DOES THE LABOR MARKET OPERATE EFFICIENTLY?

- to answer: measure unemployment gap
  - actual unemployment rate – efficient unemployment rate

⇒ model design
  - competitive search?
  - bargained wages?
  - rigid wages?

⇒ policy making: distance from “full employment”

⇒ optimal macro policies
  - monetary policy
  - fiscal policy
  - social insurance
THEORY
US BEVERIDGE CURVE

![Graph showing the relationship between unemployment rate and vacancy rate over time from 2010 to 2019. The graph illustrates a negative correlation, indicating that as unemployment rates decrease, vacancy rates increase.](image-url)
US BEVERIDGE CURVE

Unemployment rate

Vacancy rate

Beveridge curve

Unemployment rate
CONDITION FOR LABOR-MARKET EFFICIENCY

Beveridge curve

Vacancy rate vs. Unemployment rate graph

Efficient?
CONDITION FOR LABOR-MARKET EFFICIENCY
CONDITION FOR LABOR-MARKET EFFICIENCY

Unemployment rate vs. Vacancy rate graph showing Beveridge curve and Isowelfare curve. The graph indicates points of efficient and inefficient labor market conditions, with a highlighted area representing higher welfare.
CONDITION FOR LABOR-MARKET EFFICIENCY

Unemployment rate

Vacancy rate

Beveridge curve

Isowelfare curve

Efficiency
UNEMPLOYMENT GAP

Unemployment rate

Vacancy rate

Beveridge curve

Gap > 0

Isowelfare curve
UNEMPLOYMENT GAP

Unemployment rate

Vacancy rate

Isowelfare curve

Beveridge curve

Gap < 0
BEVERIDGEAN MODEL OF LABOR MARKET

1. Beveridge curve: $v(u)$
   - $v$: vacancy rate
   - $u$: unemployment rate
   - $v(u)$: decreasing, convex

2. Social welfare: $W(u, v) = F(n, u, v)$ with $n = 1 - u$
   - $n$: employment rate
   - $F$: production + preferences
   - $W(u, v)$: decreasing in $u$ and $v$, quasiconcave
EFFICIENCY: GRAPHICAL CONDITION

- efficiency at tangency point: $v'(u) = MRS_{uv}$
- decomposing the social marginal rate of substitution:
  $$MRS_{uv} = - \frac{\partial W/\partial u}{\partial W/\partial v}$$
- social value of nonwork: $\zeta = (\partial F/\partial u)/(\partial F/\partial n) < 1$
- recruiting cost: $\kappa = -(\partial F/\partial v)/(\partial F/\partial n) > 0$
- efficiency condition:
  $$v'(u) = -\frac{1 - \zeta}{\kappa}$$
EFFICIENCY: GRAPHICAL CONDITION

• efficiency at tangency point: \( v'(u) = MRS_{uv} \)

• decomposing the social marginal rate of substitution:

\[
MRS_{uv} = - \frac{\partial F/\partial u - \partial F/\partial n}{\partial F/\partial v}
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EFFICIENCY: GRAPHICAL CONDITION

- efficiency at tangency point: \( v'(u) = MRS_{uv} \)
- decomposing the social marginal rate of substitution:
  \[
  MRS_{uv} = -\frac{1 - \left( \frac{\partial F}{\partial u} \right) / \left( \frac{\partial F}{\partial n} \right)}{-\left( \frac{\partial F}{\partial v} \right) / \left( \frac{\partial F}{\partial n} \right)}
  \]
- social value of nonwork: \( \zeta = \left( \frac{\partial F}{\partial u} \right) / \left( \frac{\partial F}{\partial n} \right) < 1 \)
- recruiting cost: \( \kappa = -\left( \frac{\partial F}{\partial v} \right) / \left( \frac{\partial F}{\partial n} \right) > 0 \)
- efficiency condition:
  \[
  v'(u) = -\frac{1 - \zeta}{\kappa}
  \]
EFFICIENCY: GRAPHICAL CONDITION

- efficiency at tangency point: $v'(u) = MRS_{uv}$
- decomposing the social marginal rate of substitution:
  $$MRS_{uv} = -\frac{1 - (\partial F/\partial u)/(\partial F/\partial n)}{-(\partial F/\partial v)/(\partial F/\partial n)}$$
- social value of nonwork: $\zeta = (\partial F/\partial u)/(\partial F/\partial n) < 1$
- recruiting cost: $\kappa = -(\partial F/\partial v)/(\partial F/\partial n) > 0$
- efficiency condition:
  $$v'(u) = -\frac{1 - \zeta}{\kappa}$$
EFFICIENCY: SUFFICIENT STATISTICS

• labor market tightness: $\theta = v/u$
• Beveridge elasticity: $\epsilon = -d \ln(v)/d \ln(u) > 0$
• efficient labor market tightness:
  \[ v'(u) = -\frac{1 - \xi}{\kappa} \]
• $u^*$ obtained from $\theta^*$ through Beveridge curve
  \[ \frac{u}{u^*} = \left( \frac{\theta}{\theta^*} \right)^{-1/(1+\epsilon)} \]
EFFICIENCY: SUFFICIENT STATISTICS

- labor market tightness: $\theta = \frac{v}{u}$
- Beveridge elasticity: $\epsilon = -\frac{d \ln(v)}{d \ln(u)} > 0$
- efficient labor market tightness:

$$-\frac{v'(u)}{v/u} \cdot \frac{v}{u} = \frac{1 - \zeta}{\kappa}$$

- $u^*$ obtained from $\theta^*$ through Beveridge curve

$$\frac{u}{u^*} = \left(\frac{\theta}{\theta^*}\right)^{-1/(1+\epsilon)}$$
EFFICIENCY: SUFFICIENT STATISTICS

- labor market tightness: \( \theta = \frac{v}{u} \)
- Beveridge elasticity: \( \epsilon = -\frac{d \ln(v)}{d \ln(u)} > 0 \)
- efficient labor market tightness:

\[
\theta = \frac{1 - \zeta}{\kappa \cdot \epsilon}
\]

- \( u^* \) obtained from \( \theta^* \) through Beveridge curve

\[
\frac{u}{u^*} = \left( \frac{\theta}{\theta^*} \right)^{-1/(1+\epsilon)}
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MEASUREMENT
US UNEMPLOYMENT RATE (BLS CPS)
US VACANCY RATE (BARNICHON 2010)
BEVERIDGE-CURVE BRANCHES (BAI, PERRON 1998)

Log unemployment rate
-4.2
-3.9
-3.6
-3.3
-3.0
Log vacancy rate
1961
1951

Log unemployment rate vs. Log vacancy rate graph.
BEVERIDGE-CURVE BRANCHES (BAI, PERRON 1998)
BEVERIDGE-CURVE BRANCHES (BAI, PERRON 1998)
BEVERIDGE-CURVE BRANCHES (BAI, PERRON 1998)
BEVERIDGE ELASTICITY (BAI, PERRON 1998)
SOCIAL VALUE OF NONWORK: REVEALED PREFERENCES

- Borgschulte, Martorell (2018): military administrative data
  - 420,000 veterans
  - home production + recreation = 13%–35% earnings
- Mas, Pallais (2019): field experiment in which job applicants choose wage-hour bundles
  - 900 subjects
  - home production + recreation = 58% earnings

\[ \zeta \in [0.03, 0.49], \text{ with median value of } \zeta = 0.26 \]
RECRUITING COST: FIRM SURVEY

- 1997 National Employer Survey, administered by Census Bureau
- 3,000 establishments
  - more than 20 workers
  - private firms
- on average, recruiting = 3.2% of labor costs

$\kappa = 0.92$
COMPARISON WITH EXISTING “NATURAL RATES”

Unemployment rate

Crump et al (2019)
NAIRU
Trend
CBO
Efficient

Unemployment rate

ALTERNATIVE CALIBRATIONS OF STATISTICS
HAGEDORN, MANOVSKII (2008): $\zeta = 0.96$
INVERSE-OPTIMUM $z$, SO $u$ ALWAYS $= u^*$
DIAMOND-MORTENSEN-PISSARIDES MODEL
• Beveridge curve: UE flows = EU flows

\[ v(u) = \left[ \frac{s \cdot (1 - u)}{\mu \cdot u^\alpha} \right]^{1/(1-\alpha)} \]

⇒ Beveridge elasticity:

\[ \epsilon = \frac{1}{1 - \alpha} \left[ \alpha + \frac{u}{1 - u} \right] \]

• social welfare: \( F(n, u, v) = p \cdot (n + z \cdot u - c \cdot v) \)

⇒ recruiting cost: \( \kappa = c \)

⇒ social value of nonwork: \( \zeta = z \)
ACTUAL VS. BEVERIDGE UNEMPLOYMENT

Unemployment rate

Actual

0% 3% 6% 9% 12%

ACTUAL VS. BEVERIDGE UNEMPLOYMENT
BUSINESS CYCLES

- Efficiency
- Unemployment rate
- Vacancy rate
- Beveridge curve
- Isowelfare curve
- Job-creation curve

Diagram showing the relationship between vacancy rate and unemployment rate with the Beveridge curve, Job-creation curve, and Isowelfare curve.
BUSINESS CYCLES

- Unemployment rate
- Vacancy rate
- Beveridge curve
- Isowelfare curve
- Slump
- Gap > 0
- Job-creation curve
PRODUCTIVITY CHANGES: ~ SAME

Efficient unemployment rate

Benchmark
ENDOGENEITY OF BEVERIDGE ELASTICITY: ~ SAME

\[ e = \frac{1}{1 - \alpha} \left( \alpha + \frac{u}{1 - u} \right) \]
ENDOGENEITY OF BEVERIDGE ELASTICITY: ~ SAME

\[ \epsilon = \frac{1}{1 - \alpha} \left( \alpha + \frac{u}{1 - u} \right) \]

\[ \kappa = c/p, \quad \zeta = z/p \]
OUT-OF-BEVERIDGE DYNAMICS: ~ SAME

Efficient unemployment rate

Benchmark

Hosios

0%
1%
2%
3%
4%
5%
6%

OUT-OF-BEVERIDGE DYNAMICS: ~ SAME

Efficient unemployment rate

Benchmark

Hosios

\[ \kappa = c/p, \quad \zeta = z/p \]
ALL RATES COMPUTED WITH SAME PARAMETERS

Efficient unemployment rate

Benchmark

All rates with \( s \) and \( \mu \) from CPS
CONCLUSION
IMPLICATIONS

- model design
  - rigid-wage models
  - other models generating a countercyclical gap
- policy making
  - stabilization policies warranted in bad times
- optimal macro policies
  - monetary policy: procyclical
  - government spending: countercyclical
  - unemployment insurance: countercyclical