The Role of Labor Market Entry and Exports in Sorting: Evidence from West Germany

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Federal Trade Commission*

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*The views experssed are those of the author and do not neccessarily reflect those of the Federal Trade Commission.

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RQ2: Why did sorting rise? $\rightarrow$ **International trade**

Illustration of sorting and inequality

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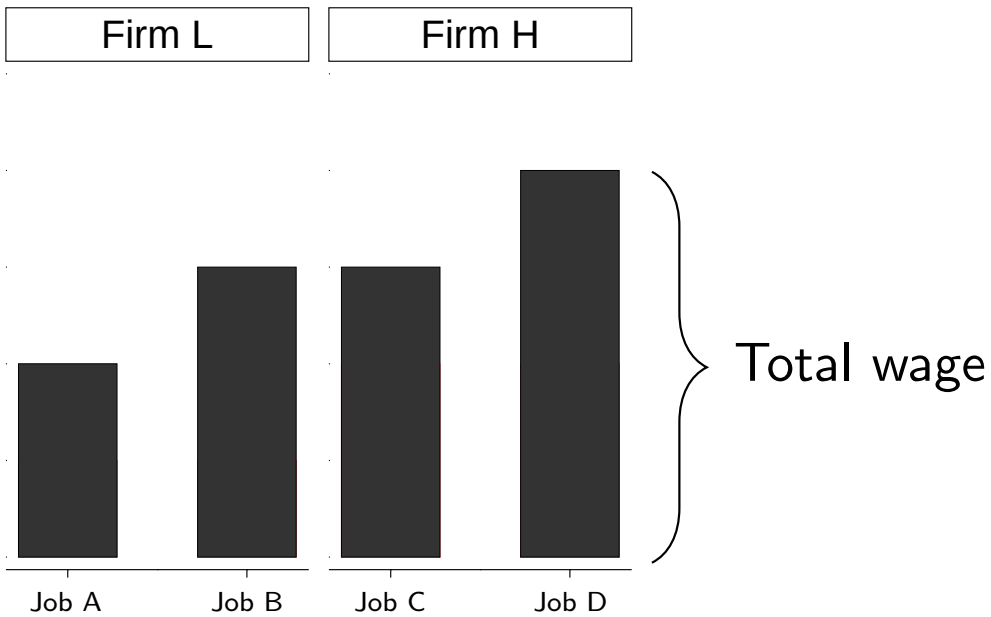

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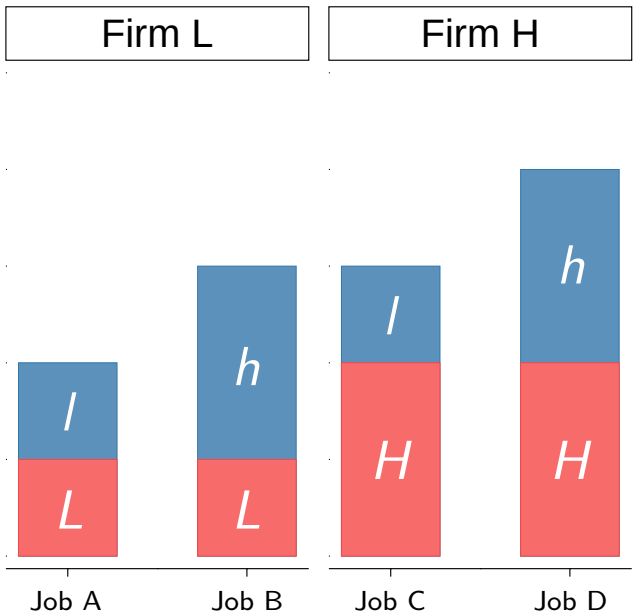

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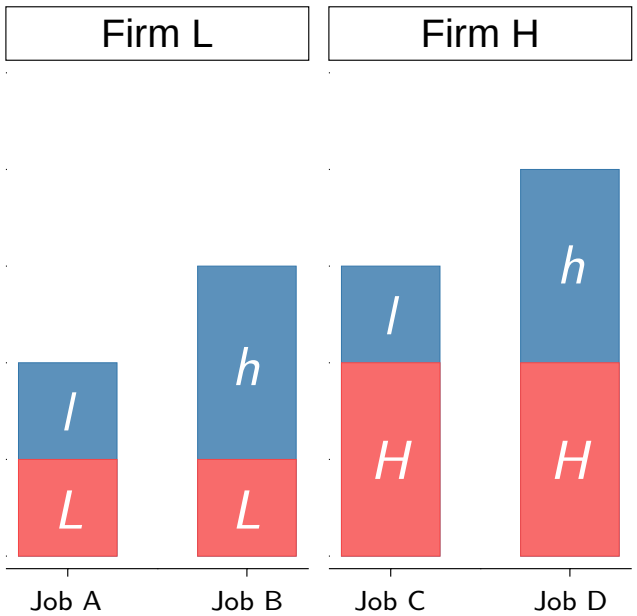

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Sorting $\equiv$ Corr(Worker Wage, Firm Wage)

$\Rightarrow$ **No Sorting**

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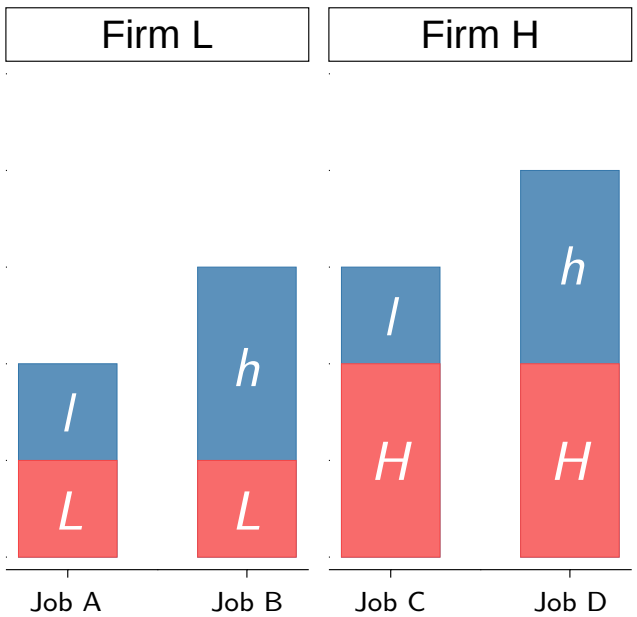

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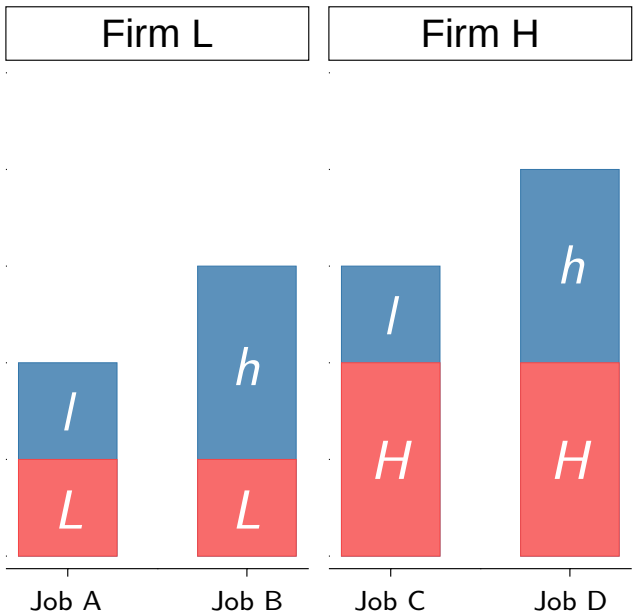

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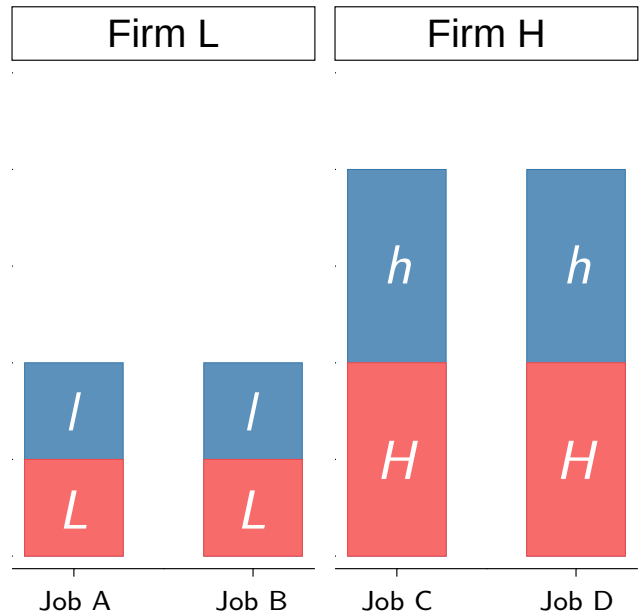

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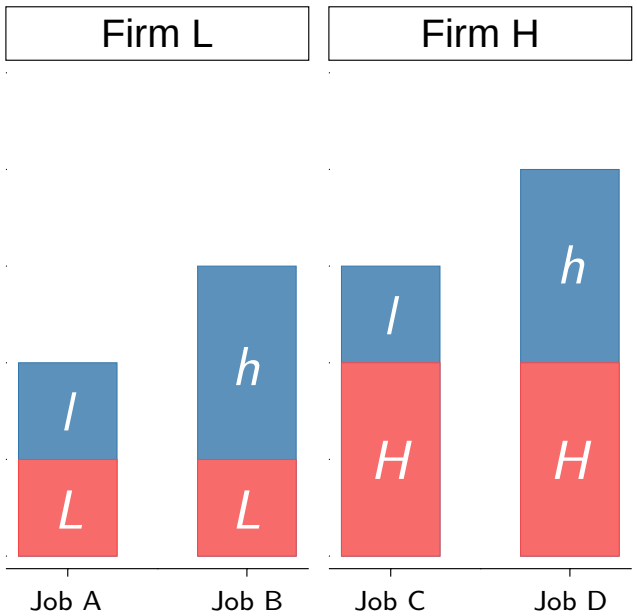

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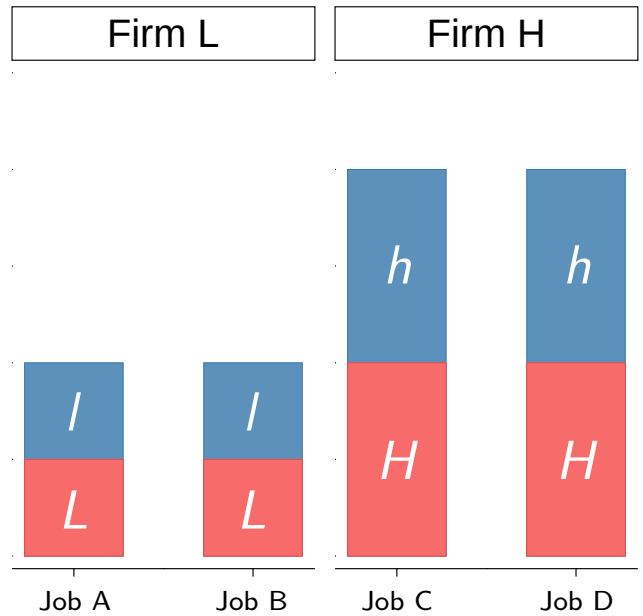

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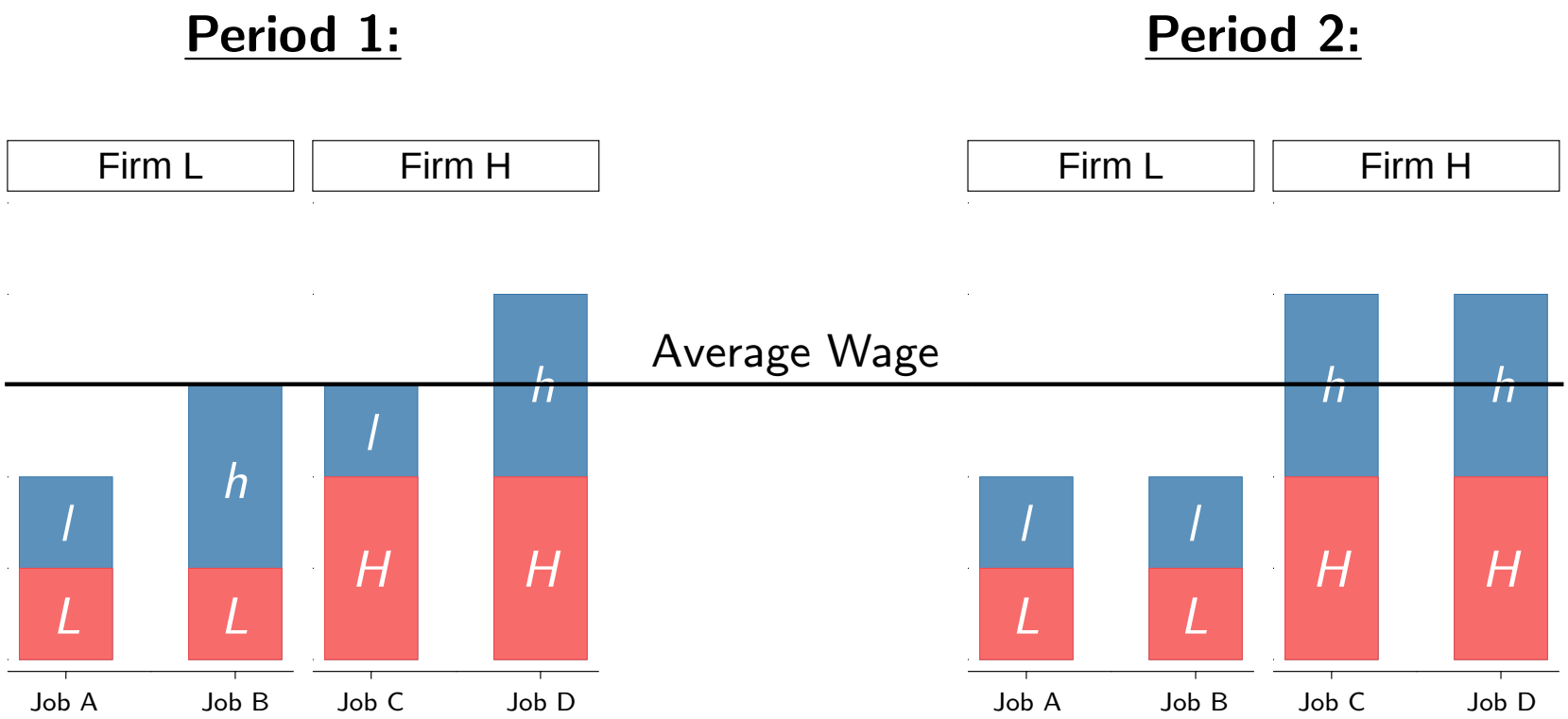

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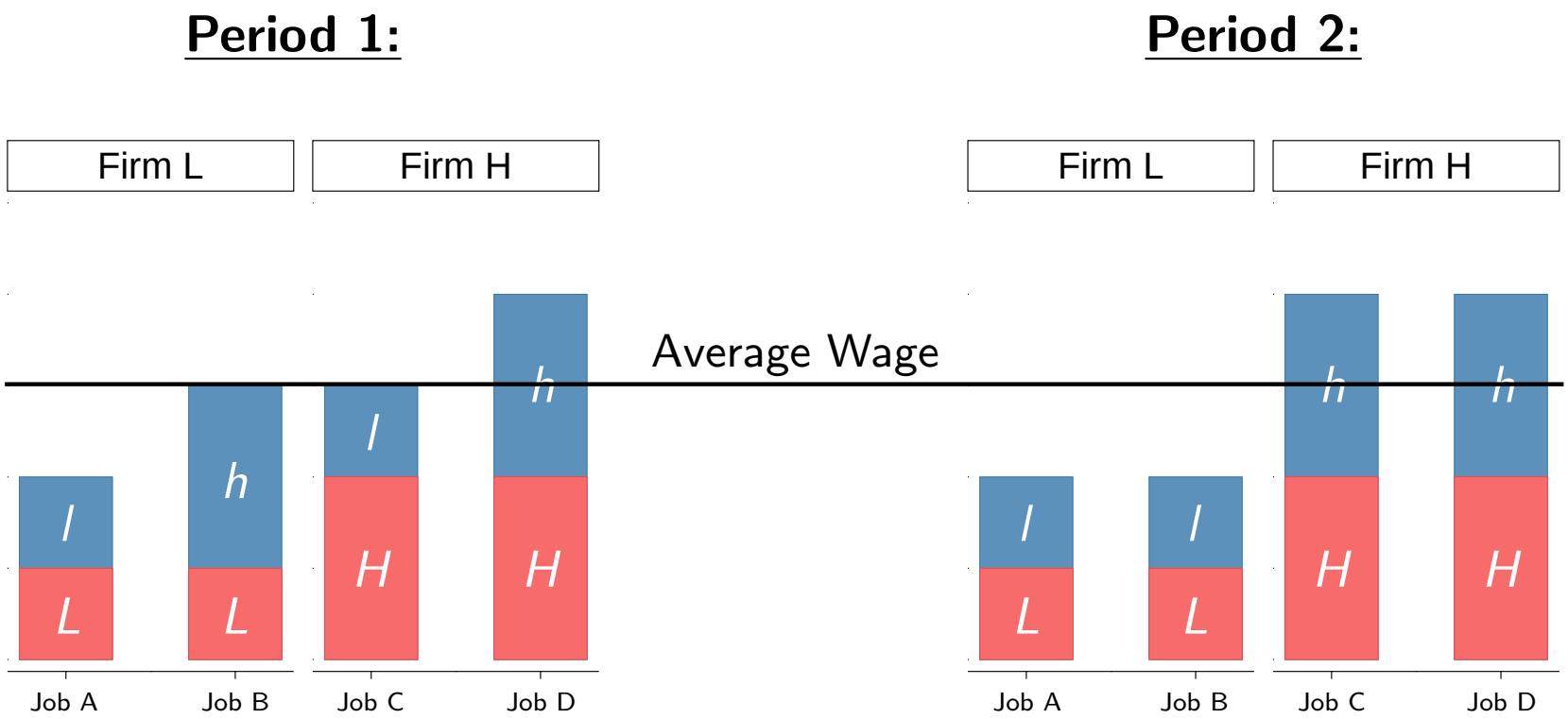

↑ Var(wage)

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  - Use exogenous variation in trade exposure induced by:
    - fall of Soviet Union and rise of China.

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3.) How (firm side)? **Apply decomposition method to export-induced worker flows only.**

- Goal: isolate the role of labor demand in sorting.
- Results: *again* labor market entry $\approx$ $^1/_2$ of rise in sorting.
  - Entry of young, low-wage workers to low-wage service firms.

Contributions to the literature

1.) **First to quantify the role of worker flows in sorting.**

1.a.) Importance of sorting at labor market entry for lifetime inequality.

- Sources of lifetime inequality: Guvenen, Kaplan, Song, Weidner (2017), Huggett, Ventura, Yaron (2011)
- Persistence of entry conditions: Kahn (2010), Oreopoulos, von Wachter, and Heisz (2012)

1.b.) Small role of job-to-job transitions in reallocation.

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2.) **Export exposure has a large effect on labor market sorting.**

- New, important source of rising sorting.
  - Outsourcing: Goldschmidt & Schmieder (2017) - accounts for only 8%.
- Export exposure increases sorting through labor market entry.
  - Exports & sorting: Davidson et al. (2014); Bombardini, Orefice, & Tito (2017)

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- Import/export exposure instruments:
  - *UN Comtrade*: value of imports/exports to Eastern Europe/China.
  - *Establishment History Panel*: 50% sample of employment at industry-county level.

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Agent types based on fixed effect wage components

- Estimate Abowd, Margolis, and Kramarz (AKM) wage equation:

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model fit
critiques

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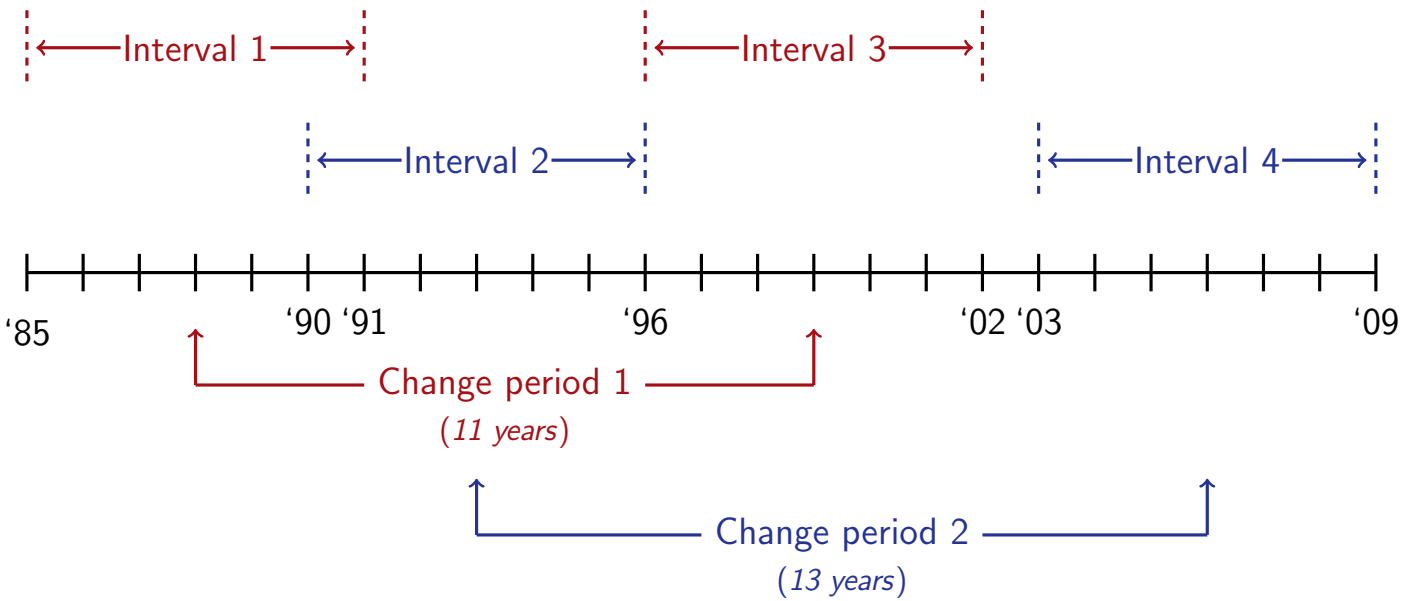
- Figure: Timeline of fixed effect estimation intervals



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Result 1: Worker flow contributions to aggregate sorting

Table: Decomposition of change in correlation of firm and worker effects

	Share of Total Sorting (1)	Initial Employment Share (2)
Labor market entry	56.2	33.5
Job-to-job	18.6	30.6
Between-LLM job-to-job	*12.5*	*15.5*
Within-LLM job-to-job	*6.0*	*15.1*
Nonemployment to emp.	11.6	14.1
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Upper bound for job-to-job: job-to-job + "other" = 27.6% details

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Between-LLM job-to-job	*12.5*	*15.5*
Within-LLM job-to-job	*6.0*	*15.1*
Nonemployment to emp.	11.6	14.1
Other to emp.	*9.0*	*10.0*
Unemp. to emp.	*2.6*	*4.1*
Job Stayers	12.8	21.8

Upper bound for job-to-job: job-to-job + "other" = 27.6% details

defs methods

Result 1: Worker flow contributions to aggregate sorting

Table: Decomposition of change in correlation of firm and worker effects

	Share of Total Sorting (1)	Initial Employment Share (2)
Labor market entry	56.2	33.5
Job-to-job	18.6	30.6
Between-LLM job-to-job	*12.5*	*15.5*
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WI/BT Group

Sequencing

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Est eqn: $\triangle Corr_{lp}\left(\hat{\alpha}_i, \hat{\psi}_{j(i,t)}\right) = \beta_1 \triangle EXP_{lp} + \beta_2 \triangle IMP_{lp} + \gamma X_{lp} + \lambda_{r(l)} + \delta_p + \epsilon_{lp}$

	Region fixed effect				
	OLS: None	IV: None	IV: State	IV: LMR1	IV: LMR2
	(1)	(2)	(3)	(4)	(5)
Export exposure	0.0093***	0.0131***	0.0109***	0.0105***	0.0080***
	(0.0022)	(0.0029)	(0.0033)	(0.0026)	(0.0025)
Import exposure	-0.0028	-0.0082*	-0.0047	-0.0039	-0.0014
	(0.0025)	(0.0042)	(0.0043)	(0.0046)	(0.0040)
Labor market controls	N	N	Y	Y	Y
# geo f.e.'s	0	0	11	74	214
Adj R^2	0.093	0.076	0.115	0.371	0.445
N (county-periods)	650	650	650	650	650

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- Magnitude: **14% of total change in sorting from '85 to '09**. details

ID

Result 3: Labor market entry most important export flow

Table: Decomposition of Export Sorting into Worker Flows

	Share Export Sorting (1)	Share Aggregate Sorting (2)	Initial Employment Shares (3)
Labor market entry	47.7	56.2	33.5
Job-to-Job	16.6	18.6	30.6
Between-LLM job-to-job	*16.6*	*12.5*	*15.5*
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Upper bound for job-to-job: 26.7% details

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Outline

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  - Firm-, occupation-, or industry-specific skills may make reallocation of experienced workers difficult.

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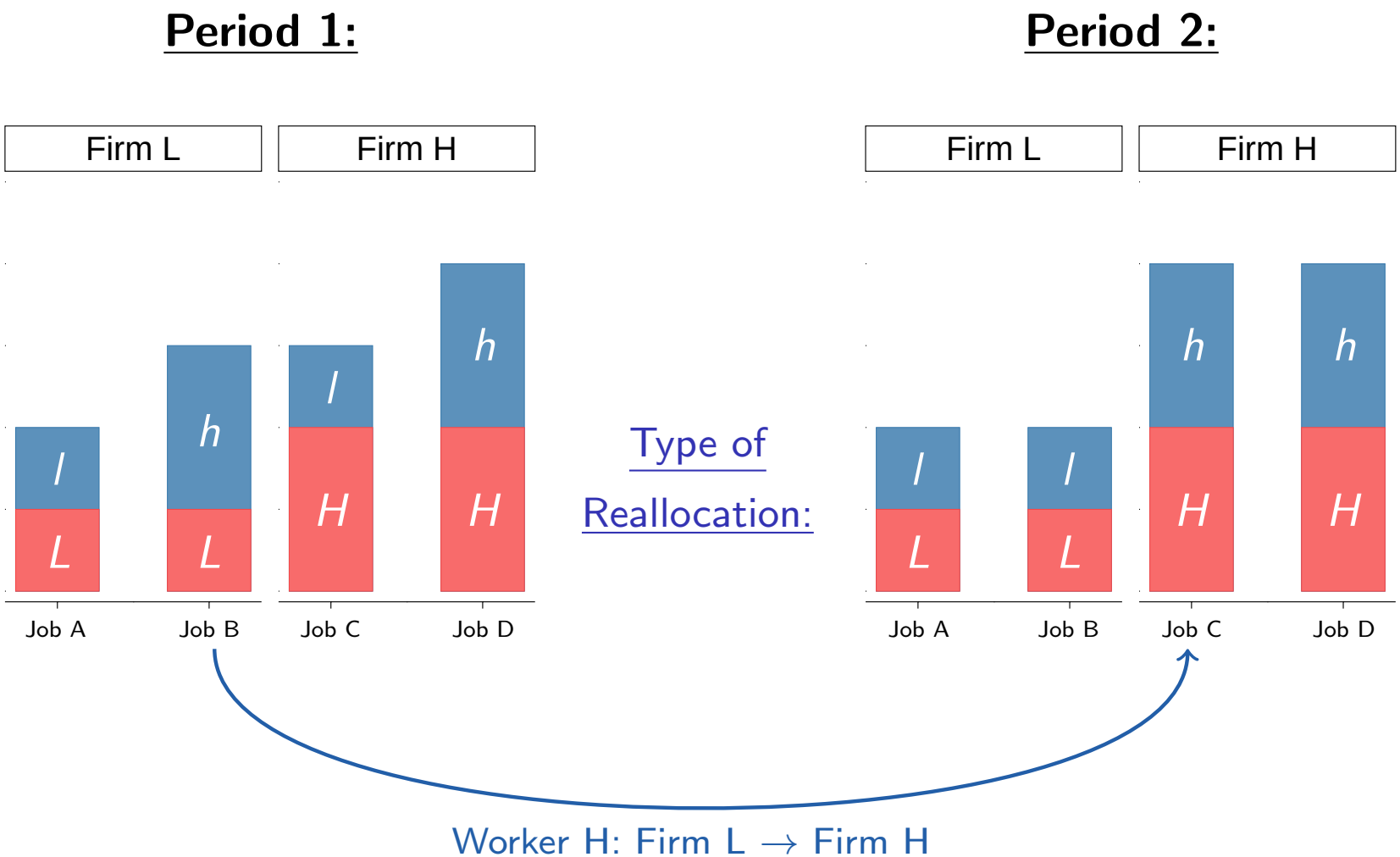
  - Export effect works through similar worker flow channels as aggregate effect.
    - Suggests that trade/demand effects important for the rise of sorting.

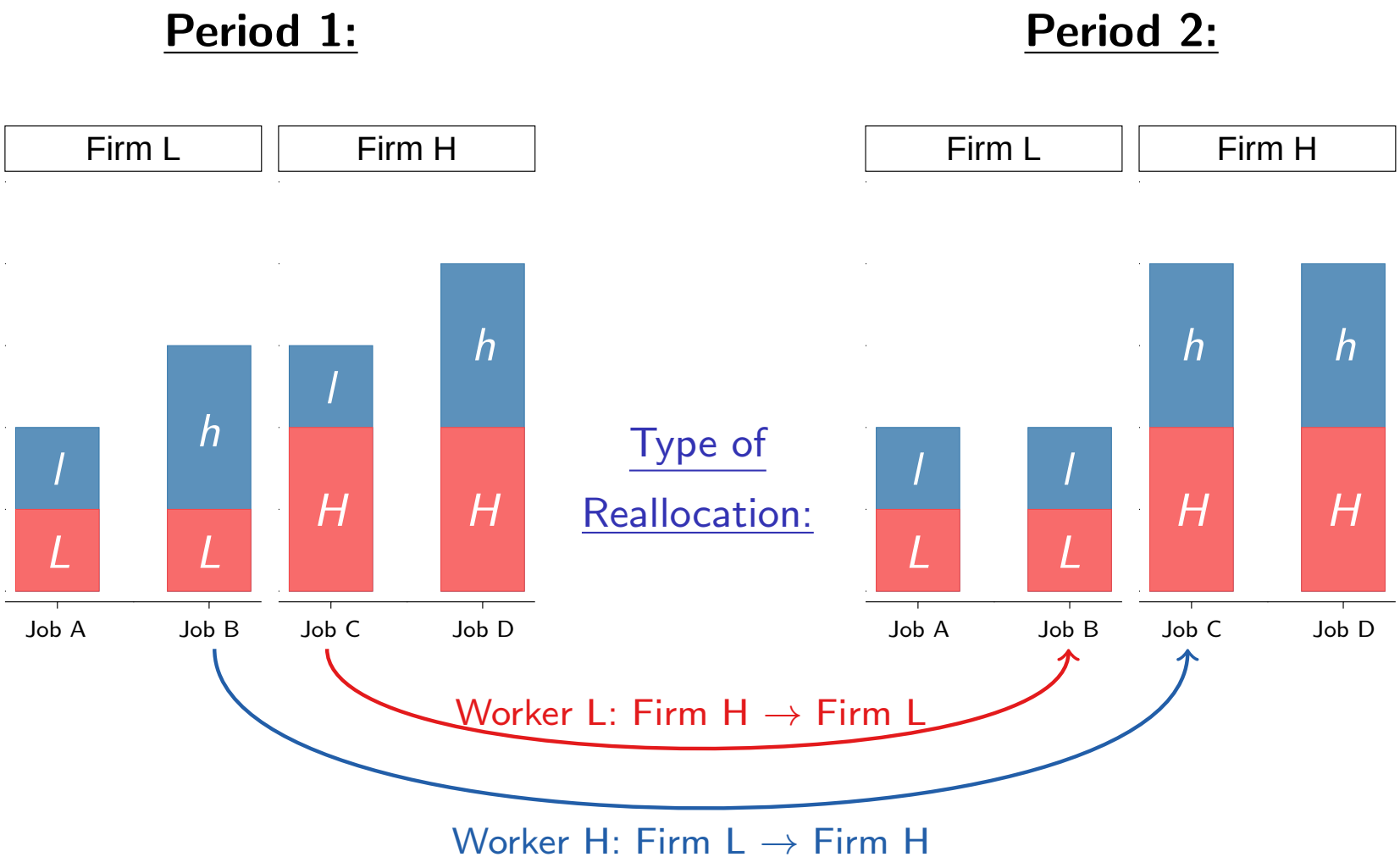
Appendix

RQ1: How did sorting rise?



Job-to-job transitions?

RQ1: How did sorting rise?



Job-to-job transitions?

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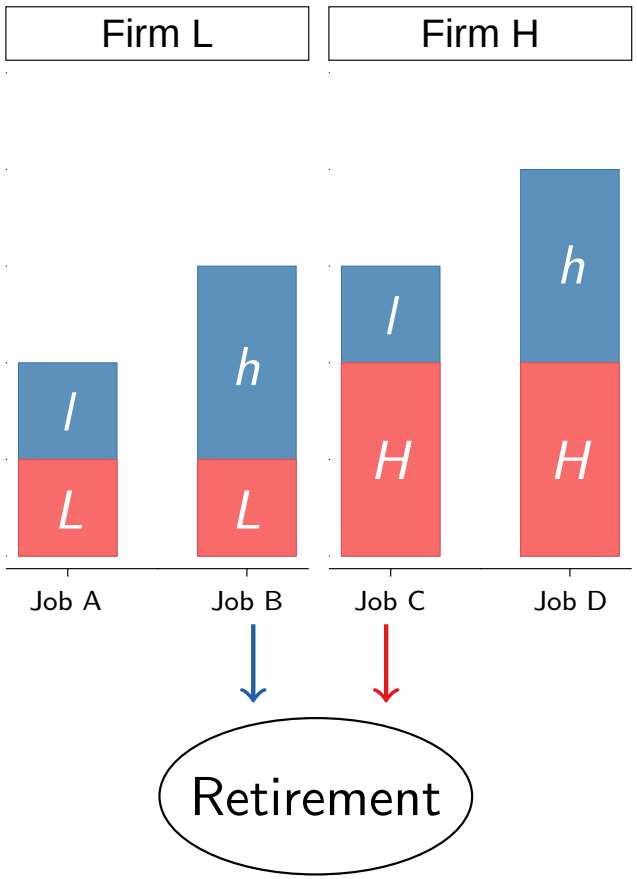

Type of Reallocation:

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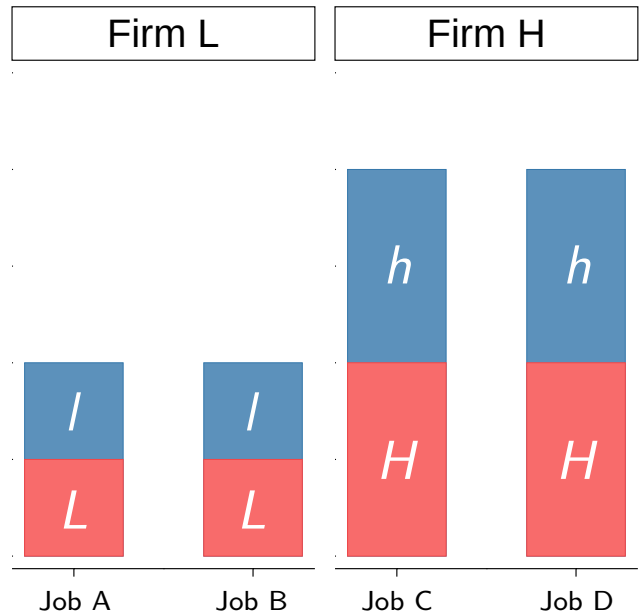

Labor market entry?

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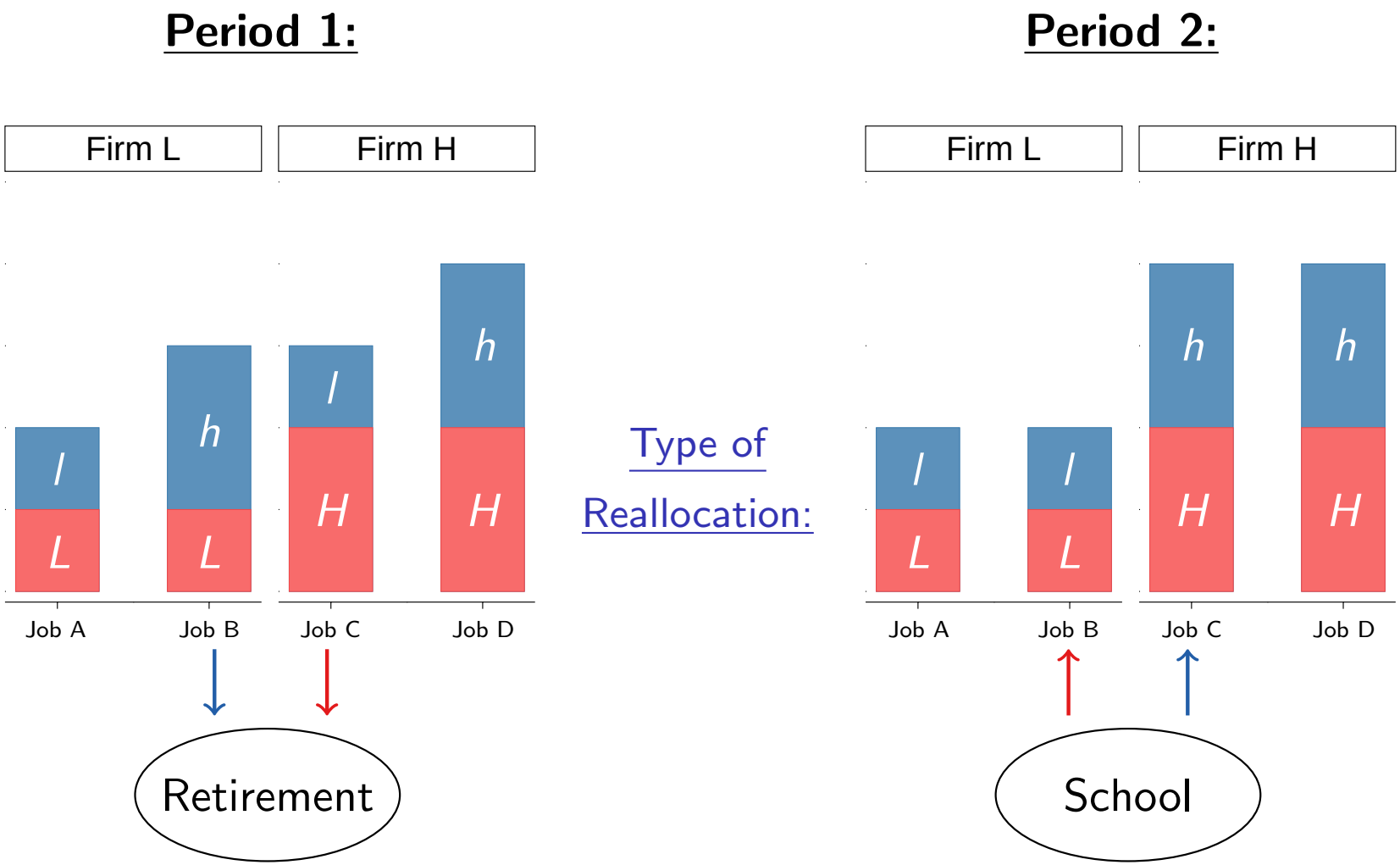

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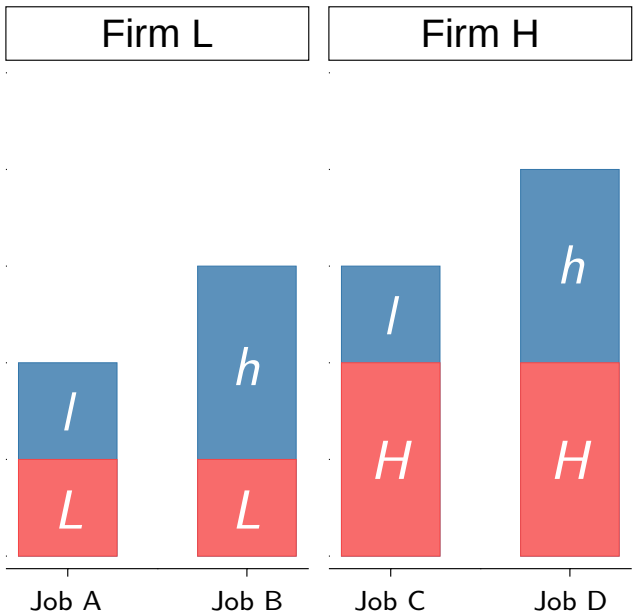

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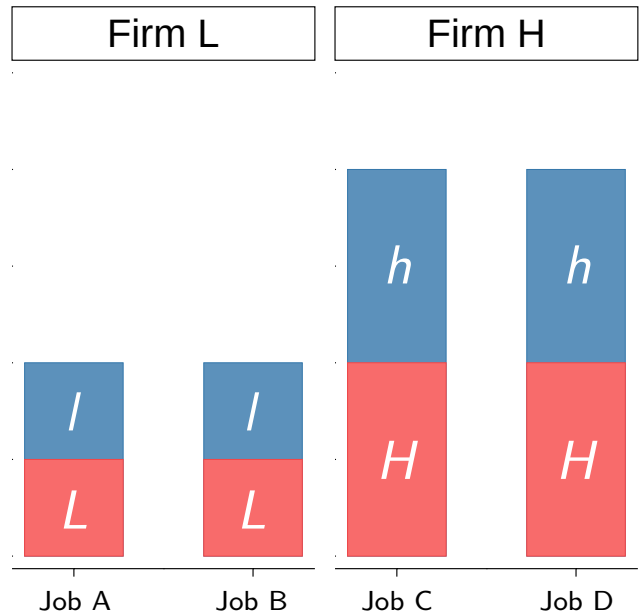


RQ1: How did sorting rise?

Job-to-job transitions or labor market entry?

Sample restrictions

- Main analysis:
  - Male only
  - Age 20-60
  - Full-time employment
  - Earnings from highest earning firm only
  - "Firm" is an establishment
- Excludes self-employed and civil servants: 80% coverage.
- Top 14% of earnings censored.
  - Apply a Tobit wage imputation.

back

Theories of labor market sorting

- Becker (1973)
  - Heterogenous productivity for workers and firms.
  - Worker-firm complementarity in production.
  - Optimal allocation: assortative matching.
- Factors that affect the value of complementarities:
  - Firm technology.
  - Worker skill distribution.
  - Search frictions. (Shimer & Smith 2000)
  - Product demand. (Bombardini, Orefice, & Tito 2017)
- Non-complementarity based explanations.
  - Preferences: e.g. workplace amenities (Card et al 2016).
  - Access: e.g. job referral networks (Schmutte 2014).

back

Theory for how trade increases sorting

- **Worker-firm productive complementarities** lead to *assortative matching*. (Becker 1973)
- **Search frictions** lead to deviations from optimal allocation within a *matching set*. (Shimer and Smith 2000)
- **Export markets** increase output of match, shrink matching set, approach assortative matching. (Bombardini, Orefice, Tito 2017)

Fit of AKM wage equation

- Evidence from Card, Heining, & Kline (2013).
  - Match effect residual:
    - Reduction in root mean squared error: 10-15%.
    - Stable over time, but variance of worker and firm effects growing.
    - No evidence for large average match effect residuals across the joint distribution of worker and firm effects.
  - Symmetry in wage change between different type firms.
    - Ordering firm by average wages or fixed effects.
    - No change in average residual before vs. after move.
- Evidence from Bonhomme, Lamadon, & Manresa (2017).
  - Simplify firms to firm classes to directly estimate interaction of firm and worker types.
  - Find quantitatively insignificant match effects.

back

Two critiques of AKM wage component-based sorting

1.) Theoretical critique: firm fixed effect $\neq$ firm productivity

- Opportunity cost of hiring $\Rightarrow$ highest wage at optimal firm, each worker type paid differently.
- Empirical evidence:
  - Firm effects correlated with observable measures of productivity.
  - Match effects appear to be small.

2.) Empirical critique: limited mobility bias.

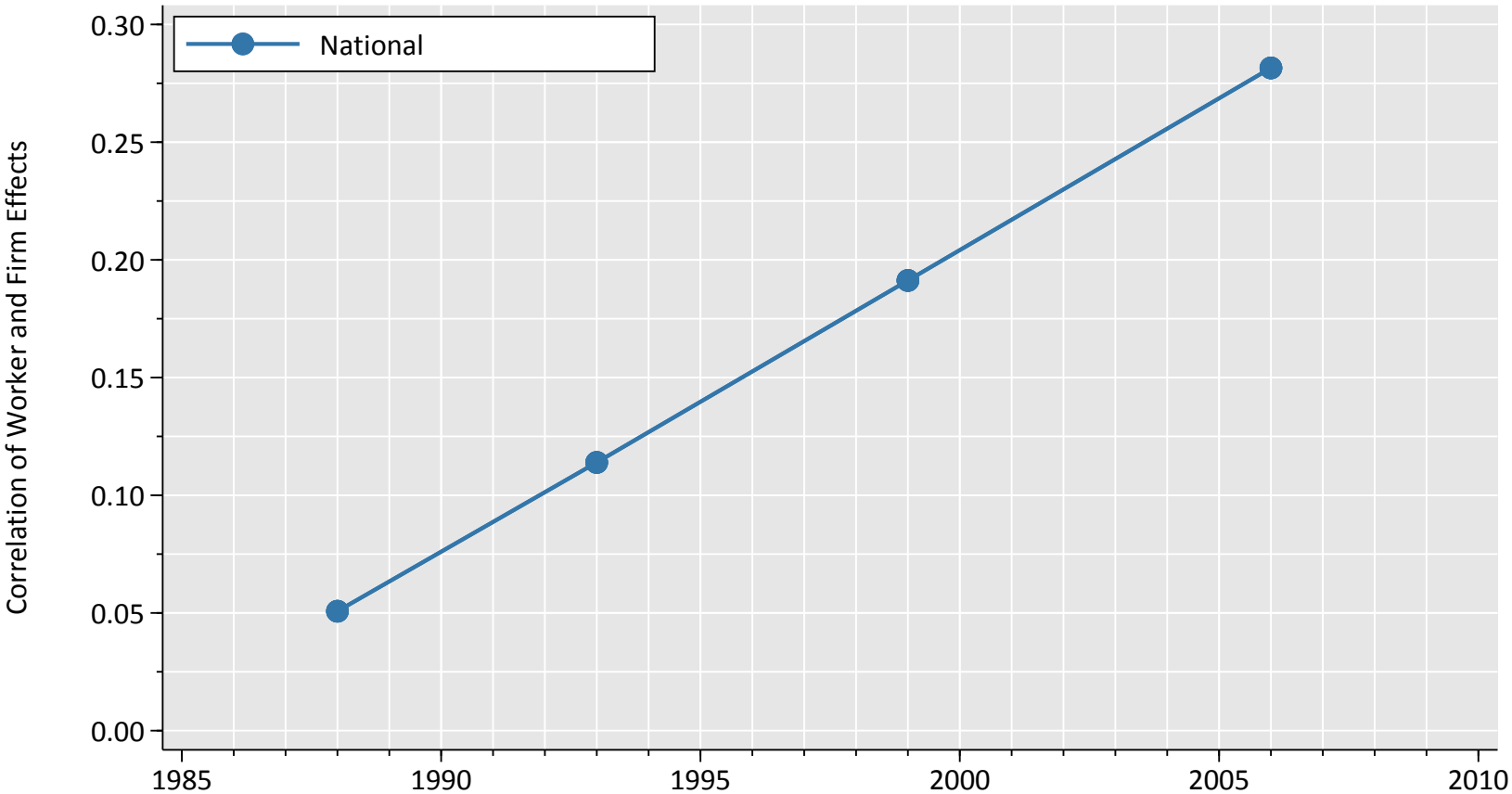
- Few job switches per firm results in sampling error $\Rightarrow$ negative correlation between firm and worker fixed effects.
- Solution:
  - Use 100% sample + change in correlation of fixed effects.
  - Stable bias? Job switching rate and establishment size stable.

back

Identification of AKM wage equation

- Identified off of worker movements across firms.
- Exogenous mobility assumption: job switches uncorrelated with *firm-worker specific match components*.

Trend in regional sorting matches national trend



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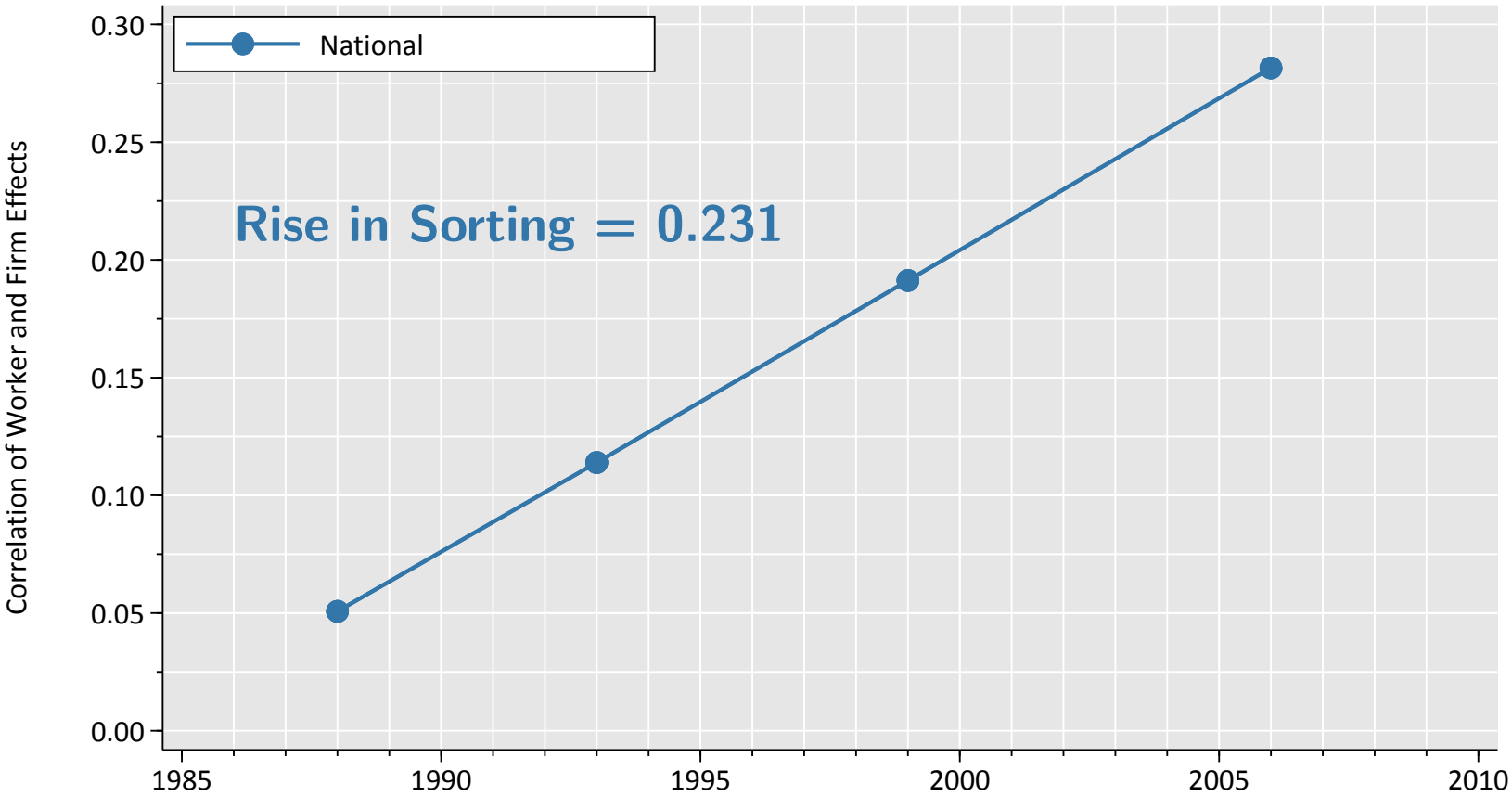

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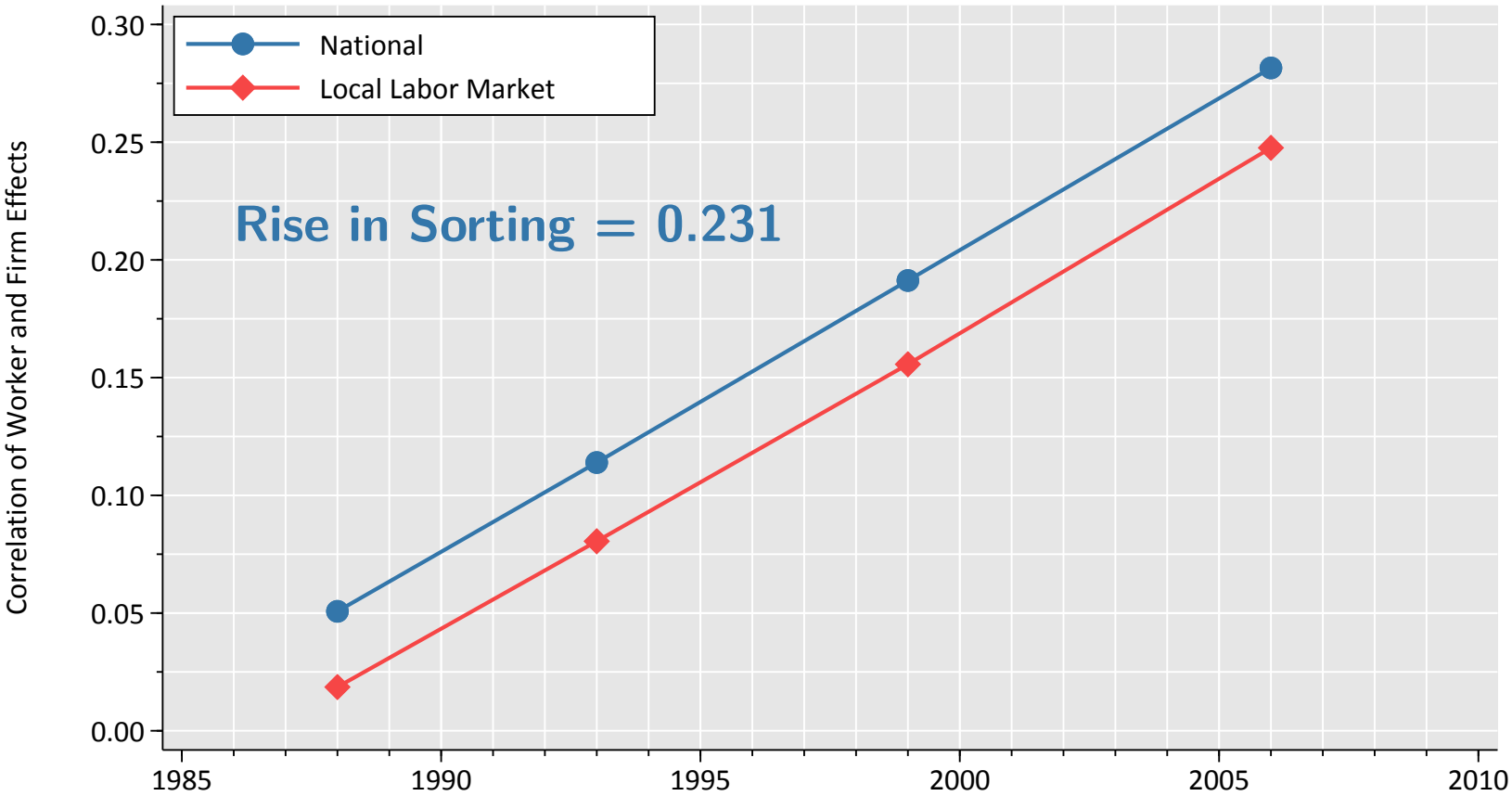

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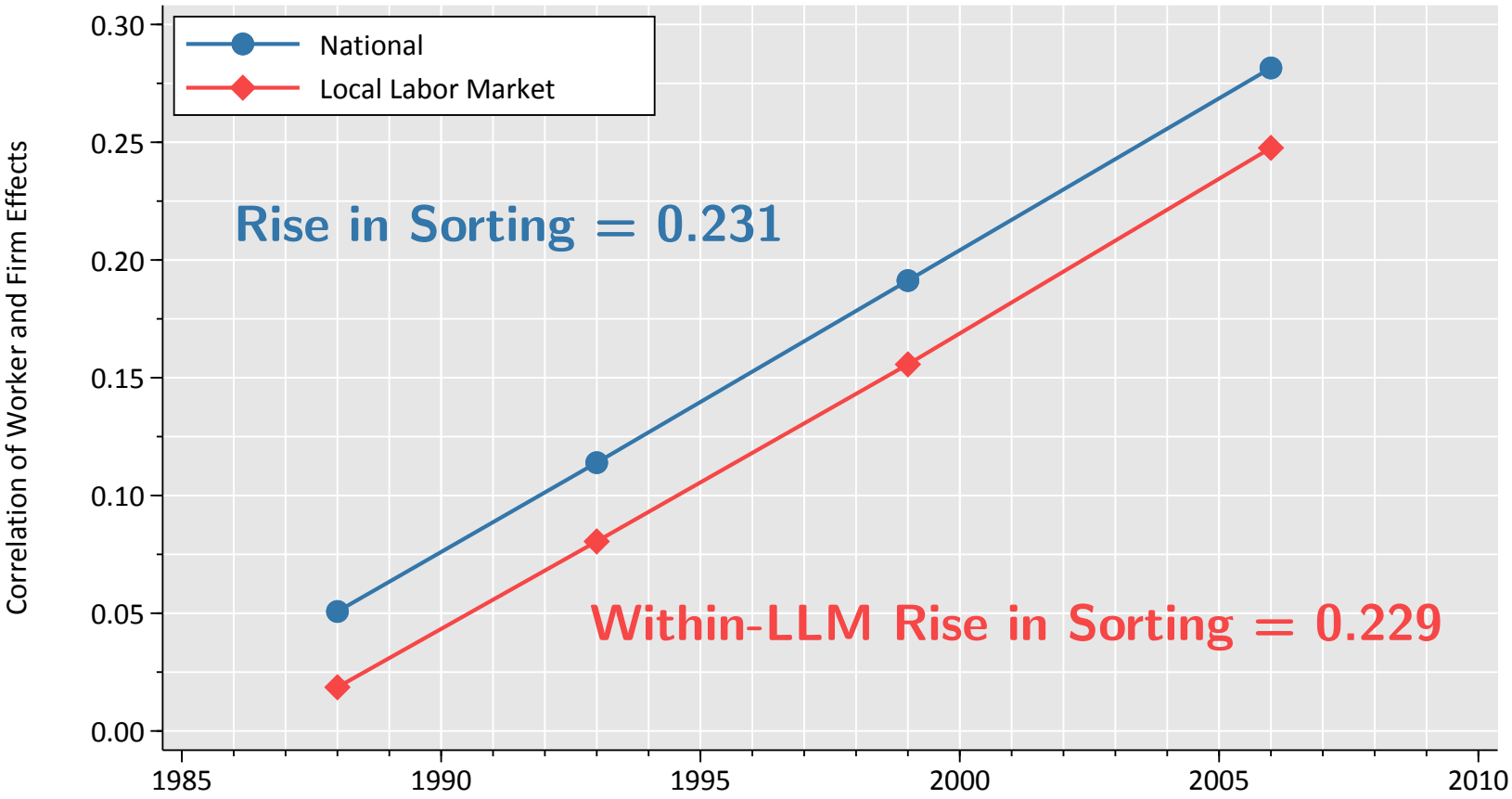

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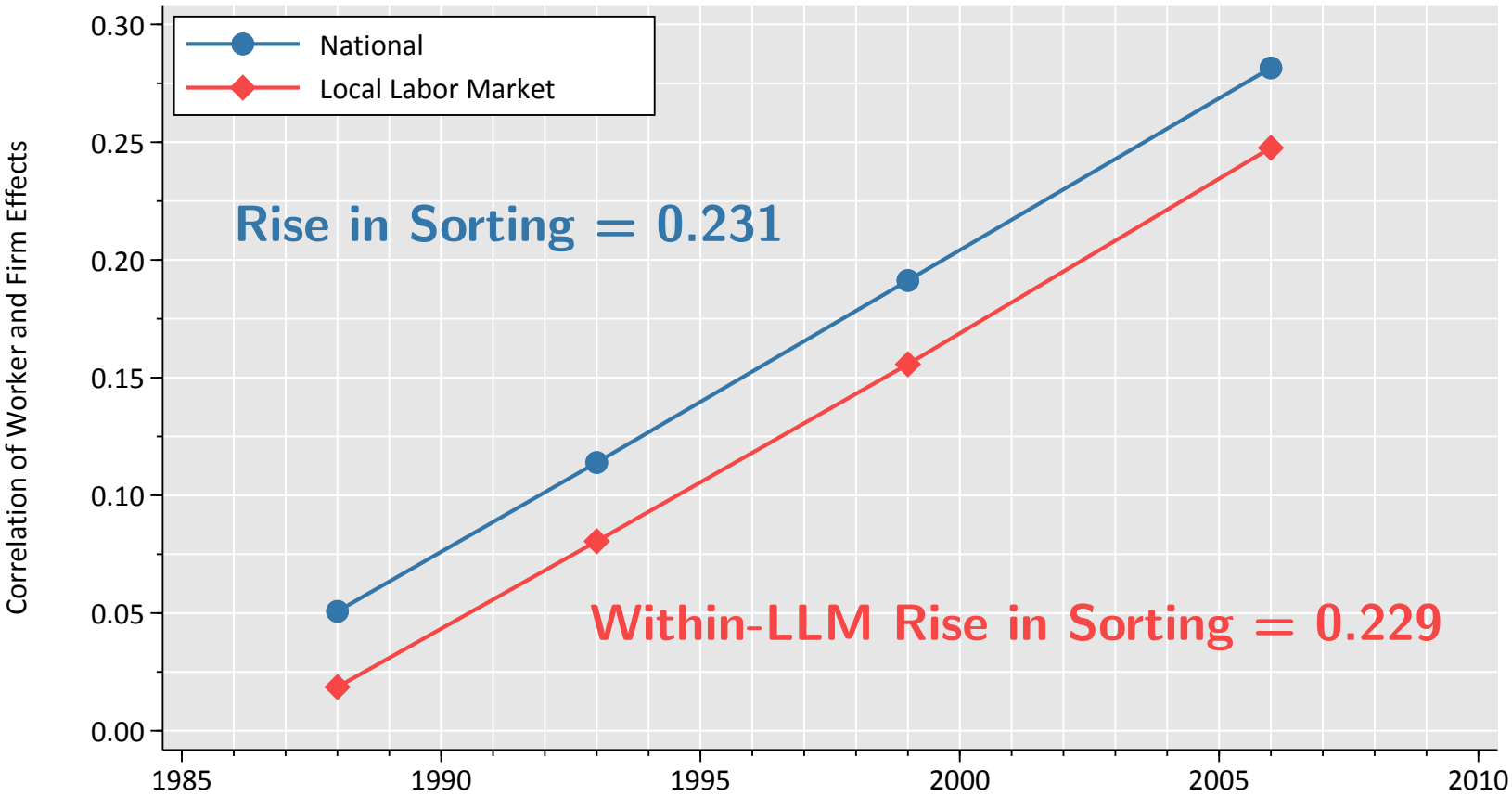

- Use a within-region sorting measure to exploit trade variation.

back

LLM sorting approximates the national change well

Table: Corr(WFE,EFE) over time: national, within-LLM, within-industry

		Int 1 '85-'91 (1)	Int 2 '90-'96 (2)	Int 3 '96-'02 (3)	Int 4 '03-'09 (4)	Change 1 to 4 (5)
Male	National	0.05	0.11	0.19	0.28	**0.23**
	Average Within-LLM	0.02	0.08	0.16	0.25	**0.23**
	Average Within-Ind	0.02	0.08	0.09	0.14	0.12
Female	National	0.04	0.09	0.10	0.14	**0.09**
	Average Within-LLM	0.02	0.06	0.07	0.11	**0.09**
	Average Within-Ind	-0.08	-0.03	-0.05	-0.01	0.06

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  - "Other" transitions:
    - out of the labor force, self employed, part-time/marginal jobs, employment in East Germany.

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    - out of the labor force, self employed, part-time/marginal jobs, employment in East Germany.
- Job stayers
  - FT employed at same firm in interval 1 and 2.

back

Devise a decomposition method based on joint distribution

- **Goal**: Estimate total effect of a worker flow on the change in sorting.

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2.) Compute sorting based on estimated joint distribution.

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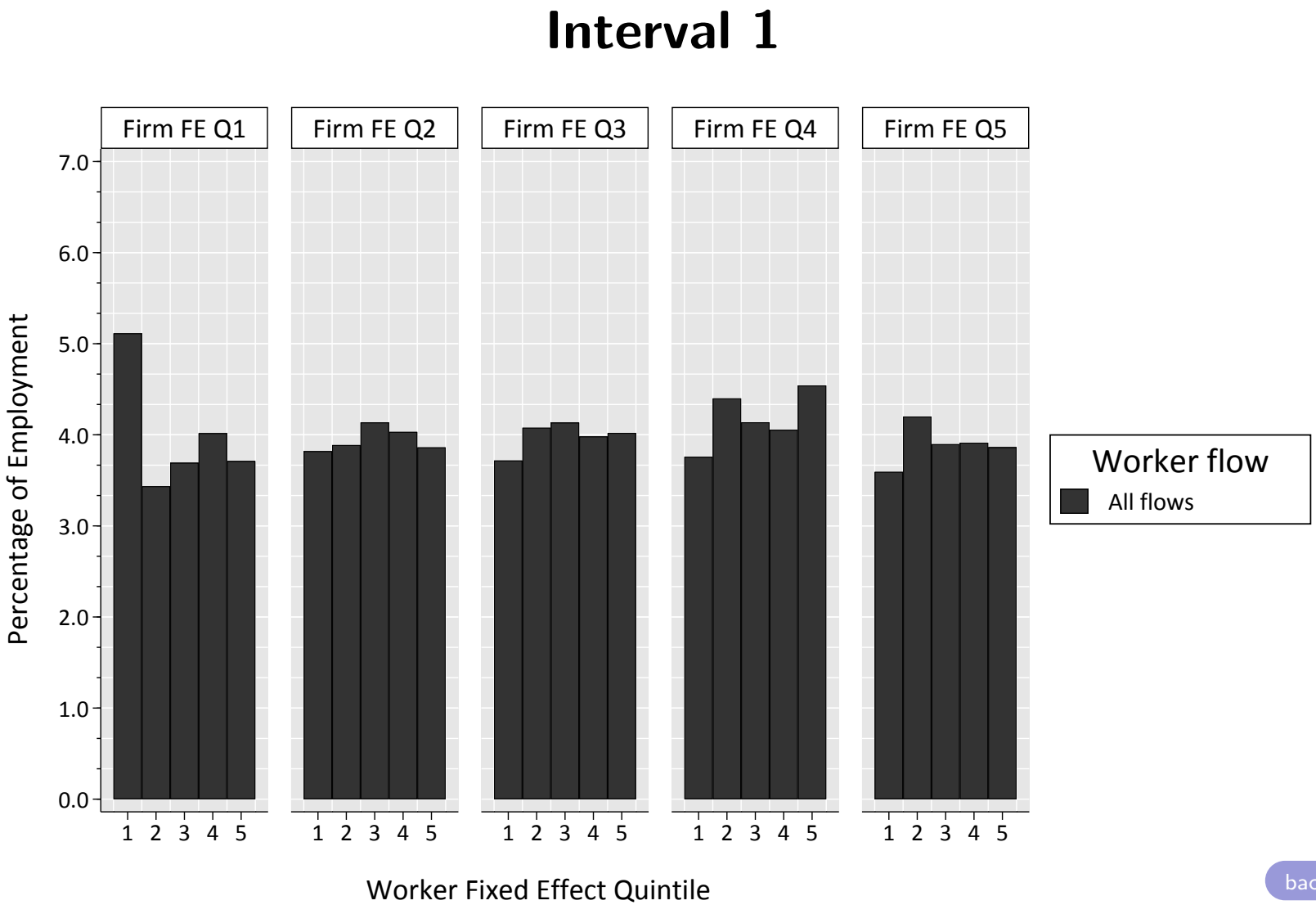
  - Net worker flows: e.g. labor market entrants - labor market exiters.

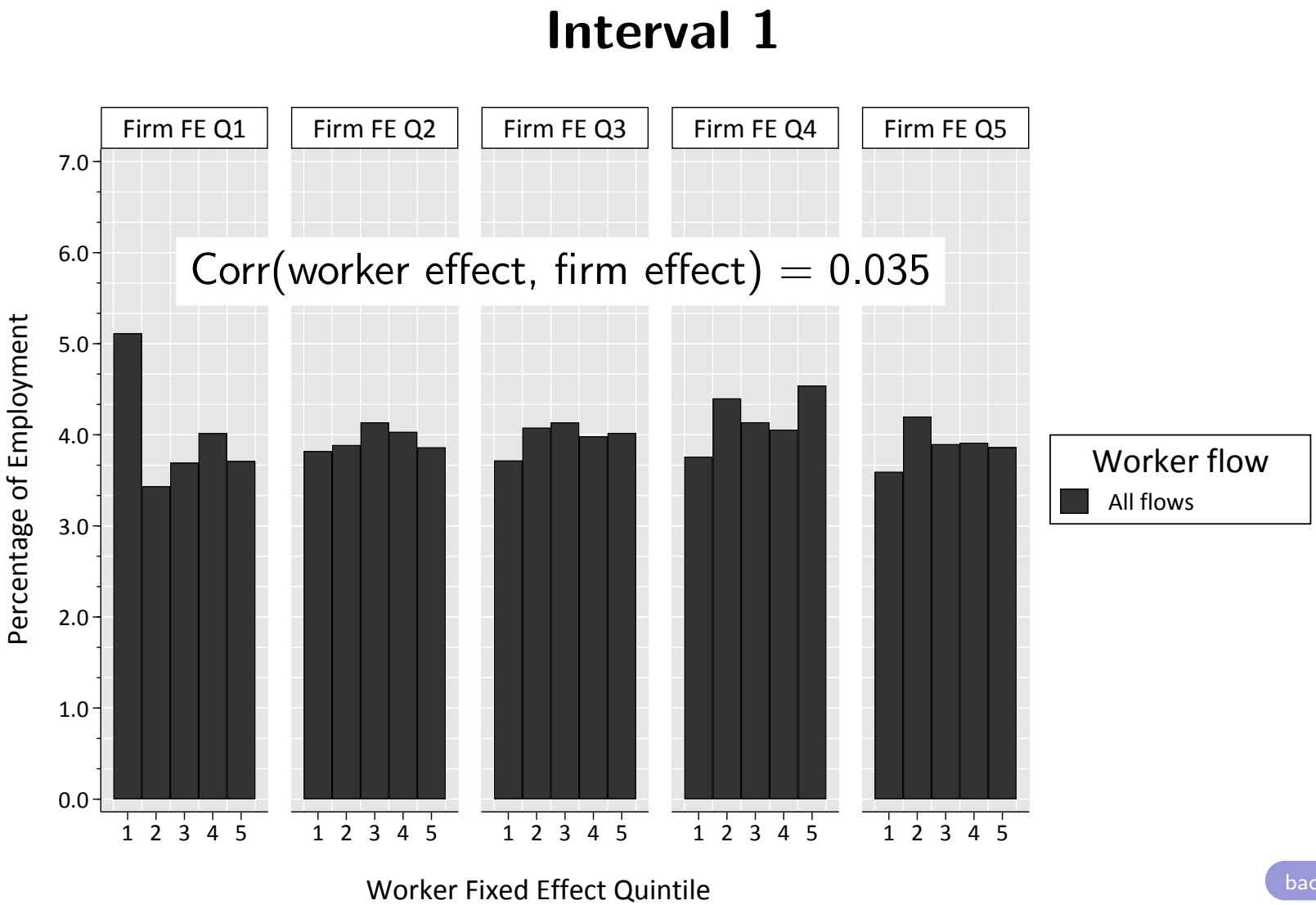
back

Step 1: Estimate joint dist. of worker and firm effects



back

Step 2: Compute sorting in each interval



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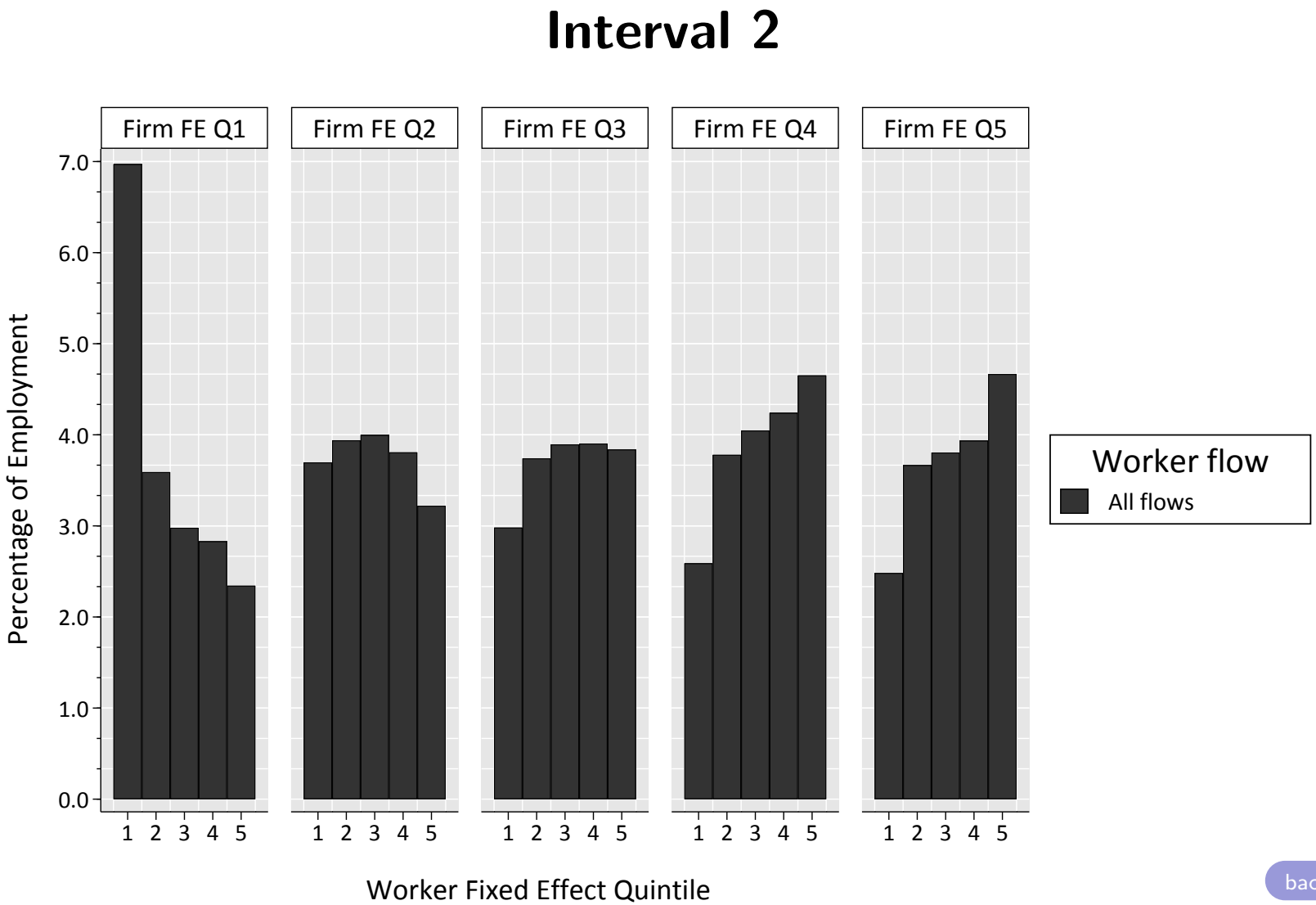

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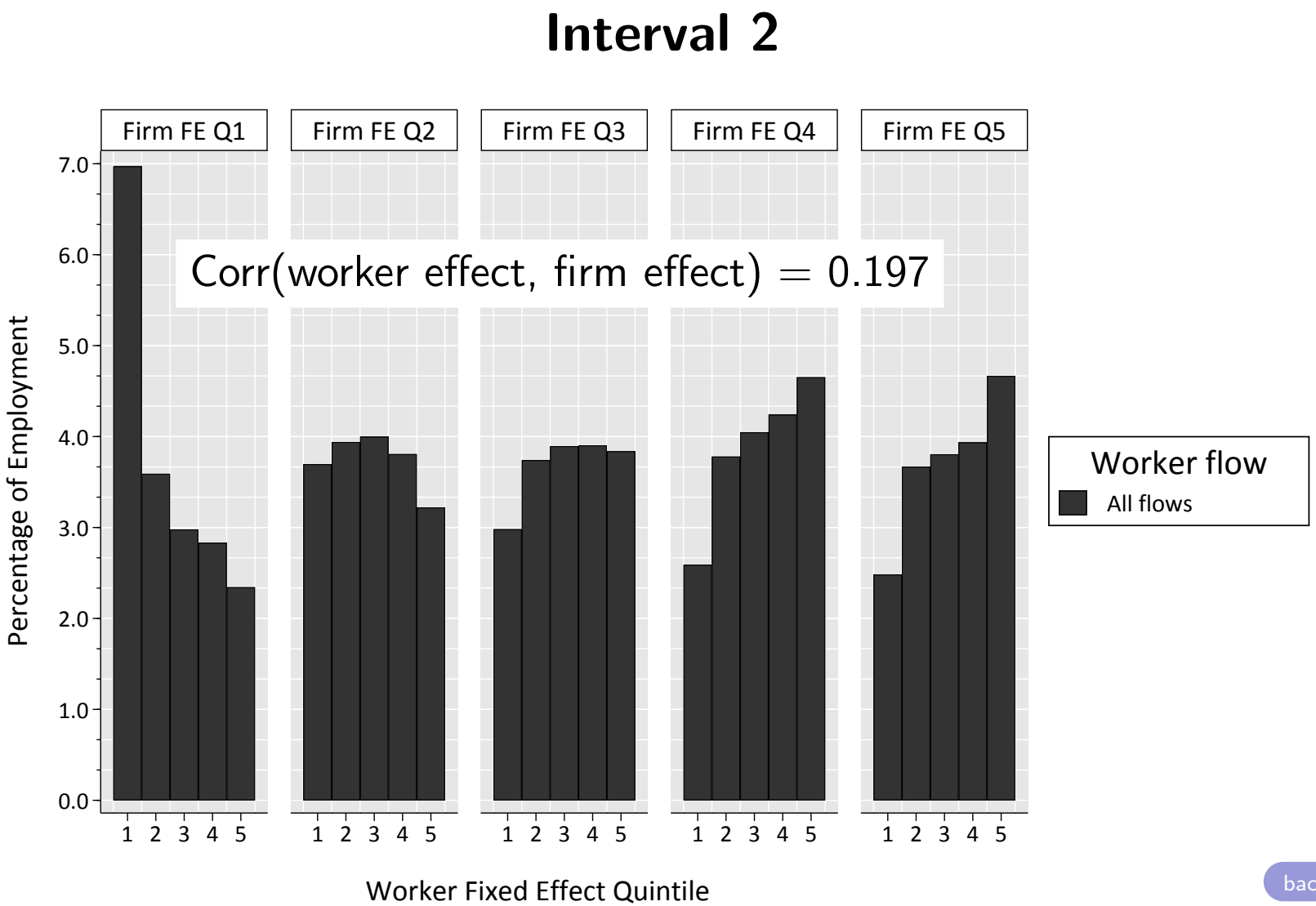

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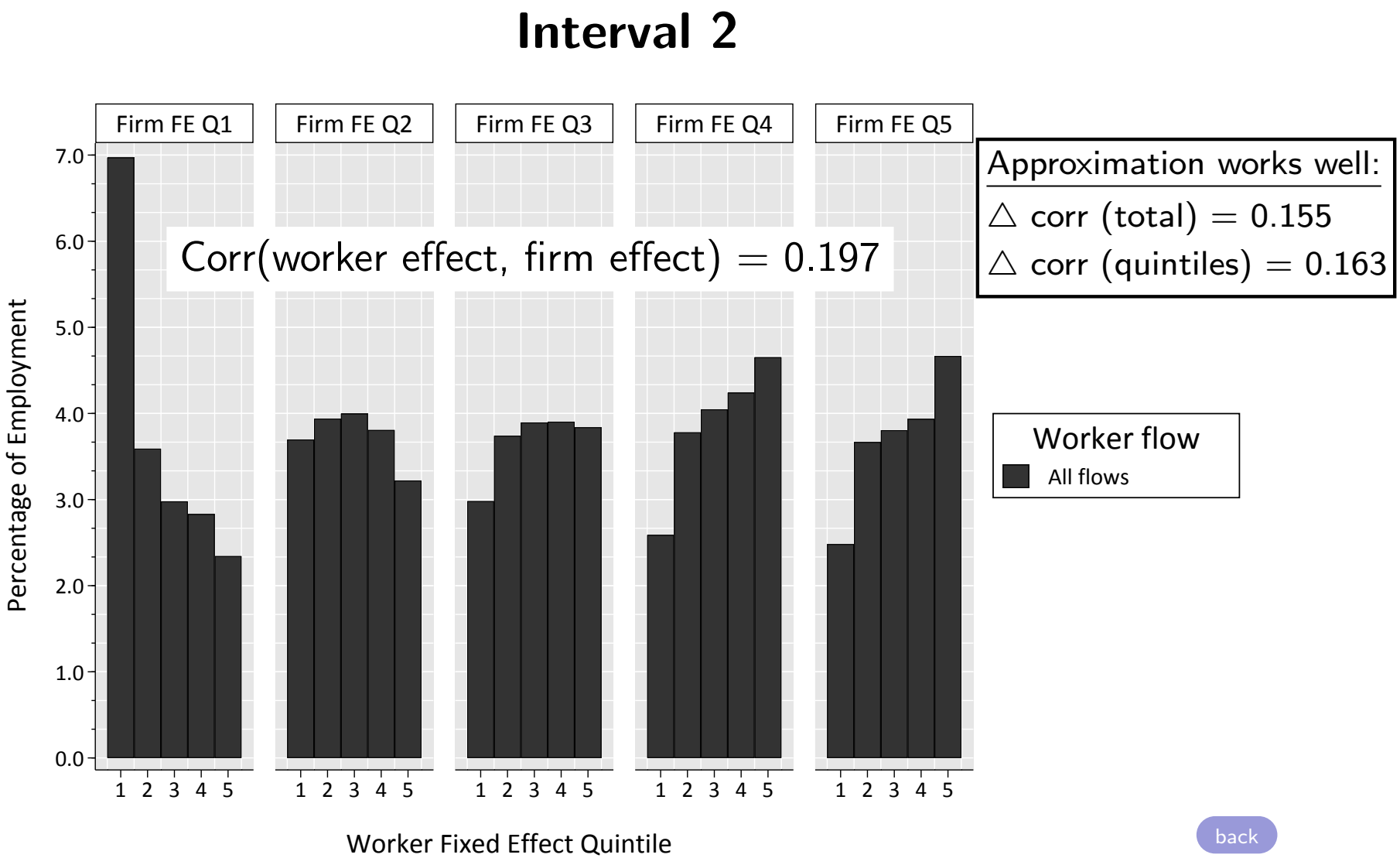
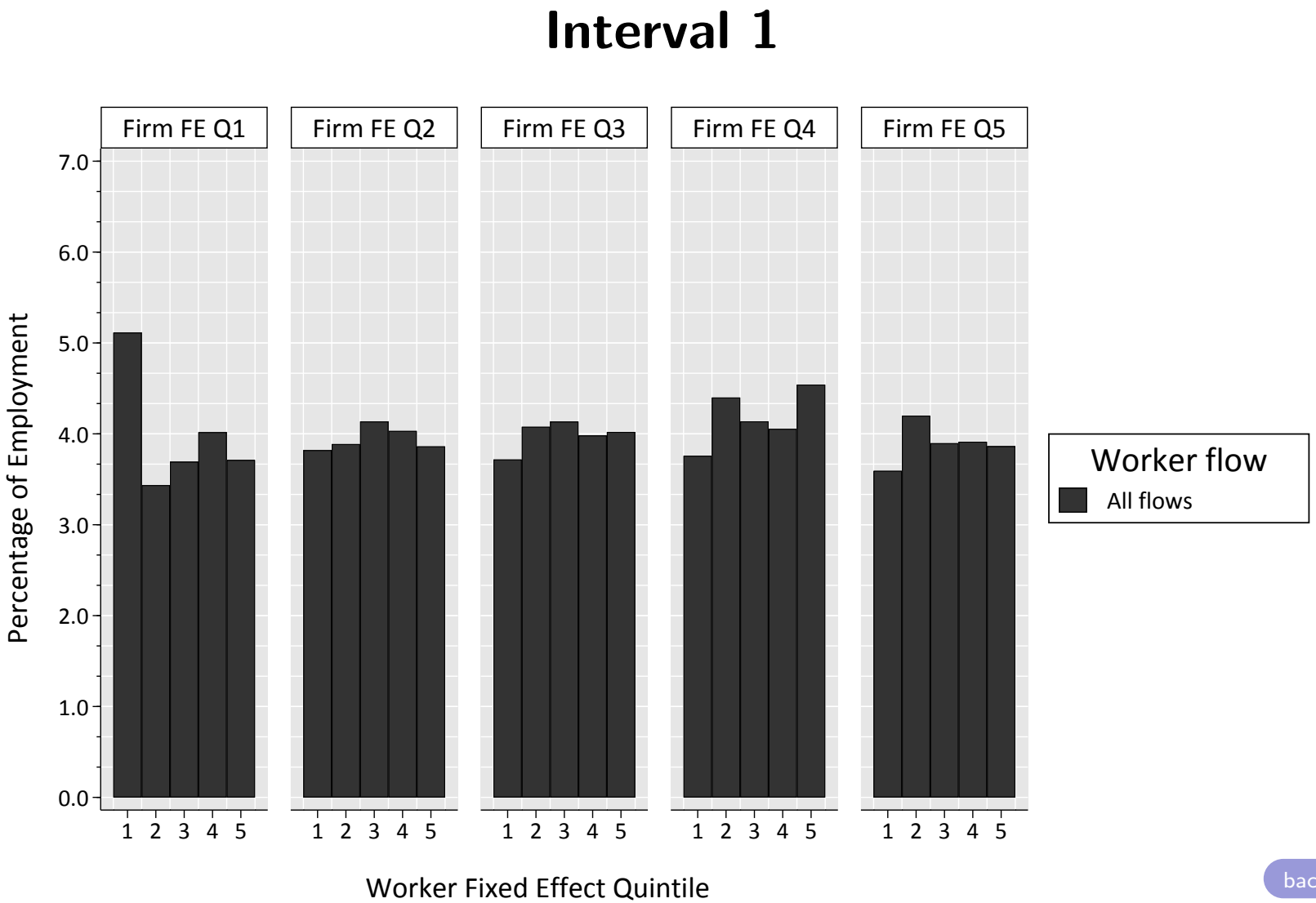


back

Step 3: Compute counterfactual sorting



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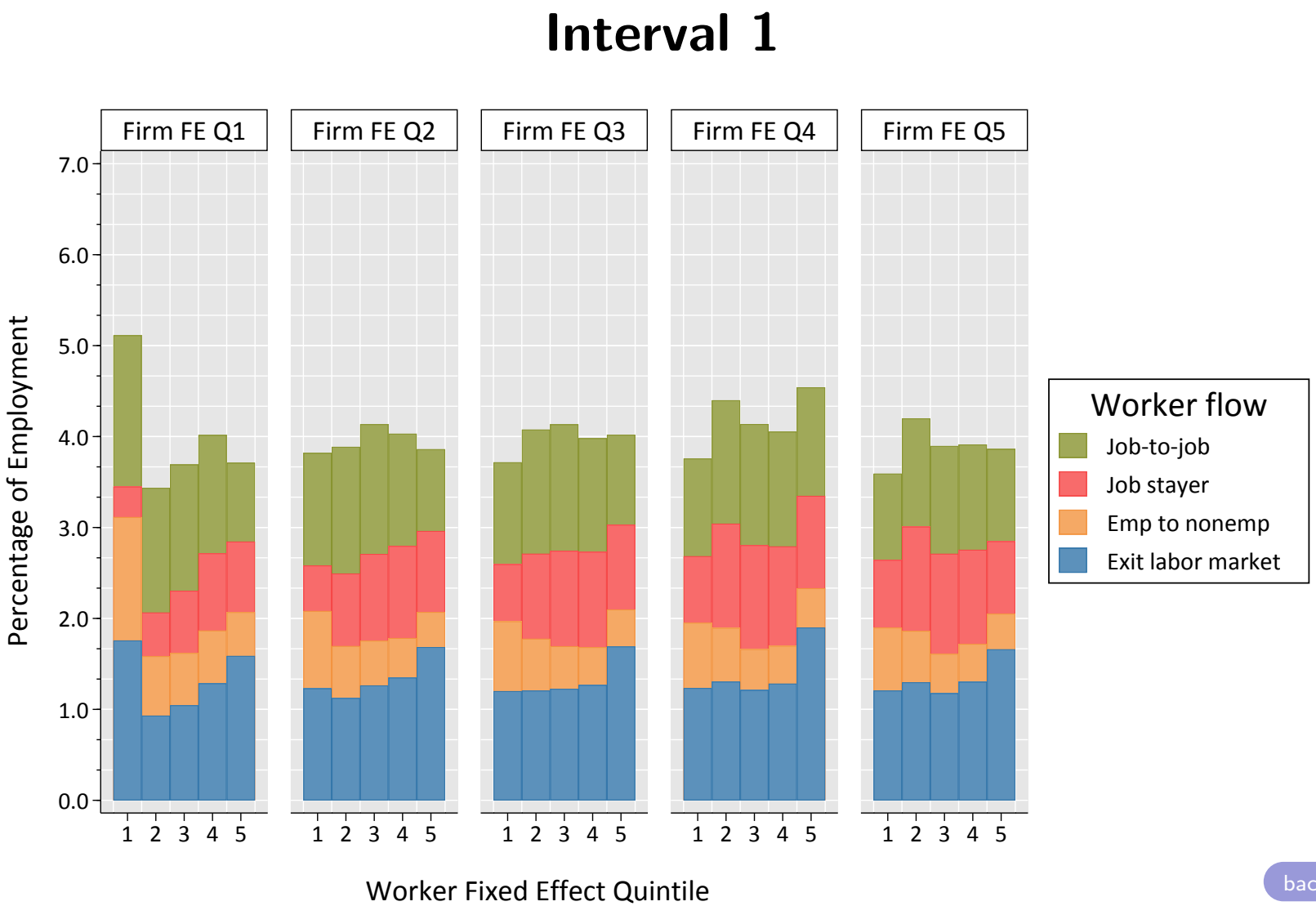

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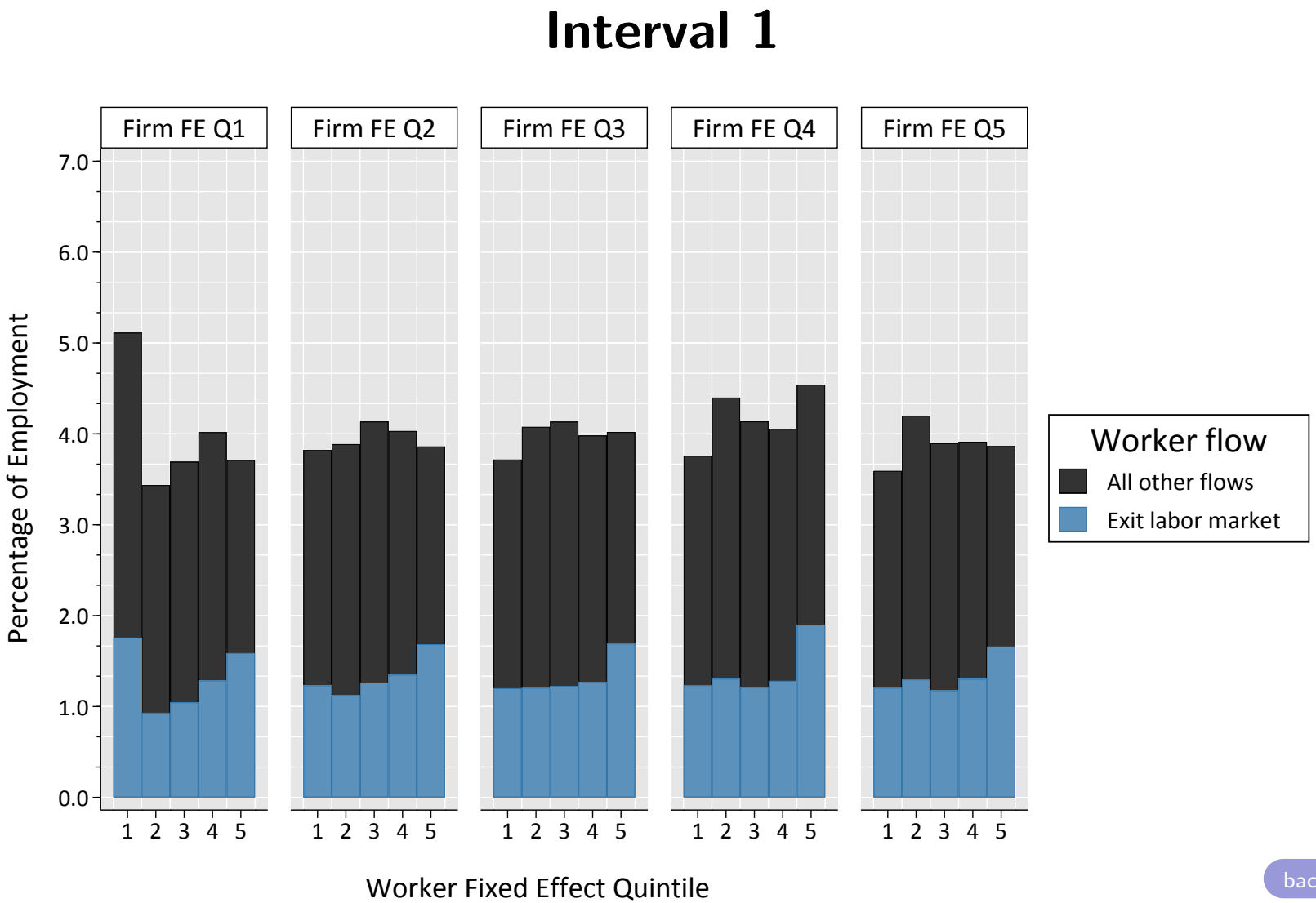

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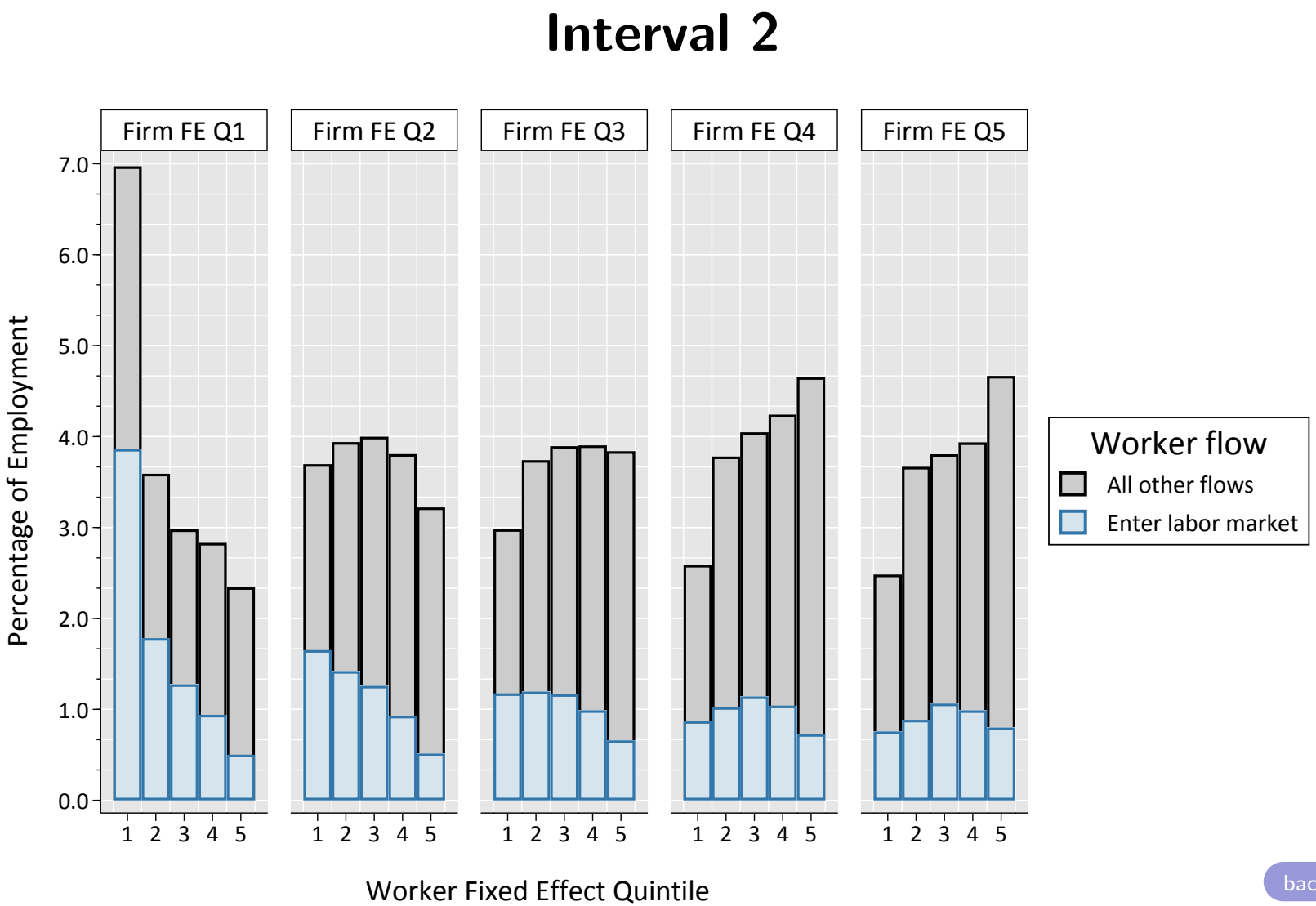

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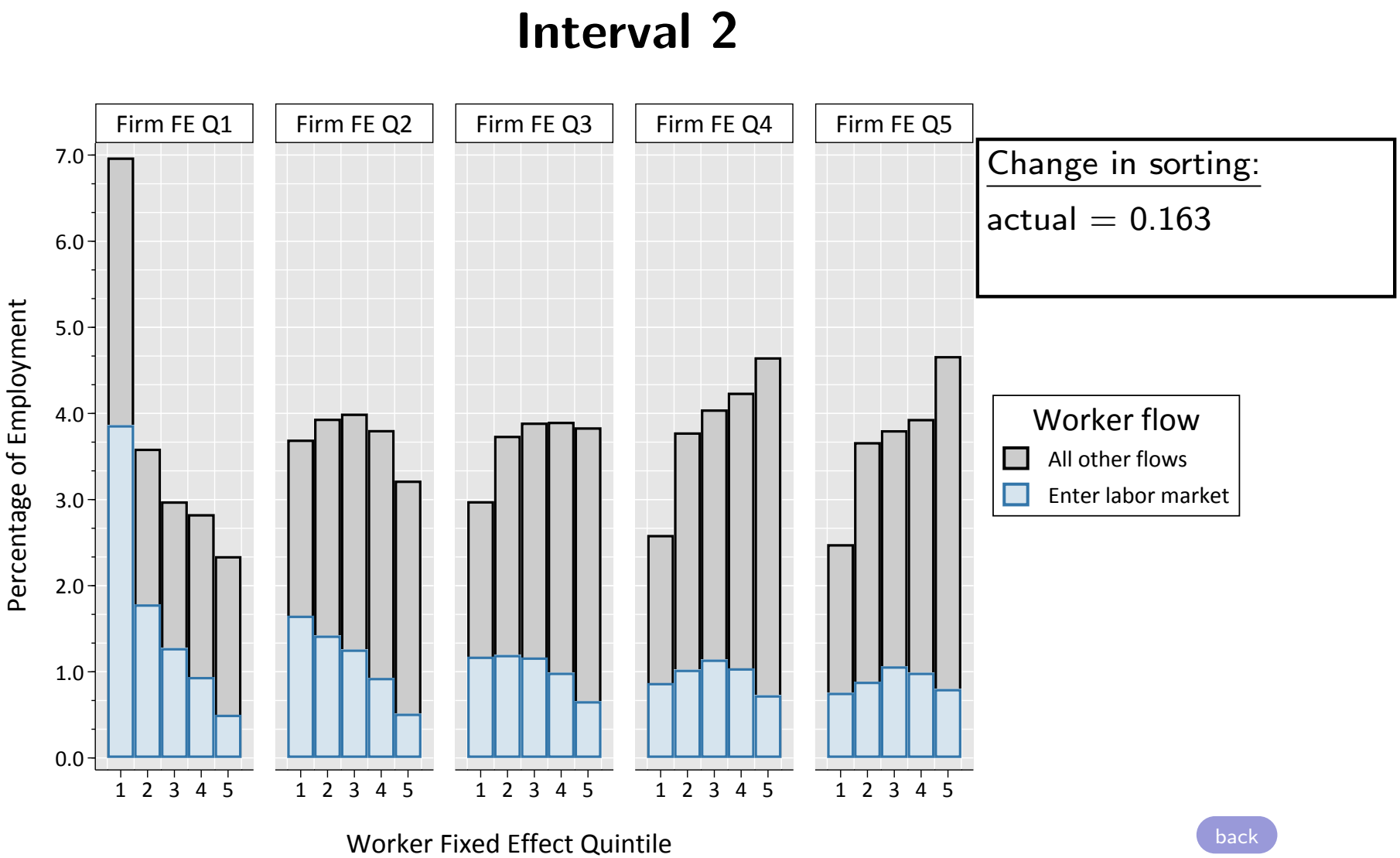

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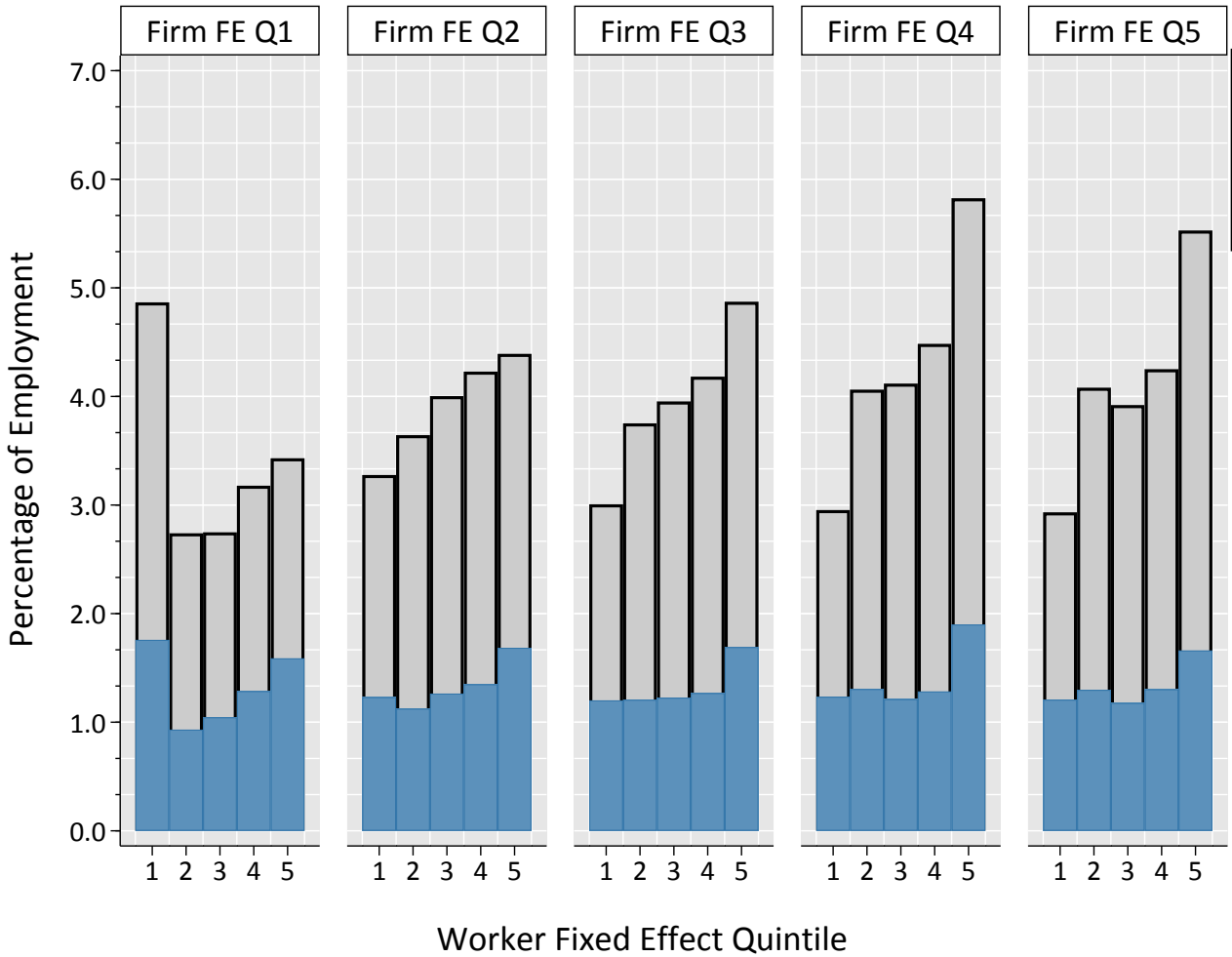
Step 3: Compute counterfactual sorting

Counterfactual Interval 2



Change in sorting:

actual = 0.163

counterfactual = 0.079

Worker flow

All other flows

Enter labor market

back

Correlation decomposition method

- Notation:
  - E_{ijk} := employment in cell WFE i, EFE j, flow k.
  - π_{ij} := employment share in cell i, j.
  - $\overline{\alpha}_i$:= average value of WFE's in quintile i.
  - $\overline{\psi}_j$:= average value of EFE's in quintile j.
- Total change: $\triangle\rho = Corr\left(\pi_{ij}^{p+1}\overline{\alpha}_i^{p+1}, \pi_{ij}^{p+1}\overline{\psi}_j^{p+1}\right) - Corr\left(\pi_{ij}^{p}\overline{\alpha}_i^{p}, \pi_{ij}^{p}\overline{\psi}_j^{p}\right)$
- Share reformulation: $\pi_{ij}^{p+1} = \left[\pi_{ij}^{p} + \frac{\triangle E_{ij}}{E^p}\right]\frac{E^p}{E^{p+1}}$
- Counterfactual share (C_k): $\pi_{ij}^{p+1,C_k} = \left[\pi_{ij}^{p} + \frac{\sum_{\sim k}\triangle E_{ij\sim k}}{E^p}\right]\frac{E^p}{E^p+\sum_{\sim k}E_{\sim k}}$
- Counterfactual change in correlation holding k constant:

  $\triangle\rho^{C_k} = Corr\left(\pi_{ij}^{p+1,C_k}\overline{\alpha}_i^{p+1}, \pi_{ij}^{p+1,C_k}\overline{\psi}_j^{p+1}\right) - Corr\left(\pi_{ij}^{p}\overline{\alpha}_i^{p}, \pi_{ij}^{p}\overline{\psi}_j^{p}\right)$
- Contribution of k to total change: $\triangle\rho - \triangle\rho^{C_k}$

back

Aggregate worker flow decomp details

Table: Decomposition of change in correlation of firm and worker effects

	III. Average across invervals			
	E (%) (1)	% △ E (2)	△ ρ (3)	△ ρ (%) (4)
Labor market entry	33.5	-4.8	0.101	57.0
Between-LLM job-to-job	*15.5*	*0.1*	*0.022*	*12.1*
Within-LLM job-to-job	*15.1*	*0.0*	*0.011*	*5.7*
Job-to-Job	30.6	0.1	0.033	17.8
Other to emp.	*10.0*	*0.8*	*0.016*	*8.9*
Unemp. to emp.	*4.1*	*-2.4*	*0.005*	*2.6*
Nonemployment	14.1	-1.6	0.021	11.5
Job Stayers	21.8	0.0	0.023	12.8
Change quintile values			0.002	0.9

back

Measuring export-induced worker flows

- Estimate for all i, j, k:

$$\frac{\triangle E_{ijkl}}{E_l^p} = \beta_1^{ijk} \triangle EXP_{lp} + \beta_2^{ijk} \triangle IMP_{lp} + \gamma^{ijk} X_{lp} + \lambda_{r(l)}^{ijk} + \delta_p^{ijk} + \epsilon_{lp}^{ijk}$$

- $\triangle E_{ijkl}$ - change in employment for:
  - joint-distribution employment cell i, j
  - worker flow k
- E_l^p - total employment
- π_{ij} - employment share
- Counterfactual, export-induced change in employment share:

$$\tilde{\pi}_{ij}^{p+1,C_k} = \left[\pi_{ij}^p + \sum_{\sim k} \hat{\beta}_1^{ij\sim k}\right] \left(\frac{1}{1+\sum_{\sim k} \hat{\beta}_1^{\sim k}}\right)$$

Previous findings on employment and wages

- Employment
  - Germany (Dauth et al. 2014): €1,000 per worker increase in:
    - exports increases total employment by 0.63 log pts.
    - imports decreases total employment by 0.32 log pts.
  - US (Autor et al. 2012): $1,000 per worker increase in imports reduces manufacturing employment 4.23 log pts.
- Wages
  - Germany (Dauth et al. 2014): €1,000 per worker increase in:
    - exports increases median wages by 0.11 log pts.
    - imports insignificantly decreases median wages.
  - US (Autor et al. 2012): $1,000 per worker increase in imports has an insignificant effect on manufacturing wages, but decreases non-manufacturing wages.

Use trade variation to isolate effect of firm demand

- Apply decomposition method to export-induced changes in employment only.

back

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- Idea: compare worker flows in exposed versus non-exposed local labor markets.

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    - e.g. differences in composition between entrants and retirees.

back

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  - Exclusion restriction: trade liberalization only affects worker composition through changes in labor demand.

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    - e.g. differences in composition between entrants and retirees.
  - Exclusion restriction: trade liberalization only affects worker composition through changes in labor demand.
- Q: For a given distribution of workers, does trade liberalization increase sorting?
  - Understand firm factors driving sorting.

back

Trade shock details

- LLM export exposure:$=\triangle EXP_{lt}^{GER} = \sum_j \frac{E_{lkt}}{E_{kt}} \frac{\triangle EXP_{kt}^{GER \to EAST}}{E_{lt}}$
  - E_{lkt}:= employment in LLM l, industry k, and year t.
  - $\triangle EXP_{kt}^{GER \to EAST}$:= change in the value of German exports to the "East" from t to $t+10$ in industry k.
- Estimate:

$$\triangle Corr\left(\hat{\alpha}_i, \hat{\psi}_j\right)_{lt} = \beta_1 \triangle EXP_{lt} + \beta_2 \triangle IMP_{lt} + \gamma X_{lt} + \lambda_{r(l)} + \delta_t + \epsilon_{lt}$$

  - l, local labor market, 325 in West Germany, average pop $\approx$ 200,000
  - t, estimation interval, two stacked first differences: 1985-1990 to 1997-2002 and 1991-1996 and 2003-2009.

back

Estimation details

- Estimation equation:

$$\triangle Corr_l^p \left(\hat{\alpha}_i, \hat{\psi}_{j(i,t)} \right) = \beta_1 \triangle EXP_{lp} + \beta_2 \triangle IMP_{lp} + \gamma X_{lp} + \lambda_{r(l)} + \delta_p + \epsilon_{lp}$$

- l - local labor market, p - period of change.
- $\triangle EXP_{lp}$, $\triangle IMP_{lp}$: change in export/import exposure.
- Controls:
  - $\lambda_{r(l)}$, δ_p - regional and time trends.
  - X_{lp} : initial LLM emp, % emp in manufacturing, % high-skill, % foreign-born, % female, and % routine occ.

Results of sorting on trade for females

Est eqn: $\triangle Corr_{lp}\left(\hat{\alpha}_i, \hat{\psi}_{j(i,t)}\right) = \beta_1 \triangle EXP_{lp} + \beta_2 \triangle IMP_{lp} + \gamma X_{lp} + \lambda_{r(l)} + \delta_p + \epsilon_{lp}$

	Region fixed effect					
	OLS: None (1)	IV: None (2)	IV: State (3)	IV: LMR1 (4)	IV: LMR2 (5)	IV: LMR2 (6)
Export exp	0.0067**	0.0073*	0.0046	0.0071**	0.0063**	0.0066**
	(0.0032)	(0.0044)	(0.0039)	(0.0032)	(0.0032)	(0.0026)
Import exp	0.0017	0.0014	0.0034	0.0037	0.0034	-0.0007
	(0.0030)	(0.0041)	(0.0042)	(0.0037)	(0.0044)	(0.0037)
Initial sorting						-0.9006***
						(0.0037)
Labor market controls	N	N	Y	Y	Y	Y
# geo f.e.'s	0	0	11	74	214	214
Adj R^2	0.033	0.027	0.030	0.064	0.089	0.409
N (county-periods)	650	650	650	650	650	650

back

First stage: trade to Germany on trade to other countries

	Dep. var.: △ export exp to the "East"			
	(1)	(2)	(3)	(4)
△ export exp other	0.6492***	0.4878***	0.5128***	0.5576***
△ import exp other	0.0420*	0.0141	0.0114	0.0097
F-stat	167.9	90.5	104.5	91.8
	Dep. var.: △ import exp to the "East"			
△ export exp other	0.2924***	0.2733***	0.2626***	0.2421***
△ import exp other	0.2286***	0.0961**	0.1014**	0.0933
F-stat	76.2	32.4	30.3	16.1
Labor market controls	N	Y	Y	Y
Region fixed effect	None	State	LMR1	LMR2

Notes: All 2SLS regressions are weighted by the initial size of the regional labor force. Standard errors are clustered at the LRC 2 level. Labor market controls include: % employment in manufacturing, % high skilled employment, % foreign born employment, % female employment, and % routine occupation employment.

back

Robustness of the effect of trade on sorting

	Specification:					
	First Interval '88–'99 (1)	Second Interval '93–'06 (2)	Control for Job Flows (3)	Constant WFE (4)	Net Exposure Total (5)	Net Exposure EE vs.CH (6)
Export exposure	0.0246**	0.0161***	0.0086***	0.0066***	-	-
	(0.0118)	*(0.0054)*	*(0.0025)*	*(0.0020)*		
Import exposure	-0.0183**	-0.0050	-0.0016	-0.0012	-	-
	(0.0084)	*(0.0038)*	*(0.0050)*	*(0.0043)*		
Net trade exposure	-	-	-	-	0.0047	
					(0.0037)	
Net trade exposure Eastern Europe	-	-	-	-	-	0.0090**
						(0.0041)
Net trade exposure China	-	-	-	-	-	*0.0024*
						(0.0059)
Change in job flows per firm	-	-	-0.00011	-	-	-
			(0.00018)			
Labor market controls	Y	Y	Y	Y	Y	Y
# geo fixed effects	74	74	214	214	214	214
Adj R^2	0.266	0.346	0.443	0.436	0.440	0.446
N (county-periods)	325	325	650	650	650	650

Notes: All 2SLS regressions are weighted by the initial size of the regional labor force. Standard errors are clustered at the LMR2 level. Standard errors in parentheses. Result are with respect to men only.

back

Quantifying the effect of trade on sorting

- Back of the envelope calculation.
  - Average $\triangle$ in county trade exposure from 1988 to 2008: $\overline{\triangle \text{export}} = 7.61$, $\overline{\triangle \text{import}} = 6.25$
  - Net effect of trade on sorting: $7.61 * 0.0080 - 6.25 * 0.0017 = 0.0503$
  - Total change in within-county Corr(EFE,WFE)$= 0.230$
  - $\Rightarrow 0.0503/0.2290 = 21.9\%$ of total change.
- Using only exogenous part: $0.032/0.230 =$ **14.0% of total change**.
  - Scale by IV's share of total variation in trade exposure.
- **Relative magnitude.** Goldschmidt & Schmeider (2017) find outsourcing responsible for about 8% of total change.

back

Identification of the effect of trade on sorting

- Estimate: change in sorting $= f$(change in exports + imports).

details

back

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  - *Shift-share instrument* measures trade exposure for each local labor market based on initial industrial composition.
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  - Follow Autor, Dorn, Hanson (2013); Dauth et al. (2016)
- Exclusion restriction:
  - Change in sorting uncorrelated with initial industrial composition other than through direct effect of change in Eastern demand.

details back

Export-sorting worker flow decomp details

Table: Decomposition of Export Sorting into Worker Flows

	I. Components of Change in Sorting through Exports		*II. Employment Shares*		*III. Components of Change in Aggregate Sorting*
	$\triangle\ \rho$ (1)	$\triangle\ \rho$ % (2)	E % (3)	% $\triangle$ E (4)	$\triangle\ \rho$ % (5)
Labor market entry	0.0045	47.7	33.5	0.35	57.0
Between-LLM job-to-job	*0.0016*	*16.6*	*15.5*	*0.18*	*12.1*
Within-LLM job-to-job	*0.0000*	*0.0*	*15.1*	*0.00*	*5.7*
Job-to-Job	0.0016	16.6	30.6	0.18	17.8
Other to emp.	*0.0009*	*9.8*	*10.0*	*0.20*	*8.9*
Unemp. to emp.	*0.0000*	*0.3*	*4.1*	*0.17*	*2.6*
Nonemployment to emp.	0.0009	10.1	14.1	0.37	11.5
Job Stayers	0.0023	25.0	21.8	0.00	12.8

back

Export shock as a demand shock

Table: Wage and employment effects in manufacturing industries

	△ emp	△ wage	△ EFE	△ WFE
	(1)	(2)	(3)	(4)
Export exposure	1.358***	0.334**	-0.072	0.435***
	(0.430)	(0.160)	(0.157)	(0.116)
Import exposure	-1.519***	-0.098	0.000	-0.042
	(0.585)	(0.230)	(0.126)	(0.180)

back

Outline

Trade ideas to inform results

- Trade liberalization as a shock to product demand.

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  - Demand shocks increase value of match output $\Rightarrow \uparrow$ WTP for optimal worker.
  - Approach the optimal allocation of assorative matching.
  - Prediction: exports increase within-industry sorting, productive firms react the most.

Effect of trade liberalization across sectors

- Manufacturing sector

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    - Driven by high-wage and large firms.
    - Worker flow decomposition: 60% job stayers, 40% job-to-transitions.

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    - Within-industry sorting: export coef = 0.0083* (0.0050).
    - Driven by high-wage and large firms.
    - Worker flow decomposition: 60% job stayers, 40% job-to-transitions.
- Non-manufacturing sector

Effect of trade liberalization across sectors

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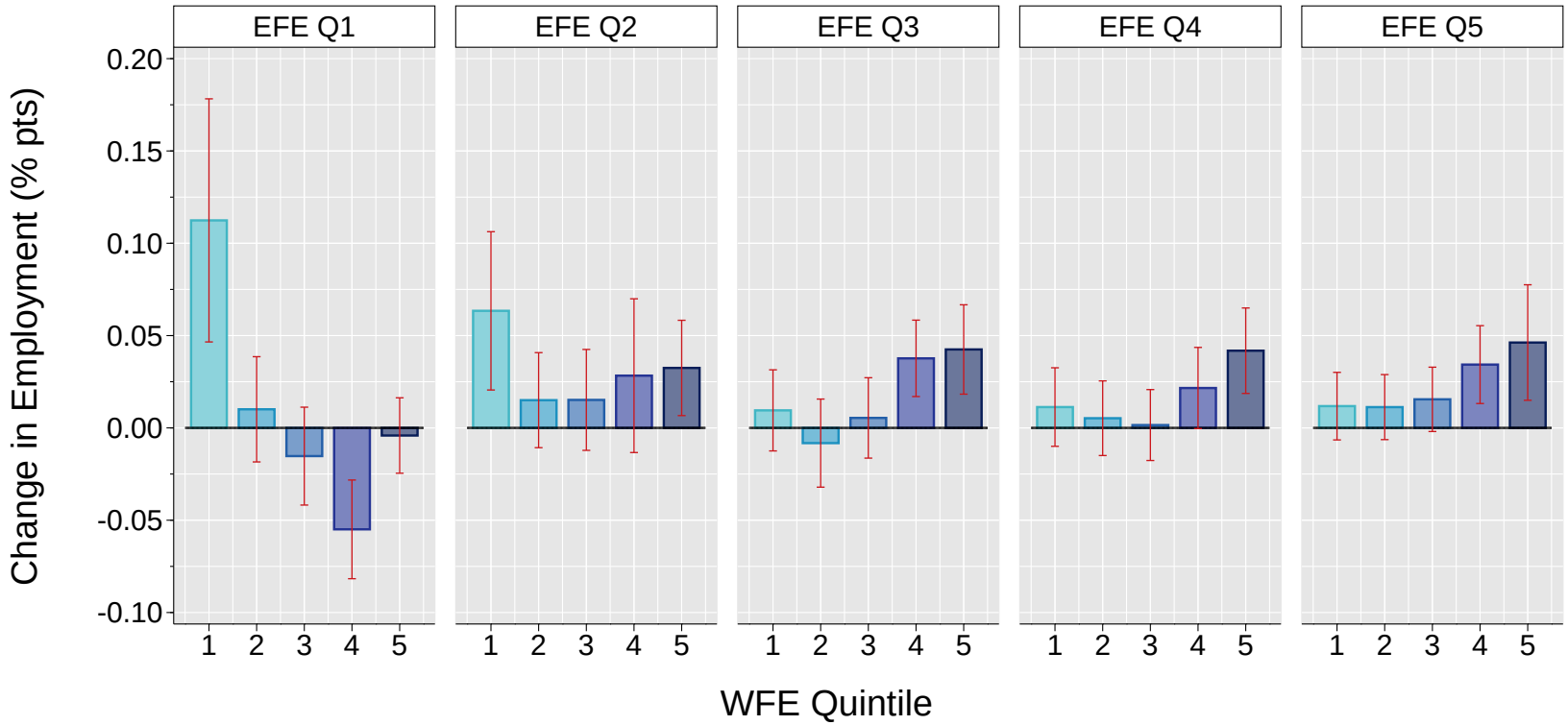
  - Worker flow decomposition: 92% labor market entry.
  - Driven by low-wage and new firms.

Labor market entry into non-manufacturing sector



Note: Bars show change in employment in each WFE-EFE cell as a percentage of initial LLM employment.

- Low-wage worker to low-wage firms: 72%.
- High-wage worker to high-wage firms: 26%.

Why?

Why effects on entry in other industries?

- Hypothesis:
  - Firms invest as new markets open: scale effect.
  - Technology complementarity to high skill labor.
  - Shift away from low-skill workers.
- Prior evidence that trade liberalizations induce tech upgrading:
  - Lileeva & Trefler (2010), Bustos (2011)
- Estimate effect of export exposure on investment
  - Firm survey: smaller sample, simplified design.
  - Coefficient on export exposure: 1.107*** (0.425).
- Consistent with long term-trend of manufacturing.
  - Increasing output, decreasing employment.
  - (But long-term outcome, i.e. next generation).

back

Worker flow decomposition for Manufacturing

	I. Change in Export Sorting		*II. Employment* Shares	
	Comp (1)	Share (2)	Initial (3)	Change (4)
Labor market entry	0.0002	2.4	13.7	-0.14
Between-LLM job-to-job	*0.0008*	*8.4*	*5.5*	*0.18****
Within-LLM job-to-job	*0.0003*	*3.1*	*6.6*	*0.00*
Job-to-job	0.0011	11.5	12.1	0.18
Other to emp.	*0.0007*	*8.0*	*3.4*	*0.13*
Unemp. to emp.	*-0.0002*	*-2.1*	*1.9*	*0.20****
Nonemployment	0.0005	5.8	5.3	0.33
Job Stayers	0.0029	30.7	11.6	0.00
Industry total	0.0047	50.5	42.7	0.37

- Mostly through job stayers.
  - Change in skill prices (WFEs)

Sorting through labor market entry in Non-Manufacturing

	I. Change in Export Sorting		*II. Employment Shares*	
	Comp (1)	Share (2)	Initial (3)	Change (4)
Labor market entry	0.0042	45.7	19.8	0.49***
Between-LLM job-to-job	*0.0008*	*8.3*	*9.9*	*0.00*
Within-LLM job-to-job	*-0.0003*	*-3.1*	*8.5*	*0.00*
Job-to-job	0.0005	5.2	18.5	0.00
Other to emp.	*0.0002*	*1.9*	*6.5*	*0.07*
Unemp. to emp.	*0.0002*	*2.4*	*2.3*	*-0.04***
Nonemployment	0.0004	4.3	8.8	0.04
Job Stayers	-0.0005	-5.6	10.2	0.00
Industry total	0.0046	49.5	57.3	0.52

- Mostly low-wage and new firms.
- Increase in the level of entry. Shift away from manufacturing

Table: Decomposition of Export Sorting into Worker Flows by Industry

	I. Components of Change in Sorting through Exports				*II. Employment Shares*			
	Manufacturing		Non-Manufacturing		Manufacturing		Non-Manufacturing	
	$\triangle\rho_k$ (1)	$\triangle\rho_k$ (%) (2)	$\triangle\rho_k$ (3)	$\triangle\rho_k$ (%) (4)	E_k^p (%) (5)	$\%\triangle E_k$ (6)	E_k^p (%) (7)	$\%\triangle E_k$ (8)
Labor market entry	0.0002	2.4	0.0042	45.7	13.7	-0.14	19.8	0.49***
Between-LLM job-to-job	*0.0008*	*8.4*	*0.0008*	*8.3*	*5.5*	*0.18****	*9.9*	*0.00*
Within-LLM job-to-job	*0.0003*	*3.1*	*-0.0003*	*-3.1*	*6.6*	*0.00*	*8.5*	*0.00*
Job-to-job	0.0011	11.5	0.0005	5.2	12.1	0.18	18.5	0.00
Other to emp.	*0.0007*	*8.0*	*0.0002*	*1.9*	*3.4*	*0.13*	*6.5*	*0.07*
Unemp. to emp.	*-0.0002*	*-2.1*	*0.0002*	*2.4*	*1.9*	*0.20****	*2.3*	*-0.04***
Nonemployment to emp.	0.0005	5.8	0.0004	4.3	5.3	0.33	8.8	0.04
Job Stayers	0.0029	30.7	-0.0005	-5.6	11.6	0.00	10.2	0.00
Industry total	0.0047	50.5	0.0046	49.5	42.7	0.37	57.3	0.52

Notes: "$\triangle\rho_k$" presents the component of the change in the correlation of worker and establishment fixed that can be attributed to a given worker flow through export exposure. "$\triangle\rho_k$ (%)" presents the contribution of a given worker flow as a share of the total export-induced change in sorting. "E_k^p (%)" presents the initial share of a given worker flow relative to total LLM employment. "$\%\triangle E_k$" presents estiamtes of the *export-induced* change in employment of a given worker flow divided by initial total LLM employment.

Table: Decomposition of Export Sorting into Worker Flows by Industry and Establishment Fixed Effect

	I. Share of Change in Sorting through Exports by Industry & EFE Distribution						*II. Initial Employment Shares by Industry & EFE Distribution*					
	Manufacturing			Non-Manufacturing			Manufacturing			Non-Manufacturing		
	Low (1)	Mid (2)	High (3)	Low (4)	Mid (5)	High (6)	Low (7)	Mid (8)	High (9)	Low (10)	Mid (11)	High (12)
Labor market entry	2.9	-3.8	3.2	32.8	1.1	11.8	2.7	2.9	8.1	10.6	3.7	5.5
Between-LLM job-to-job	*0.2*	*-0.5*	*8.7*	*13.9*	*0.1*	*-5.8*	*1.3*	*1.2*	*3.0*	*5.3*	*1.8*	*2.9*
Within-LLM job-to-job	*1.0*	*-0.5*	*2.6*	*-6.3*	*-0.4*	*3.6*	*1.4*	*1.5*	*3.7*	*4.8*	*1.6*	*2.1*
Reallocation	1.3	-1.0	11.3	7.7	-0.3	-2.2	2.8	2.7	6.7	10.0	3.4	5.0
Other to emp.	*1.3*	*-0.5*	*7.2*	*9.5*	*-0.1*	*-7.5*	*0.9*	*0.7*	*1.8*	*3.8*	*1.1*	*1.6*
Unemp. to emp.	*-0.2*	*-0.4*	*-1.5*	*1.2*	*0.2*	*1.0*	*0.4*	*0.4*	*1.0*	*1.2*	*0.4*	*0.6*
Nonemployment	1.1	-0.9	5.7	10.7	0.2	-6.5	1.3	1.1	2.8	5.1	1.5	2.3
Job Stayers	-0.2	1.9	29.1	-3.3	1.1	-3.4	1.8	2.5	7.2	5.5	2.1	2.7
Industry total	5.1	-3.8	49.2	47.9	2.0	-0.3	8.6	9.2	24.9	31.1	10.7	15.5

Table: Decomposition of Export Sorting into Worker Flows by Industry and Firm Size

	I. Share of Change in Sorting through Exports by Industry & Firm Size						*II. Initial Employment Shares by Industry & Firm Size*					
	Manufacturing			Non-Mnfctr			Manufacturing			Non-Mnfctr		
	NC (1)	Sml (2)	Lrg (3)	NC (4)	Sml (5)	Lrg (6)	NC (7)	Sml (8)	Lrg (9)	NC (10)	Sml (11)	Lrg (12)
Labor market entry	5.4	2.2	-5.2	28.8	6.6	10.2	4.4	3.3	6.0	10.0	2.6	7.2
Between-LLM job-to-job	*2.5*	*1.1*	*4.8*	*9.7*	*1.3*	*-2.7*	*2.3*	*1.4*	*1.8*	*5.7*	*1.6*	*2.6*
Within-LLM job-to-job	*0.9*	*-0.5*	*2.6*	*1.3*	*1.5*	*3.7*	*3.1*	*1.1*	*3.6*	*5.0*	*0.1*	*-0.1*
Reallocation	3.4	0.6	7.3	11.0	2.7	1.0	5.4	2.5	5.4	10.7	1.7	2.5
Other to emp.	*0.5*	*-1.2*	*8.7*	*2.6*	*1.7*	*-2.4*	*1.2*	*1.0*	*1.3*	*3.4*	*1.3*	*1.8*
Unemp. to emp.	*0.6*	*-1.3*	*-1.4*	*0.4*	*0.8*	*1.3*	*0.6*	*0.5*	*0.8*	*1.2*	*0.4*	*0.7*
Nonemployment	1.1	-2.5	7.3	2.9	2.5	-1.1	1.8	1.4	2.1	4.6	1.8	2.4
Job Stayers	0.0	0.2	30.5	0.0	-3.4	-2.2	0.0	4.3	7.2	0.0	3.5	6.7
Industry total	9.9	0.5	39.9	42.8	8.4	7.9	11.7	11.6	20.6	25.3	9.6	18.9

Table: Decompostion of the Change in Sorting into Between- and Within-Group Components

	Change in correlation between worker and establishment fixed effects			
	I. Aggregate		II. Export-induced	
Group definition	BT-Group (1)	WI-Group (2)	BT-Group (3)	WI-Group (4)
Industry	0.002 *(1.57)*	0.148 *(98.43)*	0.0000 *(0.06)*	0.0094 *(99.94)*
Firm Size	0.004 *(2.89)*	0.144 *(97.11)*	0.0005 *(5.81)*	0.0089 *(94.19)*
Worker Flow	-0.002 *(-1.12)*	0.149 *(101.12)*	0.0003 *(3.51)*	0.0091 *(96.49)*
Industry*Firm Size	0.007 *(4.86)*	0.142 *(95.14)*	0.0004 *(4.58)*	0.0090 *(95.42)*
Industry*Worker Flow	0.001 *(0.51)*	0.129 *(99.49)*	-0.0003 *(-4.87)*	0.0074 *(104.87)*
Firm Size*Worker Flow	0.003 *(2.17)*	0.126 *(97.83)*	0.0004 *(6.04)*	0.0066 *(93.96)*
Industry*Firm Size*Worker Flow	0.006 *(4.28)*	0.143 *(95.72)*	-0.0003 *(-3.38)*	0.0098 *(103.38)*

back: agg
back: export

Notes: The contribution of each component as a percentage of the total change is in parentheses. "Industry" consists of two groups: manufacturing and non-manufacturing. "Firm Size" consist of three groups: non-continuing firms, small continuing firms, and large continuing firms.

Table: Descriptive Stats of Worker Flow Decomposition Across Sequences

	I. Aggregate				II. Export-Induced			
	Mean (1)	S.E. (2)	Max (3)	Min (4)	Mean (5)	S.E. (6)	Max (7)	Min (8)
Unemployment to Employment	0.0031 *(1.93)*	0.00024 *(0.15)*	0.0052 *(3.26)*	0.0012 *(0.77)*	0.00003 *(0.35)*	0.000001 *(0.01)*	0.00004 *(0.41)*	0.00003 *(0.28)*
"Other" to Employment	0.0152 *(9.61)*	0.00025 *(0.16)*	0.0180 *(11.38)*	0.0130 *(8.20)*	0.00093 *(9.92)*	0.000001 *(0.01)*	0.00094 *(10.02)*	0.00092 *(9.83)*
Labor Market Entry	0.0883 *(55.71)*	0.00090 *(0.57)*	0.0980 *(61.85)*	0.0782 *(49.38)*	0.00448 *(47.93)*	0.000002 *(0.02)*	0.00450 *(48.19)*	0.00445 *(47.68)*
Job Stayers	0.0203 *(12.79)*	0.00076 *(0.48)*	0.0271 *(17.11)*	0.0143 *(9.02)*	0.00234 *(25.08)*	0.000001 *(0.01)*	0.00235 *(25.19)*	0.00233 *(24.97)*
Job-to-Job Between Region	0.0216 *(13.63)*	0.00036 *(0.23)*	0.0256 *(16.15)*	0.0183 *(11.56)*	0.00156 *(16.73)*	0.000002 *(0.02)*	0.00158 *(16.92)*	0.00155 *(16.55)*
Job-to-Job Within Region	0.0101 *(6.35)*	0.00034 *(0.21)*	0.0135 *(8.49)*	0.0072 *(4.52)*	-0.00001 *(-0.06)*	0.000001 *(0.01)*	0.00000 *(-0.01)*	-0.00001 *(-0.11)*

Notes: The contribution of each component as a percentage of the total change is in parentheses. The total change in correlation for aggregate (export-induced) employment changes is 0.158 (0.0093). There are 32 different sequences by which the six worker flows can be ordered to compute counterfactual employment distributions. "S.E." denotes the standard error across the 32 sequences.

back: agg

back: export