$u^* = \sqrt{uv}$

Pascal Michaillat, Emmanuel Saez

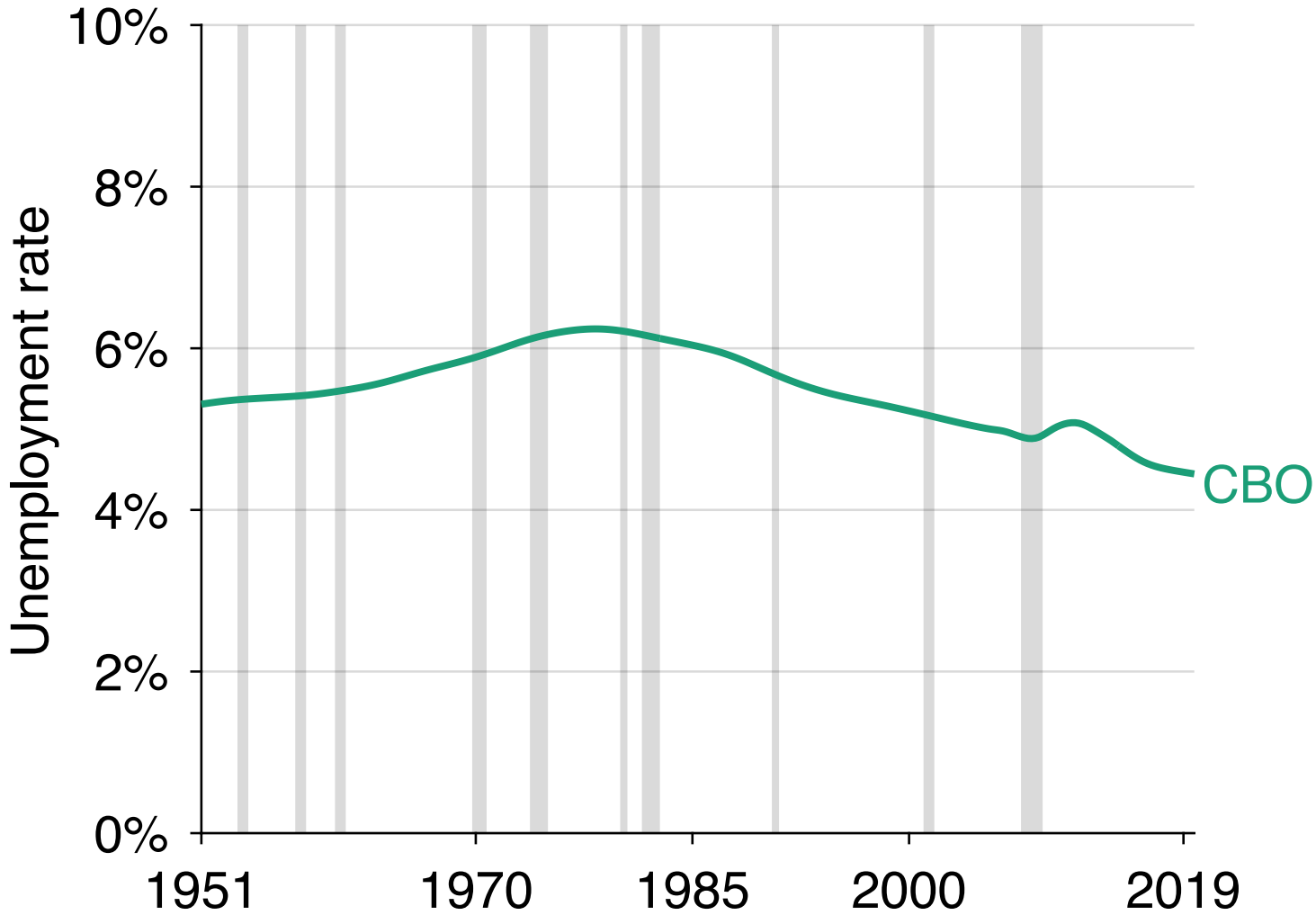
March 2023

Paper available at https://pascalmichaillat.org/13/

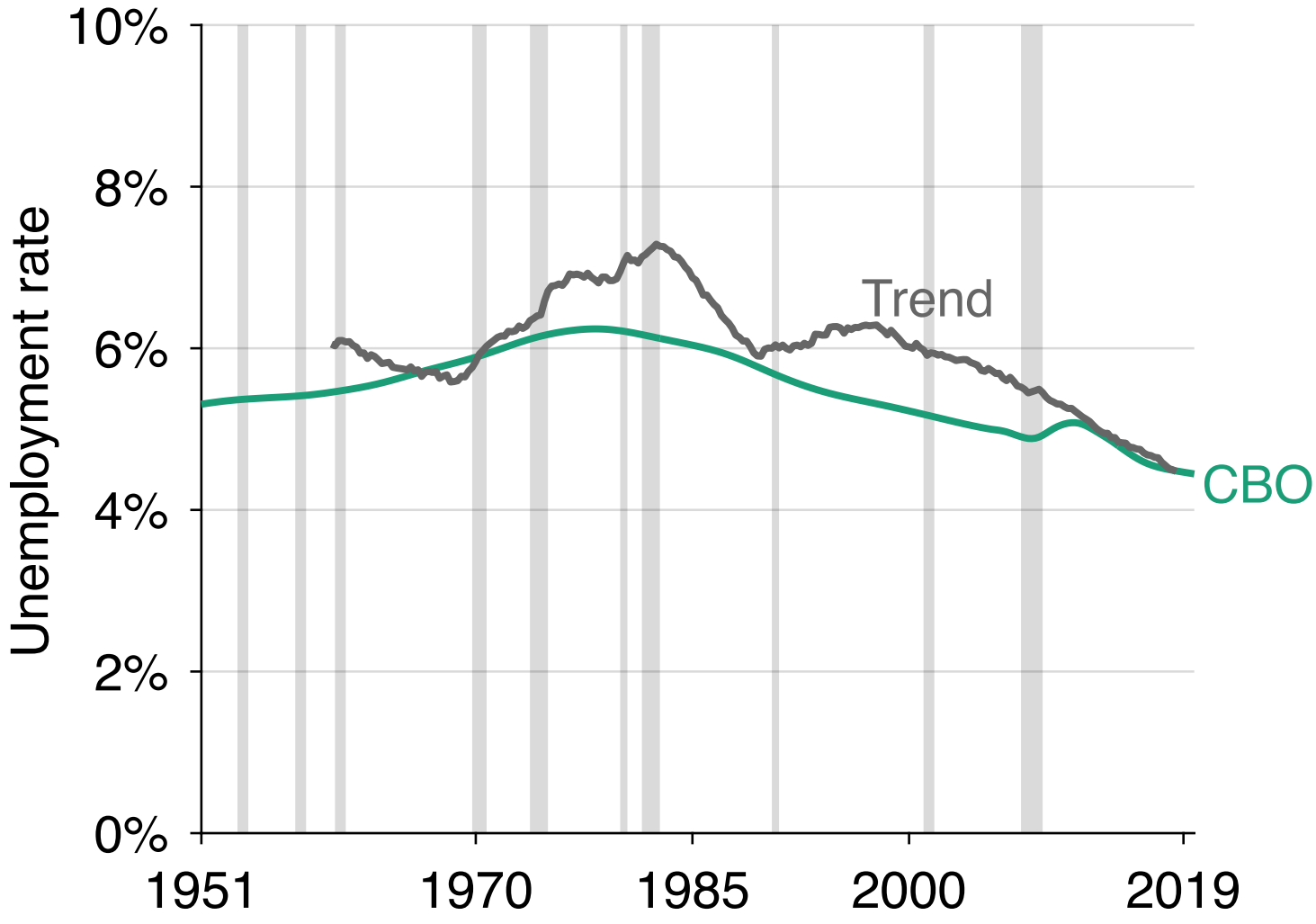
ROLES OF EFFICIENT UNEMPLOYMENT RATE, u^*

1. sufficient statistic for optimal stabilization policies
   - monetary policy (Michaillat, Saez 2022)
   - fiscal policy (Michaillat, Saez 2019)
   - unemployment insurance (Landais, Michaillat, Saez 2018)
2. welfare-based measure of “full employment”
   - Full Employment and Balanced Growth Act of 1978

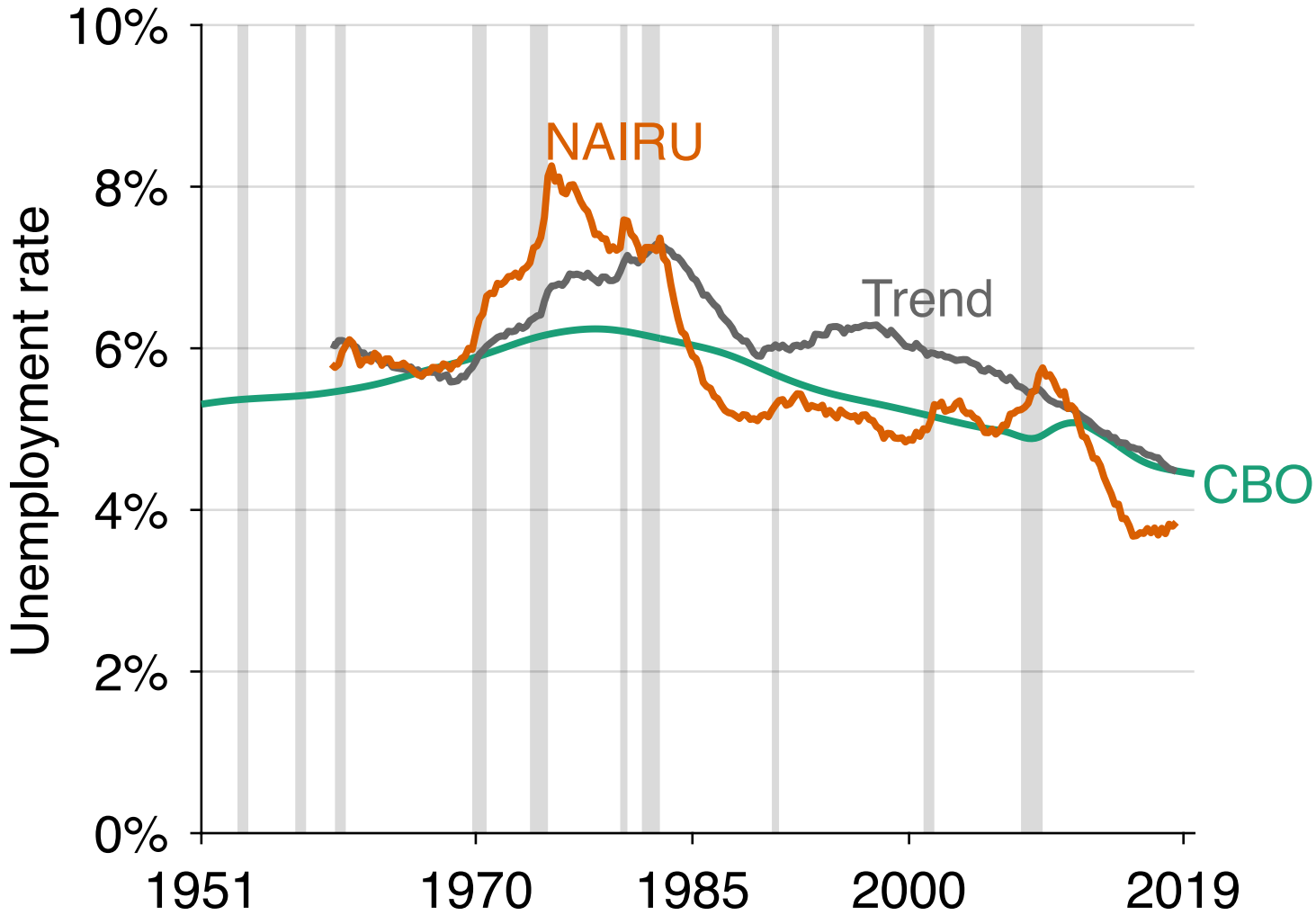
EXISTING MEASURES OF "FULL EMPLOYMENT"



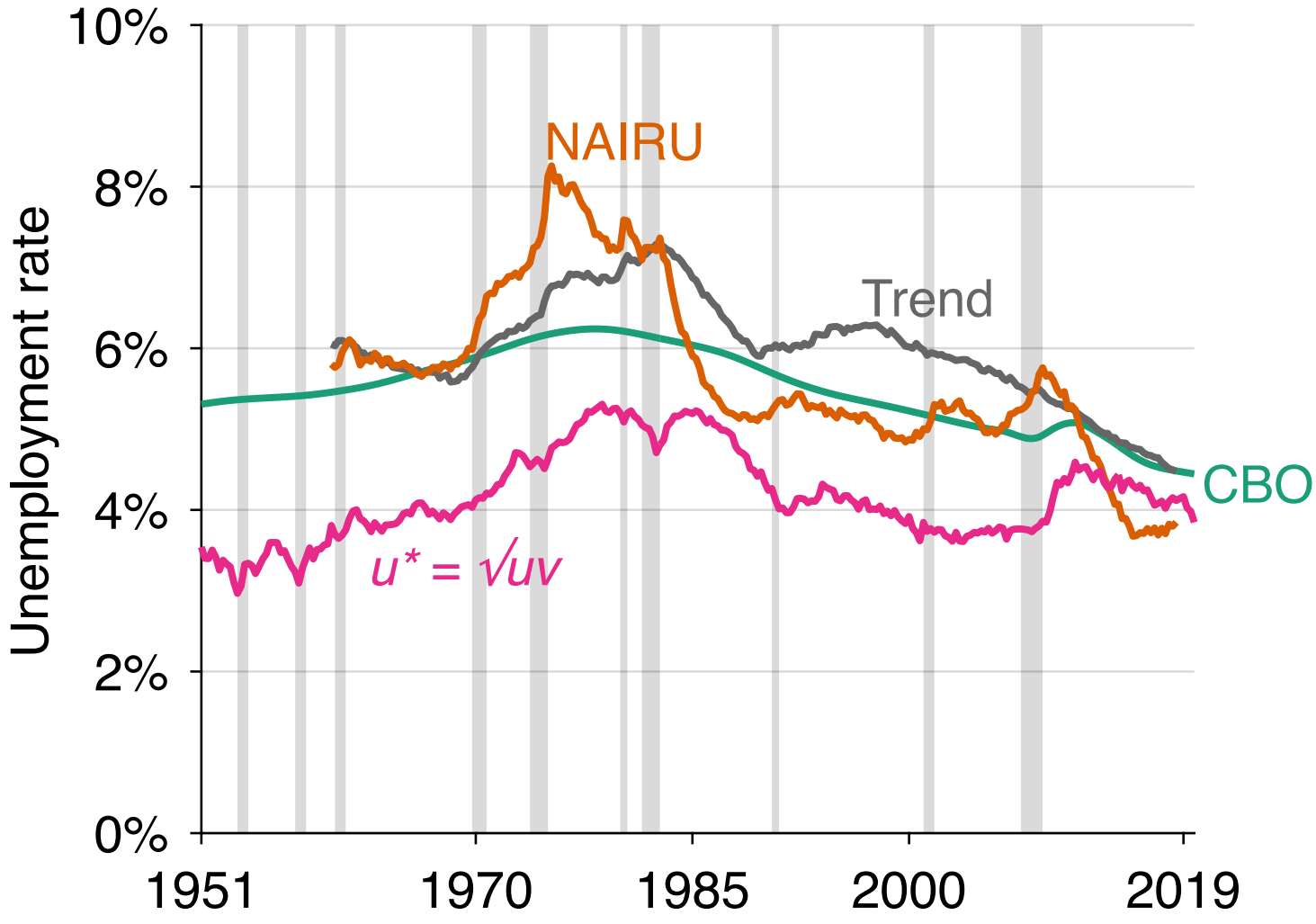
EXISTING MEASURES OF "FULL EMPLOYMENT"



EXISTING MEASURES OF "FULL EMPLOYMENT"



THIS PAPER: WELFARE-BASED "FULL EMPLOYMENT"

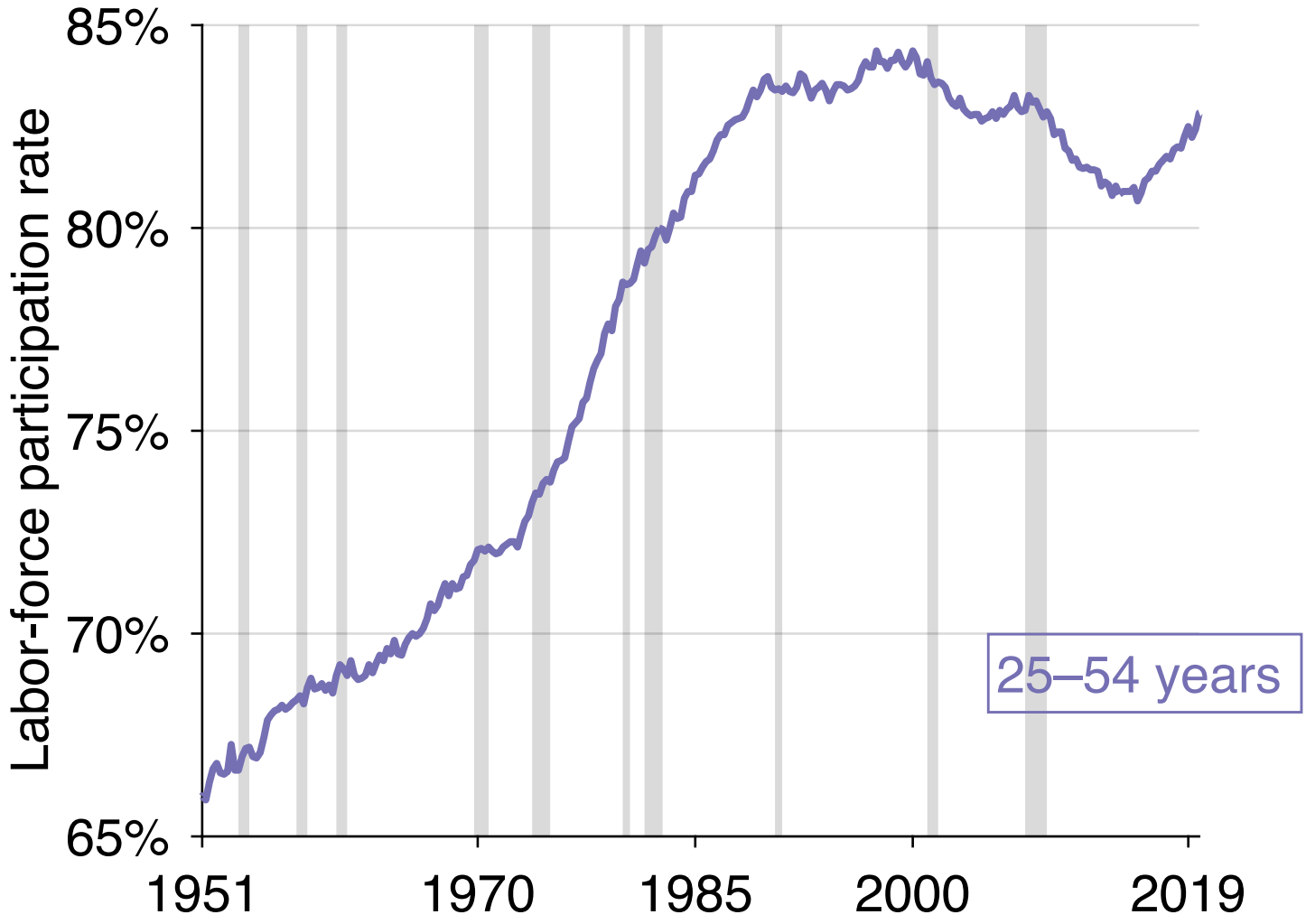


THEORY

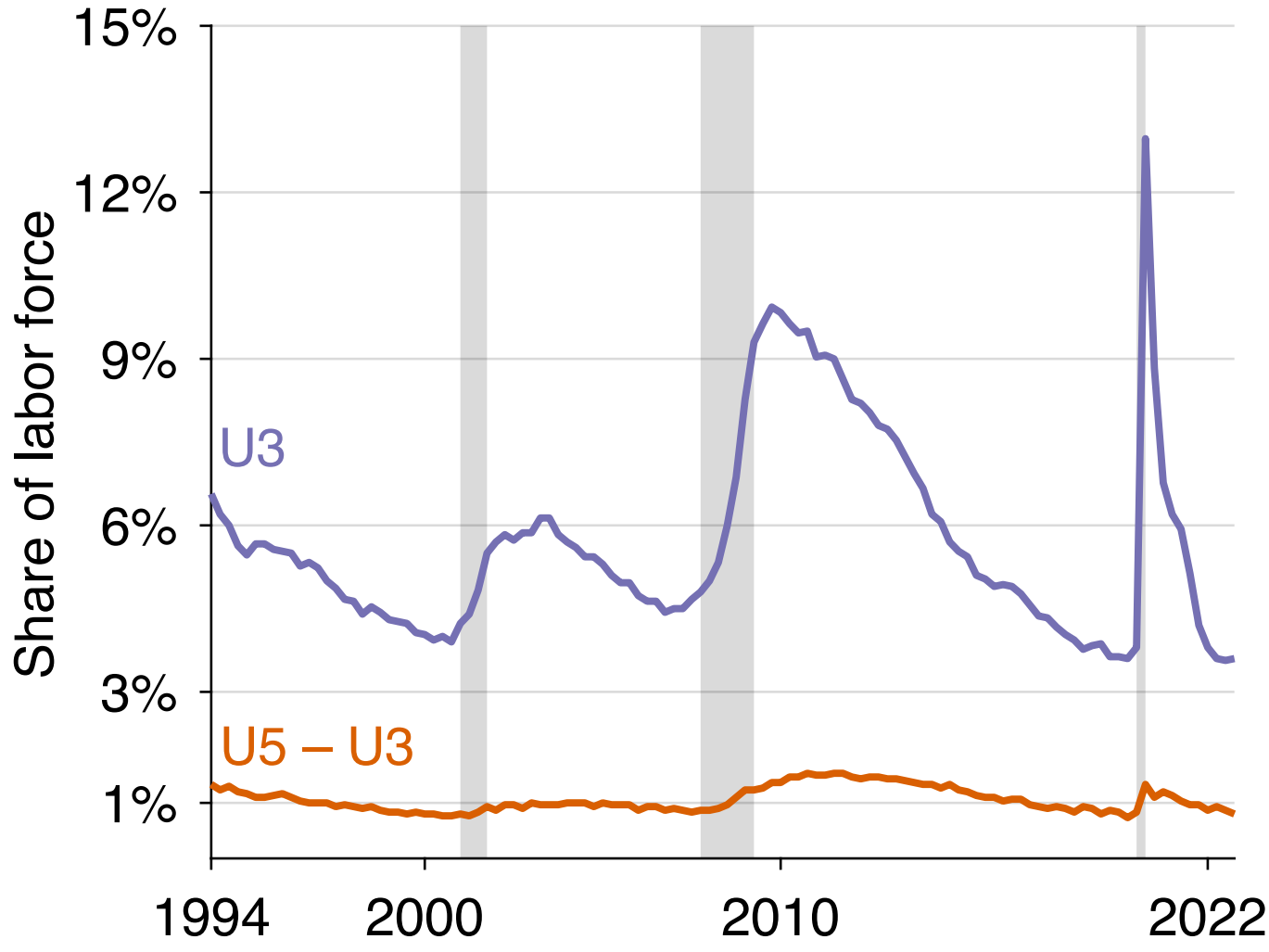
COMPOSITION OF LABOR FORCE

1. share u of labor force is unemployed
    - no home production (Borgschulte, Martorell 2018)
2. share v of labor force is employed recruiting
    - one worker per vacancy (National Employer Survey 1997)
3. share $1 - (u + v)$ of labor force is employed producing
    - production determines social welfare

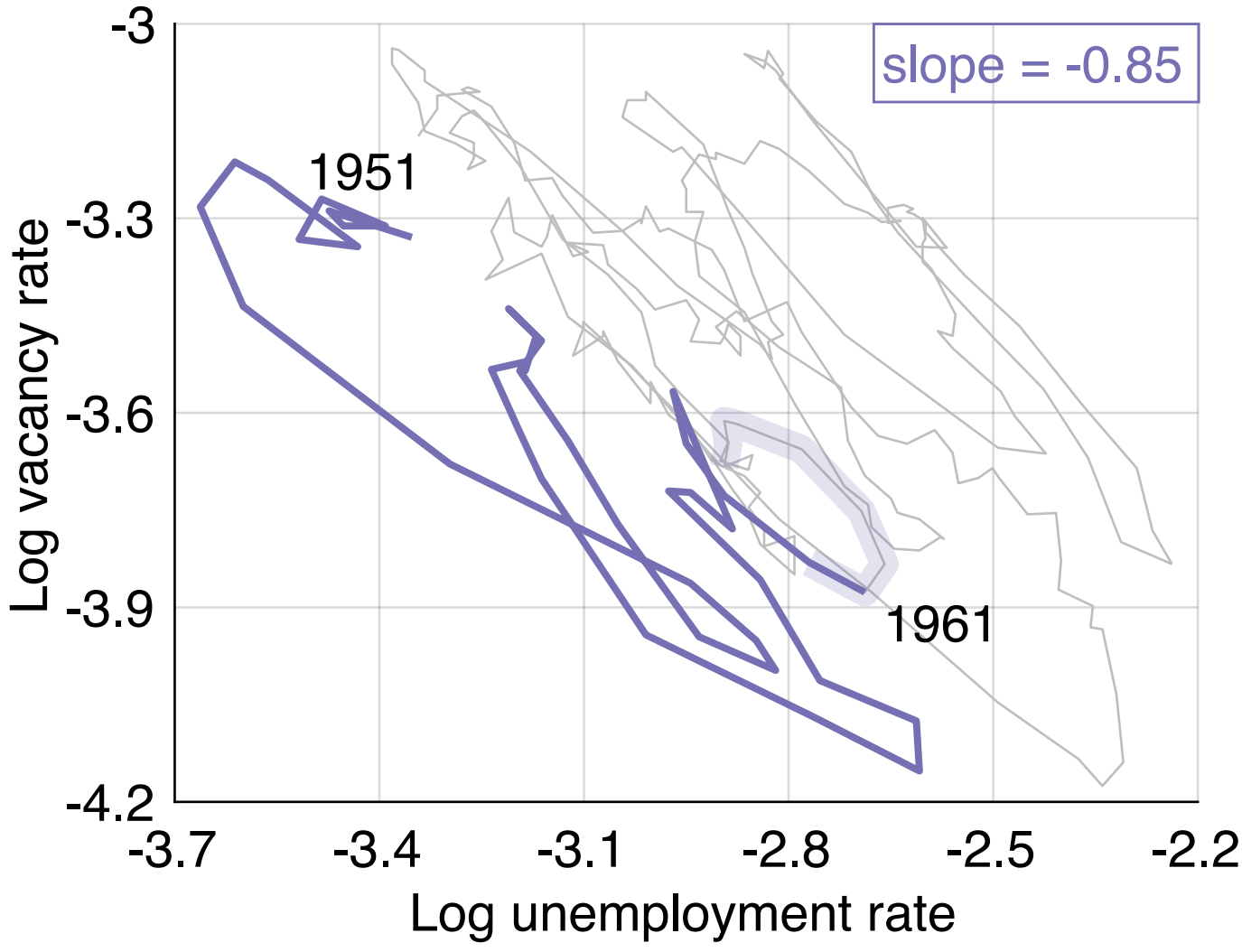
US LABOR-FORCE PARTICIPATION ≈ ACYCLICAL



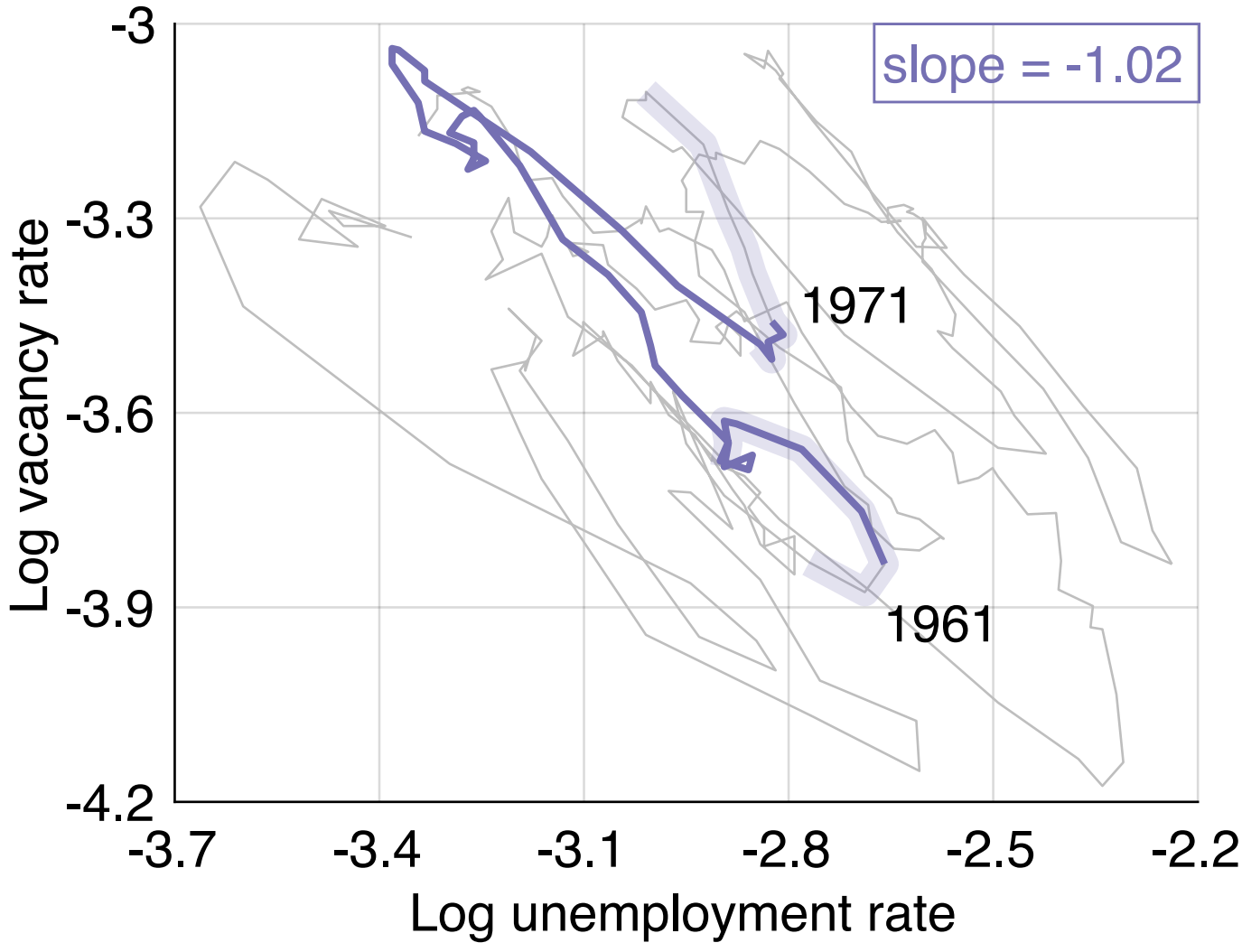
US MARGINAL ATTACHMENT RATE ≈ 1%



US BEVERIDGE CURVE ≈ HYPERBOLA



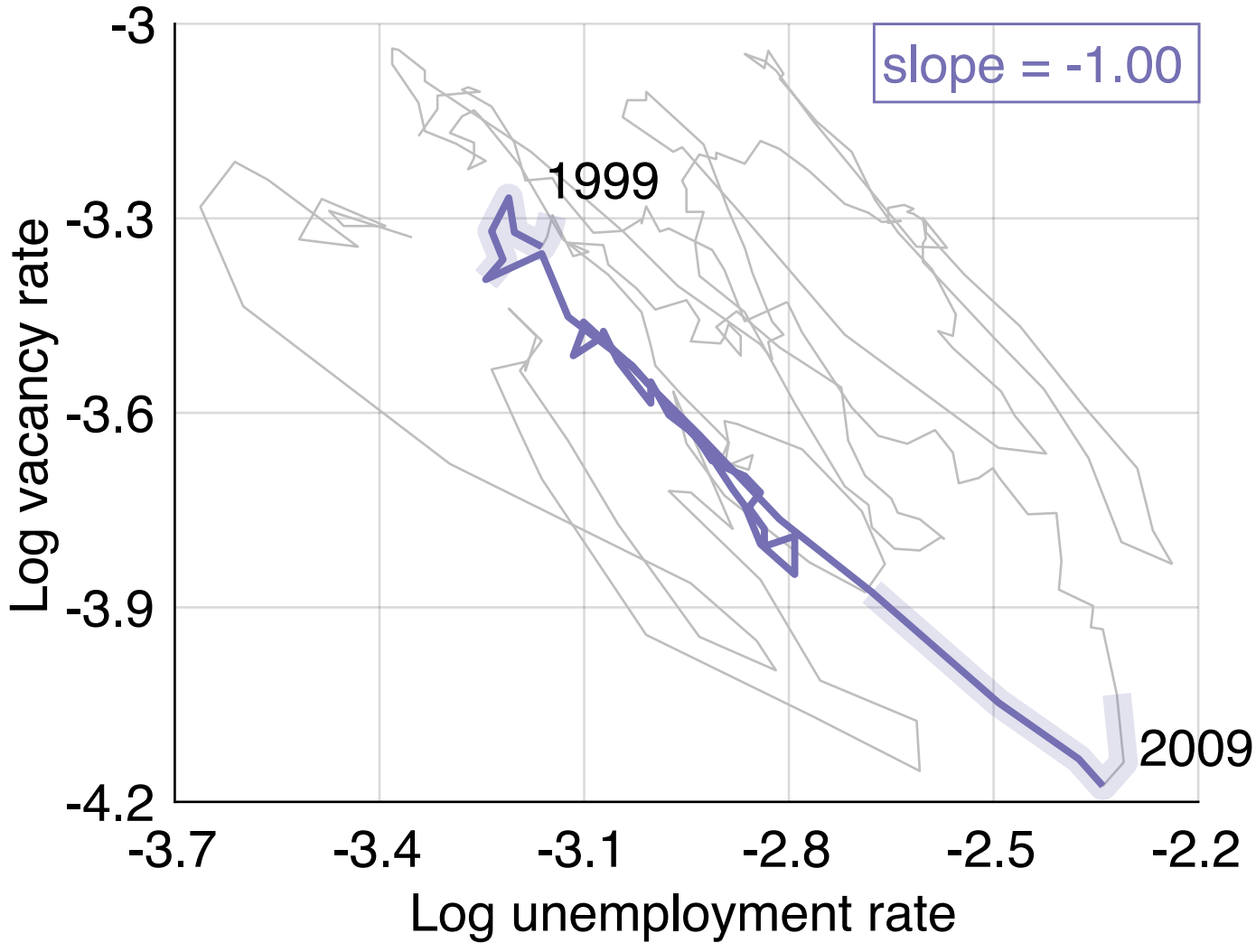
US BEVERIDGE CURVE ≈ HYPERBOLA



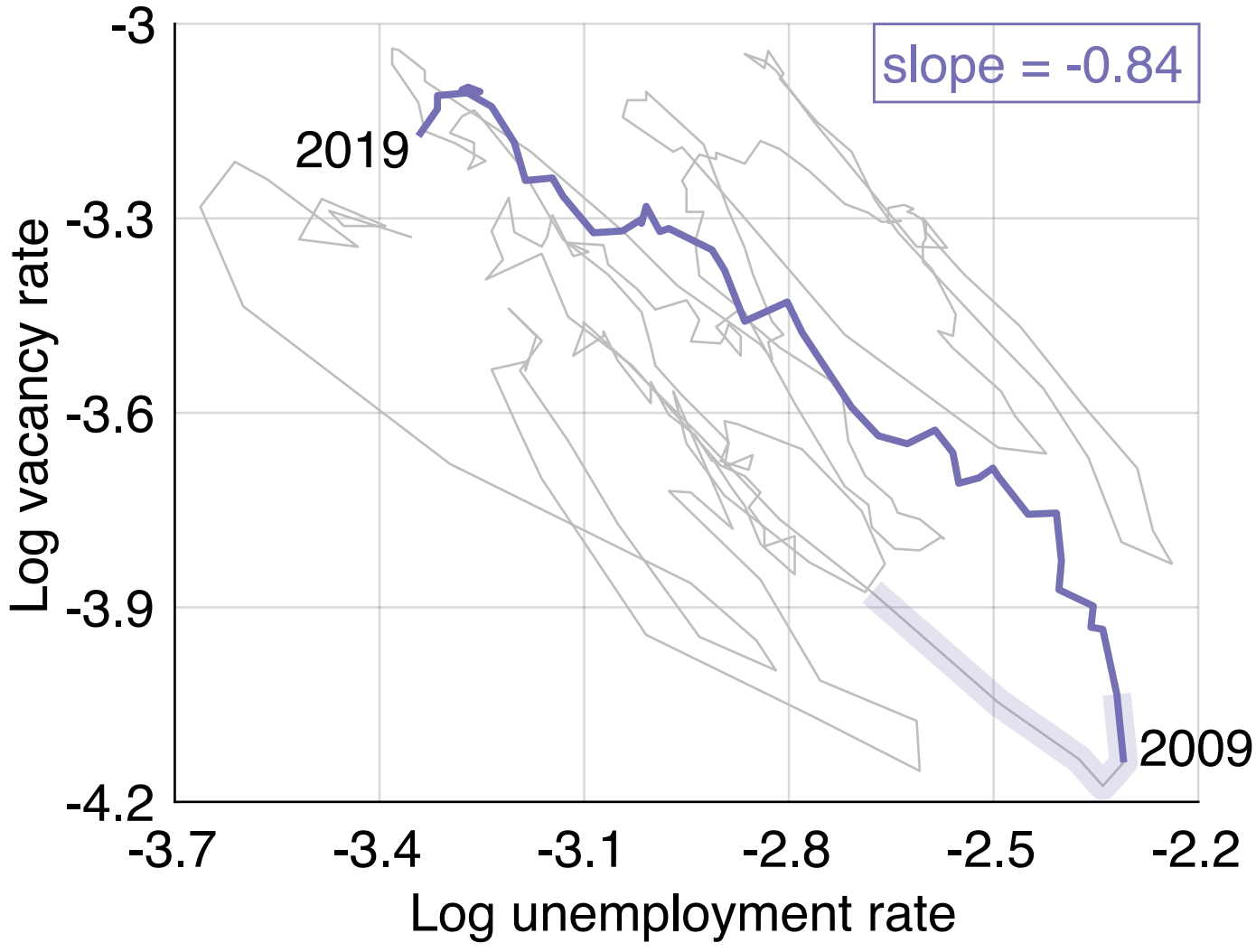
US BEVERIDGE CURVE ≈ HYPERBOLA

US BEVERIDGE CURVE ≈ HYPERBOLA

US BEVERIDGE CURVE ≈ HYPERBOLA



US BEVERIDGE CURVE ≈ HYPERBOLA



SOCIAL PLANNER'S PROBLEM

- minimize nonproductive use of labor $u + v$
- subject to hyperbolic Beveridge curve $uv = A$
- unconstrained minimization with convex objective: $u + A/u$
- first-order condition is necessary and sufficient:

$$\frac{d[u + A/u]}{du} = 0 \implies 1 - A/u^2 = 0$$

- optimal unemployment rate:

$$u^* = \sqrt{A}$$

EFFICIENT UNEMPLOYMENT RATE u^*

- u^* is geometric average of u and v:

$$u^* = \sqrt{uv}$$

- economy is inefficiently tight when $u < u^*$ or

$$u < v$$

- economy is inefficiently slack when $u > u^*$ or

$$u > v$$

WELFARE FOUNDATION FOR OLD INTUITION THAT FULL EMPLOYMENT OCCURS WHEN $u \approx v$

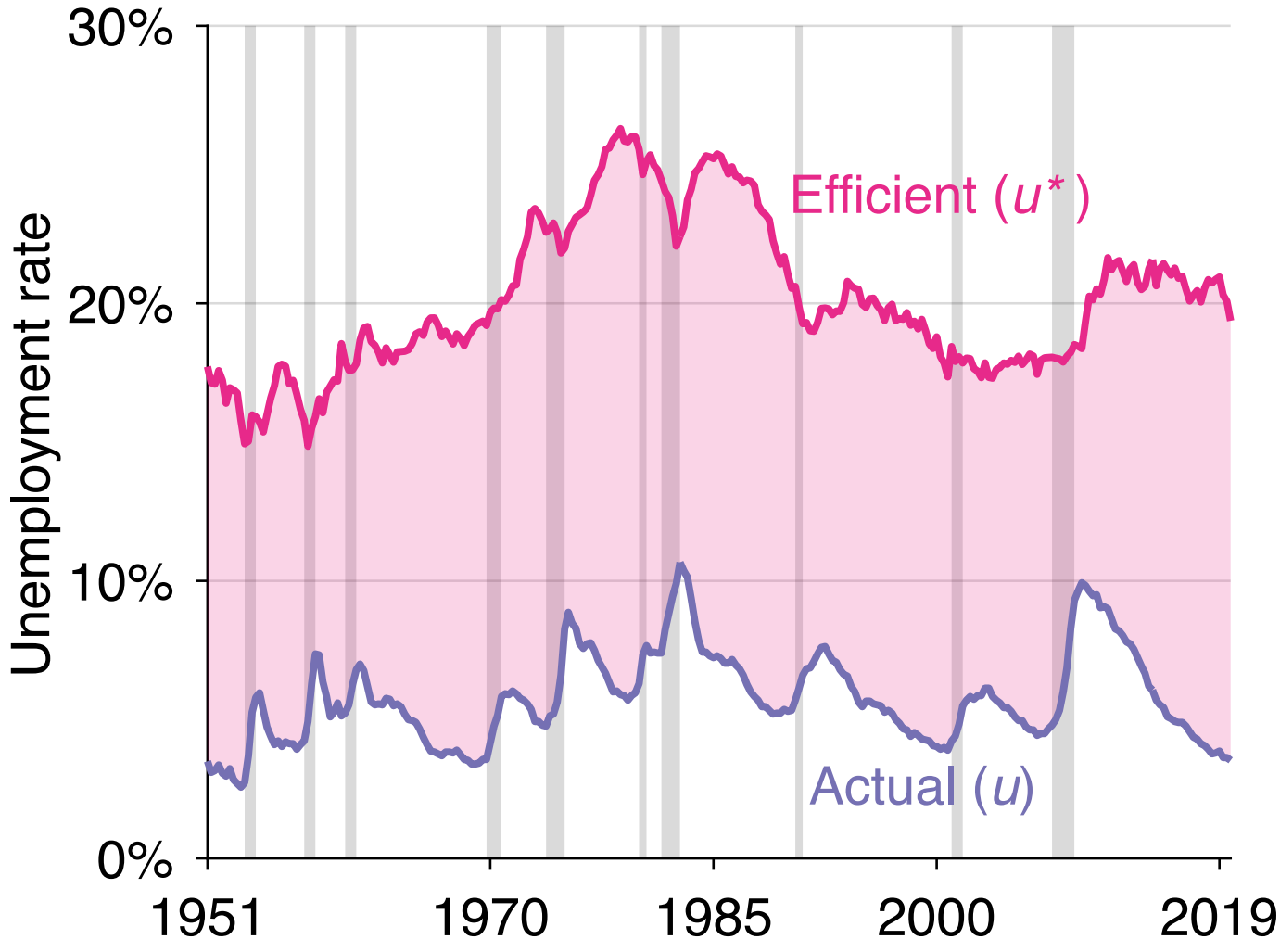
- before Beveridge (1944) report:
  - "Full employment is a state of affairs in which the number of unfilled vacancies is not appreciably below the number of unemployed persons."
- in Beveridge (1944) report:
  - "Full employment means having always more vacant jobs than unemployed men."
- US BLS and Japanese Ministry of Health, Labour, Welfare:
  - flag when # jobseekers per job opening > 1

GENERALIZATION (MICHAILLAT, SAEZ 2021)

- home production per unemployed worker: $0 \to \zeta$
- # recruiters per vacancy: $1 \to \kappa$
- Beveridge curve: $v = A/u \to v = A/u^{\epsilon}$
- efficient unemployment rate:

$$u^* = \sqrt{uv} \quad \to \quad u^* = \left(\frac{\kappa \cdot \epsilon}{1 - \zeta} \cdot v \cdot u^{\epsilon} \right)^{1/(1+\epsilon)}$$

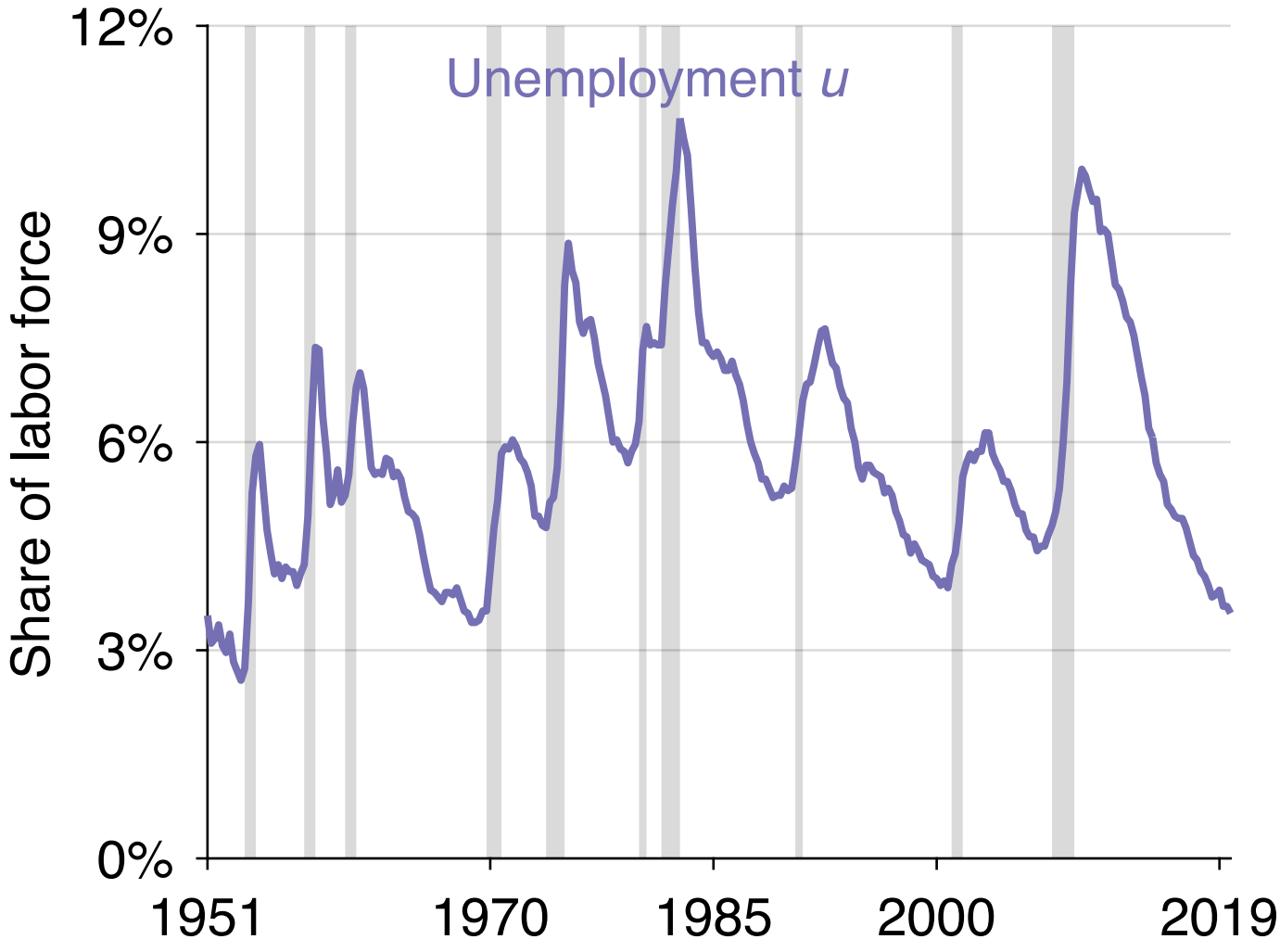
u^* WITH $\zeta = 0.96$ (HAGEDORN, MANOVSKII 2008)



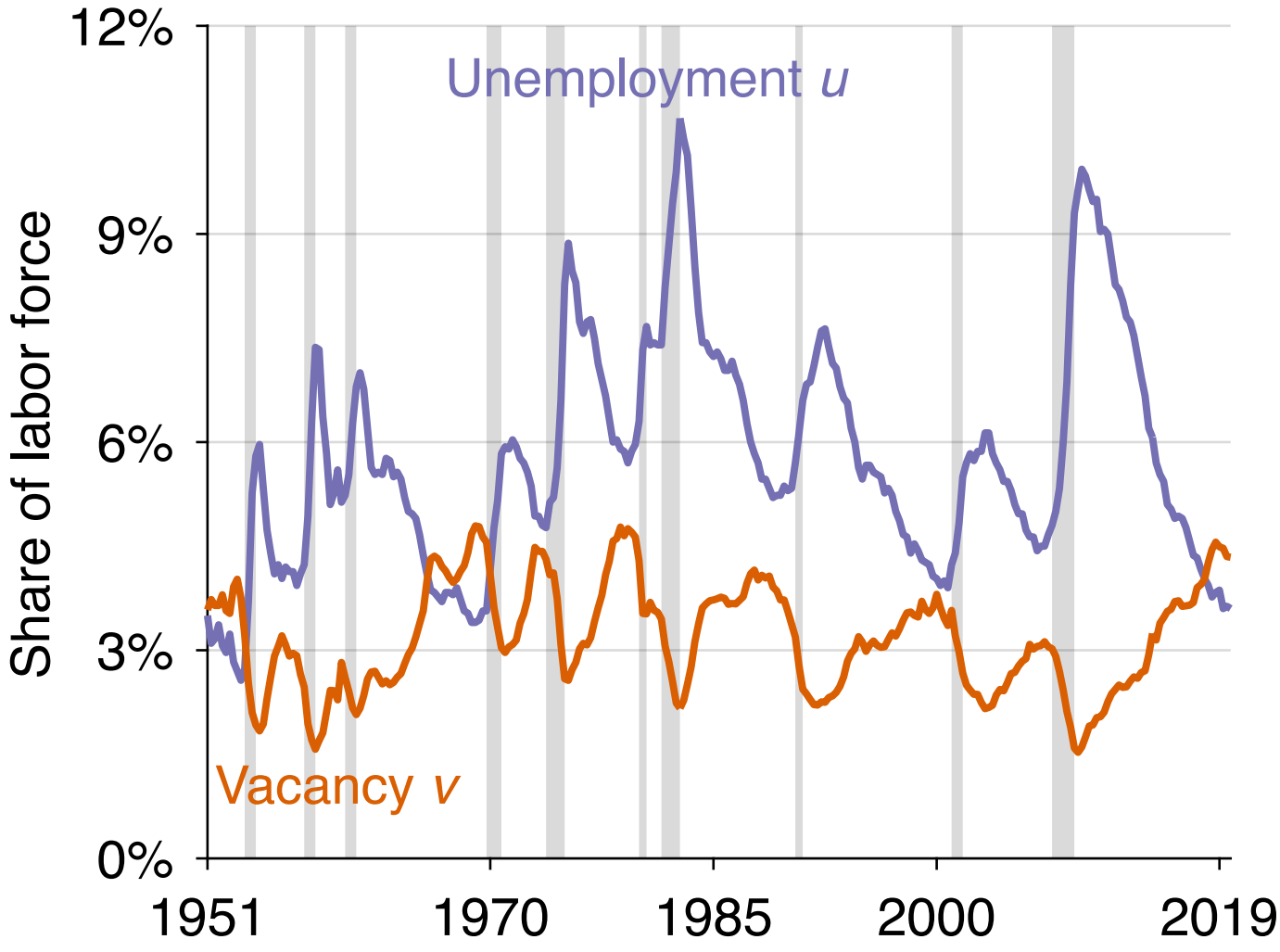
POSTWAR IN THE UNITED STATES

(1951–2019)

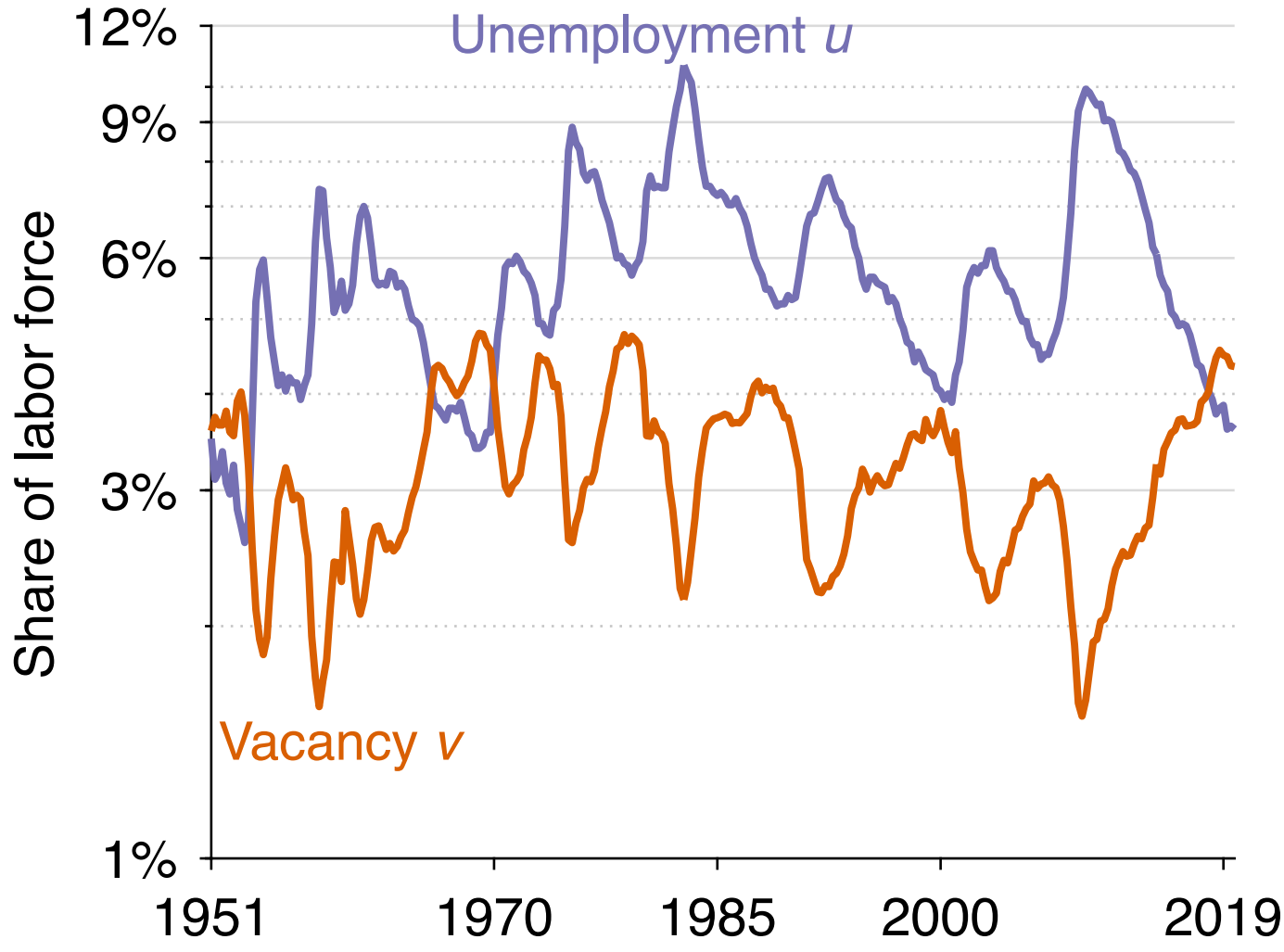
UNEMPLOYMENT RATE (CPS)



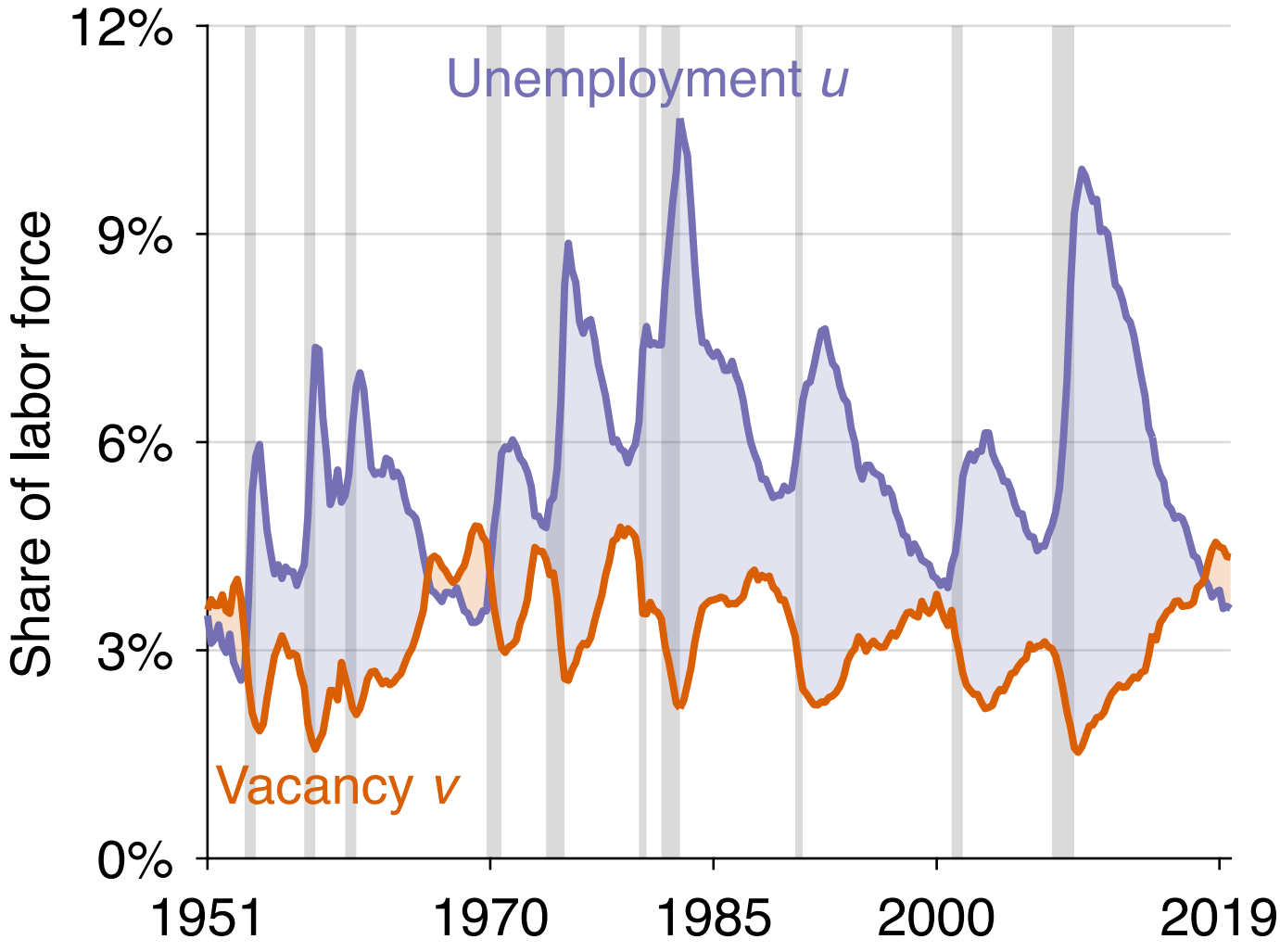
VACANCY RATE (BARNICHON 2010, JOLTS)



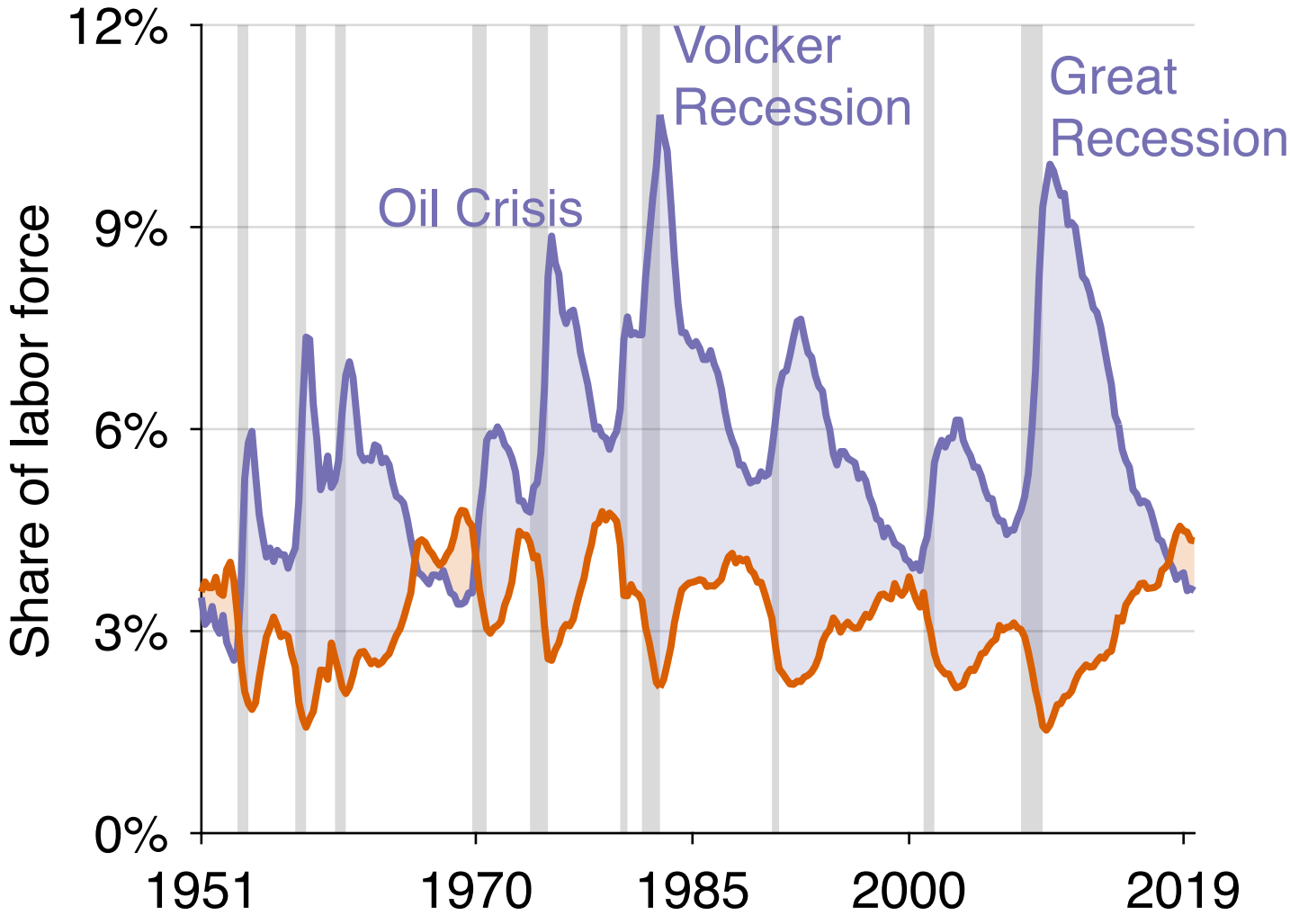
HYPERBOLIC BEVERIDGE CURVE ON LOG SCALE



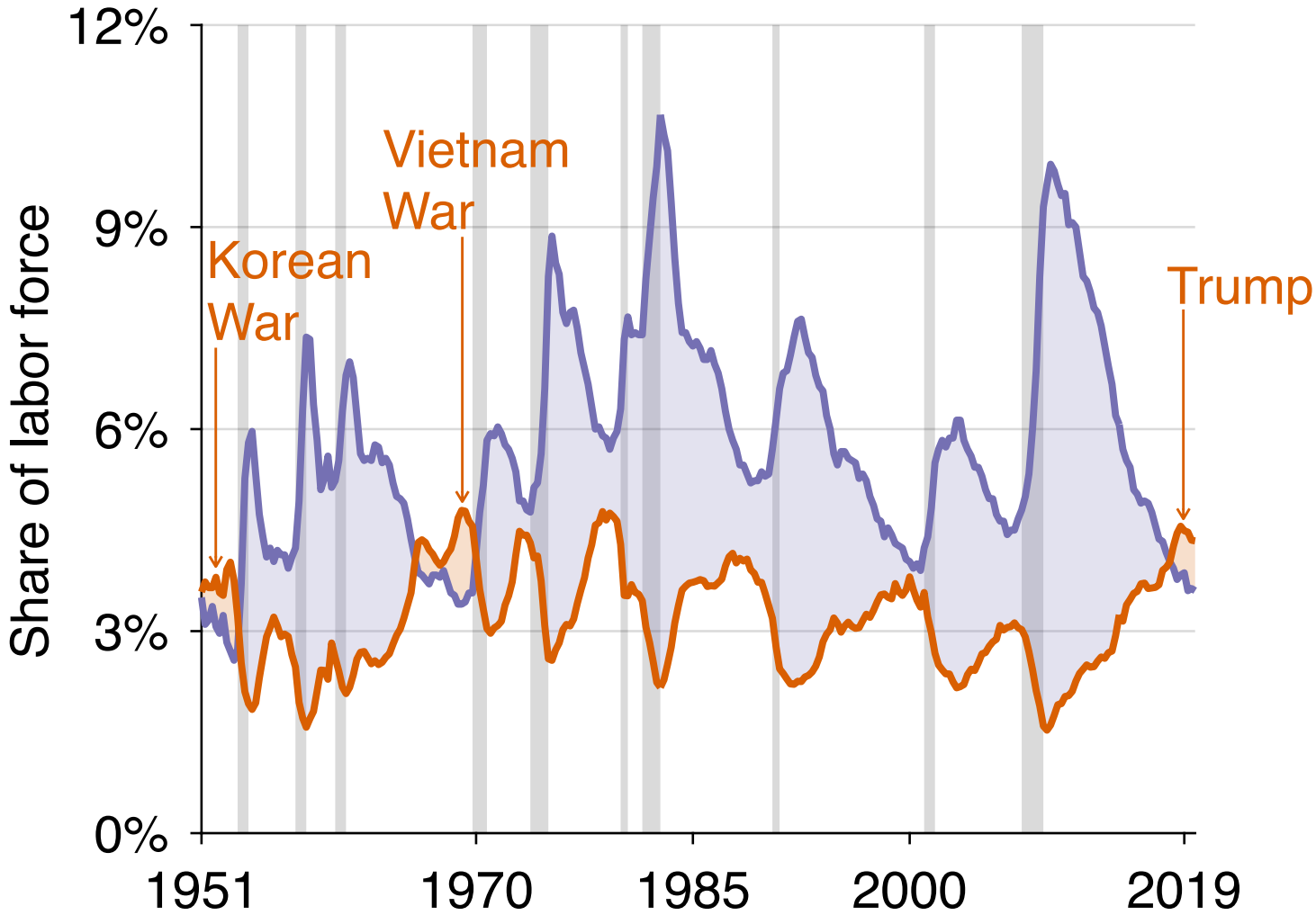
ECONOMY IS GENERALLY TOO SLACK...



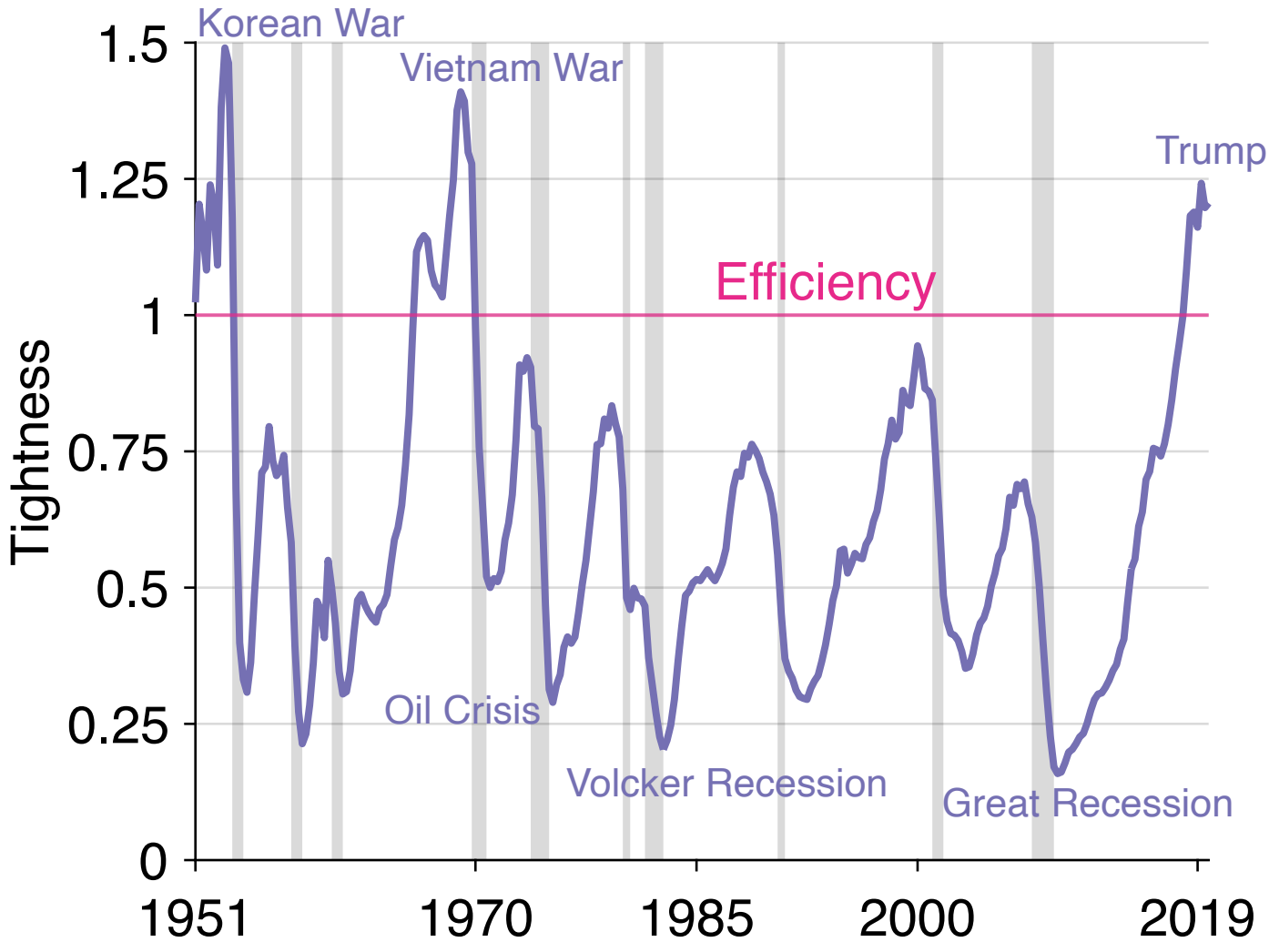
... AND IS ESPECIALLY SLACK IN SLUMPS



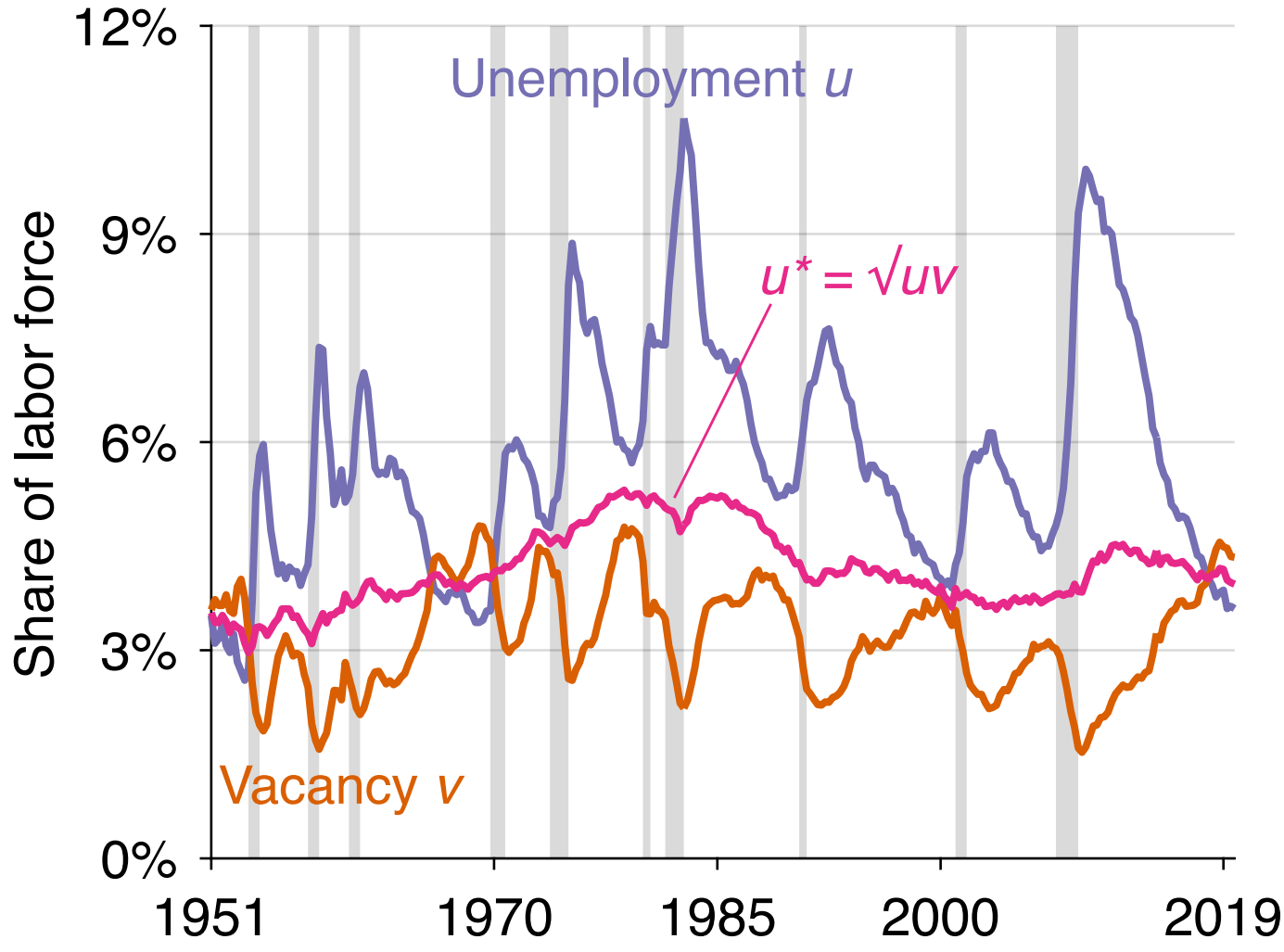
ECONOMY IS TOO TIGHT DURING WARS



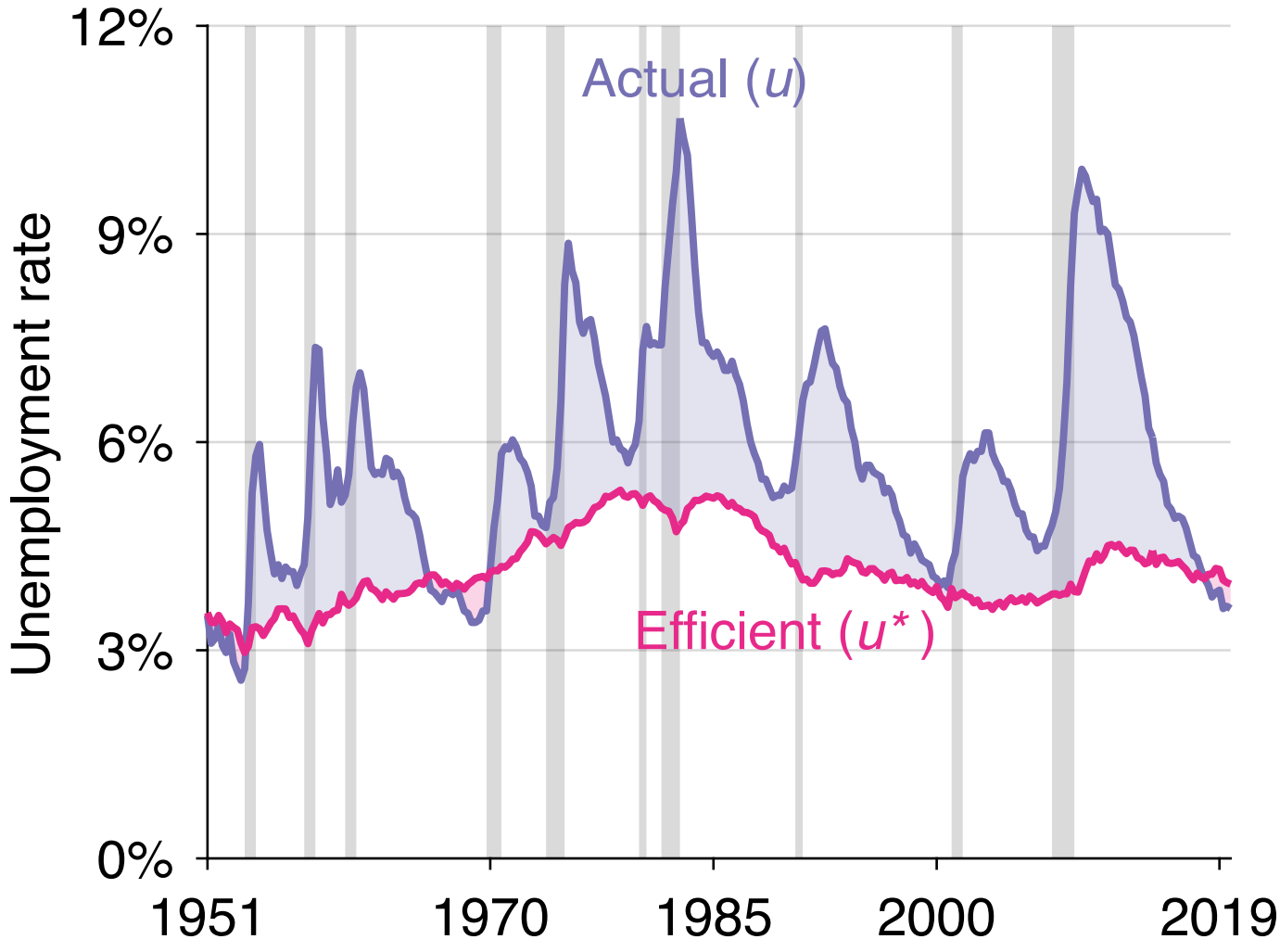
TIGHTNESS v/u SUMMARIZES STATE OF ECONOMY



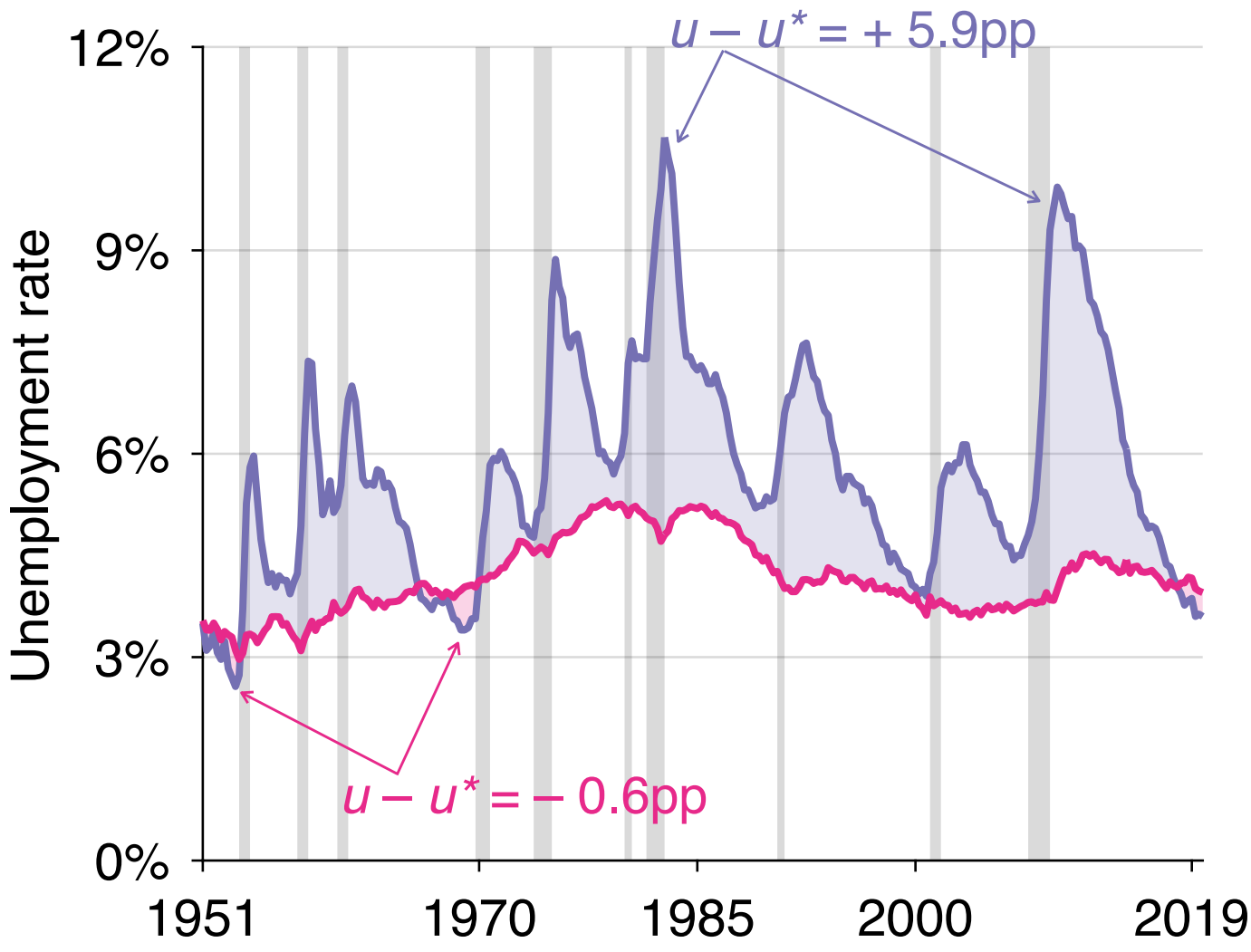
CONSTRUCTION OF EFFICIENT UNEMPLOYMENT RATE



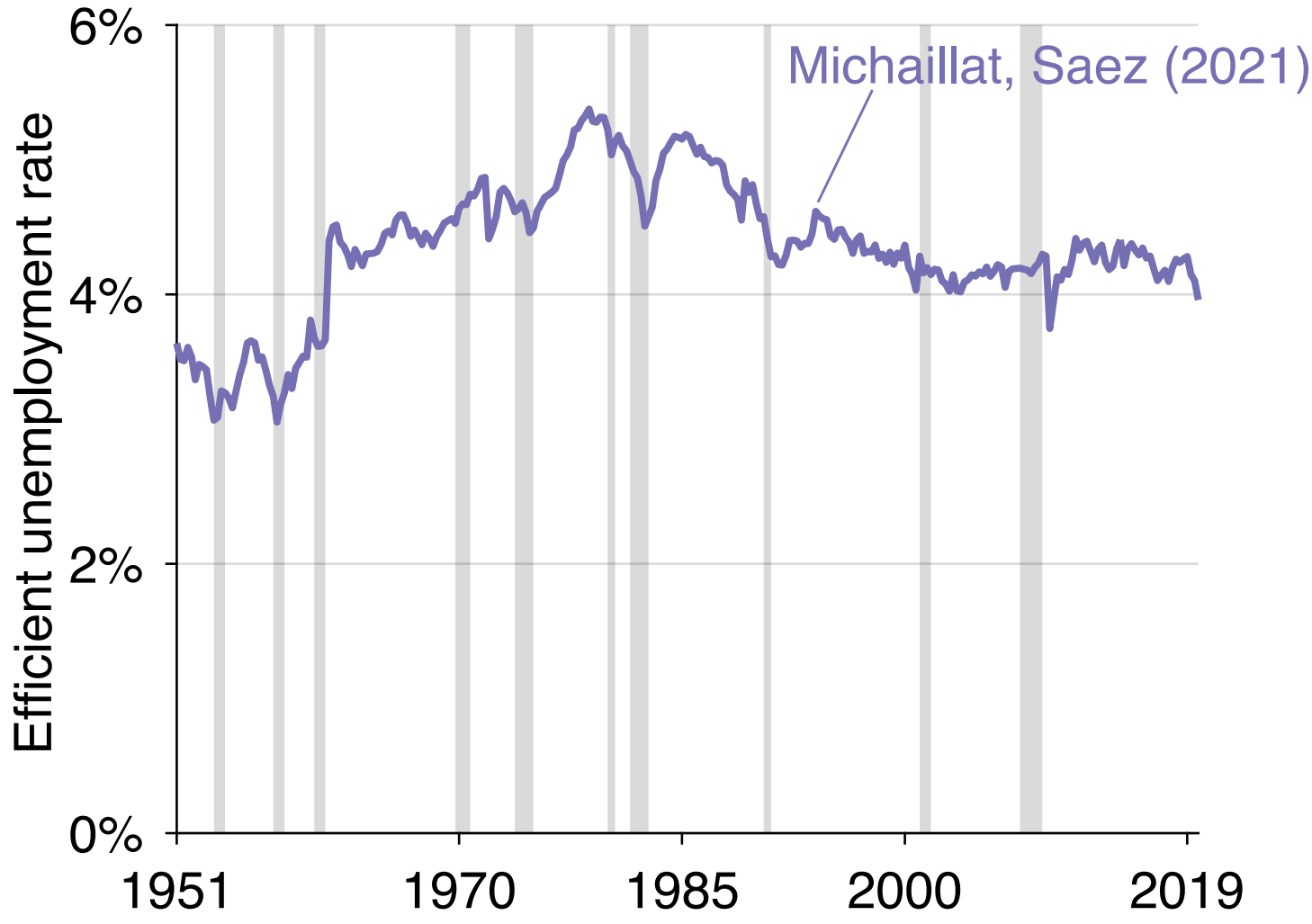
u^* REMAINS IN 3.0%–5.3%, AVERAGES 4.2%



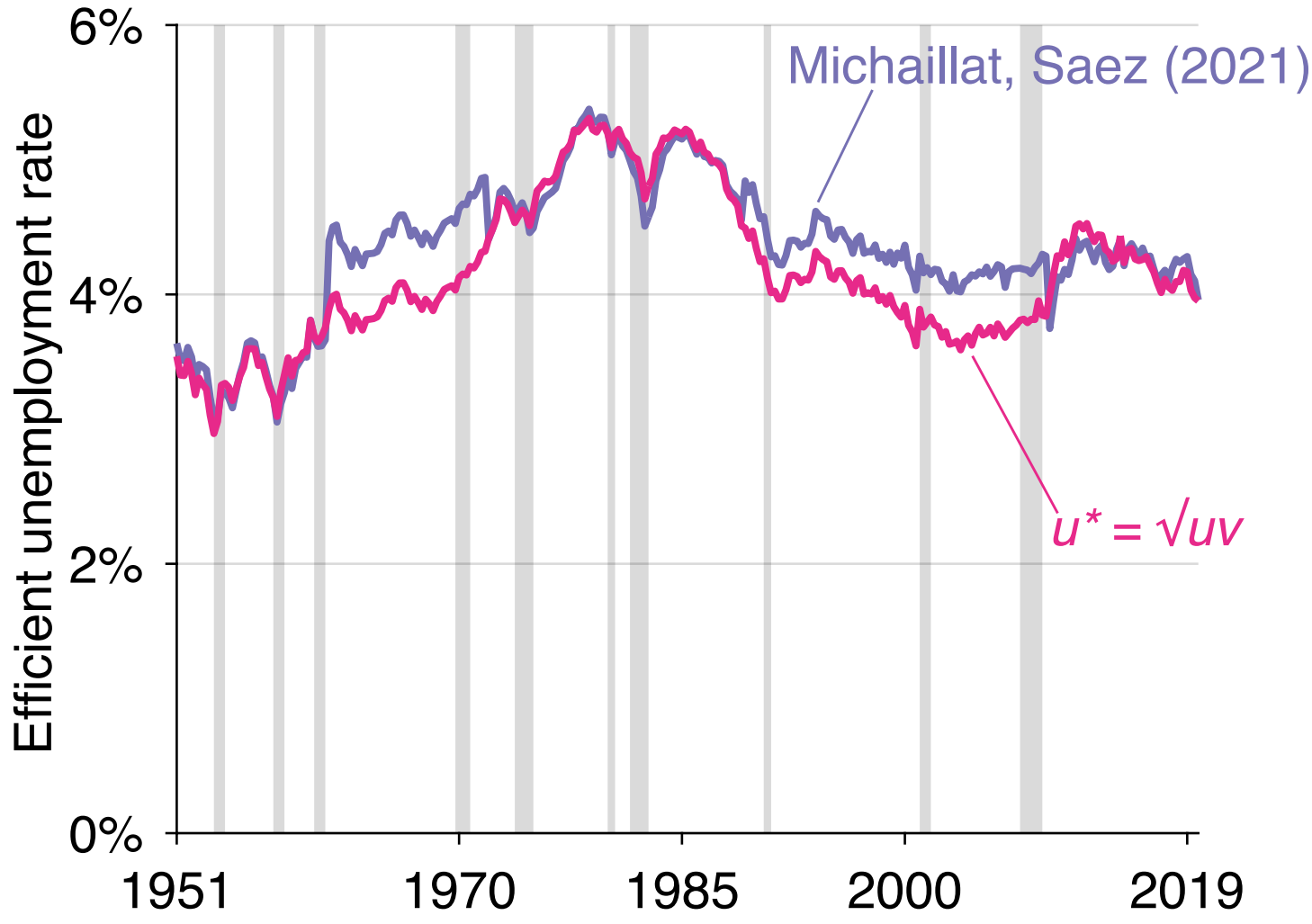
UNEMPLOYMENT GAP IS COUNTERCYCLICAL



COMPARISON WITH MICHAILLAT, SAEZ (2021)



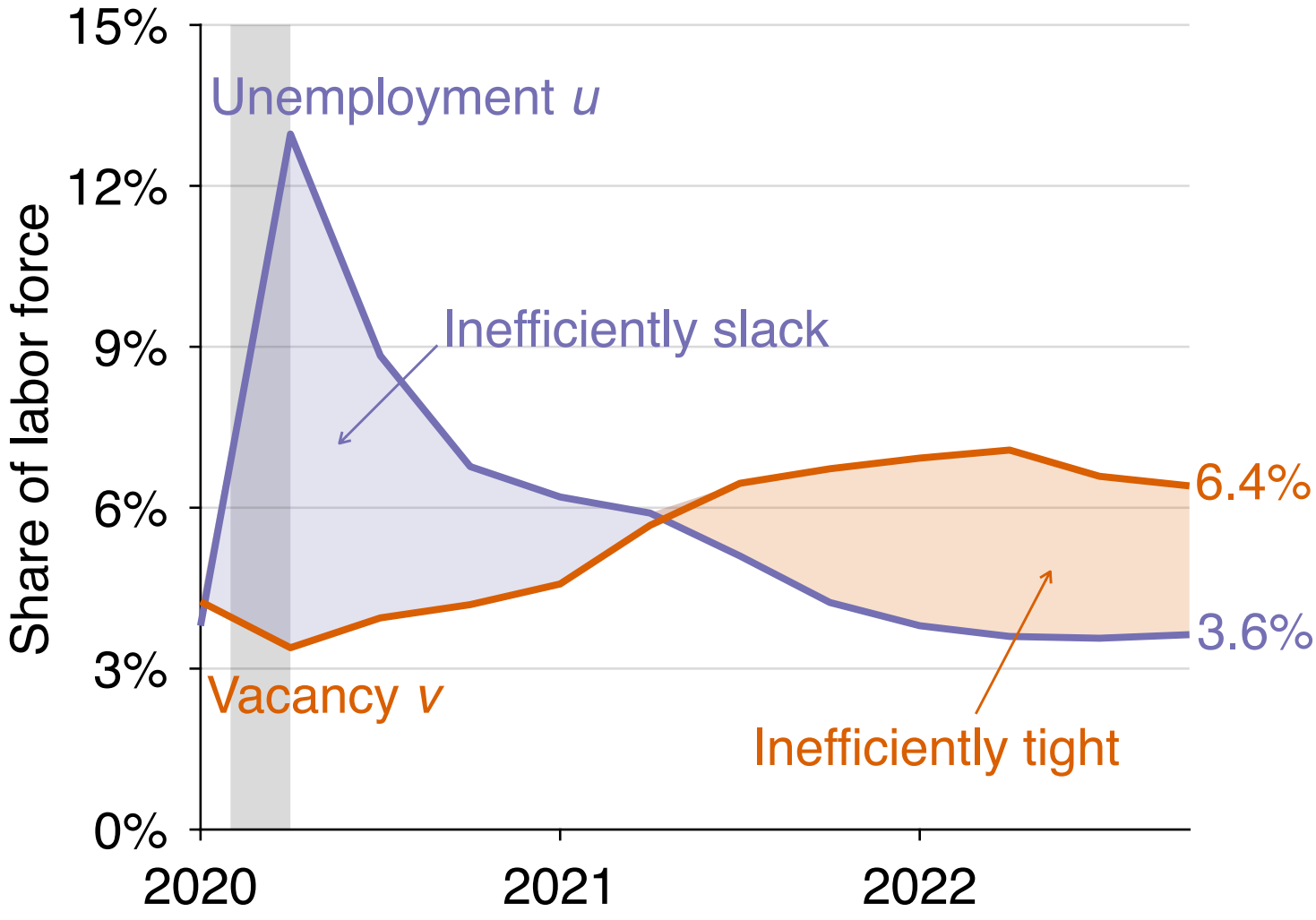
COMPARISON WITH MICHAILLAT, SAEZ (2021)



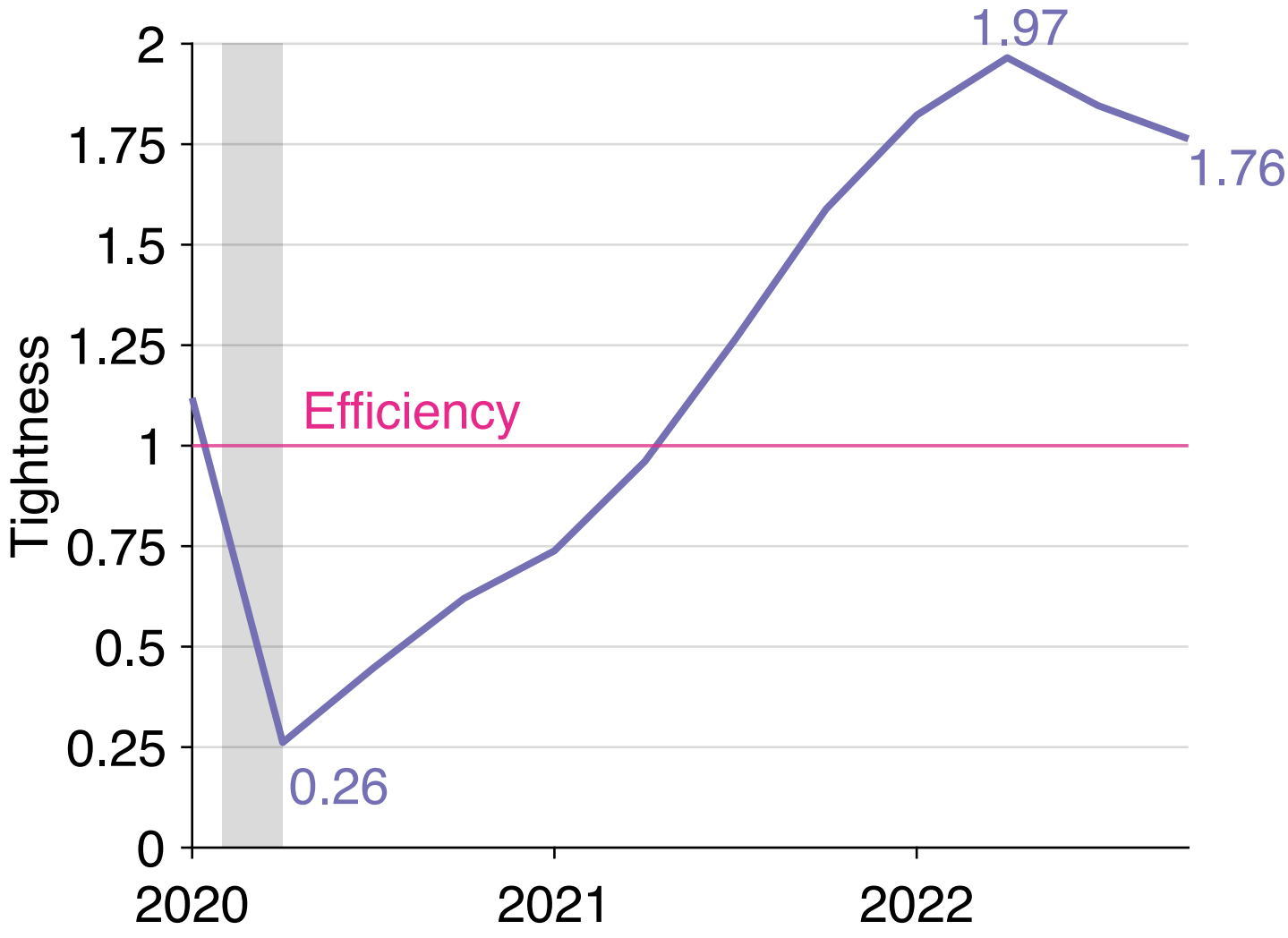
PANDEMIC IN THE UNITED STATES

(2020–2022)

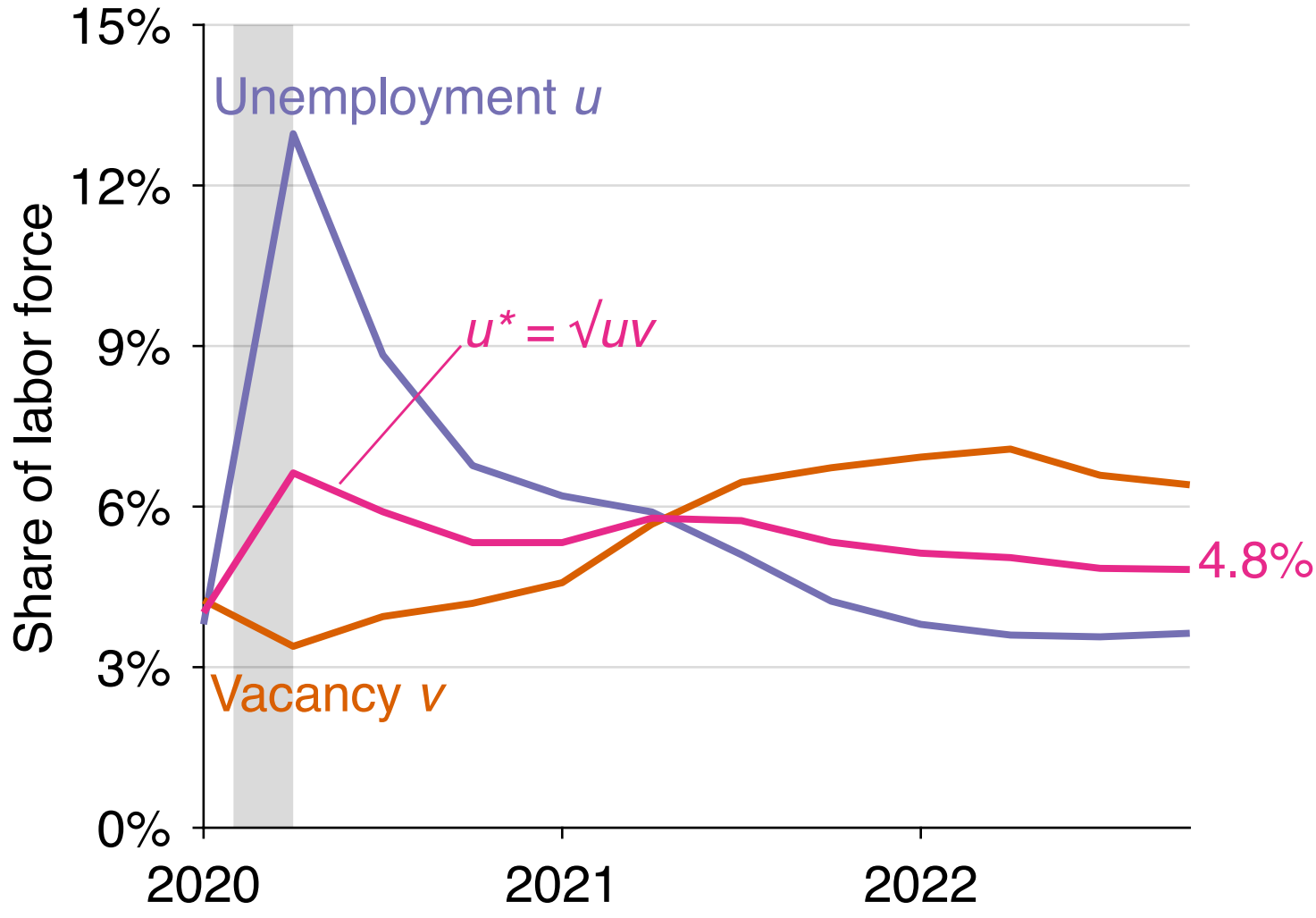
ECONOMY HAS BEEN TOO TIGHT SINCE 2021Q3



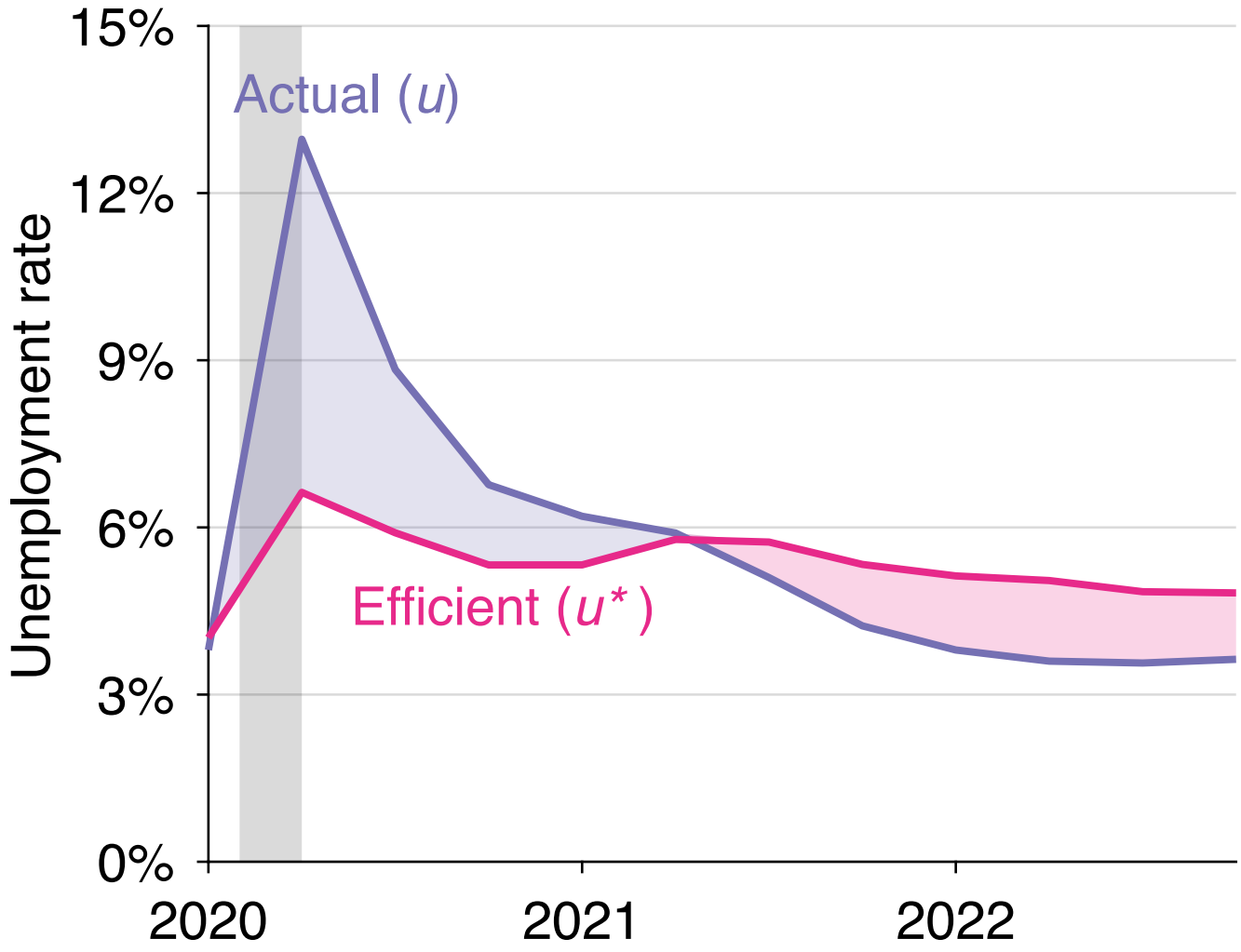
BUT ECONOMY HAS BEEN COOLING SINCE 2022Q2



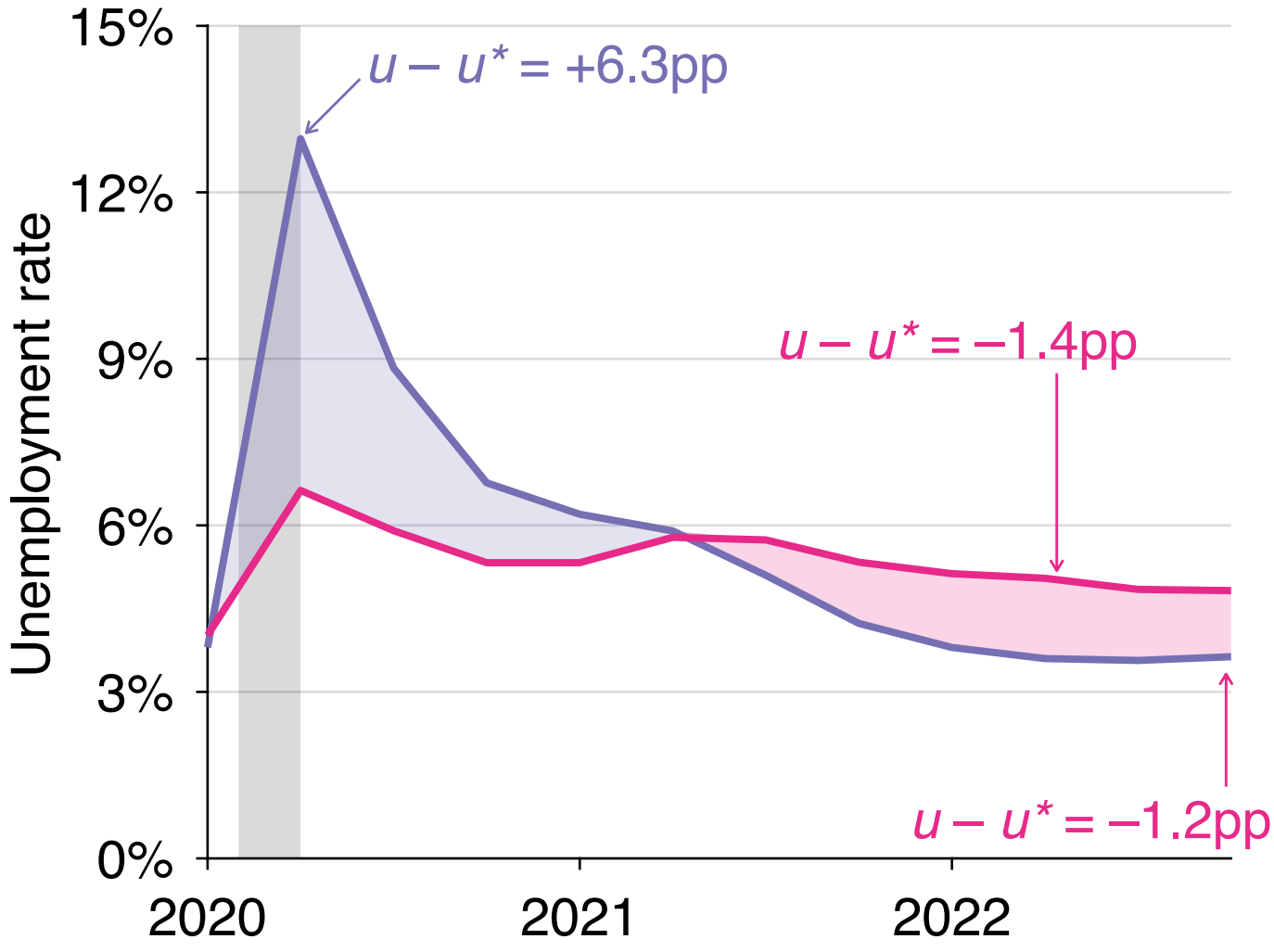
CURRENT TARGET FOR MONETARY POLICY: $u^* = 4.8\%$



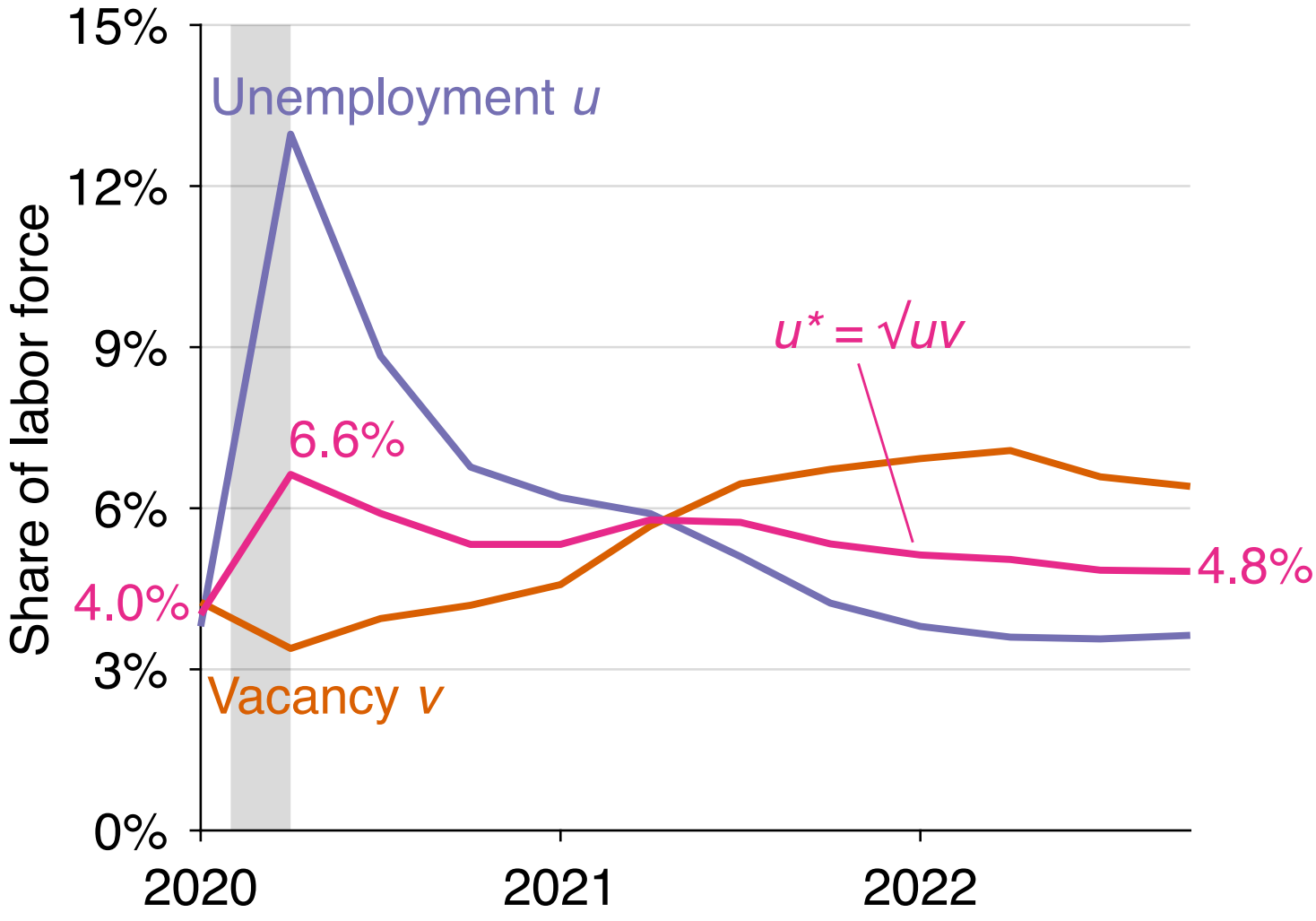
MOST EXTREME UNEMPLOYMENT GAPS SINCE WW2



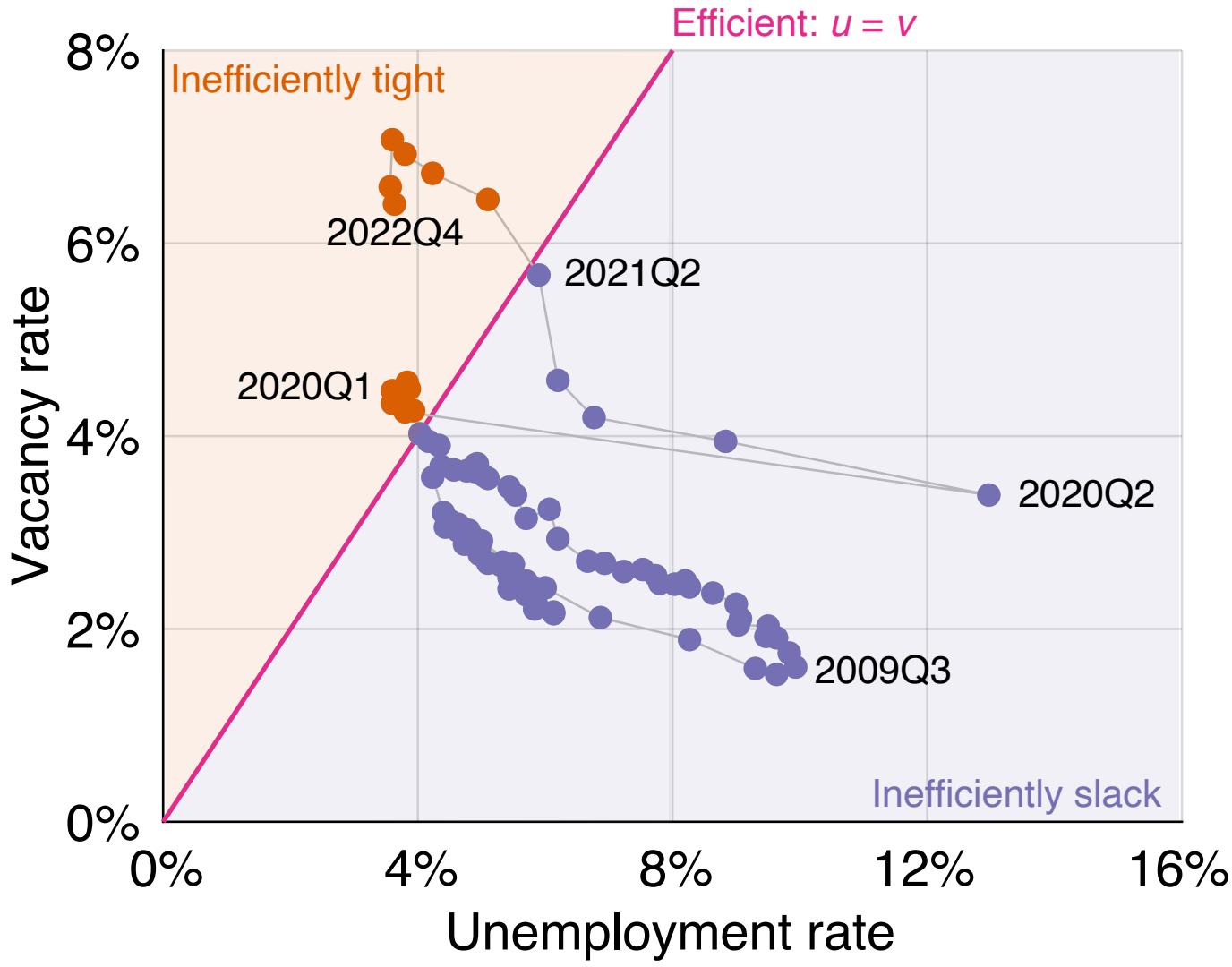
MOST EXTREME UNEMPLOYMENT GAPS SINCE WW2



WHY DID u^* INCREASE SO MUCH IN 2020?

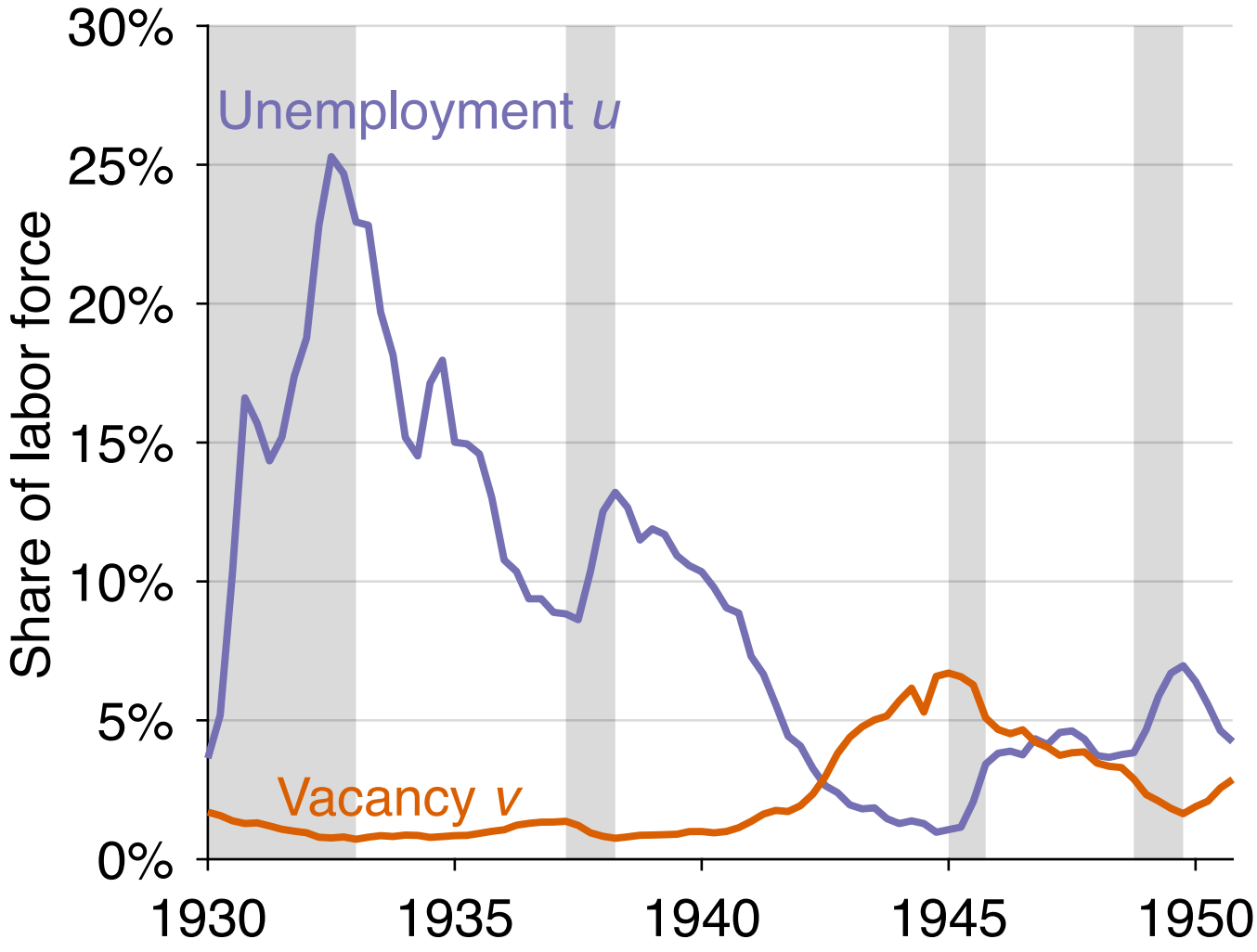


WHY DID u^* INCREASE SO MUCH IN 2020?

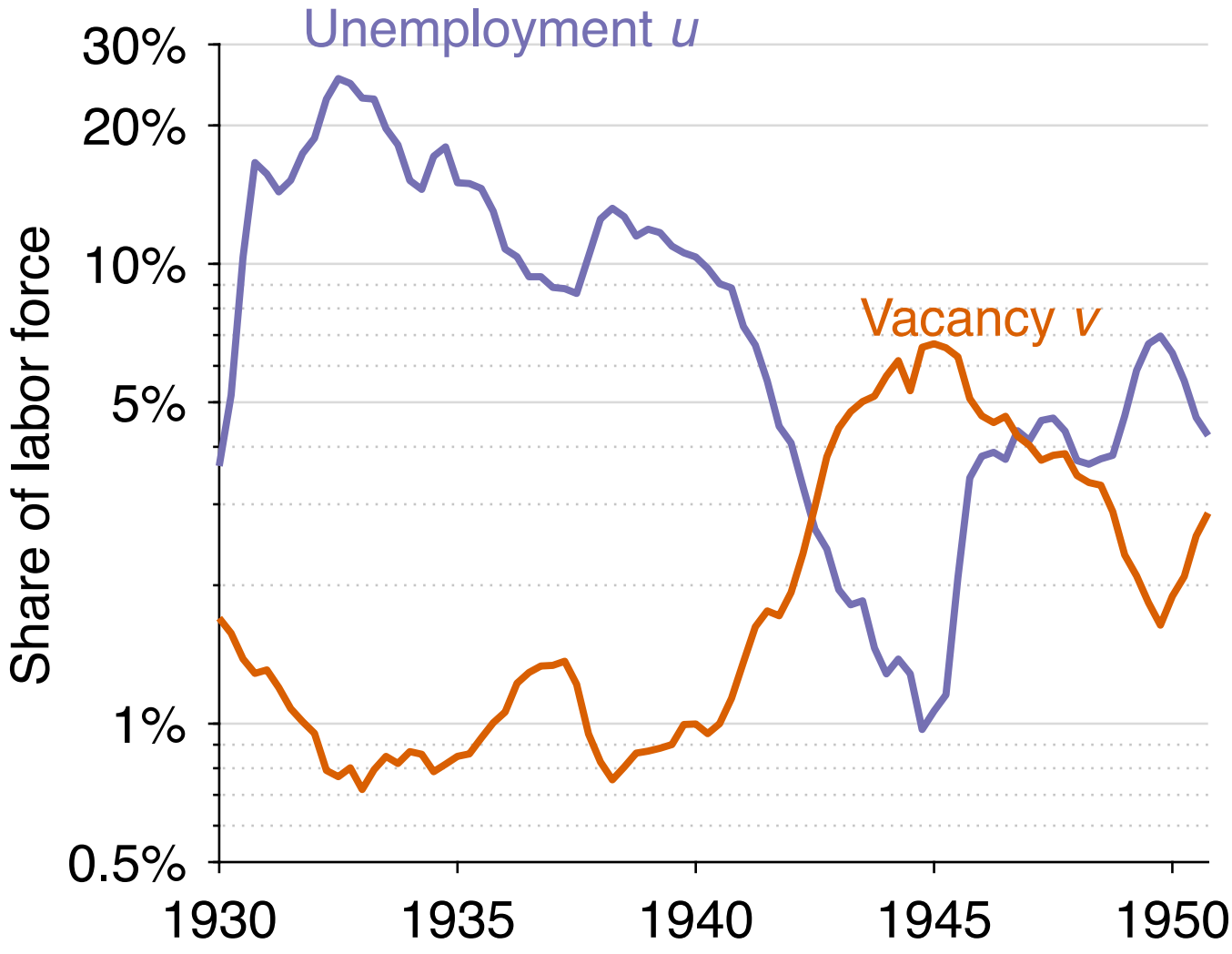


GREAT DEPRESSION IN THE UNITED STATES (1930–1950)

NBER DATA (PETROSKY-NADEAU, ZHANG 2021)



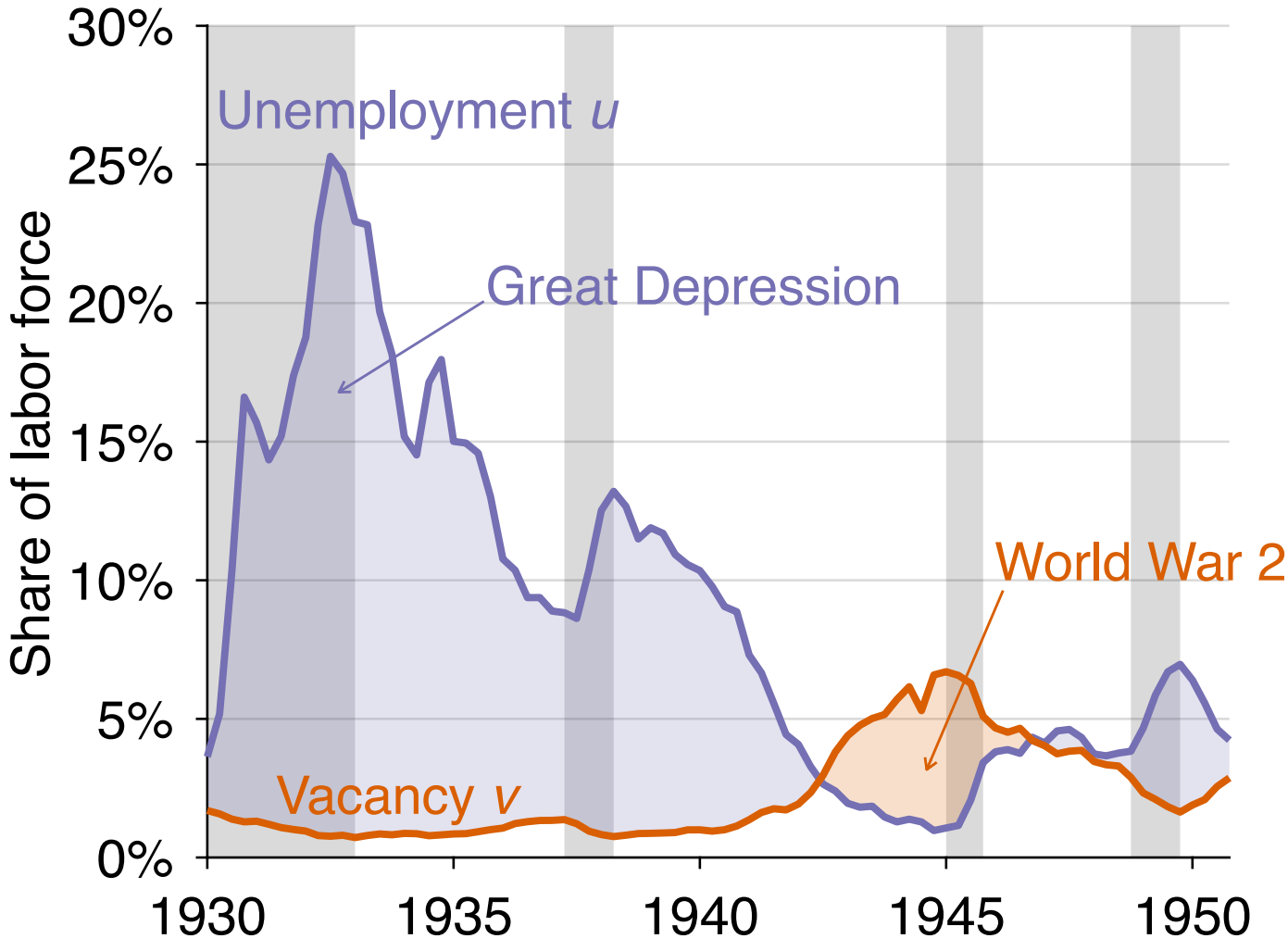
BEVERIDGE CURVE ≈ HYPERBOLA



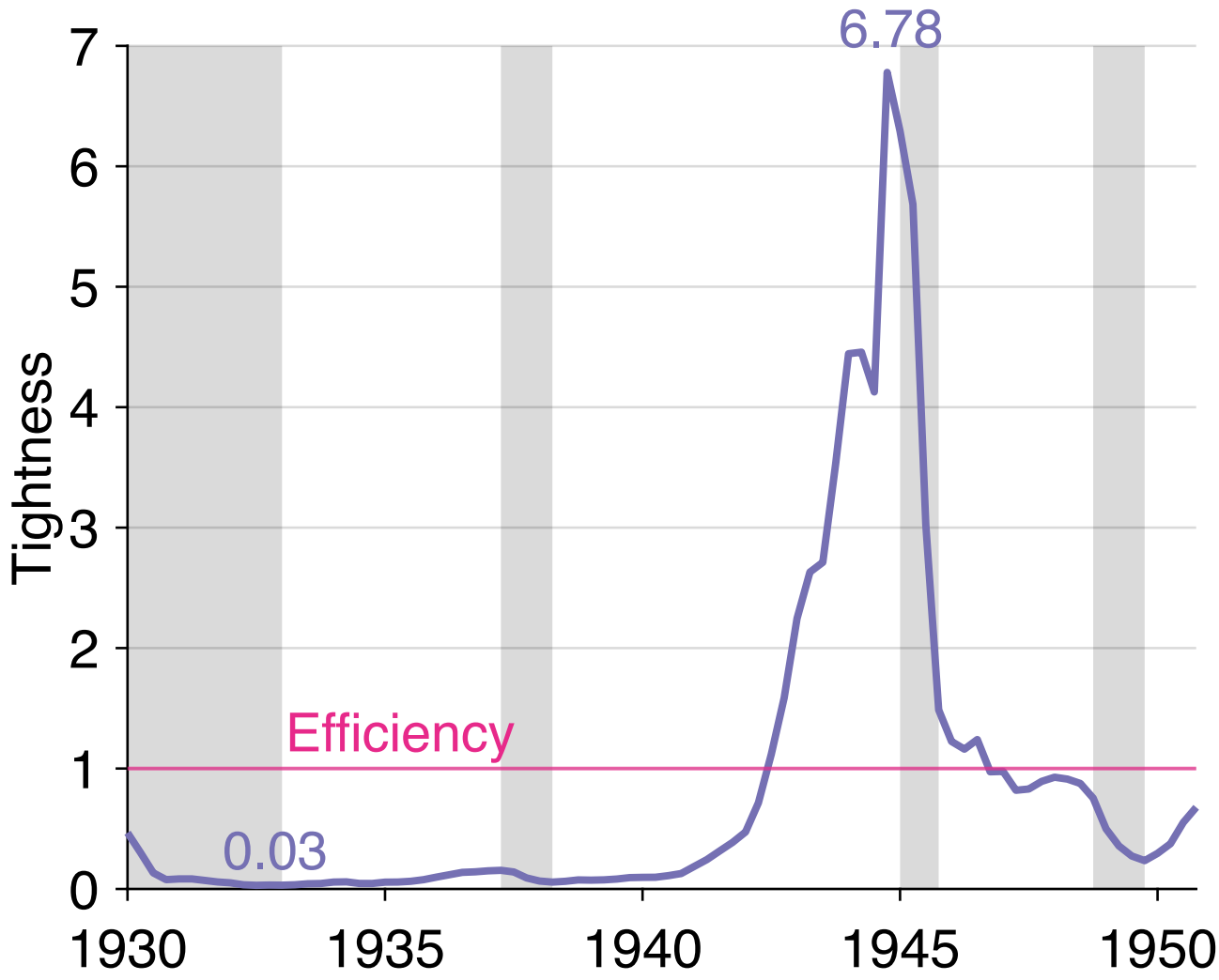
BEVERIDGE CURVE ≈ HYPERBOLA

PARALLEL: GREAT DEPRESSION AND PANDEMIC

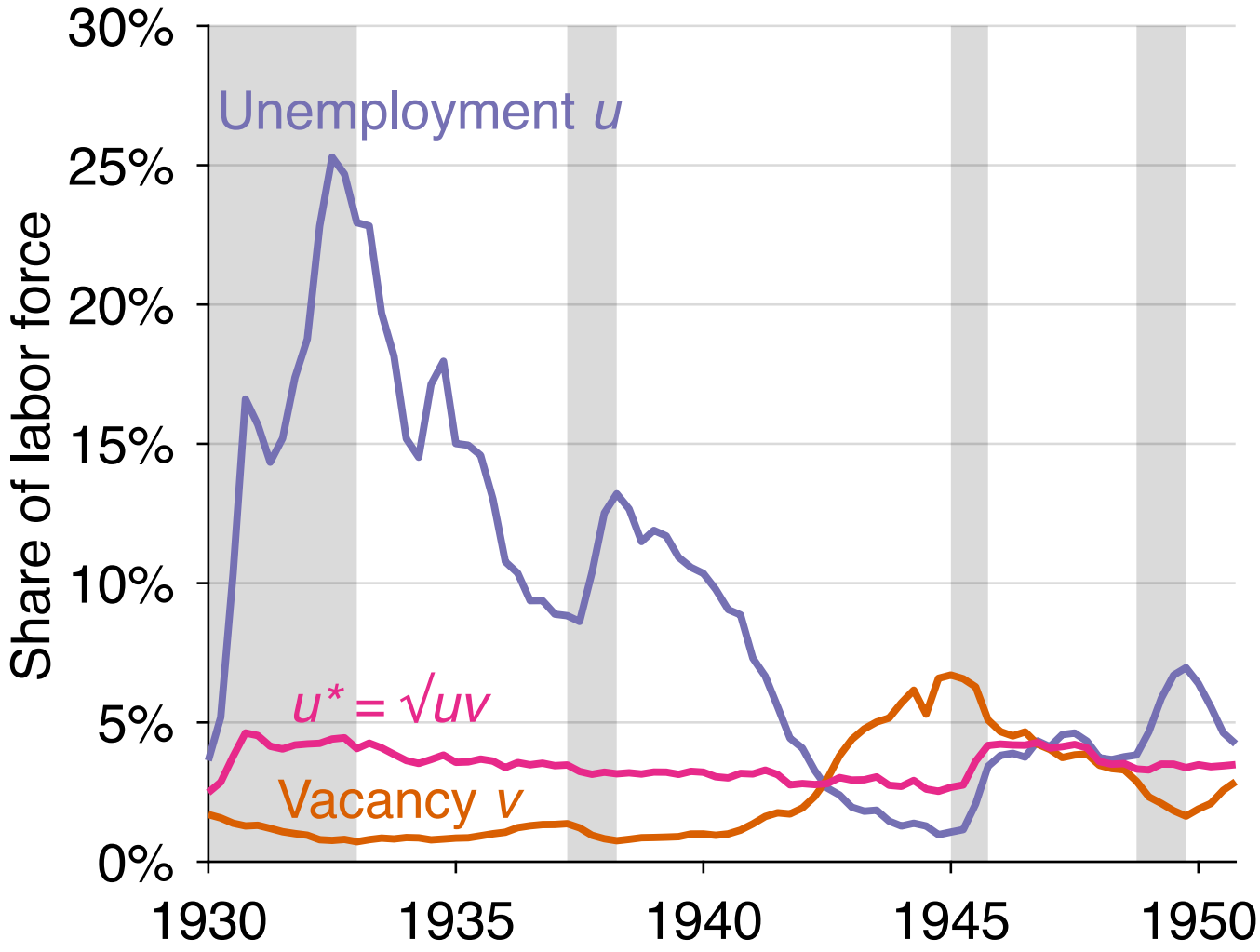
ECONOMY WAS TOO SLACK UNTIL WW2



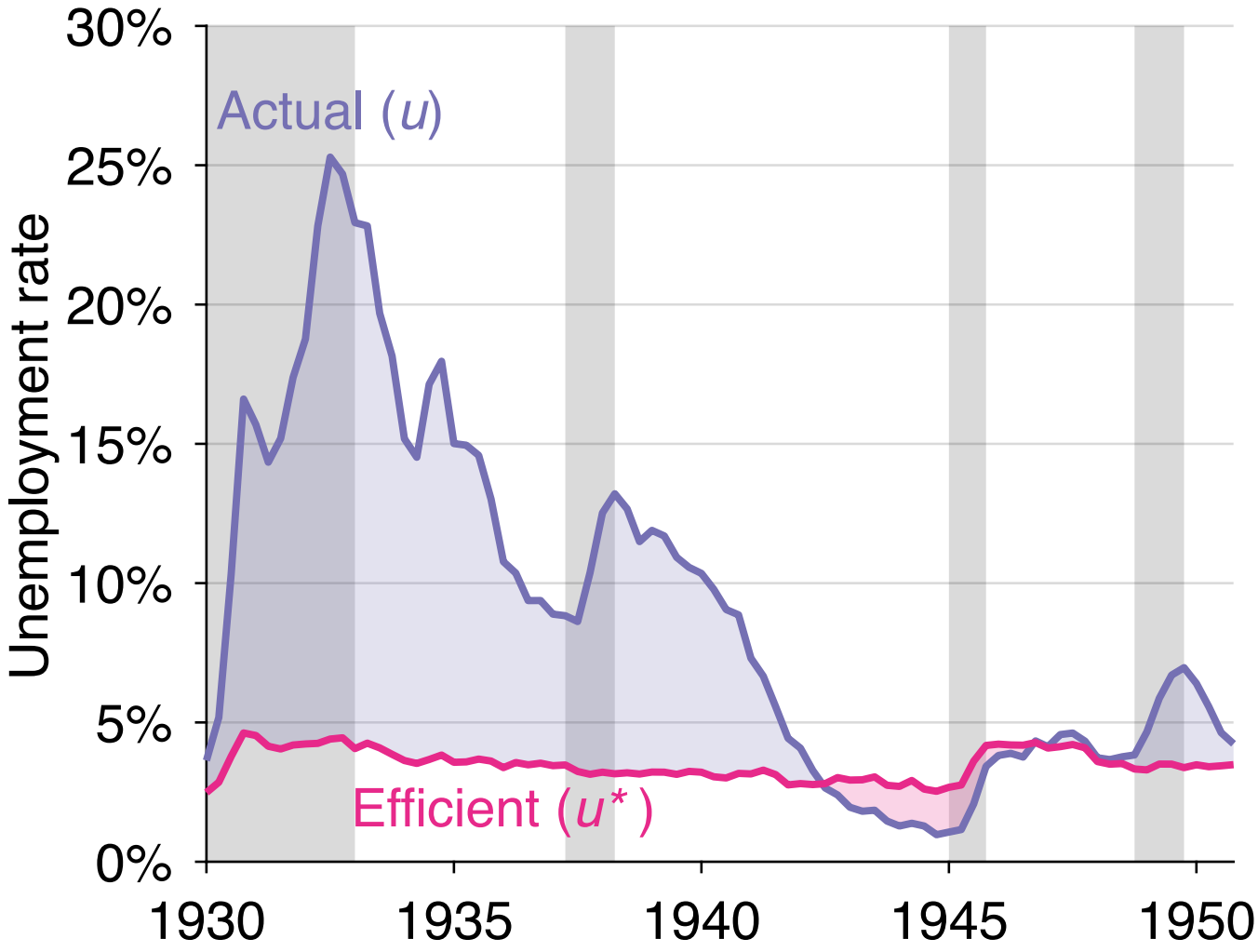
LOWEST AND HIGHEST TIGHTNESS ON RECORD



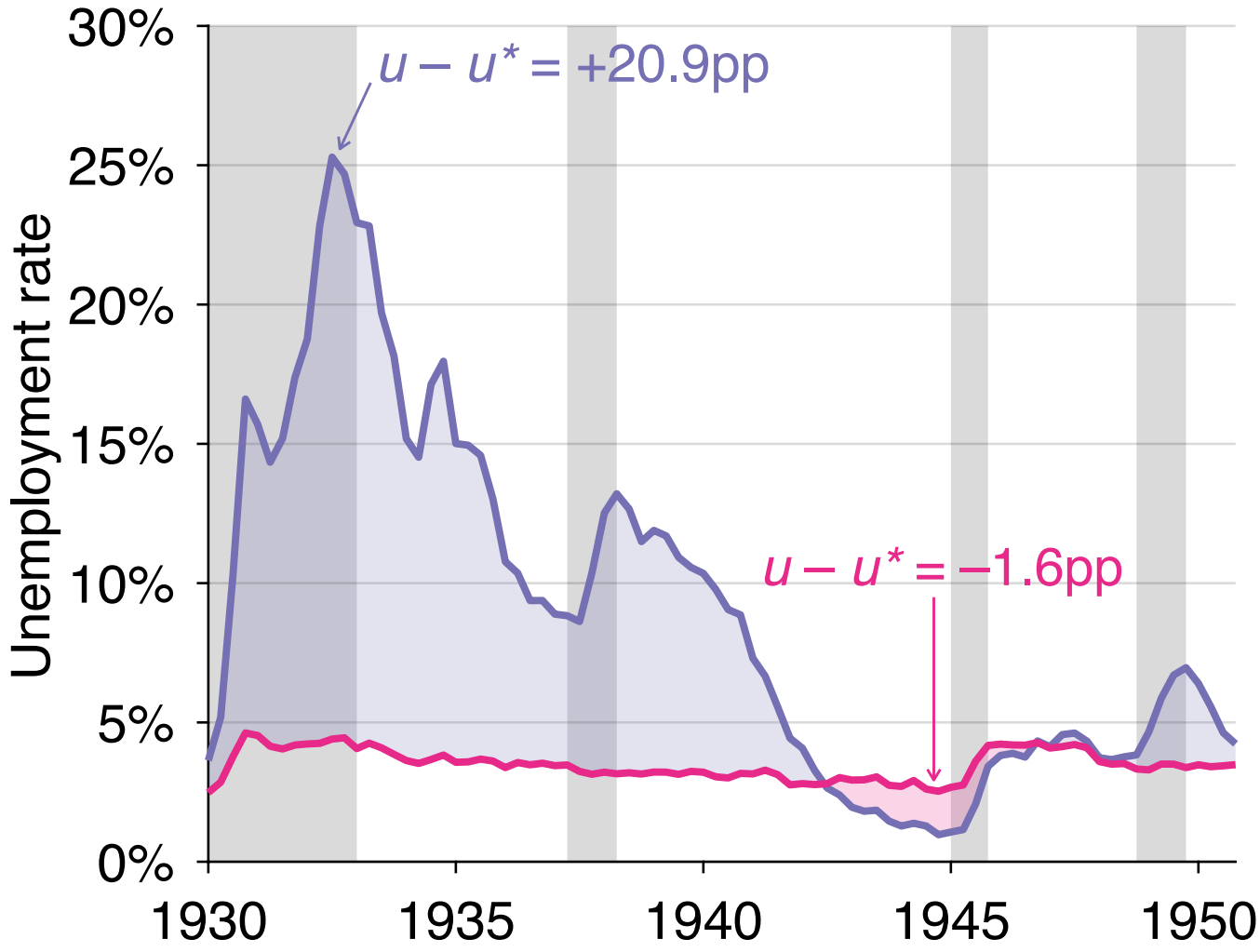
u^* REMAINS IN 2.5%–4.6%, AVERAGES 3.5%



u^* REMAINS IN 2.5%–4.6%, AVERAGES 3.5%

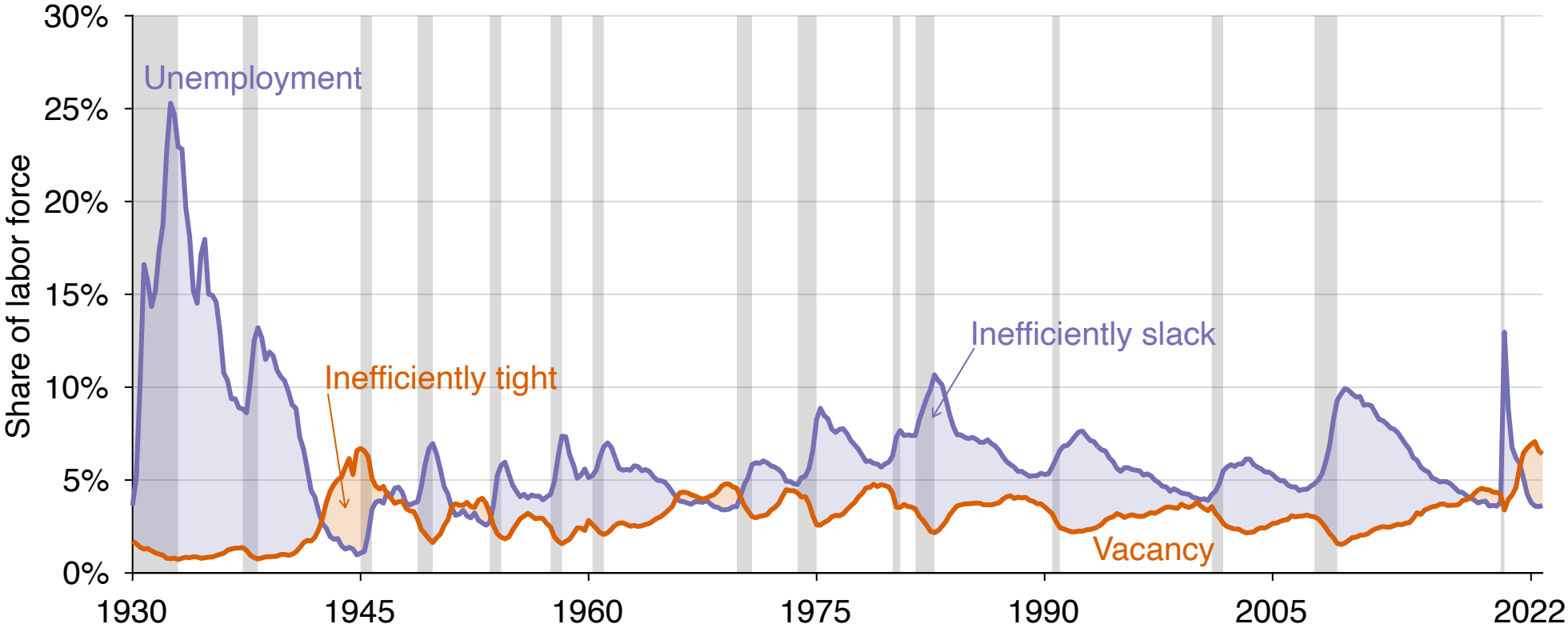


MOST EXTREME UNEMPLOYMENT GAPS ON RECORD

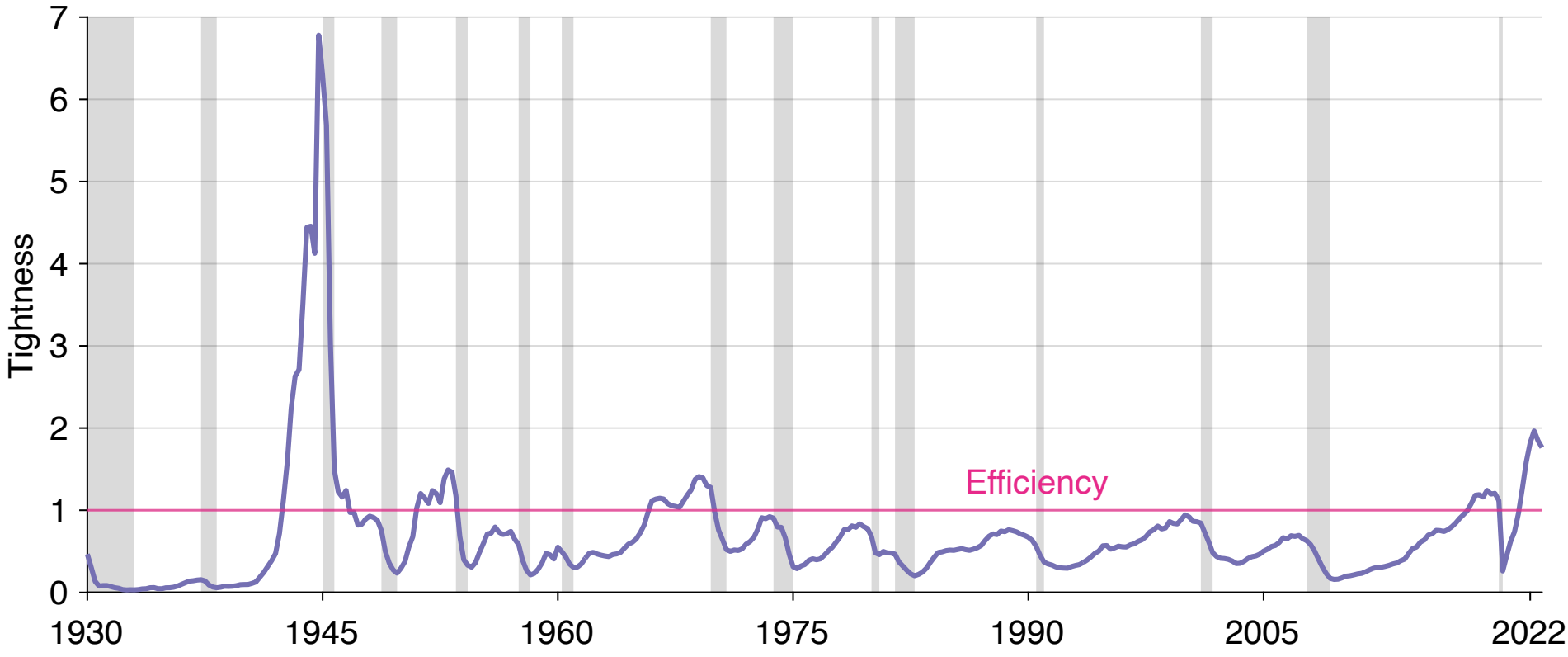
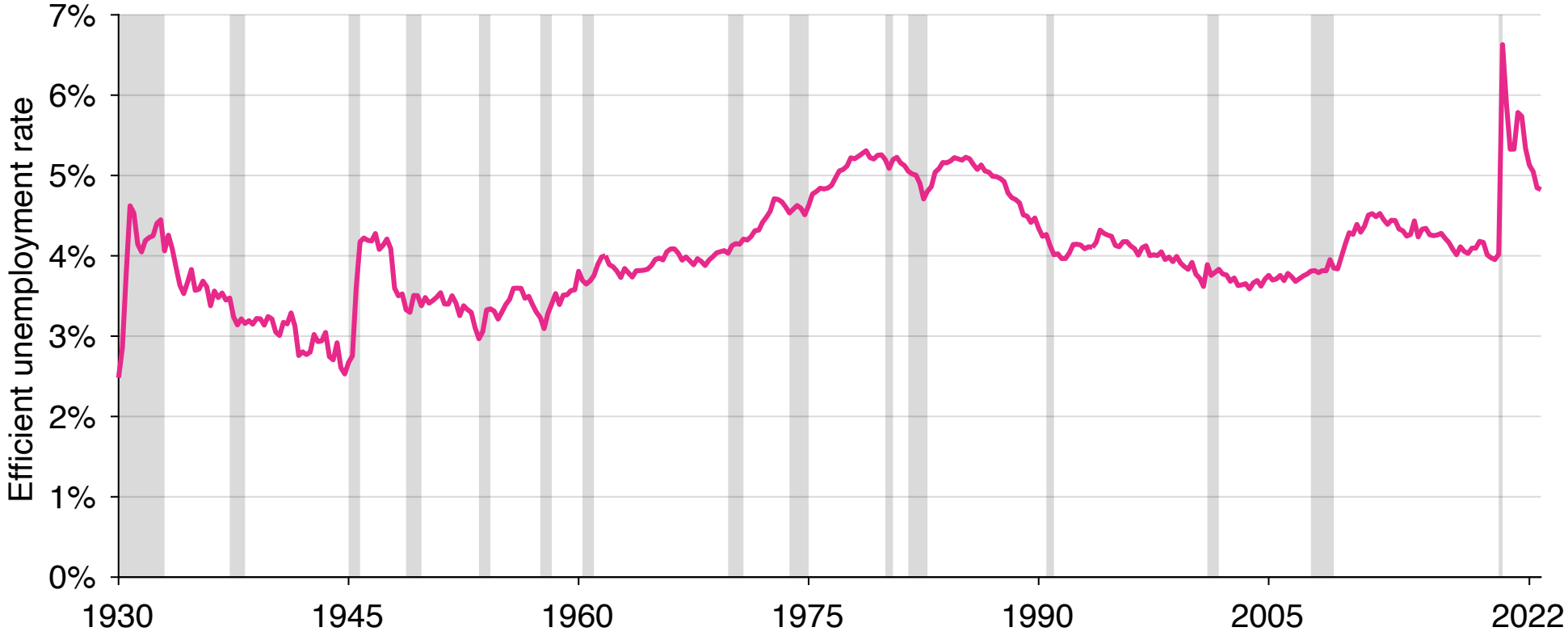


SUMMARY

EFFICIENCY CRITERION FOR US LABOR MARKET



AN EQUIVALENT EFFICIENCY CRITERION



$u^* = \sqrt{uv}$ AVERAGES 4.1% OVER 1930–2022