Equilibrium Unemployment: The Role of Discrimination

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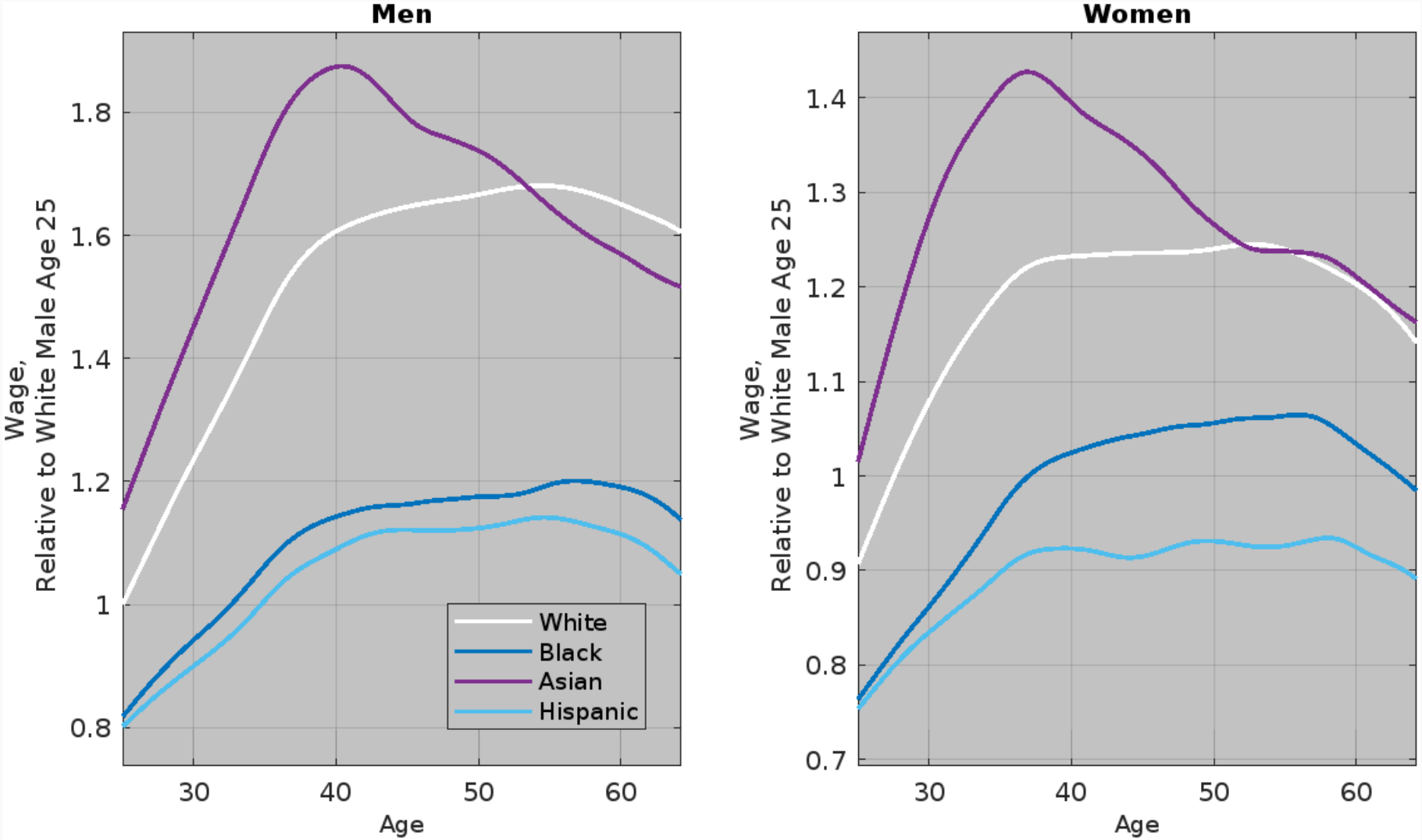
1. Introduction

Large variation in life cycle labor market outcomes



This paper

- Questions: Which factors determine outcome gaps between groups? Role of discrimination?
  - A structural model: a life-cycle Mortensen-Pissarides (MP) model with learning-by-doing human capital accumulation and nonparticipation
- Model is used to reverse engineer human capital and matching efficiency parameters needed to exactly replicate group-specific wage and job-finding rates.
- Structural decomposition
- Results: Groups differ systematically in initial human capital + returns to experience + job destruction rates + matching efficiencies
  - All these differences have direct impact on outcomes, and the impact is amplified through firms' actions

2. Life-cycle search and matching model

Preliminaries: Workers

- Workers maximize expected life time utility and are risk neutral
  - Workers' status: $\mathbf{s} \in \left\{\overline{\mathbf{E}}, \overline{\mathbf{U}}, \overline{\mathbf{N}}\right\}$.
    - Flows: $\pi_{ss'}$; job-finding rates endoneous
  - Workers differ in their group (i), status (s), age (a) and years of experience (e).
    - $x = (e, a, s, i) \rightarrow$ state x defines a type of worker.
- Human capital: Learning-by-doing, general type

$$\begin{aligned} \mathbf{h}_i^s(0, a) &= \mathbf{y}_i \text{ (new worker).} \\ \mathbf{h}_i^s(e, a) &= \mathbf{y}_i e^{\mathbf{r}(x)e}, \ e \leq a. \end{aligned}$$

  - $\mathbf{y}_i$ is the initial human capital associated to group i.
  - $\mathbf{r}(x)$ is a type-specific return to experience.

Preliminaries: Labor markets, firms, and matching

- Assumption: Perfectly segmented labor markets
  - One market for each $x = (e, a, s, i)$.
- A large number of infinitely-lived, risk-neutral, and profit-maximizing firms:
  - free entry to any market; post vacancies at a cost of $\boldsymbol{\kappa}(x)$;
- Mass of successful matches in market x is given by:

$$M(u, v; x) = \mathbf{A}(x) u^{\alpha} v^{(1-\alpha)}$$

  - $u(x)$ and $v(x)$ are masses of workers and firms searching in market x.
  - $\mathbf{A}(x) \rightarrow$ matching efficiency
    - allows for market specific frictions: e.g., search effort, taste-based discrimination, etc.

Solution: Job-finding rates

- Define $\theta(x) \equiv \frac{v(x)}{u(x)} \rightarrow$tightness of market x.
  - Relative abundance of vacancies per job seeker.
- Define the value of a firm with a worker as:

$$J(x) = \left[\mathbf{h}(x) - w(x) + \beta\left(1 - \boldsymbol{\pi_{EU}}(x) - \boldsymbol{\pi_{EN}}(x)\right) J\left(x'\right)\right]$$

- Worker's job-finding rate:

$$f(x) = \mathbf{A}(x)\left(\theta(x)\right)^{1-\alpha} = \left[\frac{\mathbf{A}(x)}{\boldsymbol{\kappa}(x)^{1-\alpha}}\left(\beta J\left(x'\right)\right)^{1-\alpha}\right]^{\frac{1}{\alpha}}$$

  - Increasing in $A(x)$, $h(x)$, and decreasing in π_{EU}, π_{EN}

Solution: Wages

- Nash bargaining implies that wages satisfy:

$$w(x) = \frac{\mathbf{h}(x) + \Theta(x)\left[\mathbf{c}_i^U(e,a) + \beta W(x')\right]}{1 + \Theta(x)}, \tag{1}$$

  where $W(x)$ collects various gains from being employed and match surplus

- Wage differentials arise if $\Theta(x) > 0$,

$$\text{where } \Theta(x) = \frac{1 - \boldsymbol{\phi}(x)}{\boldsymbol{\phi}(x)}. \tag{2}$$

  - Workers with same productivity, $\mathbf{h}(x) = \mathbf{h}(x')$, are paid differently
    - Workers with better outside options are paid more.
    - Wages are higher the total surplus of the match, captured by $W(x)$.

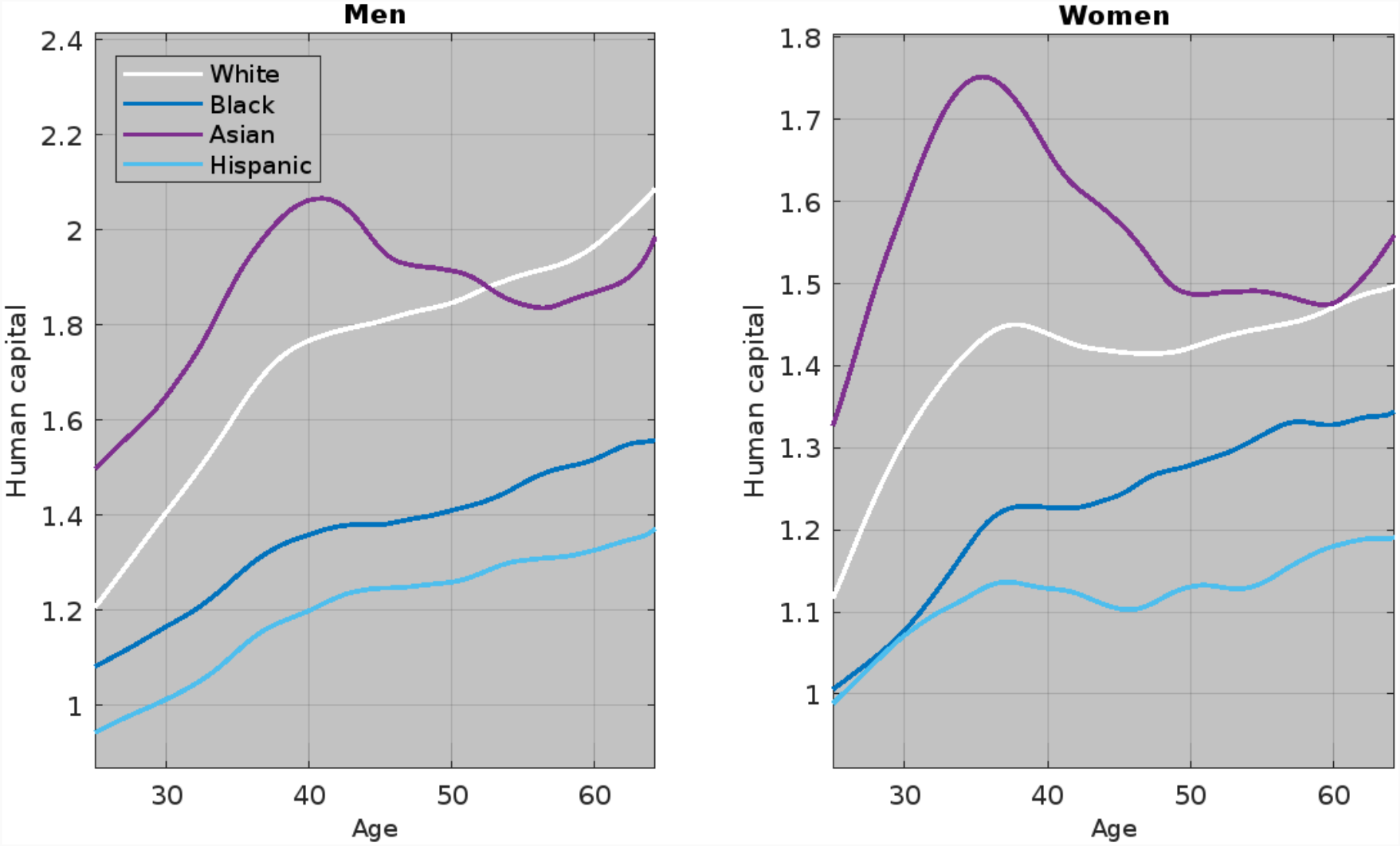
3. Calibration and decomposition

Calibration

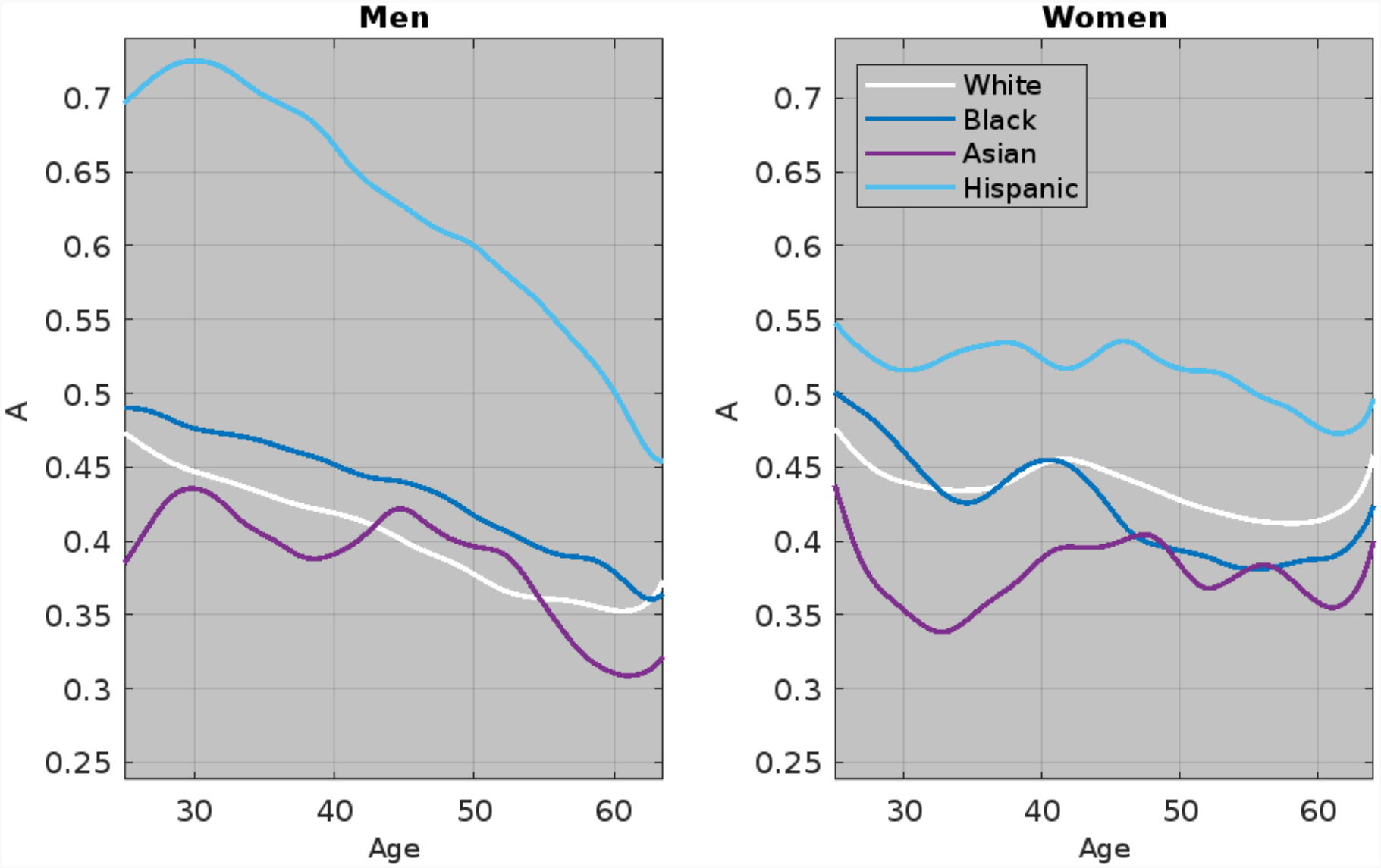
- Period = quarterly
- 24 groups (sex = Male, Female; race = Asian, Black, Hispanic, White; schooling = Average, No college, At least some college):
- Data: IPUMS CPS, 1998–2018
- Match exactly wage profiles and job-finding rates to recover:

$$\mathbf{r}(x), \mathbf{y}_i, \mathbf{A}(x)$$

Large gaps in human capital patterns...



... and in matching efficiencies



Wage gap determinants vary

	Gender gaps	Race gaps
Human capital		
Initial human capital (y)	38.4%	24.2%
Returns to experience (r)	15.4%	36.5%
Total	53.8%	60.7%
Job-destruction rates (d)		
To unemployment (π_{EU})	-3.3%	8.5%
To nonparticipation (π_{EN})	29.4%	21.9%
Total	26.1%	30.4%

Role of discrimination

- Statistical discrimination
  - Exercise: Firms use the comparison groups' job-destruction rates (π_{EN}, π_{EU}) when deciding the number of vacancies and negotiating over wage rates
  - Results:

	Gender gaps	Race gaps
Wage	16.0%	22.6%
Job-finding rate	32.6%	40.7%

- Taste-based discrimination
  - Unexplained differences in matching efficiencies (A)
  - Results:

	Gender gaps	Race gaps
Wage	4.7%	0.2%
Job-finding rate	29.6%	-22.2%

4. Conclusions

Conclusions

- Macro-search can contribute to our understanding of the large disparities in labor market outcomes across demographic groups.
- Main takeaways:
  - Human capital differences can explain a good share of gaps, but not all: two equally productive workers may have different labor market outcomes
  - Job-destruction rates turns out to be important and the impact partly coming from discrimination
    - We have a good understanding why job destruction rates matter for women but not why they matter for race gaps
  - Matching efficiencies not important at the aggregate level, but these may be important for individual groups
    - Representative agent approach fails here