INTERMEDIATE MACROECONOMICS

MATCHING MODEL OF UNEMPLOYMENT

14. MATCHING FUNCTION

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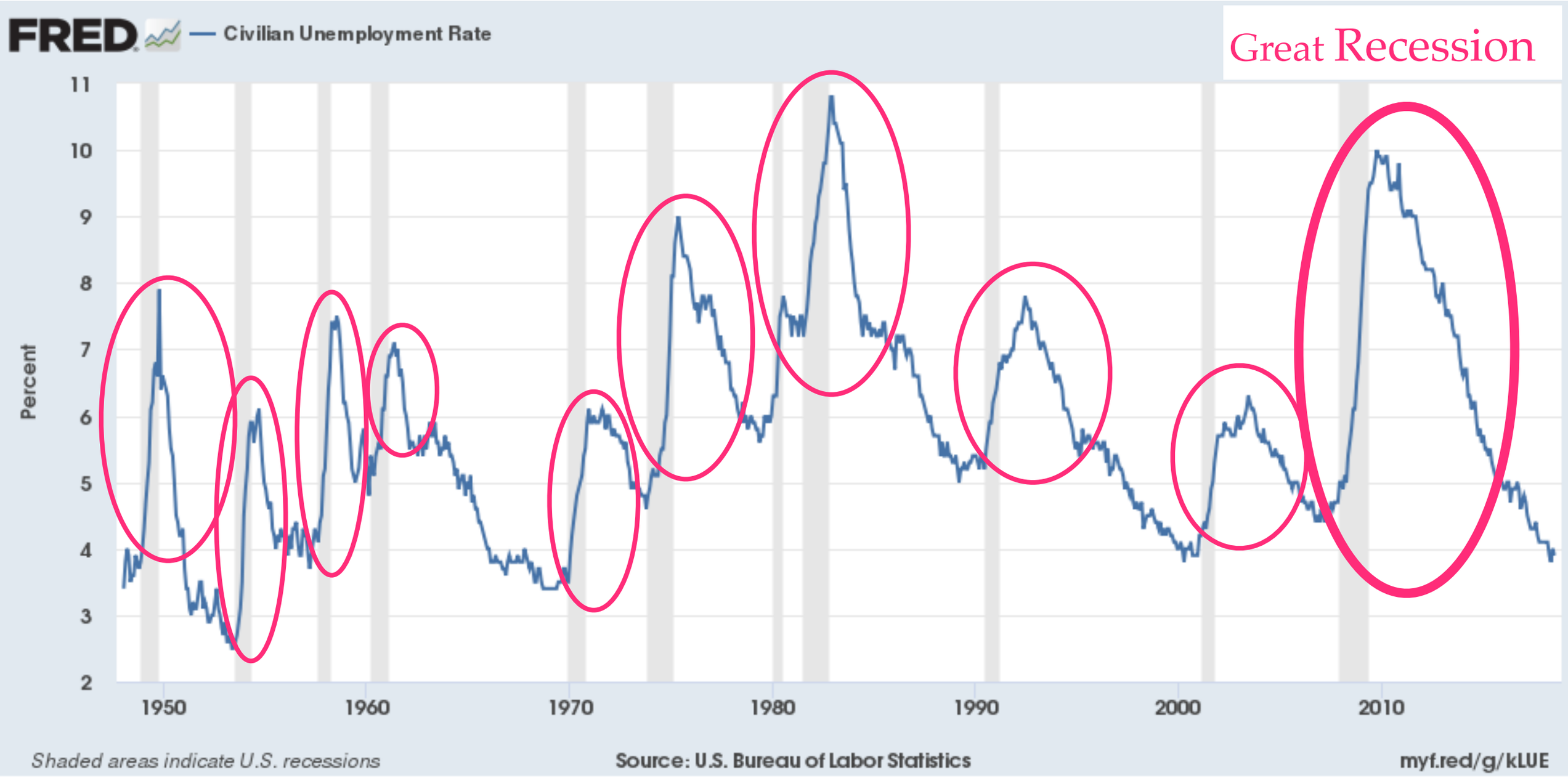
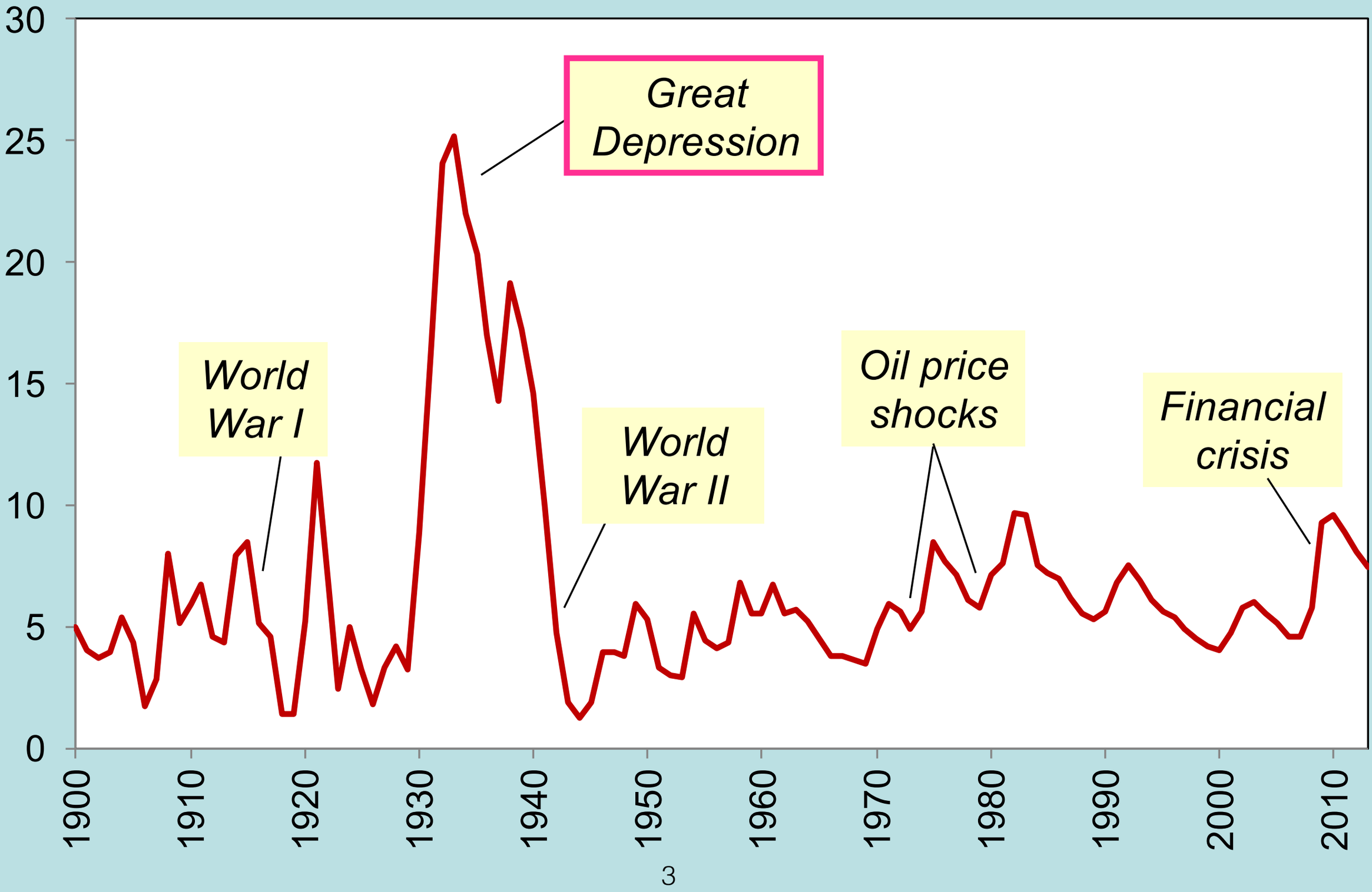
US UNEMPLOYMENT RATE



- unemployment goes up in recessions
- unemployment varied between 2.5% and 10% since 1948
- average unemployment rate: 5.8%

U.S. Unemployment Rate
(% of labor force)



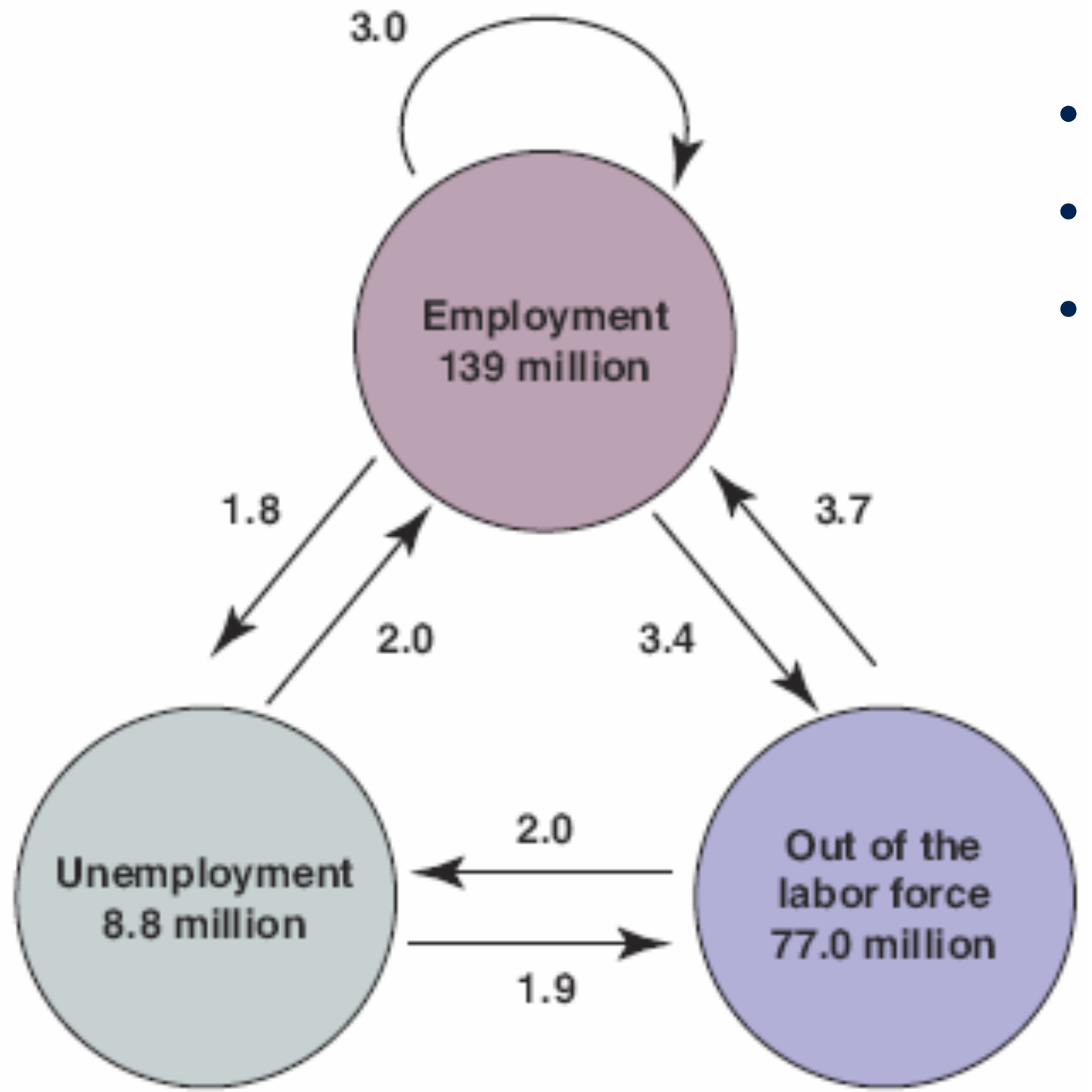
JOBS LAST A LONG TIME

- typical job lasts 8 years in the US
- 25% of jobs last more than 20 years in the US
- in the US before WWI, labor was sold on a “spot market”
  - people would come every morning to the factory to be hired
- the personnel management movement changed that after WWI
- the goal was to offer job security to make workers more productive
  - workers gain knowledge specific to the firm
  - workers are more dedicated to the firm

UNEMPLOYMENT AND VACANCIES COEXIST

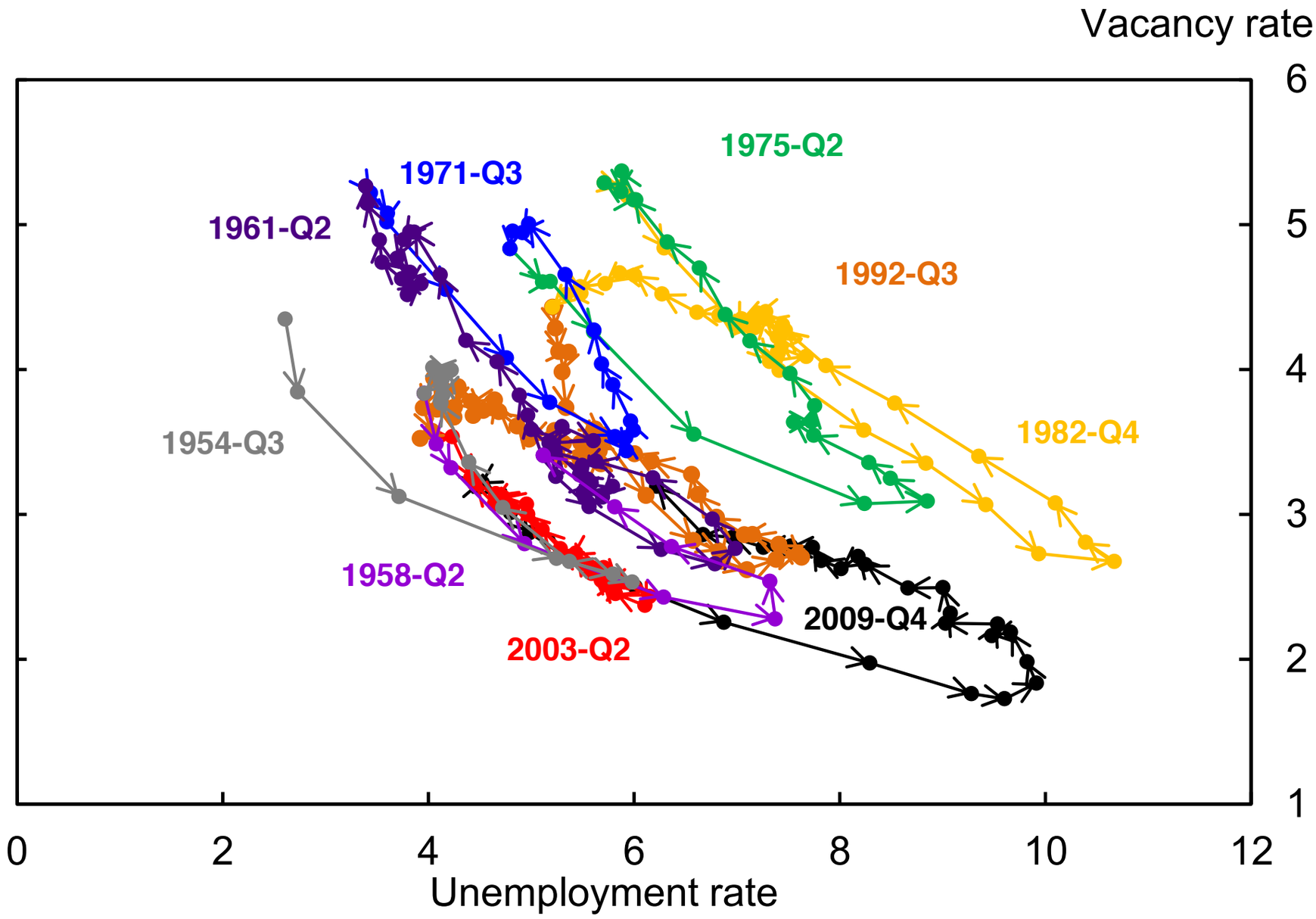
- it takes time to find a job in the US
  - average unemployment duration: 2 to 3 months
  - unemployment duration goes up in slumps: countercyclical
- it takes time for firms to fill their vacancies in the US
  - average duration to fill a vacancy: 2 weeks to 1 month
  - vacancy-filling duration goes down in slumps: procyclical
- coexistence of vacant jobs and unemployed is described by a Beveridge curve

US LABOR MARKET FLOWS



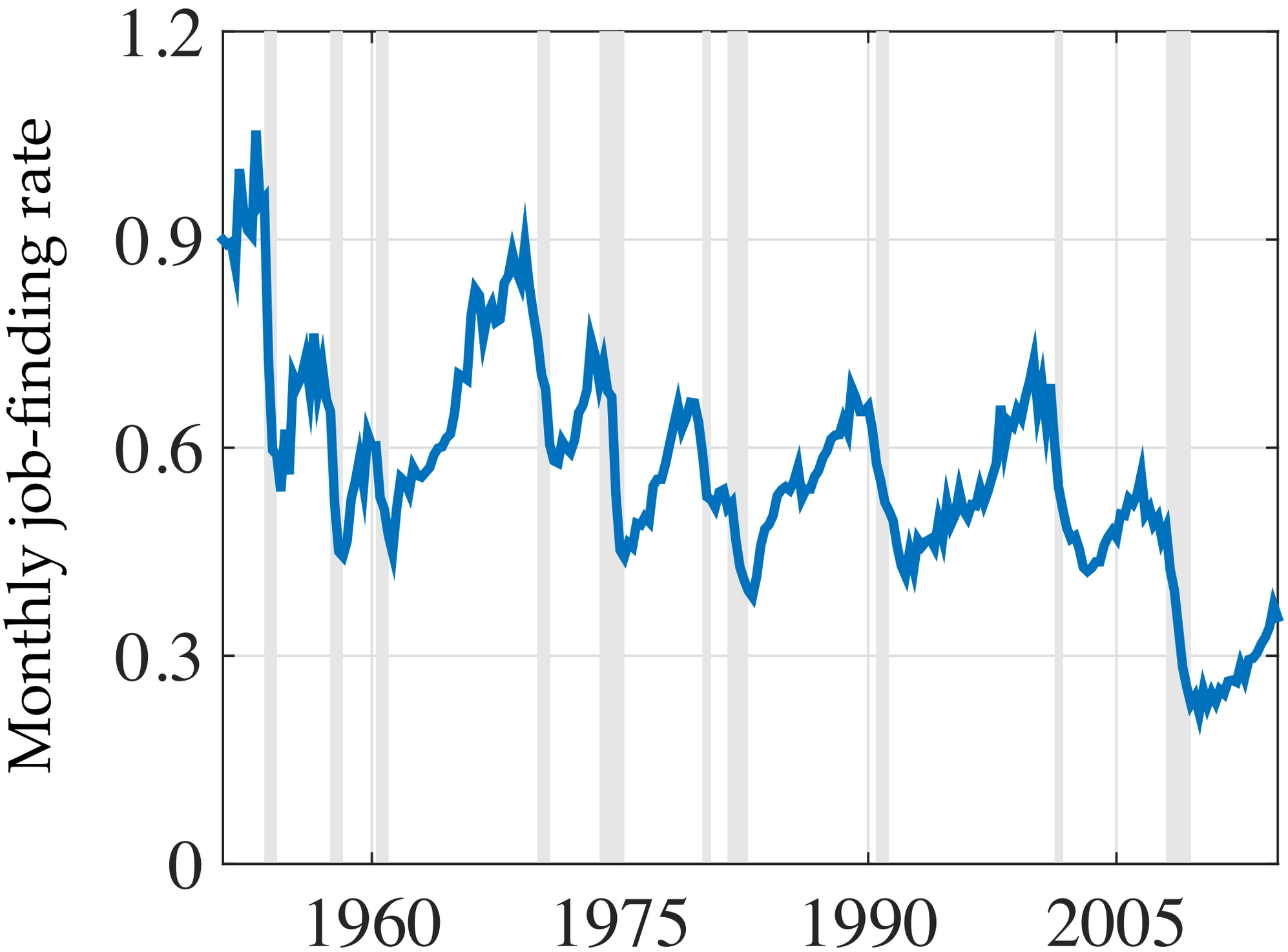
- monthly data for 1996—2014
- flows are in millions
- job separations = quits + layoffs
  - quit: decided by worker
  - layoff: decided by firm

US VACANCIES AND BEVERIDGE CURVE

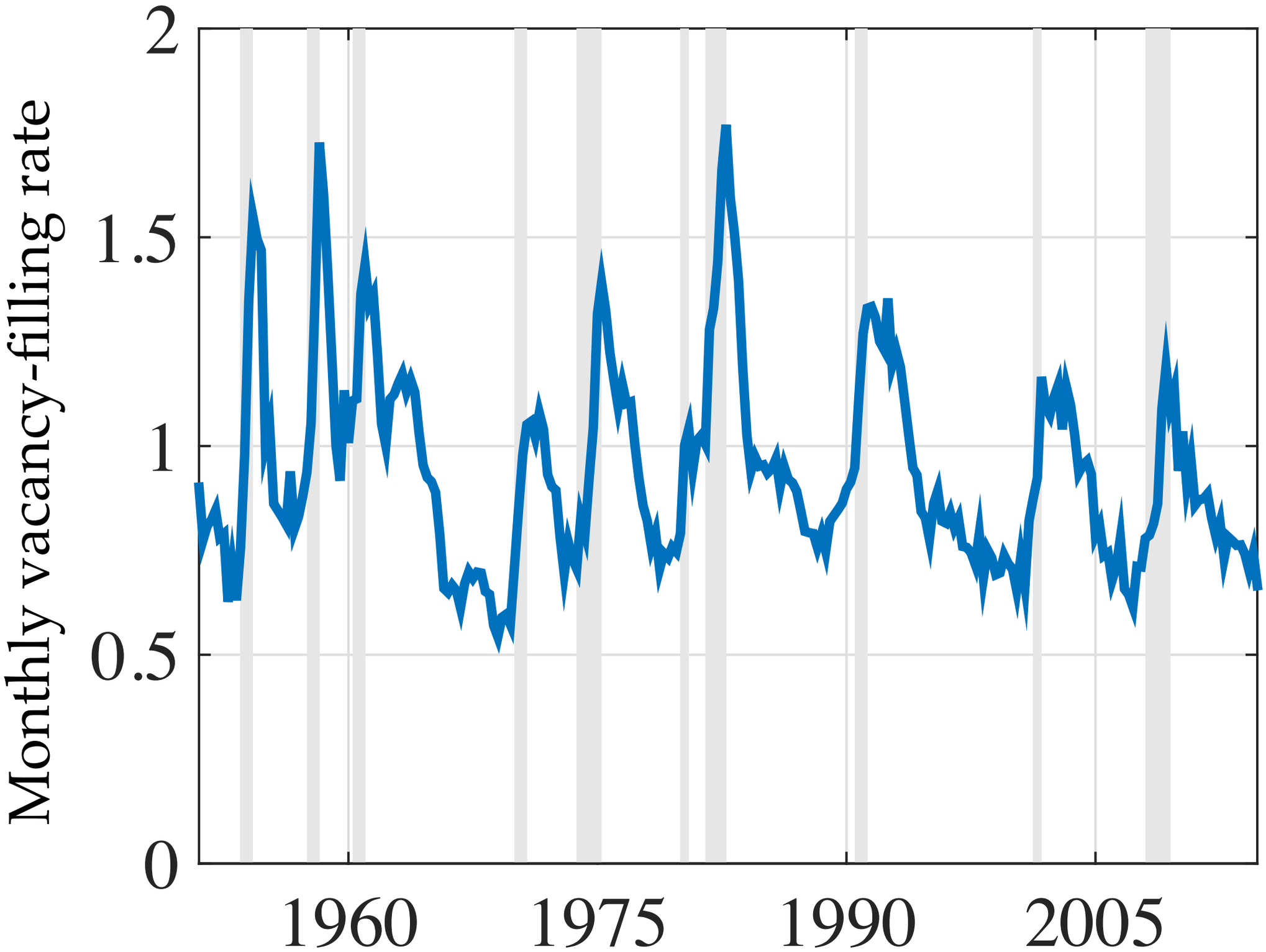


- each color indicates a different business cycle
- vacancies always coexist with unemployed workers
- when the vacancy rate is high, unemployment is low

US JOB-FINDING RATE IS PROCYCLICAL



US VACANCY-FILLING RATE IS COUNTERCYCLICAL



MATCHING PROCESS

- firms need to find a worker that they like
  - skills, education, experience, motivation, fit
- workers need to find a job that they like
  - location, pay, colleagues, industry, benefits, responsibilities
- each worker and job are unique, so it takes time for the right worker and right job to match: the market is described by a matching function
  - the matching function describes the complicated process of matching jobseekers and firms together
  - firms post vacancies to recruit workers
  - unemployed workers search for jobs

WORKERS & FIRMS

- H : number of workers in the labor force
  - $H > 0$ is parameter: fixed number of people in labor force
  - we do not model people out of the labor force
- L: number of employed workers
- U: number of unemployed workers
  - $u = U / H$: unemployment rate
- V: vacancies posted by firms

MATCHING FUNCTION

- number of matches in one month = m(U,V)
- m(U,V) is increasing in U
- m(U,V) is increasing in V
- m(U,V) has constant returns to scale
  - m(constant×U, constant×V)=constant × m(U,V)
  - Cobb-Douglas example: $m(U,V)=\omega \times U^{\eta} \times V^{1-\eta}$, where $\omega > 0$ and $0 < \eta < 1$

LABOR MARKET TIGHTNESS

- new tool: matching function
- new variable: labor market tightness $\theta = V / U$
- labor market tightness determines the probabilities to find a job and fill vacancy
- labor supply and labor demand will depend on wage & labor market tightness
  - generalization of the market model from microeconomics

JOB-FINDING RATE

- fraction of unemployed workers finding a job in a month: $f(\theta)$

- $f(\theta) = m(U,V)/U = m(U/U,V/U) = m(1,\theta)$

- $f(\theta)$ is increasing in θ

- when labor market tightness is lower, it takes longer to find a job

- because there are a lot of jobseekers relative to vacancies, competition for jobs among workers is strong

VACANCY-FILLING RATE

- fraction of vacancies filled in a month: $q(\theta)$
- $q(\theta) = m(U,V) \ / \ V = \ m(U/V,V/V) = m(1/\theta,1)$
- $q(\theta)$ is decreasing in θ
- when labor market tightness is higher, it takes longer to fill a vacancy
- because there are a lot of vacancies posted relative to jobseekers, so competition for workers among firms is strong