Quantifying Racial Disparities Using Consecutive Employment Spells

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Motivation and question

Black-white disparities in unemployment and earnings [e.g., Bound and Freeman (1992), Bayer and Charles (2018)]

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How large are the gaps among equally-productive workers?

- ▶ Hard to get to **quantities** from audit studies
- ▶ Hard to generate (natural) experiments to study race [e.g., Charles and Guryan (2011)]
- ▶ Hard to deal with **unobservables** in observational data

Idea of the paper

Use employer learning to match Black and white workers on unobservables:

[e.g., Farber and Gibbons (1996) and Altonji and Pierret (2001)]

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Develop an equilibrium model of learning and turnover

▶ Discuss mechanisms/assumptions/how to label this gap

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  - ▶ About half of the 5.3 is between-firm, mediated by share of Black workers
  - ▶ About half of the 5.3 is within-firm (go A to B in same quarter)
- ▶ Separations: first spell gaps re-emerge in the second spell
  - ▶ Over 20% of **unconditional** separation gaps
  - ▶ About 0.6% of lifetime consumption

Outline

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- ▶ Race/ethnicity from Census and ACS
    - ▶ Non-hispanic Black and white
- ▶ Age: 18 - 61 (inclusive)

Coding separations

▶ Separate from j if earnings in quarter t and no earnings in quarter $t+1$ to $t+4$
▶ Focus on *dominant* (highest earnings) employer within quarter
▶ EE if overlapping earnings in a quarter
    ▶ EN otherwise

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Other data handling steps:
▶ Use *full* quarter employment relationships (employed in $t-1$, t, and $t+1$)
  ▶ Quarter t also known as a *sandwich* quarter
▶ Impose earnings floor (annualized \$3250 in \$2011 using CPI-U)

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Other matching steps:

▶ Reweight white workers to match Black workers' distribution (nonparametric propensity score)

Samples

Sample	Age	Female (%)	Tenure	Earn	Workers	Firms	Worker-Q
All workers							
All	40.6	49.4	22.2	10.74	44,960,000	2,540,000	1,140,000,000

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Matched sample							
White	41.3	54.1	25.9	10.83	15,930,000	152,000	168,500,000
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Outline

Separation gaps: full sample to matched and weighted

Full set of covariates: firm-quarter and state-quarter earnings and tenure
deciles, and firm x gender x quarter

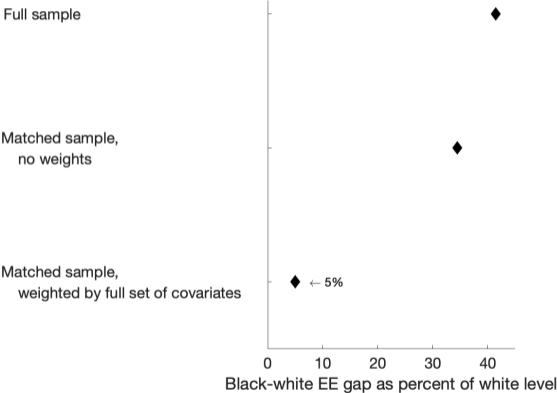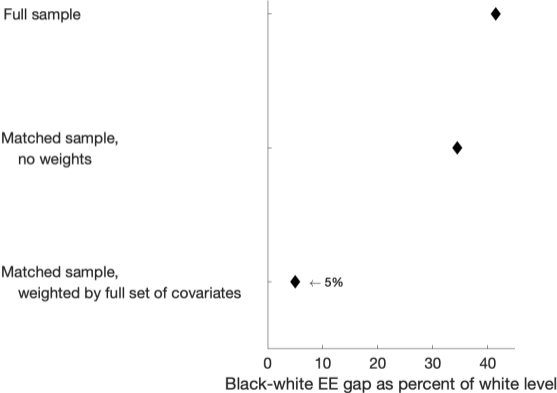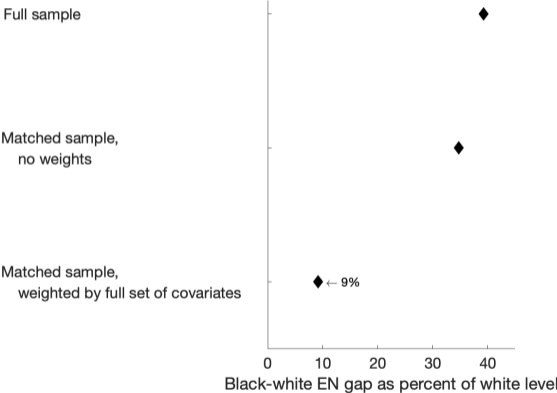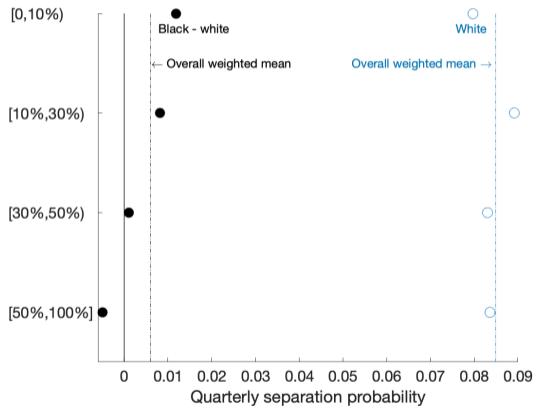# Separation gaps: full sample to matched and weighted

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Separation gaps: EE vs. EN

Employer to employer (EE)

Full sample

Matched sample,
no weights

Matched sample,
weighted by full set of covariates   ← 5%

0   10   20   30   40
Black-white EE gap as percent of white level

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Employer to nonemployment (EN)

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Black-white EN gap as percent of white level

Separation gap heterogeneity

Share of workers that are Black

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Sector
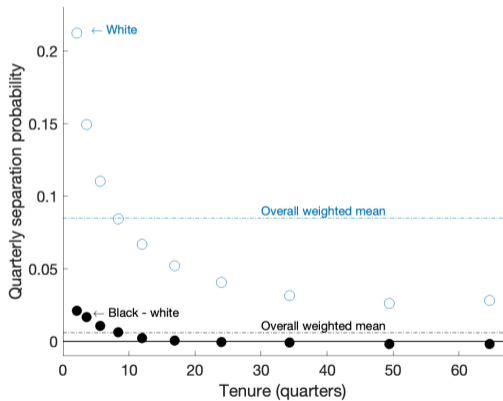

▸ Employment shares   ▸ By employer size   ▸ Employment shares   ▸ By gender

Separation gap heterogeneity: tenure, EE vs. EN

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- ▶ Worker type: $\theta \in \{\theta_l, \theta_h\}$
- ▶ Group share of high-type: α^g

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To keep (the model solver's) life simple:

- ▶ Workers live for two employment spells, terminal payoff is market's view of their type

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Market/second employer:
- ▶ Observe tenure (and employer identity) with the first employer
  - ▶ Use tenure (along with group identity) to infer worker type

Wage setting

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Conjecture: if (history of) wages do not fully reveal firm's information, results go through
- ▶ Hard to generate (conditional) separation gaps if wages convey firm's information

Separation rates by type and group in the first spell

Separation rate for worker known to be high/low productivity:

$$s_h \equiv \frac{1}{1 + exp(J(g, > 0, 1))} < s_l \equiv \frac{1}{1 + exp(J(g, > 0, 0))}$$

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- $\Rightarrow$ High-enough tenure = group separation rates converge

Implications for the second spell

Market's belief given t periods of tenure in the first spell and group g:

$$\tilde{p}(g, t) = \frac{\alpha^g (1 - s_h)^{t-1} s_h}{\alpha^g (1 - s_h)^{t-1} s_h + (1 - \alpha^g)(1 - s_l)^{t-1} s_l}$$

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For "high enough" tenure:

▶ Workers are matched on unobservables

▶ $\Rightarrow$ in the "second spell," outcomes shouldn't depend on group identity

▶ Any gaps in earnings or separations are among equally productive workers

Key assumptions

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- ▶ Failure of the second:
  - ▶ Upper or lower bound: if employer acts biased against Black (lower) or white workers (upper)

Outline

Summary statistics

Sample	Age	Female (%)	Tenure	Earn	Workers
All workers					
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High-tenure matched ** and reweighted separators***					
Black	46.5	57.2	46.4	11.07	12,000
White	46.5	57.2	46.4	11.08	18,500
High-tenure matched and reweighted separators, mass layoff					
Black				11.04	2,600
White				11.05	6,100

* Top 3 deciles of state-year-quarter distribution, AND 20 or more quarters of tenure

** Match on current and lagged quarter

*** If a worker goes A to B, then only a separation if no more than 20% of workers at A go to B AND no more than 20% of B's workers joined from A

# Methods: how this displaced worker analysis differs from others

$$y_{ik} = \beta_{0,k} + \beta_{1,k} Black_{ik} + \epsilon_{ik},$$

- ▶ k is horizon relative to separation (negative), and finding post-separation job (positive)
- ▶ Post-period is only in first post-separation job
- ▶ Matched sample (reweight at each horizon), conditional on mass layoff in same quarter

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4. Timing in the post-period is relative to getting first post-separation job

Separators are approximately balanced on (non-imputed) education
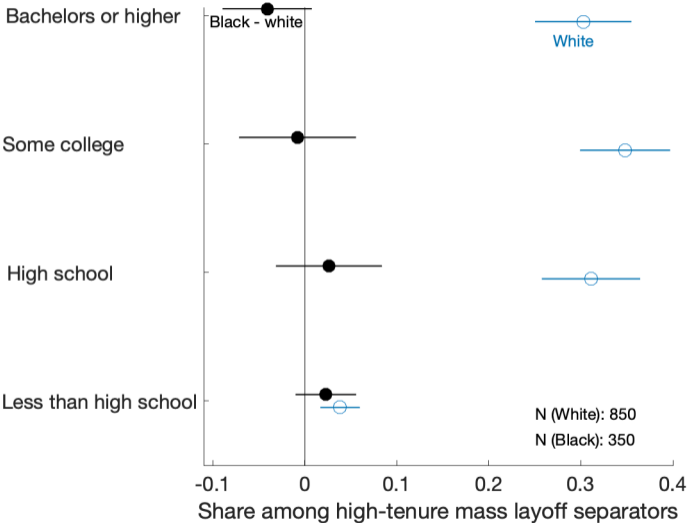
Earnings gaps among high-tenure matched mass layoff separators
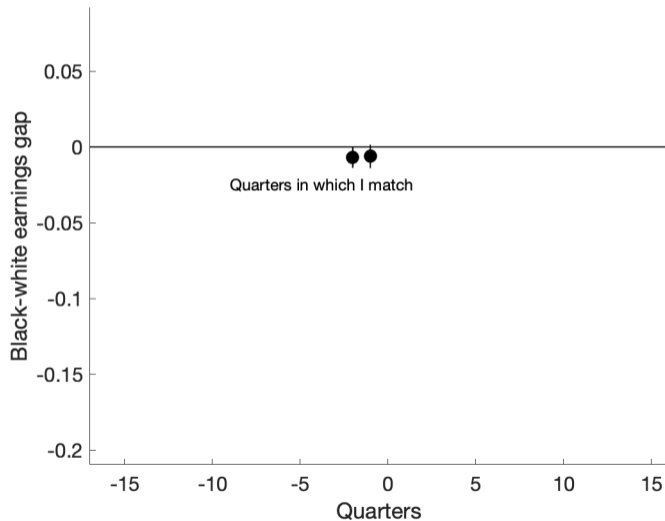
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Average weighted by number of Black workers

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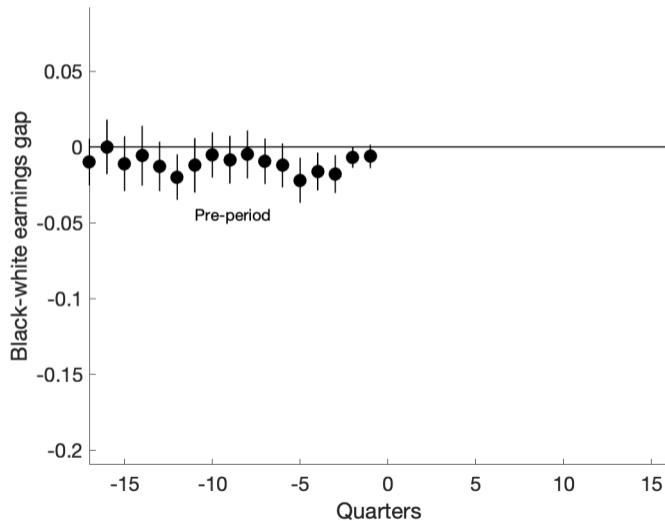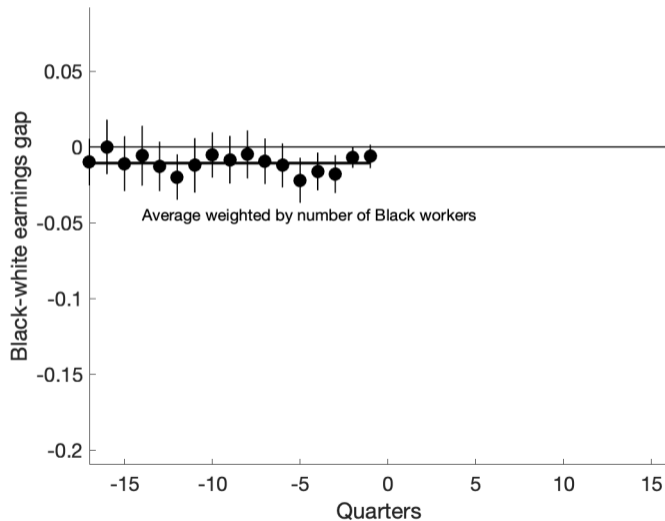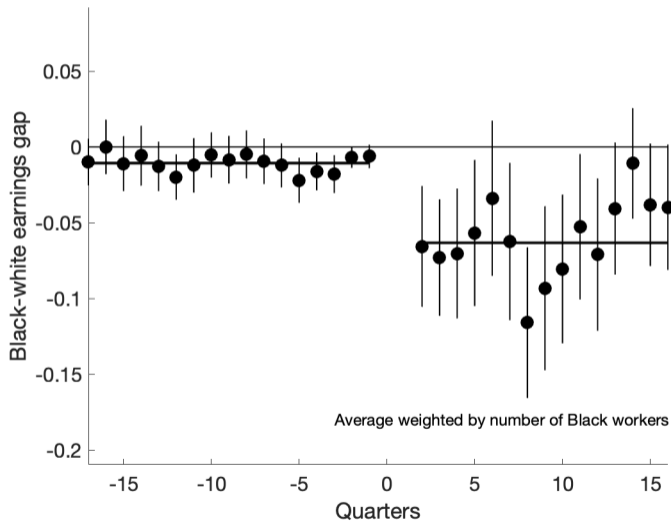
Earnings gaps among high-tenure matched mass layoff separators

Levels and gaps of mediating outcomes

	Quarters b/w jobs	Post-separation firm characteristics	
Black-white gap	**0.16**		
	(0.09)		
White	2.19		
	(0.08)		
N (Black)	2,600		
N (White)	6,100		
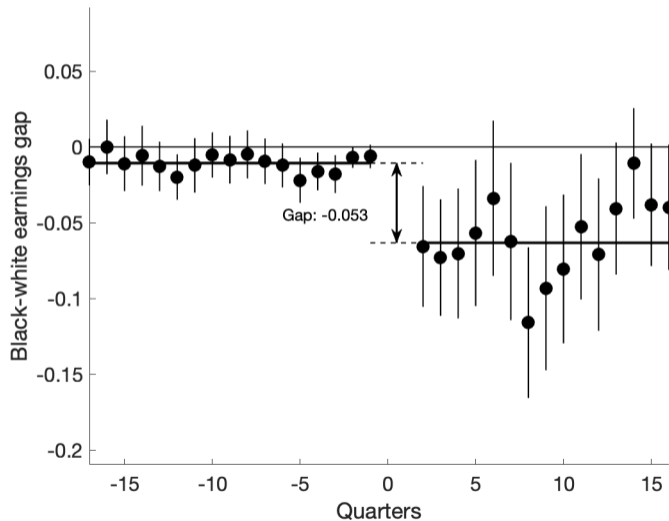
Levels and gaps of mediating outcomes

		Post-separation firm characteristics
	Quarters b/w jobs	Same sector
Black-white gap	**0.16**	**-0.015**
	(0.09)	(0.009)
White	2.19	0.475
	(0.08)	(0.012)
N (Black)	2,600	2600
N (White)	6,100	6100

Characteristics computed the quarter before the worker joins.

Levels and gaps of mediating outcomes

| | Quarters b/w jobs | Post-separation firm characteristics | |
		Same sector	Mean firm earnings
Black-white gap	**0.16**	**-0.015**	**-0.023**
	(0.09)	(0.009)	(0.014)
White	2.19	0.475	10.76
	(0.08)	(0.012)	(0.015)
N (Black)	2,600	2600	2600
N (White)	6,100	6100	6100

Characteristics computed the quarter before the worker joins.

Levels and gaps of mediating outcomes

| | Quarters b/w jobs | Post-separation firm characteristics | | |
		Same sector	Mean firm earnings	Share Black
Black-white gap	**0.16**	**-0.015**	**-0.023**	**0.075**
	(0.09)	(0.009)	(0.014)	(0.004)
White	2.19	0.475	10.76	0.136
	(0.08)	(0.012)	(0.015)	(0.003)
N (Black)	2,600	2600	2600	2600
N (White)	6,100	6100	6100	6100

Characteristics computed the quarter before the worker joins.

Event study: controlling for...
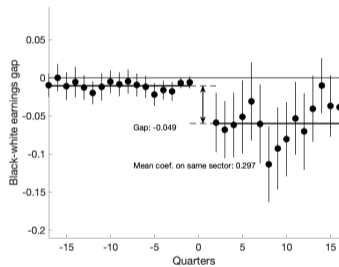
Same sector

Gap: -0.049

Event study: controlling for...

Same sector
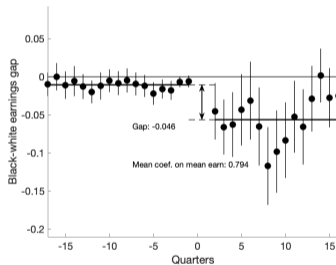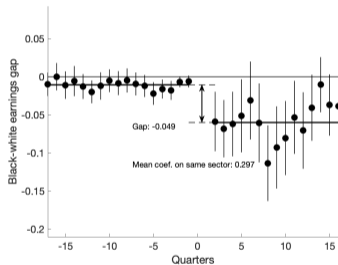
Mean firm earnings

Gap: -0.049

Gap: -0.046

Event study: controlling for...

Same sector

Mean firm earnings
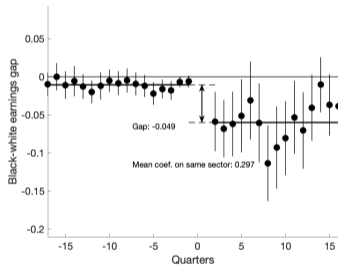
Share black

Gap: -0.049

▸ Coefficients on controls
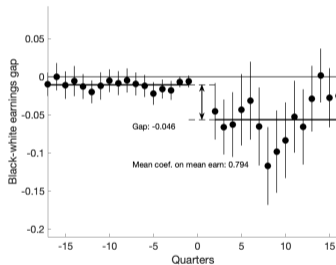
Gap: -0.046
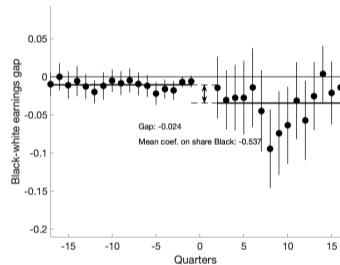
Gap: -0.024

Taking stock

What does share of Black workers proxy for?

- ▶ Amount of discrimination in hiring

Taking stock

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Taking stock

What does share of Black workers proxy for?

- ▶ Amount of discrimination in hiring
- ▶ Social networks
- ▶ $\Rightarrow$ affects policy conclusions, not necessarily normative concern

What is the remaining half?

- ▶ Other between-firm sorting?
- ▶ Within-firm?

Samples

Sample	Age	Female (%)	Tenure	Earn	Workers
All workers					
Black	39.8	55.5	19.2	10.54	5,145,000
White	41.2	48.9	23.5	10.79	31,200,000
High-tenure workers					
Black	47.2	56.6	46.3	10.98	1,450,000
White	47.3	46.5	46.6	11.14	13,590,000
High-tenure matched and reweighted separators					
Black	46.5	57.2	46.4	11.07	12,000
White	46.5	57.2	46.4	11.08	18,500
High-tenure matched and reweighted separators, mass layoff					
Black				11.04	2,600
White				11.05	6,100
High-tenure matched separators, mass layoff, same second firm (same quarter)					
Black				11.16	800
White				11.16	2,700

Event study: same second firm (in the same quarter)
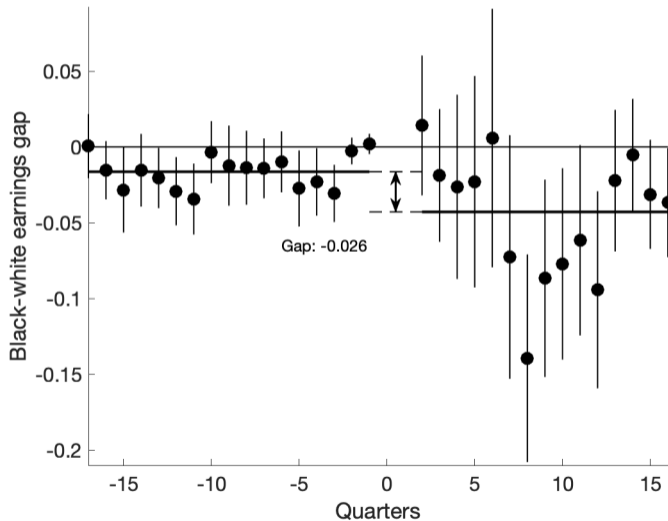
Interpretation

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Summing up:

- ▶ 5.3 log point gap
  - ▶ Closes to 2.4 log points controlling for share of Black workers ("half is between firm, mediated by share of Black workers")
  - ▶ Gap of 2.6 log points among workers joining same second firm ("half is within firm")

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Second unobservable:

- ▶ Same sector rules out large role for one observable form
- ▶ Share of Black workers labels between-firm—not obviously about productivity
- ▶ Within-firm holds fixed technology

Gaps in separations
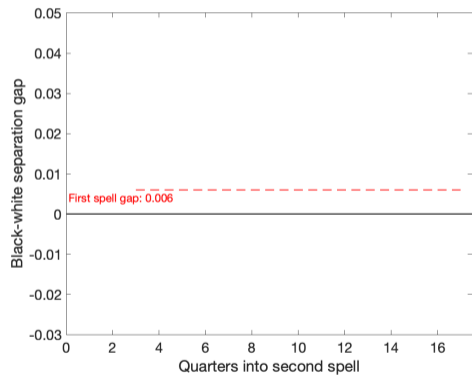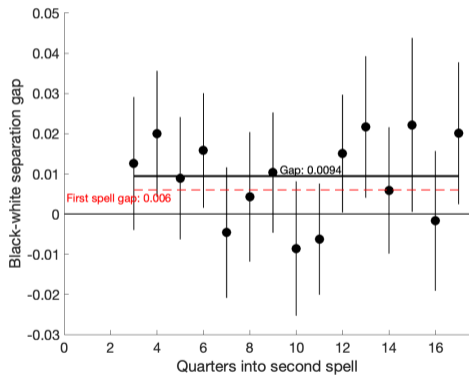
All

▸ Sample counts

Gaps in separations

All

▸ Sample counts

Gaps in separations

All

▸ Sample counts

Gaps in separations

All

EN
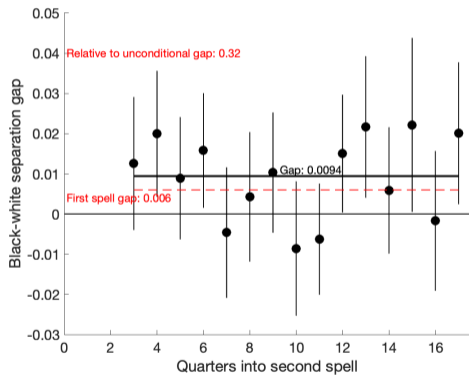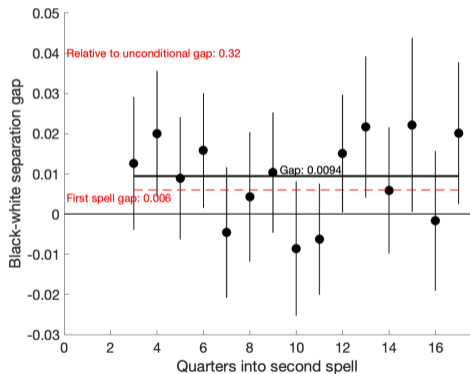
▸ Sample counts
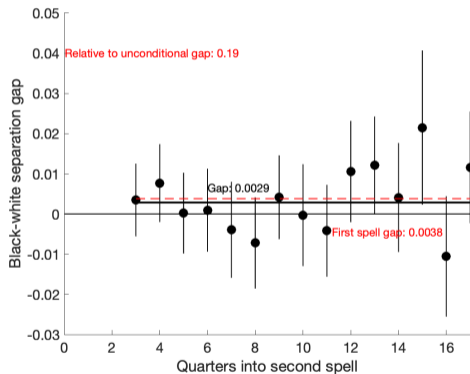
▸ White level

Outline

1. Data description, coding, and samples
2. Separation gap: heterogeneity and by tenure
3. A model of employer learning $+$ turnover
4. Outcomes in the second spell
5. **Welfare calculation**   ▸ Skip to end

Set-up

Search block:

- ▶ Workers are born unemployed
- ▶ Flow payoff to unemployment is b
- ▶ Find a job with probability λ
- ▶ All jobs pay w
- ▶ Workers live for A periods

Consumption (and curvature) block:

- ▶ No borrowing or saving
- ▶ Period utility is $u(\cdot)$ (CRRA, with coefficient γ)

Group difference:

- ▶ Probability that a job is destroyed depends on group membership and tenure: δ_t^g

Value functions and welfare calculation

Employed worker:

$$\underbrace{W(g, t, a)}_{\text{value of a job}} = \underbrace{u(w)}_{\text{flow payoff}} + \beta \underbrace{\delta_t^g U(g, a+1)}_{\text{lose job}} + \beta \underbrace{(1 - \delta_t^g) W(g, t+1, a+1)}_{\text{keep job}}$$

Unemployed worker:

$$\underbrace{U(g, a)}_{\text{value of u/e}} = \underbrace{u(b)}_{\text{flow payoff}} + \beta \underbrace{\lambda W(g, 0, a+1)}_{\text{find a job}} + \beta \underbrace{(1 - \lambda) U(g, a+1)}_{\text{remain u/e}}$$

Value functions and welfare calculation

Employed worker:

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Consumption equivalent, solve for c^g such that:

$$U(g,0) = \sum_{a=1}^{A} \beta^{a-1} u(c^g)$$

Compare c^w and c^b

Model parameters

Parameter	Description	Value	Source
β	Discounter	$0.95^{\frac{1}{4}}$	Convention
γ	CRRA curvature	1.5	Low, Meghir, Pistaferri (2010)
b	Flow value of u/e	0.4	Chodorow-Reich and Karabarbounis (2016)
λ	0.61	Job finding	Black rate, 2003-2019
δ^g	Job loss probability		This paper ("second spell")

Model results

	Black-white gaps		
	Unemployment (p.p)	PDV of cons. (%)	Certain cons.-equivalent (%)
Baseline (EN only)	0.5	-0.3	-0.6
All separations	2.0	-1.2	-2.1
$b = 0.65$	0.5	-0.2	-0.2
$b = 0.9$	0.5	-0.2	-0.2
$f = .3757$	0.4	-0.3	-0.5
$\gamma = 4$	0.5	-0.3	-1.3

Summary

Some of Black-white disparities in unemployment and earnings are discrimination

- ▶ Hard to get to **quantities** from audit studies
- ▶ Hard to deal with **unobservables** in observational data

This paper: at high-enough tenure, firms have learned about worker unobservables

- ▶ What happens in the next job?

Results:

- ▶ Earnings gaps: 5.3 log points (compared to 16 log point gap among high-tenure workers)
  - ▶ About half is between-firm, mediated by share of Black workers
  - ▶ About half is within-firm
- ▶ Separation gaps: first spell gaps re-emerge
  - ▶ About 0.6% of lifetime consumption
  - ▶ 20% of **unconditional** separation gaps

Thank You

Sample shares: share of workers that are Black
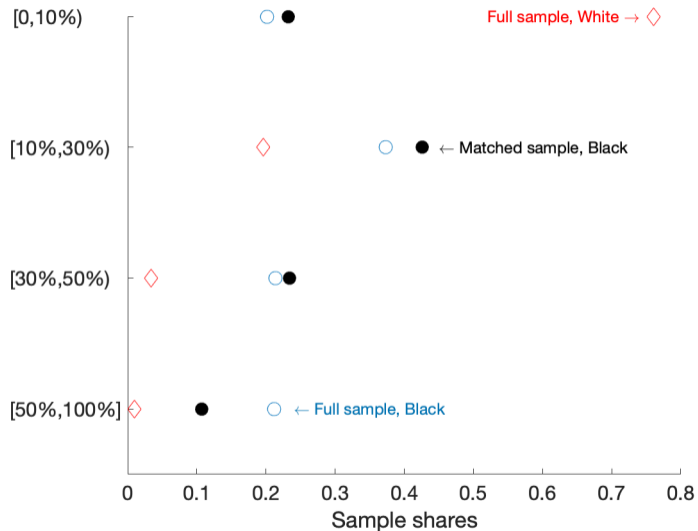
Sample shares: sectors

Sample shares
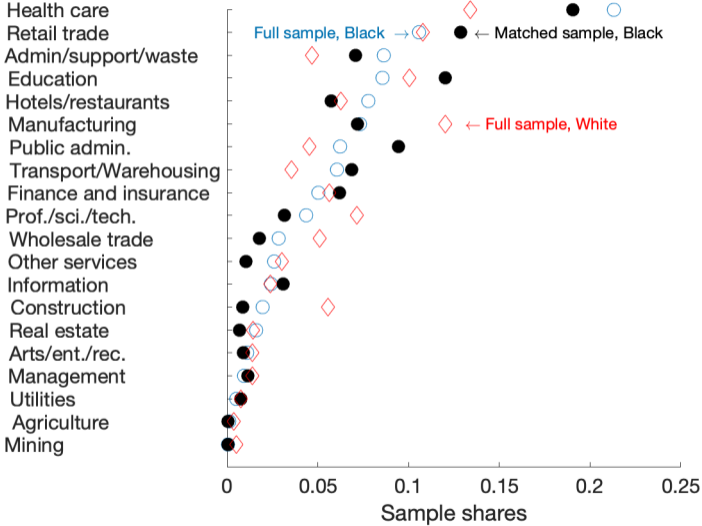
Separation gap heterogeneity: employer size
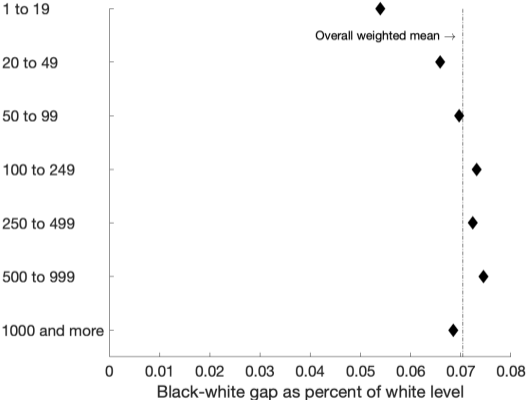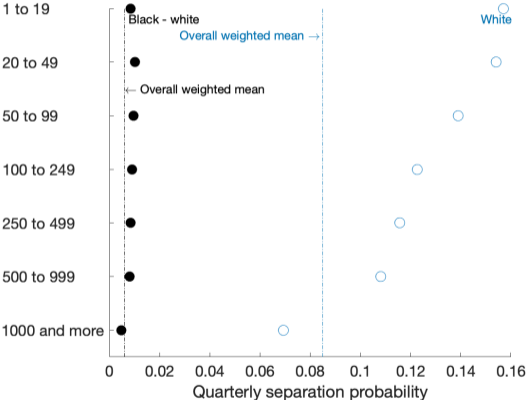
▸ Back to gaps

Separation gap heterogeneity: gender

Sample counts: mass layoff
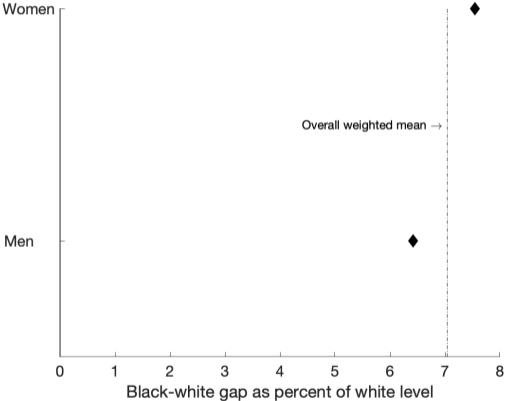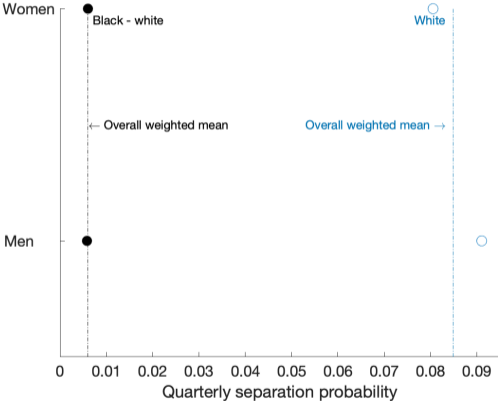
White workers
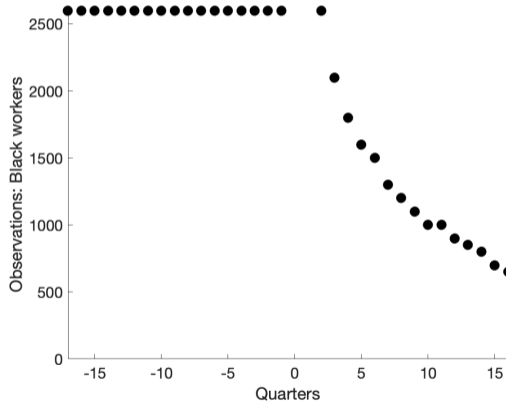
Black workers

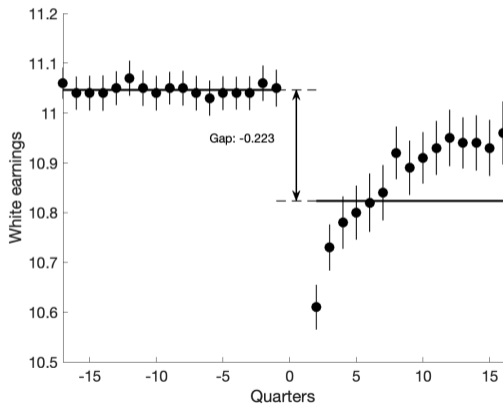# Sample counts: mass layoff, same second firm

White workers
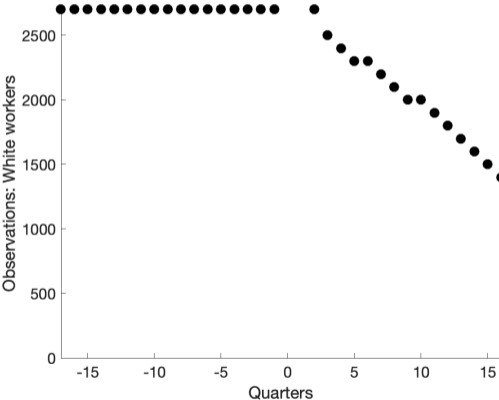
Black workers
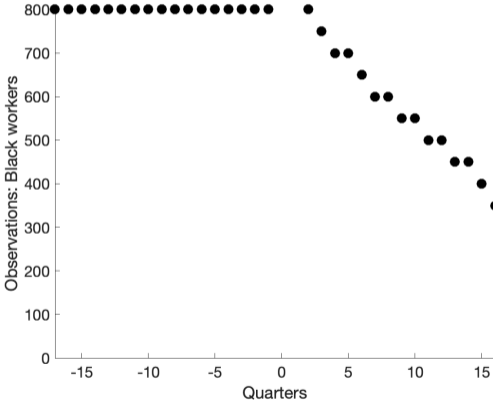
▸ Back to mass layoff, same second firm

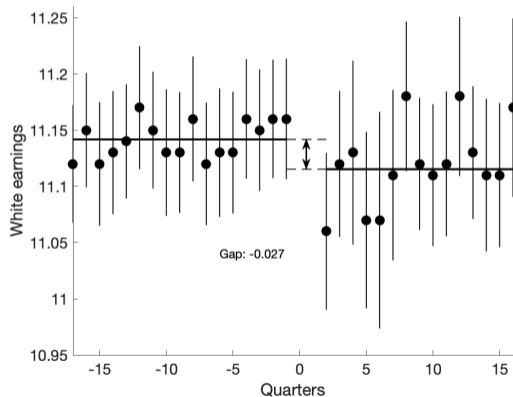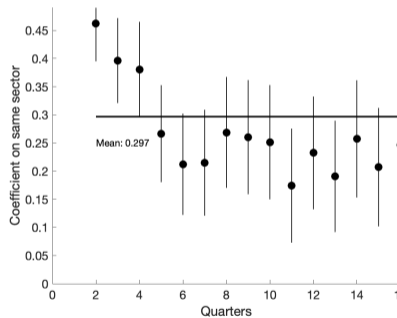# White level

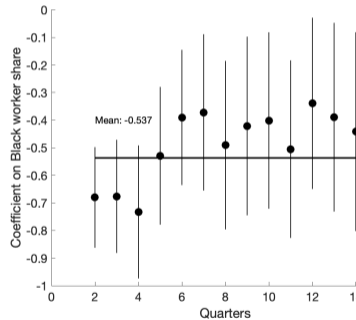Mass layoff

Mass layoff, same next firm
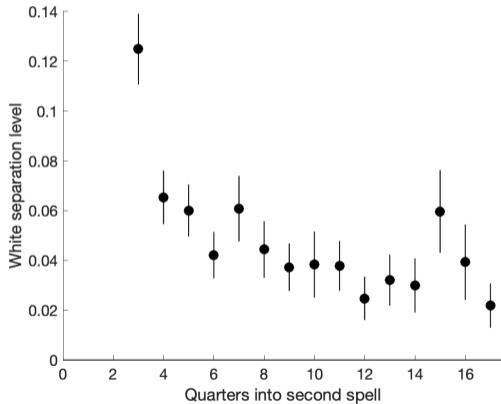
Coefficients on controls

Same sector

Mean firm earnings
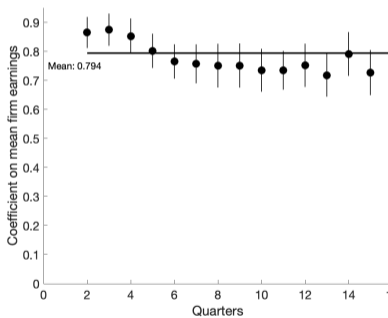
Share black

▸ Back to conditional event study

White level: mass layoff separations

All separations

EN separations