Inequality and Firms

UniTo, Labor Economics Part II
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Lecture 5

Agenda

Inequality and Firms

- Worker and firm two-way fixed effects (AKM)
- Worker-firm sorting and cross-sectional inequality
- Worker-firm sorting and intergenerational mobility

Introduction

Recent literature has focused on the role of firms in generating wage inequality. In particular:

- Firm wage premia: different firms pay systematically different wages to the same type of worker ($\rightarrow$ AKM)
- Worker-firm sorting, cross-section: inequality increases if more productive workers work at better-paying firms
- Worker-firm sorting, intergenerational: children from high-income parents tend to work in better-paying firms

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Abowd, Kramarz and Margolis (1999)

Abowd, Kramarz, and Margolis (1999) "High Wage Workers and High Wage Firms." Econometrica

Abowd, Kamarz and Margolis (AKM) decompose wages into (i) returns to worker characteristics, (ii) worker fixed effects, (iii) firm fixed effects, and (iv) residual variation.

- High-wage worker: Wage higher than expected based on worker's observable characteristics
- High-wage firm: Pays higher wages than expected given these same observable characteristics

Abowd, Kramarz and Margolis (1999)

Questions:

- Why do high-paying firms pay more than other firms?
  -
  -
  -
- Study industry wage differentials and firm-size wage effect

Data:

- Administrative data from France (1976-1987) based on employer reports with $\sim$7M workers and employer identifiers

Worker and firm effects can be correlated

- Does assortative matching between firms and workers contribute to rising inequality in wages?

The AKM model

The AKM model (simplified notation)

$$y_{it} = \alpha_i + \psi_{J(i,t)} + x'_{it}\beta + r_{it} \tag{1}$$

where α_i are worker fixed effects, ψ_j is a firm fixed effects (paid to workers at firm $J(i,t) = j$), x_{it} includes year dummies and a polynomial in age, and r_{it} is an error term (see below).

- Between-firm mobility of workers is essential for the identification of the parameters in eq. (1). **Why?**

Previous studies could not separately identify α_i and $\{\psi_1, ..., \psi_J\}$

- For example, confound worker and firm effects when studying compensation systems and inter-industry wage differentials

Inter-industry wage differentials

- Can inter-industry wage diff. be explained by person effects?
- Controversy in literature: Murphy and Topel (1987) in favor vs Kruger and Summer (1988) against person FE explanation

AKM decomposition:

- Industry effects κ_k are weighted average of firm fixed effects
- Estimation of Mincer equation with industry FE but without firm information may lead to biased estimate of κ_k
- Estimation without person FE always leads to biased estimate $\kappa_k^{**} = \kappa_k +$ *weighted avg. person FE* and biased estimate of β. **Why?**

Industry vs. worker and firm fixed effects

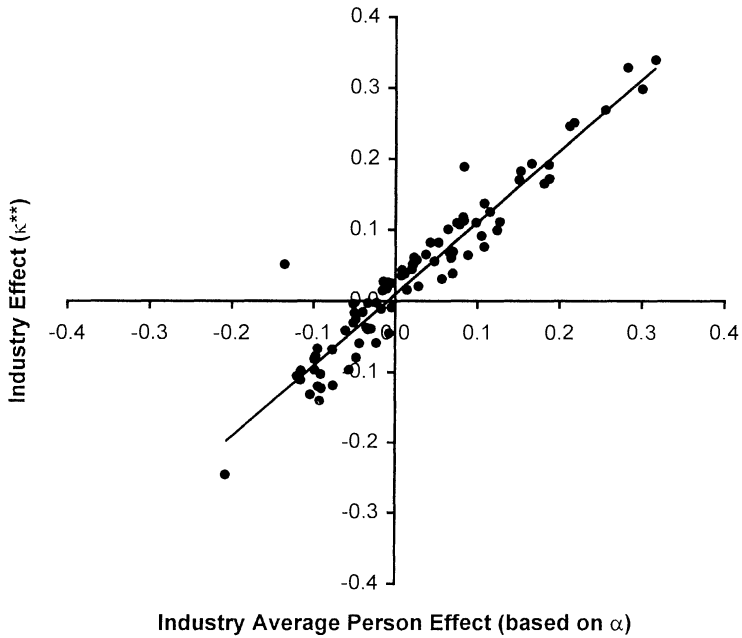

FIGURE 1.—Actual and predicted industry effects using industry-average person effects.

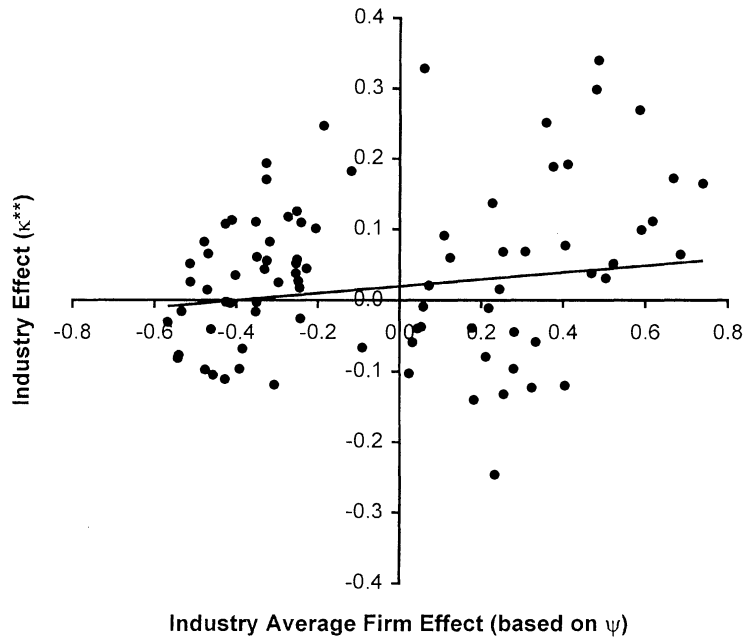

FIGURE 2.—Actual and predicted industry effects using industry-average firm effects.

Firm size vs. worker and firm fixed effects

Average person effects are much more closely related to the firm size effects than average firm effects:

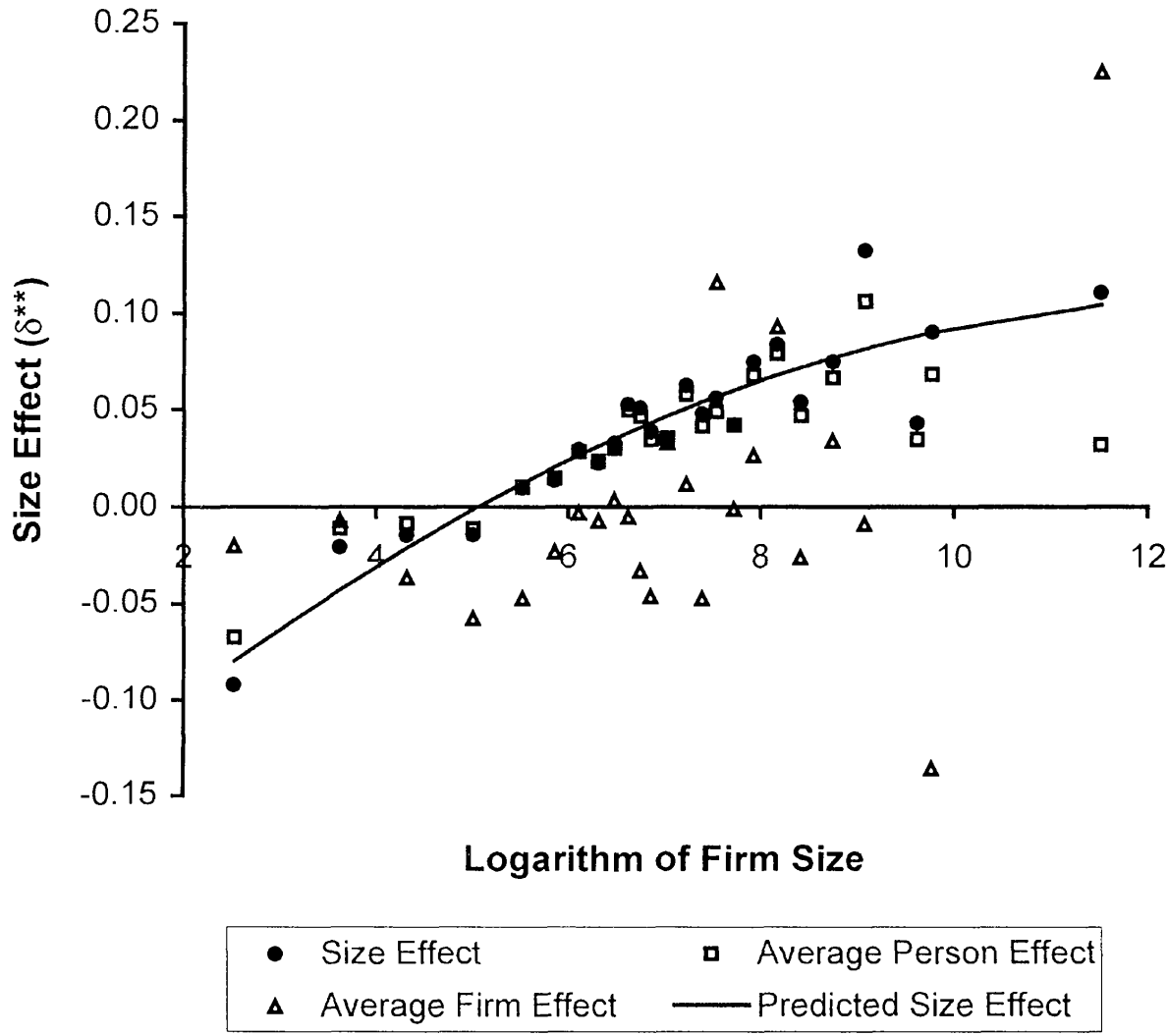

FIGURE 3.—Firm size effects related to firm-size average person and firm effects

Abowd, Kramarz and Margolis (1999)

Main findings:

- Worker fixed effects more important than firm fixed effects
  - Worker effects explain 90% of inter-industry and 75% of firm-size wage differentials
  - Firm effects explain relatively little of either differential
- Worker and firm fixed effects are positively correlated ($\rightarrow$ Card, Heining and Kline 2013)
- High-paying firms (conditionally on worker FEs) are more productive, more profitable, and more capital-intensive

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Card, Heining, and Kline (2013)

Card, Heining, and Kline (2013): Did sorting of workers and firms change over time, contributing to rising wage inequality in Germany?

Background:

- Wage inequality widened substantially in Germany in 1990s and 2000s (Dustmann, Ludsteck, and Schönberg 2009)

Method:

- German matched employer-employee data, divide into four overlapping intervals
- Fit separate linear models in each interval with additive person and establishment fixed effects (i.e. "AKM over time")

Card, Heining, and Kline (2013): Trend in wage inequality

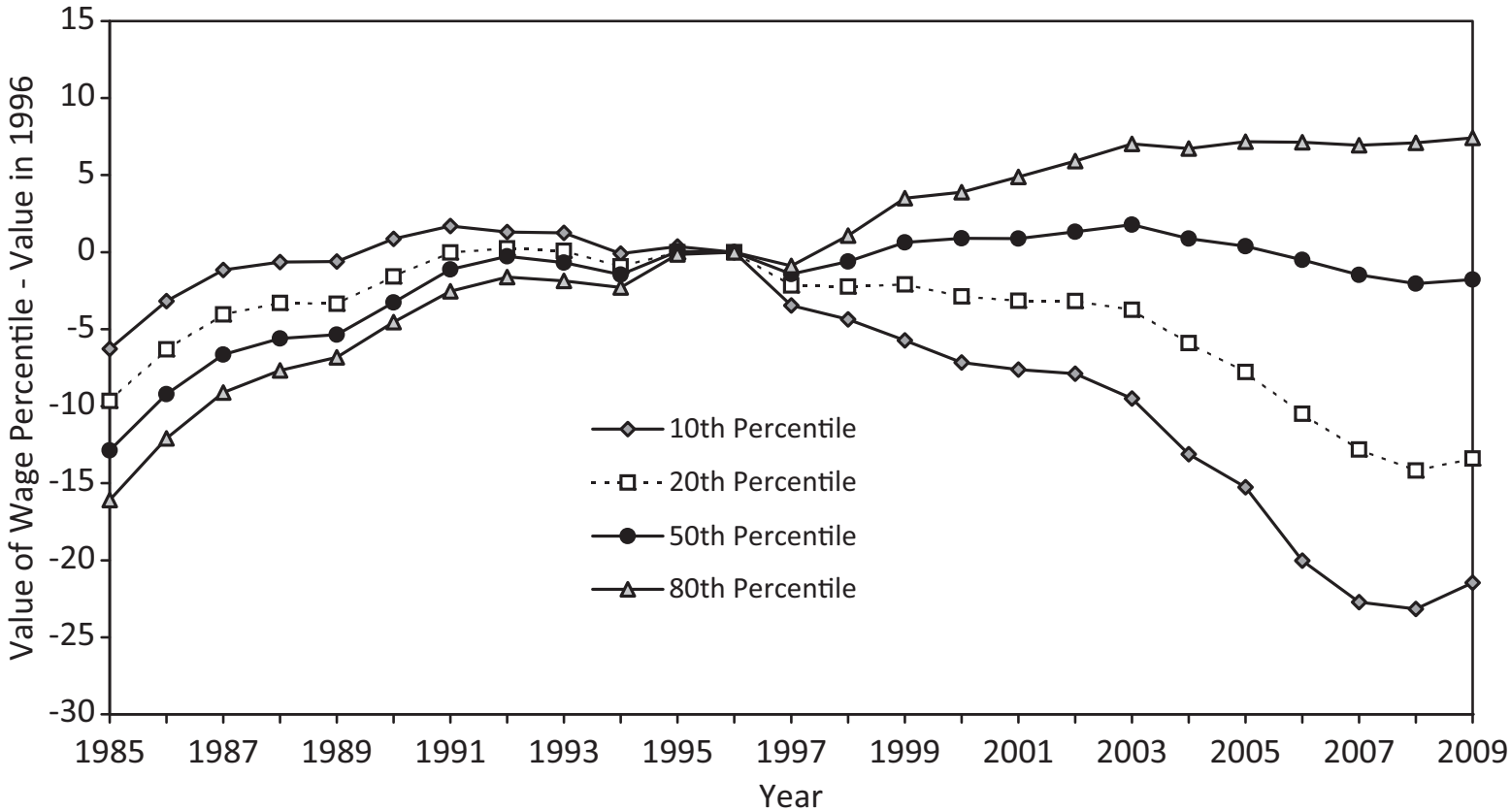


FIGURE I

Trends in Percentiles of Real Log Daily Wages for West German Men

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, and Kline (2013): Mincer regressions

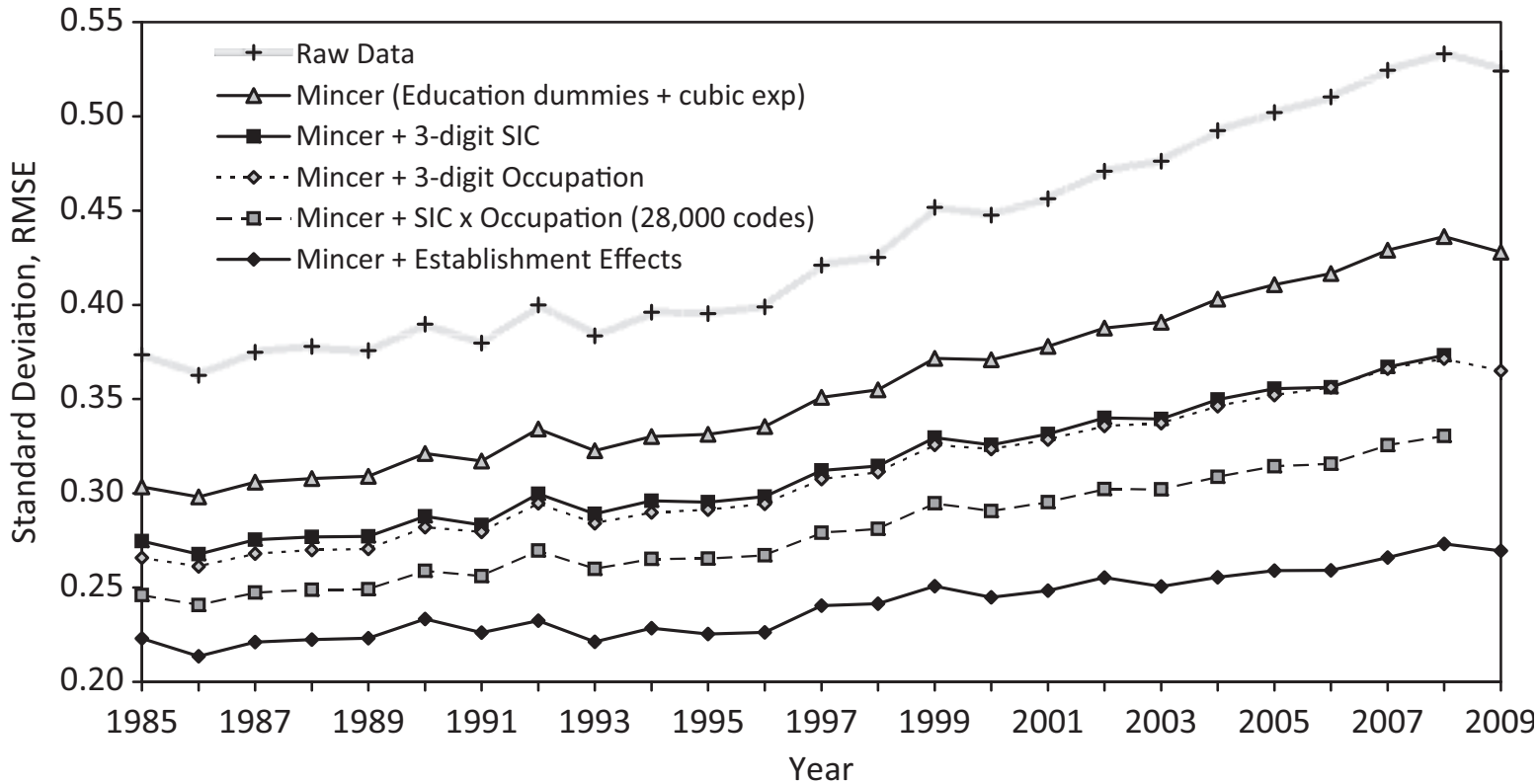


FIGURE IV

Raw and Residual Standard Deviations from Alternative Wage Models

However: Firm fixed effects hard to interpret if workers sort non-randomly across firms

Card, Heining, and Kline (2013): The AKM approach

Estimate AKM model

$$y_{it} = \alpha_i + \psi_{J(i,t)} + x_{it}'\beta + r_{it} \tag{2}$$

where α_i are worker fixed effects, ψ_j is a firm fixed effects (paid to workers for whom $J(i,t) = j$), and x_{it} includes year dummies and polynomial in age, each interacted with education.

Error term r_{it} consists of match component $\eta_{iJ(i,t)}$, "unit root" component, and transitory error

$$r_{it} = \eta_{iJ(i,t)} + \zeta_{it} + \varepsilon_{it} \tag{3}$$

Card, Heining, and Kline (2013): The AKM approach

Can then decompose inequality into

$$\begin{aligned}\text{Var}(y_{it}) = &\text{Var}(\alpha_i) + \text{Var}\left(\psi_{\boldsymbol{J}(i,t)}\right) + \text{Var}\left(x_{it}'\beta\right) \\ &+ 2\,\text{Cov}\left(\alpha_i, \psi_{\boldsymbol{J}(i,t)}\right) + 2\,\text{Cov}\left(\psi_{\boldsymbol{J}(i,t)}, x_{it}'\beta\right) \\ &+ 2\,\text{Cov}\left(\alpha_i, x_{it}'\beta\right) + \text{Var}(r_{it})\end{aligned} \tag{4}$$

- CHK estimate (2) for four different time periods (1985-1991, 1990-1996, 1996-2002, and 2002-2009)
- Then compute the sample equivalents of equation (4)

Some issues:

- Sampling errors in worker and firm fixed effects leads to positive biases in estimates of $Var(\alpha_i)$ and $Var\left(\psi_{\boldsymbol{J}(i,t)}\right)$
- Simply assume that bias is constant over time

Card, Heining, and Kline (2013): Endogenous mobility

The AKM model is identified from movers between firms

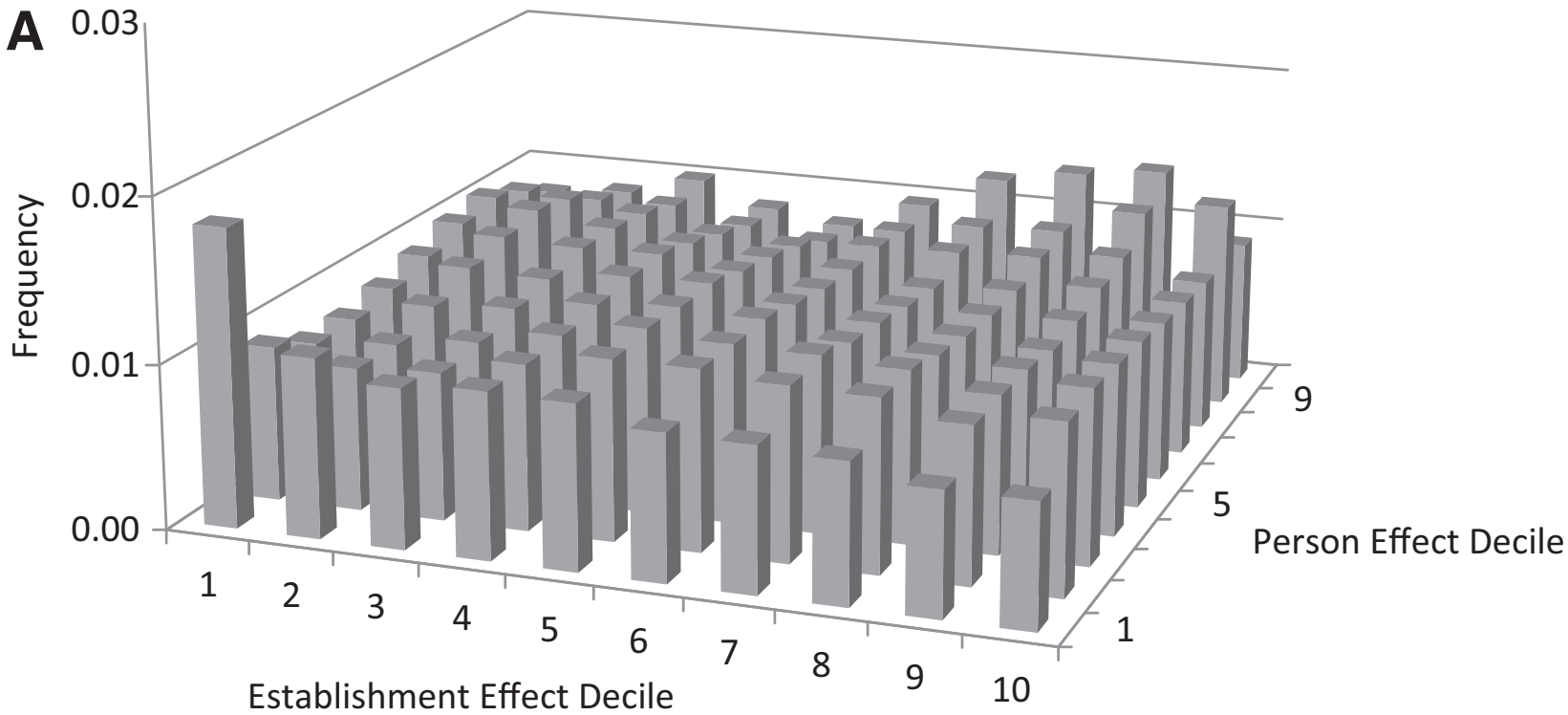
- However, moving decision likely linked to wage difference between firms; "*endogenous mobility*" could bias estimates
- The model needs dynamics to be identified, but is itself static
- Mention three forms of endogenous mobility that cause bias:
  1. Mobility based on the idiosyncratic match component of wages (η_{ij}) ($\rightarrow$ Search models)
  2. Learning worker ability over time ("drift" term ζ_{it})
  3. Mobility related to fluctuations in transitory error ε_{it}

Card, Heining, and Kline (2013): Endogenous mobility

Evidence speaks against endogenous mobility:

1. Wage gains and losses are (roughly) symmetric for movers between higher and lower wage establishments
2. No systematic trends in wages prior to a move for workers who transition to better or worse jobs
3. Mobility unrelated to transitory wage fluctuations

Sorting 1985-1991



Sorting 2002-2009

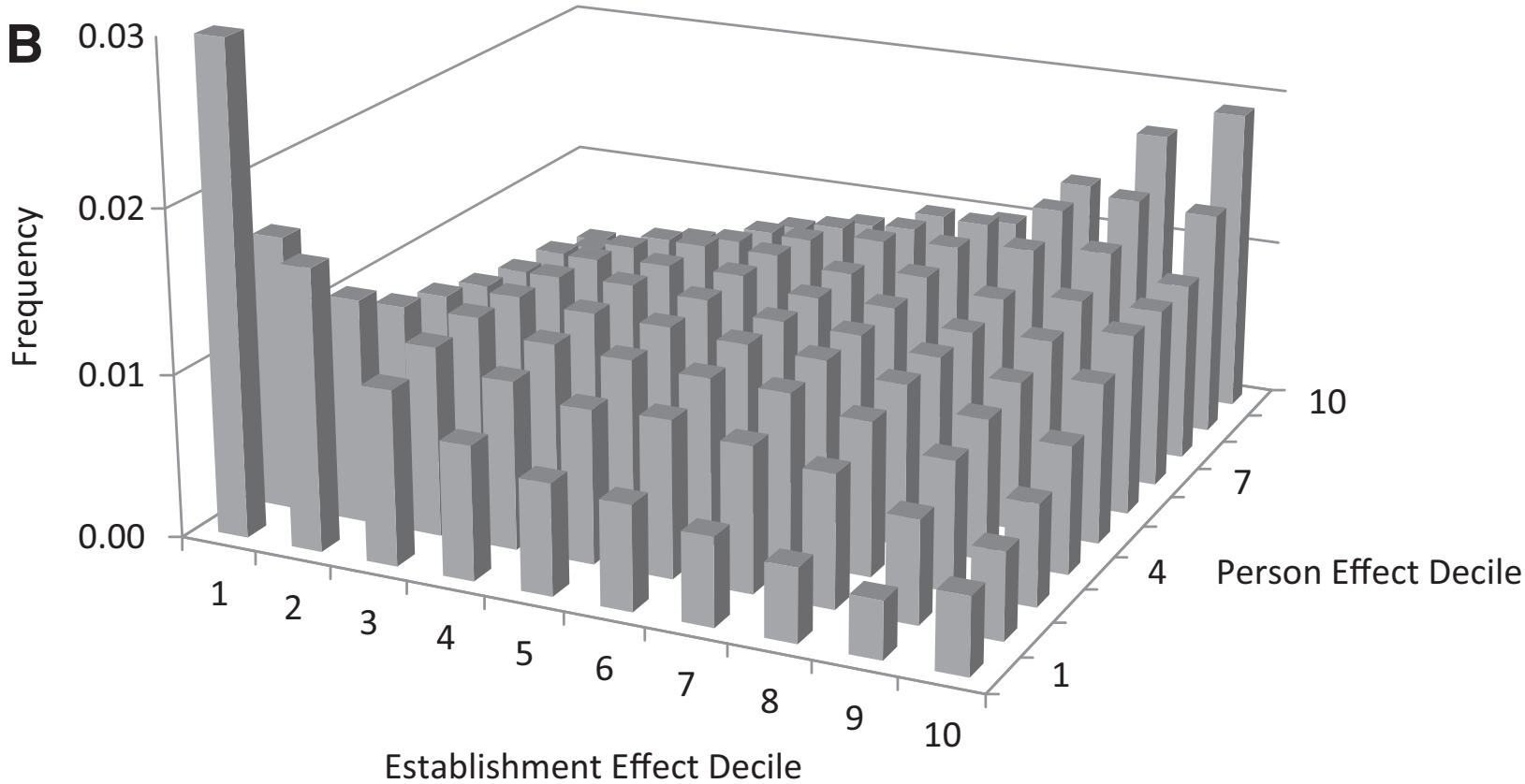


FIGURE VIII

Joint Distribution of Person and Establishment Effects (A) 1985–1991, (B) 2002–2009

Card, Heining, and Kline (2013)

Card, Heining, and Kline (2013) find that increase in wage inequality is due to:

1. rising heterogeneity between workers
2. rising heterogeneity between firms, and
3. increasing **assortativeness** in worker-firm matching

Stronger sorting of high-wage workers to high-paying firms ...

- explains 1/3 of overall increase in wage inequality
- explains 2/3 of increase in wage gap between higher- and lower-educated workers
- increases wage gaps between occupations, industries

Related work on AKM

- Card, Cardoso, Heining and Kline (2018, JOLE) link the AKM fixed effects specification to a model of rent sharing
- Sampling error and limited mobility bias: Variance components biased upward, assortative correlation biased downwards. Bias-corrections proposed in Andrews, Gill, Schank, Upward (2008) and Kline, Saggio and Solvsten (2018)
- Can "discretize" unobserved heterogeneity to then estimate more complicated models with non-linearities (Bonhomme, Lamadon, and Manresa, 2018)
- Abowd, McKinney and Schmutte (2019) argue that exogenous mobility is rejected by the data (in contrast to Card, Heining and Kline, 2013)
- Lopes de Melo (2018) link AKM model to equilibrium job search models

Other work on firms and inequality

Autor, Dorn, Katz, Patterson, and Van Reenen (2020), "The Fall of the Labor Share and the Rise of Superstar Firms", QJE

- Argue that recent fall of labor share in US and other countries is due to globalization benefitting most productive ("superstar") firms in each industry
- Product market concentration rises as industries become increasingly dominated by superstar firms, which have high profits and low labor share in firm value-added and sales

Song, Price, Guvenen, Bloom, and von Wachter (2019) "Firming Up Inequality", QJE

- Study contribution of firms to rising wage inequality in U.S. using the AKM approach
- One-third of rise in the variance of (log) earnings occurred within firms, two-thirds between firms

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Worker-firm sorting and intergenerational mobility

Worker-firm sorting may also explain part of the intergenerational correlation in earnings.

Two recent contributions:

- Staiger (2023, WP) "The Intergenerational Transmission of Employers and the Earnings of Young Workers"
- Dobbin and Zohar (2023, WP) "Quantifying the Role of Firms in Intergenerational Mobility"

Staiger (2023)

Staiger (2023) "The Intergenerational Transmission of Employers and the Earnings of Young Workers"

- Firm-followers: 7 percent of young workers find their first stable job at a parent's employer (see also Kramarz and Skans 2014 & Corak and Piraino 2011, as well as the literature on "occupational following")
- In contrast to previous work, exploits exogenous variation in the availability of jobs at the parent's employer
- IGE would be 7.2 percent lower if no one found a job through parental connections

Dobbin and Zohar (2023)

Dobbin and Zohar (2023) "Quantifying the Role of Firms in Intergenerational Mobility"

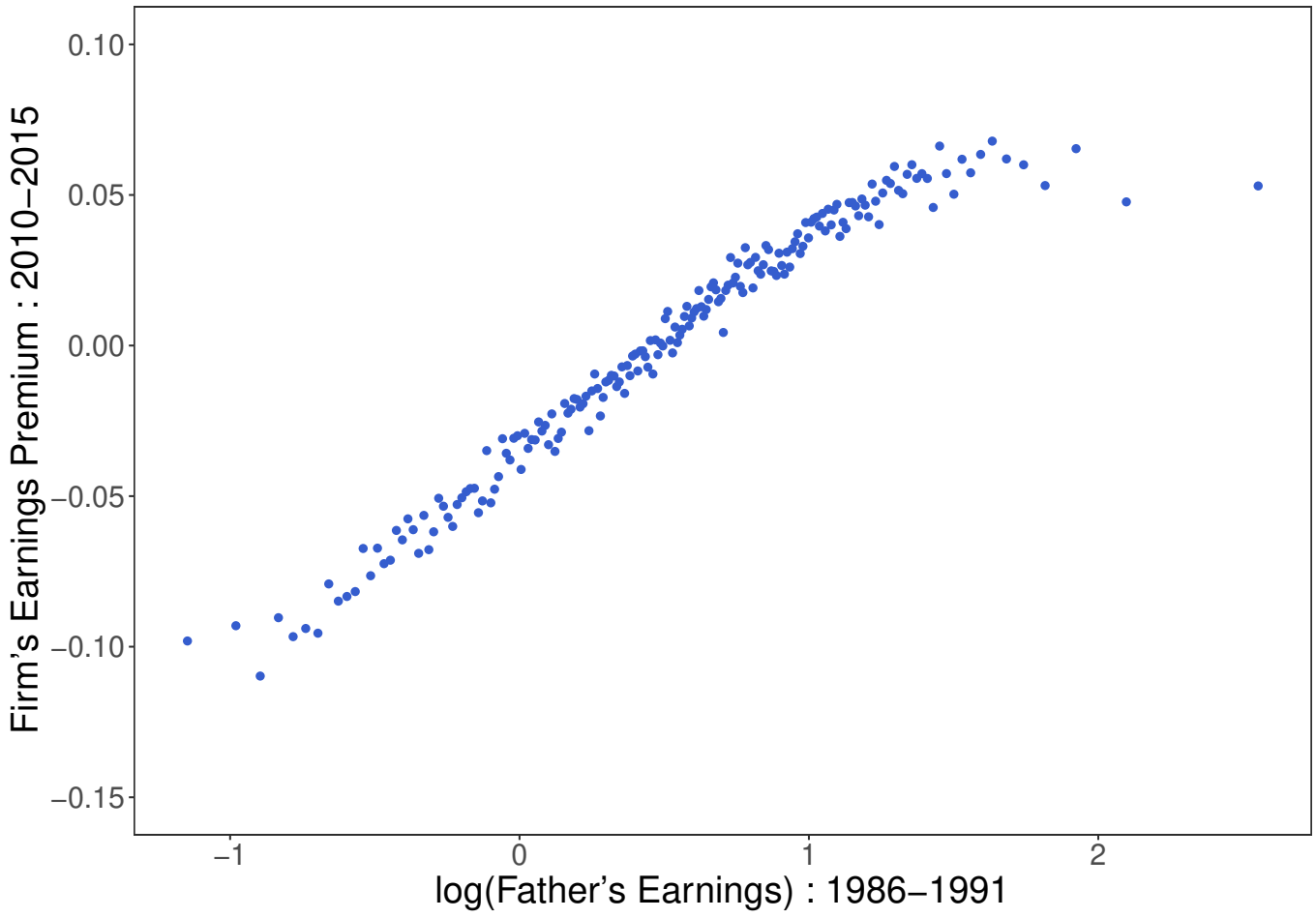
- Quantify the role of access to better-paying firms on intergenerational mobility in Israel
- Do children from richer parents end up in firms with higher pay premiums?

Three simple steps:

- Step 1: AKM
- Step 2: Decompose intergenerational elasticity
- Step 3: Distinguish parental from general worker-firm sorting

Step 1: AKM

Figure: Firm's Earnings Premium vs. Log Father's Earnings



Step 2: Decompose intergenerational elasticity

After having decomposed child income (AKM)

$$\overline{lnY_i} = \hat{\alpha}_i + \overline{\hat{\psi}_i}$$

we can decompose the intergenerational elasticity of income

$$\overline{lnY_i} = \beta \overline{lnY_{f(i)}} + \varepsilon_i$$

- Estimate separately

$$\hat{\alpha}_i = \beta^{\alpha} \overline{lnY_{f(i)}} + \varepsilon_i^{\alpha}$$
$$\overline{\hat{\psi}_i} = \beta^{\psi} \overline{lnY_{f(i)}} + \varepsilon_i^{\psi}$$

- Decompose IGE

$$\beta = \beta^{\alpha} + \beta^{\psi}$$

Table: Firm Earnings Premium and Fathers' Earnings

Table III

Decomposing the IGE into individual and firm components

	(1)		(2)		(3)
Dependent variable:	$\overline{\log Y}_i$		α_i		$\overline{\psi}_i$
	IGE $\overbrace{\beta^{IGE}}$	=	individual-IGE $\overbrace{\beta^{\alpha\|Y_f}}$	+	firm-IGE $\overbrace{\beta^{\psi\|Y_f}}$
$\overline{logY_{f(i)}}$	0.253		0.197		0.056
	(0.000)		(0.000)		(0.000)
Share of IGE	1.00		0.78		0.22
	.		(0.000)		(0.000)
Observations	595,493		595,493		595,493

Step 3: Distinguish parental from general worker-firm sorting

Part of firm effect β^{ψ} just reflects the "usual" worker-firm sorting between high ability (high FE) workers and better-paying firms, as also found by Card, Heining and Kline (2013).

To distinguish this, decompose the firm effect β^{ψ} further:

$$\beta^{\psi} = \underbrace{\beta_{\alpha}^{\psi} \cdot \beta^{\alpha}}_{\text{Assortativeness}} + \underbrace{\beta_{Y_f}^{\psi}}_{\text{Remaining Parental Effect}}$$

where the cross-elasticities $\beta_{Y_f}^{\psi}$ and β_{α}^{ψ} are estimated from

$$\overline{\hat{\psi}_i} = \beta_{\alpha}^{\psi} \cdot \alpha_i + \beta_{Y_f}^{\psi} \cdot \overline{lnY_{f(i)}} + \eta_i^{\psi}$$

Assortative matching

Figure: Worker FEs are correlated with firm wage premiums

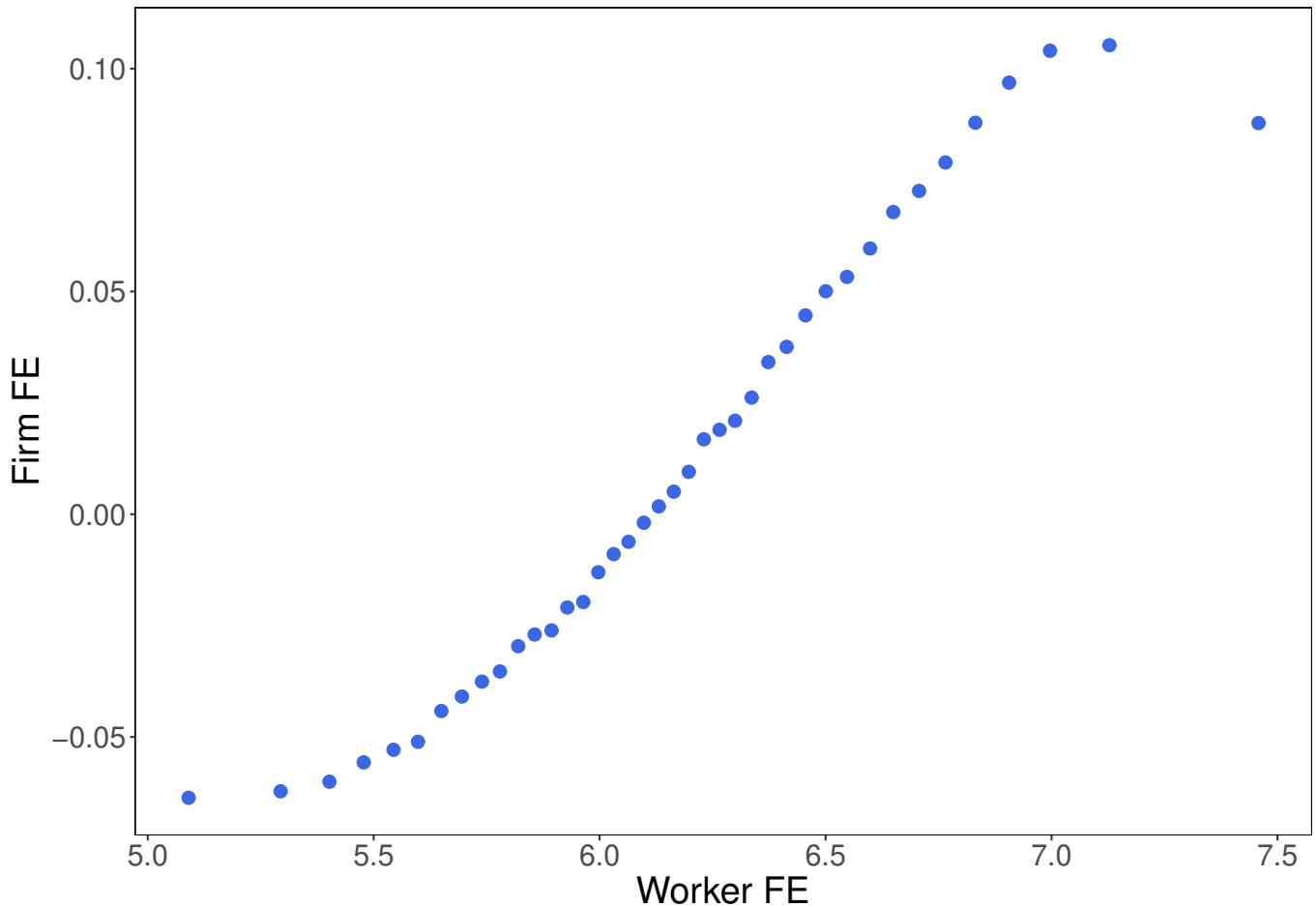


Table: Firm Earnings Premium and Fathers' Earnings

Table IV

Firm-IGE controlling for the individual component of earnings

	Dependent variable: Firm earnings premium $(\overline{\psi_i})$		
	(1)	(2)	(3)
$\overline{logY_{f(i)}}$	0.056	0.027	0.014
	(0.000)	(0.000)	(0.000)
Control		α	α
Instrument			Has Higher Ed
F-stat			775,977
Observations	595,493	595,493	595,493