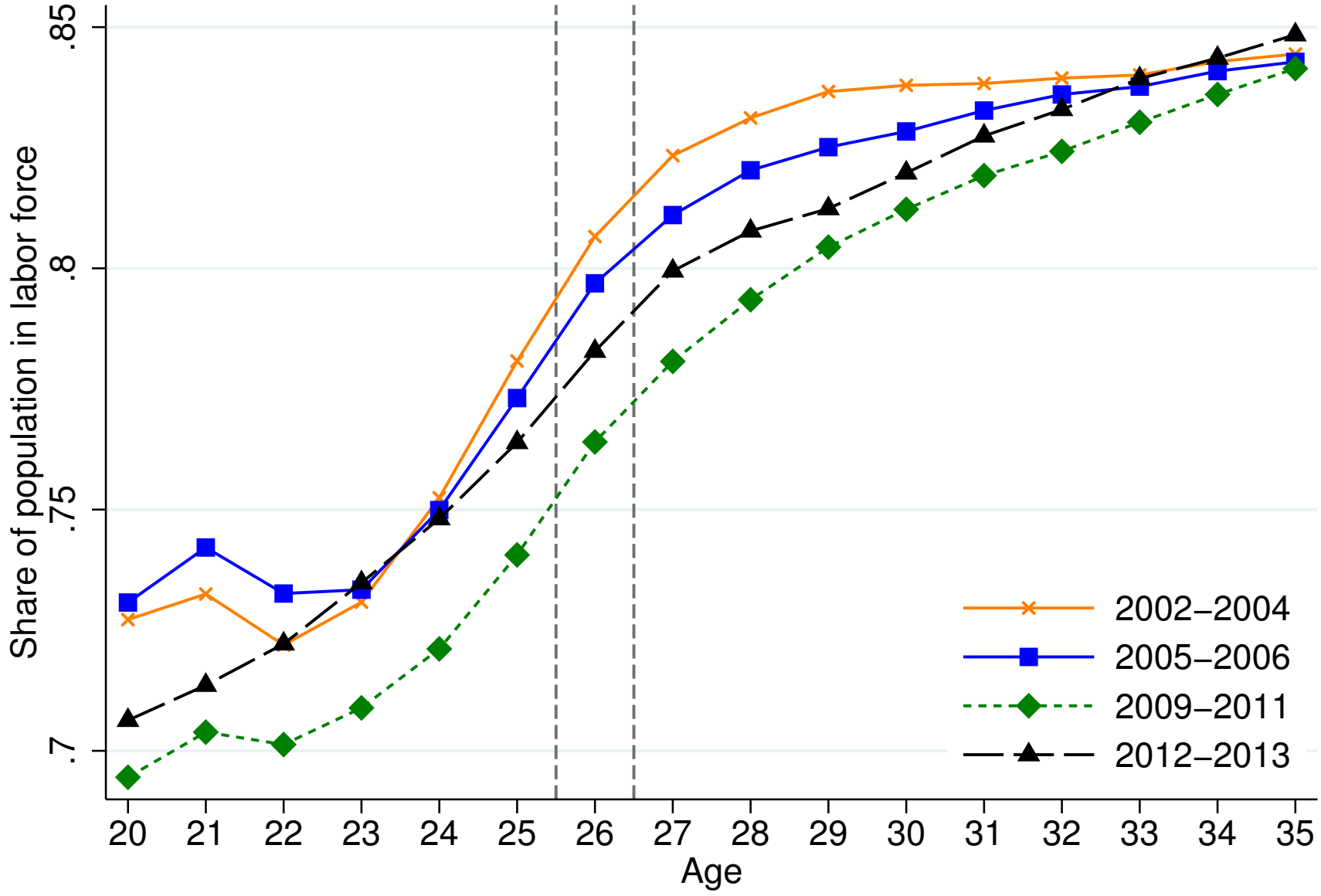
APPENDIX SLIDES

Previous Work on this payroll tax cut

- Bennmarker, H., Calmfors, L. and Larsson Seim, A. 2013. Earned income tax credits, unemployment benefits and wages: Evidence from Sweden, IFAU Working Paper 2013:12, Uppsala.
  https://izajolp.springeropen.com/articles/10.1186/s40173-014-0026-1
- Skedinger, Per. 2014. Effects of Payroll Tax Cuts for Young Workers, in eds. Michael Rosholm and Michael Svarer, Nordic Economic Policy Review: Consequences of youth unemployment and effectiveness of policy interventions 1, Norden.
  www.norden.org/en/publications/publikationer/2014-416
- Egebark, Johan. 2016. Effects of Taxes on Youth Self-Employment and Income., IFN Working Paper No. 1117.
  http://www.ifn.se/eng/publications/wp/2016/1117
- Egebark, Johan and Niklas Kaunitz. 2017. Payroll Taxes and Youth Labor Demand, IFN Working Paper No. 1001, 2014 (revised June 2017).
  http://www.ifn.se/eng/publications/wp/2014/1001
- Kaunitz, Niklas 2017. The Impact of Payroll Taxes on Firm Performance, Chapter 2 in Workers, Firms and Welfare: Four Essays in Economics, Ph.D. Dissertation, Stockholm University.
  http://urn.kb.se/resolve?urn=urn:nbn:se:su:diva-142906

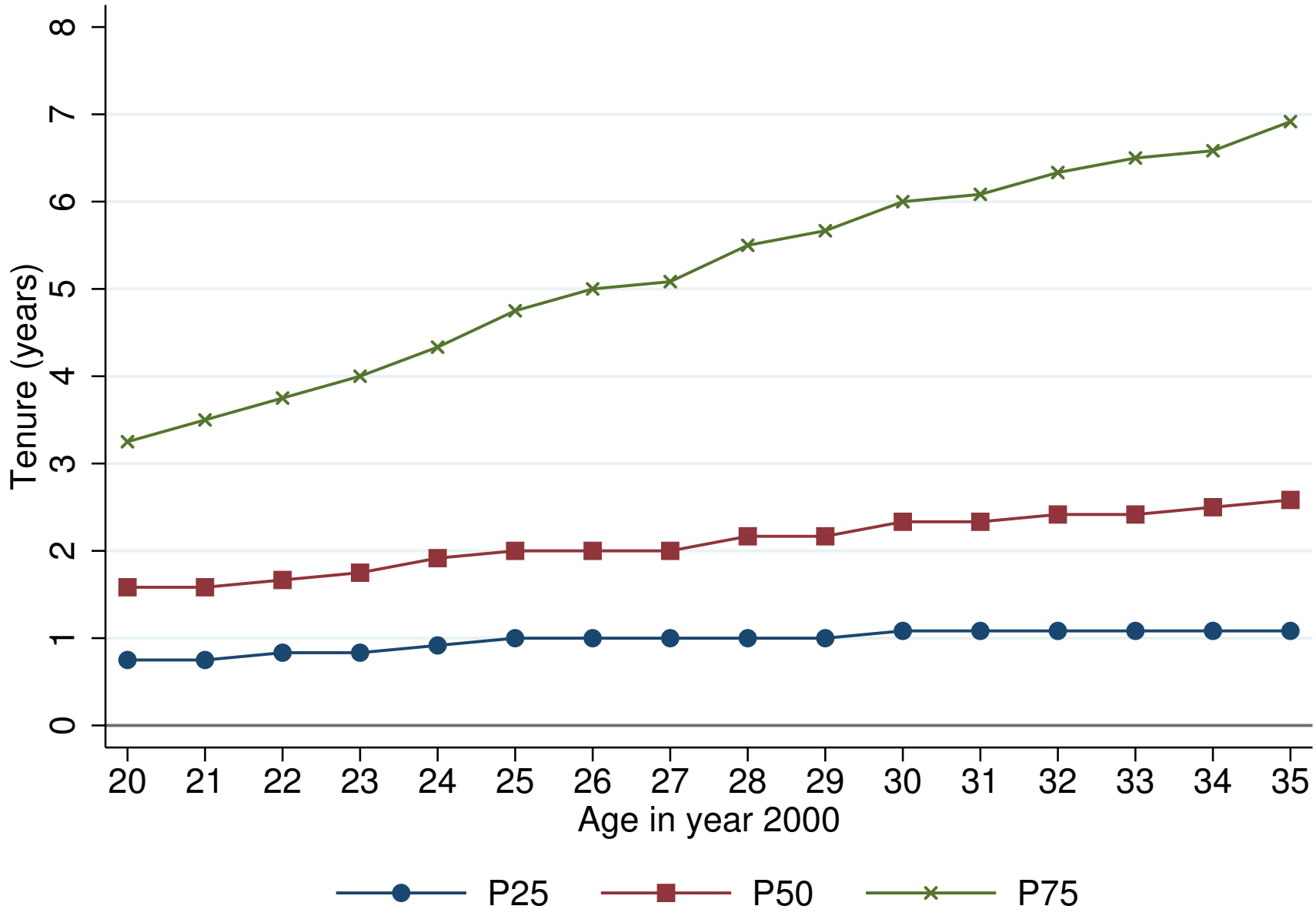
Labor Force Participation

Back



LF consists of employed (above one basis threshold) and unemployed

New hires in 2000: Job length by age



STANDARD TAX INCIDENCE FRAMEWORK

Labor supply and labor demand at the **market level** define wage rate and labor. (Individual firms are irrelevant.)

Share of payroll tax incidence on workers' take-home wage is given by $|\varepsilon_D|/(\varepsilon_S + |\varepsilon_D|)$.

$\varepsilon_D, \varepsilon_S$: Labor **D**emand and **S**upply elasticities.

Received wisdom is that $|\varepsilon_D| >> \varepsilon_S$ economy-wide $\Rightarrow$ incidence **mostly** on workers [Hamermesh '93 survey $|\varepsilon_D| \simeq 0.5$]

In our context: Targeted young workers' labor very close substitute to slightly older workers'

$\Rightarrow |\varepsilon_D| \to \infty$ at the age discontinuity.

$\Rightarrow$ **Wage incidence fully on young workers regardless of ε_S.**

$\Rightarrow$ **Employment** response largely driven by ε_S. **Small.**

Definitions and measurement of the labor force

- Employed:
  - **Official statistics (ILO standard), based on interview during reference week:**

    Employed; self-employed; absent due to parental leave/vacation

  - **Microdata**:

    Annual labor or self-employment earnings above official cutoff of USD 5,500 (in 2013).

- Unemployed:
  - **Official statistics (ILO standard):**

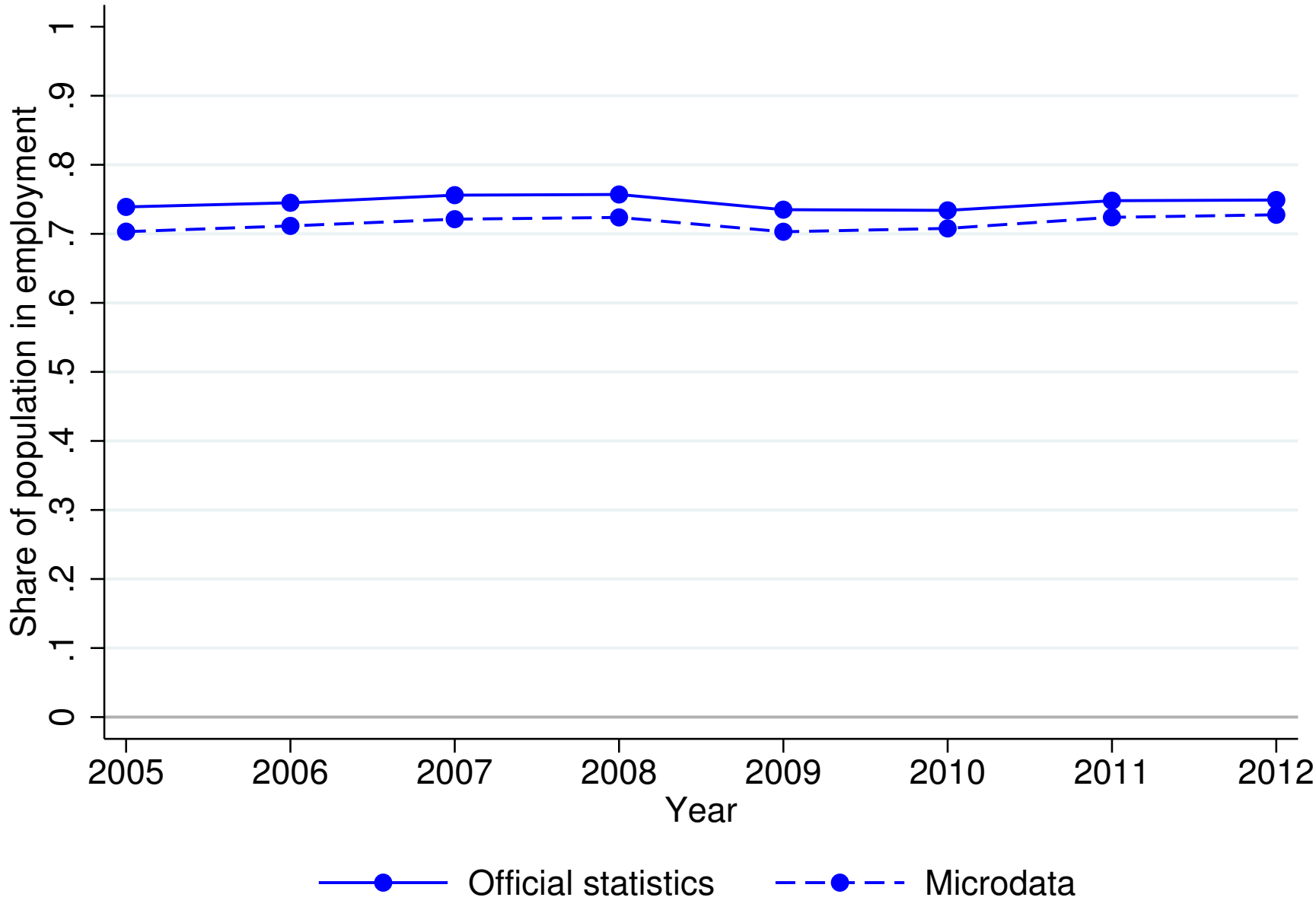
    Idle individuals who have applied for a job during past 4 weeks and is able to start immediately.

  - **Microdata:**

    Have registered with UI office sometime during the year (and is not employed).

- Potential caveats: Students applying for work; idle job-seekers who do not register with UI office

Comparison of employment rate



Comparison of unemployment rate