Employment Inequality:

Why Do the Low-Skilled Work Less Now?

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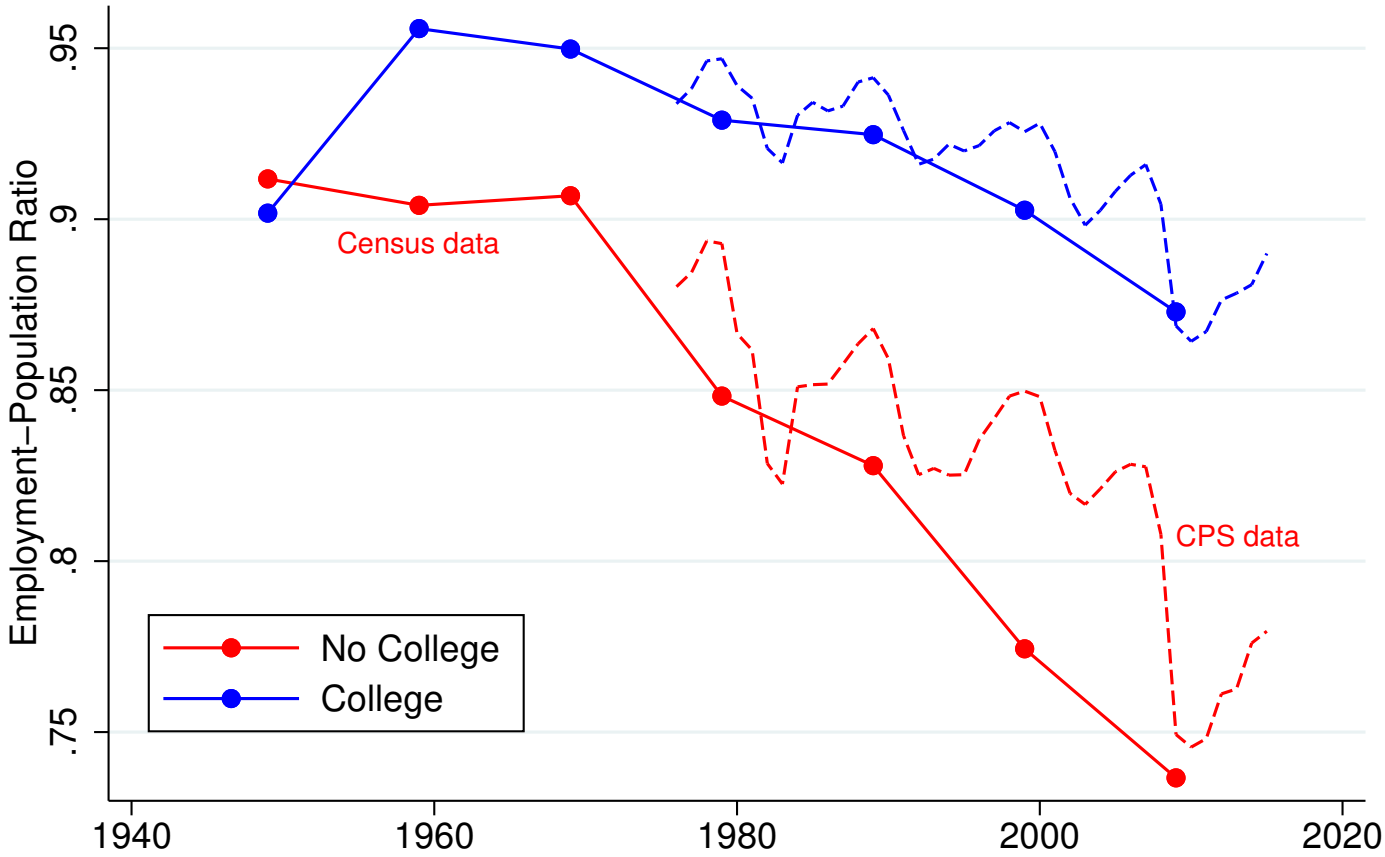
January 6, 2019

This material is based upon work supported by the National Science Foundation Graduate Research Fellowship Program under Grant No. DGE-1144086.

Widening Employment Gap



Men, ages 25–54, excluding instituationalized. 'College' is one year or more.
Census (solid) demographically adjusted for age; matched–CPS (dashed).

▸ Disaggregated

Why?

1. **Supply Shift**
   - Disability insurance (Barnichon and Figura, 2015)
   - Video games (Aguiar et al. 2017)
   - Health (Krueger, 2017; Case and Deaton, 2017)
2. **Demand Shift**
   - Automation (Autor et al.1998; Acemoglu and Restrepo, 2017)
   - Trade (Autor et al. 2013; Pierce and Schott, 2016)
3. **Search Frictions**
   - Search frictions important feature of the labor (Blanchard and Diamond, 1989; Davis et al. 2013; Hornstein & Kudlyak, 2016)
   - Not looked at for this question

This Paper Decomposes Role of Each Channel

- **Document novel empirical finding**
  - Since 1970s high-skilled labor market became tighter
- **Build labor search model**
  - Heterogeneous permanent characteristic (ability, wealth)
  - College choice
- **Main findings:**
  - Supply shift no effect
  - Demand shift large effect
  - Search frictions go the wrong way

Merge Datasets to Document Tightness by Skill

1. **Vacancy data by occupation**
   - BLS pilot study, 4 "representative" states, 1979
   - Hobijn and Perkowski (2016) data, 2005-2013

2. **Job-seekers by education**
   - IPUMS-CPS
   - Men, ages 25-54

- **Link datasets classifying occupations by education**
  - $z \equiv$ share of employed men with some college
  - $z^* \equiv$ cutoff for high-skill
  - Baseline $z^* = 0.6$ ▸ Occupations

Labor Market Tightness

- **Unemployment Measure:**

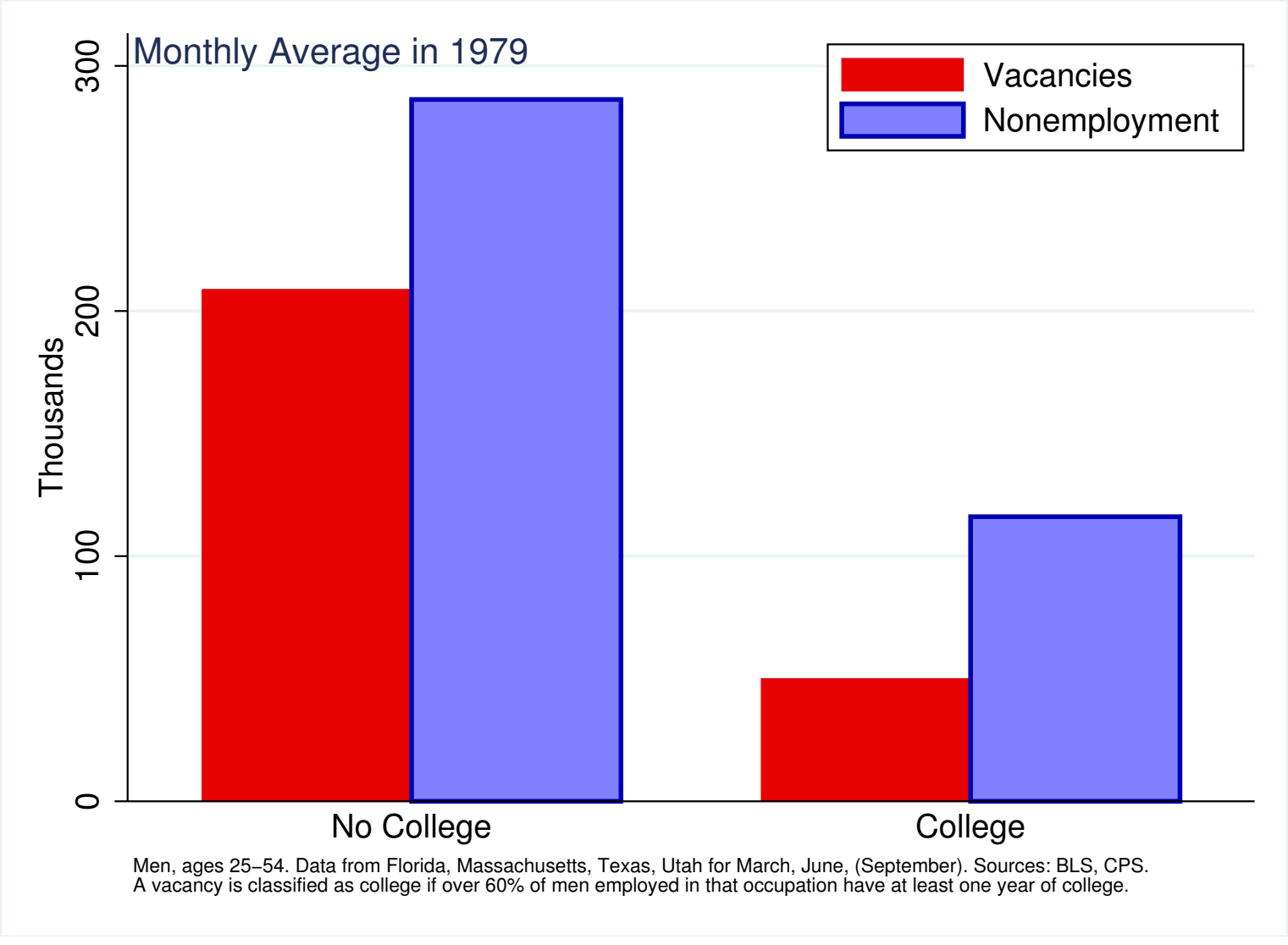
$$\theta_j^u = \frac{V_j}{U_j}$$

- **Nonemployment Measure:**

$$\theta_j^n = \frac{V_j}{U_j + NLF_j}$$

where $j \in \{\text{Non-college } (L), \text{College}(H)\}$

Labor Market Tightness in 1979



Men, ages 25–54. Data from Florida, Massachusetts, Texas, Utah for March, June, (September). Sources: BLS, CPS.
A vacancy is classified as college if over 60% of men employed in that occupation have at least one year of college.

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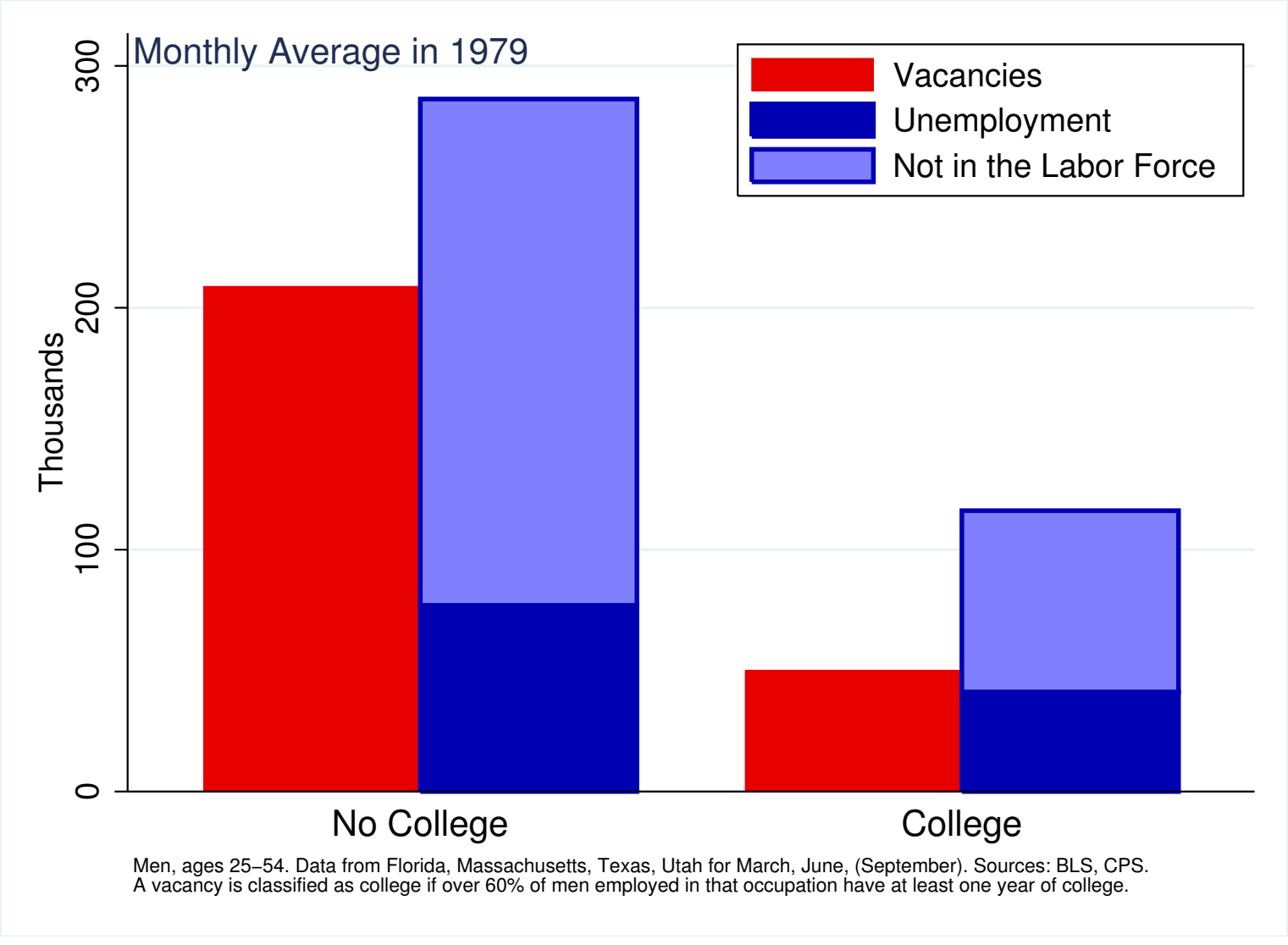

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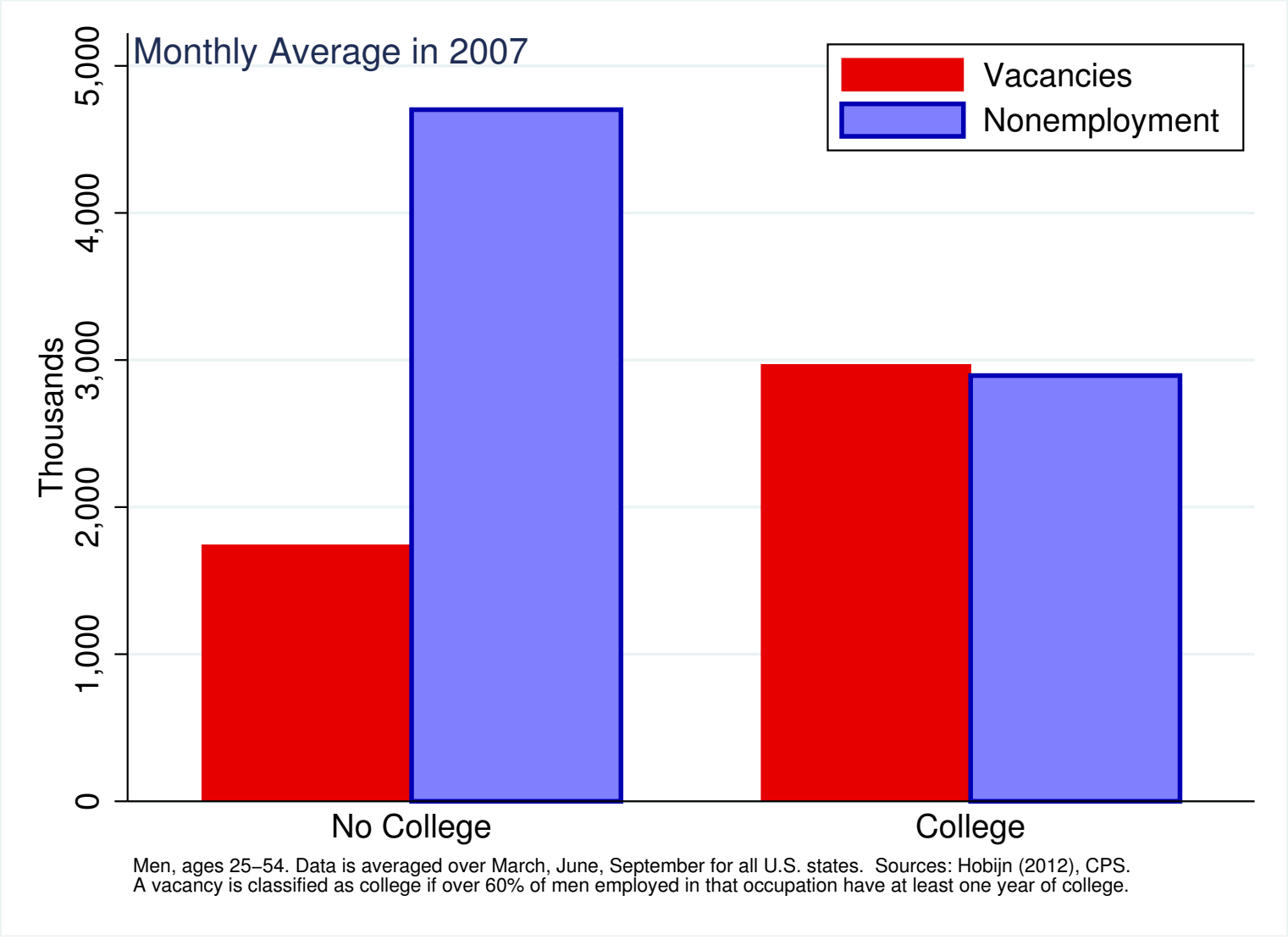
Labor Market Tightness in 2007



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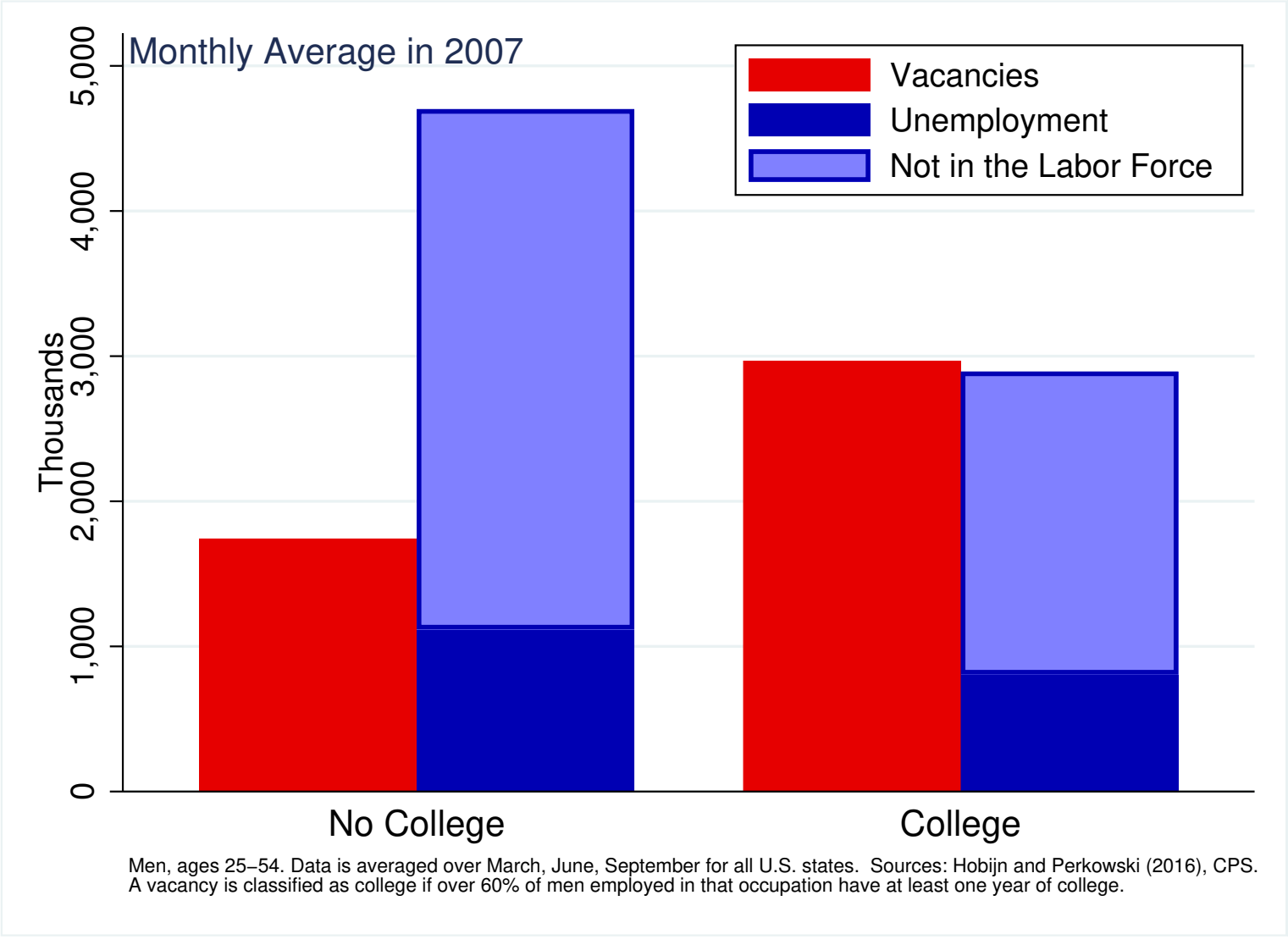

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A vacancy is classified as college if over 60% of men employed in that occupation have at least one year of college.

Divergence of Labor Market Tightness

Measure	Year	θ_H	θ_L	Percent Gap
Nonemployment	1979	0.44	0.73	**-40**
Nonemployment	2007	1.03	0.37	**177**
Unemployment	1979	1.22	2.71	**-55**
Unemployment	2007	3.68	1.56	**136**

- Low-skilled labor market slightly tighter in 1970s
- High-skilled labor market substantially tighter in 2000s

▸ By State ▸ By Year ▸ With Women ▸ Education Cutoff

Model: Production Technology

- Ability $x \in \{x_1 < x_2 < ... < x_M\}$ approximately log-normal
- The occupation-specific production function per worker is:

$$y_{jt}(x) = \begin{cases} A_L & \text{if } j = L \\ A_H x & \text{if } j = H \end{cases}$$

↑ key demand shifters

- A_L and A_H technology in low- and high-skilled jobs

Model: Matching Technology

- Job finding rate $f_{jt}(\theta) = \phi_j \theta_{jt}(x)^{1-\alpha}$
  search friction parameter $\uparrow$

- Exogenous separation rates $\delta_j \in (0, 1)$

Model: College Choice

- Value of being nonemployed:

$$N_{jt}(x) = \max\left[N^c_{Lt}(x), N^c_{Ht}(x)\right]$$

$$N^c_{jt}(x) = b_j + \beta\left[f_{jt}(\theta)W_{jt+1}(x) + (1 - f_{jt}(\theta))N_{jt+1}(x)\right]$$

$\uparrow$ key supply shifters

Summary of Structural Framework

- **Labor Search Model:**
  - Supply shifters b_j
  - Demand shifters A_j
  - Search friction parameters ϕ_j
  - Exogenous separation rates δ_j
- **Next Steps:**
  - Calibrate two steady states: 1979 and 2007
  - Target moments, one of which is labor market tightness
  - Uncover how structural parameters changed
  - How does each channel contribute to employment rate gap?

Disentangling the Mechanisms

1. Matching Efficiency:

$$\phi_j = \frac{f_j}{\theta_j^{1-\alpha}}$$

2. Value of Leisure and Automation/Trade:

   Two equations:

   - Job creation curve
   - Wage equation

   Two unknowns:

   - Value of leisure b_j
   - Labor-augmenting technology A_j

3. Ability Parameters
   - Recall $x \in \{x_1 < x_2 < ... < x_M\}$ approximately log-normal
   - Choose μ_x and σ_x to match share of college prime-age men

Calibrate 1970s and 2000s Steady States

Parameter	Explanation	Value	Source
β	discount factor	0.9967	monthly rate
$\alpha_{j,t}$	matching elasticity	0.62	Veracierto (2011)
$\pi_{j,t}$	bargaining weight	0.62	Hosios condition
$\kappa_{L,t}$	vacancy posting cost	0.5	share of 1979 offer wages
$\delta_{L,79}$	separation rate	0.0223	CPS
$\delta_{L,07}$	separation rate	0.0326	CPS
$\delta_{H,79}$	separation rate	0.0121	CPS
$\delta_{H,07}$	separation rate	0.0162	CPS
$\phi_{L,79}$	match efficiency	0.1892	CPS job finding rate $= 0.1679$
$\phi_{L,07}$	match efficiency	0.2118	CPS job finding rate $= 0.1451$
$\phi_{H,79}$	match efficiency	0.2698	CPS job finding rate $= 0.1975$
$\phi_{H,07}$	match efficiency	0.1590	CPS job finding rate $= 0.1608$
$b_{L,79}$	**value of leisure**	**0.31**	**calibrated**
$b_{L,07}$	**value of leisure**	**0.26**	**calibrated**
$b_{H,79}$	**value of leisure**	**0.61**	**calibrated**
$b_{H,07}$	**value of leisure**	**0.60**	**calibrated**
$A_{L,79}$	**technology**	**1.06**	**calibrated**
$A_{L,07}$	**technology**	**0.68**	**calibrated**
$A_{H,79}$	**technology**	**0.64**	**calibrated**
$A_{H,07}$	**technology**	**1.13**	**calibrated**
μ_x	**mean ability**	**0.36**	**calibrated**
σ_x	**standard dev of ability**	**0.144**	**calibrated**

Targeted Moments

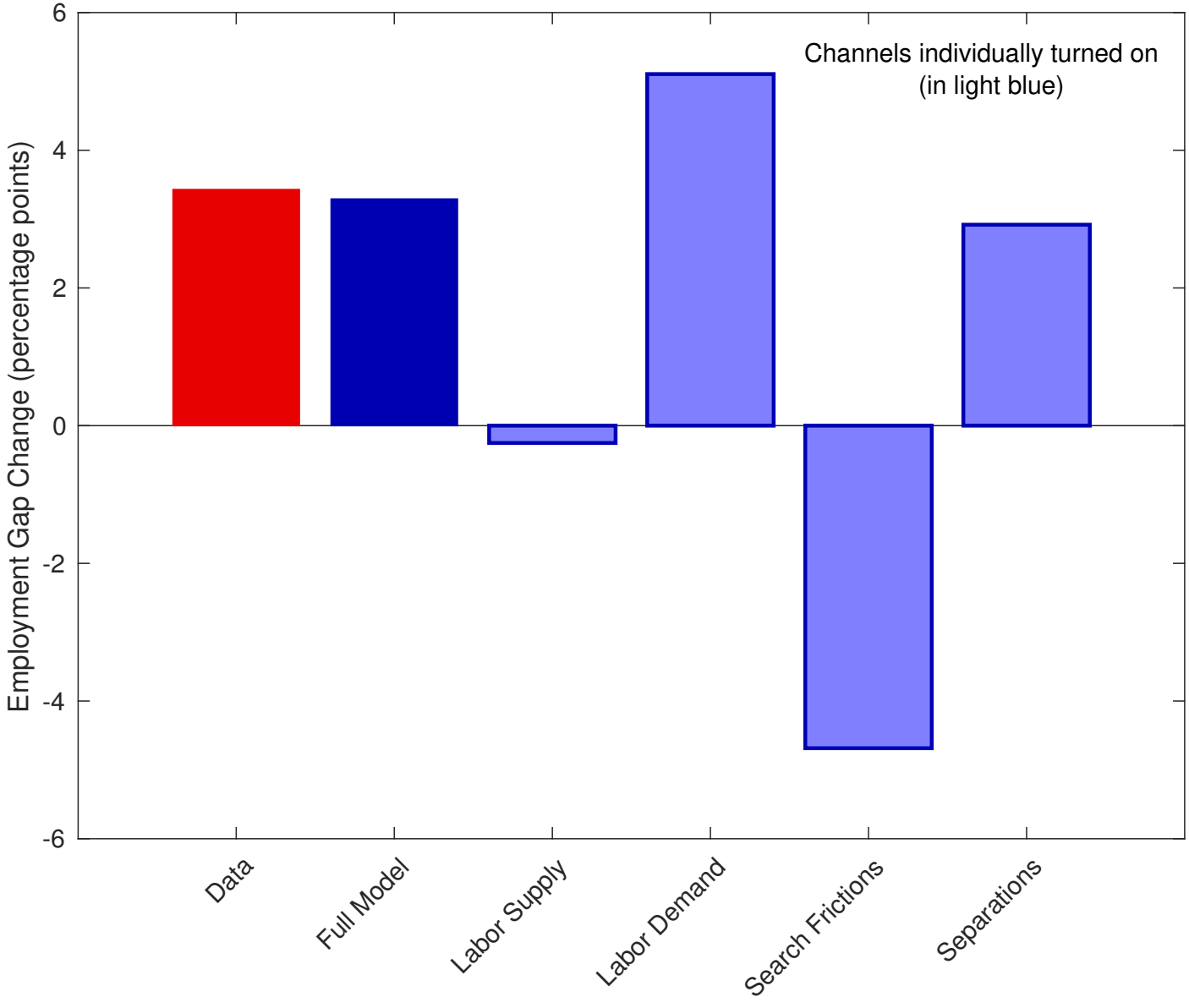
Moment	Explanation	Year	Model	Data	Model Gap	Data Gap
$\theta_{L,79}$	L tightness	1979	0.73	0.73		
$\bar{\theta}_{H,79}$	H tightness	1979	0.43	0.44	-40%	-40%
$\theta_{L,07}$	L tightness	2007	0.37	0.37		
$\bar{\theta}_{H,07}$	H tightness	2007	1.06	1.03	187%	177%
$\omega_{L,79}$	L wages	1979	1.00	1.00		
$\bar{\omega}_{H,79}$	H wages	1979	1.00	1.00	0%	0%
$\omega_{L,07}$	L wages	2007	0.63	0.63		
$\bar{\omega}_{H,07}$	H wages	2007	1.60	1.60	149%	154%
$\frac{100\times(M-\xi)}{M}$	H share	1979	40%	43%		
$\frac{100\times(M-\xi)}{M}$	H share	2007	90%	56%		

▸ Wage Gap

Non-Targeted Moments

Moment	Explanation	Year	Model	Data	Model Gap	Data Gap
$e_{L,79}$	L employment rate	1979	88%	89%		
$\bar{e}_{H,79}$	H employment rate	1979	94%	95%	5.9 pp	5.4 pp
$e_{L,07}$	L employment rate	2007	82%	83%		
$\bar{e}_{H,07}$	H employment rate	2007	91%	92%	9.2 pp	8.8 pp
			Difference		3.3 pp	3.4 pp

Counterfactuals



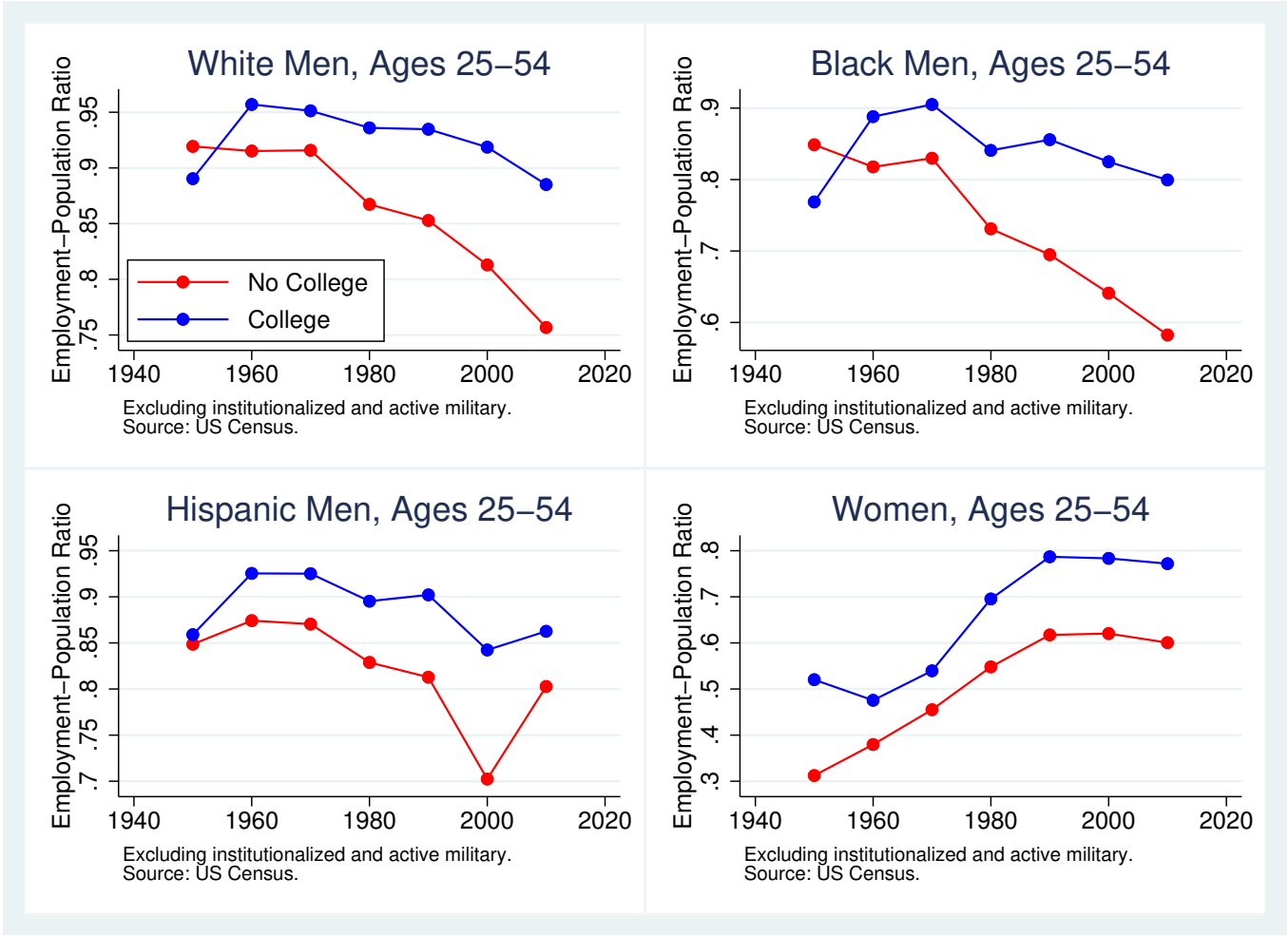
Robustness

- Different education cutoffs ▸ Details
- Alternative vacancy data ▸ Details
- Matching efficiency with unemployment measure ▸ Details
- Bargaining power greater for high-skilled ▸ Details
- Vacancy posting costs greater for high-skilled ▸ Details
- No college choice: college share fixed at 40% ▸ Details

Conclusion

- Why are lower skilled men not working today?
- Document since 1970s high-skilled labor market tighter
- Build search model and calibrate to empirical finding
- Main findings:
  - Supply shift no effect
  - Demand shift large effect
  - Search frictions go the wrong way

Employment Gap: Disaggregated



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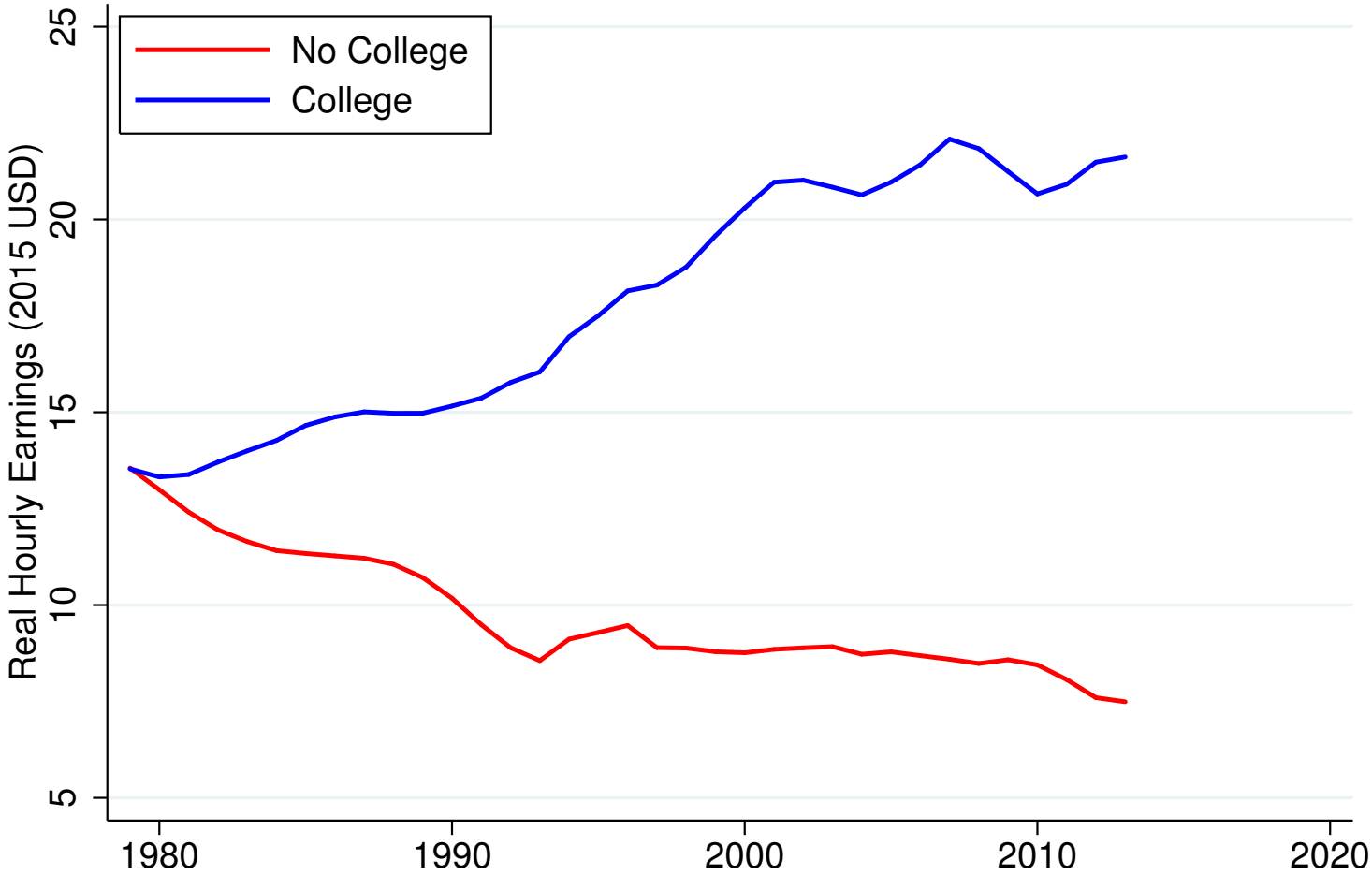
Demand Shift Evidence: Widening Wage Gap



Men, ages 25–54, excluding armed forces. 3–year moving average. Sources: CPS, FRED.

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Baseline Vacancy Categories, $z^* = 0.6$

BLS Pilot Vacancy Data (2-digit 1977 SOC)	**Hobijn and Perkowski (2016) Vacancy Data** (2-digit 2000 SOC)
High-Skilled Occupations	
Executive, Administrative & Managerial	Management
Engineers & Architects	Business and Financial Operations
Natural Scientists & Mathematicians	Computer & Mathematical Science
Social Scientists, Social Workers, Religious Workers & Lawyers	Architecture and Engineering
Teachers, Librarians & Counselors	Life, Physical & Social Science
Health Diagnosing & Treating Practitioners	Community and Social Services
RNs, Pharmacists, Dietitians, Therapists & Physicians Assistants	Legal
Writers, Entertainers, Artists & Athletes	Education, Training & Library
Health Technologists & Technicians	Arts, Design, Entertainment, Sports & Media
	Healthcare Practitioners & Technical
	Healthcare Support
	Protective Service
	Personal Care & Service
	Sales & Related
	Office & Administrative Support
	Installation, Maintenance & Repair
Low-Skilled Occupations	
Marketing & Sales	Food Production & Serving Related
Clerical Occupations	Building & Grounds Cleaning & Maintenance
Service Occupations	Farming, Fishing, and Forestry
Construction & Extractive Occupations	Mechanics & Repairers
Agricultural, Forestry, Fishers & Hunters	Production Work Occupations
Transportation & Material Moving	Material Handlers, Equipment Cleaners & Laborers
Construction & Extraction	
Production	

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Labor Market Tightness by State in 1979

Florida	-30%
Massachusetts	-37%
Texas	-44%
Utah	-82%

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Divergence of Labor Market Tightness

Hobijn and Perkowski (2016) and CPS Data

Year*	θ_H	θ_L	Percent Gap
2005	0.848	0.314	170
2006	0.898	0.395	128
2007	1.026	0.370	177
2008	0.805	0.266	203
2009	0.386	0.100	286
2010	0.466	0.127	268
2011	0.458	0.158	191
2012	0.579	0.204	184
2013	0.581	0.278	135

*Vacancy and non-employment data are the average over 3 months in the second quarter of the reference year.

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Labor Market Tightness Including Women

Measure	Year	θ_H	θ_L	Percent Gap
Unemployment	1979	0.5891	1.0574	**-44.3**
Unemployment	2007	1.7888	0.8768	**104**

- Low-skilled labor market slightly tighter in 1970s
- High-skilled labor market substantially tighter in 2000s

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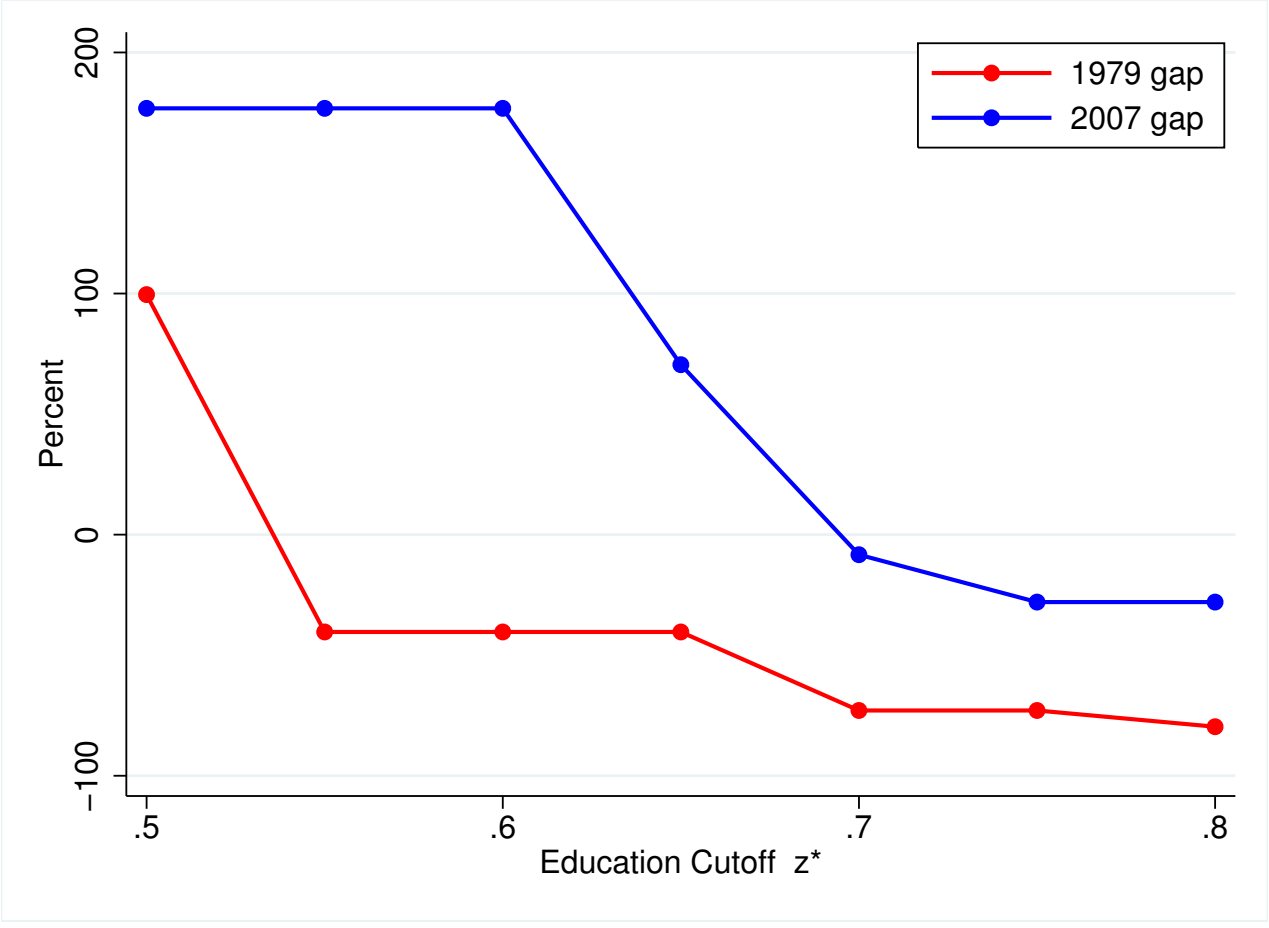
Tightness Gap by Education Cutoff: θ^n Measure



- Regardless of the cutoff, tightness gap is larger today.

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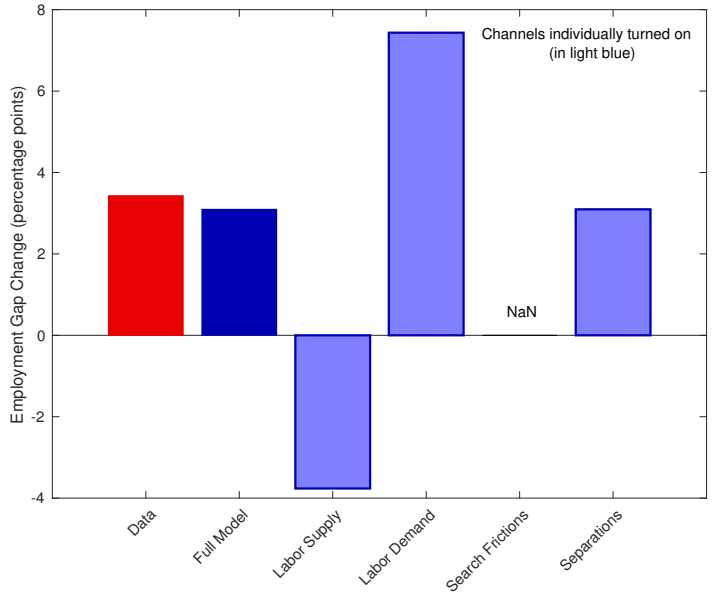
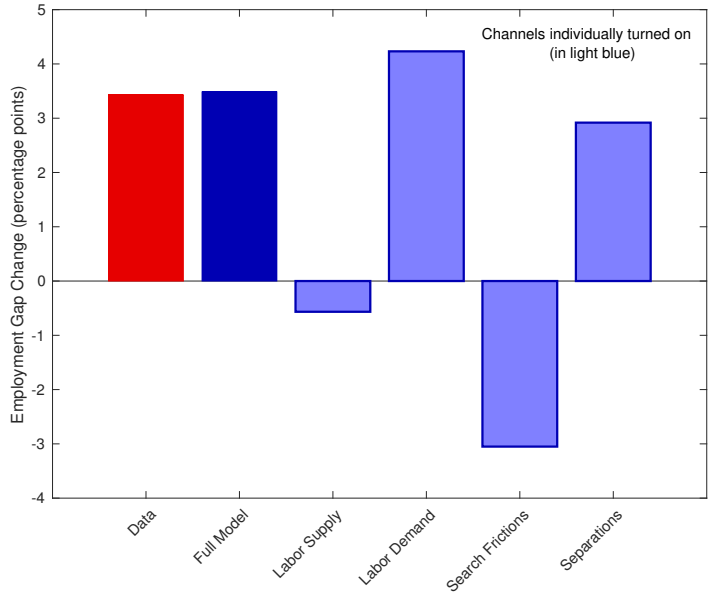
Robustness to Education Cutoff

$z^* = 0.5$



$z^* = 0.65$



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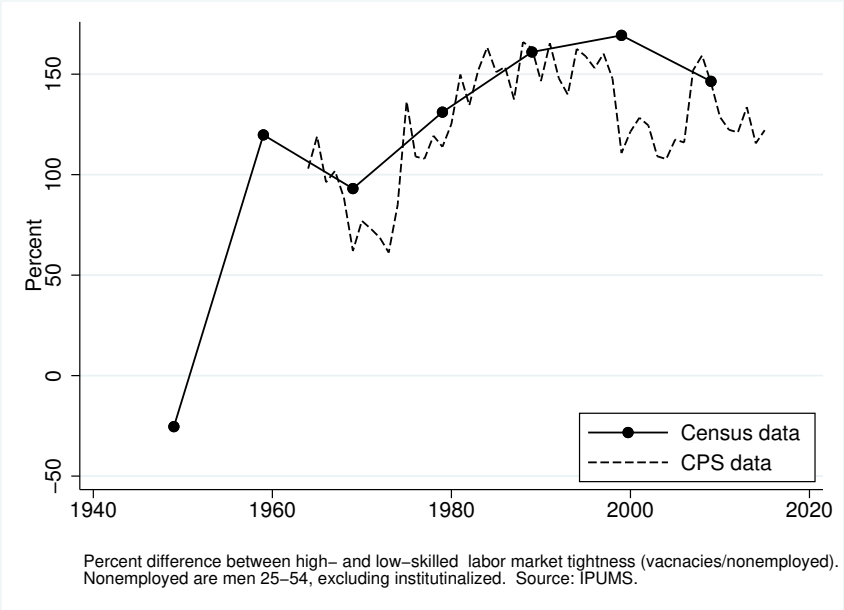
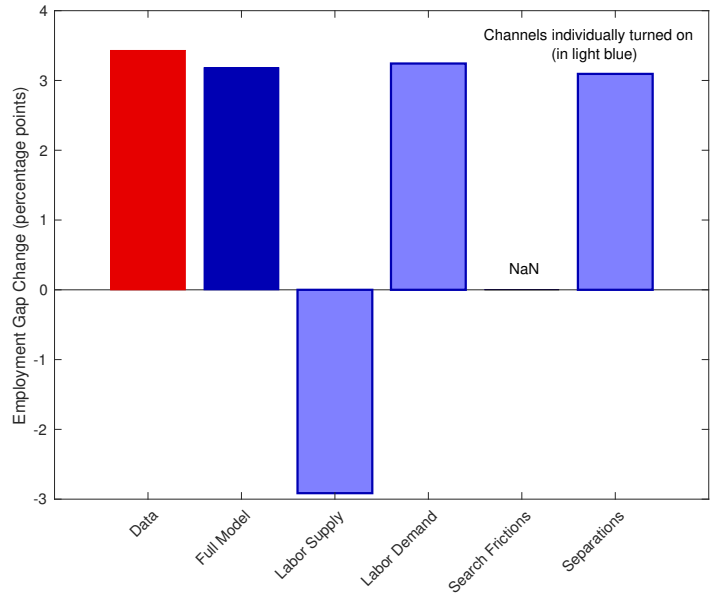
Robustness to Alternative Tightness Data

Tightness Gap



Percent difference between high– and low–skilled labor market tightness (vacnacies/nonemployed). Nonemployed are men 25–54, excluding institutinalized. Source: IPUMS.

Counterfactuals



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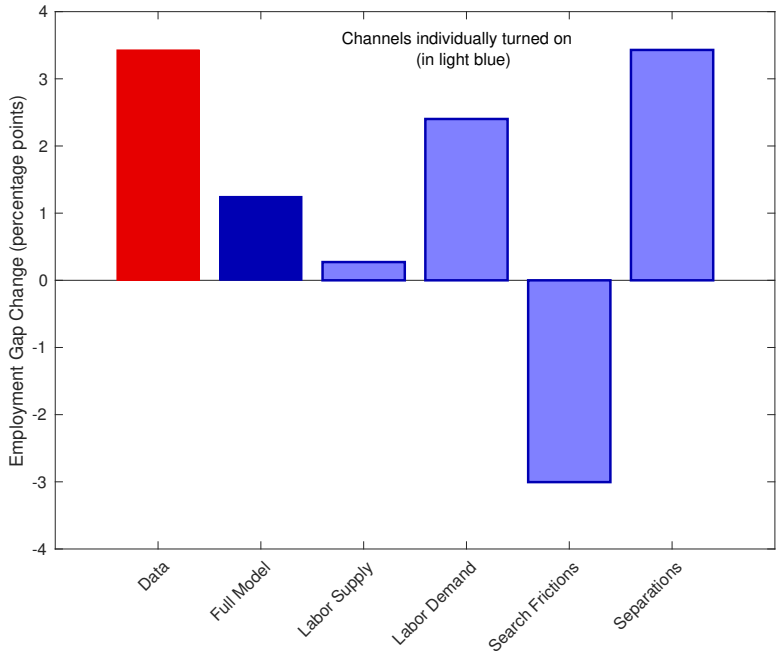
Robustness to Unemployment Tightness Measure

Parameter	Explanation	Value	Source
$\phi_{L,79}$	match efficiency	0.2674	CPS finding rate $= 0.2732$
$\phi_{L,07}$	match efficiency	0.2952	CPS finding rate $=0.2808$
$\phi_{H,79}$	match efficiency	0.3602	CPS finding rate $= 0.2946$
$\phi_{H,07}$	match efficiency	0.2214	CPS finding rate $= 0.2762$



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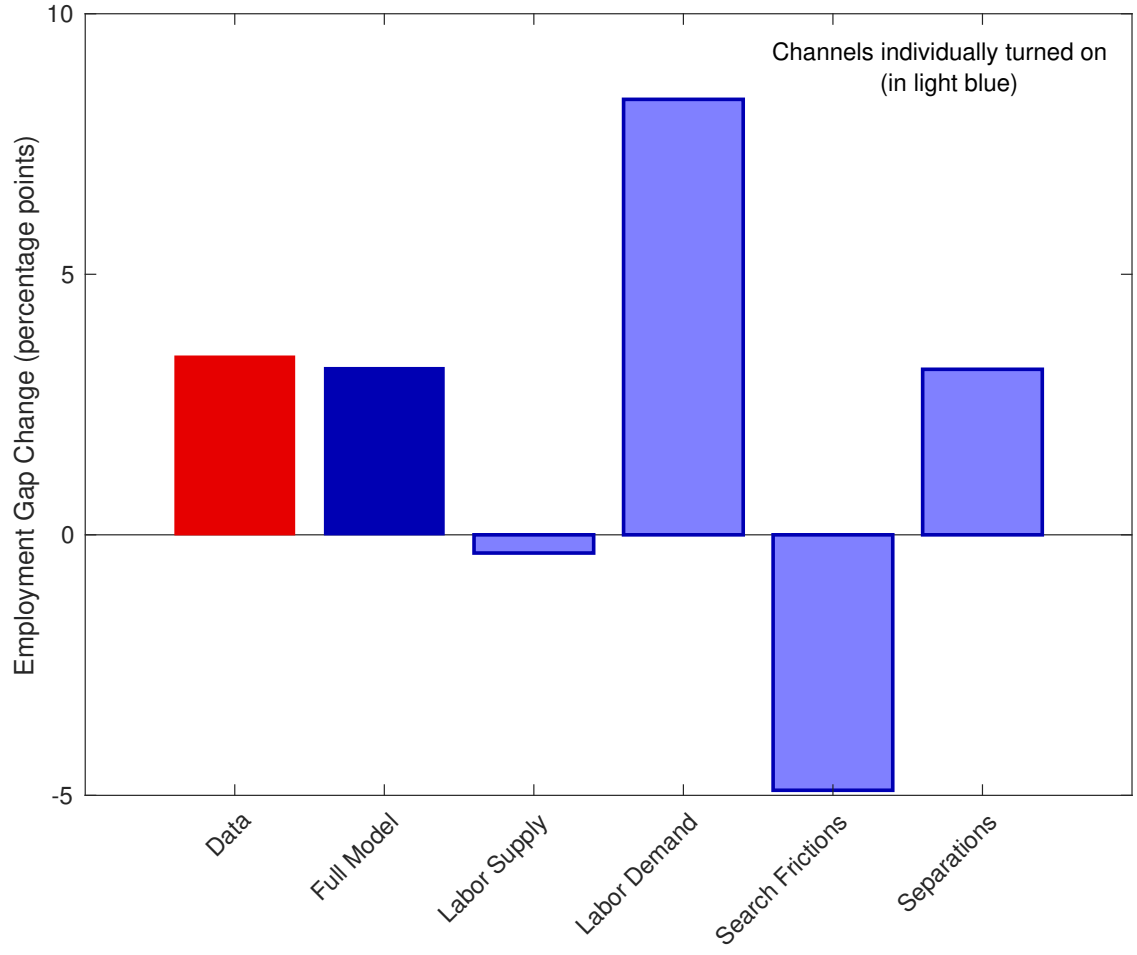
Robustness to Bargaining Power Parameters

$\pi_L = 0.52$, $\pi_H = 0.72$



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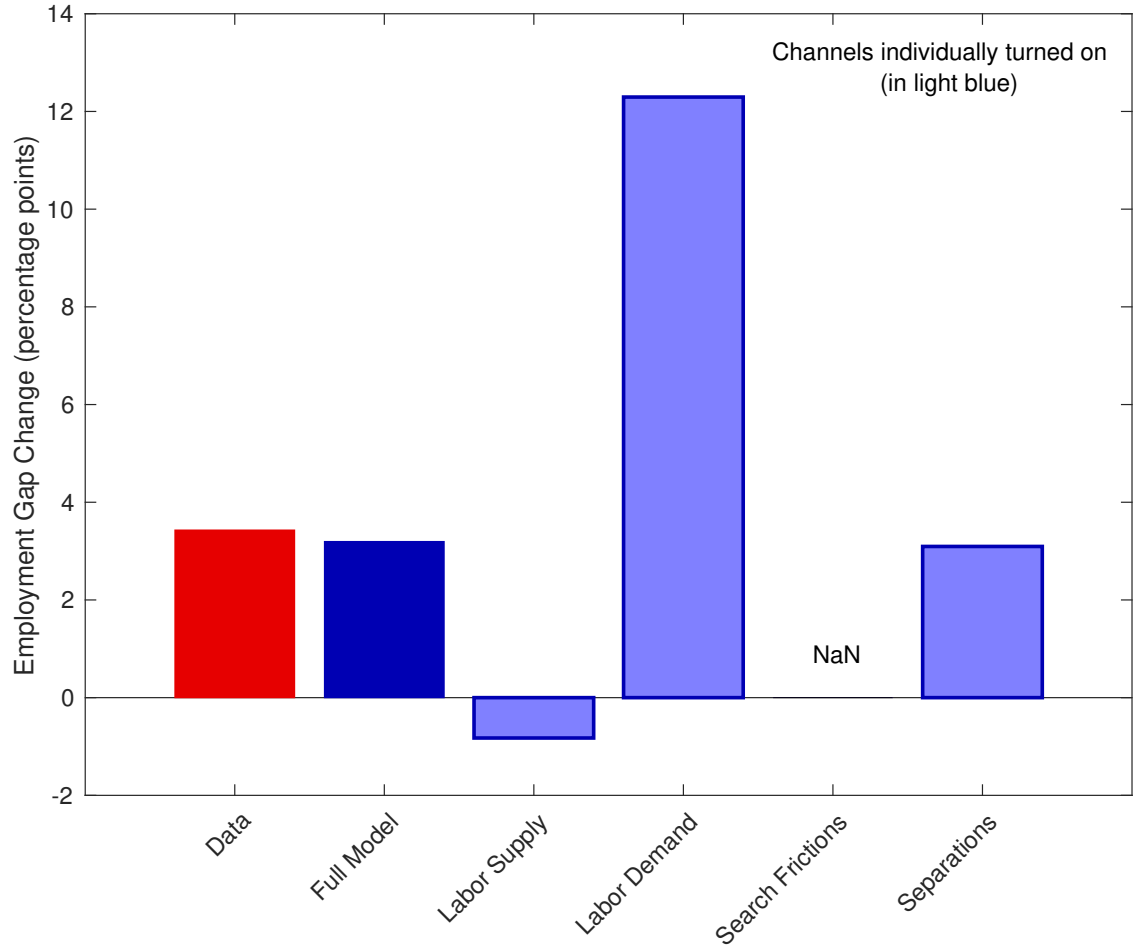
Robustness to Posting Cost Parameters

$\kappa_L = 0.3$, $\kappa_H = 0.7$



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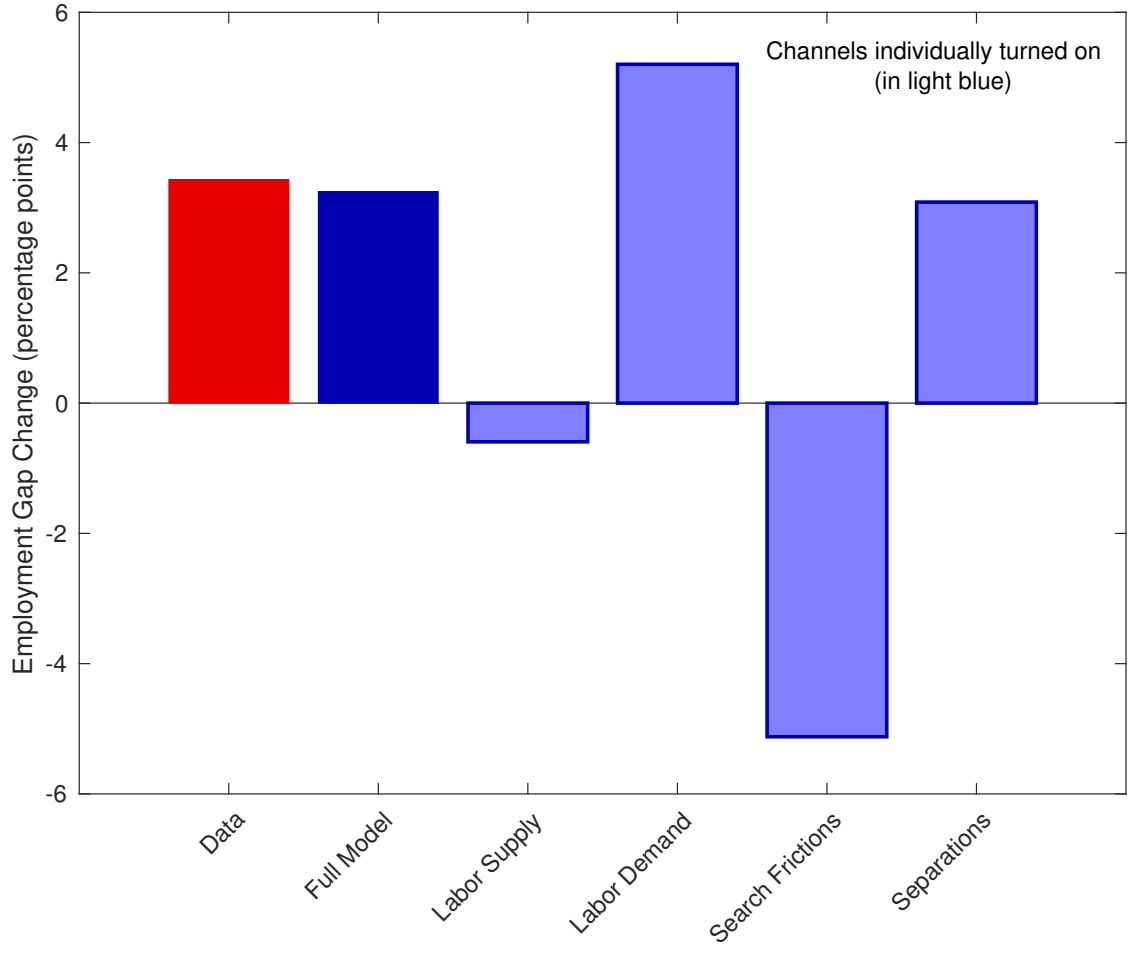
Robustness to College Share Fixed at 40 Percent



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