Institutions, Norms, Collective Bargaining and Worker Productivity

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14.662 – Graduate Labor Economics
Spring 2017

Labor Market Institutions

- **Neoclassical conception of labor market**
  - Frictionless Walrasian spot market
- **In reality, large number of institutions that shape…**
  1. Supply and demand for labor
  2. Contracts that can or cannot be struck
  3. Wage setting: Wage floors, overtime rules, rents, comparisons and morale
  4. Non-wage attributes of job: Fringe benefits, safety, flexibility, status, autonomy, authority vs. submission
  5. Norms of behavior: Discrimination, gender preference, racism, tolerance/ intolerance

Taxonomy of Institutions

1. Contracting and collective bargaining environment
2. Labor standards and regulations
3. Social norms
4. Competitive environment

Taxonomy of Institutions

1. **Contracting and collective bargaining environment**
   - What is default contracting regime, e.g., Employment at Will, Master and Servant?
   - Do workers have a right to collectively bargain? Do firms?
   - Does a legal authority oversee union activity and elections? Is there an arbitration regime?
   - What can and cannot be bargained over (rents, quasi-rents; wages, employment levels, job security)?
2. **Labor standards and regulations**
3. **Social norms**
4. **Competitive environment**

Taxonomy of Institutions

1. Contracting and collective bargaining environment
2. Labor standards and regulations
   - Occupational licensing and certification
   - Safety regulations
   - Minimum wages
   - Benefit mandates
   - Overtime laws, limits on hours per day/week
   - Unemployment, injury compensation, and disability insurance
   - Dismissal and severance pay
3. Social norms
4. Competitive environment

Taxonomy of Institutions

1. Contracting and collective bargaining environment
2. Labor standards and regulations
3. Social norms
   - Fairness and reciprocity
   - Tolerance for or aversion to inequality
   - Discrimination, preference, intolerance
   - Identification with profession, firm, mission
4. Competitive environment

Taxonomy of Institutions

1. Contracting and collective bargaining environment
2. Labor standards and regulations
3. Social norms
4. Competitive environment
   - Market power
   - Presence of rents and quasi-rents
   - Degree of national and international competition

Outline

1. Labor coercion and contracting
   - Master and Servant
   - Employment at Will, Right to Work, Yertle the Turtle
2. What do unions do?
   - Efficient bargaining
   - Holdup
   - Voice
   - Inefficient bargaining
3. Firms effects and outsourcing
   - Firm effects, worker effects, and sorting
   - Outsourcing and ‘rent sharing’
4. Competitive environment
   - ‘Superstar’ firms

Coercive Contract Enforcement: Law and the Labor Market in Nineteenth Century Industrial Britain

Suresh Naidu and Noam Yuchtman

AER, 2013

Labor Coercion

Acemoglu and Wolitzky, 2011

"The majority of labor transactions throughout much of history and a significant fraction of such transactions in many developing countries today are "coercive," in the sense that force or the threat of force plays a central role in convincing workers to accept employment or its terms."

Labor Coercion

When does coercion occur?

1. Evsy Domar, 1970
   - Slavery or serfdom should be more likely when labor is scarce so that (shadow) wages are high
2. "Neo-Malthusian" theory of feudal decline (Habakkuk, 1958)
   - Labor coercion started to *decline when labor became scarcer* following the Black Death and other demographic shocks that reduced population and raised wages
   - Coercion more likely when labor is abundant?

Acemoglu and Wolitzky 2011

Principle-agent model

- Worker's outside option is $\tilde{\mu} \geq 0$
- Convey cost of effort function (satisfying inada conditions)

Employer has three instruments

1. Wage conditional on success of project: $w^x > 0$
2. Punishment conditional on failure of project $p^y \geq 0$
3. 'Guns' if contract not accepted $-g < 0$. Convex cost of 'guns,' satisfying inada conditions

Acemoglu and Wolitzky 2011

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Standard P-A constraints

1. Participation: Agent prefers contract to outside option
2. IC: Contract yields a stipulated level of effort (a function of w^x, p^y, g)

Acemoglu and Wolitzky 2011

Standard P-A constraints

1. Participation: Agent prefers contract to outside option
   - Coercion used to 'persuade' worker to *accept* contract by reducing outside option $\tilde{\mu} - g$
   - Worker's alternative is to *accept* is to *escape* to seek better option. But pays g (whipping, etc)
2. IC: Contract yields a stipulated level of effort, a function of w^x, p^y, g, and bargaining weight (Coasian)
   - To induce higher worker effort, firm can raise w^x, lower p^y, and increase g
   - But $p^y \geq 0$: 'Limited liability'
   - Thus, increase g to get more effort
   - *Effort and coercion are complements*

Acemoglu and Wolitzky 2011

Intuition

- Once contract accepted, employer wants worker to *exert effort* to increase odds of success of project
- Effort costly for agent, so need a higher wage to induce more effort
- By reducing outside option, coercion reduces the contingent wage needed to satisfy IR constraint
- *Coercion and effort are complements*

Acemoglu and Wolitzky 2011

General equilibrium interactions

1. When labor is scarce, output is lower so prices are higher
2. Higher value of output, raises value of effort
3. But this raises the employer's value of coercion (to reduce wage payments through use of force)
4. *Thus, tight labor markets can increase coercion*

Labor Coercion

"I attribute the increase [in prosecutions] to the present prosperous state of trade… [A worker] wanted to change his employer, but could not do so. The paucity of hands has increased the value of labor, and the workmen can get in many instances more advantageous terms by leaving their present employ, but those [yearly] contracts [in pottery] prevent their leaving."

Report of the Select Committee on Master and Servant (House of Commons 1866, pp. 60–61)

(Supports the Domar view)

Acemoglu and Wolitzky 2011

General equilibrium interactions

- When labor is scarce, output is lower so prices are higher
- Higher value of output, raises value of effort
- But this raises the employer's value of coercion (to reduce wage payments through use of force)
- Thus, tight labor markets can increase coercion
- *But if tight labor markets raise the outside option fast enough, this will reduce coercion*

Acemoglu and Wolitzky 2011

1. Domar point: *Procyclical coercion*
   - General (market) equilibrium interactions working through the price of output lead to a positive relationship between labor scarcity and coercion
2. Malthusian point: *Procyclical outside option*
   - If the outside option increases fast enough, this reduces effort and therefore coercion
   - Can lead to countercyclical coercion

Acemoglu and Wolitzky 2011

1. Coercion is *statically* inefficient
   - Coercion forcibly transfers worker utility to employer
   - Coercion not a 'conservative commodity'
   - *Possible for coerced workers to have high expected wages and still be worse off than 'free' workers*
   - Why? Their effort is inefficiently (endogenously) high due to reduced outside option
2. Coercion is dynamically inefficient
   - Investing in employer-specific skills would *raise workers' marginal product of effort* (efficient)
   - But this will induce more coercion – holdup
   - Coercion therefore reduces incentives for specific skills accumulation – dynamic inefficiency

What about coercion in Naidu-Yuchtman?

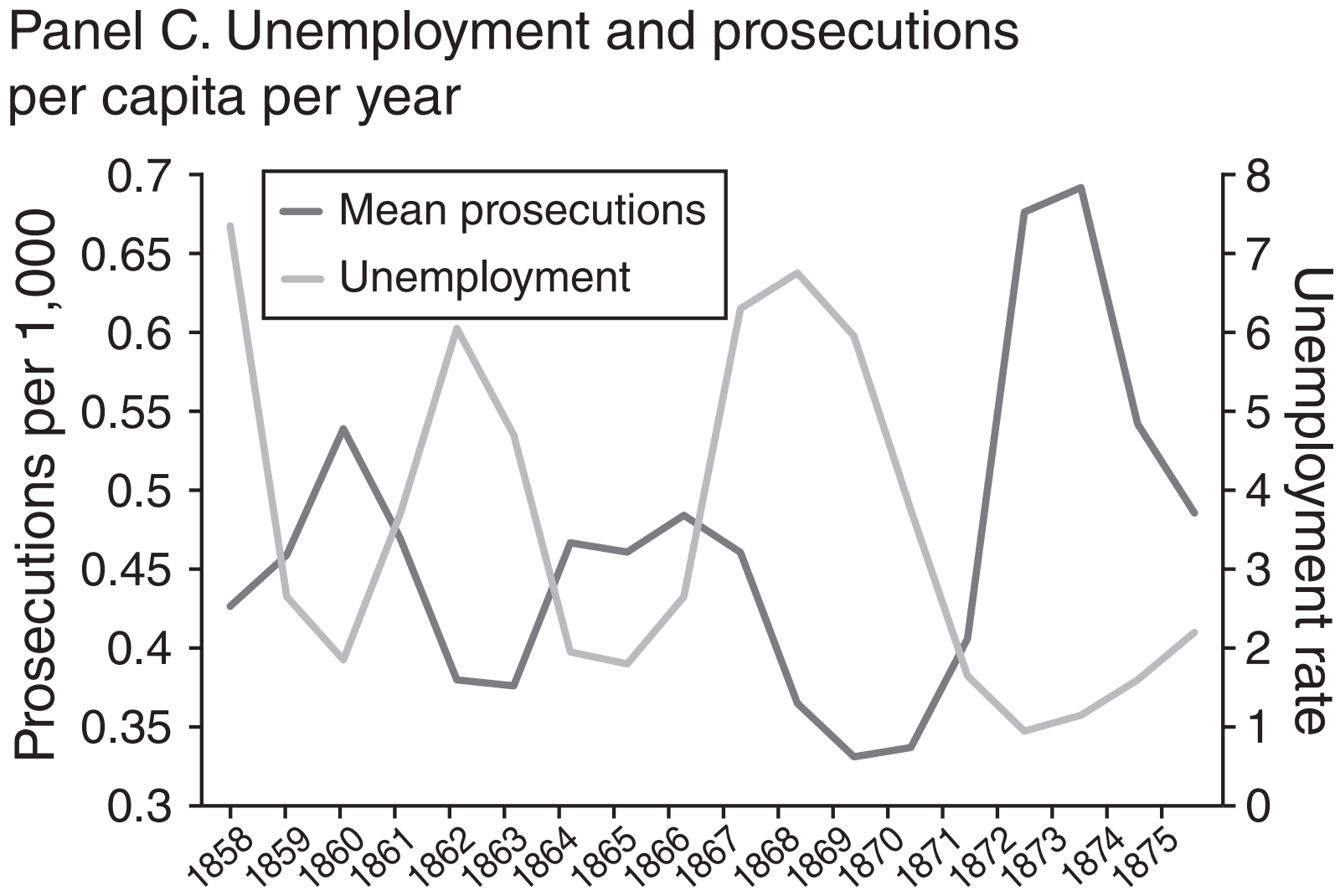
In Naidu-Yuchtman, coercion is one component of *efficient contracting*

- Coercion reduces commitment problems in insurance contracts
- Why different from Acemoglu-Wolitzky?
  - In N-Y, coercion *only applied when worker breaks contract*.
  - In A-W, coercion used to persuade worker to accept contract ("an offer you can't refuse")
  - Fundamentally, these are different mechanisms

Labor Coercion

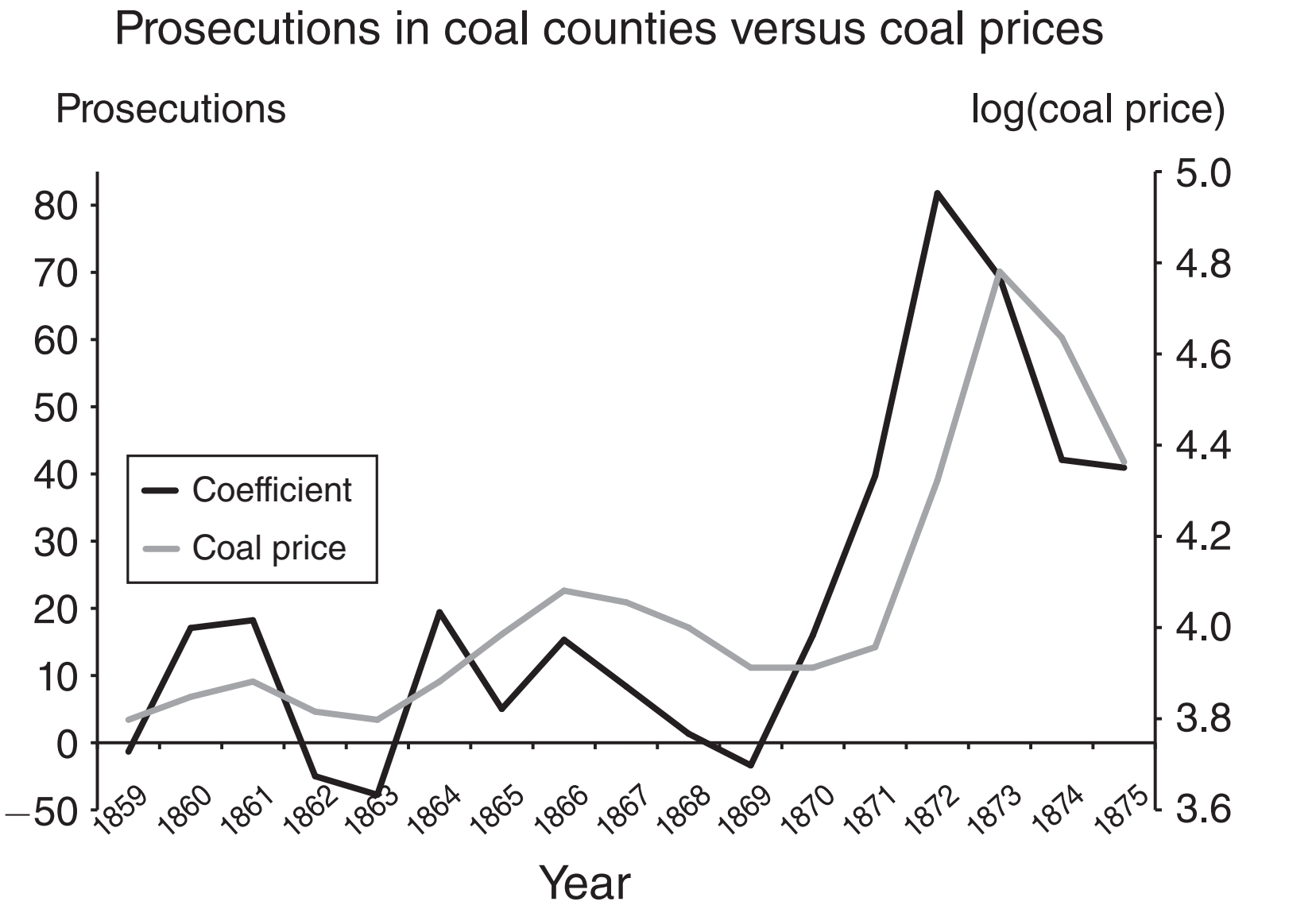
- **1823 United Kingdom: Master and Servant Act**
  - Allowed British employers to "have their workmen sent to the house of correction and held at hard labor for up to three months for breaches of their labor agreements"
  - Criminally (as opposed to civilly) prosecute and severely punish employees for breach of contract.
- **>10K Master-Servant prosecutions annually 1858-75**
  - *More prosecutions for M/S than for petty larceny*
  - Modal case: employee 'absconding' from employer
  - Masters won ~70% of cases against servants
  - Imprisonment and whipping: ~10% of prosecutions

Unemployment and Master and Servant Prosecutions per 1,000 pop per Year, 1858 – 1875



Naidu and Yuchtman 2013

M&S Prosecutions in Coal Counties vs. Coal Prices



Naidu and Yuchtman 2013

Impact of Cotton, Iron, and Coal Prices on Master and Servant Prosecutions by County, 1858 – 1875

TABLE 2—REDUCED FORM SECTORAL SHOCKS ON MASTER AND SERVANT PROSECUTIONS

	OLS						2SLS	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fraction textiles 1851 × log(cotton price ratio)	210.9*** (42.39)			159.3*** (42.02)	145.5*** (46.24)	141.2*** (39.05)	147.2*** (45.04)	127.8* (64.94)
Iron county × log(iron price)		76.03*** (22.90)		51.98** (19.48)	64.58** (27.84)	67.27** (33.18)	90.64* (46.71)	89.83* (49.25)
Coal county × log(coal price)			68.32*** (15.90)	41.25*** (10.11)	35.63** (14.31)	27.50*** (8.428)	25.22* (14.92)	26.82** (12.05)
log(population)	145.5*** (50.52)	124.8*** (42.20)	73.26* (36.68)	79.13** (35.09)	41.84 (36.18)	54.69 (115.2)	83.75** (36.70)	39.21 (38.10)
F-statistic *p*-value on joint significance				0.000	0.000	0.000	0.000	0.000
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time-varying controls	No	No	No	No	Yes	Yes	No	Yes
County-specific trends	No	No	No	No	No	Yes	No	No
Observations	3,942	3,942	3,942	3,942	3,942	3,942	3,942	3,942

Notes: Dependent variable is absolute number of master and servant prosecutions. Standard errors, clustered on county, included in parentheses. Time varying controls are year specific effects of 1851 income, 1851 population density, 1851 proportion urban, and a Wales dummy. Columns 1 through 6 are estimated using OLS; columns 7 and 8 use 2SLS, where distance to Lancashire is used as an instrument for employment share in textiles and iron ore production is used as an instrument for pig iron production. First stage results from columns 7 and 8 are presented in the online Appendix.

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Wages Rise in High Prosecution Counties Following 1875 Repeal of Master and Servant

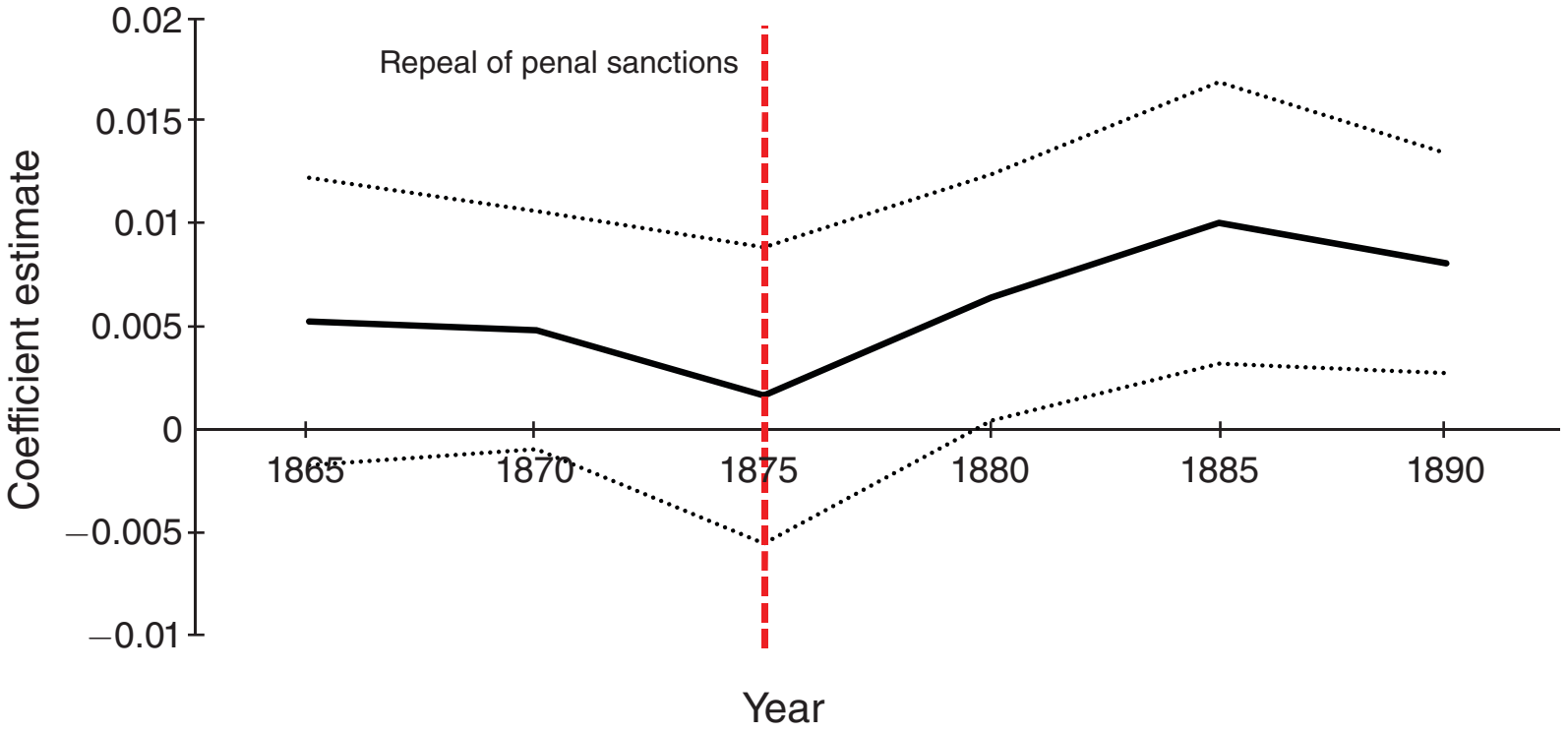

FIGURE 5. WAGES IN HIGH PROSECUTION COUNTIES RELATIVE TO LOW PROSECUTION COUNTIES, BEFORE AND AFTER REPEAL OF PENAL SANCTIONS

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Wages Rise in High Prosecution Counties Following 1875 Repeal of Master and Servant (1851 – 1905 data)

TABLE 5—EFFECT OF REPEAL ON WAGE LEVELS, BY AVERAGE PROSECUTIONS

	OLS							Arellano-Bond
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post-1875 × log (average prosecutions)	0.0206** (0.0082)	0.0130* (0.0072)	0.0122* (0.0061)	0.0030** (0.0013)	0.0053*** (0.0017)	0.0073*** (0.0024)	0.0026** (0.0013)	0.0133** (0.0053)
Population density			−0.0570 (0.0583)		−0.0105 (0.00805)	−0.00453 (0.0124)	−0.00722 (0.00625)	−0.0455* (0.0274)
Proportion urban			−0.0488 (0.0461)		0.0009 (0.0022)	0.0038 (0.0023)	−0.0012 (0.0018)	0.0010 (0.0047)
log (income)			0.0291 (0.0312)		0.0042 (0.0035)	0.0034 (0.0038)	0.0037 (0.0030)	0.0194 (0.0136)
log (population)	0.1050*** (0.0279)	0.0559** (0.0219)	0.0944** (0.0389)	0.0113*** (0.0038)	0.0177*** (0.0059)	0.0158* (0.0090)	0.0123*** (0.0046)	0.0511 (0.0343)
Union membership		0.170 (0.1080)	0.0881 (0.0955)	0.0648** (0.0282)	0.0170 (0.0172)	0.0234 (0.0235)	0.0606** (0.0298)	0.0437 (0.0500)
Lagged log (wage)				0.861*** (0.0198)	0.849*** (0.0125)	0.837*** (0.0111)	0.836*** (0.0110)	0.813*** (0.0207)
Time-varying controls	No	Yes	Yes	No	Yes	Yes	Yes	Yes
Labor market controls	No	No	No	No	No	Yes	No	No
Post-1875 × county controls	No	No	No	No	No	No	Yes	No
County-specific recession effect	No	No	Yes	No	Yes	Yes	Yes	Yes
Observations	2,860	2,860	2,392	2,808	2,392	1,685	2,392	2,392

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Wages Rise in High Prosecution Counties Following 1875 Repeal of Master and Servant

TABLE 6—WAGE RESPONSES TO LABOR DEMAND SHOCKS, PRE- AND POST-REPEAL OF PENAL SANCTIONS

	Pre-repeal				Post-repeal			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fraction textiles 1851 × log(cotton price ratio)	−0.0071			−0.0017	0.278***			0.102
	(0.109)			(0.107)	(0.0951)			(0.0925)
Iron county × log(iron price)		−0.0028		−0.0081		0.175***		0.126**
		(0.0214)		(0.0215)		(0.0633)		(0.0494)
Coal county × log(coal price)			0.0149	0.0167			0.101***	0.105***
			(0.0205)	(0.0203)			(0.0176)	(0.0196)
Iron county × log(steel price)						−0.168**		−0.158**
						(0.0638)		(0.0619)
log(population)	0.0517	0.0520	0.0459	0.0460	0.124***	0.118***	0.102***	0.0946***
	(0.0368)	(0.0356)	(0.0349)	(0.0349)	(0.0409)	(0.0380)	(0.0342)	(0.0314)
F-statistic *p*-value on joint significance				0.852				0.000
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time-varying controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,300	1,300	1,300	1,300	1,560	1,560	1,560	1,560

Note: Bessemer diffusion

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Labor Coercion

1. **Domar point: Procyclical coercion**
   - General (market) equilibrium interactions working through the price of output lead to a positive relationship between labor scarcity and coercion
   - *This is seen while M&S in effect*
2. **Malthusian point: Procyclical outside option**
   - If the outside option increases fast enough, this reduces effort and therefore collusion
   - Can lead to countercyclical coercion
   - *Once M&S rescinded, we we see wages (and hence outside option) rising with labor market tightness*
   - *Breaks link between tightness and coercion*

Outline

1. Labor coercion and contracting
   - Master and Servant
   - Employment at Will, Right to Work, Yertle the Turtle
2. What do unions do?
   - Efficient bargaining
   - Holdup
   - Voice
   - Inefficient bargaining
3. Firms effects and outsourcing
   - Firm effects, worker effects, and sorting
   - Outsourcing and 'rent sharing'
4. Competitive environment
   - 'Superstar' firms

What Came After Master-Servant?
Employment at Will

Employment-at-will doctrine famously articulated by the Tennessee Supreme Court in 1884

- "Men must be left, without interference to buy and sell where they please, and to discharge or retain employees at will for good cause or for no cause, or even for bad cause without thereby being guilty of an unlawful act per se"
  (*Payne v. Western & Atlantic Railroad*, Tennessee 1884)

Employment at Will

Texas Supreme Court 1985

- "Absolute employment-at-will is a relic of early industrial times, conjuring up visions of the sweatshops described by Charles Dickens and his contemporaries. The doctrine belongs in a museum, not in our law."
  (*Sabine Pilot Service, Inc. v. Hauck*, Texas 1985)

Count of U.S. States Recognizing Exceptions to Employment at Will Doctrine

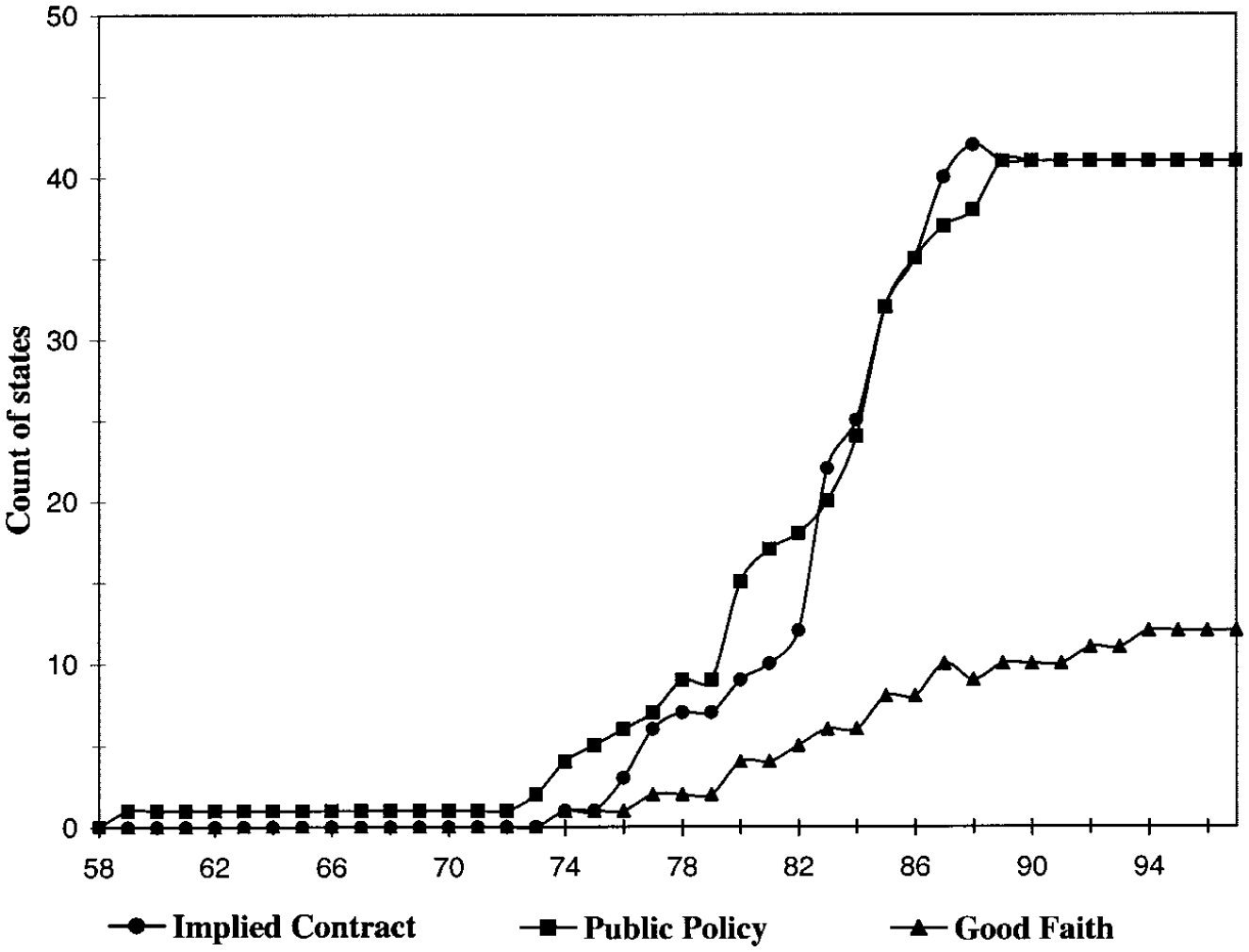
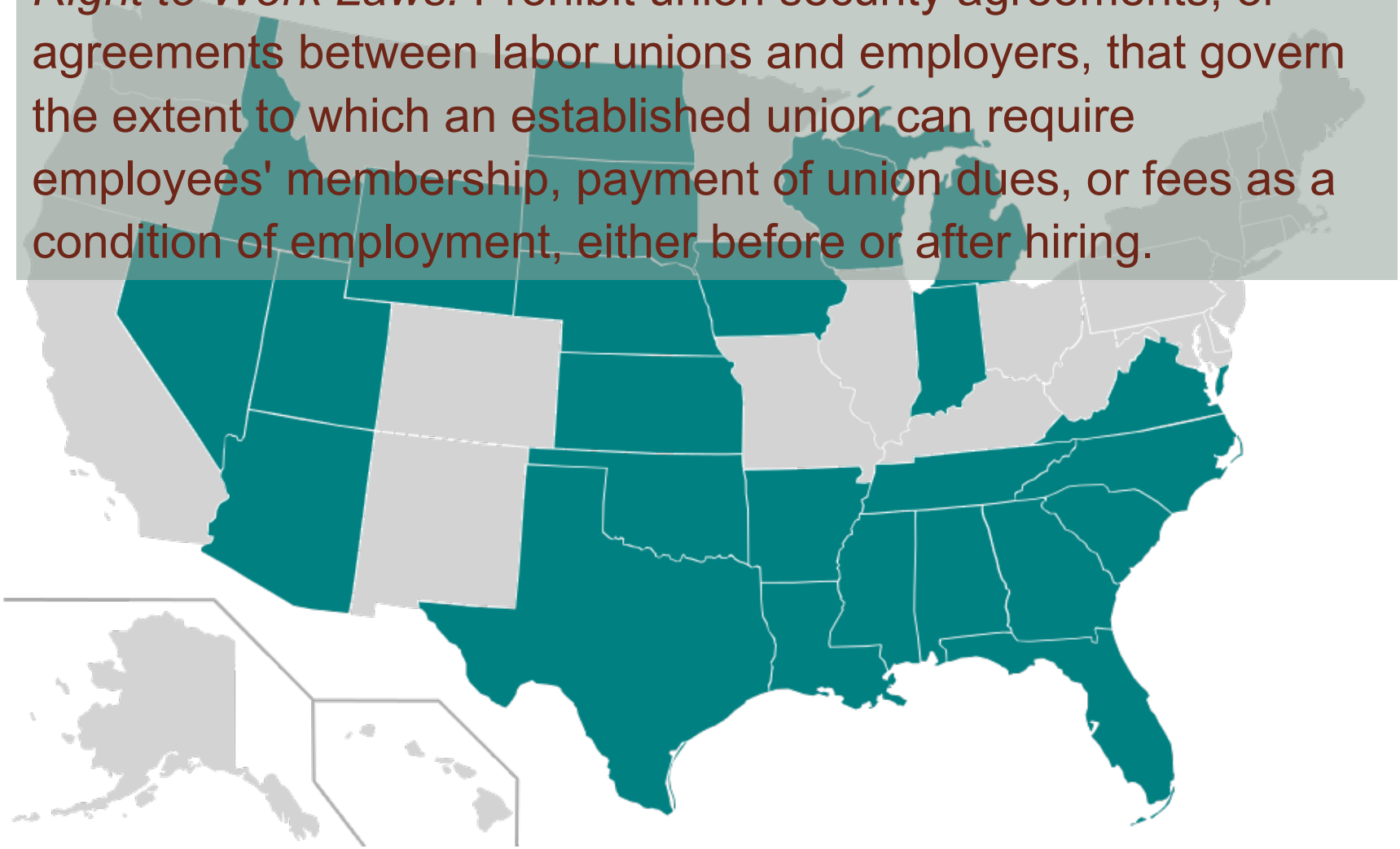


FIG. 1.—Count of states recognizing exceptions to the employment-at-will doctrine, 1958–97.

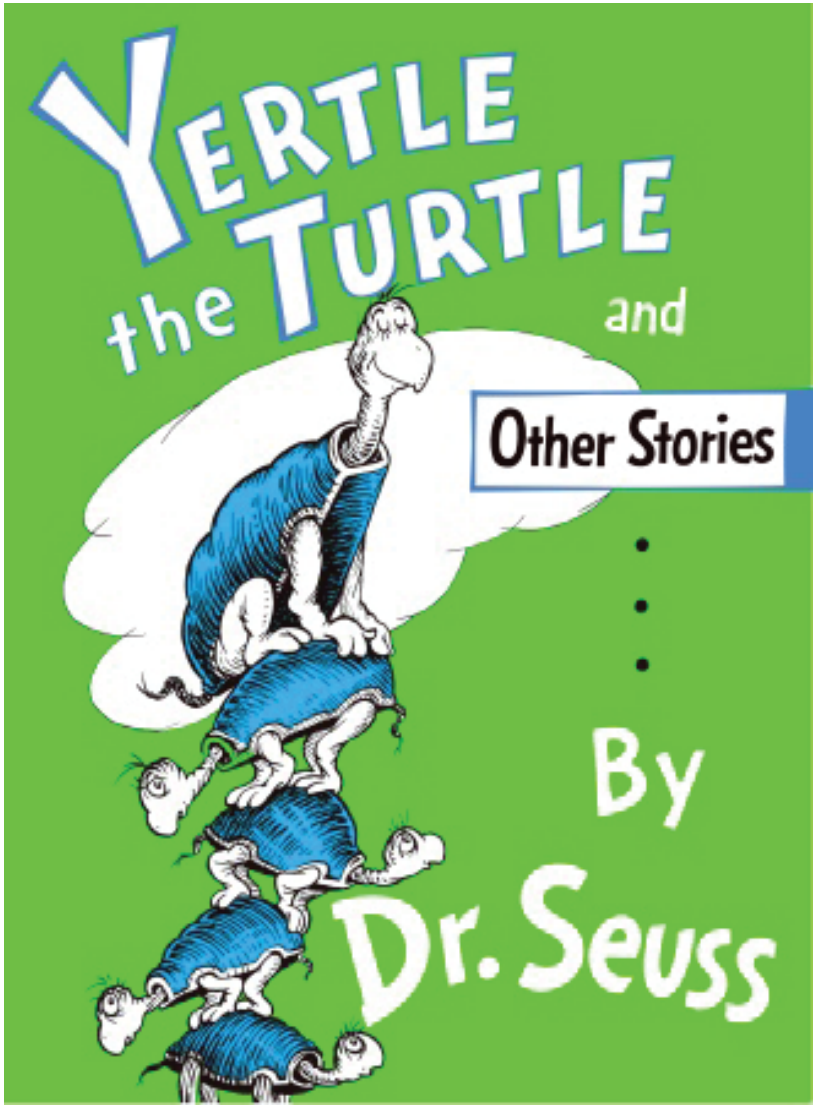
Autor 2003

States with Right to Work Laws as of 2015

Right to Work Laws: Prohibit union security agreements, or agreements between labor unions and employers, that govern the extent to which an established union can require employees' membership, payment of union dues, or fees as a condition of employment, either before or after hiring.



Labor Coercion



On the far-away island of Sala-ma-Sond, Yertle the Turtle was king of the pond.

A nice little pond. It was clean. It was neat.

The water was warm. There was plenty to eat.

The turtles had everything turtles might need.

And they were all happy. Quite happy indeed.

Labor Coercion

They were... until Yertle, the king of them all,

Decided the kingdom he ruled was too small.

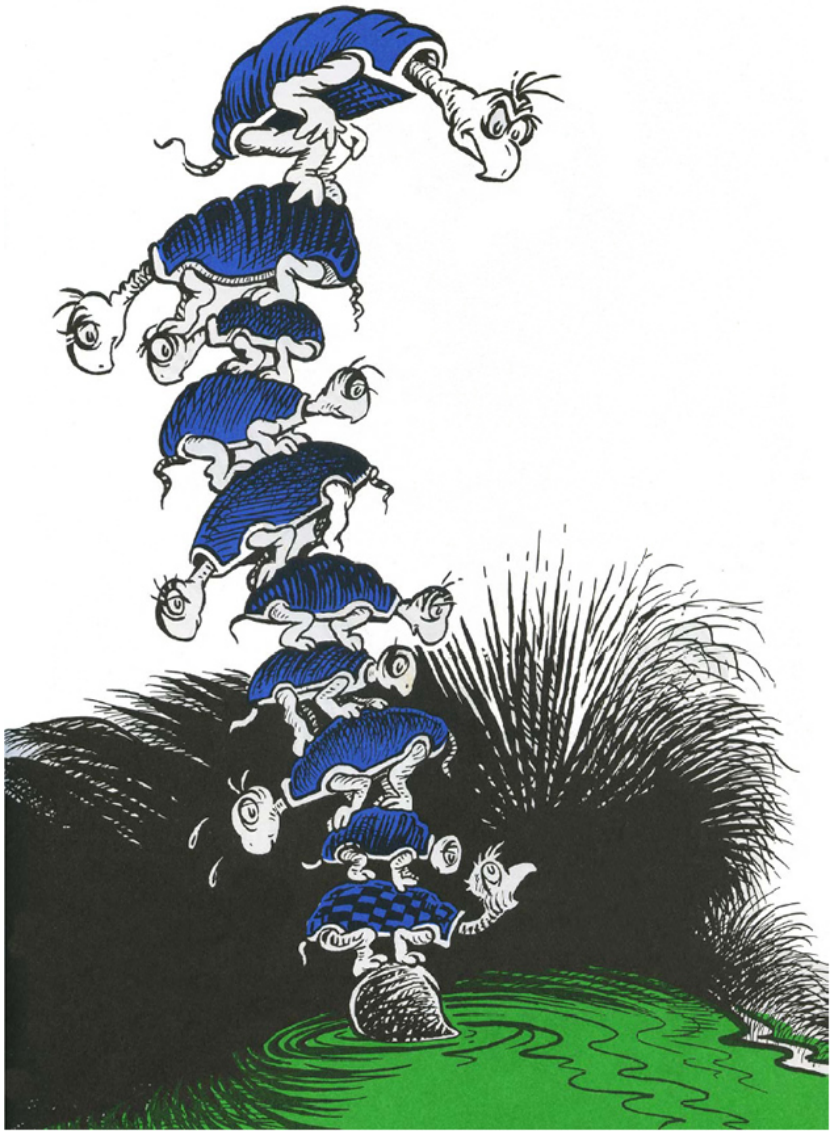
“I'm ruler,” said Yertle, “of all that I see.

But I don't see enough. That's the trouble with me.

With this stone for a throne, I look down on my pond

But I cannot look down on the places beyond.”

Labor Coercion



So Yertle, the Turtle King, lifted his hand

And Yertle, the Turtle King, gave a command.

He ordered nine turtles to swim to his stone

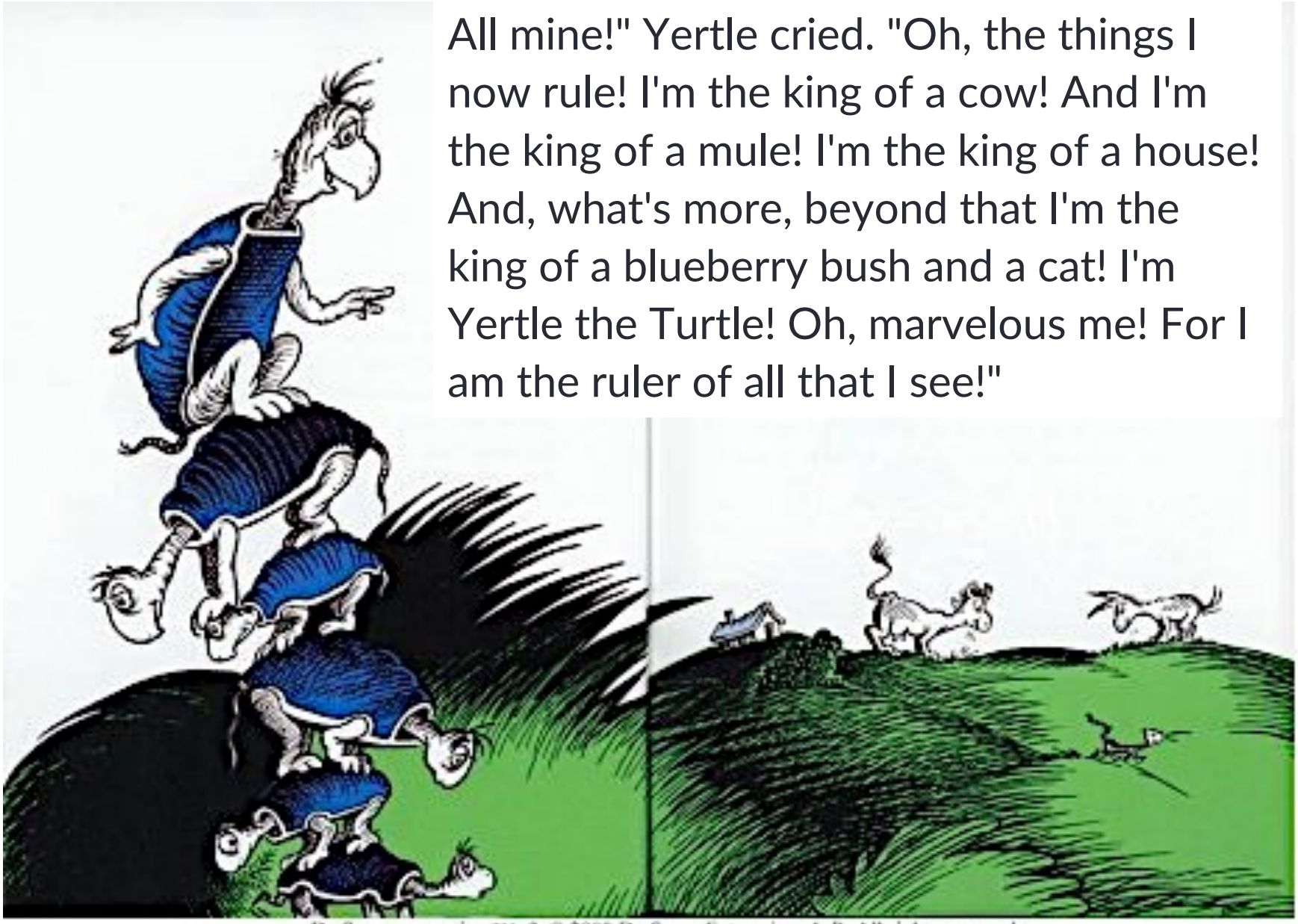
And, using these turtles, he built a new throne.

He made each turtle stand on another one's back

And he piled them all up in a nine-turtle stack.

Labor Coercion

All mine!" Yertle cried. "Oh, the things I now rule! I'm the king of a cow! And I'm the king of a mule! I'm the king of a house! And, what's more, beyond that I'm the king of a blueberry bush and a cat! I'm Yertle the Turtle! Oh, marvelous me! For I am the ruler of all that I see!"



Labor Coercion – Enter the Turtle Named Mack

“Your Majesty, please... I don't like to complain,

But down here below, we are feeling great pain.

I know, up on top you are seeing great sights,

But down here at the bottom we, too, should have rights.

We turtles can't stand it. Our shells will all crack!

Besides, we need food. We are starving!” groaned Mack.

Labor Coercion

“You hush up your mouth!” howled the mighty King Yertle.

“You've no right to talk to the world's highest turtle.

I rule from the clouds! Over land! Over sea!

There's nothing, no, NOTHING, that's higher than me!”

Labor Coercion

But, as Yertle, the Turtle King, lifted his hand

And started to order and give the command,

That plain little turtle below in the stack,

That plain little turtle whose name was just Mack,

Decided he'd taken enough. And he had.

And that plain little lad got a bit mad.

And that plain little Mack did a plain little thing. He burped!

And his burp shook the throne of the king!

Labor Coercion

Outline

1. Labor coercion and contracting
2. What do unions do?
   - Efficient bargaining
   - Holdup
   - Voice
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   - Firm effects, worker effects, and sorting
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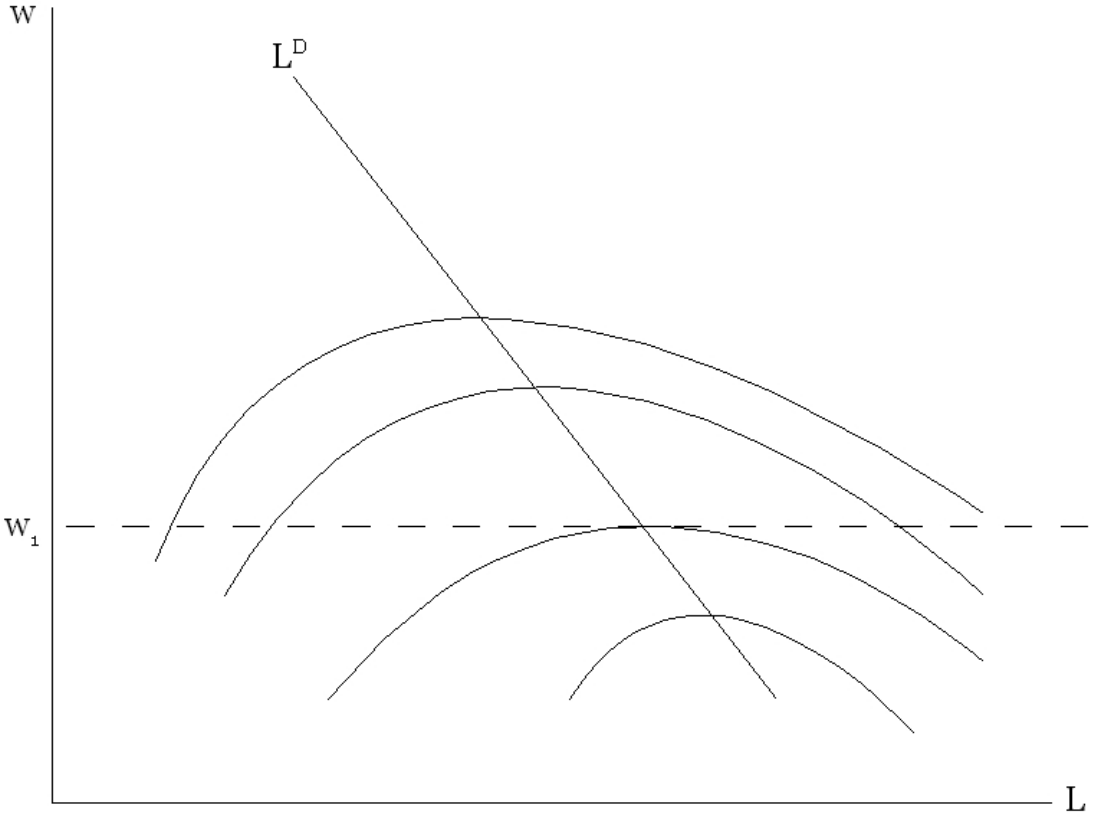
4. Competitive environment
   - 'Superstar' firms

What Do Unions Do?

1. Efficient bargaining view
   - No necessary reduction in profits
   - Higher employment (and lower wages) than in free market equilibrium
2. Rent extraction (holdup) view
3. 'Voice' view
4. Inefficient bargaining view

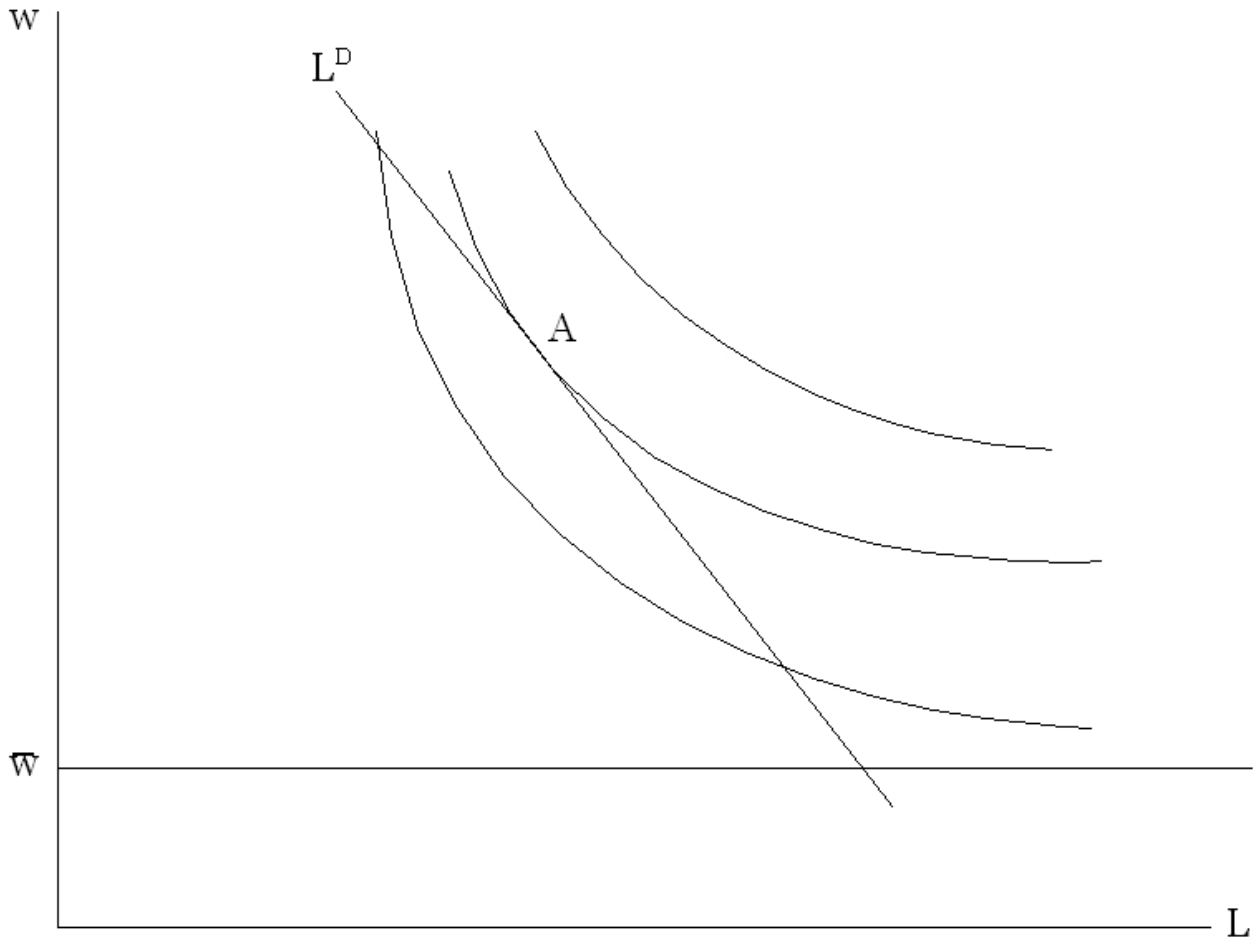
Labor Demand and Isoprofit Curves

Figure 1: Labour Demand Curve



Lawson 2010

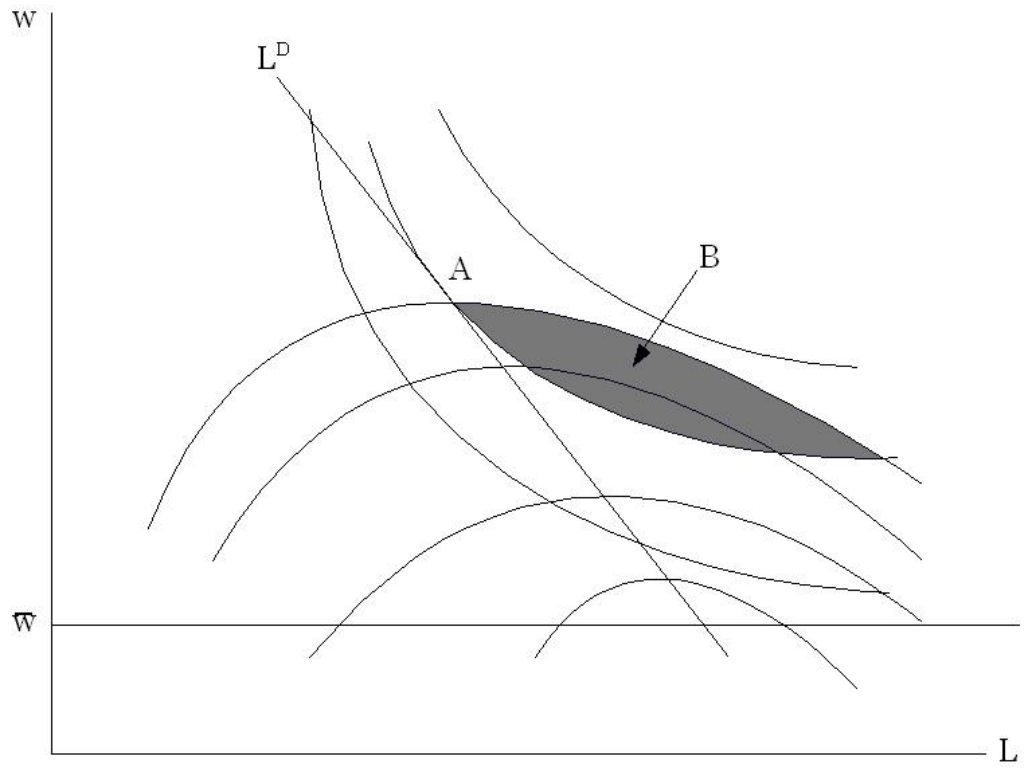
Tangency of Union Indifference Curves to Labor Demand Curve



Lawson 2010

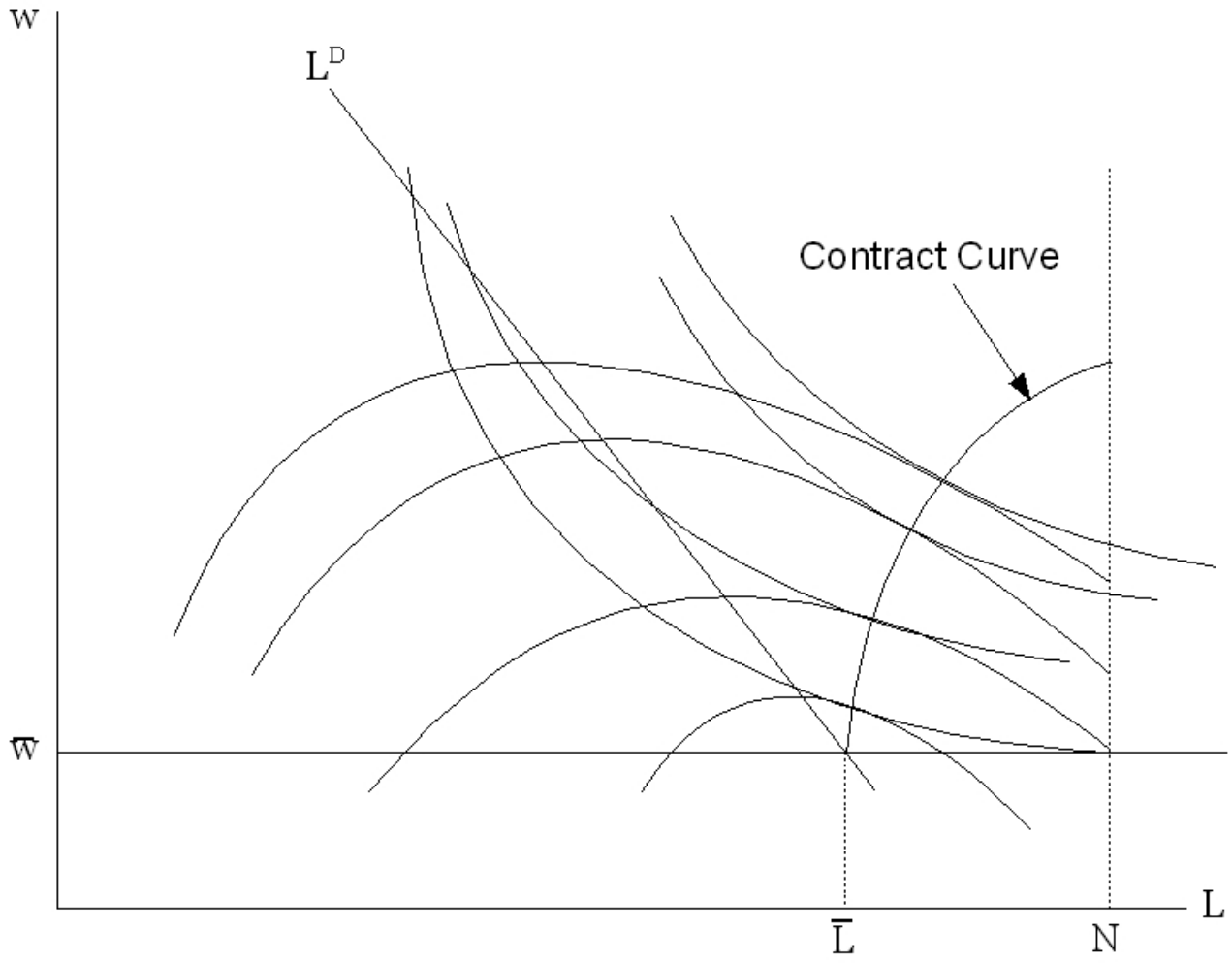
Inefficiency of Bargain if Union Chooses Wage, Firm Chooses Employment

Figure 3: Inefficiency of Monopoly Union Outcome



Lawson 2010

Efficient Union Bargaining over Wages and Employment



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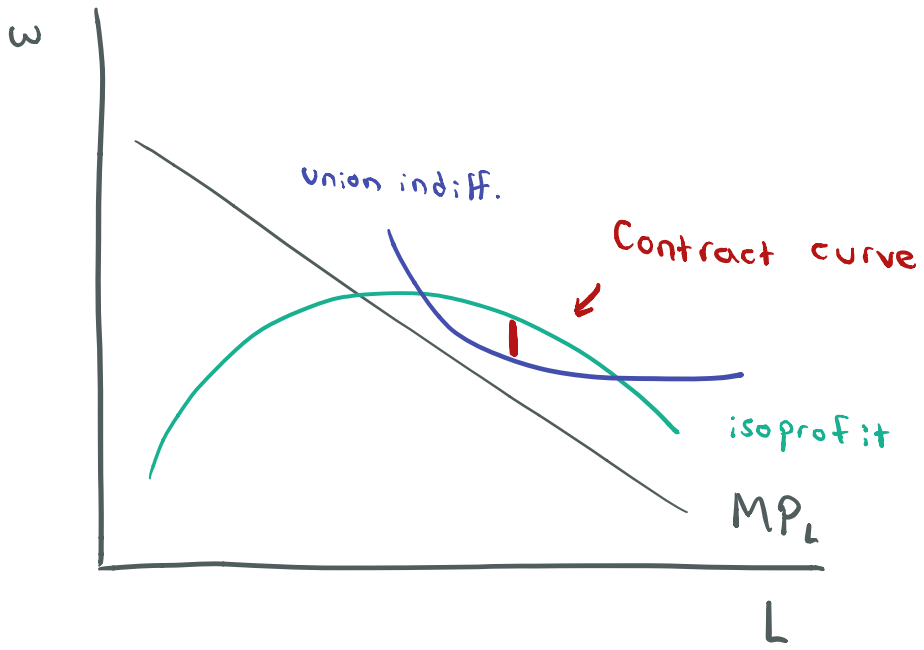
Efficient Union Bargaining over Wages and Employment



Firm solves

$$\underset{\{L,w\}}{\text{MAX}} \; p(f(L))f(L) - wL$$

$$\text{s.t.} \quad \underbrace{U(w,L)}_{\text{union utility fn}} \geq \bar{u}$$

FOCs:

$$-L + \lambda U_w(\cdot) = 0$$

&

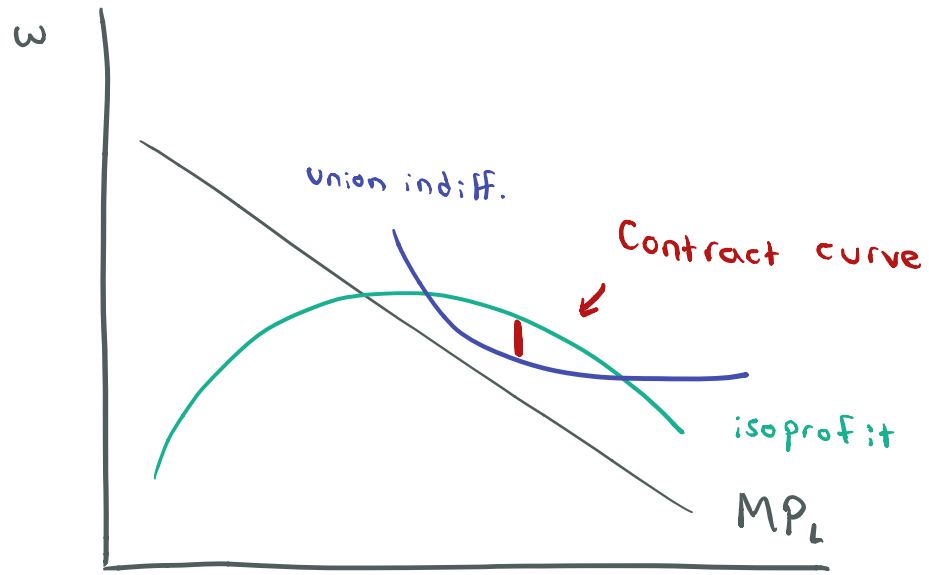
$$p'\underbrace{\left(f(L)\right)f'(L)f(L) + p\left(f(L)\right)f'(L)}_{= \frac{\partial}{\partial L} pf(L) \equiv R(L)} - w + \lambda U_L(\cdot) = 0$$

$$\frac{L}{U_w(\cdot)} = \lambda = \frac{w-R}{U_L(\cdot)} \Longleftarrow$$

$$\Downarrow$$

$$\frac{w-R}{L} = \frac{U_L(\cdot)}{U_w(\cdot)} \quad \text{along contract curve.}$$

Efficient Union Bargaining over Wages and Employment



Firm solves

$$\underset{\{L,w\}}{\text{MAX}} \; p(f(L))f(L) - wL$$

$$\text{s.t.} \quad \underbrace{U(w,L)}_{\text{union utility fn}} \geq \bar{u}$$

Now suppose $U(w,L) = (w - w^0)L$.

Eqbm cond'n is $\frac{w-R}{L} = \frac{w-w_0}{L} \iff R(L) = w_0$

So L along the contract curve depends on outside option w_0 but NOT w itself.

David Card, "Unexpected Inflation, Real Wages, and Employment Determination in Union Contracts" *AER 1990*

"Finally, the empirical results suggest that employment outcomes in union contracts are determined on a conventional downward-sloping demand schedule, taking the prevailing contract wage as given. There is no indication that employment is related to outside wages in a manner consistent with a simple model of efficient contracting."

David Card, "Unexpected Inflation, Real Wages, and Employment Determination in Union Contracts" *AER 1990*

TABLE 4—ESTIMATED EMPLOYMENT DETERMINATION EQUATIONS

	OLS		IV[a]		IV[b]			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1. Year Effects	No	Yes	No	Yes	No	Yes	No	Yes
2. Real Industry Input Price	0.22	0.16	0.20	0.16	0.19	0.16	0.19	0.15
	(0.06)	(0.08)	(0.06)	(0.08)	(0.06)	(0.08)	(0.06)	(0.08)
3. Real Industry Output	0.20	0.29	0.22	0.28	0.23	0.28	0.23	0.28
	(0.07)	(0.09)	(0.07)	(0.09)	(0.07)	(0.09)	(0.07)	(0.09)
4. Real Industry Output (Previous Year)	0.17	0.10	0.15	0.11	0.14	0.11	0.14	0.10
	(0.06)	(0.07)	(0.07)	(0.07)	(0.06)	(0.07)	(0.07)	(0.07)
5. Real Wage at End of Contract	−0.15	−0.02	−0.28	−0.45	−0.39	−0.51	−0.42	−0.40
	(0.08)	(0.10)	(0.17)	(0.35)	(0.12)	(0.29)	(0.17)	(0.42)
6. Unexpected Inflation During Contract	–	–	–	–	–	–	−0.03	0.10
							(0.13)	(0.20)
7. Standard Error	0.196	0.194	0.196	0.195	0.196	0.196	0.196	0.195
8. Test for Exclusion of Year Effects (p-Value)	–	0.003	–	0.006	–	0.004	–	0.004
9. Overidentification Test[c]	–	–	–	–	0.76	0.97	0.74	0.96

Note: Standard errors in parentheses. Sample size is 1293. All regressions include a (first-differenced) linear trend. The mean and standard deviation of the dependent variable are −0.017 and 0.201. Standard errors are corrected for first-order moving average error component and heteroskedasticity.

[a]Instrumental variable for real wage at end of contract is the unanticipated change in real wages during the contract.

[b]Instrumental variables for real wage at end of the contract include 18 year effects, the real wage in manufacturing at the start of the contract, and the unanticipated change in real wages during the contract.

[c]Probability value of test for orthogonality of residuals and instruments. The test statistic is distributed as chi-squared with 19 degrees of freedom in all cases.

What Do Unions Do?

1. Efficient bargaining view
2. Rent extraction (holdup) view
   - Grout ‘84 ECMA insight: Bargaining over sunk costs
   - See Los Angeles port workers
     - International Long-shore and Warehouse Union represents 20,000 dockworkers
     - Current contract pays $26 to $41 an hour, with full healthcare for members + copious overtime
3. ‘Voice’ view
4. Inefficient bargaining view

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   - Freeman and Medoff, 1984, *What do Unions Do?*
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What Do Unions Do?

1. Efficient bargaining view
2. Rent extraction (holdup) view
3. 'Voice' view
4. Inefficient bargaining view
   - "The best of all monopoly profits is a quiet life." J. R. Hicks, *Econometrica*, 1935
   - Harvey Leibenstein: "Allocative Efficiency vs. X-Efficiency" *AER '66*
   - Carmichael-MacLeod, 2000
   - Schmitz, 1995

What Determines Productivity? Lessons from the Dramatic Recovery of the U.S. and Canadian Iron Ore Industries Following Their Early 1980s Crisis

James A. Schmitz Jr.

Journal of Political Economy, 2005

Context: Great Lakes Iron Ore

- 1880 – 1980
  - Minnesota mines, plus a few others in the Great Lakes region, were sole suppliers of iron ore to the Great Lakes region steel market
  - Why? Low transport costs from ore mines to Great Lakes steel producers
  - Outside producers were uncompetitive in region
- Early 1980s
  - Brazilian ore producers began offering iron ore to Chicago at prices substantially below prices of local iron ore
  - Minnesota mines challenged in their only market
  - Canadian producers faced similar existential threat

Pig Iron Production by Region, 1950 – 1996

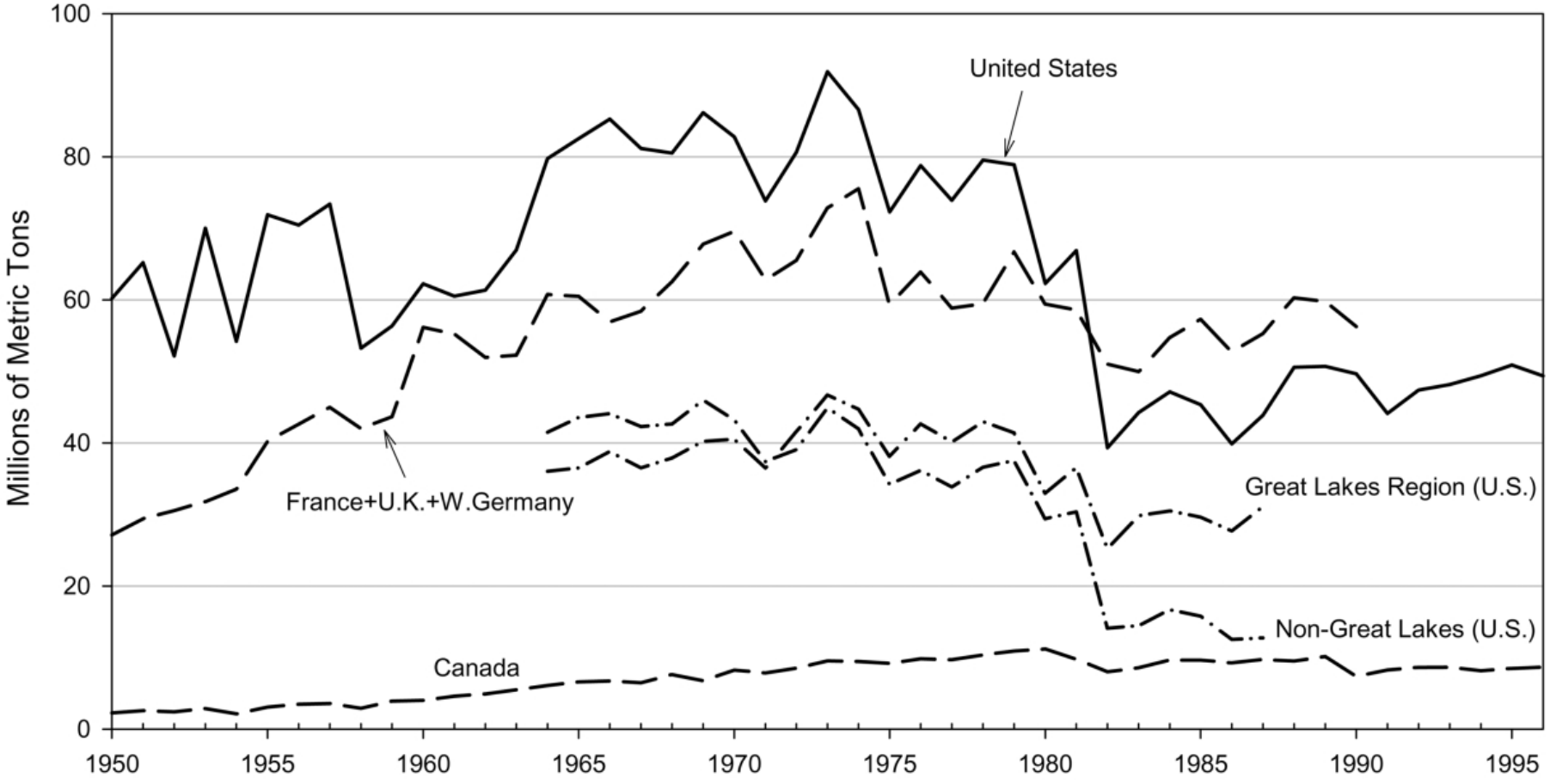

FIG. 1.—Pig iron production by various regions, 1950–96

Schmitz 2005

Context: Great Lakes Iron Ore

Industry response

1. Labor productivity doubled in a few years
2. Materials productivity increased by > 50%
3. Capital productivity increased as well
4. Potential foreign competition was pushed out of the Great Lakes region

How did this occur – i.e., what the heck happened?

Output and Labor Productivity in Minnesota Iron Ore Pellet Industry, 1965 – 1995

FIG. 2.—Production and labor productivity: Minnesota pellet industry

Schmitz 2005

Decomposition of Labor Productivity Growth in Minnesota Pellet Industry: Within/Between Mines

TABLE 2
DECOMPOSITION OF INDUSTRY LABOR PRODUCTIVITY GROWTH: MINNESOTA PELLET INDUSTRY

GROWTH BETWEEN 1980 AND	OVERALL INDUSTRY GROWTH (1)	SHARE OF INDUSTRY GROWTH DUE TO: Within Mines (2)	Between Mines (3)	Cross Mines (4)	Closing Mines (5)
1981	10.20	105	−16	11	0
1982	0	. . .	. . .	. . .	. . .
1983	13.60	79	16	5	0
1984	55.10	93	6	1	0
1985	67.90	97	3	0	0
1986	77.50	87	7	6	0
1987	121.50	77	3	14	6
1988	108.80	76	3	15	7
1989	101.80	73	3	16	7
1990	100.90	95	7	−2	0
1991	87.20	96	9	−5	0
1992	91.70	92	9	−1	0
1993	104.40	108	6	−13	0
1994	113.70	106	6	−12	0
1995	119.90	101	6	−7	0

NOTE.—All figures are percentages. Ellipses in place of a figure mean that it is not defined (growth was zero between 1980 and 1982). Weights are the mine's share of industry hours.

Schmitz 2005

TFP and Its Subcomponents in Canadian Ore Industry, 1980 – 1995

TABLE 1
TOTAL FACTOR PRODUCTIVITY: CANADIAN IRON ORE INDUSTRY

YEAR	TOTAL FACTOR PRODUCTIVITY	CALCULATED FROM		
		Y_t/N_t	$(M_t/N_t)^{S_{M_t}}$	$(K_t/N_t)^{S_{K_t}}$
1981	1.00	1.00	1.00	1.00
1982	.91	.94	.98	1.06
1983	.86	.97	1.06	1.07
1984	.91	1.09	1.14	1.05
1985	1.00	1.19	1.08	1.10
1986	1.33	1.61	1.09	1.11
1987	1.34	1.64	1.05	1.16
1988	1.46	1.78	1.10	1.11
1989	1.48	1.79	1.08	1.12
1990	1.36	1.57	1.04	1.11
1991	1.40	1.64	1.06	1.11
1992	1.41	1.58	1.01	1.11
1993	1.50	1.59	1.00	1.06
1994	1.54	1.75	1.05	1.07
1995	1.51	1.64	1.02	1.06

Schmitz 2005

TFP and Its Subcomponents in Canadian Ore Industry, 1980 – 1995

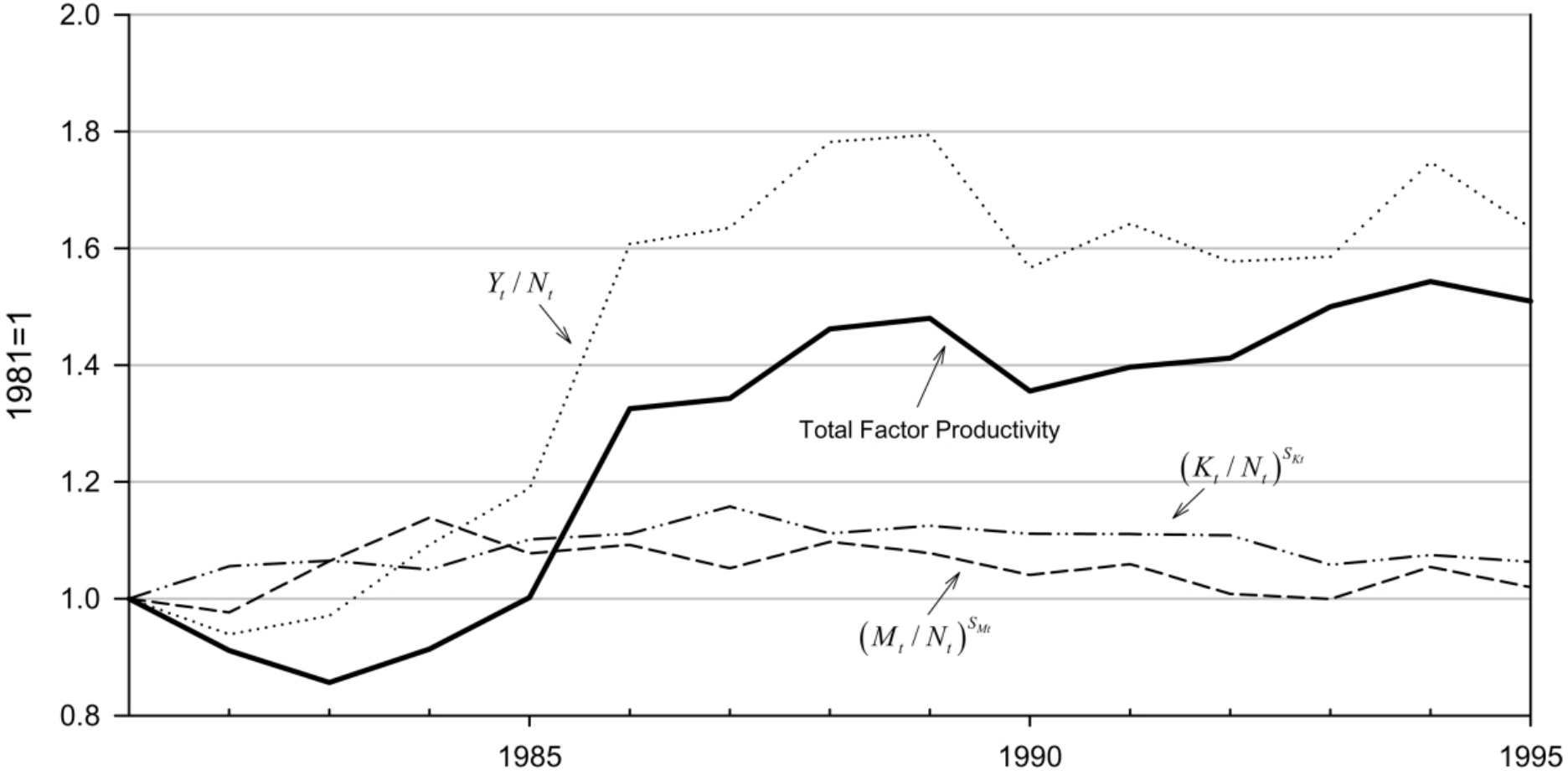

FIG. 6.—Total factor productivity (and quantities used in its calculation): Canadian iron ore industry

Schmitz 2005

Sources of Labor Productivity Growth

Pre-crisis

1. Machine operators (production workers) *barred* from setting up their own machines, picking up small supplies and parts incidental to the job
2. *Not* allowed to maintain their machines: tightening nuts and bolts; replacing fuses, wiper blades, tires, bulbs, batteries, and fluids; or jump-starting vehicles
3. Could *not* make repairs or assist repair workers

Post-crisis

- Number of distinct “repair job” categories fell from upper 20s to the low single digits
- About 2 of every 5 repair jobs *redundant*

Total Hours and Repair Hours as a Percentage of Total Hours @ Minntac/USX Mine, 1968 – 1995

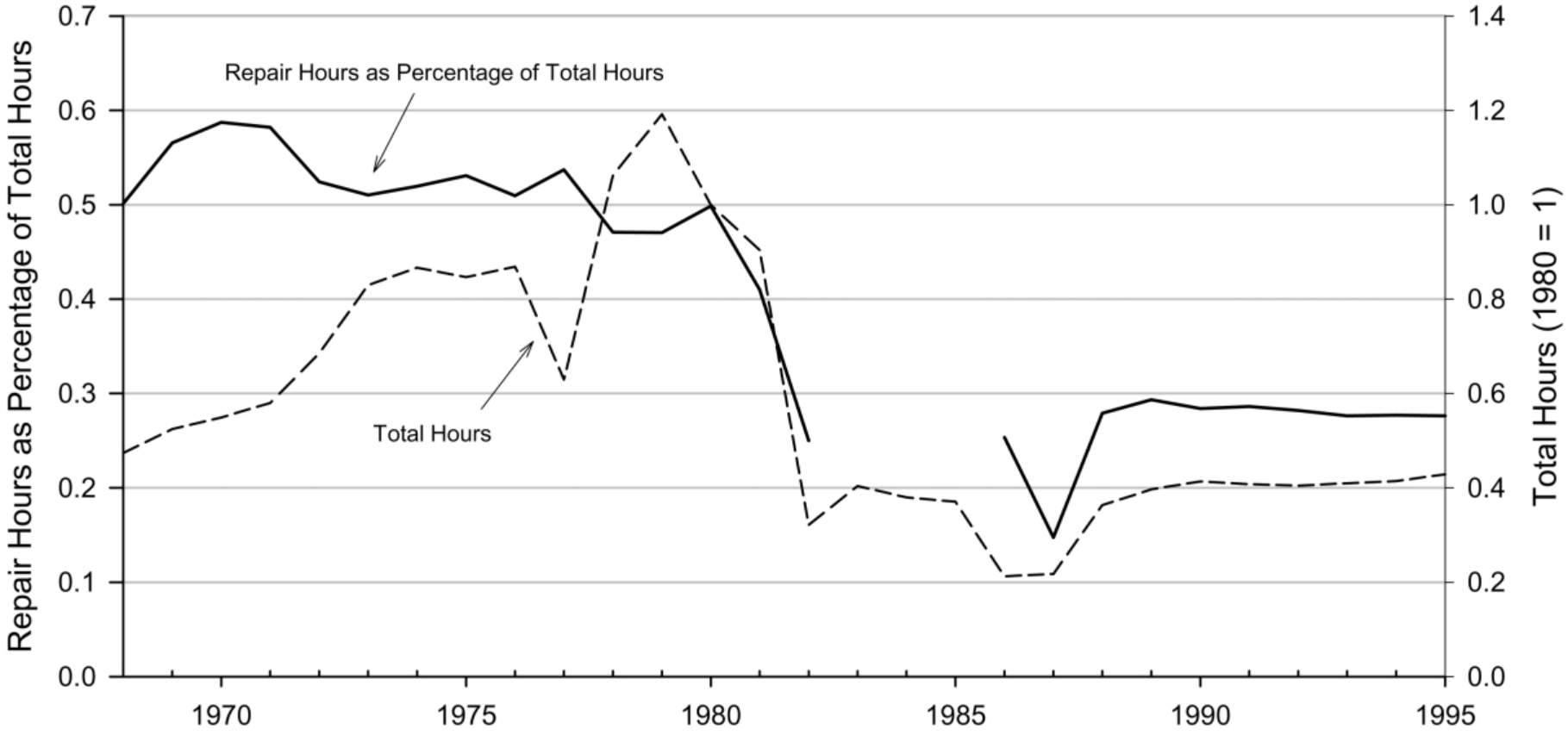

FIG. 10.—Total hours and repair hours as a percentage of total hours: Minntac/USX pellet mine

Schmitz 2005

Sources of Labor Productivity Growth

Before crisis

- Changes in work shifts occurred “at the dry,” i.e., at a fixed point in the mine
- Machines stood idle during travel to and back from “the dry” — approximately 15 – 30 minutes of eight-hour shift

After crisis

- Shift changes were done “eyeball-to-eyeball” — that is, at the equipment

Schmitz's View

- "I have shown that increases in competition (or decreases in tariffs) led to surges in TFP through changes in restrictive work practices
- "This naturally leads to the question, Why were restrictive work practices not changed before the crisis in iron ore?
- "Let me start with a straw man. This straw man says that these work practices were part of a rent package received by workers.

Schmitz's View

- "But this view is vastly incomplete… If it was idle time workers wanted, why structure work practices so that machinery sat idle as well?
- "With machinery idle, capital productivity and materials productivity suffer. Work practices clearly led to money being flushed down the toilet.
- "Hence, there are other reasons these work practices were not changed before the crisis."

Schmitz's View

- **What are these reasons?**
  1. X-Efficiency/Hicks
  2. Disagreements about how to divide generated rents
  3. Commitment problems (Carmichael-MacLeod '00)

Outline

1. Labor coercion and contracting
2. What do unions do?
3. Firms effects and outsourcing
   - Firm effects, worker effects, and sorting
   - Outsourcing and ‘rent sharing’
4. Competitive environment
   - ‘Superstar’ firms

Workplace Heterogeneity and the Rise of West German Wage Inequality

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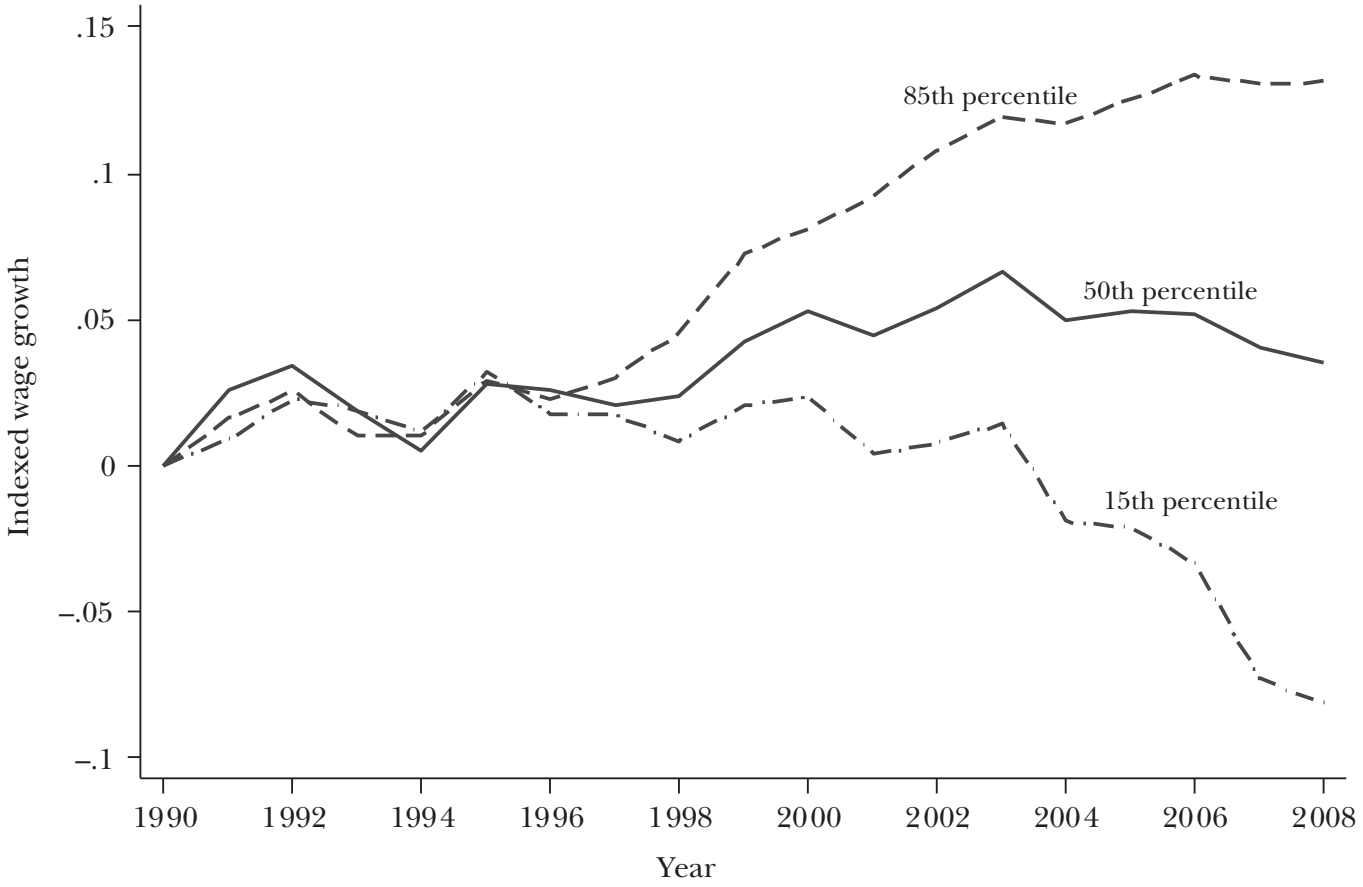
Card, Heining and Kline
QJE 2013

Evolution of Wage Inequality in West Germany, 1990 – 2008

Indexed Wage Growth of the 15th, 50th, 85th Percentiles, West Germany, 1990–2008

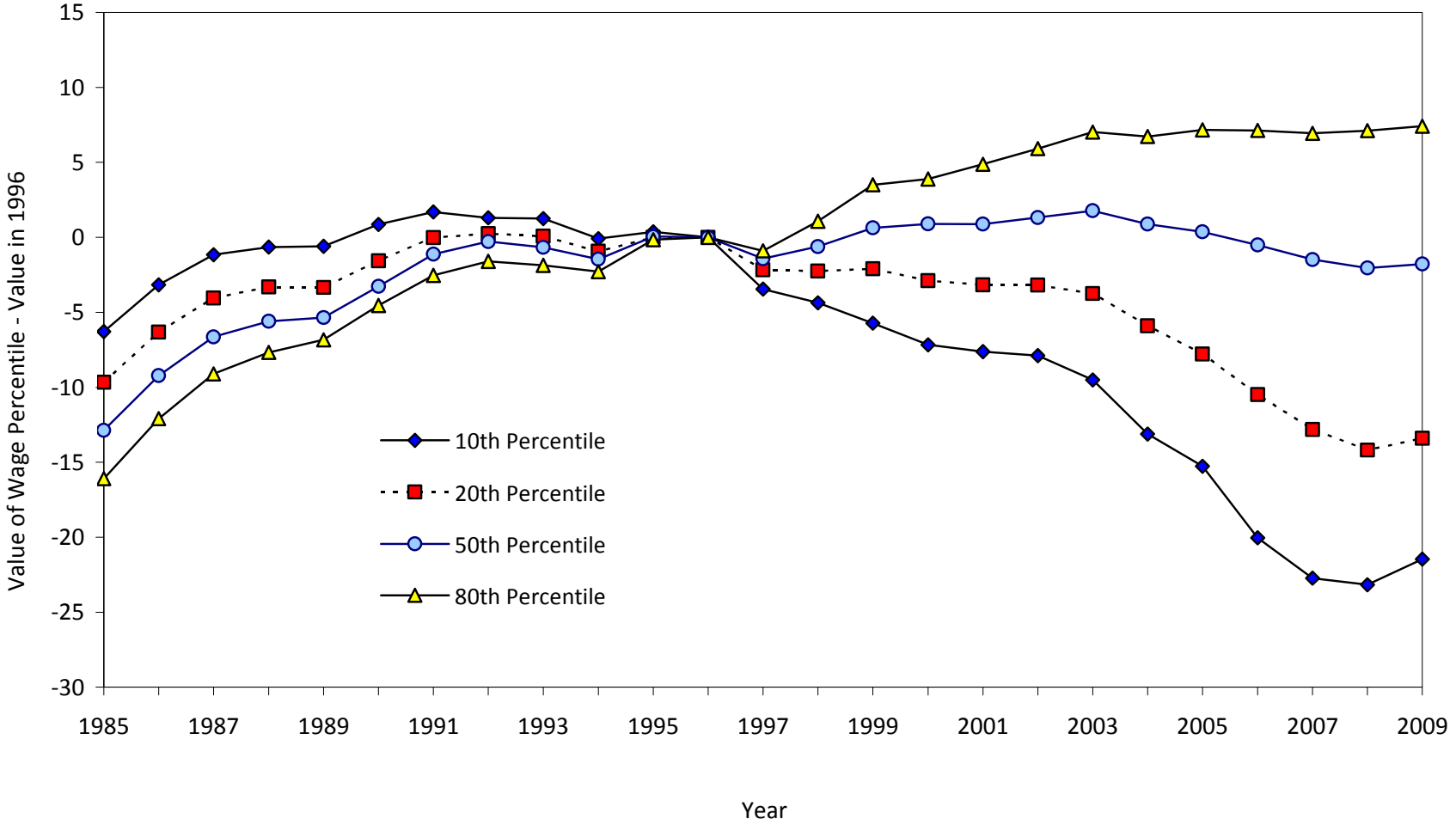


Notes: Calculations based on SIAB Sample for West German Full-Time Workers between 20 and 60 years of age. The figure shows the indexed (log) real wage growth of the 15th, 50th, and 85th percentiles of the wage distribution, with 1990 as the base year. Nominal wages are deflated using the consumer price index (1995 = 100) provided by the German Federal Statistical Office.

Dustmann, Fitzenberger, Schönberg and Spitz-Oener, 2014

Wage Inequality: German Males, 1985 - 2009

Figure 1a: Trends in Percentiles of Real Log Daily Wage
West German Men Relative to 1996 Base

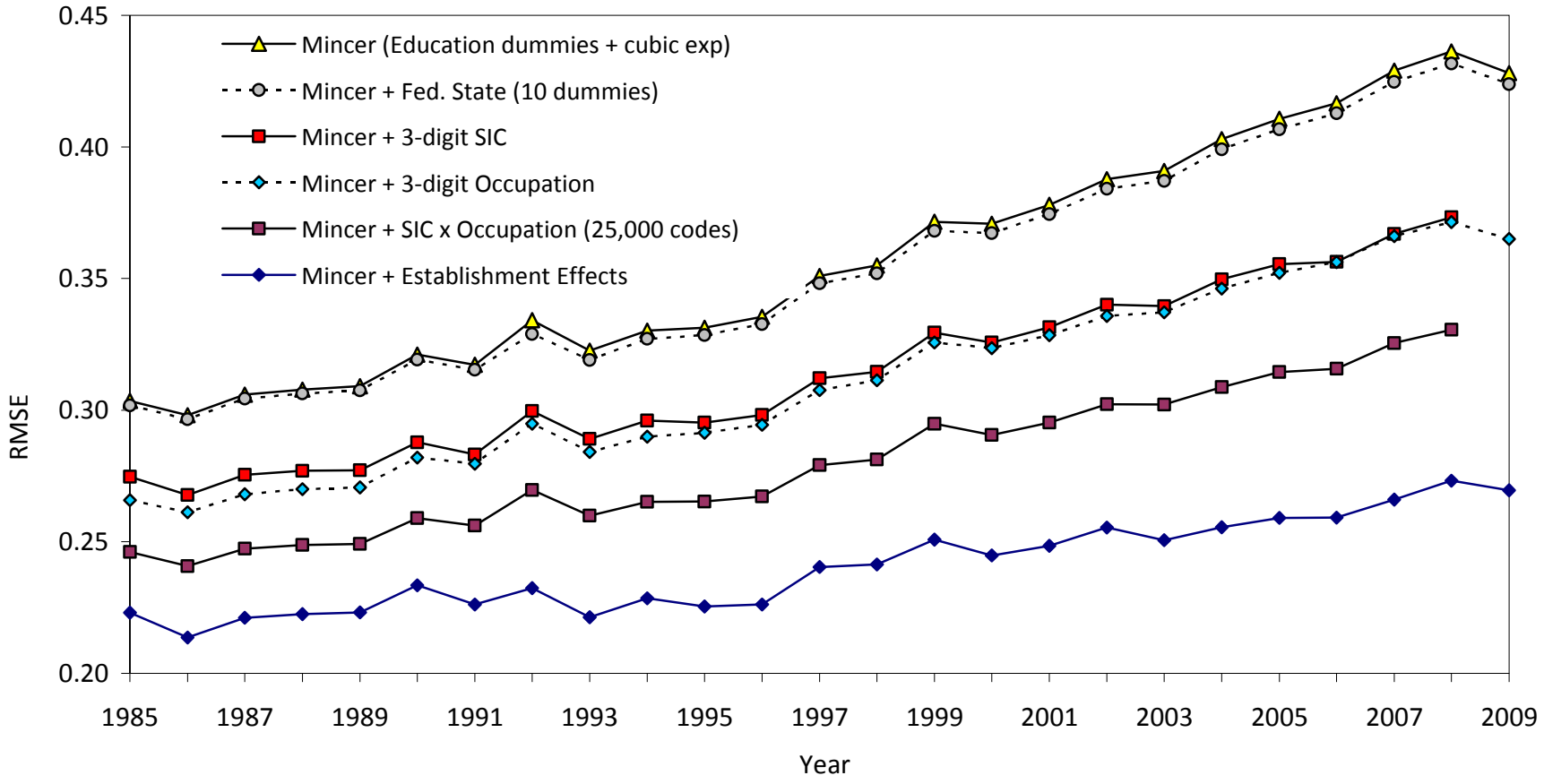


Note: figure shows percentiles of log real daily wage for full time male workers on their main job, deviated from value of same percentile in 1996 and multiplied by 100.

Card, Heining, Kline 2013

Residual MSE of Earnings Conditional on Many Covs

Figure 4: Residual Standard Deviations from Alternative Wage Models



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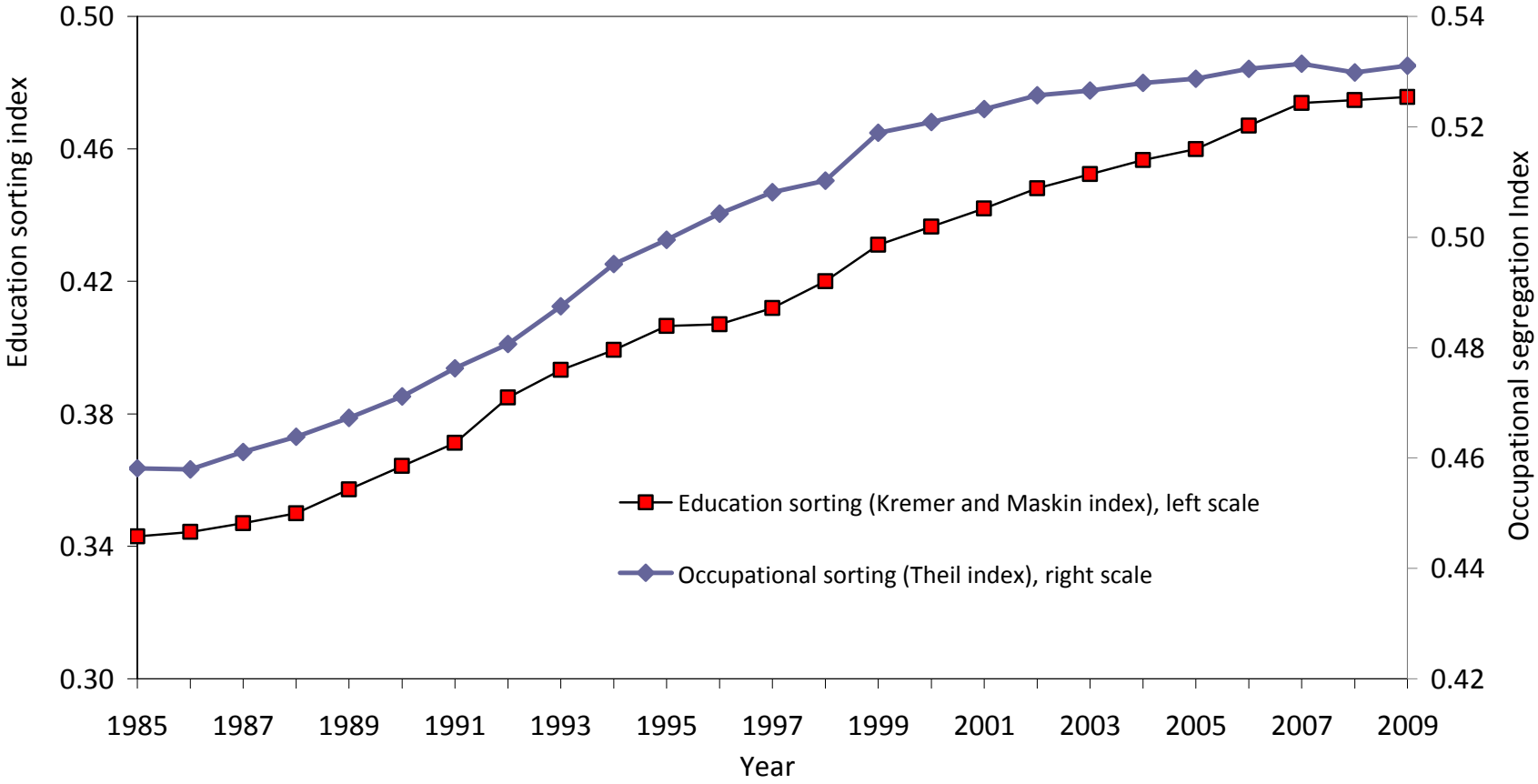
Increased Sorting of Workers by Education and Occupation Across West German Establishments

Figure 5: Sorting Across Establishments of Workers in Different Education and Occupation Groups



Notes: figure shows two measures of sorting of full time male workers across establishments. See text for definitions of indices.

Card, Heining, Kline 2013

Estimating Abowd-Kramarz-Margolis Wage Model

- **Basic model for $y_{it} = \ln w_{it}$**

$$y_{it} = \alpha_i + \psi_{J(i,t)} + X'_{it}\beta + \eta_{i,J(i,t)} + \varsigma_{it} + \varepsilon_{it}$$

- **Where**
  - α_i is time-invariant worker effect
  - $\psi_{J(i,t)}$ is proportional pay premium for firm *J* where worker *i* is employed in year *t*
  - X'_{it} worker covariates
  - $\eta_{i,J(i,t)}$ match specific effect
  - ς_{it} individual drift term (with unit root)
  - ε_{it} iid error term

Estimating Abowd-Kramarz-Margolis Wage Model

- Basic model for $y_{it} = \ln w_{it}$

$$y_{it} = \alpha_i + \psi_{J(i,t)} + X'_{it}\beta + r_{it}$$

$$r_{it} = \eta_{i,J(i,t)} + \varsigma_{it} + \varepsilon_{it}$$

- Rewrite in matrix notation

$$y_{it} = D\alpha + F\psi + X\beta + r = Z'\xi + r$$

- Where

$$Z \equiv [D, F, X]$$

$$\xi = [\alpha', \psi', \beta']$$

$$\xi = (Z'Z)^{-1}Z'y$$

- Consistency of OLS requires

$$E[D'r] = E[F'r] = E[X'r] = 0$$

Estimating Abowd-Kramarz-Margolis Wage Model

- Consistency of OLS requires

  $E[D'r] = 0, E[F'r] = 0, E[X'r] = 0$

  Maintained assumption that person fixed effects orthogonal to error terms $E[D'r] = 0$

- Key concern for ID
  - *Is the composite error term orthogonal to the matrix of establishment identifiers?*

Estimating Abowd-Kramarz-Margolis Wage Model

Is composite error term orthogonal to estab FE's?

- **Sufficient condition**: Job mobility patterns are independent of $(\eta, \varsigma, \varepsilon)$, *exogenous mobility assumption*
- Can be written as

  $$\mathrm{P}[J(i,t) = j|r] = \mathrm{P}[J(i,t) = j] = G_{jt}\left(\alpha_i, \psi_1, \dots, \psi_J\right) \forall\, i, t$$

- Where $G_{jt}\left(\alpha_i, \psi_1, \dots, \psi_J\right)$ is a deterministic mobility function whose elements sum to 1
- This function says that mobility independent of r_{it} conditional on person and firm FE's

Estimating Abowd-Kramarz-Margolis Wage Model

$$\mathbf{P}[\boldsymbol{J(i,t)=j|r}]=\mathbf{P}[\boldsymbol{J(i,t)=j}]=\boldsymbol{G_{jt}}\left(\boldsymbol{\alpha_i,\psi_1,\ldots,\psi_J}\right)\forall\ \boldsymbol{i,t}$$

- Where $G_{jt}\left(\alpha_i,\psi_1,\ldots,\psi_J\right)$ is a deterministic mobility function whose elements sum to 1
- This function says that mobility independent of r_{it} conditional on person and firm FE's

What does <u>not</u> violate this assumption:

1. Systematic mobility based on $\alpha_i,\psi_1,\ldots,\psi_J$, *workers generally moving from low- to high-wage estabs*
2. Higher or lower turnover by worker skill
3. Sorting: *high-wage workers move to high FE estabs*
4. Matching on non-wage attributes

Estimating Abowd-Kramarz-Margolis Wage Model

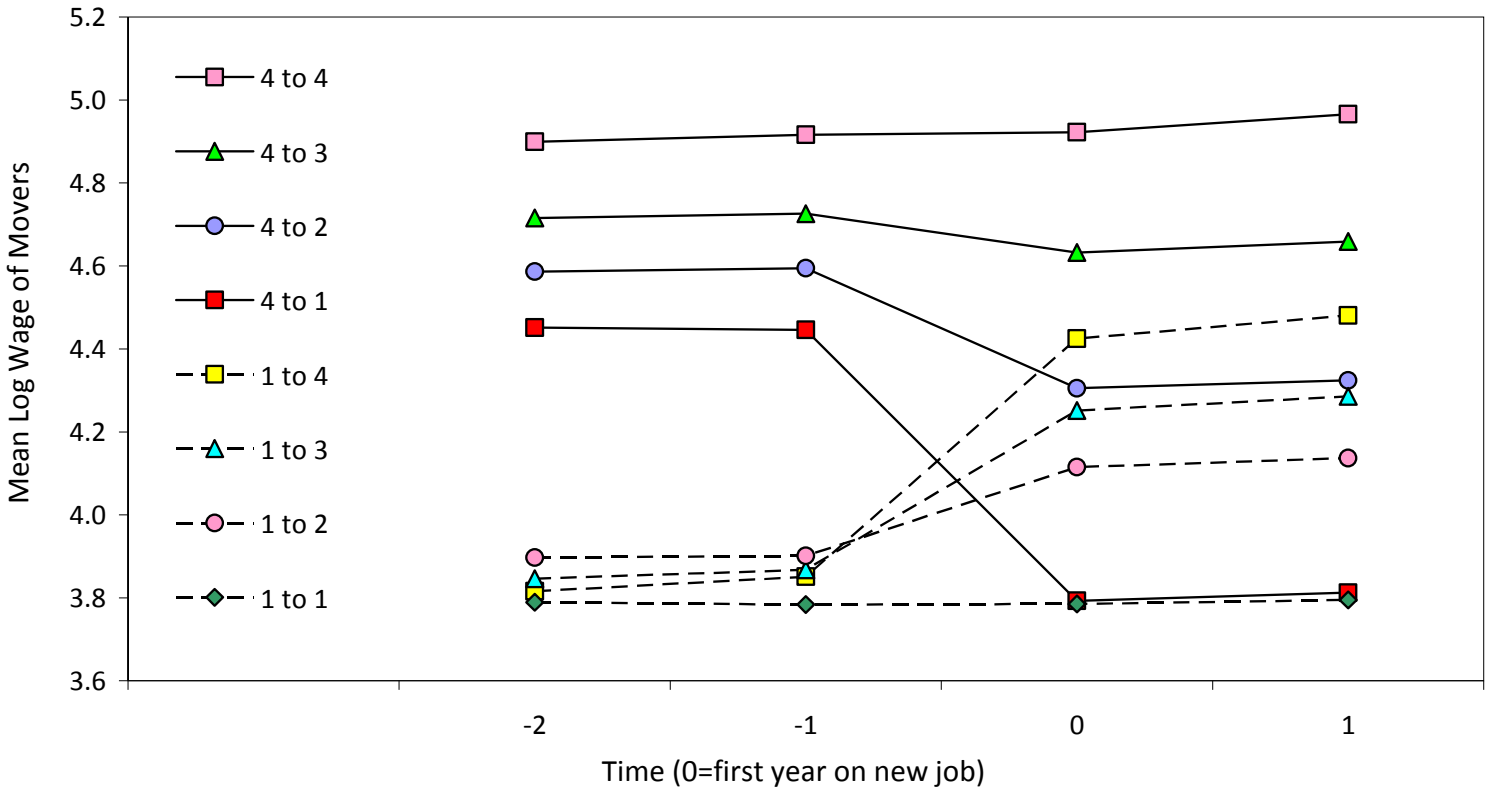
- Consistency of OLS requires

$$E[D'r] = 0, E[F'r] = 0, E[X'r] = 0$$

1. Possible that workers are sorting on idiosyncratic match specific component, $\eta_{i,J}$
   - Implies that wage gains from 'upward' moves not symmetric with wage losses from 'downward' moves
   - Comparative advantage would generate this pattern
   - Also implies that a saturated model will perform much better than FE model

No Evidence that Wage Changes are Asymmetric for Upward vs. Downward Worker Moves

Figure 9a: Mean Wages of Movers, Classified by Quartile of Establishment Effects for Origin and Destination Firms, Interval 4

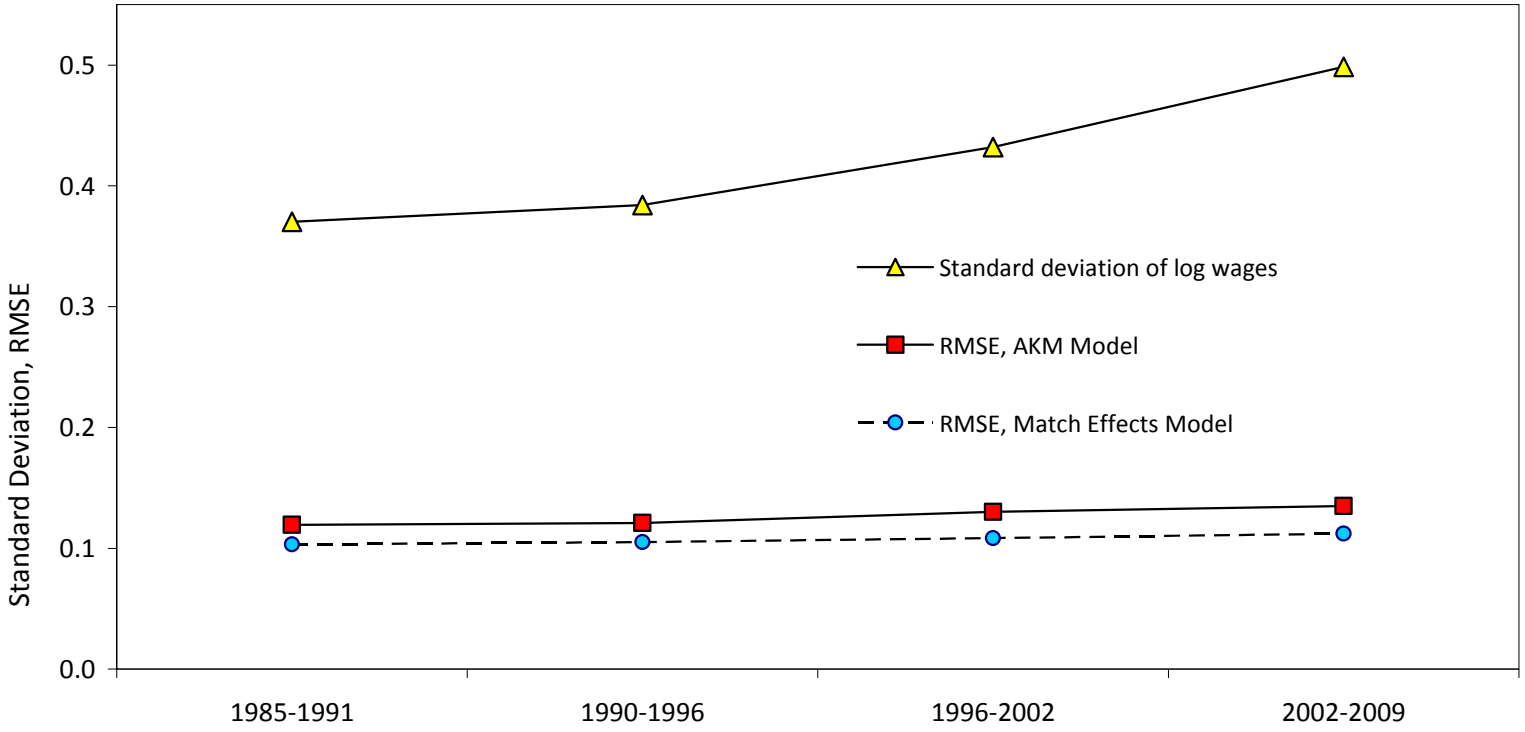


Notes: figure shows mean wages of male workers observed in 2002-2009 who change jobs in 2004-2007, and held the preceding job for 2 or more years, and the new job for 2 or more years. "Job" refers to main job in year, excluding part time jobs. Each job is classified into quartiles based on estimated establishment effect from AKM model presented in Table 3.

Card, Heining, Kline 2013

Comparing AKM Fit Against 'Less Parametric' Fit

Figure 7: Relative Explanatory Power of AKM Model in Different Periods

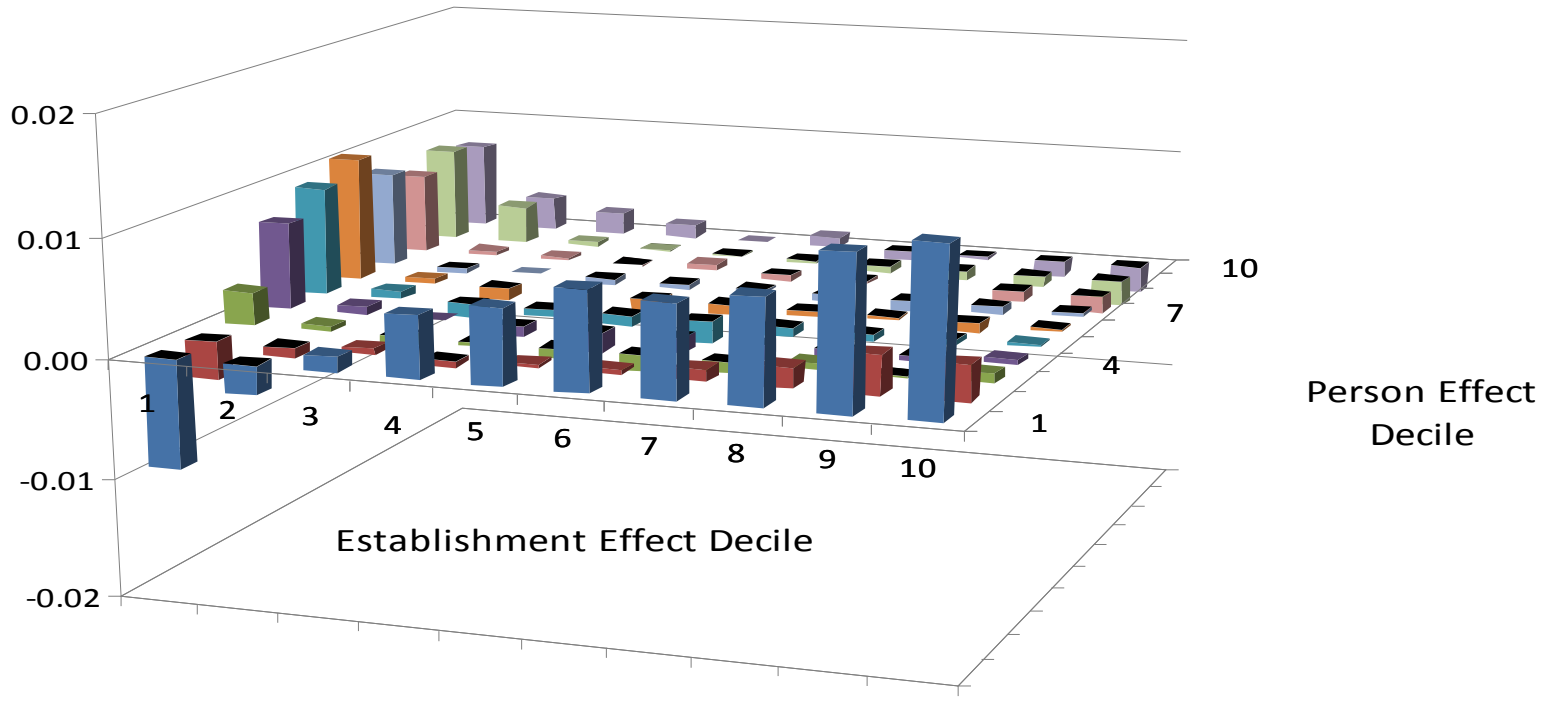


Notes: figure shows standard deviation of log real wages for full time male workers in indicated interval, along with root-mean-squared error (RMSE) from AKM specification and alternative model with unrestricted match effects. See notes to Table 3 for description of models.

Card, Heining, Kline 2013

Comparing Residuals Within Deciles of Person and Establishment FE's

Figure 8b: Mean Residual by Person/Establishment Deciles, Interval 4



Notes: figure shows mean residuals from estimated AKM model with cells defined by decile of estimated establishment effect, interacted with decile of estimated person effect. See Table 3 for summary of model parameters.

Card, Heining, Kline 2013

Estimating Abowd-Kramarz-Margolis Wage Model

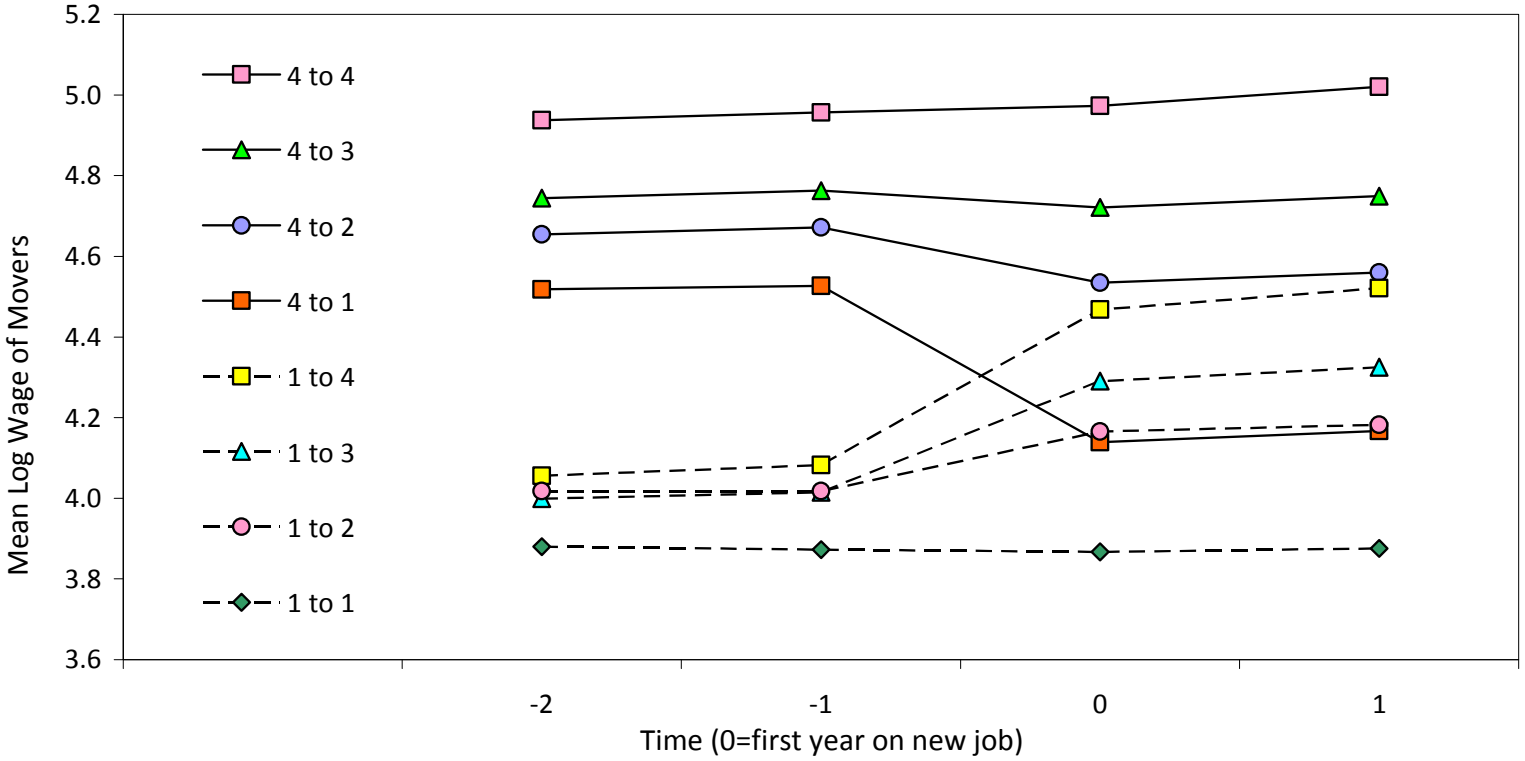
- Consistency of OLS requires

$$E[D'r] = 0, E[F'r] = 0, E[X'r] = 0$$

1. Possible that workers are sorting on idiosyncratic match specific component, $\eta_{i,J}$
2. Possible that 'drift' component of wage changes ς_{it} correlated with mobility
   - Workers who turn out to be more productive than expected will experience rising wages at their initial employer, and will also be more likely to move higher-wage establishments (and v.v. for workers moving in opposite direction)
   - Implies pre-trends

No Evidence of Pre-Trends in Wages for Movers

Figure 6b: Mean Wages of Job Changers, Classified by Quartile of Mean Wage of Co-Workers at Origin and Destination Establishment, Interval 4



Notes: figure shows mean wages of male workers observed in 2002-2009 who change jobs in 2004-2007 and held the preceding job for 2 or more years, and the new job for 2 or more years. "Job" refers to establishment with most earnings in year, excluding part time work. Each job is classified into quartiles based on mean wage of co-workers (quartiles are based on all full time workers in the same year).

Card, Heining, Kline 2013

Estimating Abowd-Kramarz-Margolis Wage Model

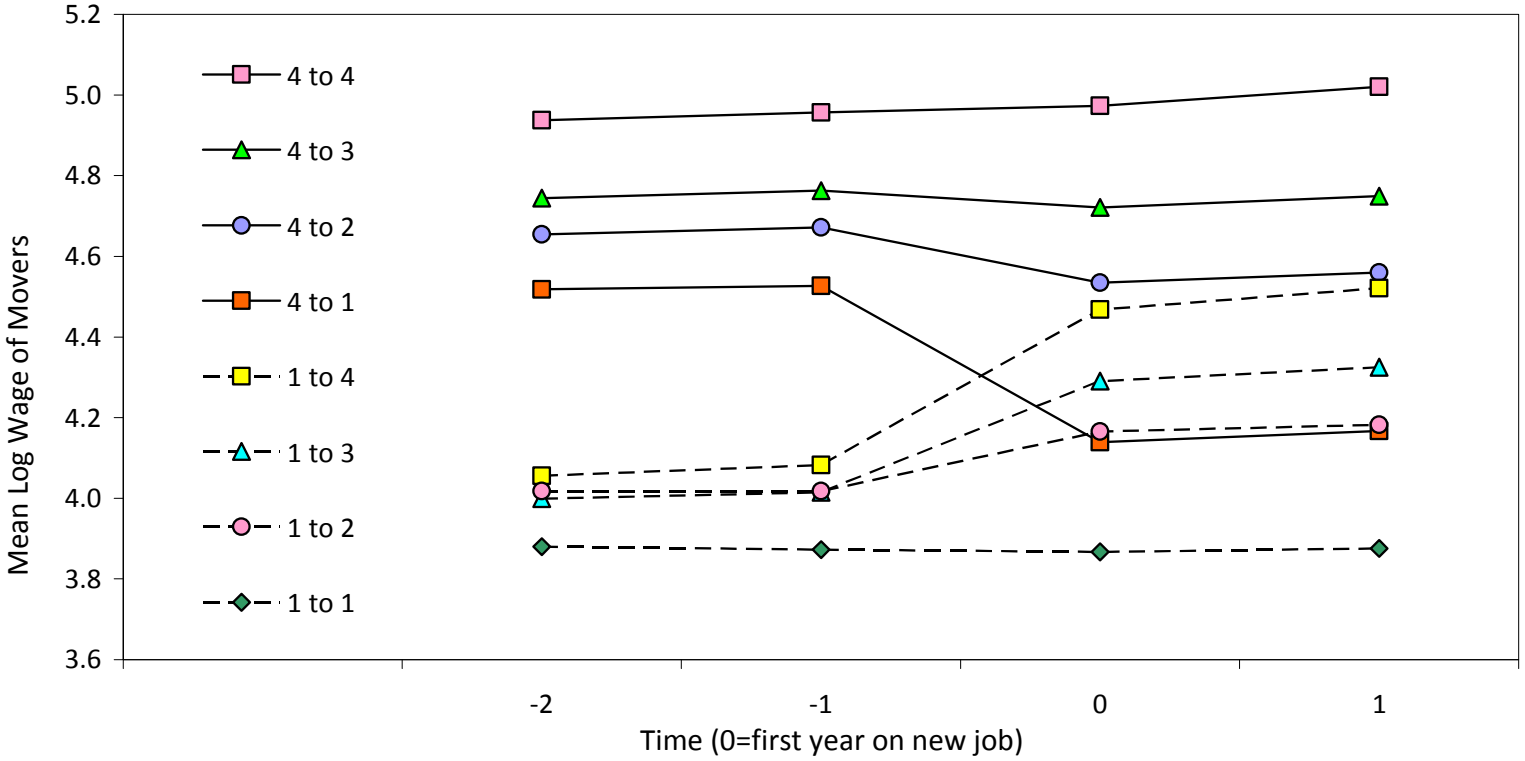
- Consistency of OLS requires

$$E[D'r] = 0, E[F'r] = 0, E[X'r] = 0$$

1. Possible that workers are sorting on idiosyncratic match specific component, $\eta_{i,J}$
2. Possible that 'drift' component of wage changes ς_{it} correlated with mobility
3. Possible that mobility induced by shocks to establishment effects
   - May induce bias where receiving firms' FE's look 'better' than they are
   - *Again suggests that mobility related to transitory wage patterns*

No Evidence of Pre-Trends in Wages for Movers

Figure 6b: Mean Wages of Job Changers, Classified by Quartile of Mean Wage of Co-Workers at Origin and Destination Establishment, Interval 4



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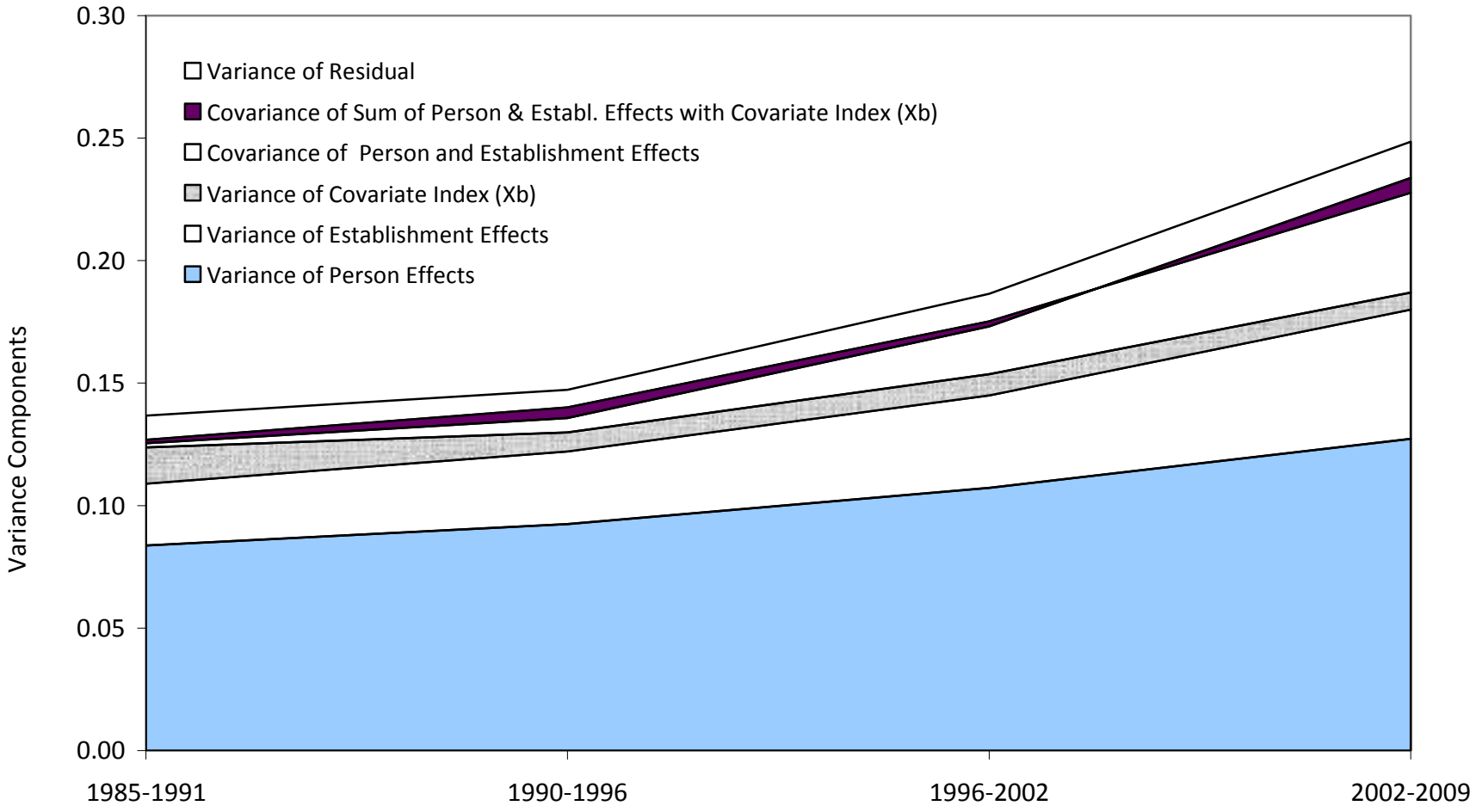
Card, Heining, Kline 2013

Decomposition of Wage Variance

Figure 11: Decomposition of Variance of Log Wages

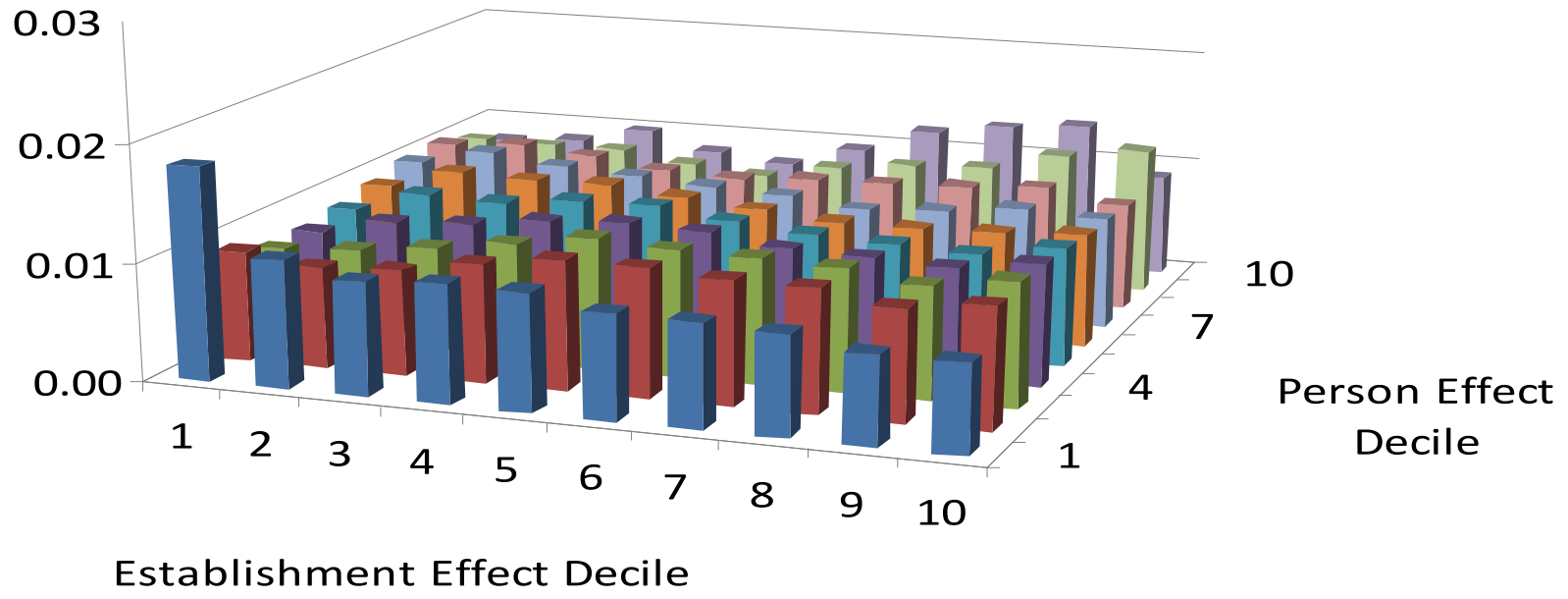


Notes: figure shows terms in decomposition of observed variance of log wages for full time male workers, based on estimated AKM models shown in Table 3. See text for decomposition formula.

Card, Heining, Kline 2013

Joint Distribution of Person and Establishment Effects: Period 1

Figure 10a: Joint Distribution of Person and Establishment Effects, Interval 1

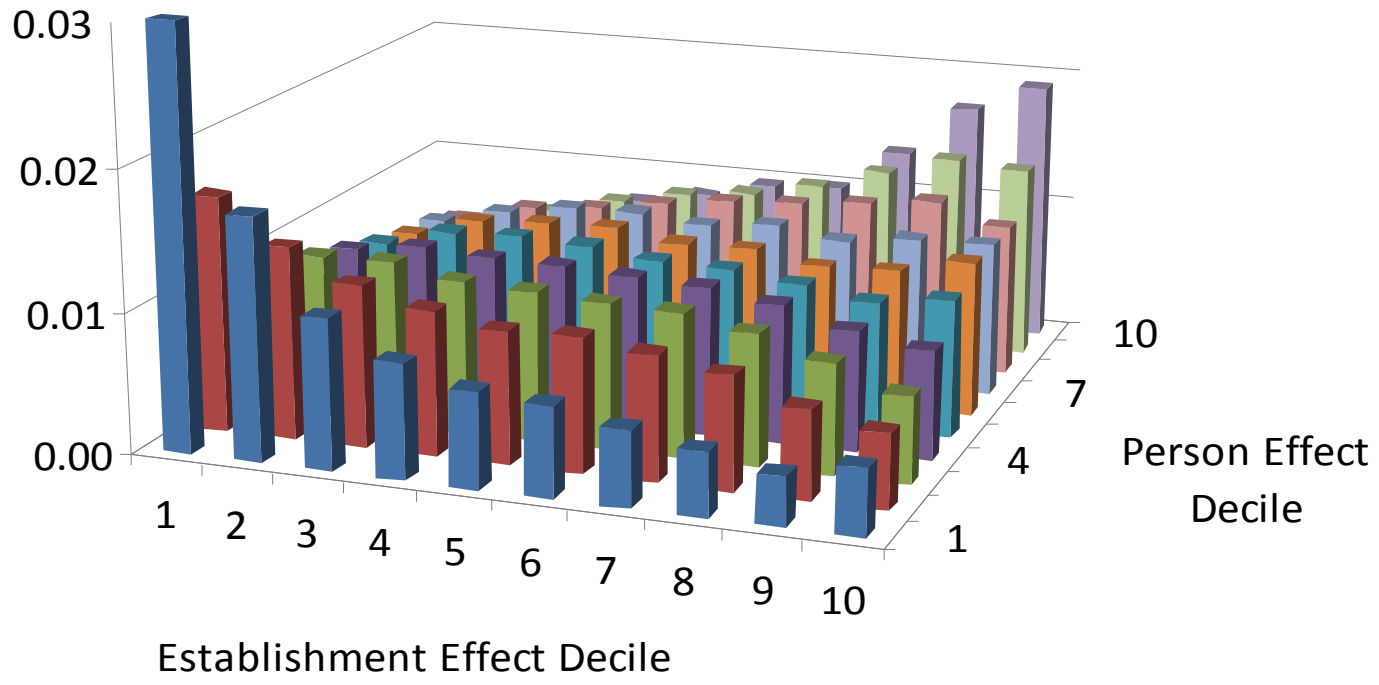


Note: figure shows joint distribution of estimated person and establishment effects from AKM model. See Table 3 for summary of model parameters.

Card, Heining, Kline 2013

Joint Distribution of Person and Establishment Effects: Period 2

Figure 10b: Joint Distribution of Person and Establishment Effects, Interval 4



Note: figure shows joint distribution of estimated person and establishment effects from AKM model. See Table 3 for summary of model parameters.

Card, Heining, Kline 2013

Decomposition of Wage Variance

TABLE IV

DECOMPOSITION OF THE RISE IN WAGE INEQUALITY

	Interval 1 (1985–1991)		Interval 4 (2002–2009)	
	(1) Var. component	(2) Share of total	(3) Var. component	(4) Share of total
Total variance of log wages	0.137	100.0	0.249	100.0
Components of variance:				
Variance of person effect	0.084	61.3	0.127	51.2
Variance of establ. effect	0.025	18.5	0.053	21.2
Variance of Xb	0.015	10.7	0.007	2.8
Variance of residual	0.011	8.2	0.015	5.9
2cov(person, establ.)	0.003	2.3	0.041	16.4
2cov(Xb, person + establ.)	–0.001	–1.0	0.006	2.4

Card, Heining, Kline 2013

Decomposition of Wage Variance

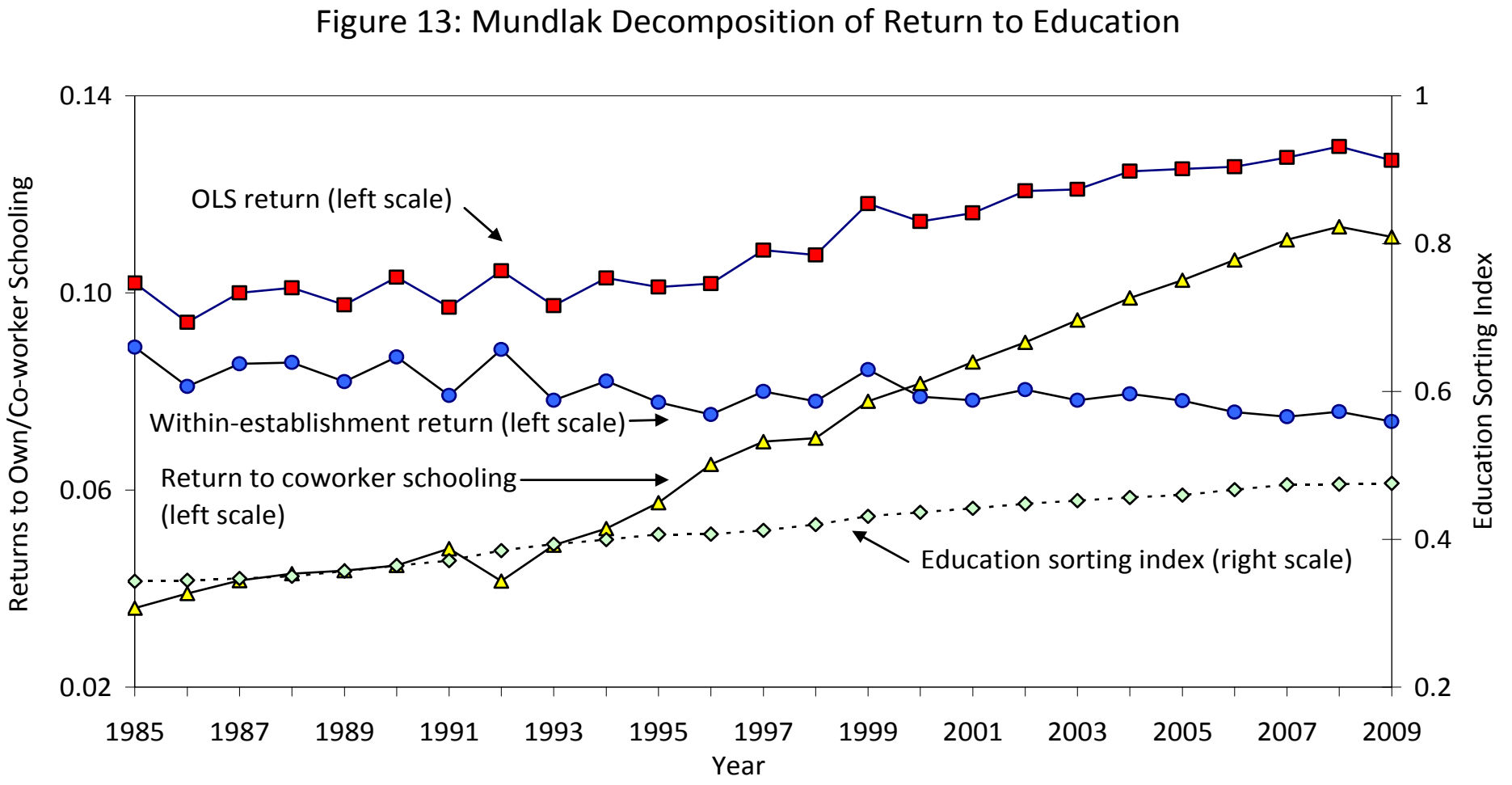
TABLE IV

DECOMPOSITION OF THE RISE IN WAGE INEQUALITY

	Change from interval 1 to 4	
	(5) Var. component	(6) Share of total
Total variance of log wages	0.112	100
Components of variance:		
Variance of person effect	0.043	39
Variance of establ. effect	0.027	25
Variance of Xb	–0.008	–7
Variance of residual	0.003	3
2cov(person, establ.)	0.038	34
2cov(Xb, person + establ.)	0.007	7
Counterfactuals for variance of log wages*		
1. No rise in correl. of person/estab. effects	0.077	69
2. No rise in var. of estab. effect	0.072	64
3. Both 1 and 2	0.047	42

Card, Heining, Kline 2013

Mundlak Decomposition of Return to Education



Card, Heining, Kline 2013

the ONION®

What Are We Feeling That Would Be Better Expressed In German?

1. Dread of something inevitable yet benign
   Fuerchtenünabwendbarfreundlich
2. The wish to see all suffer for the crimes of one
   Schadenallemeinverbrechen
3. Laughter at something one knows in one's soul is not funny
   Lachenaüfkomischsnichtspaßheit

4. Für die Stichprobenverteilungsfunktion von $Z_1^*, ..., Z_n^*$ verwenden wir die folgende Notation

$$\widehat{F}^*(z) = n^{-1} \sum_{i=1}^{n} \mathbf{1}\{Z_i^* \leq z\}.$$

Outline

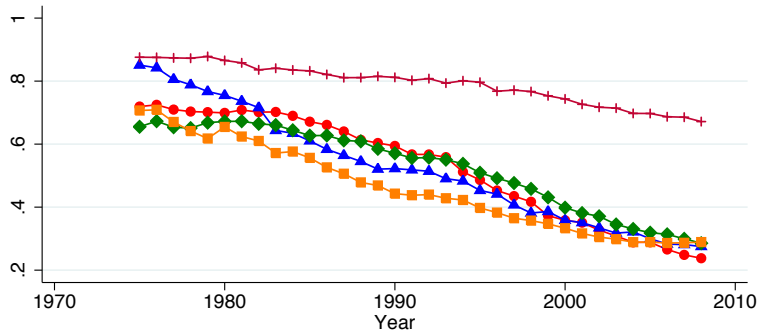
1. Labor coercion and contracting
2. What do unions do?
3. Firms effects and outsourcing
   - Firm effects, worker effects, and sorting
   - Outsourcing and ‘rent sharing’
4. Competitive environment
   - ‘Superstar’ firms

"The Rise of Domestic Outsourcing and the Evolution of the German Wage Structure"

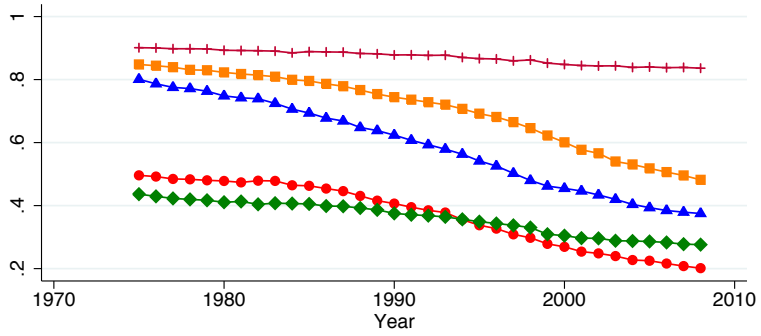
Goldschmidt and Schmieder
QJE forthcoming

Where Did All of The Food, Cleaning, Security and Logistics Workers Go?

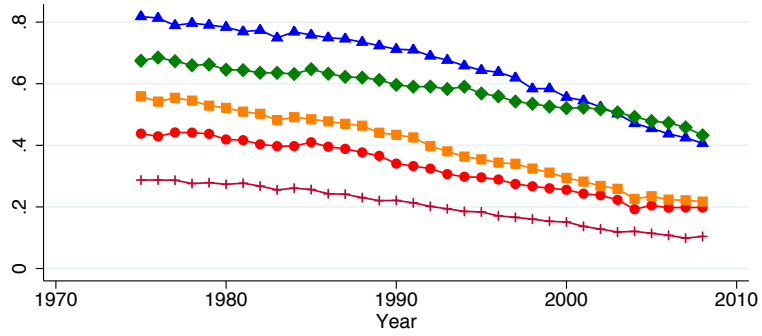
Figure I: Share of Firms with any Food/Cleaning/Security/Logistics workers, by Industry



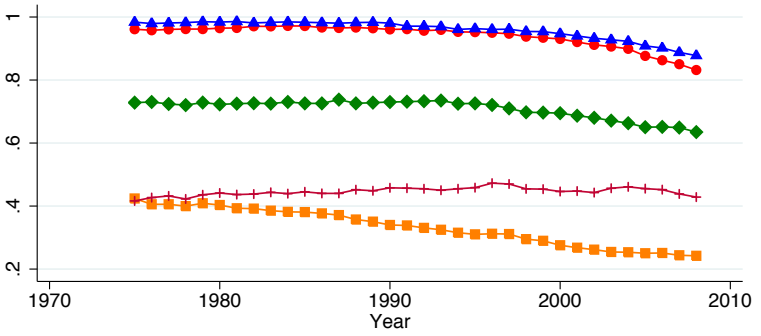
(a) Retail



(b) Manufacturing



(c) Finance

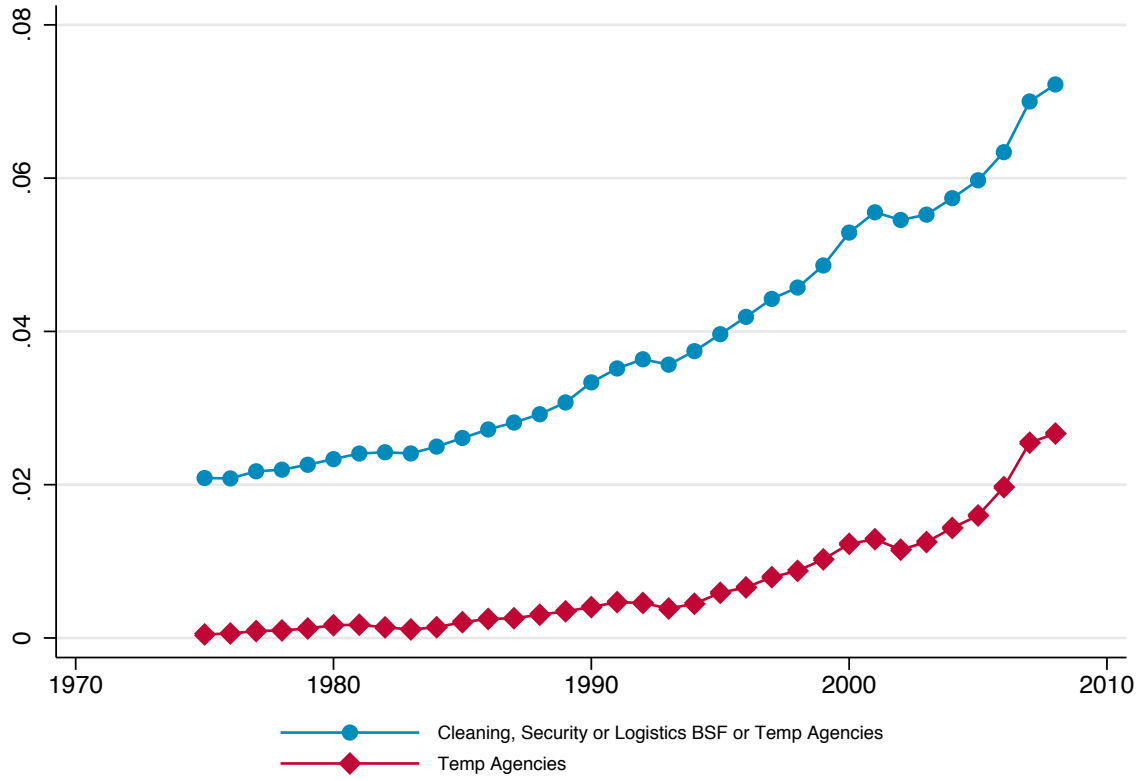


(d) Hospitals

Goldschmidt and Schmieder 2015

Growing Employment in Temp Agencies, Cleaning, Security, Logistics, and and Business Service Firms

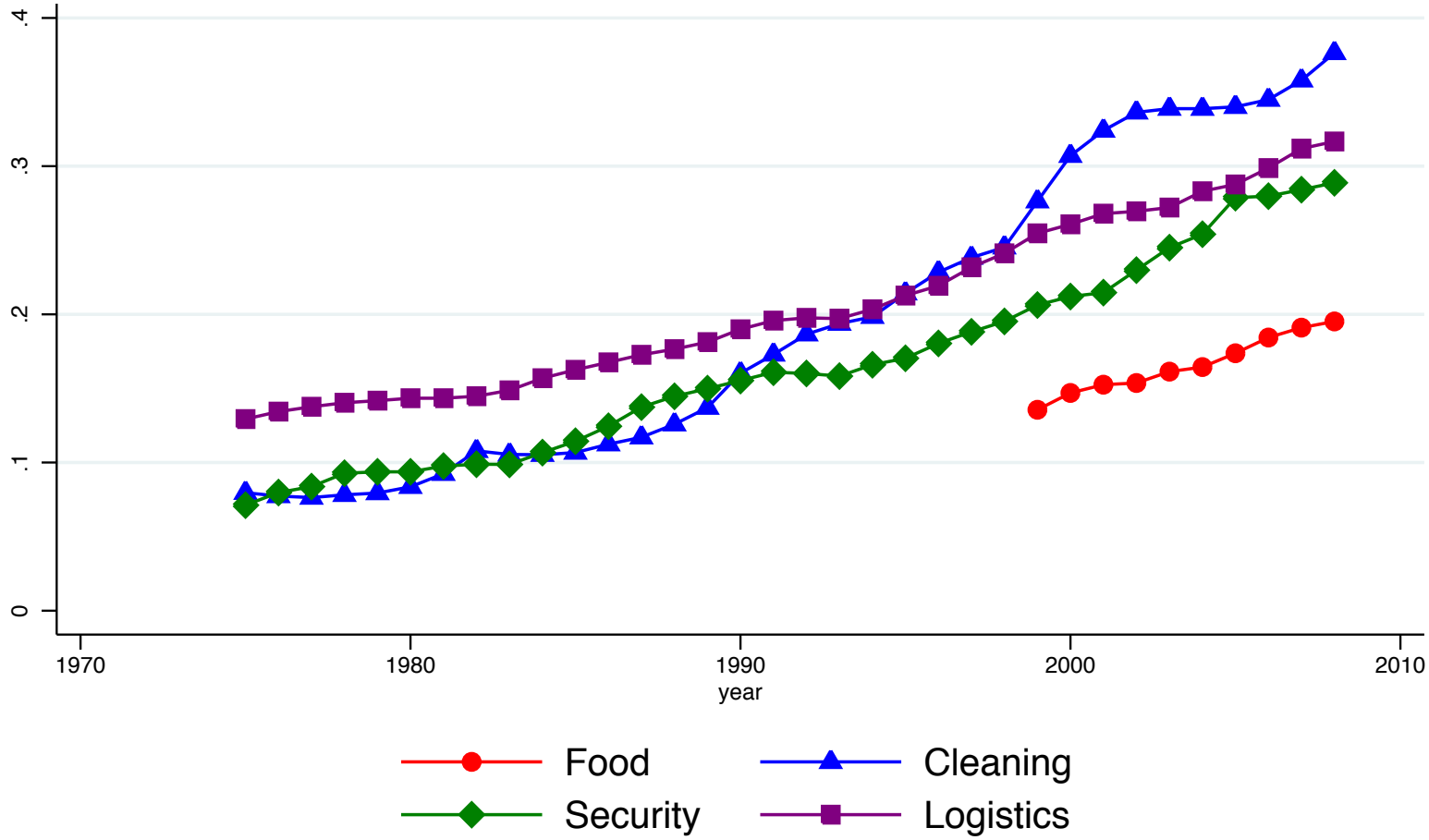
Figure II: Share of Workers employed by Business Service Firms and Temp Agencies over time



(a) Worker in all Occupations

Large Share of FCSL Workers Now Employed in Temp Agencies and Business Services

Figure II: Share of Workers employed by Business Service Firms and Temp Agencies over time

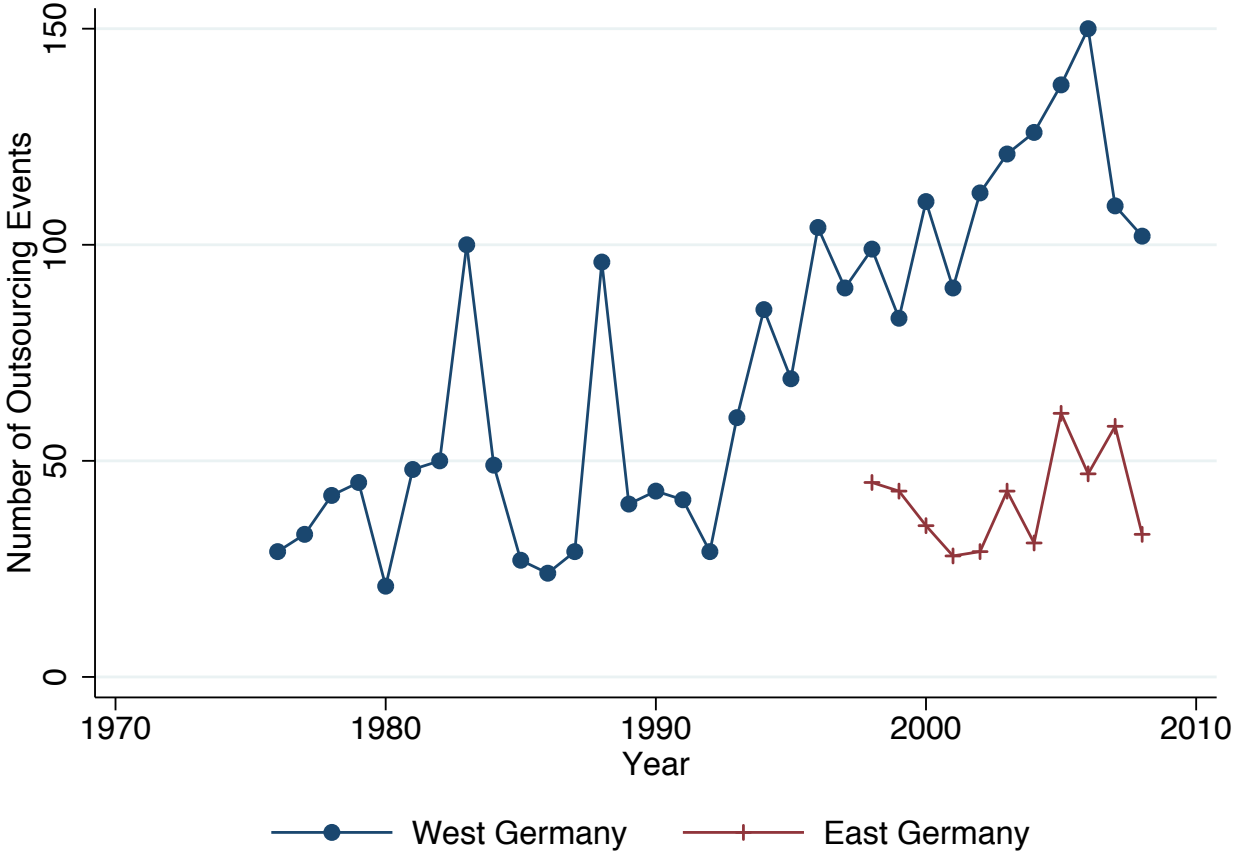


(b) Workers in Food / Cleaning / Security / Logistics Occupations

Goldschmidt and Schmieder 2015

Establishments with On-Site Outsourcing Events

On-site outsourcing events are defined as groups of workers leaving large establishments and moving to business service firms

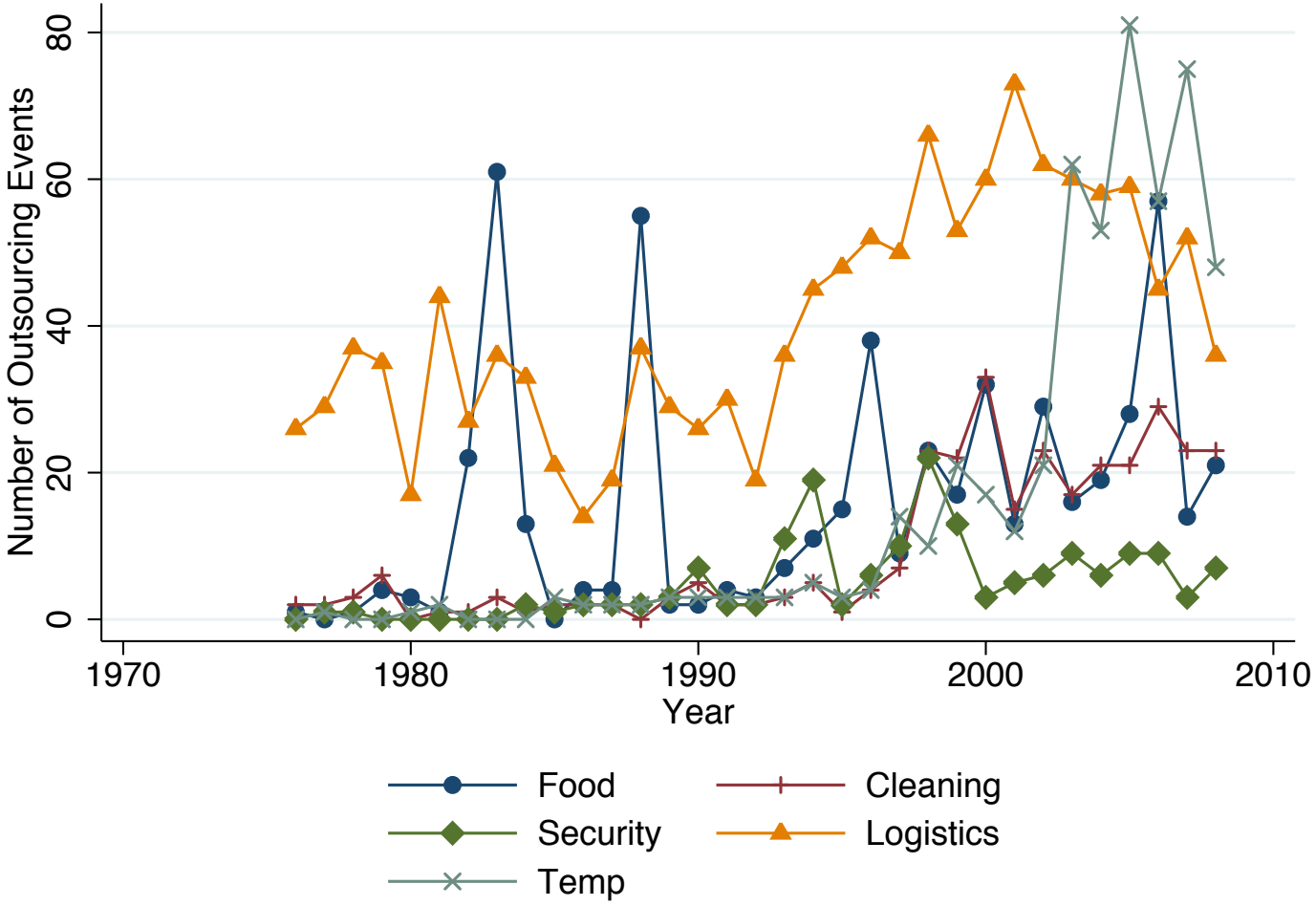


(a) Number of Outsourcing Establishments in East and West Germany

Goldschmidt and Schmieder 2015

Establishments with On-Site Outsourcing Events

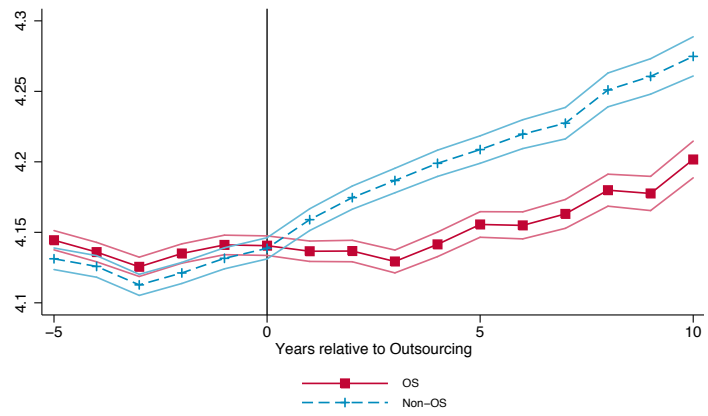
On-site outsourcing events are defined as groups of workers leaving large establishments and moving to business service firms



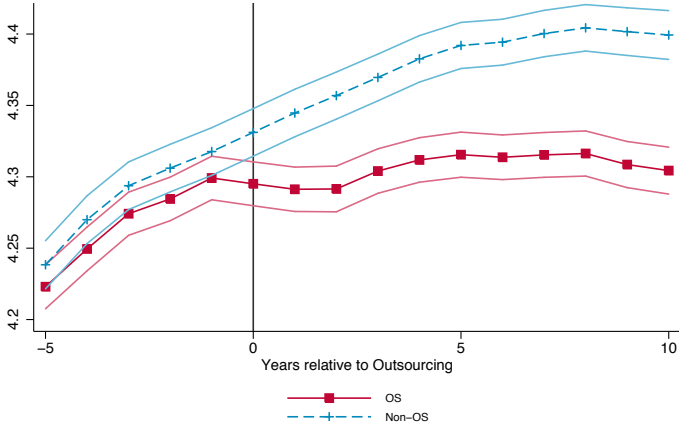
(b) Number of Outsourcing Establishments by Type of Outsourcing

Event Studies of Outsourced Workers versus Matched Comparison Groups

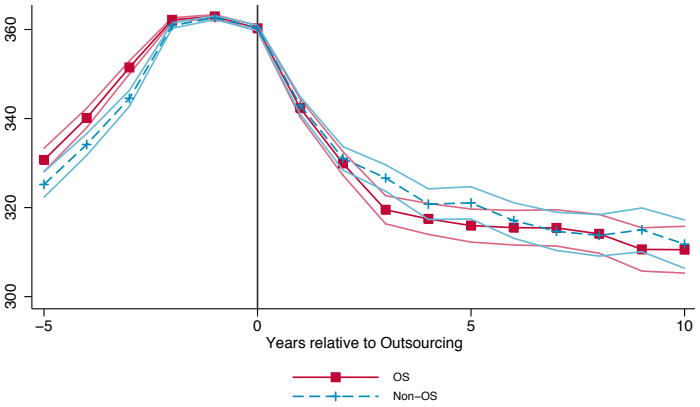
Figure IV: Employment Outcomes of Outsourced and Non-Outsourced Workers Before and After On-site Outsourcing



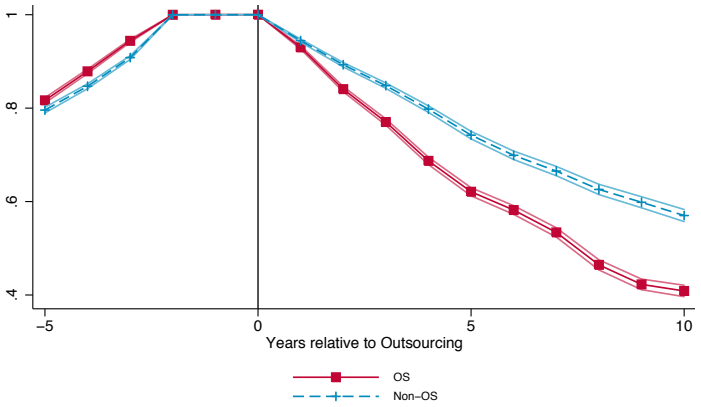
(a) Log Daily Wage



(b) Log Daily Wage - Balanced Panel



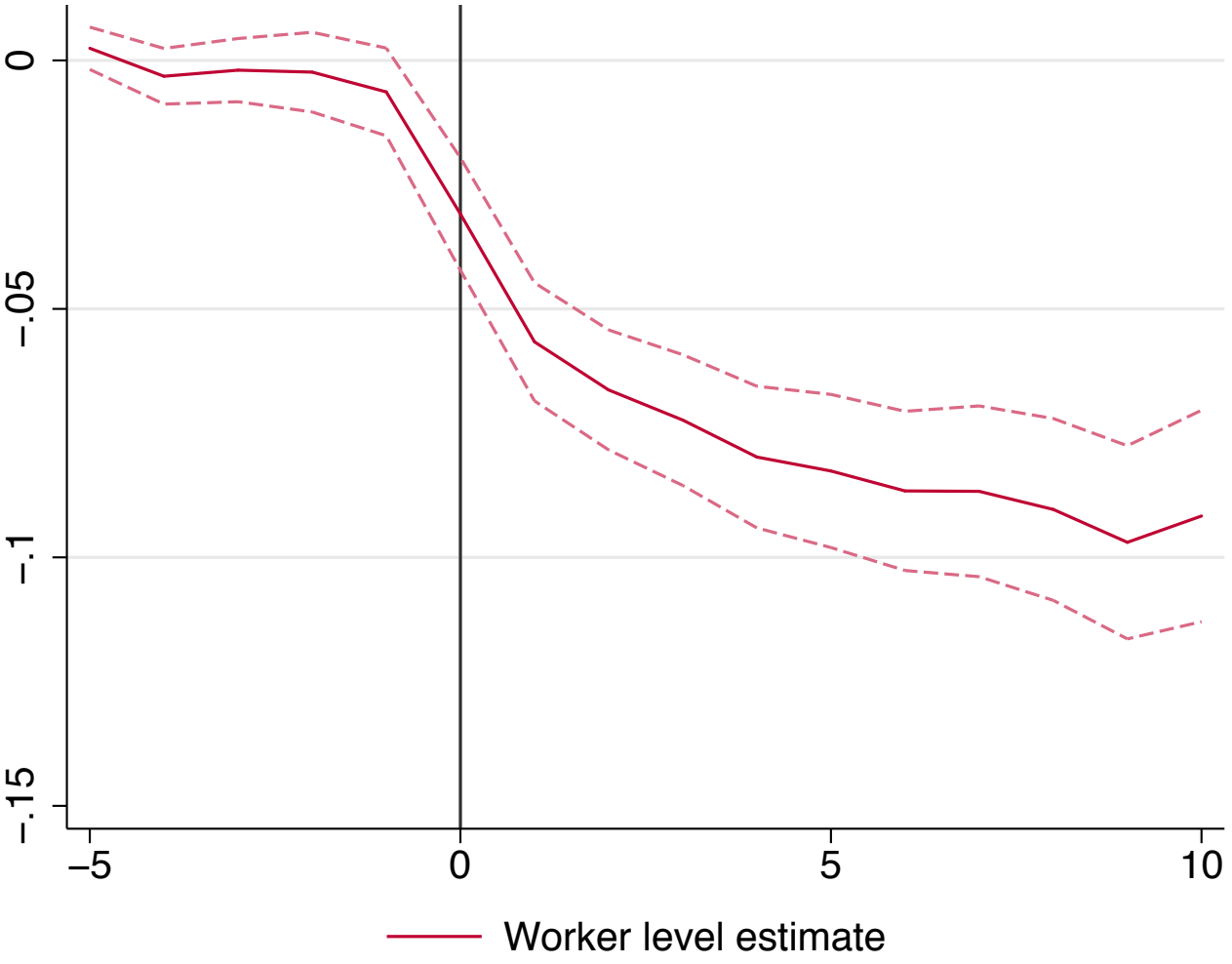
(c) Days Worked Per Year



(d) Probability of working at outsourced job

Goldschmidt and Schmieder 2015

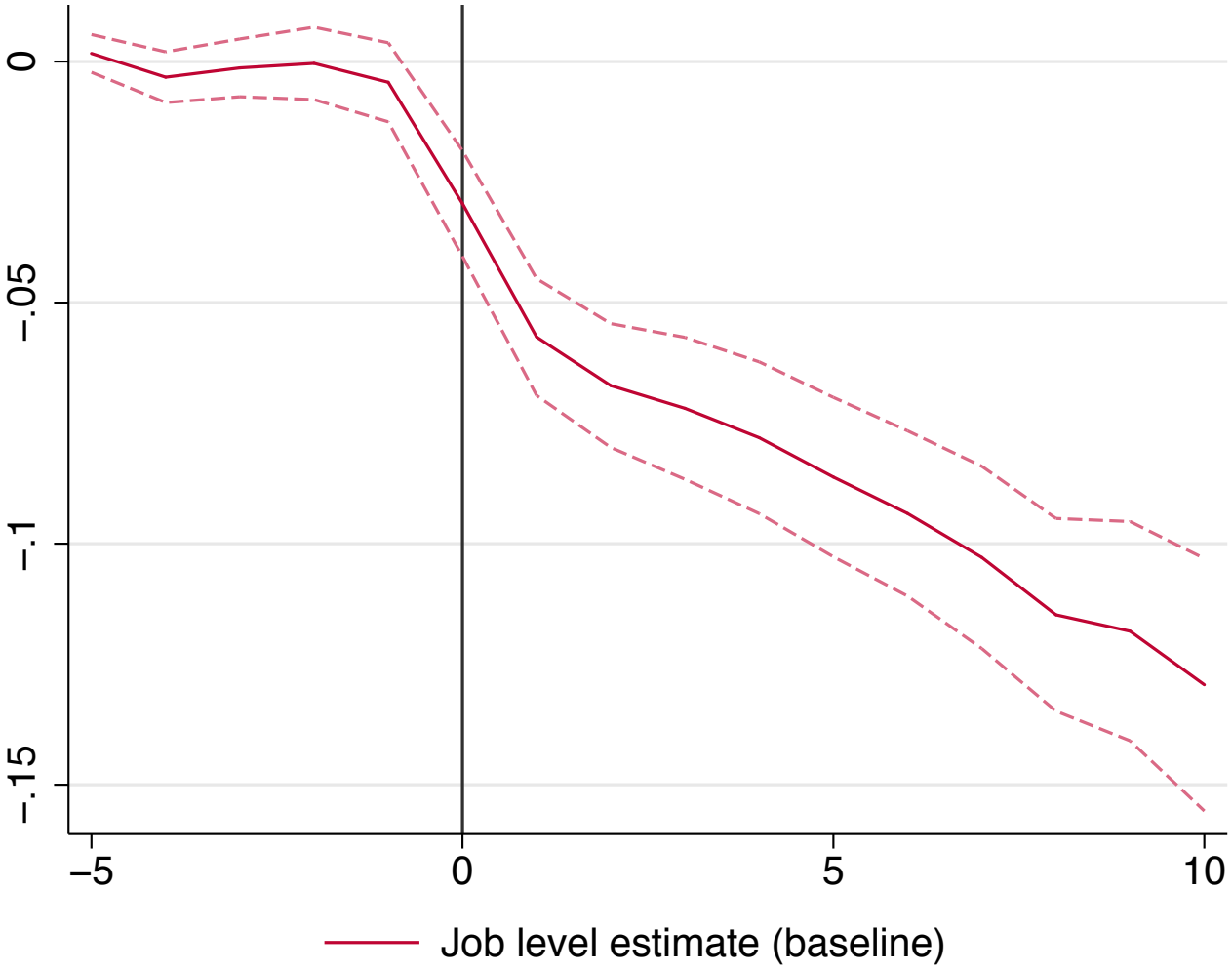
Log Wage Regression Estimates: Outsourced Workers versus Matched Comparison Groups



(a) All worker observations before and after outsourcing

Goldschmidt and Schmieder 2015

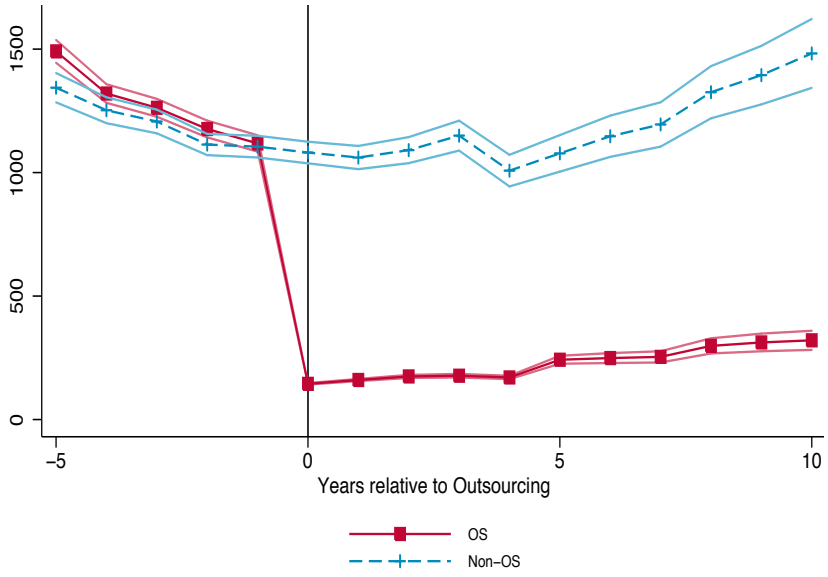
Wage Regression Estimates: Outsourced Workers Remaining at Same Job versus Matched Comparison Groups



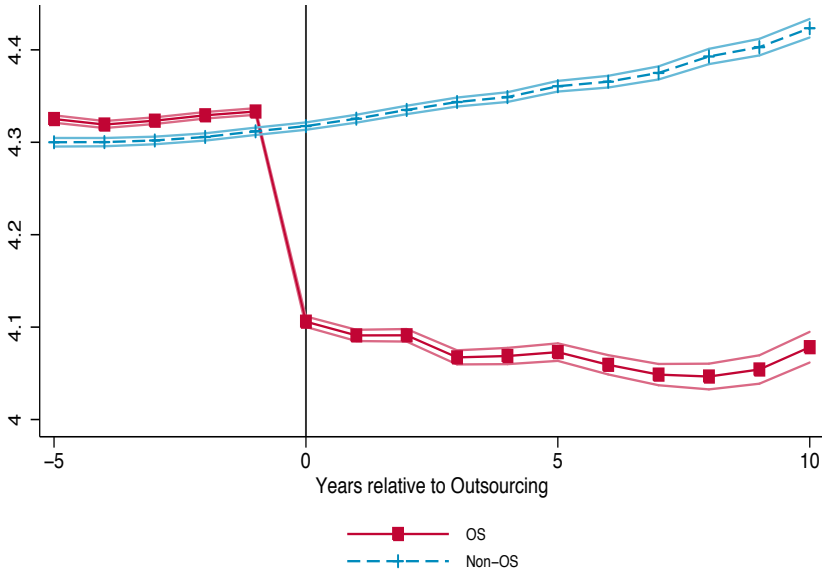
(b) Sample restricted to observations remaining at the same job

Goldschmidt and Schmieder 2015

Establishment Characteristics of Outsourced and Non-Outsourced Jobs Before and After Outsourcing



(a) Size of Employer (Establishment)

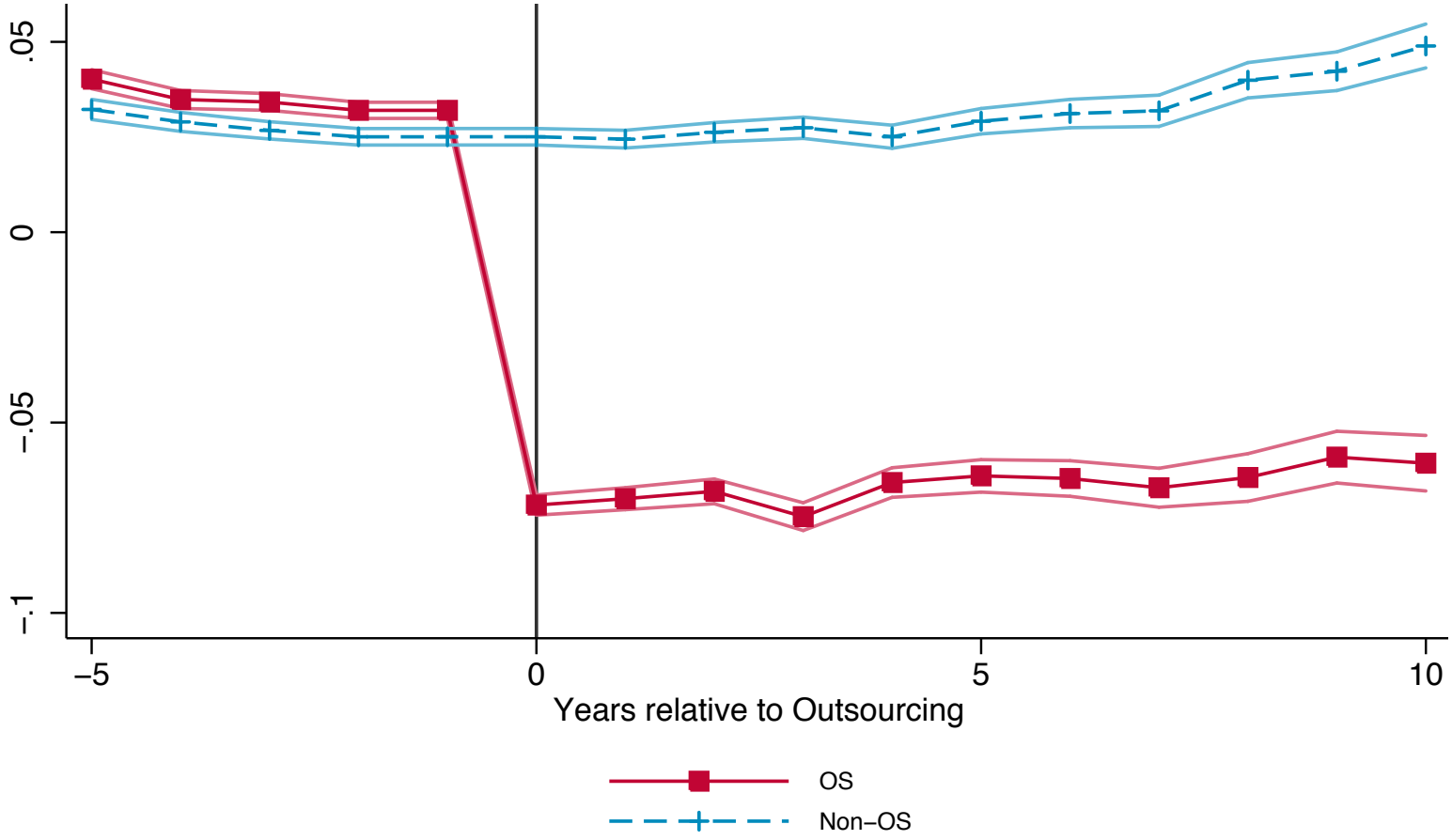


(b) Average Log Wage of Coworkers

Goldschmidt and Schmieder 2015

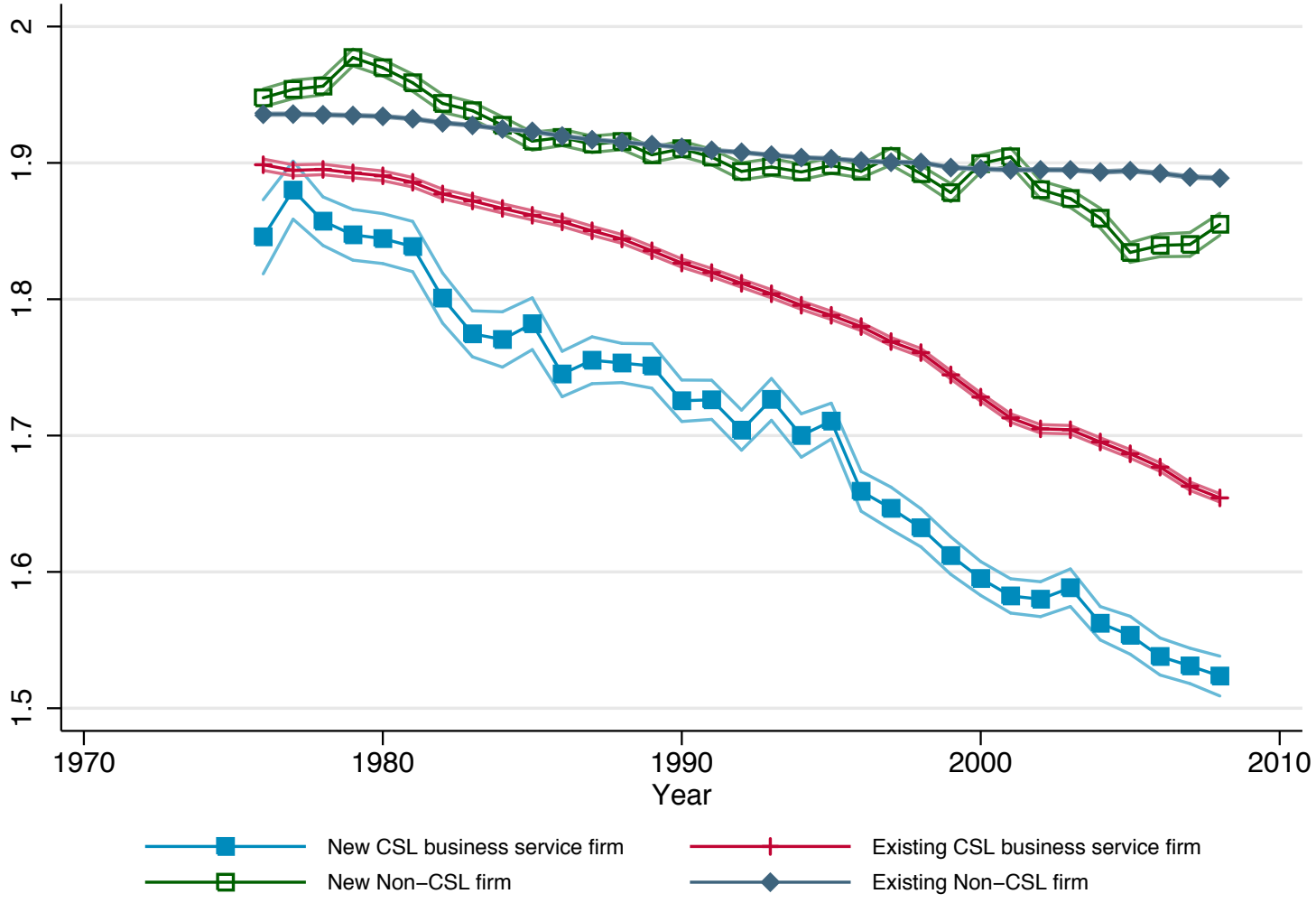
Evolution of AKM Effects Among Outsourced Workers

Figure VI: On-site Outsourcing and Establishment (AKM) Effects



Goldschmidt and Schmieder 2015

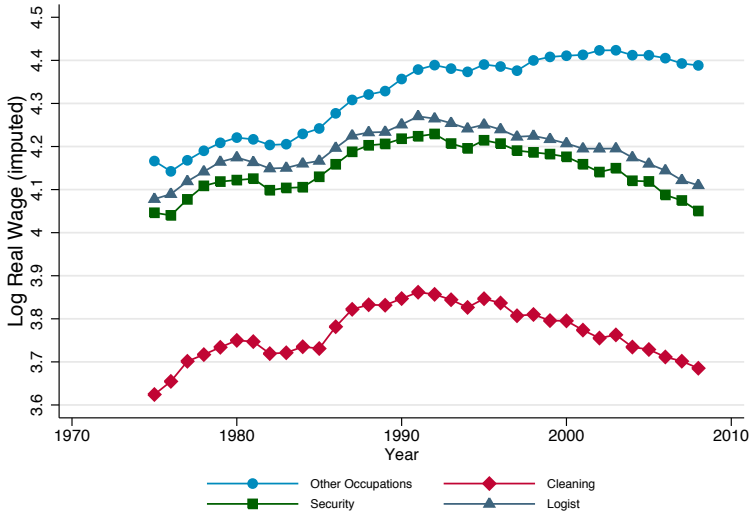
Evolution of AKM Effects of CSL Establishments



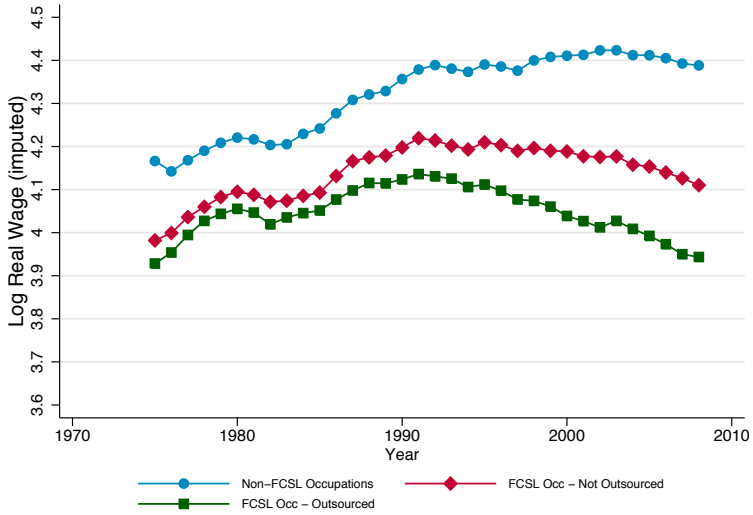
(a) AKM Effects of New and Existing Establishments by Year

Goldschmidt and Schmieder 2015

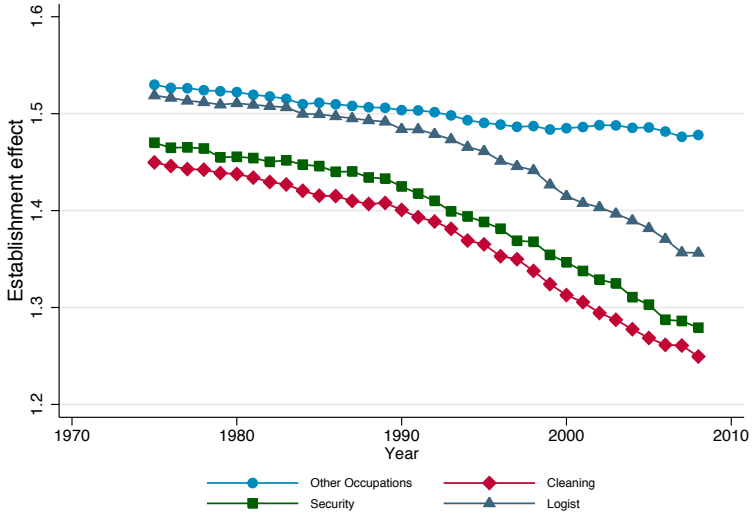
Decoupling of Wages in Logistics, Cleaning and Security Occupations from General Wage Growth



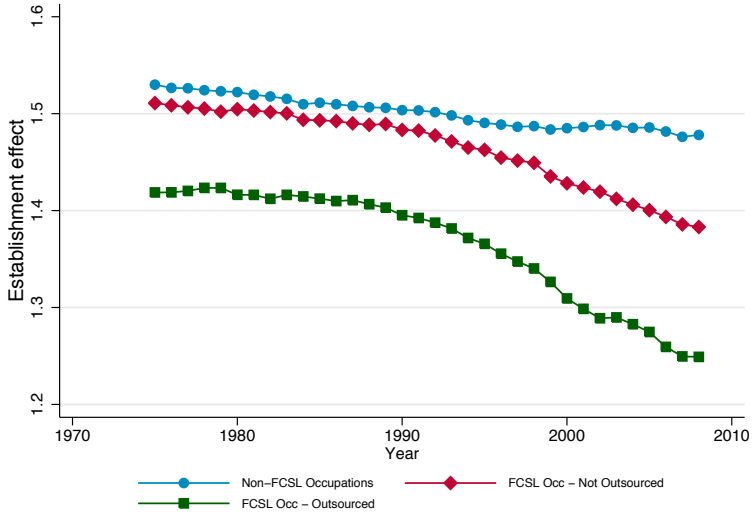
(a) Evolution of Wages by Occupations



(b) Evolution of Wages by Outsourced Status



(c) Evolution of AKM effects by Occupations

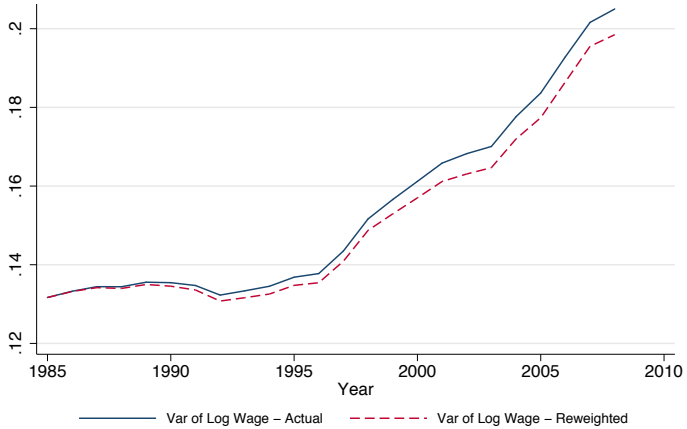


(d) Evolution of AKM Effects by Outsourced Status

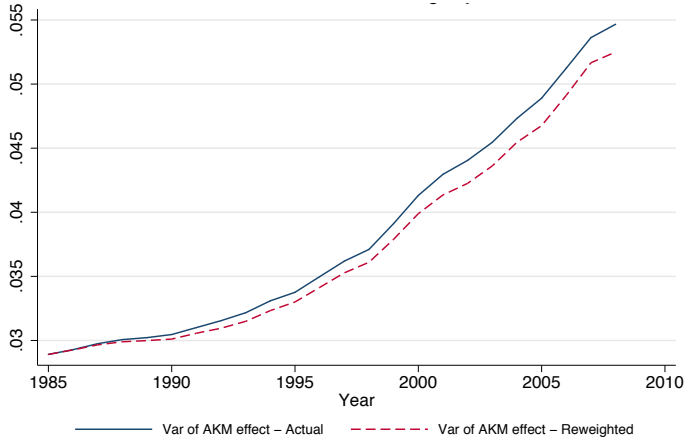
Goldschmidt and Schmieder 2015

DFL AKM Counterfactual: Holding FCLS at 1985 Level

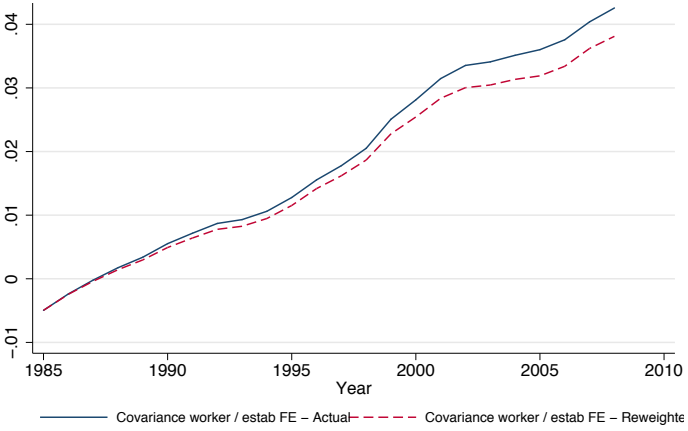
Figure X: The Evolution of the West German Wage Structure for Men, Actual and DFL Reweighted



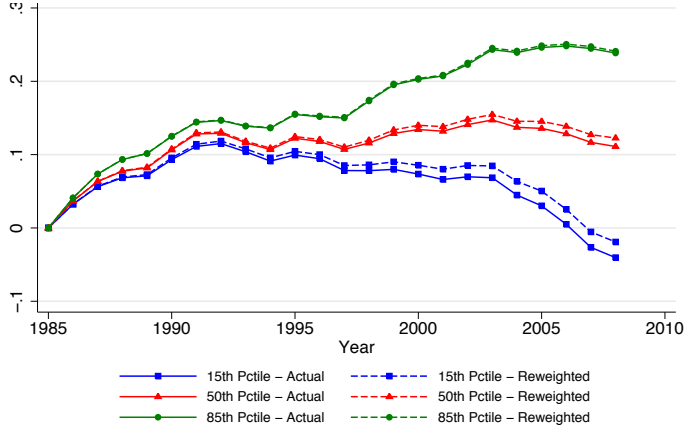
(a) Var(log wage)



(b) Var(establishment effect)



(c) Cov(estab effect, person effect)



(d) Percentiles (15-50-85) of log wage dist.

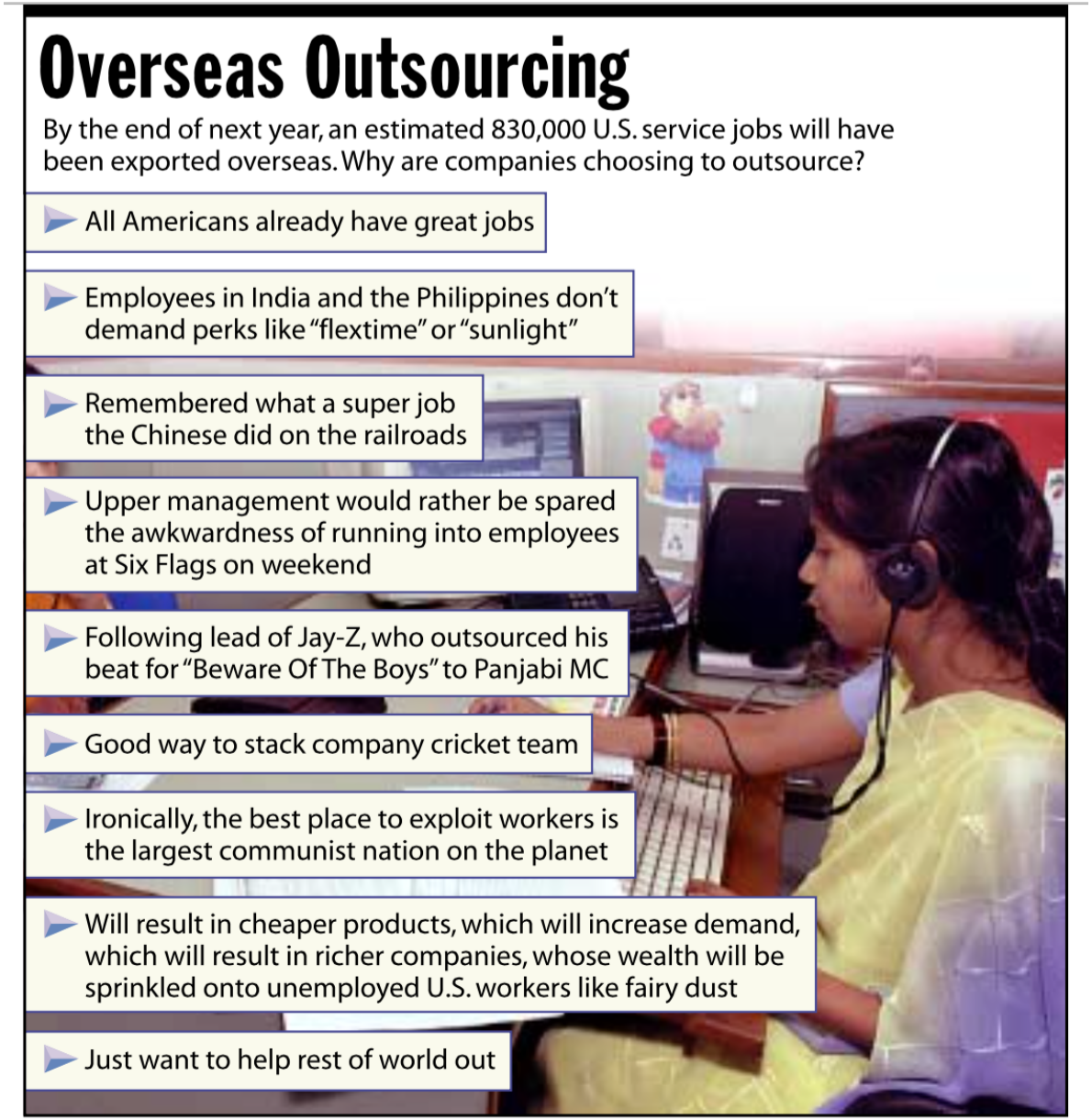
Goldschmidt and Schmieder 2015

Why Are Companies Choosing to Outsource?

Overseas Outsourcing

By the end of next year, an estimated 830,000 U.S. service jobs will have been exported overseas. Why are companies choosing to outsource?

- All Americans already have great jobs
- Employees in India and the Philippines don't demand perks like "flextime" or "sunlight"
- Remembered what a super job the Chinese did on the railroads
- Upper management would rather be spared the awkwardness of running into employees at Six Flags on weekend
- Following lead of Jay-Z, who outsourced his beat for "Beware Of The Boys" to Panjabi MC
- Good way to stack company cricket team
- Ironically, the best place to exploit workers is the largest communist nation on the planet
- Will result in cheaper products, which will increase demand, which will result in richer companies, whose wealth will be sprinkled onto unemployed U.S. workers like fairy dust
- Just want to help rest of world out



Outline

1. Labor coercion and contracting
2. What do unions do?
3. Firms effects and outsourcing
4. Competitive environment
   - ‘Superstar’ firms

Concentrating on the Falling Labor Share

Autor, Dorn, Katz, Patterson and Van Reenen 2017

Falling Labor Share of Value-Added Evident in Many Countries, Esp. Since 2000

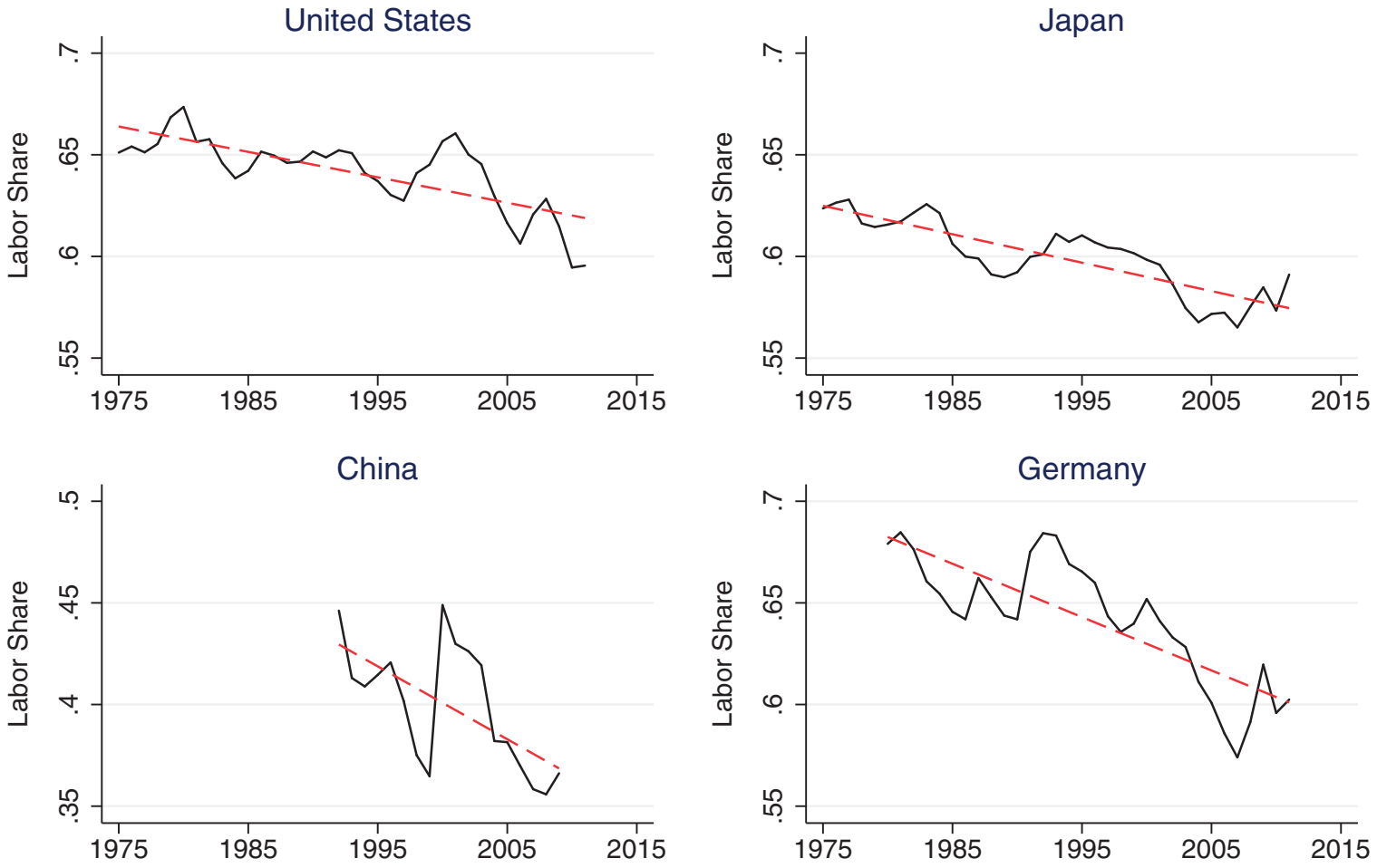


FIGURE II

Declining Labor Share for the Largest Countries

Karabarbonis and Neiman, 2014

Significance?

- Overturns a key ‘Kaldor fact’
- Fall is real and significant
  - Elsby et al. ‘13
  - Karbarbounis/Neiman ‘14
  - Rognlie ’14
  - Koh et al. ‘16
- Why is this a concern?
  1. Slow GDP growth → Labor getting a shrinking slice of slow-growing pie
  2. Since distribution of capital far more unequal than distribution of labor → Growing income inequality

Causes of the Falling Labor Share?

- **Role of technical change: Karabarbonis & Neiman '14**
  - Falling capital price and, critically, elas. of L-K sub $\sigma > 1$
  - But empirical literature suggests $\sigma < 1$, e.g., Lawrence '15, Oberfield-Raval '14, Antras '04, Hamermesh '90
- **Role of trade exposure: Elsby et al. '13**
  - Driven by falling labor share in trade-impacted manufacturing industries (China competition)
- **Role of growth vs. stagnation**
  - Piketty '14, Rognlie '14, Krusell and Smith, '15
- **Role of rising profit share – higher aggregate mark-up**
  - Barkai '16: Also finds Δ Labor share falls with Δ Concentration (not using micro-data)

Summary of Evidence

1. A rise in sales concentration within four-digit industries across US private sector
2. Industries with larger increases in concentration see larger falls in labor share
3. Labor share fall largely due to reallocation of activity between firms, not primarily a general fall within incumbent firms
4. Reallocation component of falling labor share largest in industries with rising sales concentration
5. These patterns are broadly international in scope

Superstar firm model sketch (akin to Bartelsman et al. '13, AER)

- Heterogeneous firms i in an industry
  - Monopolistic competition: CES demand with consumer price elasticity $\rho > 1$
  - Competitive factor markets: wage w, capital cost r
  - Firms pay sunk cost of entry $\kappa > 0$ for random draw of productivity A_i (TFPQ)
  - F is overhead labor, a fixed cost of production
  - Low productivity firms who cannot cover fixed cost exit

Superstar firm model sketch

- **Heterogeneous firms i in an industry**
  - $Y_i = A_i V_i^{\alpha} K_i^{1-\alpha}$
    - Y_i = value-added
    - K = capital, with share $1 - \alpha$
    - V = variable labor with share α
    - Total labor is $L = V + F$

The Labor Share, S_i

- **Labor cost wL share in nominal value added PY**
  - $S_i = \left(\frac{wL}{PY}\right)_i = \frac{\alpha_L}{\mu_i} + \frac{wF}{(PY)_i}$
  - μ_i is mark-up of price P over marginal cost c
  - Given economy-wide values of α, w, F
  - Firm has a lower labor share if
    1. Its share of fixed costs in total revenues is lower
    2. Its mark-up is higher
  - High A_i firms will be larger → Lower labor shares
  - In other imperfect comp models (e.g. Cournot), high A_i firms will have large market shares *and* higher mark-ups

Some Predictions

- **Rise in product market competition $\rho \uparrow$**

  1. Increases concentration because shifts output to high A_i (low labor share) firms

  2. This reallocation will push down the aggregate labor share (so long as it dominates any within firm changes)

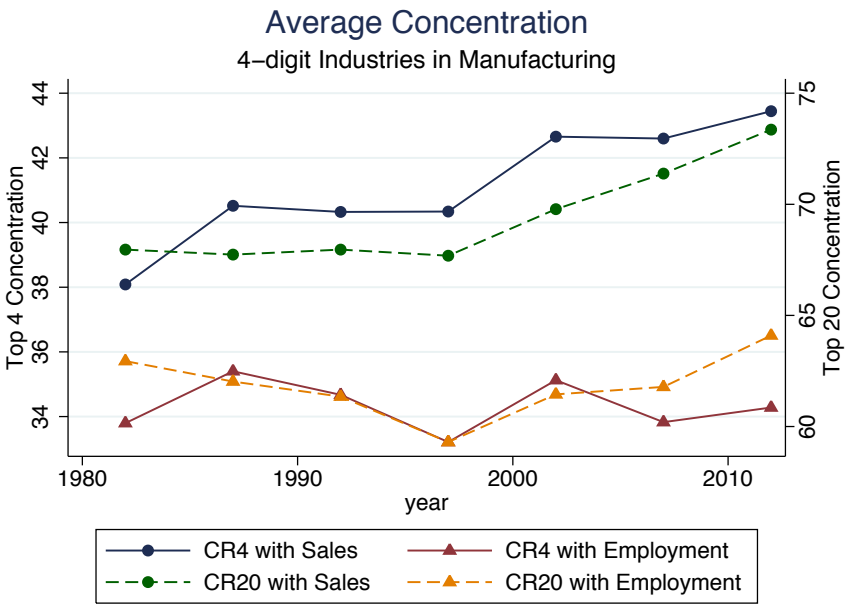
- More generally
  - Any Δ to market structure that gives more market share to higher quality firms will have reallocation effect pushing down labor share

Data Sources

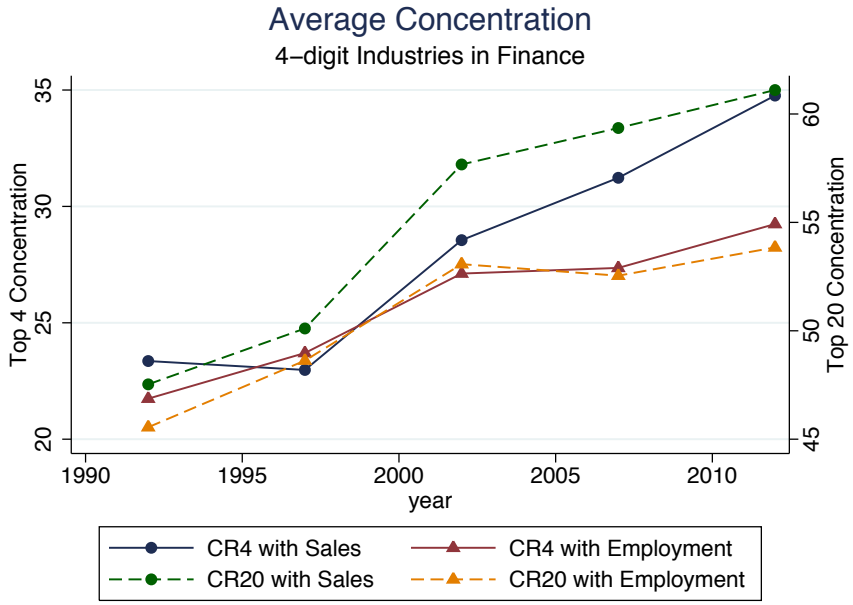
- **Measuring labor share**
  - US Economic Censuses, 1982 - 2012
  - Conducted every 5 years
  - Use six sectors covering ~80% of private sector jobs
    - 1. Manufacturing; 2. Retail; 3. Wholesale; 4. Services; 5. Finance; 6. Utilities & Transportation
  - Time consistent industries (built on 4-digit SIC-87)
    - 288 in non-manufacturing, 388 in manufacturing
- **Measuring sales concentration**
  - CR4, CR20, HHI (Herfindahl-Hirschman Index)
  - Robust to adjusting for (i) intermediate services; (ii) size of domestic market via imports

Rising Concentration: Manufacturing and Finance

Manufacturing Sector



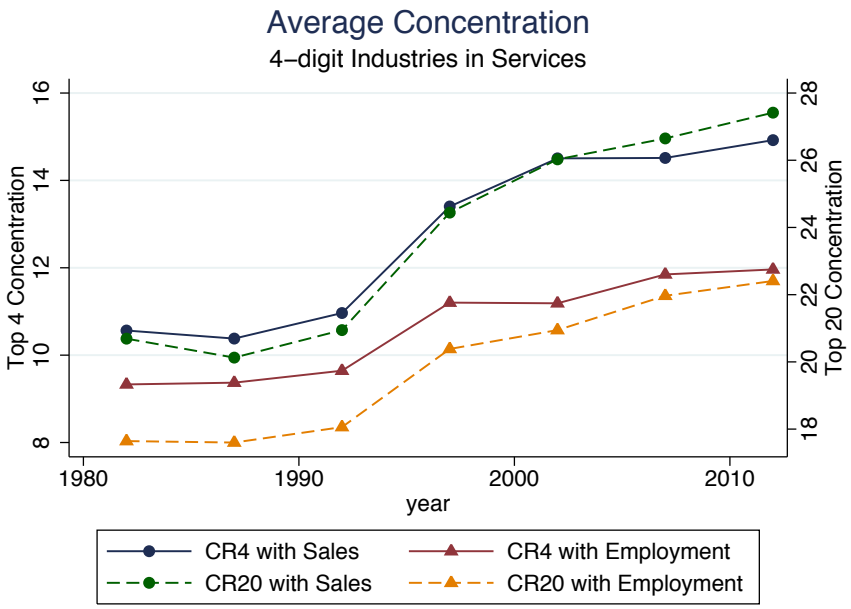
Finance Sector



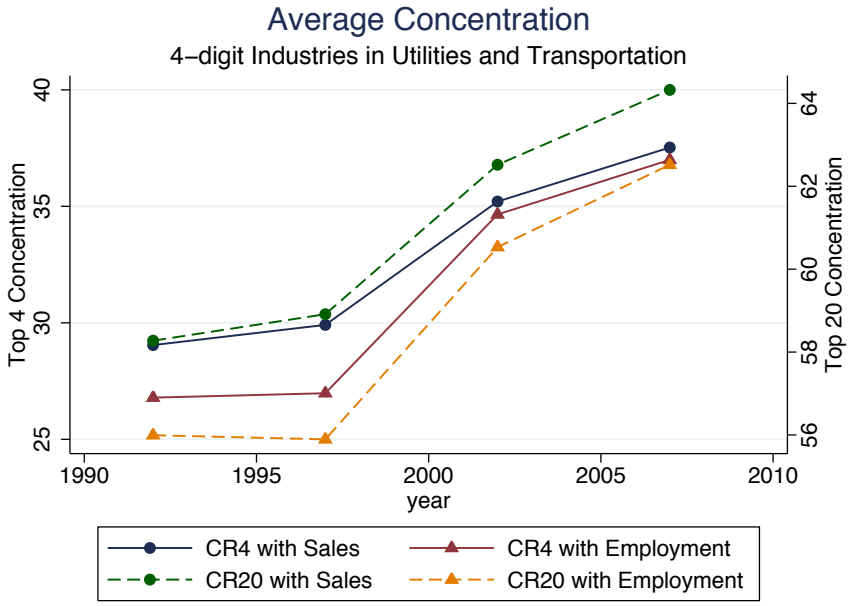
Notes: Weighted average of 4 digit industries within each large sector. Manufacturing: 388 inds; Finance: 31; Services: 95; Utilities & Transport: 48; Retail: 58; Wholesale: 56

Rising Concentration: Services, Utils + Transport

Service Sector



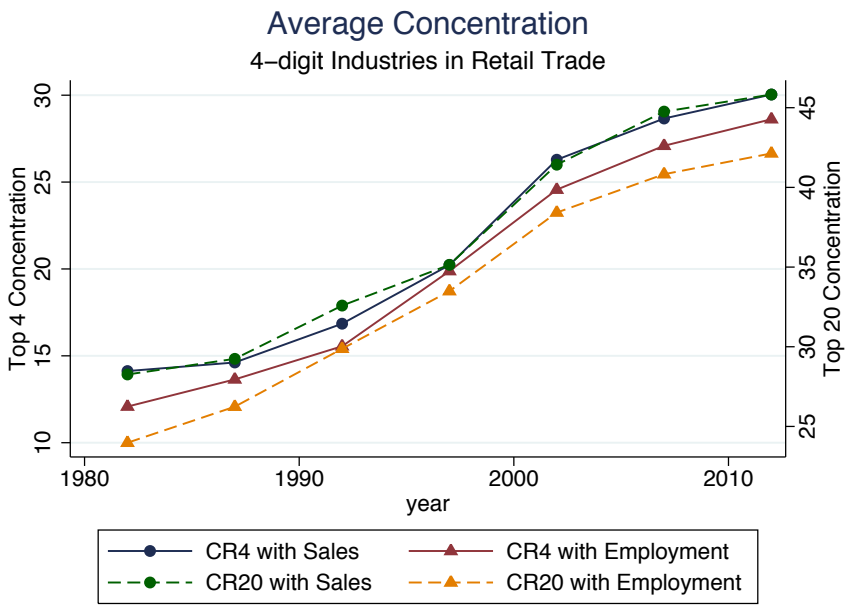
Utilities + Transportation Sector



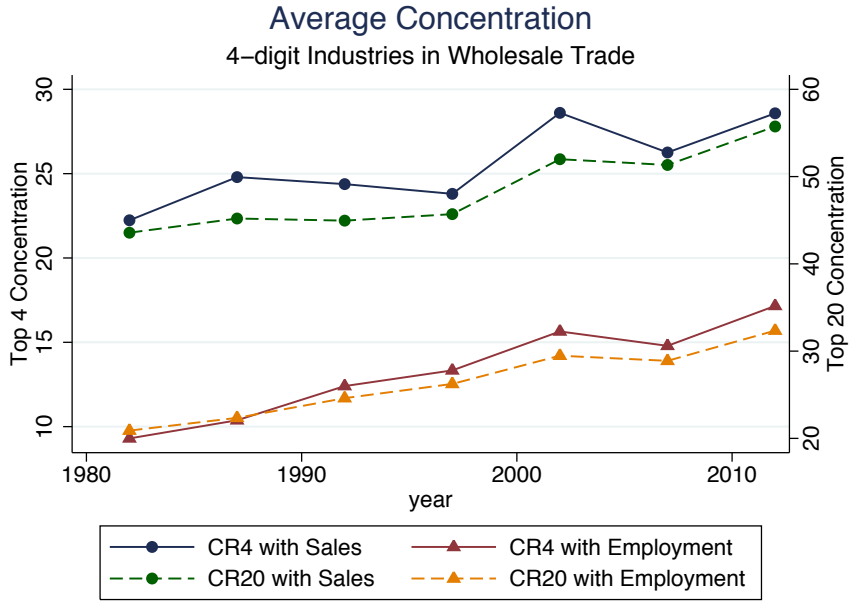
Notes: Weighted average of 4 digit industries within each large sector. Manufacturing: 388 inds; Finance: 31; Services: 95; Utilities & Transport: 48; Retail: 58; Wholesale: 56

Rising Concentration: Retail and Wholesale Trade

Retail Trade



Wholesale Trade



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4. Reallocation component of falling labor share largest in industries w/rising sales concentration
5. These patterns broadly international in scope

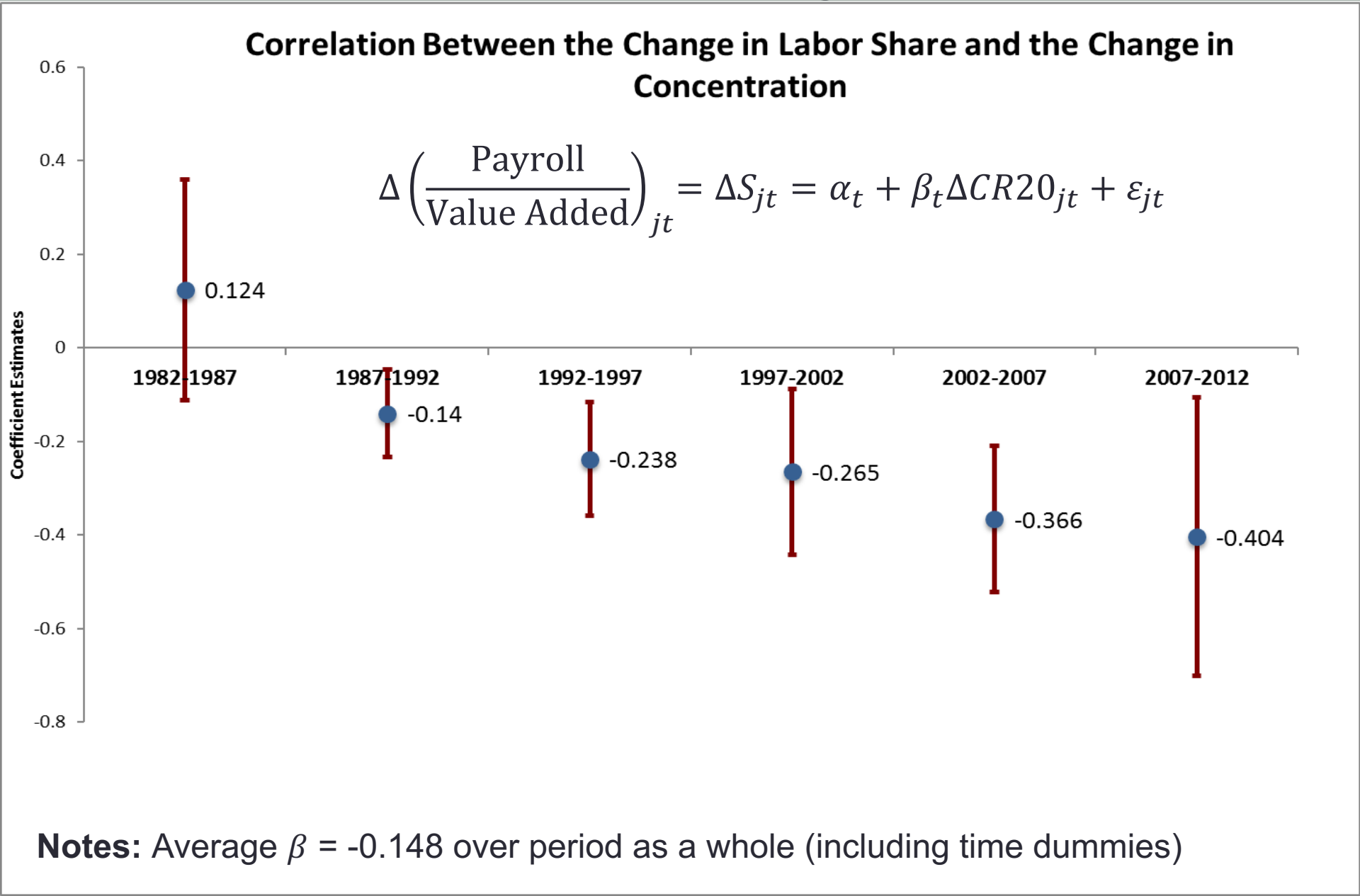
Rising Concentration → Falling Labor Share? Manufacturing: 5 year changes

- $\Delta\left(\frac{\text{Payroll}}{\text{Value Added}}\right)_{jt} = \Delta S_{jt} = \alpha + \beta \Delta \text{Conc}_{jt} + \gamma_t + \varepsilon_{jt}$

		CR4		CR20		HHI	
1	Baseline	-0.148	**	-0.234	**	-0.189	*
		(0.036)		(0.047)		(0.096)	

Notes: ** significant at 1% level; * = significant at 5% level; ~ = significant to 10% level

Regression of Δ Labor Share on Δ Concentration by period in U.S. Manufacturing, 1982 – 2012



Notes: Average β = -0.148 over period as a whole (including time dummies)

Robustness of the Rising Concentration & Falling Labor Share Association in U.S. Manufacturing

$$\Delta\left(\frac{\text{Payroll}}{\text{Value Added}}\right)_{jt} = \Delta S_{jt} = \alpha + \beta \Delta \text{Conc}_{jt} + \gamma_t + \varepsilon_{jt}$$

		CR4		CR20		HHI	
1	Baseline	-0.148	**	-0.234	**	-0.189	*
		(0.036)		(0.047)		(0.096)	
2	Compensation Share of Value Added	-0.175	**	-0.264	**	-0.231	~
		(0.046)		(0.061)		(0.121)	
3	Deduct Service Intermediates from VA	-0.331	**	-0.517	**	-0.501	**
		(0.062)		(0.071)		(0.176)	
4	Industry Trends (Four-Digit Dummies)	-0.171	**	-0.307	**	-0.208	~
		(0.042)		(0.053)		(0.118)	
5	1992 - 2012 Sub-Period	-0.181	**	-0.316	**	-0.23	*
		(0.044)		(0.063)		(0.117)	
6	Including Imports (1992 - 2012)	-0.204	**	-0.288	**	-0.138	
		(0.052)		(0.045)		(0.180)	
7	Employment-Based Concentration Measure	0.048		0.039		0.195	*
		(0.036)		(0.036)		(0.082)	

Notes: ** significant at 1% level; * = significant at 5% level; ~ = significant to 10% level

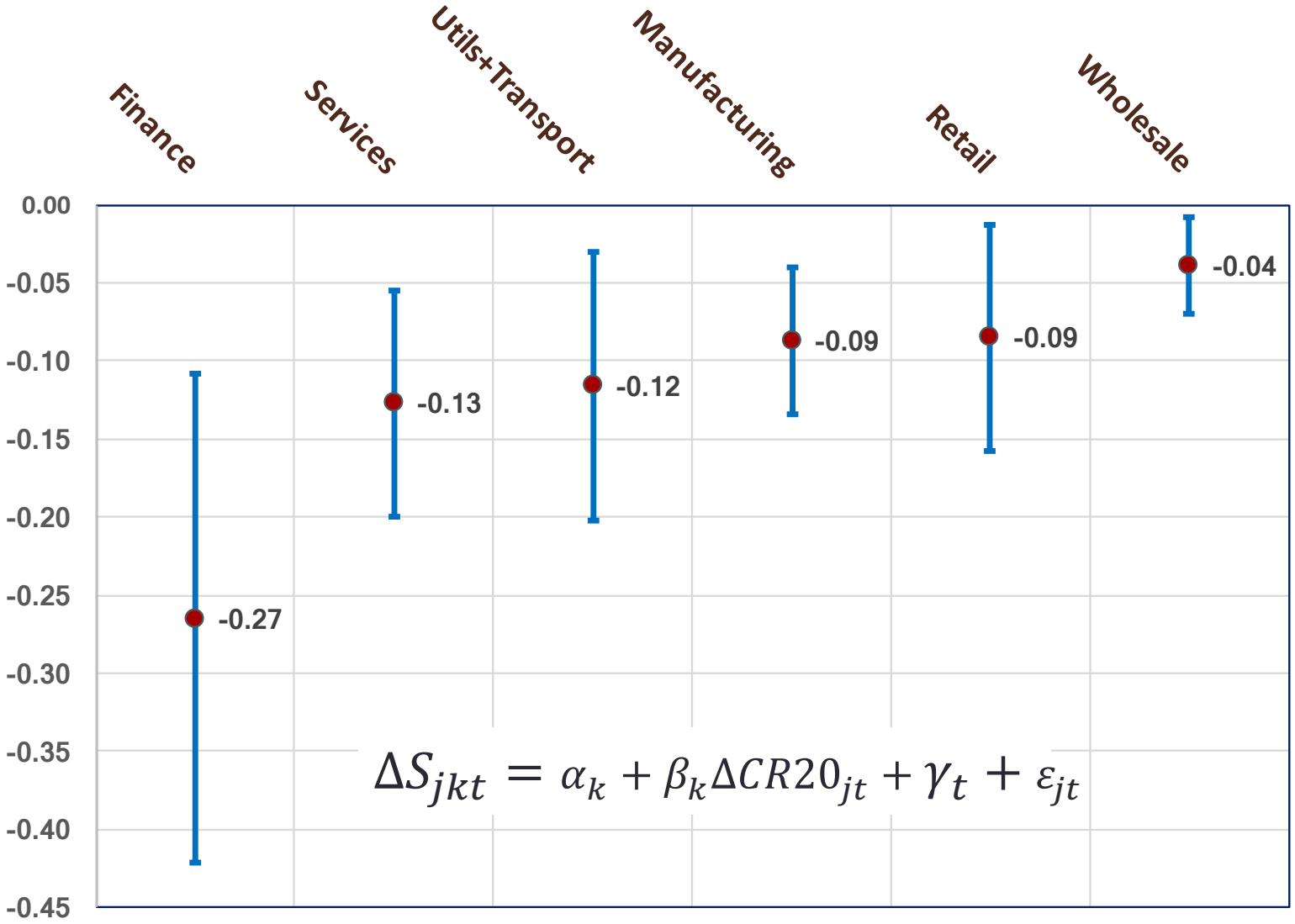
Results by Broad Sector: Switching from ΔLabor/VA to ΔLabor/Sales

$$\Delta S_{jt} = \alpha + \beta \Delta \text{Conc}_{jt} + \gamma_t + \varepsilon_{jt}$$

	Stacked Five-Year Changes						Stacked Ten-Year Changes					
	CR4		CR20		HHI		CR4		CR20		HHI	
1. Manufacturing	-0.064	**	-0.087	**	-0.107	**	-0.044	*	-0.044		-0.096	**
n = 2328; 1,164	(0.013)		(0.024)		(0.027)		(0.022)		(0.034)		(0.037)	
2. Retail	-0.036	~	-0.085	*	-0.045	~	-0.045	*	-0.070	*	-0.075	**
n = 348; 174	(0.021)		(0.037)		(0.026)		(0.018)		(0.029)		(0.023)	
3. Services	-0.090		-0.127	**	-0.354	**	-0.087		-0.129	**	-0.378	*
n = 570; 285	(0.057)		(0.037)		(0.083)		(0.070)		(0.043)		(0.158)	
4. Wholesale	-0.035	**	-0.039	*	-0.079	*	-0.037	*	-0.036	*	-0.067	
n = 336; 168	(0.012)		(0.016)		(0.039)		(0.018)		(0.018)		(0.050)	
5. Finance	-0.230	**	-0.265	**	-0.565	**	-0.252	**	-0.291	**	-0.740	*
n = 124; 62	(0.083)		(0.080)		(0.204)		(0.091)		(0.070)		(0.294)	
6. Utilits + Transport	-0.118	**	-0.116	**	-0.434	**	-0.048		-0.122	*	-0.269	**
n = 144; 48	(0.026)		(0.044)		(0.054)		(0.072)		(0.051)		(0.104)	
7. All combined	-0.076	**	-0.093	**	-0.144	**	-0.063	**	-0.083	**	-0.122	**
n = 3,850; 1,901	(0.016)		(0.022)		(0.028)		(0.019)		(0.024)		(0.033)	

Significance at the **1% level, *5% level, ~10% level. Each cell is the coefficient on a concentration measure from a separate OLS regression (standard errors in parentheses clustered by industry). Time period is 1982-2012 using different Censuses aggregated up to four digit industry-level. The combined regression in row 7 includes 6 sector fixed effects. Regressions are weighted by the share of sales of the four digit industry in total sector sales in the initial year.

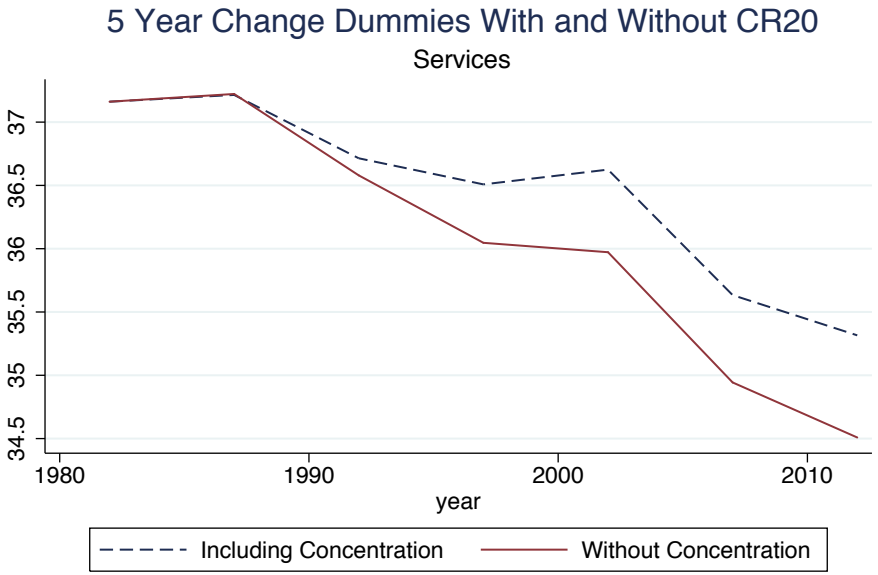
ΔLabor-Share Regressed on ΔConcentration: Results Across Six Sectors



Notes: OLS Regression coefficient of Δlab share (payroll over sales) on CR20 (5 year changes); 95% confidence intervals; 1982-2012.

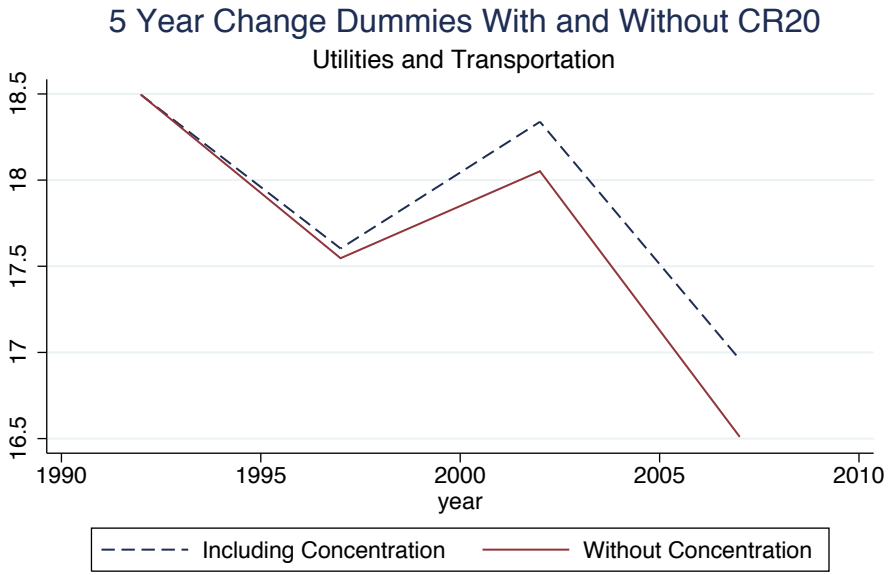
‘Explained’ Share of Falling Labor Share

Service Sector



Dependent variable is the wage–to–sales ratio.
Concentration is defined using sales

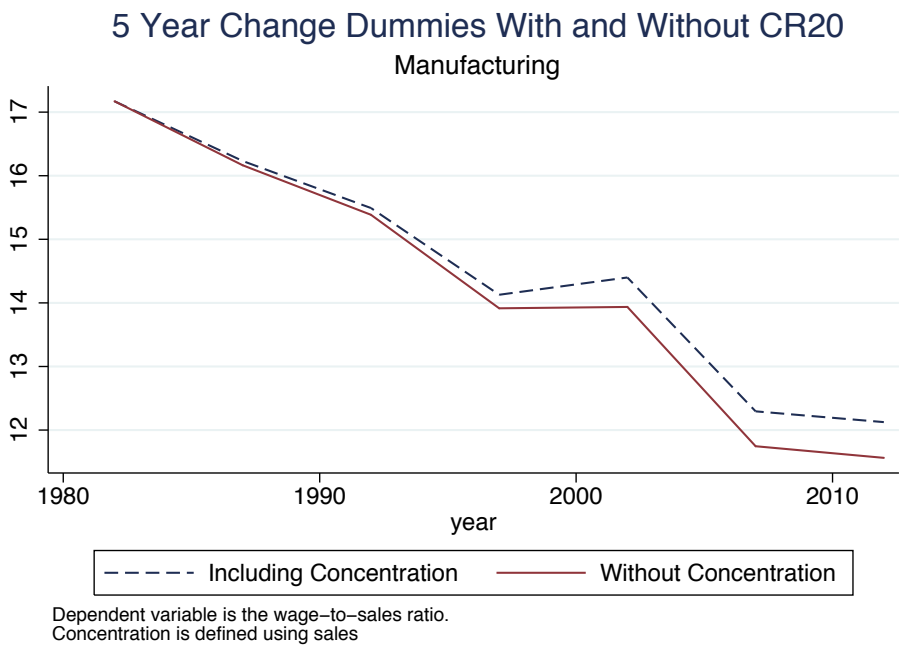
Utilities + Transportation Sector



Dependent variable is the wage–to–sales ratio.
Concentration is defined using sales

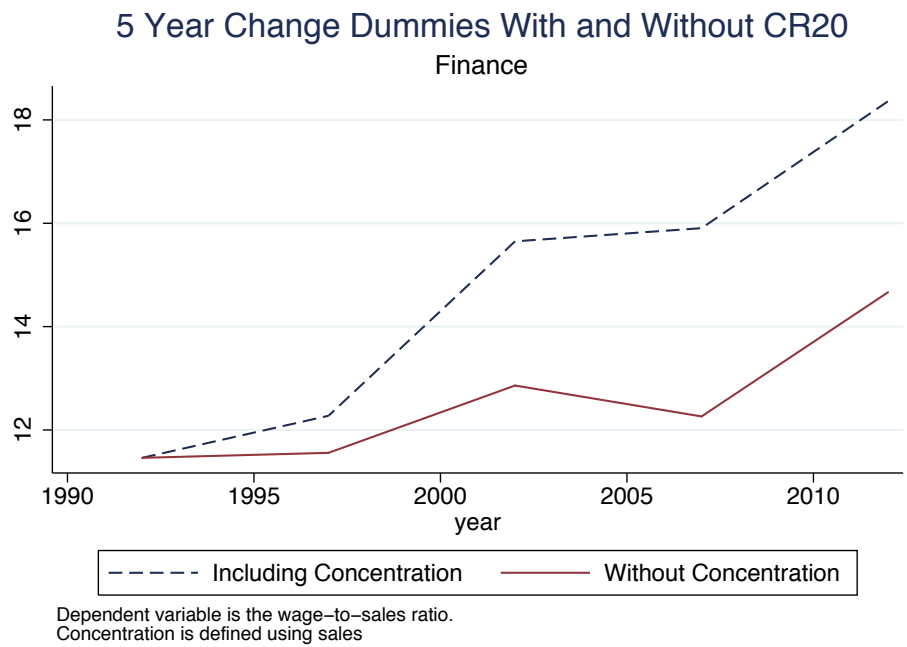
‘Explained’ Share of Falling Labor Share

Manufacturing Sector



Dependent variable is the wage–to–sales ratio.
Concentration is defined using sales

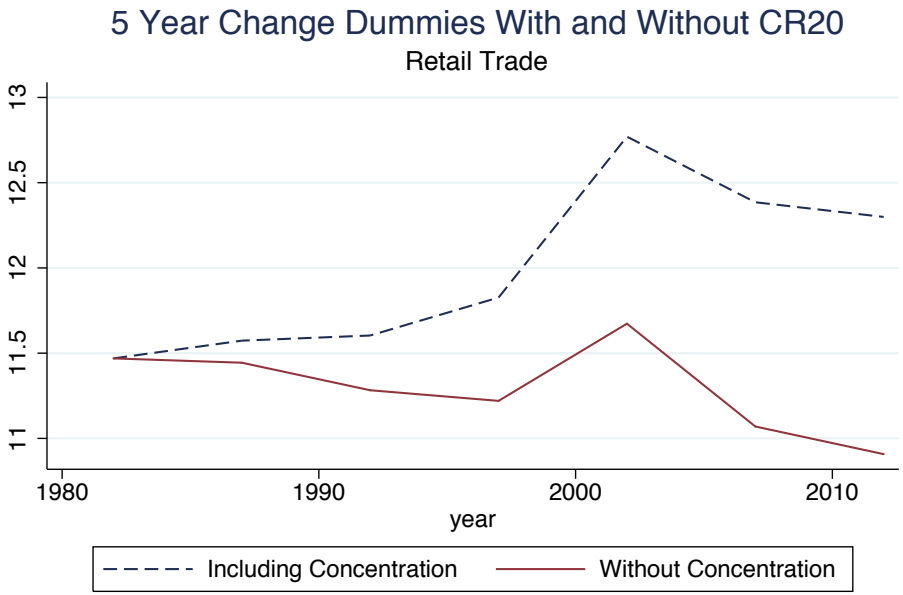
Finance Sector



Dependent variable is the wage–to–sales ratio.
Concentration is defined using sales

‘Explained’ Share of Falling Labor Share

Retail Trade



Dependent variable is the wage–to–sales ratio.
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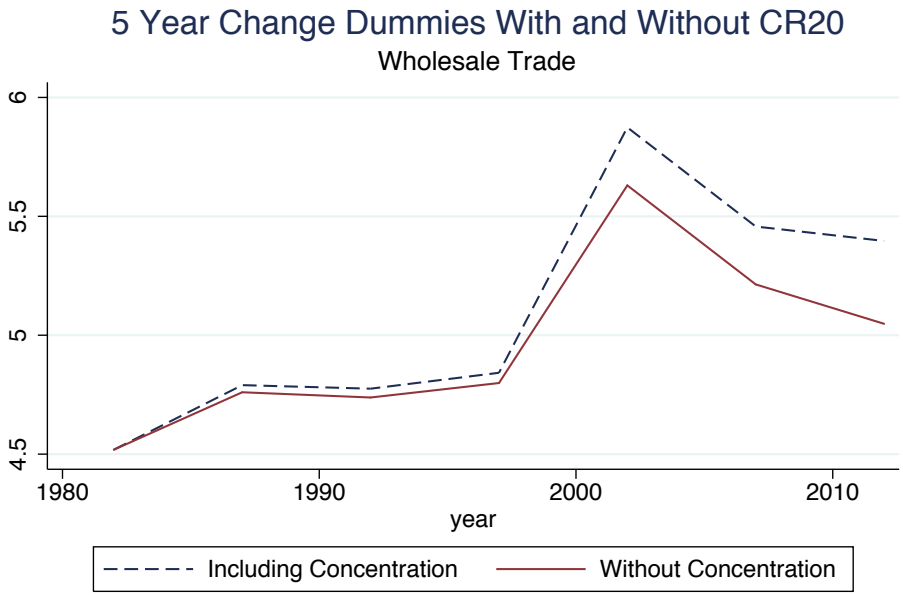
Wholesale Trade

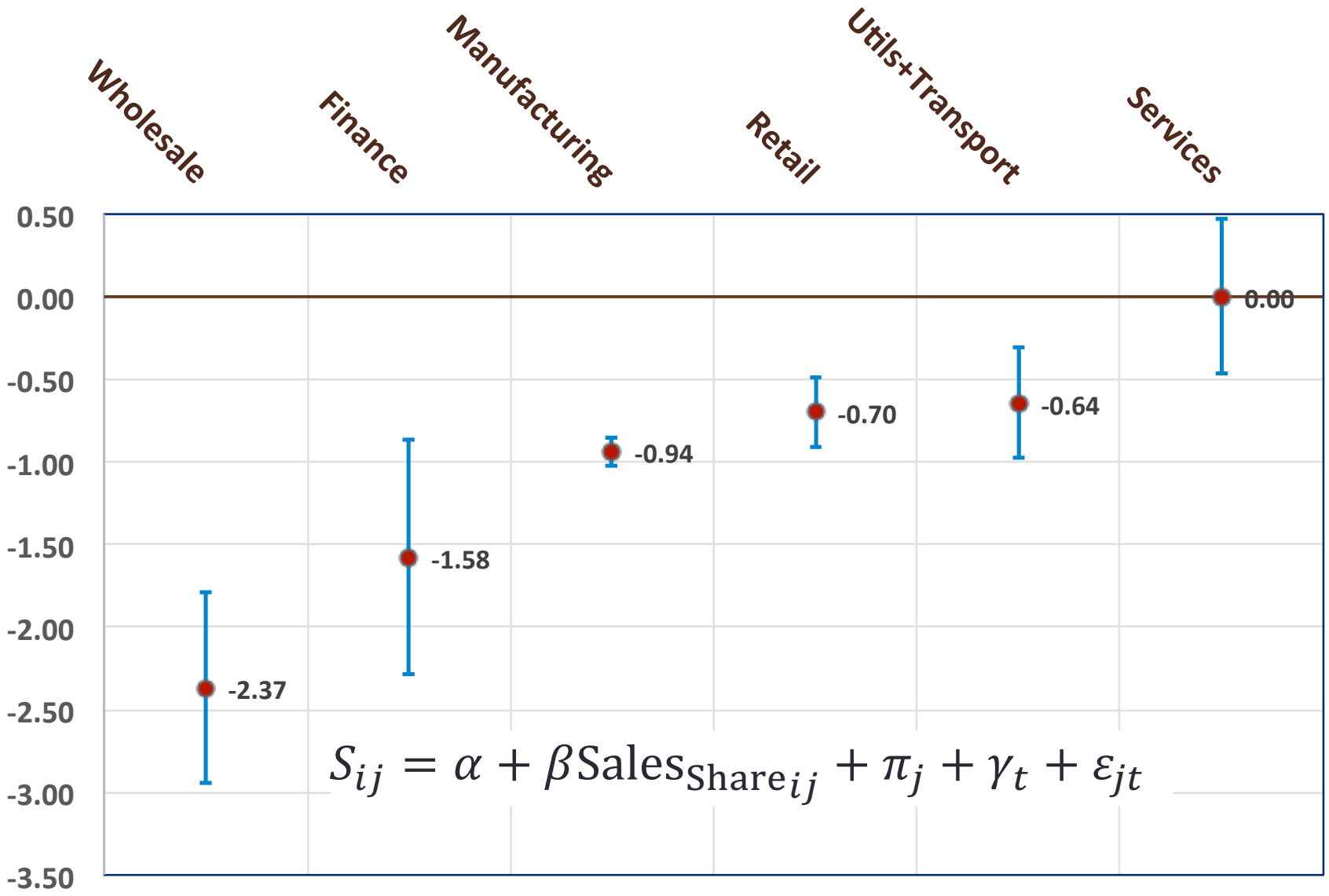


Dependent variable is the wage–to–sales ratio.
Concentration is defined using sales

Summary of Evidence

1. A rise in sales concentration within four-digit industries across US private sector
2. Industries with larger increases in concentration see larger falls in labor share
3. Labor share fall largely due to reallocation of activity between firms, not primarily a general fall within incumbent firms
4. Reallocation component of falling labor share largest in industries w/rising sales concentration
5. These patterns broadly international in scope

Basic Descriptive Relationship: Larger Firms Have Lower Labor Shares



Olley-Pakes (1996) Decomposition Applied to Labor Share

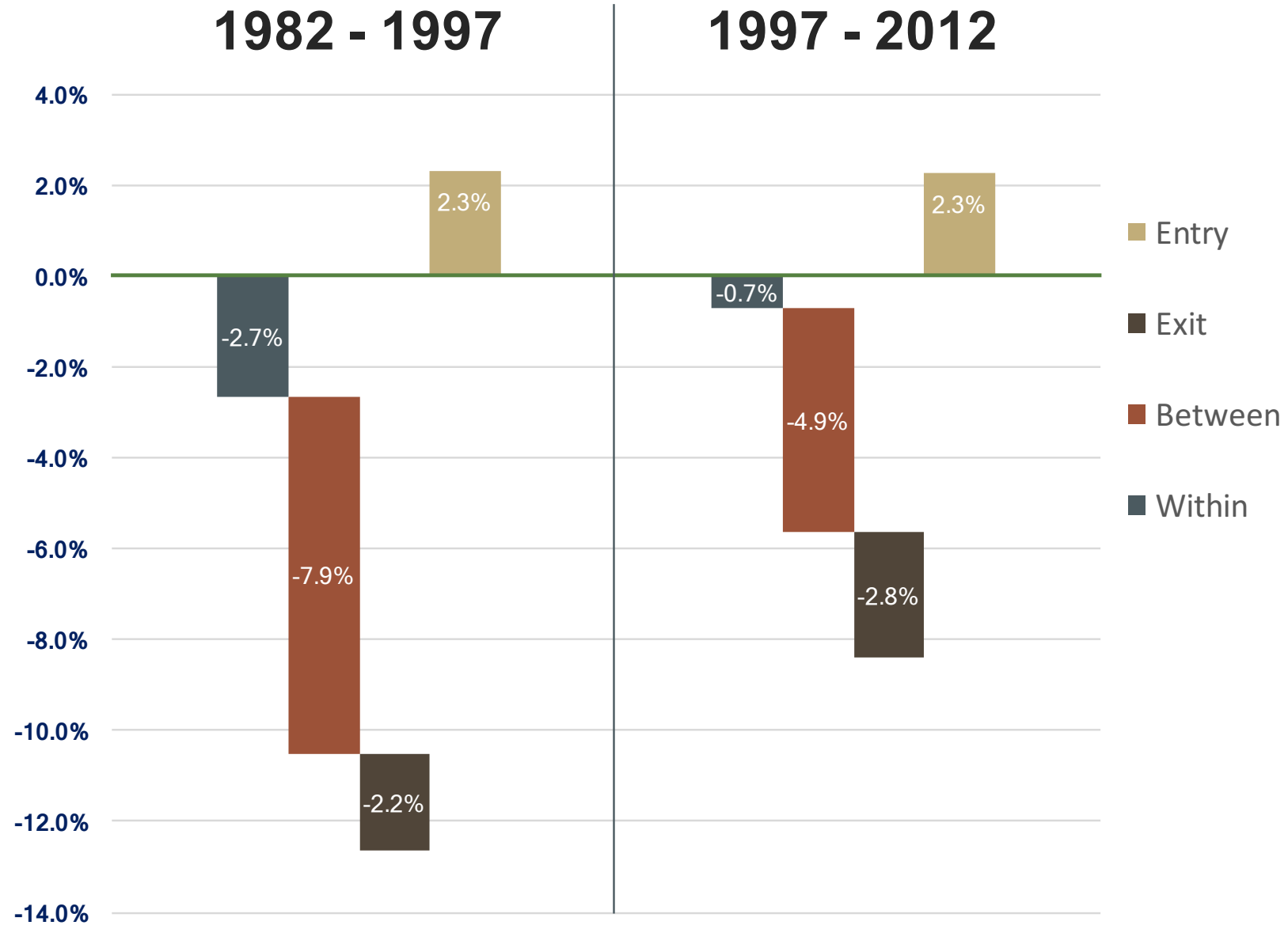
- $S = \bar{S} + [\Sigma(\omega_i - \bar{\omega})(S_i - \bar{S})]$
- Aggregate labor share (S) divided into
  1. Cross-firm unweighted average, $\bar{S}$
  2. Reallocation (covariance) term $\Sigma(\omega_i - \bar{\omega})(S_i - \bar{S})$
- Where ω_i is the sales share of firm *i* and $\bar{\omega}$ is the unweighted mean sales share
- Intuition is that overall labor share depends on within firm mean and between firm covariance (bigger firms have lower labor shares)

Extended Melitz-Polanec (2015) Decomposition of Δ Labor Share: Adding Entry + Exit

- $$\Delta S = \Delta \bar{S}_S + \Delta[\Sigma(\omega_i - \bar{\omega})(S_i - \bar{S})] + \omega_{X,1}(S_{S,1} - S_{X,1}) + \omega_{E,2}(S_{E,2} - S_{S,2})$$

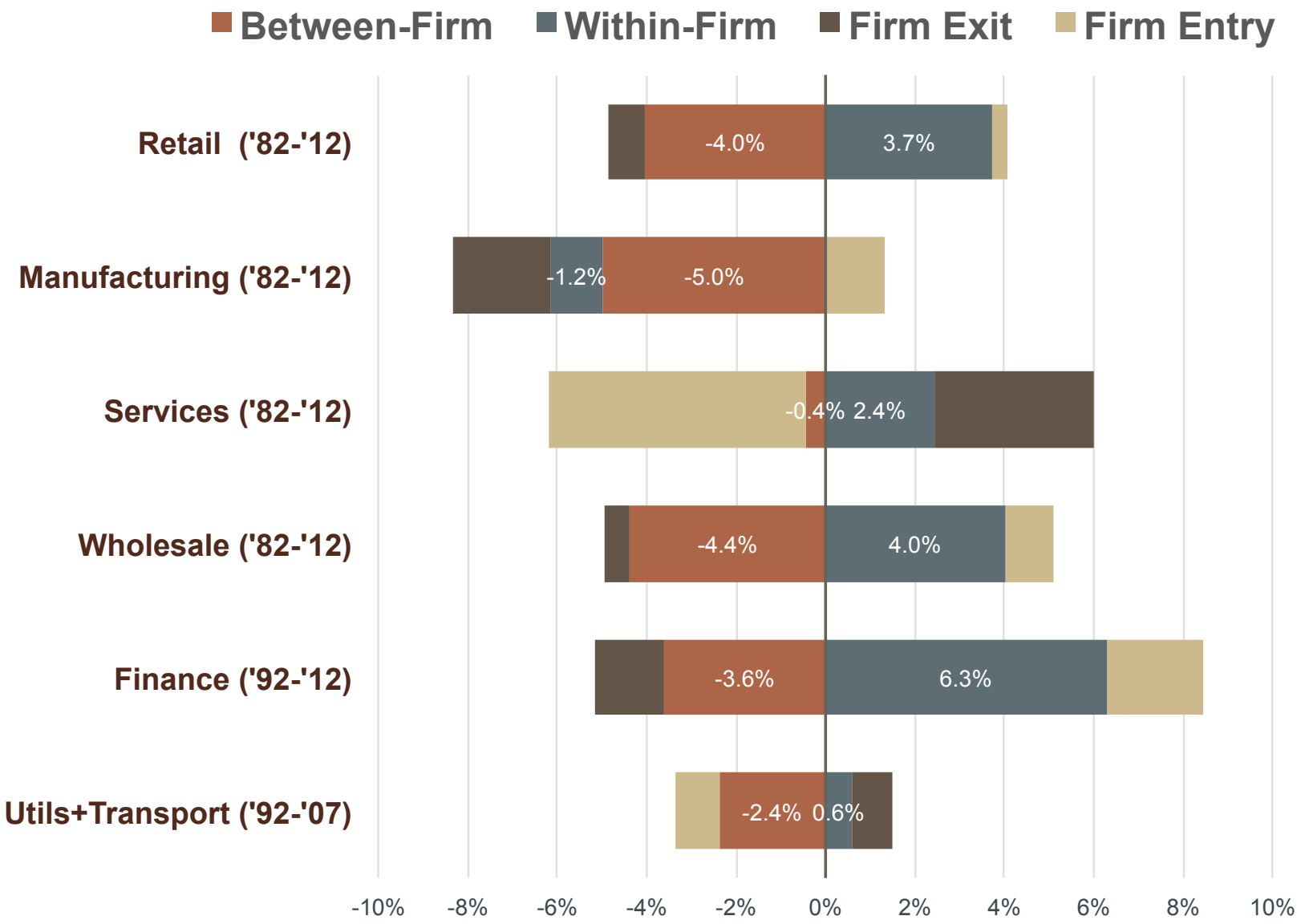
1. $\Delta \bar{S}_S$ is the change in unweighted mean labor share *within* surviving firms
2. $\Delta[\Sigma(\omega_i - \bar{\omega})(S_i - \bar{S})]$ is reallocation *between* survivors
3. $\omega_{X,1}(S_{S,1} - S_{X,1})$ is contribution of *exiting* firms
4. $\omega_{E,2}(S_{E,2} - S_{S,2})$ is contribution of *entering* firms

Δ Labor-Share, Melitz-Polanec Decomp in U.S. Manufacturing—Reallocation Major Component



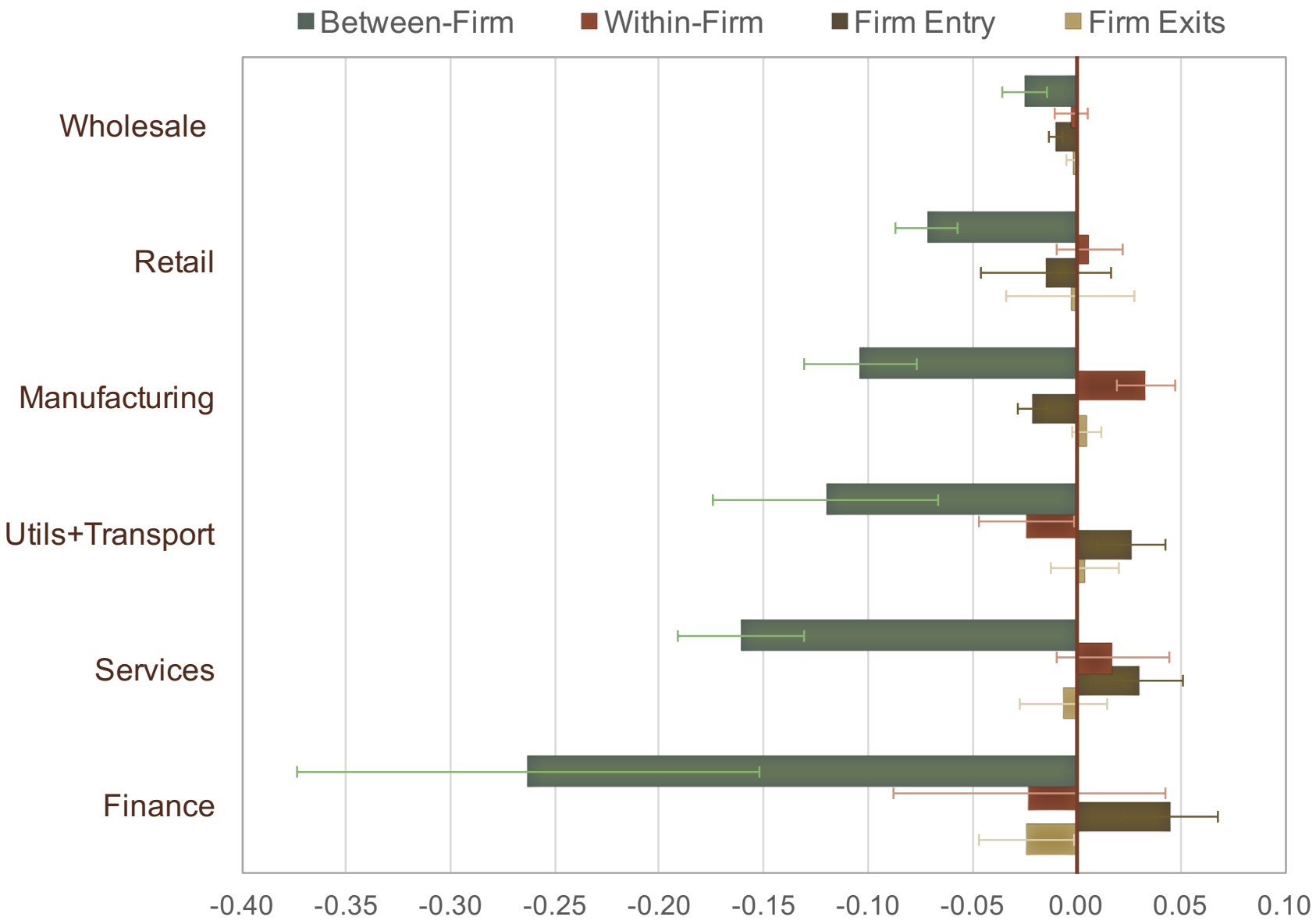
Notes: MP decomposition over 5 year periods, aggregated to two 15 year periods

Δ Labor-Share Components in Six Sectors
Melitz-Polanec Decomposition, 1982 – 2012



Notes: MP decomposition over 5 year periods, aggregated over the full sample period

Regression of ΔLabor Share Components on Sector Level Δ CR20



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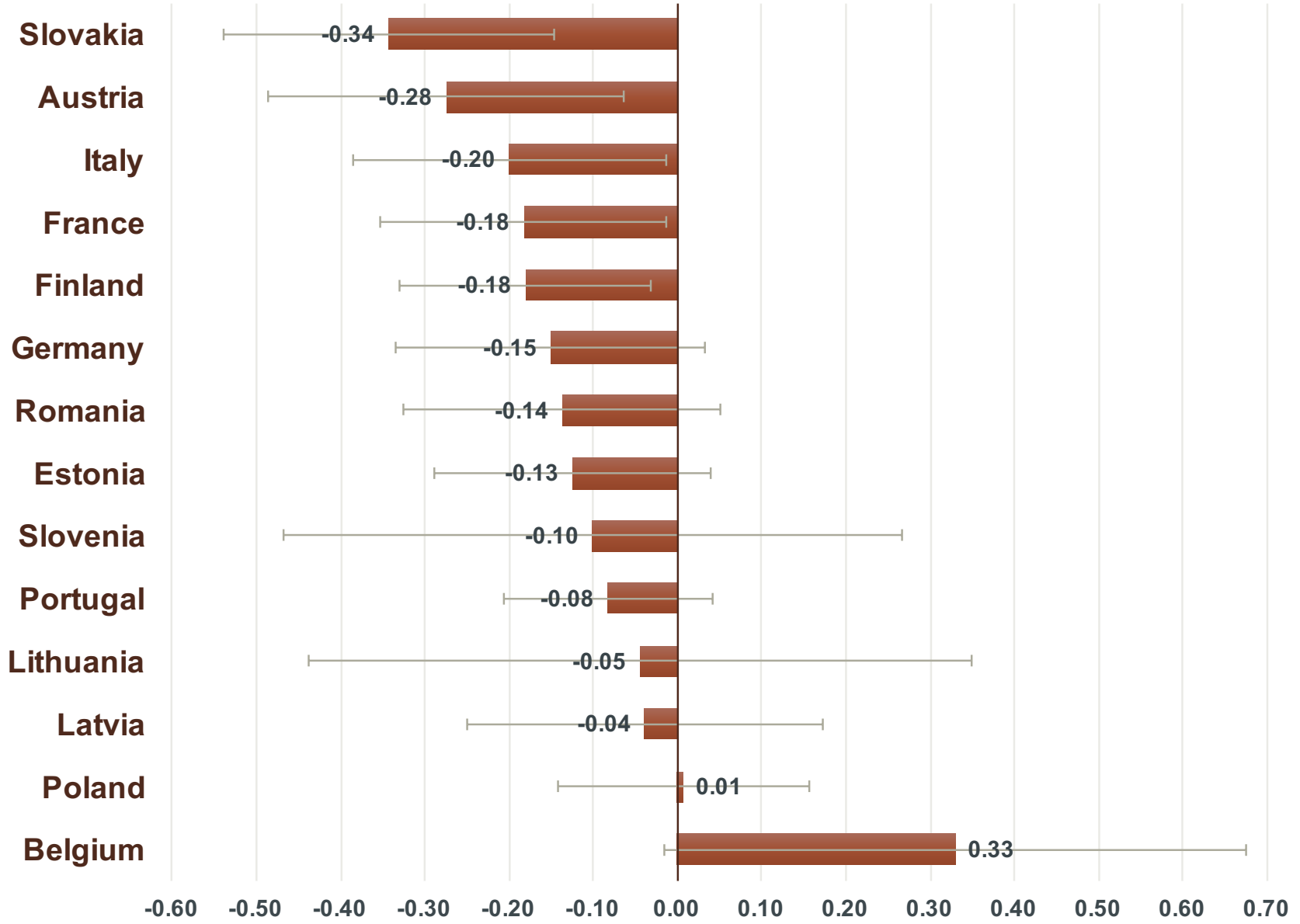
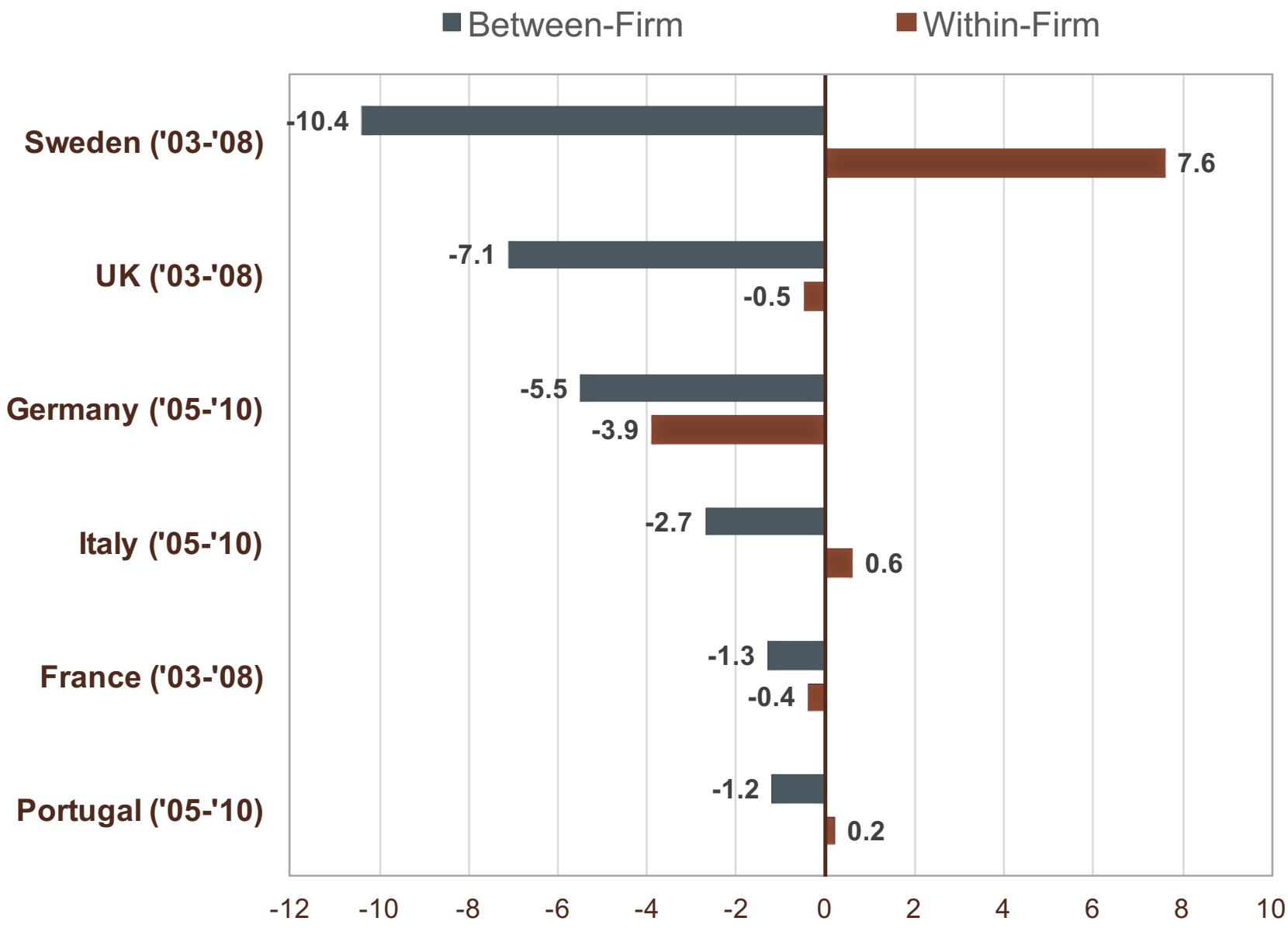
4. Reallocation component of falling labor share largest in industries w/rising sales concentration
5. Patterns broadly international in scope

Industry Regs of Δ Labor Share of Sales on Δ Concentration (COMPNET, 10 year change)



ΔLabor Share: Within/Between-Firm Decomposition by Country (BVD Orbis Data)

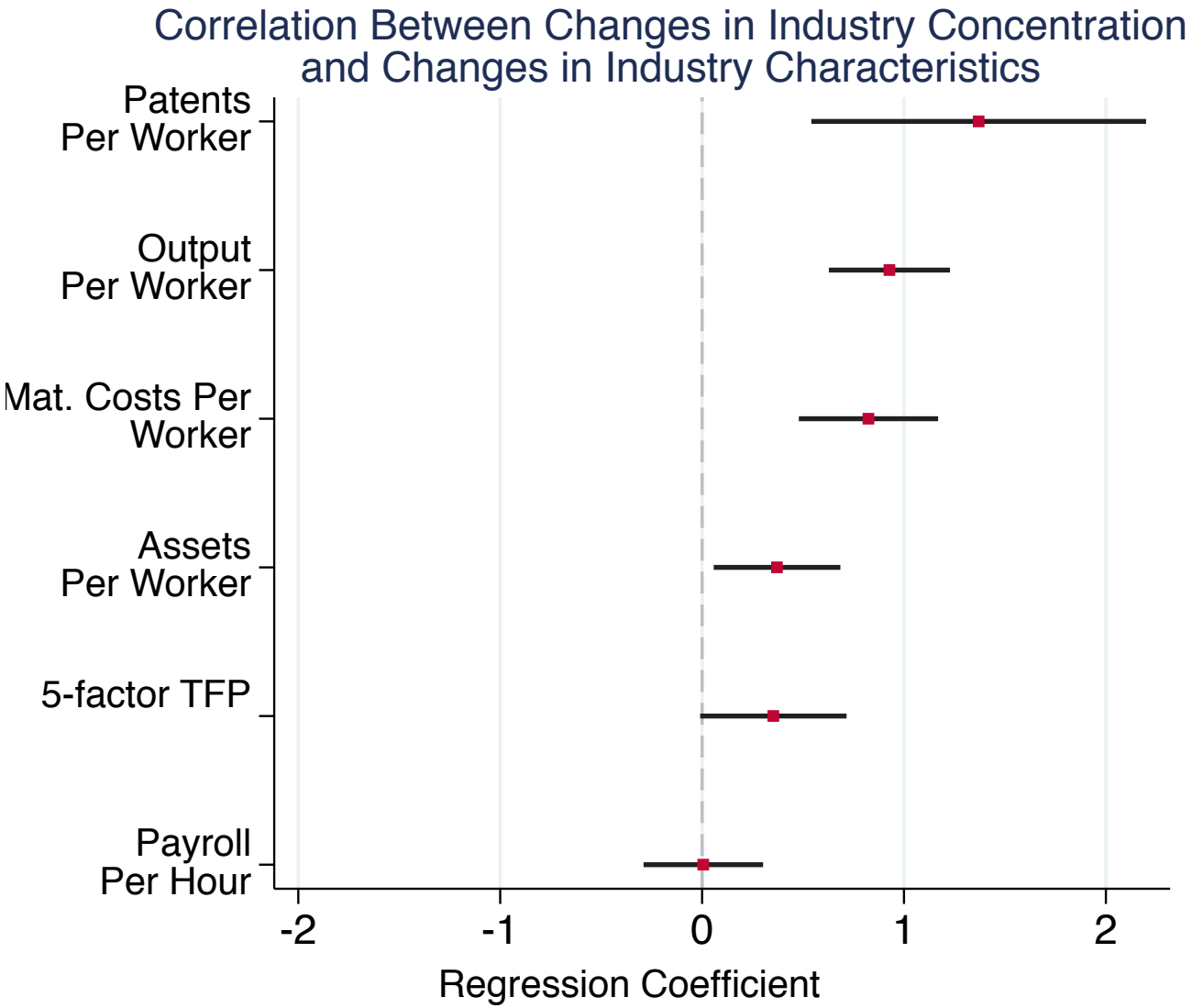


What's Not Going on

Surprisingly, does not appear explained by

1. 'China shock' – Trade exposure not major predictor
2. Susceptibility to 'routine-replacing technical change'
3. Purely U.S.- specific factors such as antitrust law; weakening labor institutions

Concentrating Industries Look "Dynamic" — Faster Rise in Patent Intensity, Labor Productivity, ΔK

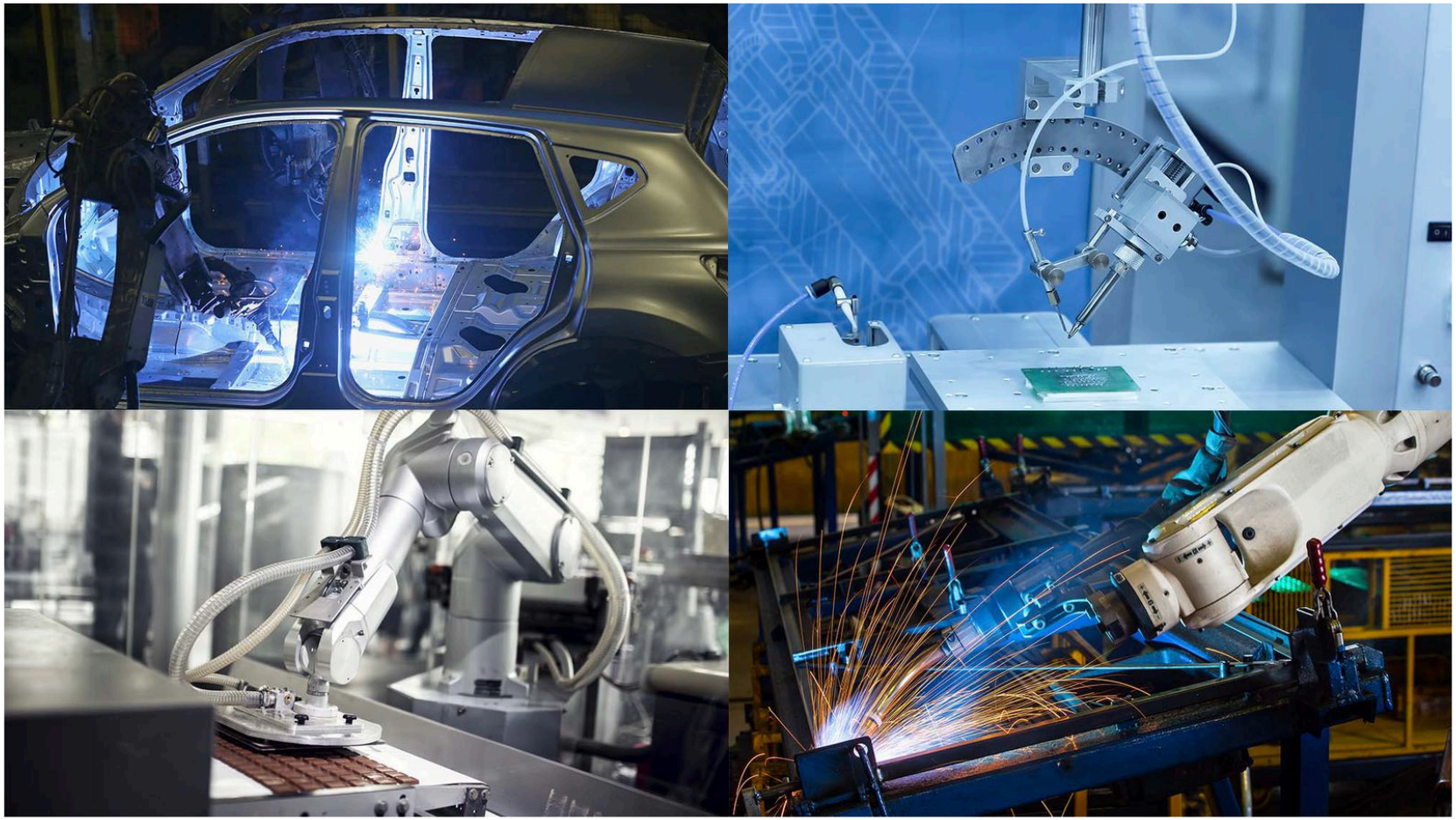


Conclusion: Much Supporting Evidence for 'Superstar Firms' – But What's the Cause?

1. **Tougher competition?**
   - More consumer sensitivity to price/quality
2. **Shift towards 'winner take most' markets?**
   - IP and information-intensive goods
3. **Less creative destruction?**
   - Less entry/exit/startup, Decker et al '14, Şahin et al '17
   - More persistent tech. leaders, Acemoglu-Hildebrand '17
   - Laggard firms catching up less quickly, Andrews et al, '16
4. **Does ↑ concentration indicate weak competition?**
   - Concentrating industries look dynamic
   - However, innovation could beget barriers to entry

the ONION®

Secretary Of Labor Assures Nation There Still Plenty Of Jobs For Americans Willing To Outwork Robots



Perez says individuals who can precisely install more than 60,000 rivets per day in aircraft-grade aluminum have their choice of thousands of jobs throughout the U.S.