

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

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Pascal Michailat, Emmanuel Saez

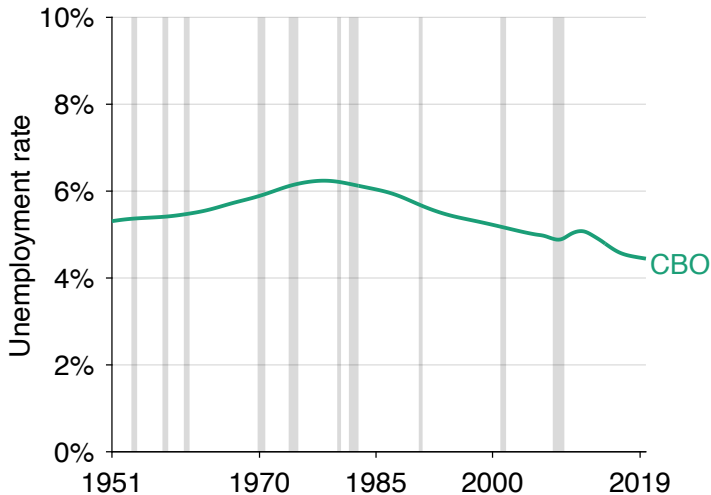
May 2023

Paper available at <https://pascalnichailat.org/13/>

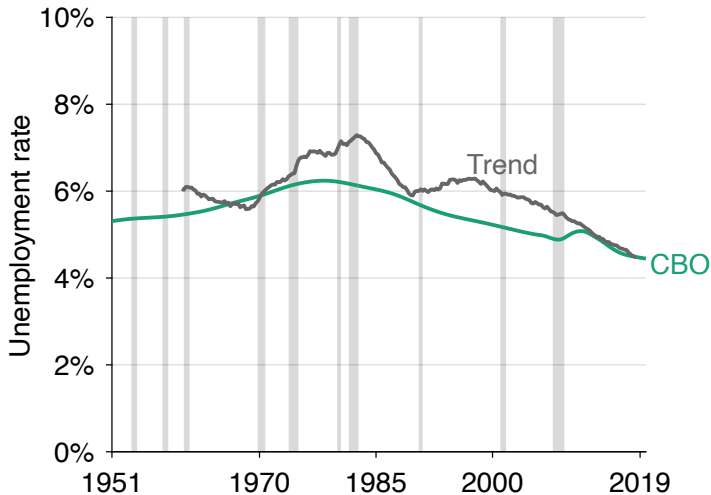
# ROLES OF EFFICIENT UNEMPLOYMENT RATE, $u^*$

1. sufficient statistic for optimal policy over the business cycle
  - monetary policy (Michaillat, Saez 2022)
  - fiscal policy (Michaillat, Saez 2019)
  - unemployment insurance (Landais, Michaillat, Saez 2018)
  - immigration (Michaillat 2023)
2. welfare-based measure of “full employment”
  - Full Employment and Balanced Growth Act of 1978

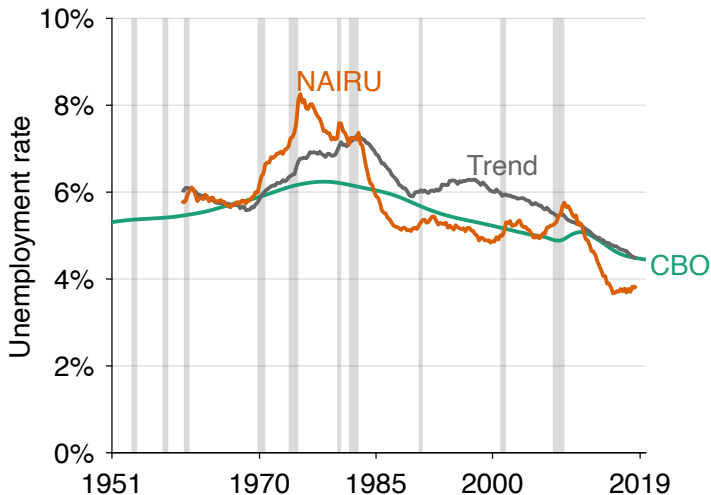
# EXISTING MEASURES OF “FULL EMPLOYMENT”



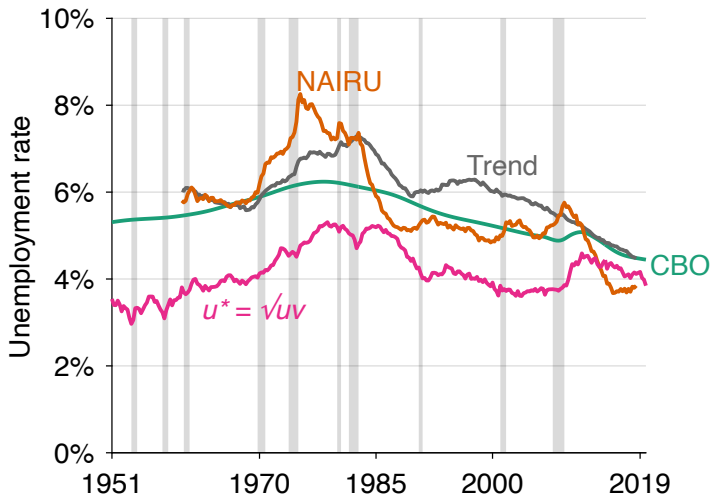
# EXISTING MEASURES OF “FULL EMPLOYMENT”



# EXISTING MEASURES OF “FULL EMPLOYMENT”



# THIS PAPER: WELFARE-BASED “FULL EMPLOYMENT”



# THEORY

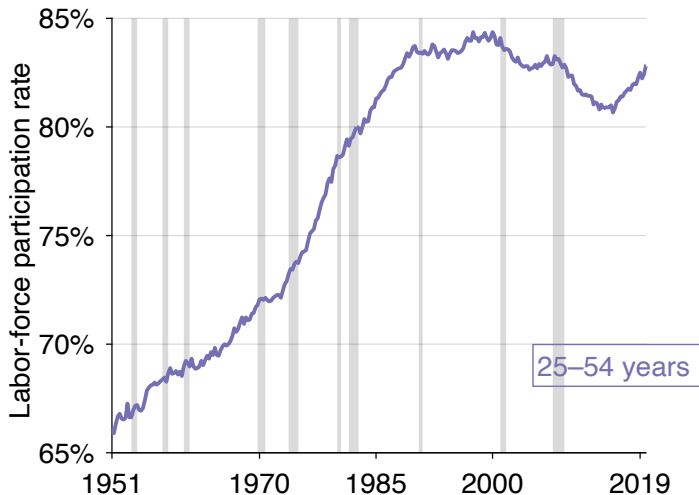
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# COMPOSITION OF LABOR FORCE

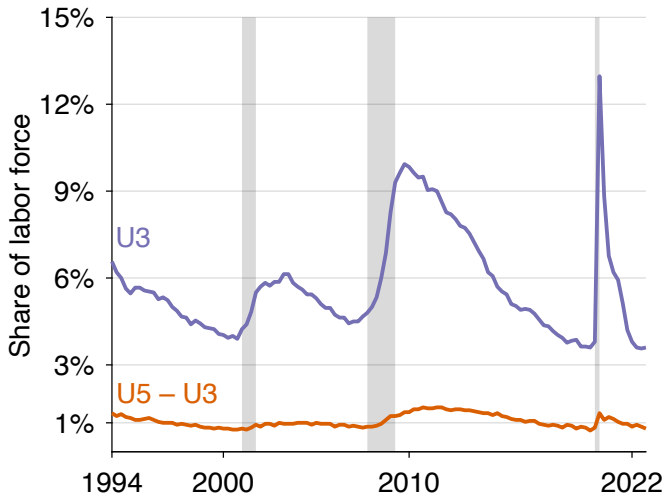
1. share  $u$  of labor force is unemployed
  - no home production (Borgschulte, Martorell 2018)
2. share  $v$  of labor force is employed recruiting
  - one worker per vacancy (National Employer Survey 1997)
3. share  $1 - (u + v)$  of labor force is employed producing
  - production determines social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



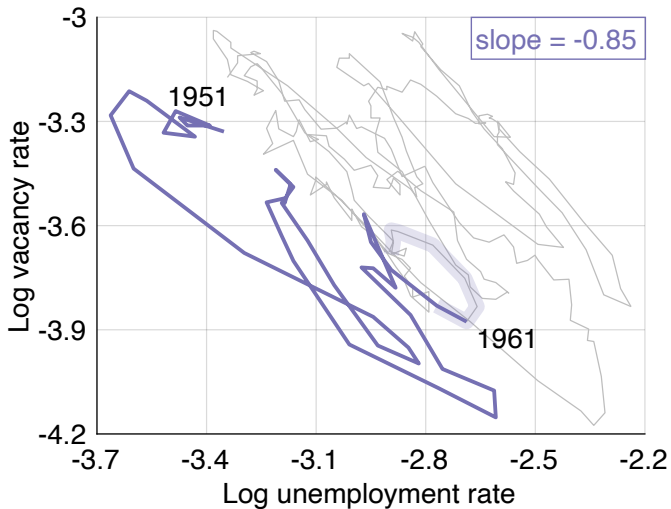
# US LABOR-FORCE PARTICIPATION $\approx$ ACYCLICAL



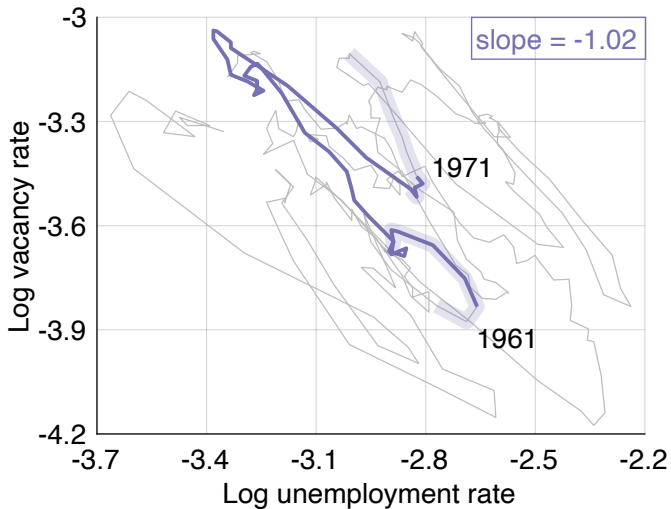
## US MARGINAL ATTACHMENT RATE $\approx 1\%$



# US BEVERIDGE CURVE $\approx$ HYPERBOLA



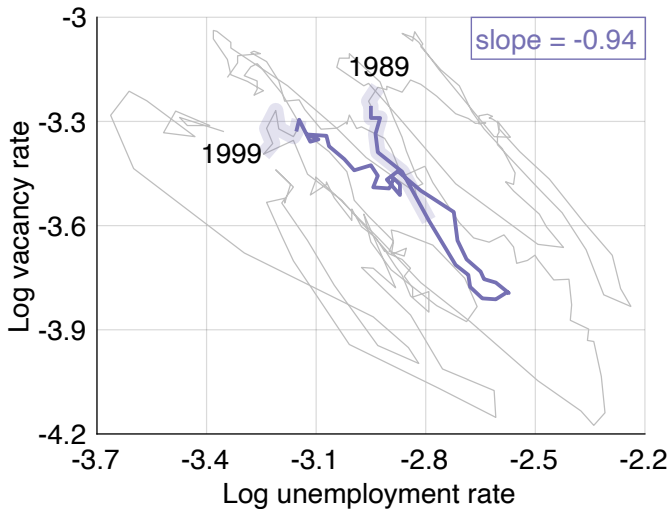
# US BEVERIDGE CURVE $\approx$ HYPERBOLA



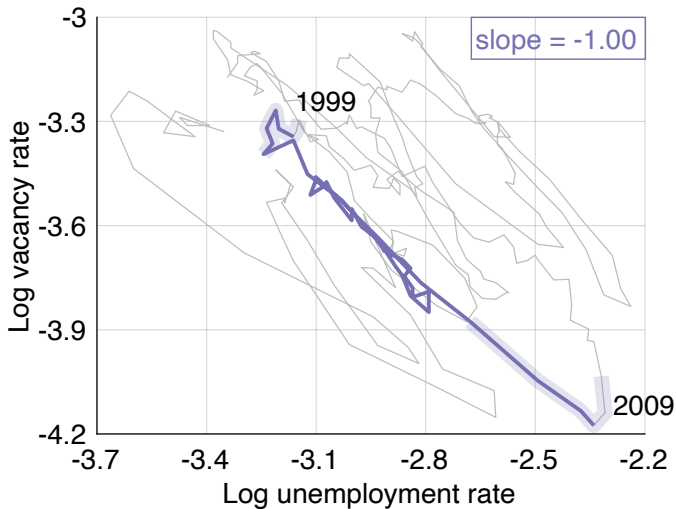
# US BEVERIDGE CURVE $\approx$ HYPERBOLA



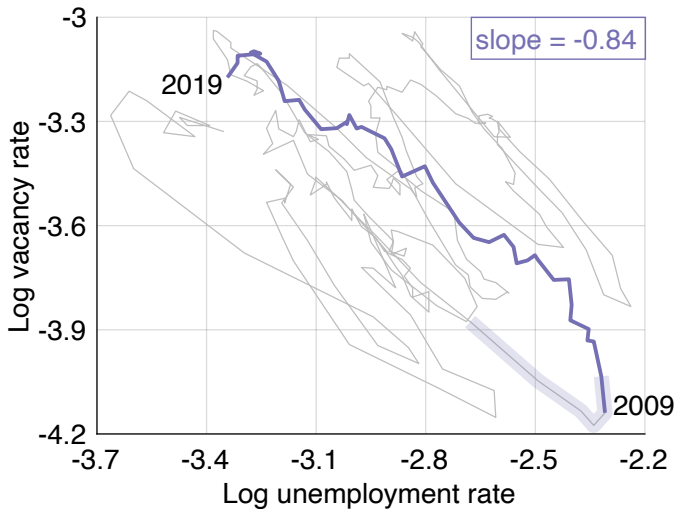
# US BEVERIDGE CURVE $\approx$ HYPERBOLA



# US BEVERIDGE CURVE $\approx$ HYPERBOLA



# US BEVERIDGE CURVE $\approx$ 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 $u \approx v$

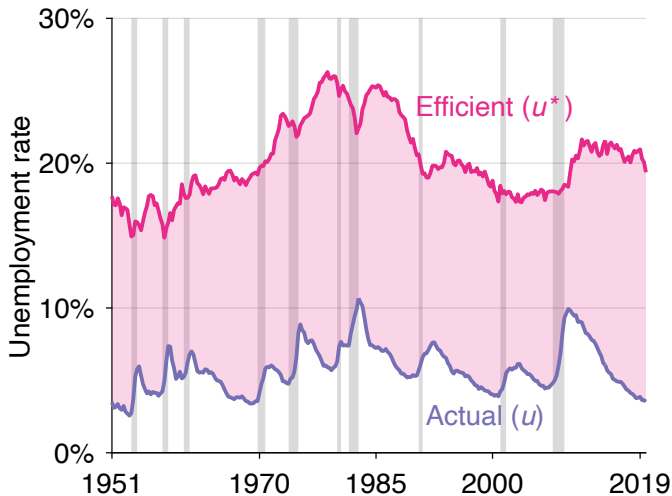
- before Beveridge (1944) report:
  - “Full employment is a state of affairs in which the number of unfilled vacancies is not appreciably below the number of unemployed persons.”
- in Beveridge (1944) report:
  - “Full employment means having always more vacant jobs than unemployed men.”
- US BLS and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

# GENERALIZATION (MICHAILLAT, SAEZ 2021)

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

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

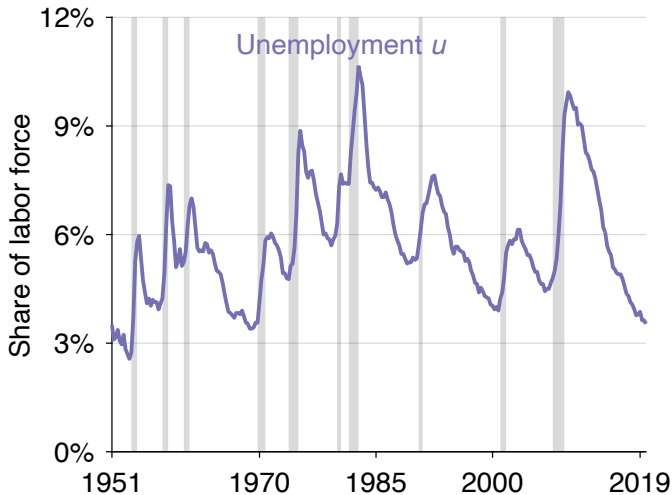
$u^*$  WITH  $\zeta = 0.96$  (HAGEDORN, MANOVSKII 2008)



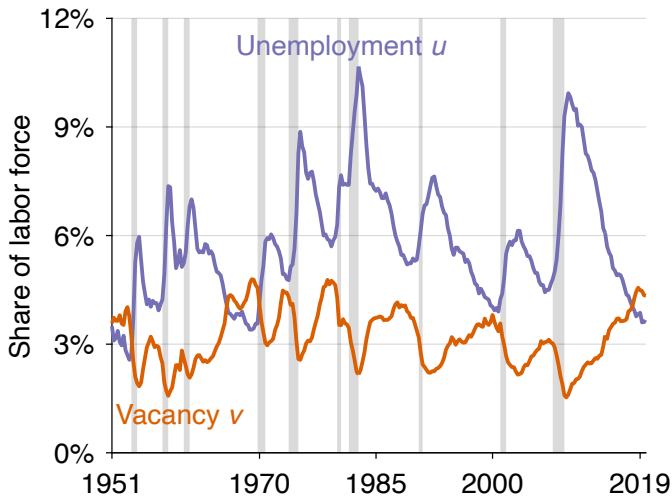
# POSTWAR IN THE UNITED STATES

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# UNEMPLOYMENT RATE (CPS)

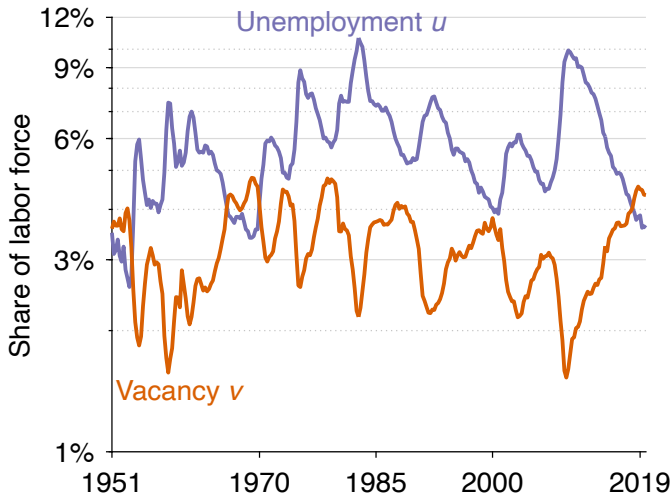


# VACANCY RATE (BARNICHON 2010, JOLTS)

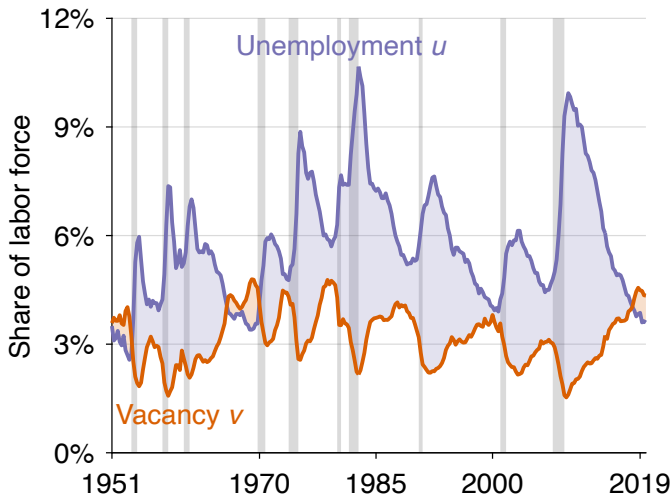




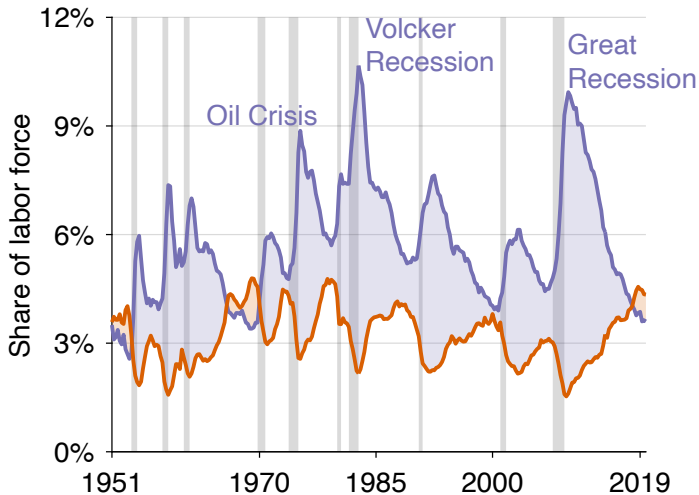
# HYPERBOLIC BEVERIDGE CURVE ON LOG SCALE



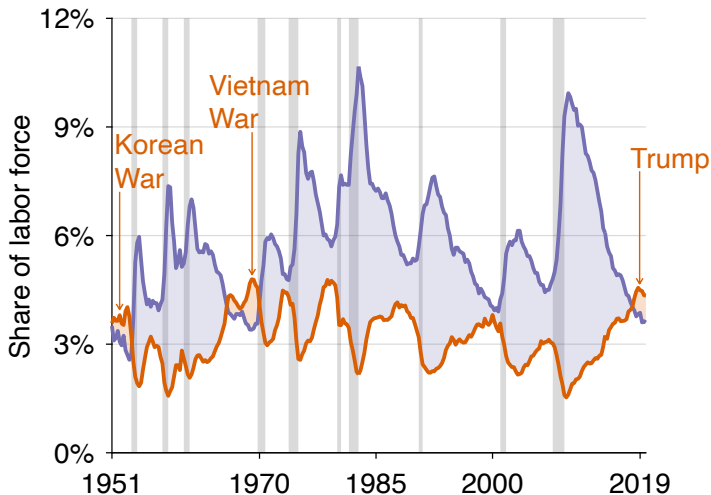
# ECONOMY IS GENERALLY TOO SLACK...



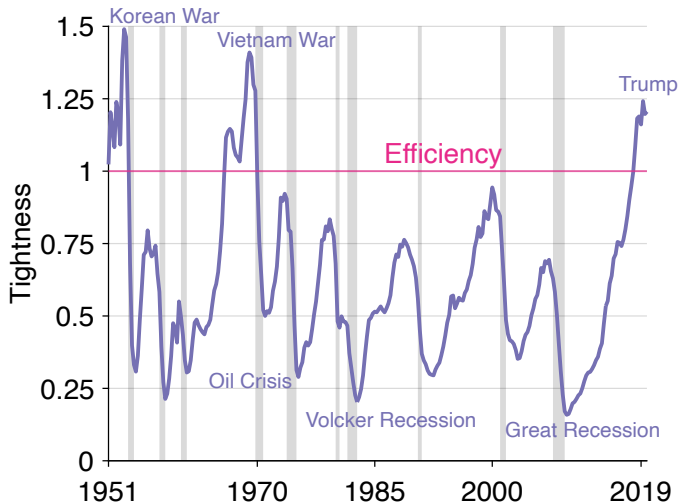
... AND IS ESPECIALLY SLACK IN SLUMPS



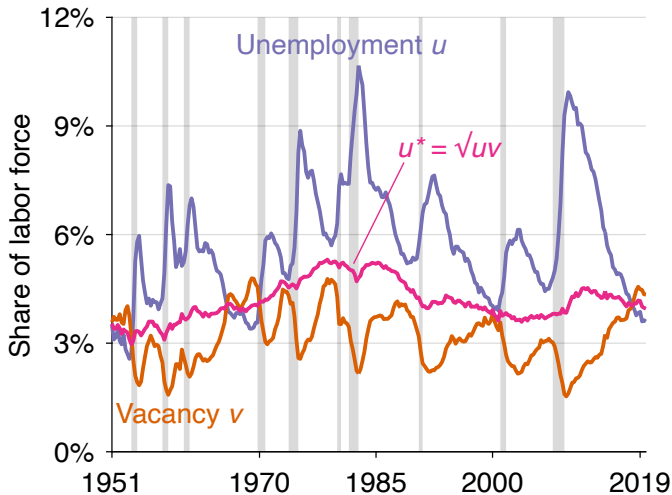
# ECONOMY IS TOO TIGHT DURING WARS



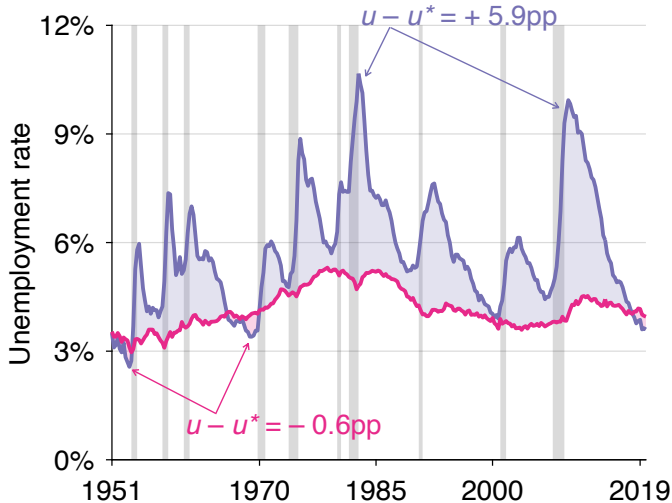
# TIGHTNESS $v/u$ SUMMARIZES STATE OF ECONOMY



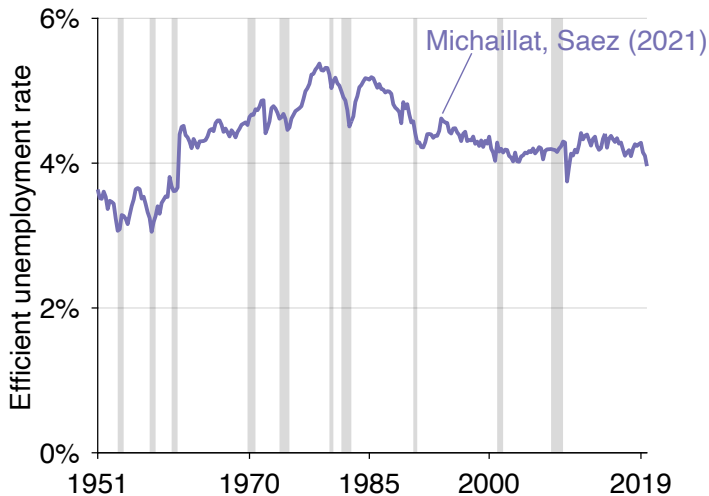
$u^*$  REMAINS IN 3.0%–5.3%, AVERAGES 4.2%



# UNEMPLOYMENT GAP IS COUNTERCYCLICAL

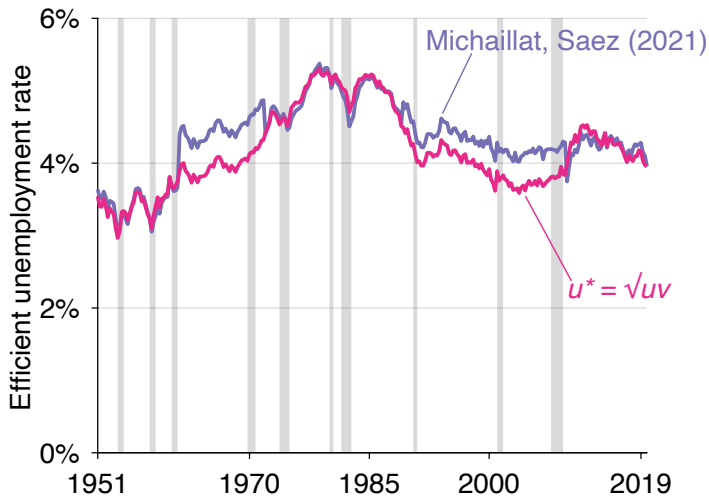


## COMPARISON WITH MICHAILLAT, SAEZ (2021)





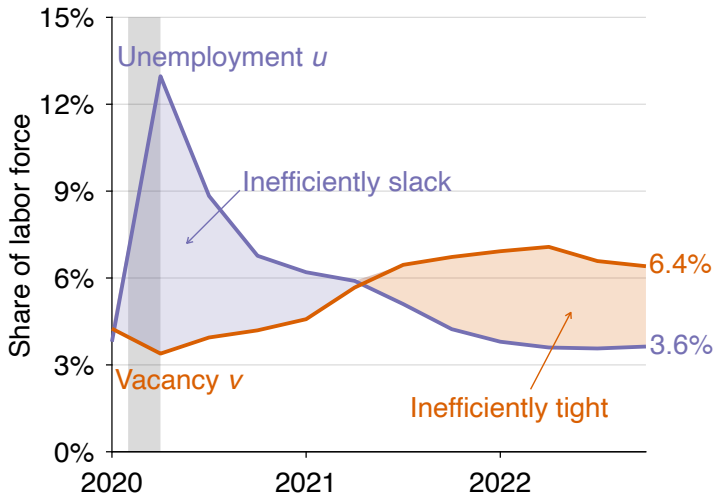
# COMPARISON WITH MICHAILLAT, SAEZ (2021)



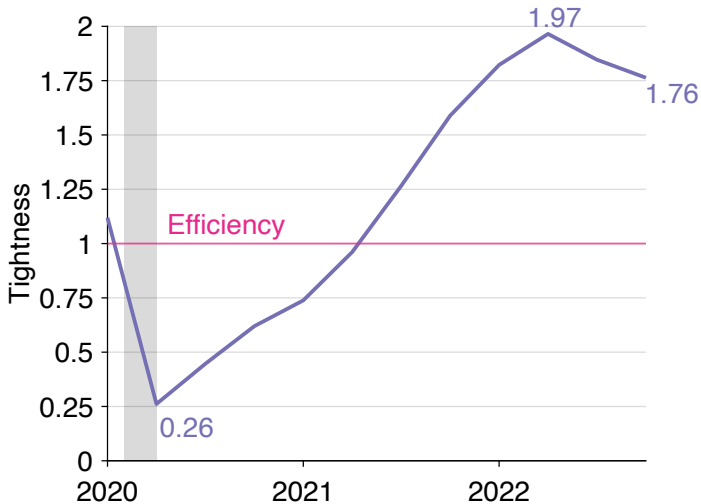
# PANDEMIC IN THE UNITED STATES

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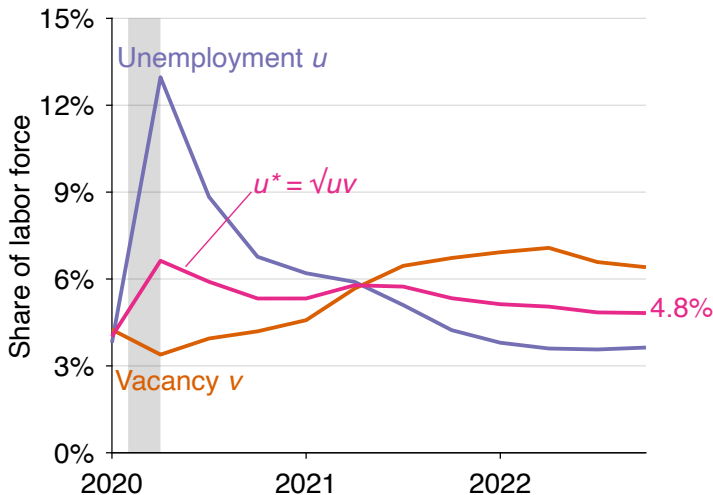
# ECONOMY HAS BEEN TOO TIGHT SINCE 2021Q3



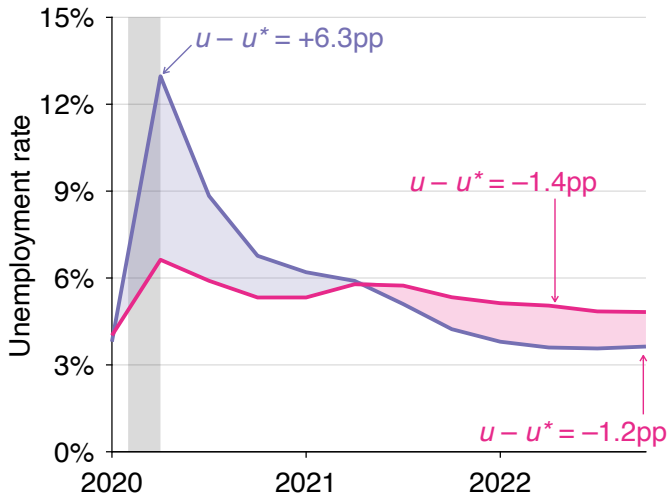
BUT ECONOMY HAS BEEN COOLING SINCE 2022Q2



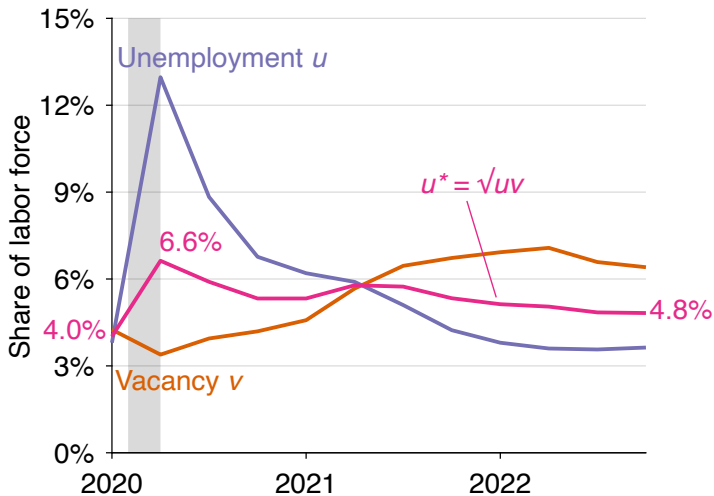
CURRENT TARGET FOR MONETARY POLICY:  $u^* = 4.8\%$



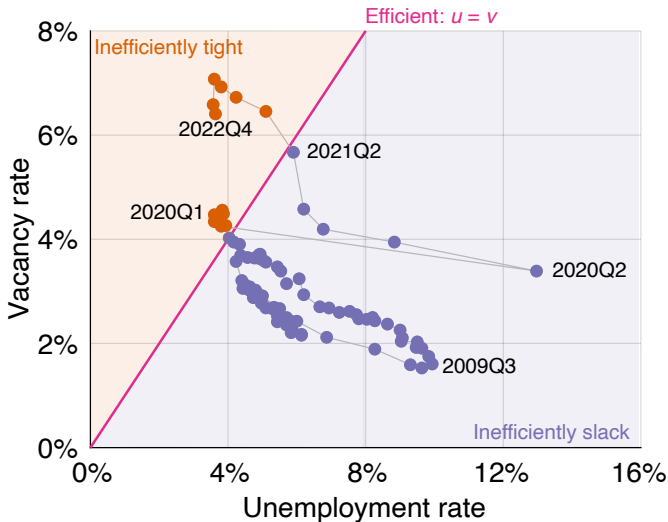
# MOST EXTREME UNEMPLOYMENT GAPS SINCE WW2



# WHY DID $u^*$ INCREASE SO MUCH IN 2020?



# BECAUSE OF LARGE OUTWARD SHIFT OF BEVERIDGE CURVE IN 2020Q2

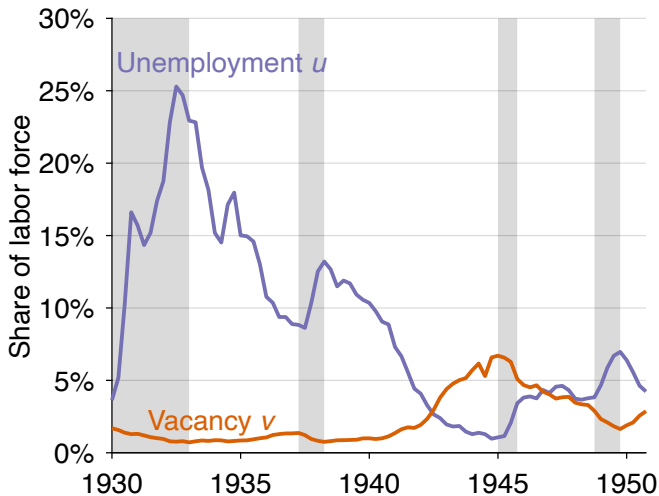




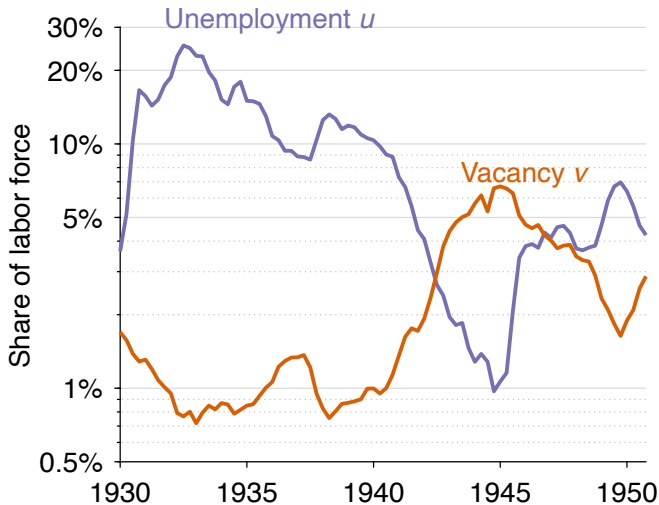
# GREAT DEPRESSION IN THE UNITED STATES

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# NBER DATA (PETROSKY-NADEAU, ZHANG 2021)



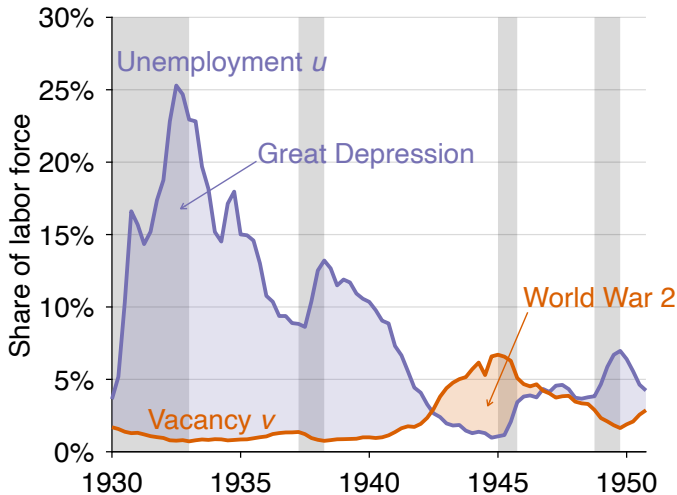
## BEVERIDGE CURVE $\approx$ HYPERBOLA



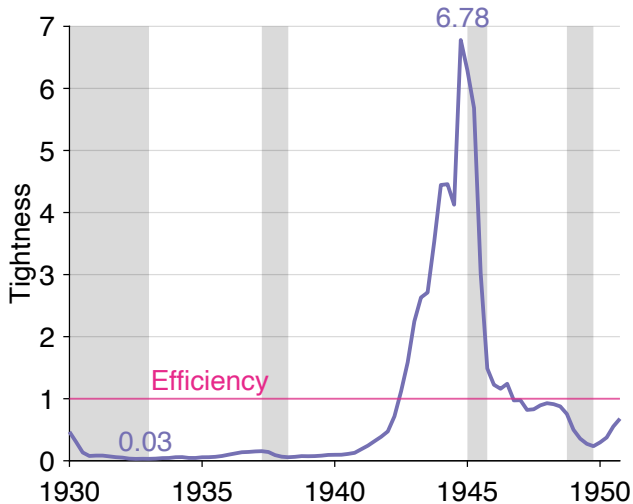
# BEVERIDGE CURVE $\approx$ HYPERBOLA



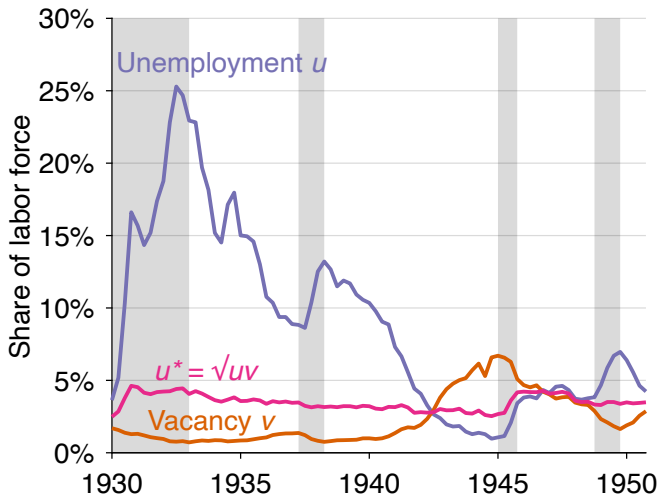
# ECONOMY WAS TOO SLACK UNTIL WW2



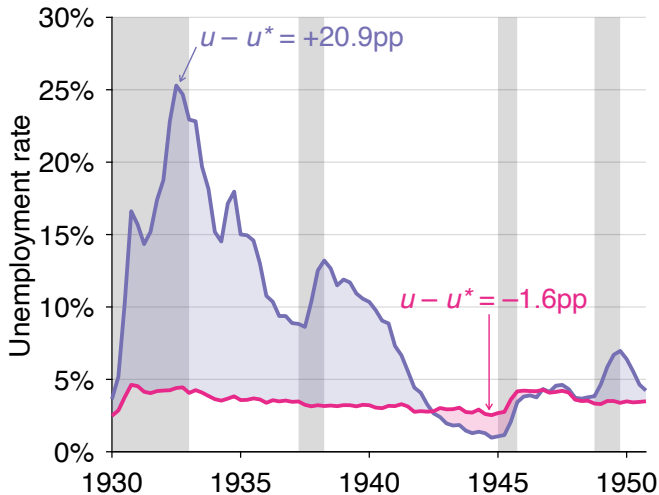
## LOWEST AND HIGHEST TIGHTNESS ON RECORD



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



# MOST EXTREME UNEMPLOYMENT GAPS ON RECORD

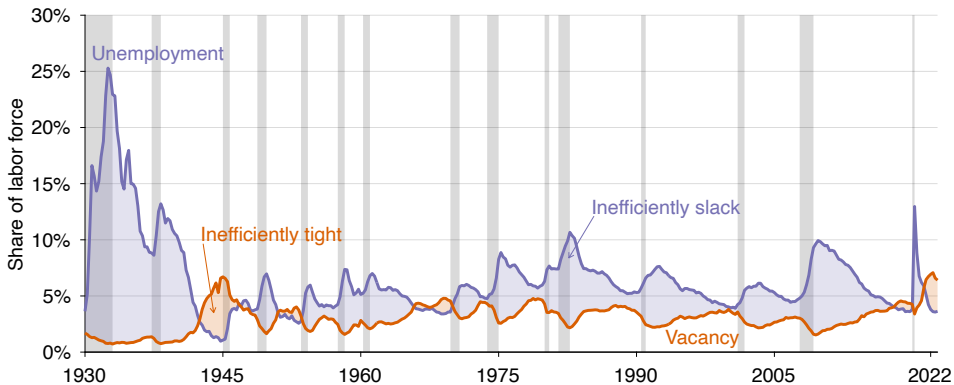




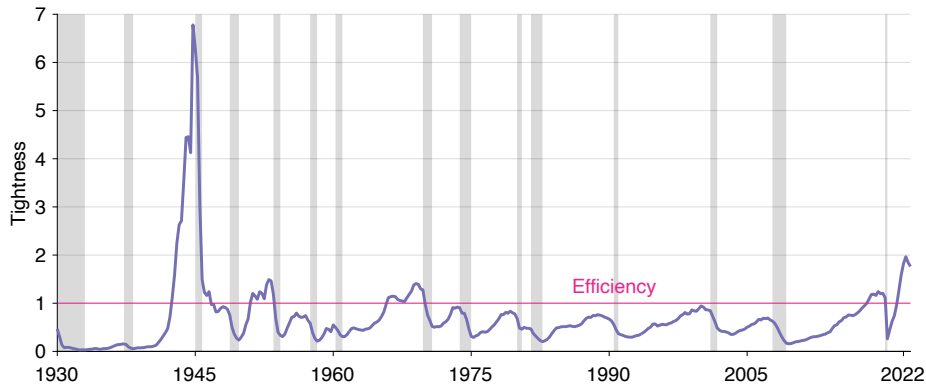
# SUMMARY

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# EFFICIENCY CRITERION FOR US LABOR MARKET



# AN EQUIVALENT EFFICIENCY CRITERION



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

