The Large Firm Pay Premium Redux

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A very old topic - data goes back to 1905

TABLE I.—MEAN DAILY WAGES OF ITALIAN WOMEN ACCORDING TO THEIR AGES AND THE SIZES OF THE ESTABLISHMENTS IN WHICH THEY WERE AT WORK

AGE OF EMPLOYEES	MEAN DAILY WAGES RECEIVED IN ESTABLISHMENTS WITH			
	Less than 20 Employees	20–99	100–499	500 and Over
15–20	.87	.93	1.04	1.24
20–35	1.09	1.10	1.21	1.50
35–55	1.05	1.12	1.17	1.48
Above 55	.92	.98	.98	1.16

"Il progresso dell' Economia politica dipenderà pel futuro in gran parte dalla ricerca di leggi empiriche, ricavate dalla statistica, e che si paragoneranno poi colle leggi teoriche note, o che ne faranno conoscere di nuove." PARETO.

Many papers over the decades also similar findings of a large firm pay premium – e.g.

Slichter (1950)

Lester (1967)

Brown and Medoff (1989)

Oi and Idson (1999)

Our Large Firm Wage Premium (LFWP) Paper

Use two massive datasets – SSA data on all W2 pay slips since 1978 and Census data on all firms since 1976, finding:

1. LFWP falls by about 50%, mainly due to falling large firm AKM Fixed-Effect (not due to less worker sorting)

2. Appears to particularly impact lower paid/educated workers

3. Associated with two industry factors in particular:
   - Shrinking manufacturing (which has a high LFWP)
   - Growth of low paying service sector (e.g. big-box retail)

Outline

1) **Data (SSA and Census Data)**
2) SSA results
3) Census Data
4) Implications for inequality

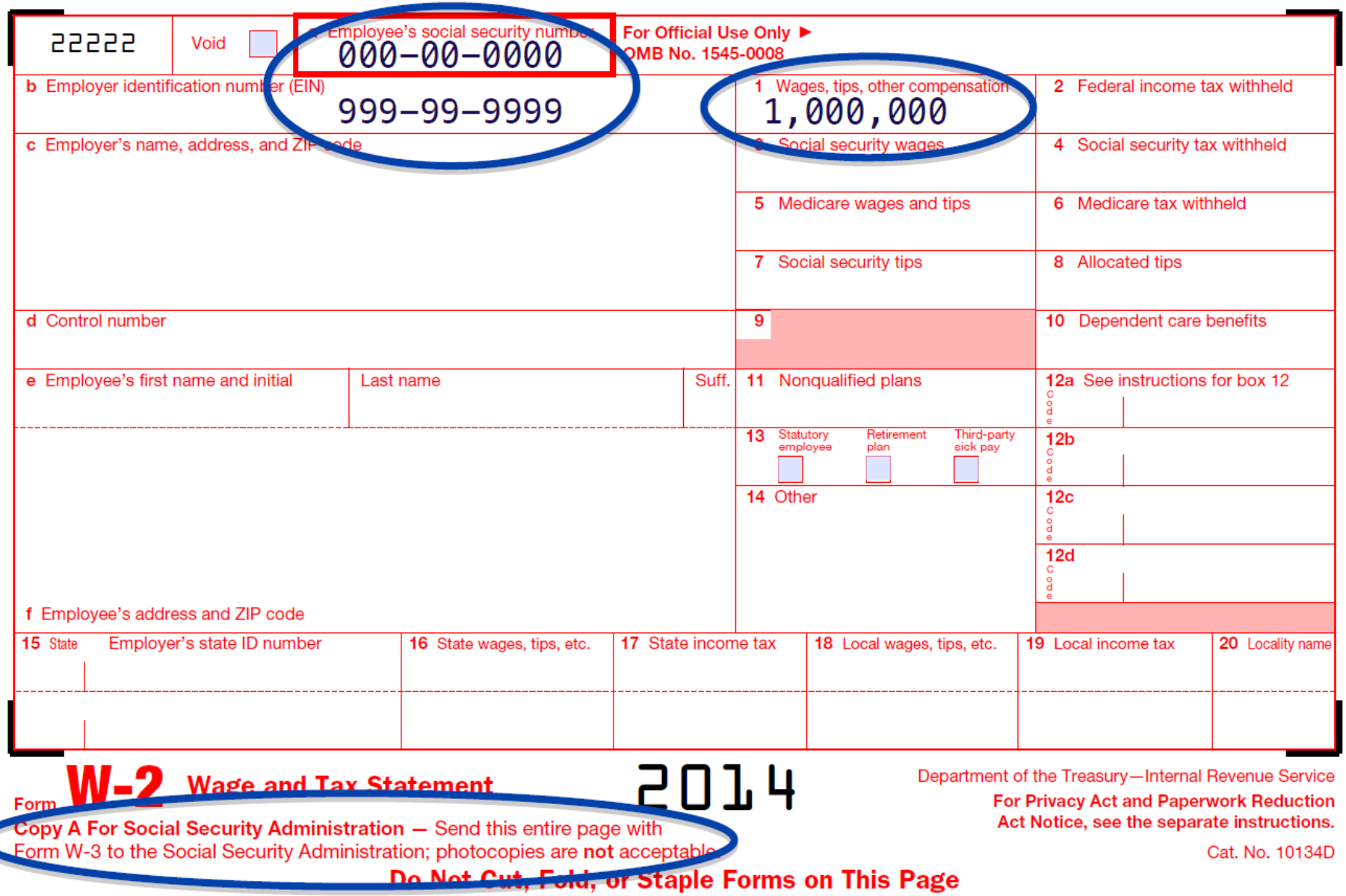
Social Security Administration (SSA) data is the Master Earnings File (MEF)

Universe of all W-2s from 1978 to 2013 (about 100m per year)

For each job: SSN, EIN and total compensation:

"Total compensation includes: wages, salaries, tips, restricted stock grants, exercised stock options, severance payments, & all other types of income considered remuneration for labor services by the IRS."

Example W2



22222 Void

a Employee's social security number 000-00-0000

For Official Use Only ▶
OMB No. 1545-0008

b Employer identification number (EIN) 999-99-9999

1 Wages, tips, other compensation 1,000,000

2 Federal income tax withheld

c Employer's name, address, and ZIP code

3 Social security wages

4 Social security tax withheld

5 Medicare wages and tips

6 Medicare tax withheld

7 Social security tips

8 Allocated tips

d Control number

9

10 Dependent care benefits

e Employee's first name and initial | Last name | Suff.

11 Nonqualified plans

12a See instructions for box 12 Code

13 Statutory employee | Retirement plan | Third-party sick pay

12b Code

14 Other

12c Code

12d Code

f Employee's address and ZIP code

15 State	Employer's state ID number	16 State wages, tips, etc.	17 State income tax	18 Local wages, tips, etc.	19 Local income tax	20 Locality name

Form **W-2** Wage and Tax Statement 2014

Department of the Treasury—Internal Revenue Service

Copy A For Social Security Administration — Send this entire page with Form W-3 to the Social Security Administration; photocopies are **not** acceptable.

For Privacy Act and Paperwork Reduction Act Notice, see the separate instructions.

Cat. No. 10134D

Do Not Cut, Fold, or Staple Forms on This Page

What is an EIN (Employer Identification Number)?

Any firm with an employee (so issues a W-2) must have an EIN

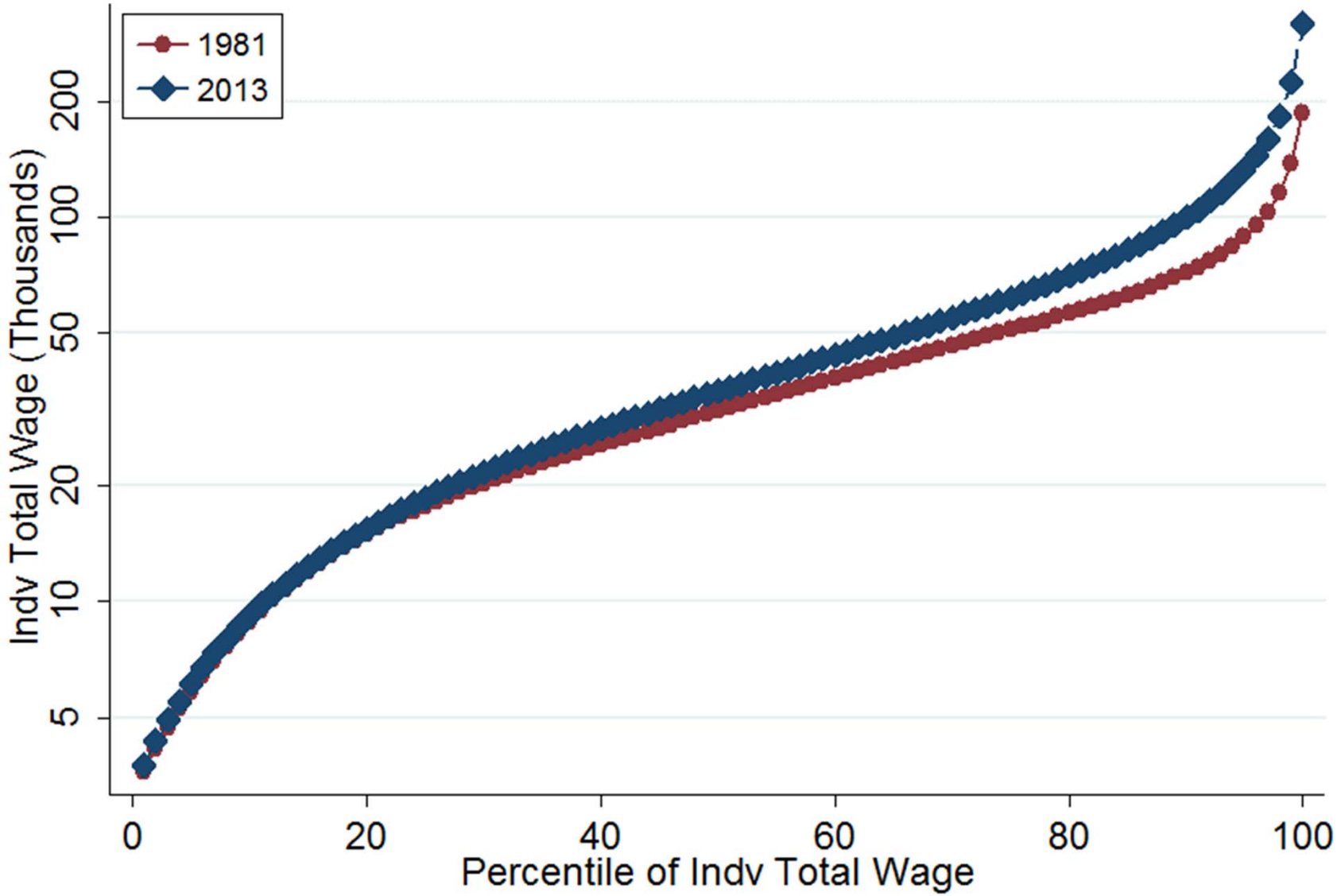
Bureau of Labor Statistics uses the EIN as its definition of a firm

Many organizations have one (e.g. Facebook, Walmart Stores)

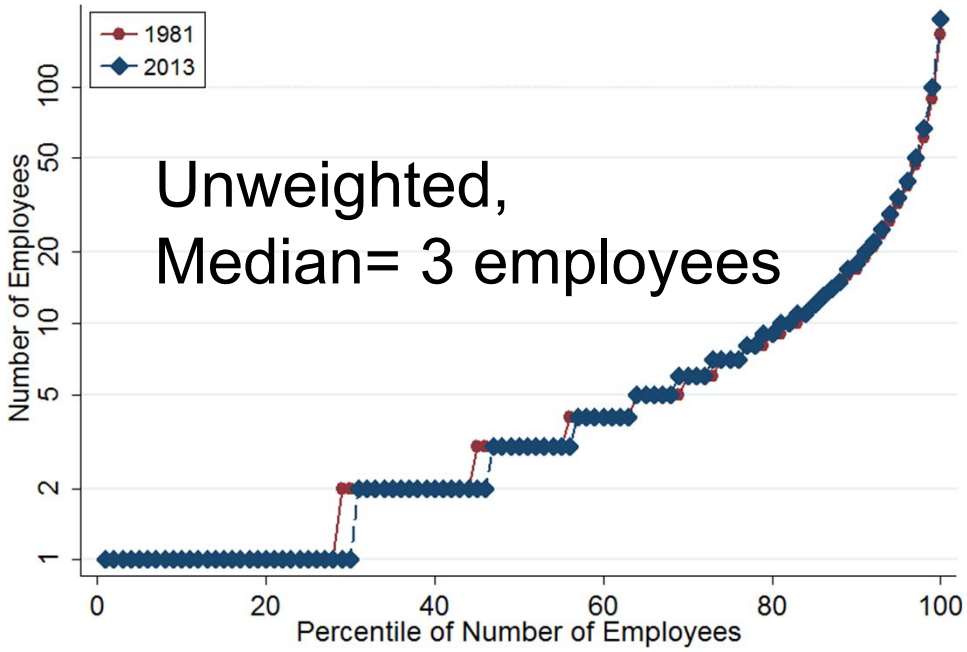
Others have many, e.g.

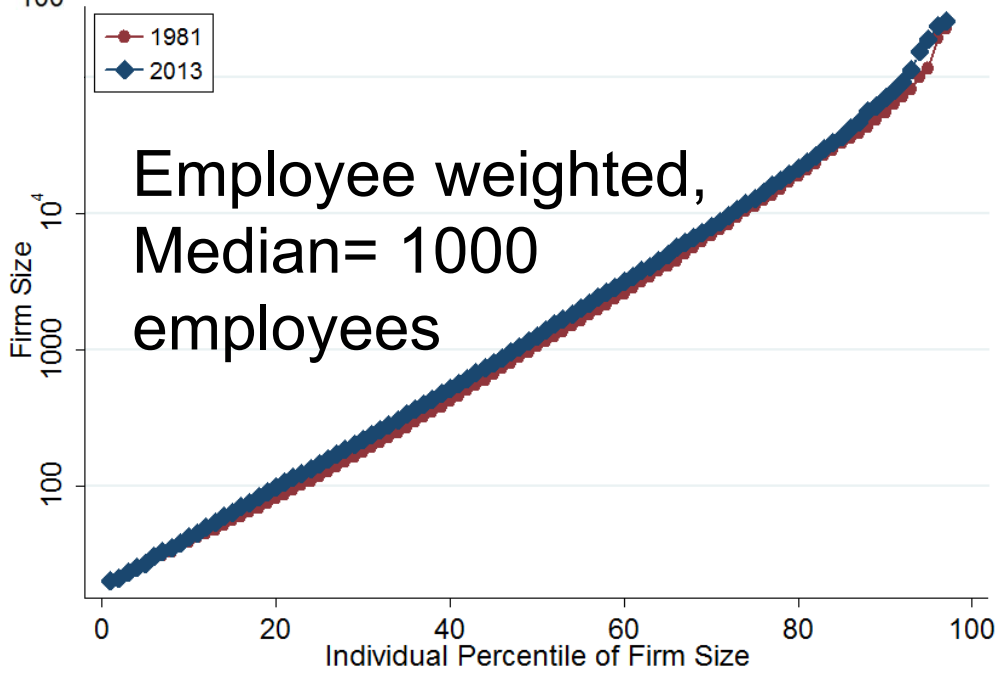
- Stanford has 4 EINs (1 for the university, 1 for each hospital and 1 for the bookstore)
- The 6165 public companies in D&B have 19,969 EINs

Individual earnings percentiles (10%=$10k, 50%=$40k, 90%=$100k, 99%=$350k)



Firm size percentiles: unweighted & emp weighted





Census data is Longitudinal Business Database

Contains all establishments from 1976 to 2015

Census groups into firms based on ownership and control

Industry defined by largest employment across establishments

Earnings data from the IRS, so similar W2 definition as SSA

Outline

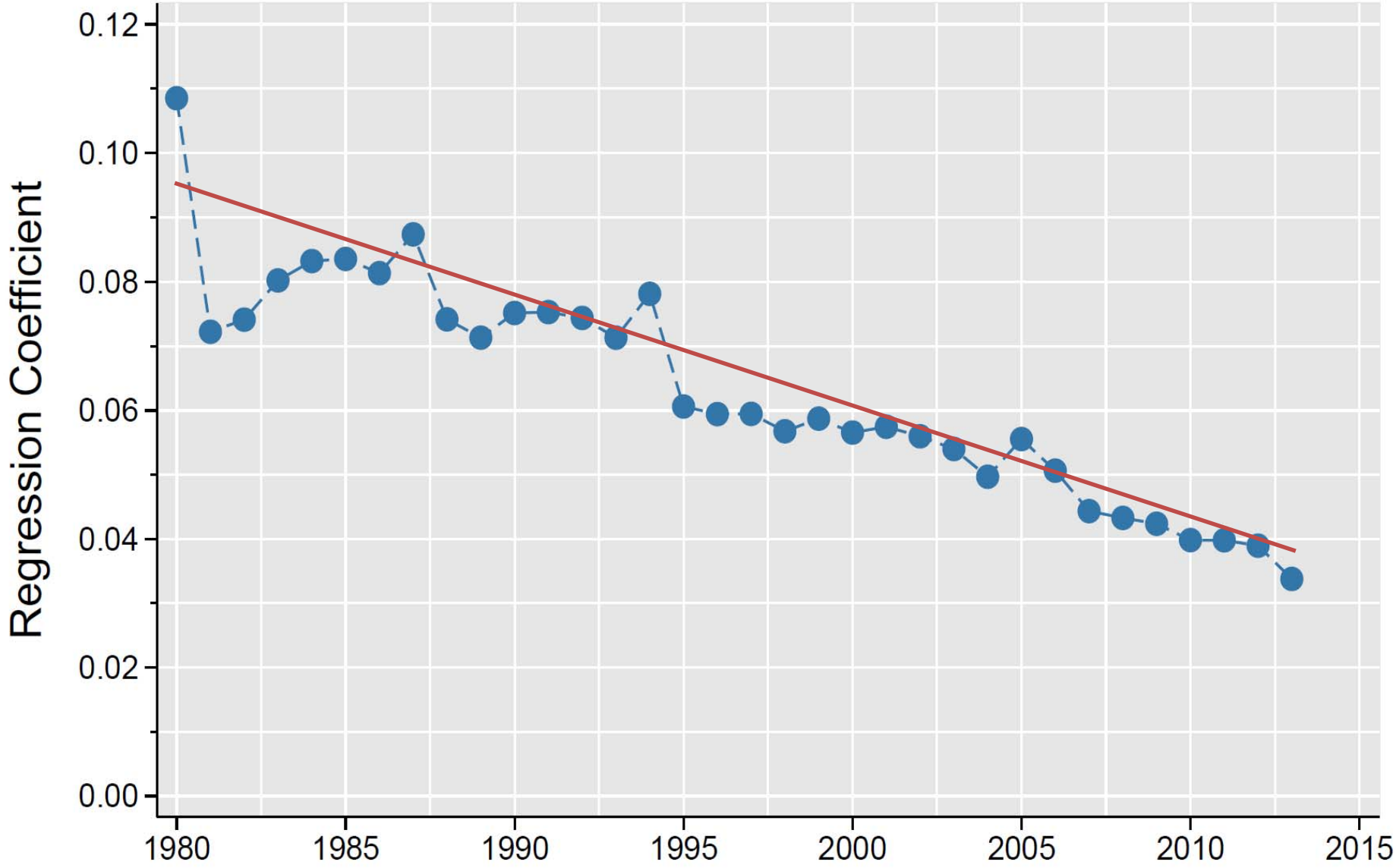
1) SSA Data

2) **SSA Results**

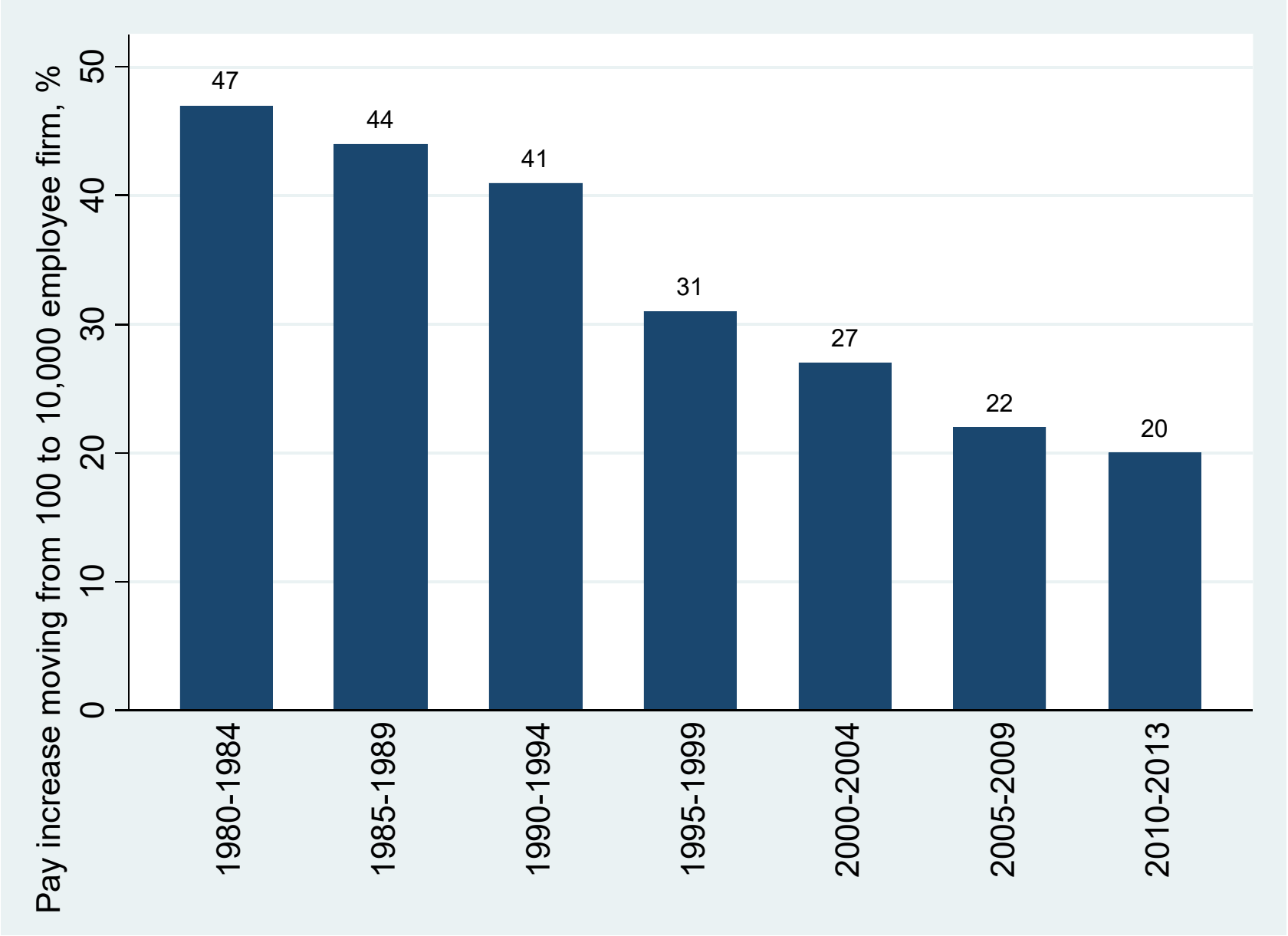
3) Census Results

4) Implications for inequality

LFWP measured by yearly regression coefficient of log(earnings) on log(size) - falls by ≈50% since 1970s



Increase in earnings from 100 to 10,000 person firm



Analysis with the Abowd, Kramarz and Margolis (1999) and Card, Henning and Kline (2013) Model

Statistical Model for Individual Log Annual Earnings

$$y_{ijt} = \alpha_i + \psi_j + X_{ijt}\beta + \varepsilon_{ijt}$$

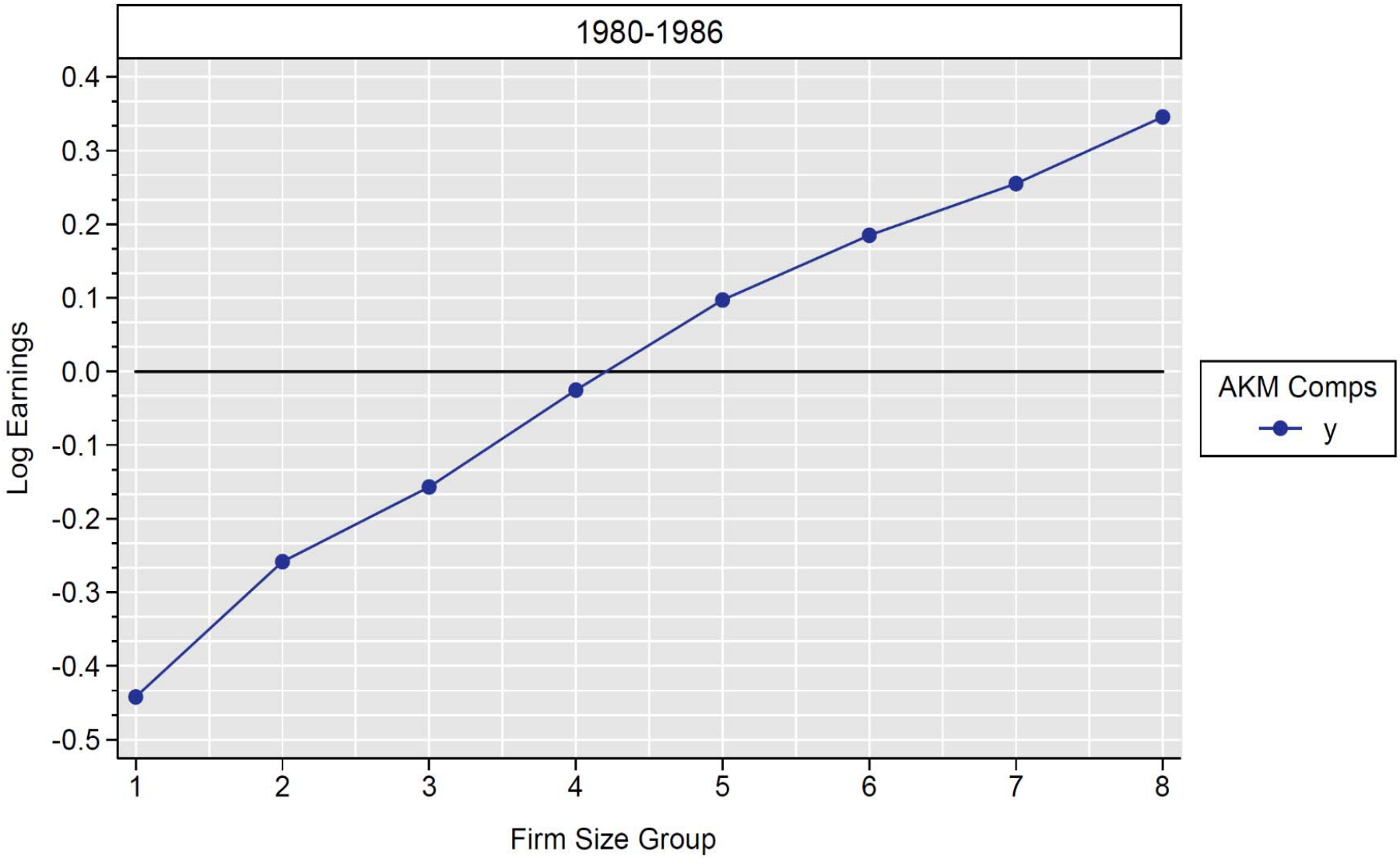
- Fixed worker component α (e.g. education, innate ability, etc.)
- Fixed firm component Ψ (e.g. rent sharing, efficiency wages, etc.)
- Time varying worker characteristics X (here age and age squared)

Estimate Separately in 7-Year Intervals from 1980 to 2013

- 1980-1986 (first): 5.2m firms, 65m workers, 332m worker years
- 2007-2013 (last): 5.2m firms, 81m workers, 414m worker-year

Details in Song et al. (forthcoming 2019)

- AKM regression equation: $y_{it} = \alpha_i + \psi_{j(i,t)} + x'_{it}\beta + r_{it}$



Firm size groups: 1=1-10, 2=10-50, 3=50-250, 4=250-1K, 5=1-2.5K, 6=2.5-10K, 7=10-15K, 8=15K+

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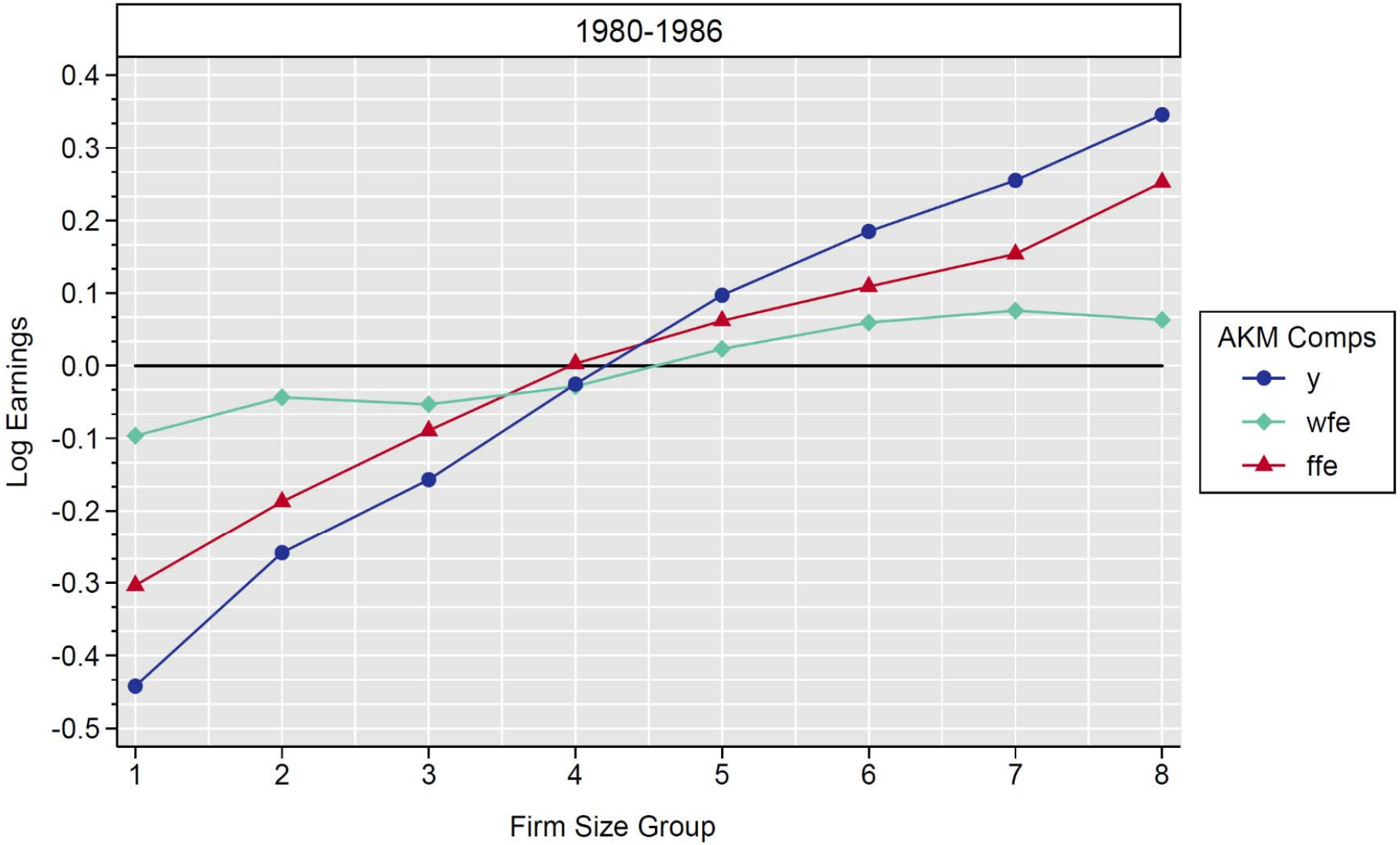
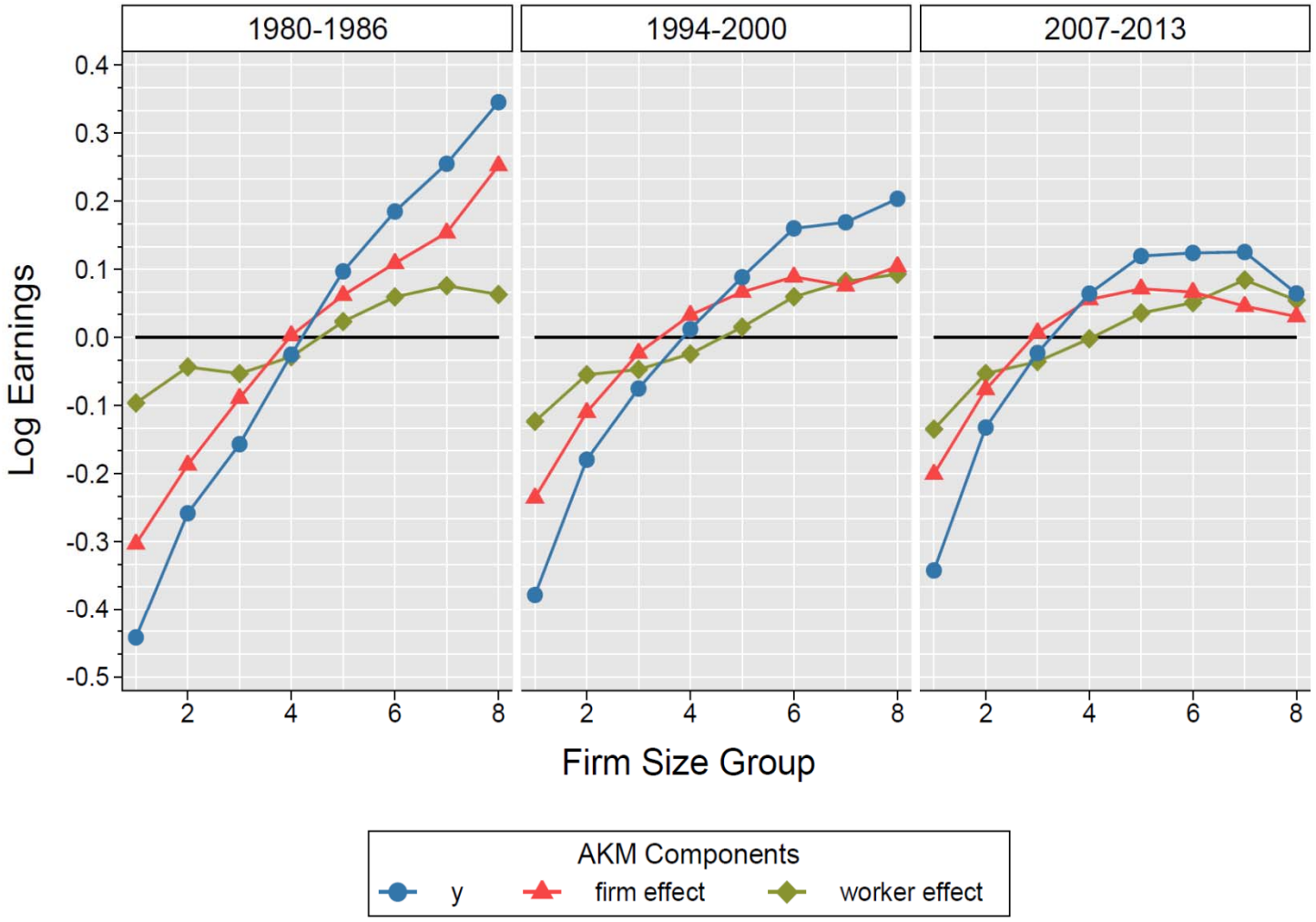


Firm size groups: 1=1-10, 2=10-50, 3=50-250, 4=250-1K, 5=1-2.5K, 6=2.5-10K, 7=10-15K, 8=15K+

Almost 90% of the decline in the large firm wage premium comes from the fall in the firm effect



Notes: Firm size groups: 1=1-10, 2=10-50, 3=50-250, 4=250-1K, 5=1-2.5K, 6=2.5-10K, 7=10-15K, 8=15K+. Age/year effects and the residual term are omitted.

Fall in LFWP more for lower end workers: earnings

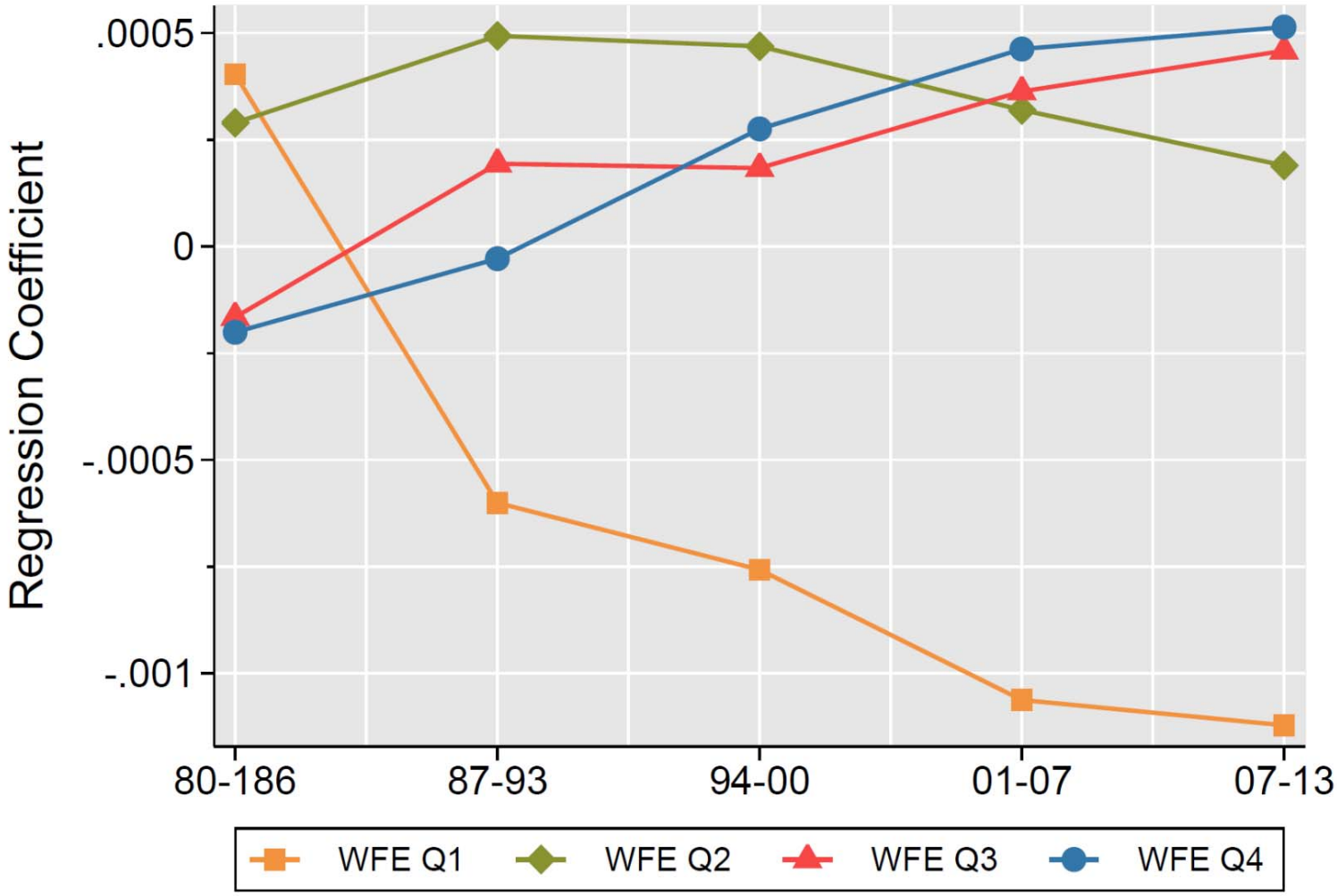
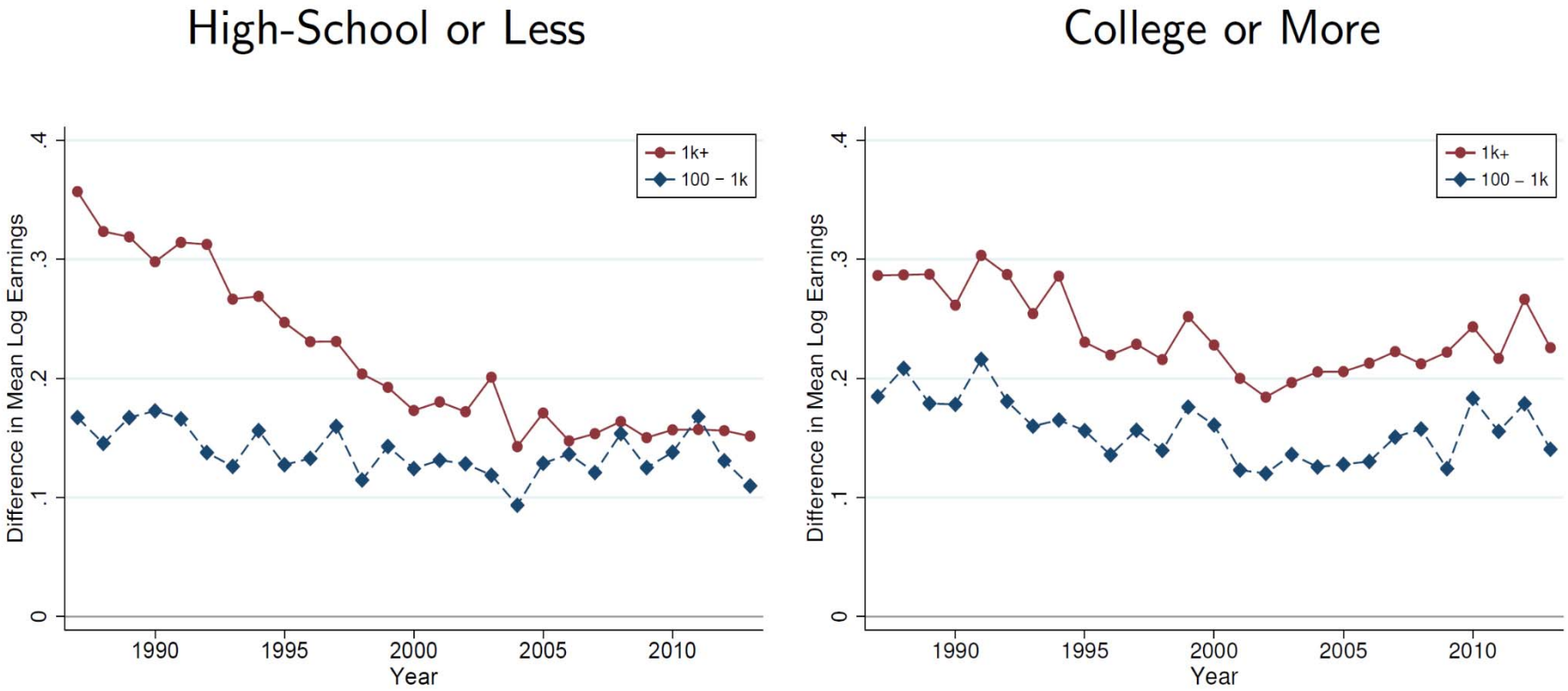


FIGURE 3. RELATIONSHIP BETWEEN FIRM SIZE AND AKM MATCH COMPONENT BY WFE QUARTILE

Fall in LFWP more for lower end workers: education

Figure: LFWP for Two Education Groups, Relative to Firm Size 100 or Less



Source: Current Population Survey, 1987 onwards using the firm-size indicator. Controls for industry, region, education and demographics.

Outline

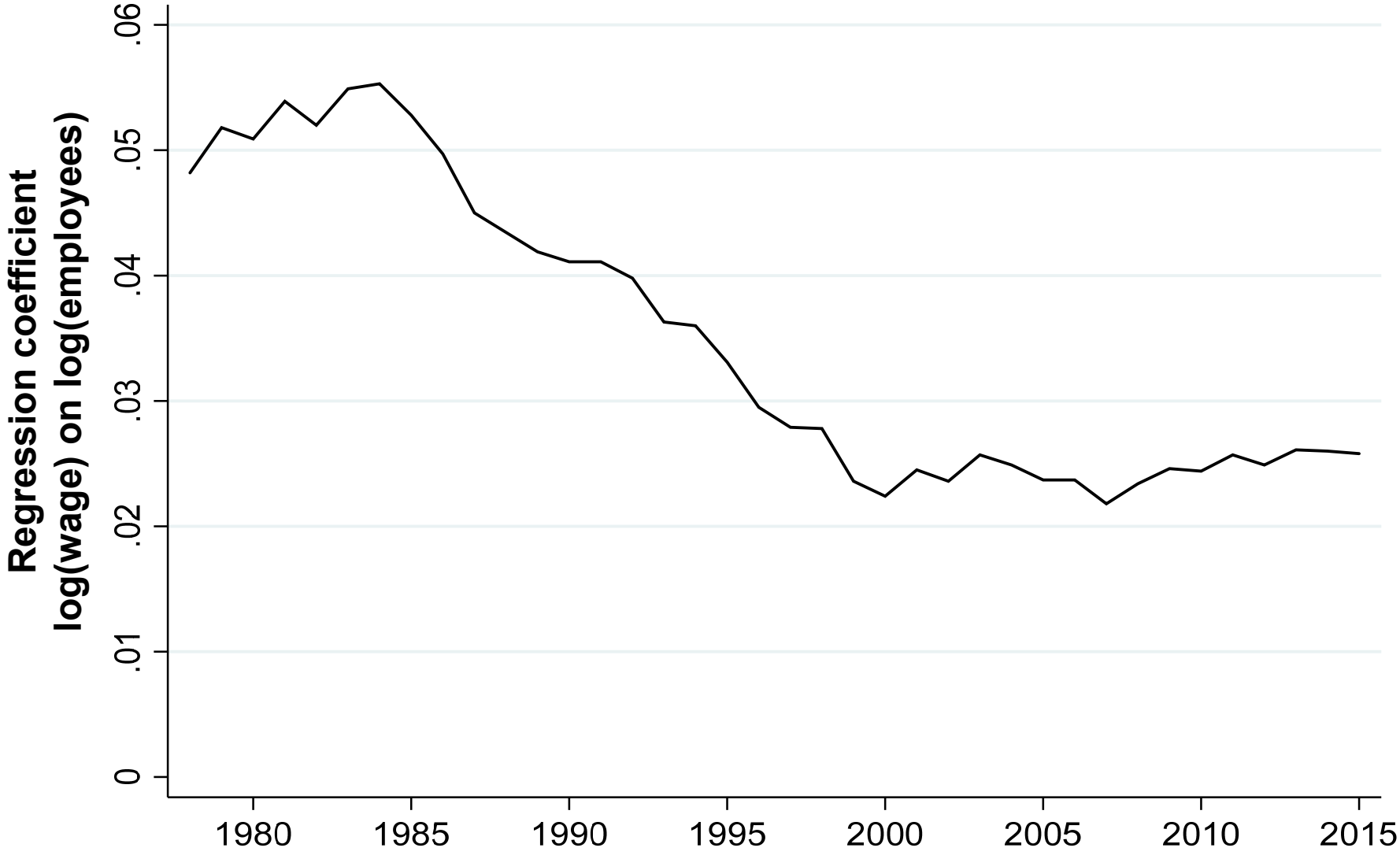
1) SSA Data

2) SSA result

3) Census results

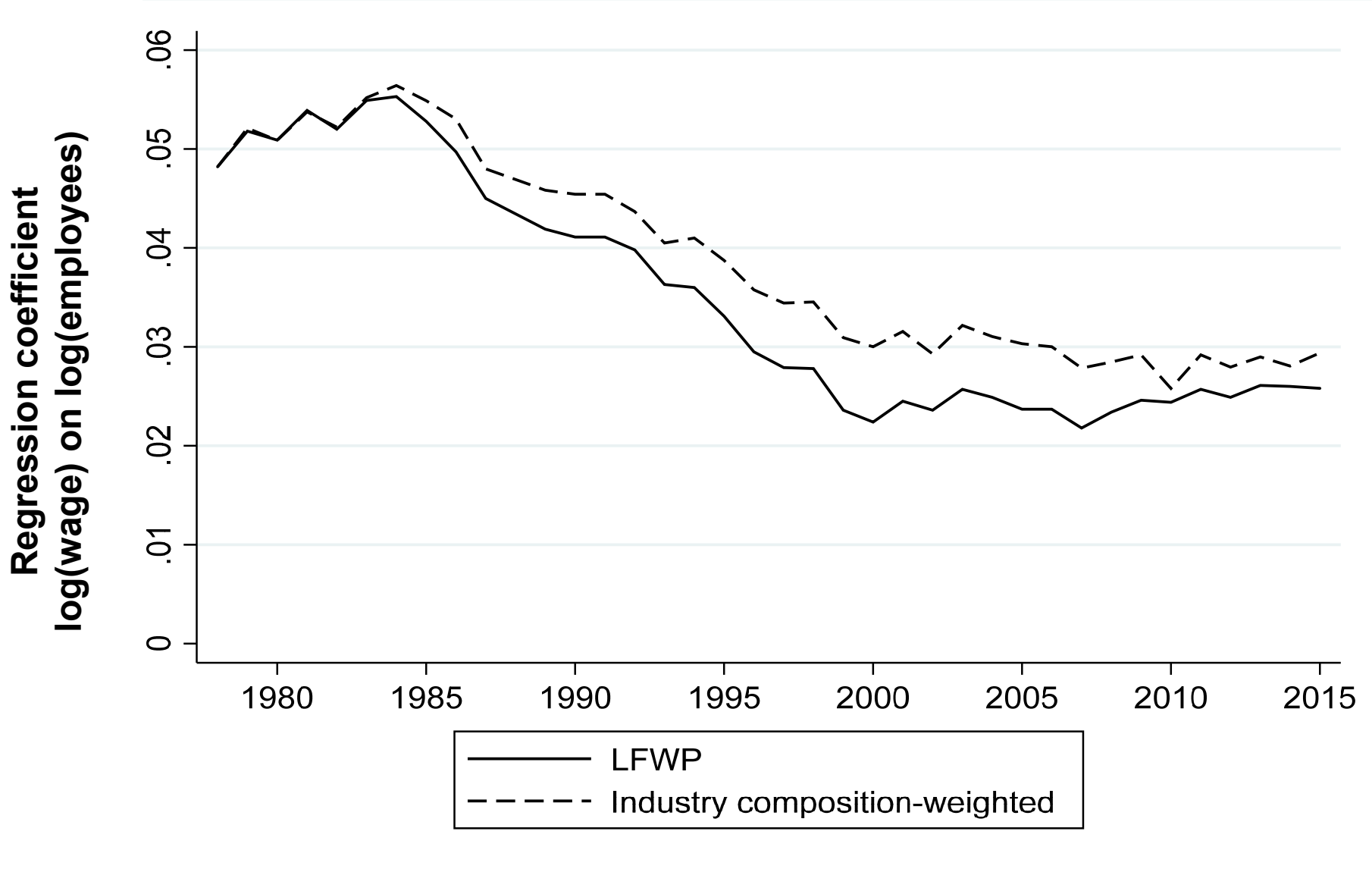
4) Implications for inequality

Census data similar 44% drop in LFWP



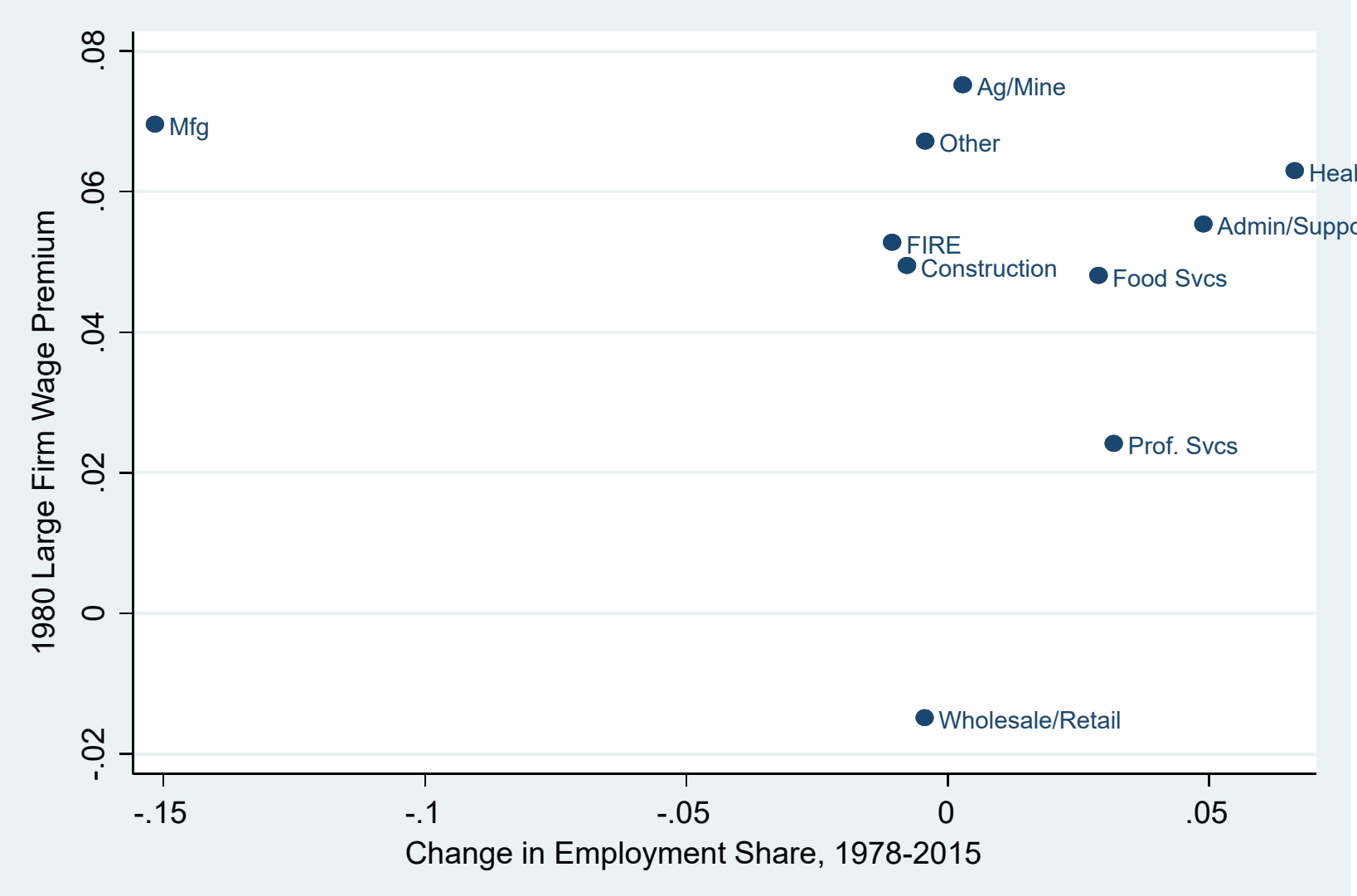
Notes: Obtained from firm-level data in the US Census Longitudinal Business Database. Results from annual employment-weighted regressions. The Y-axis represents the increase in log(firm mean wage) associated with a given increase in log(firm employment). Regressions run for each year with firm-employment weights.

Composition accounts for ≈¼ of the LFWP drop



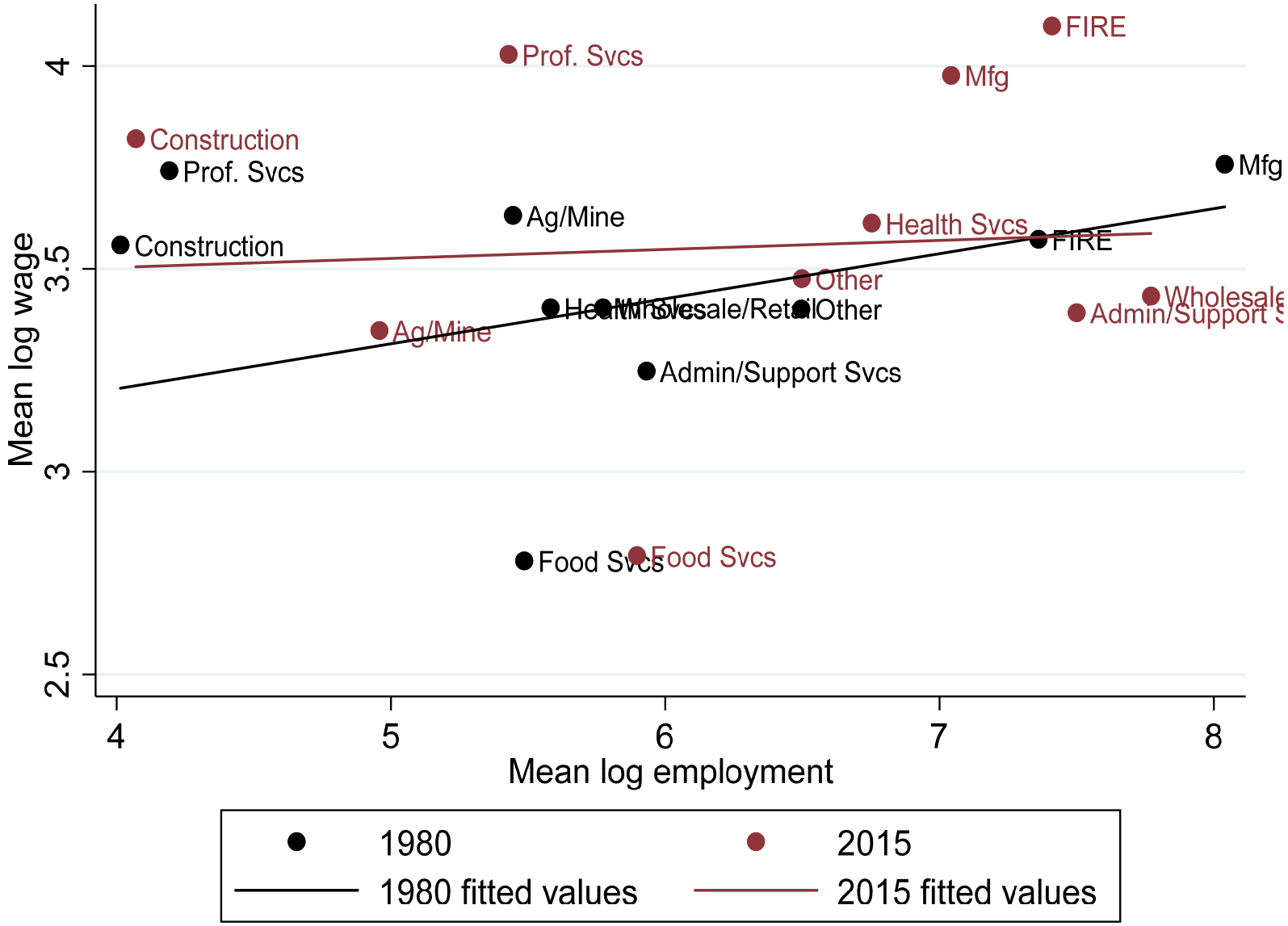
Notes: Obtained from firm-level data in the US Census Longitudinal Business Database. The solid line shows estimated from annual employment-weighted regressions. The dotted line shows estimates from regressions weighted by employment*(industry employment in 1976/industry employment in year t).

Composition change reflects mainly the shrinkage of manufacturing, which has a high LFWP



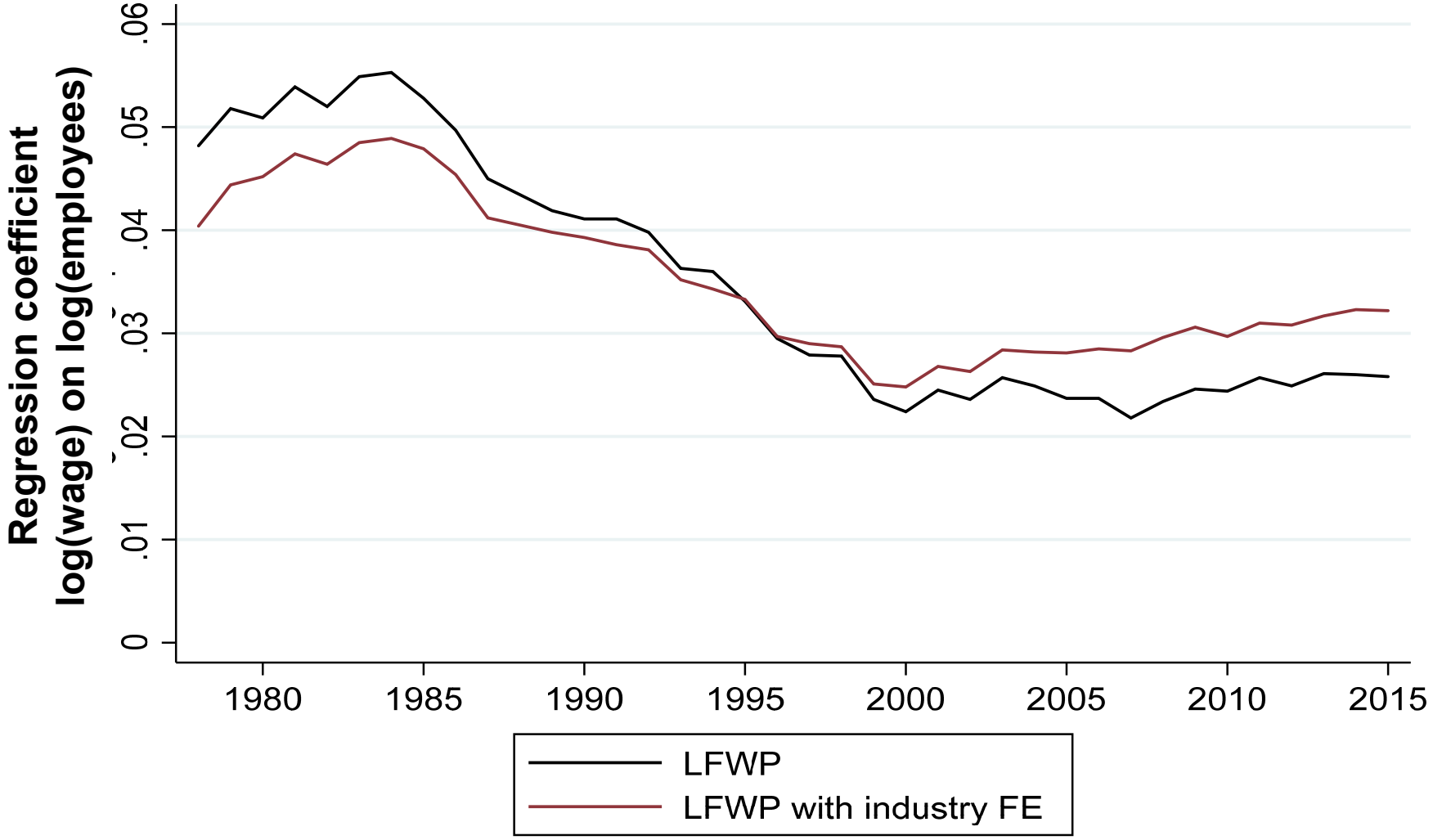
Notes: Obtained from firm-level data in the US Census Longitudinal Business Database. Results from employment-weighed regressions using data from 1980. LFWP defined as regression coefficient of log(mean wages) on log(firm employment) by industry and year.

Industry characteristic changes also matter: low pay industries (e.g. retail & admin) now have larger firms



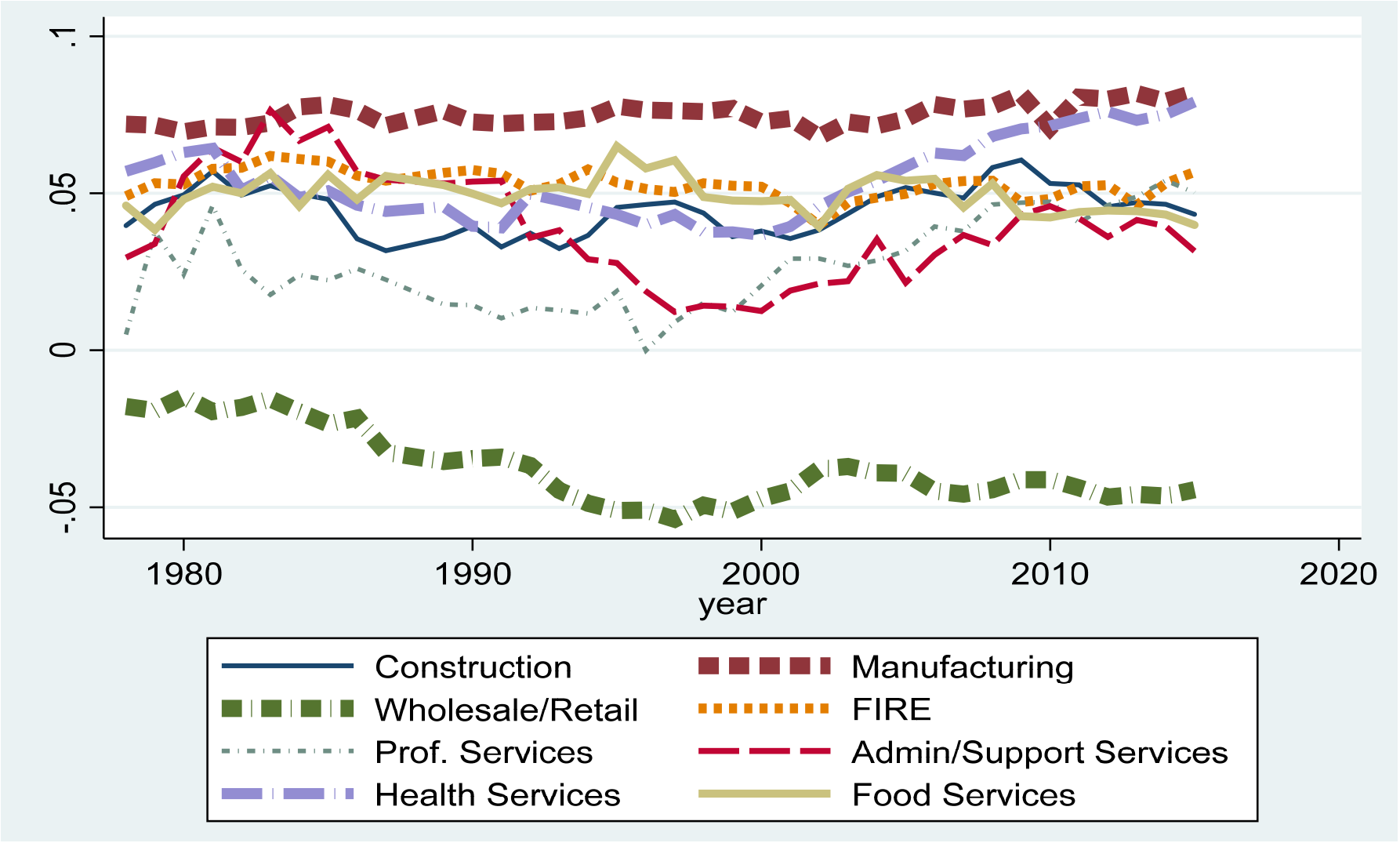
Notes: Obtained from firm-level data in the US Census Longitudinal Business Database. The fitted lines are weighted by industry employment shares.

Controlling for industry composition *and* characteristics accounts ≈2/3 of the fall in LFWP



Notes: From US Census Longitudinal Business Database. The black line shows the benchmark regression estimates from annual employment-weighted regressions. The red line adds industry fixed effects. The Y-axis represents the coefficient from regressing log(average wage) on log(firm employment) by year.

Remaining 1/3 due to drops of LFWP within individual industries – in particular Retail



Notes: From US Census Longitudinal Business Database. Results from regressions of log(average wages) on log(firm employment) by industry and year. Industry line thickness scaled to average employment share from 1978 to 2015.

Summary

1. LFWP falls by about 50%, mainly due to falling large firm AKM Fixed-Effect (not due to less worker sorting)

2. Appears to particularly impact lower paid/educated workers

3. Associated with two industry factors in particular:
   - Shrinking manufacturing (which has a high LFWP)
   - Expansion of low paying service sector (e.g. big box retail)

Outline

1) SSA Data

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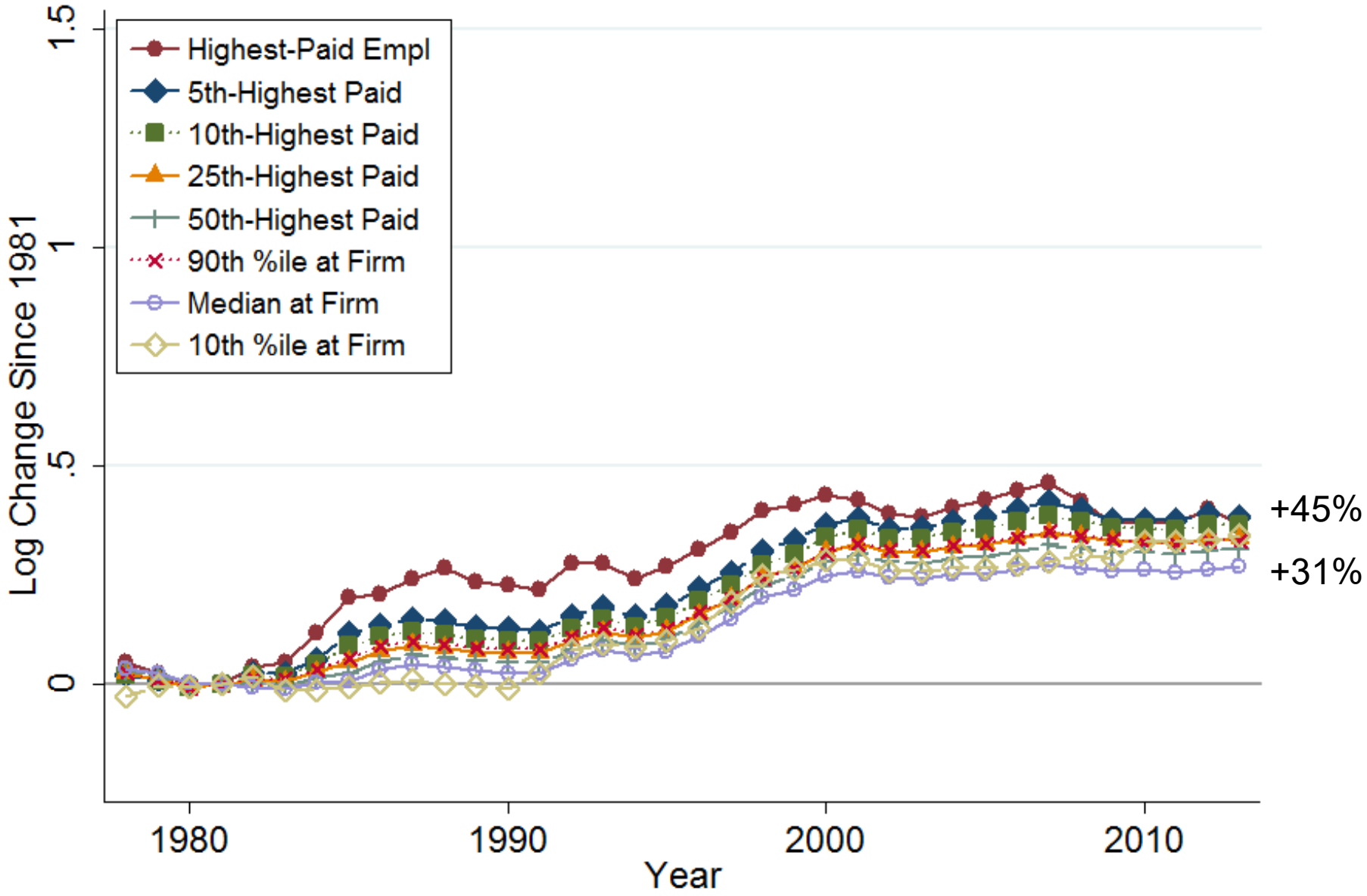
Two offsetting impacts on inequality

(1) Large firms pay more, so reducing the LFWP reduces between firm inequality

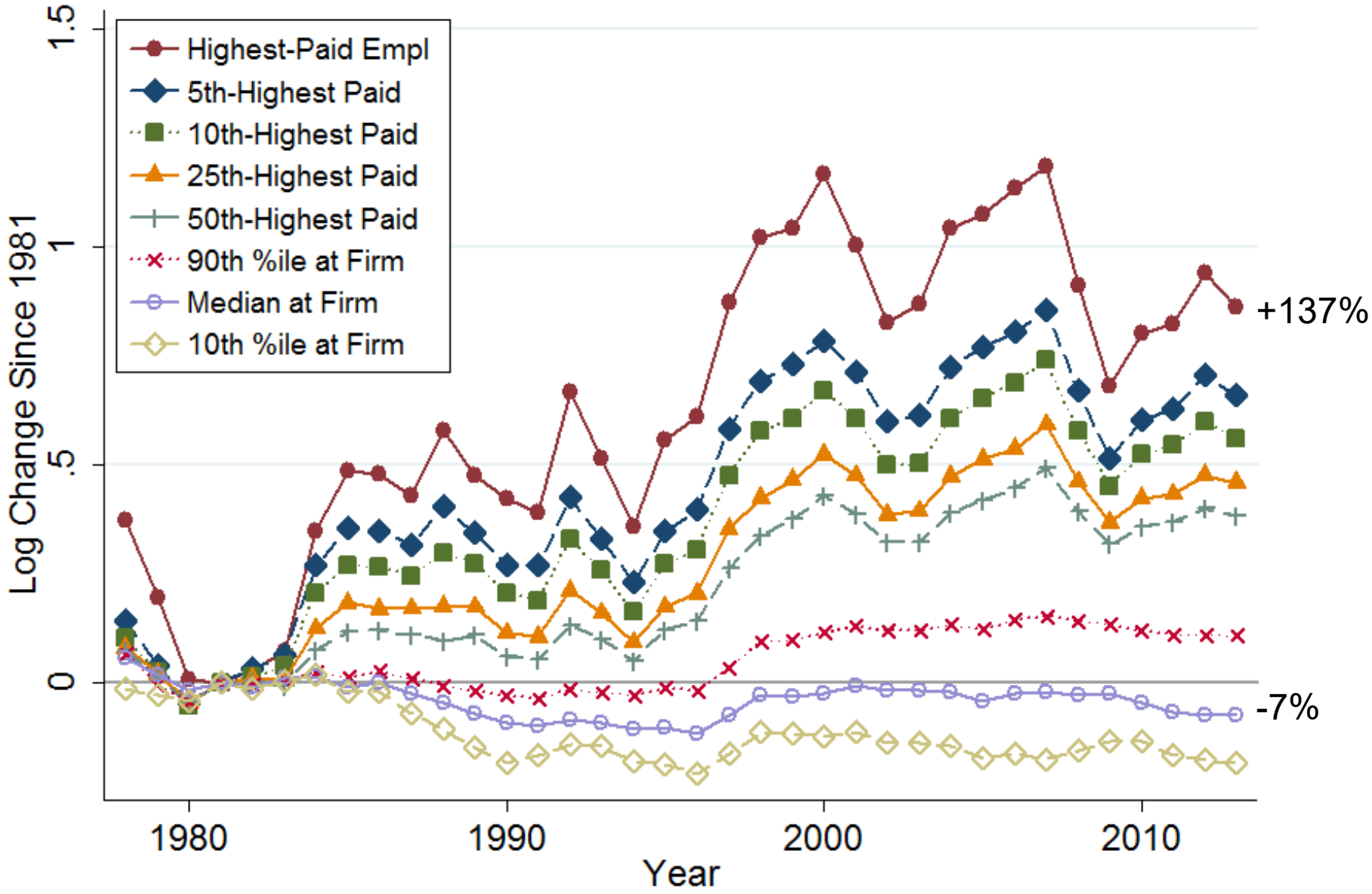
(2) LFWP falling faster for lower-end workers, increasing within firm inequality

Firms 100≤employees<1k, percentiles since 1981



Source: “Firming up inequality” (2019), Song, Price, Guvenen, Bloom and von Wachter

Firms 10k≤employees, percentiles since 1981



Source: “Firming up inequality” (2019), Song, Price, Guvenen, Bloom and von Wachter

Find that the net impact of decline in the LFWP probably relatively small

	Interval 1 1980-1986 (1)	Interval 5 2007-2013 (2)	Interval 1 to 5 Change (3)	Interval 1 to 5 Share (4)
Panel A: Between-/Within-Firm Size Class Variance Decomposition				
Total Variance	0.791	0.918	0.127	-
Between Variance	0.048	0.021	-0.027	-20.9
Within Variance	0.743	0.897	0.154	120.9
*Panel B: AKM Components of **Between-Firm Size Class** Variance*				
Var Worker Effect	0.004	0.005	0.001	0.7
Var Firm Effect	0.026	0.010	-0.016	-12.5
Cov Worker-Firm Effect	0.015	0.008	-0.007	-5.6
*Panel C: AKM Components of **Within-Firm Size Class** Variance*				
Var Worker Effect	0.429	0.546	0.117	92.3
Var Firm Effect	0.142	0.125	-0.017	-13.6
Cov Worker-Firm Effect	-0.063	0.009	0.072	56.6
N (millions)	330.63	413.23	82.59	-

TABLE 3—BETWEEN-/WITHIN-FIRM SIZE CLASS VARIANCE DECOMPOSITION

Notes: Firms are groups into 5 classes based on the size of their workforce: 1 to 20, 21 to 100, 101 to 1000, 1001 to 10000, and over 10000.

The fall in LFWP reduces between firm size class inequality

This fall in between firm size class inequality from the falling large firm AKM firm-effect

Within firm size class inequality rising from more sorting & segregation (Song et al. 2019)

Conclusions

1. US large-firm wage premium (LFWP) has been falling for over 30 years, and now about half of its value in 1980

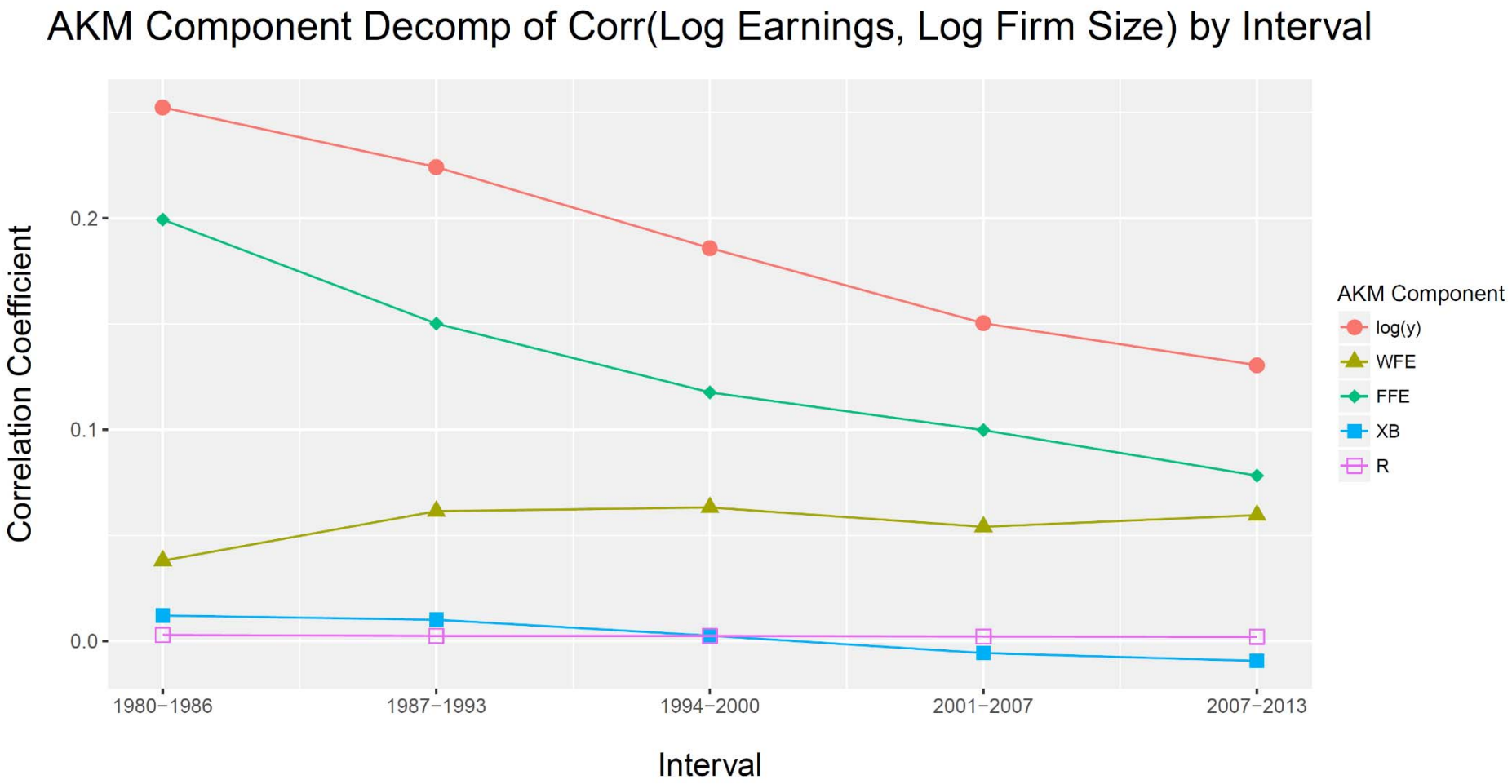
2. Appears to due to large firms are cutting their pay premium

3. Fall in LFWP particularly for lower education employees

4. Declining manufacturing and expanding services (e.g. big-box retail) appears to account for much of this

Back Up

The disappearing large-firm wage premium seems comes from a falling large-firm AKM fixed-effect – in words, large-firms no longer pay “extra”



In numbers, almost 90% of the drop is from the decline in the firm effect

	Dependent Variable:				
	Log Earnings (1)	Worker Effect (2)	Firm Effect (3)	Age Effect (4)	AKM Residual (5)
Interval 1: 1980-86	0.080	0.016	0.057	0.007	0.001
Interval 5: 2007-13	0.039	0.019	0.021	-0.002	0.001
Change	-0.041	0.003	-0.036	-0.008	0.000
Share (Percent)	-	(-7.5)	(86.8)	(20.2)	(0.5)

TABLE 1—CHANGE IN LFWP REGRESSION COEFFICIENTS BY AKM COMPONENTS

The firm size and earnings correlation: 1978-2013