The Cyclical Behavior of Labor Markets

Robert Shimer
University of Chicago

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Outline

- Develop six facts to guide theoretical models.
- Discuss the quantitative failures of existing models.
- Highlight recent research that promises to overcome these failures.

Relevant Papers

- "The Consequences of Rigid Wages in Search Models," *Journal of the European Economic Association*, 2004.
- "The Cyclical Behavior of Equilibrium Unemployment and Vacancies," *American Economic Review*, 2005.
- "Reassessing the Ins and Outs of Unemployment," 2005.
- Work by Robert Hall and many others.

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- Data are available at `http://home.uchicago.edu/~shimer/data/`

The Job Finding Rate

- Goal: Measure the job finding rate using readily available data.
- U_t is the number of unemployed workers in month t.
- E_t is the number of employed workers in month t.
- U_t^s is the number unemployed for less than one month in month t.

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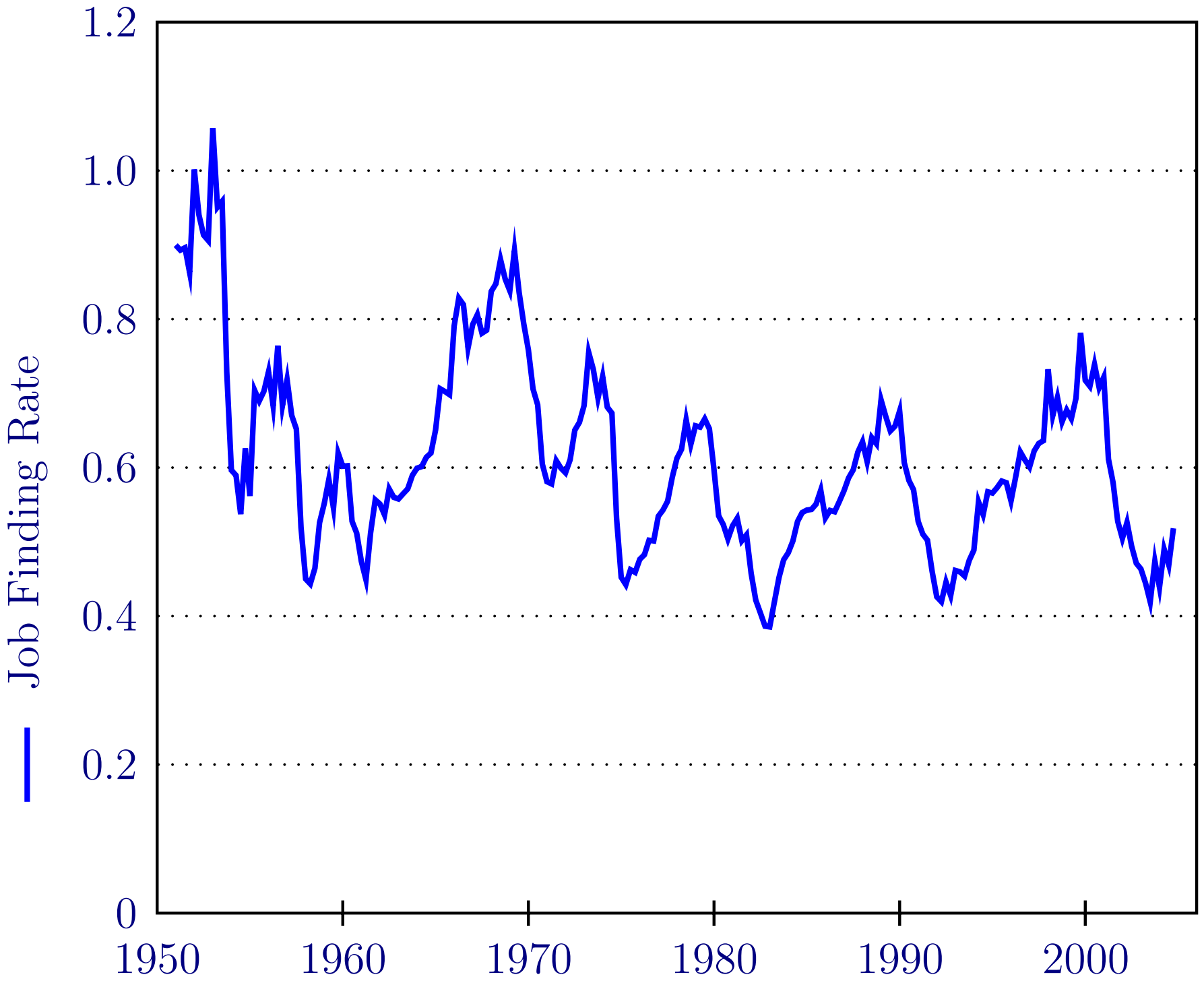
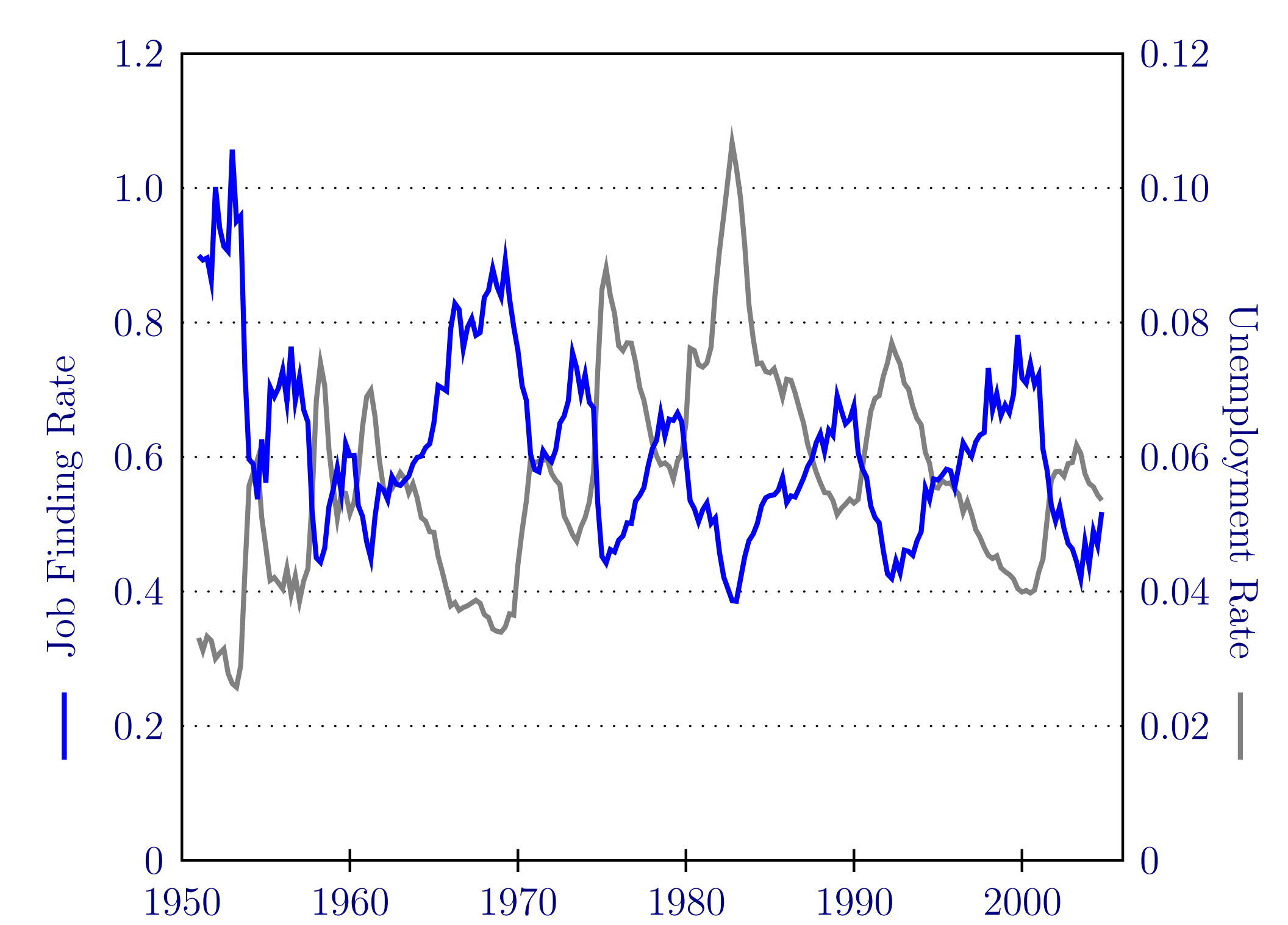
- I use these to construct two variables:
  - ◇ The unemployment rate in month t is $\dfrac{U_t}{U_t + E_t}$.
  - ◇ The job finding rate is f_t solving $\exp(-f_t) = \dfrac{U_{t+1} - U_{t+1}^s}{U_t}$.


Job Finding Rate
1.2
1.0
0.8
0.6
0.4
0.2
0
1950
1960
1970
1980
1990
2000


1.2
1.0
0.8
0.6
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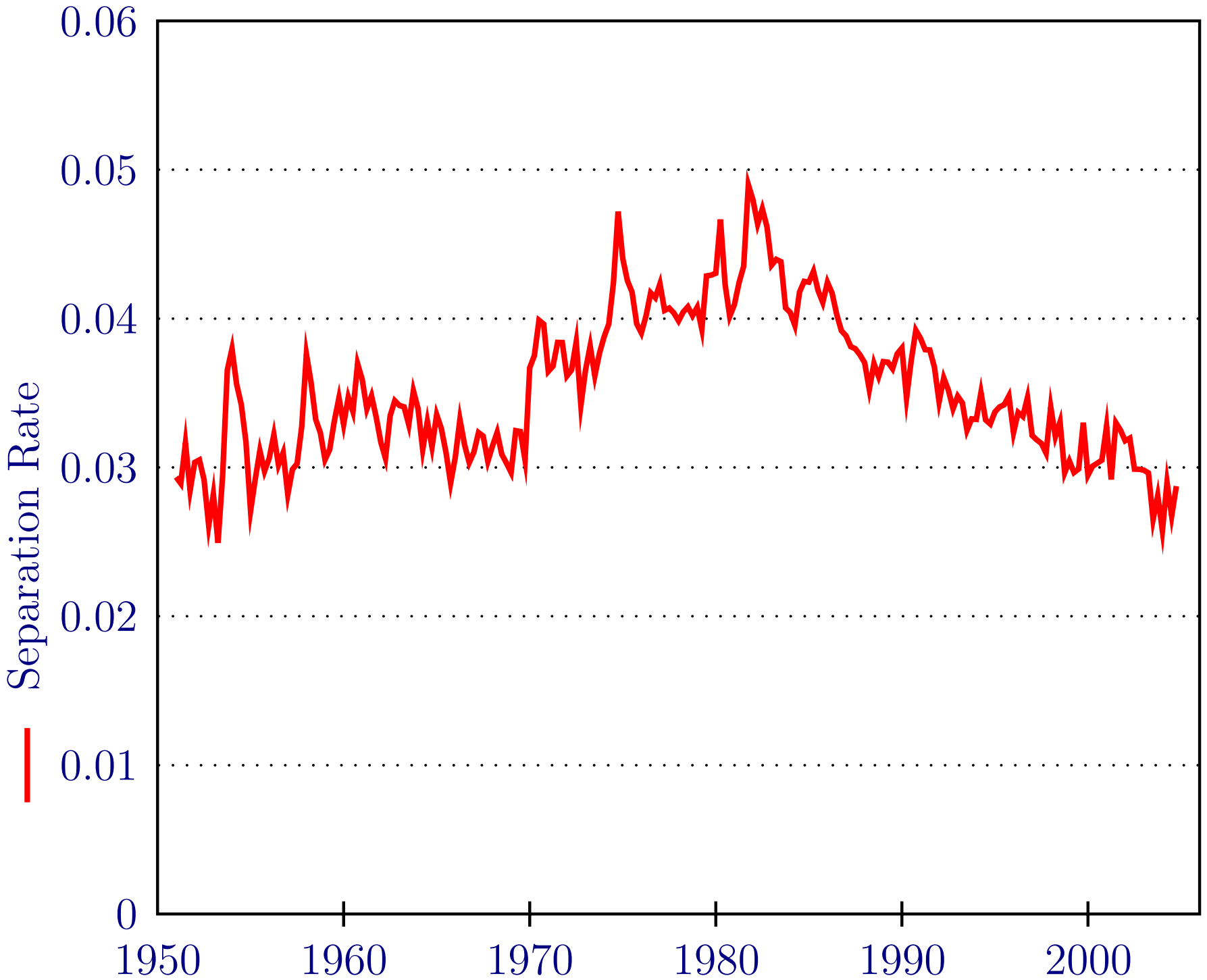
0.2
0
0.12
0.10
0.08
0.06
0.04
0.02
0
1950
1960
1970
1980
1990
2000
Job Finding Rate
Unemployment Rate

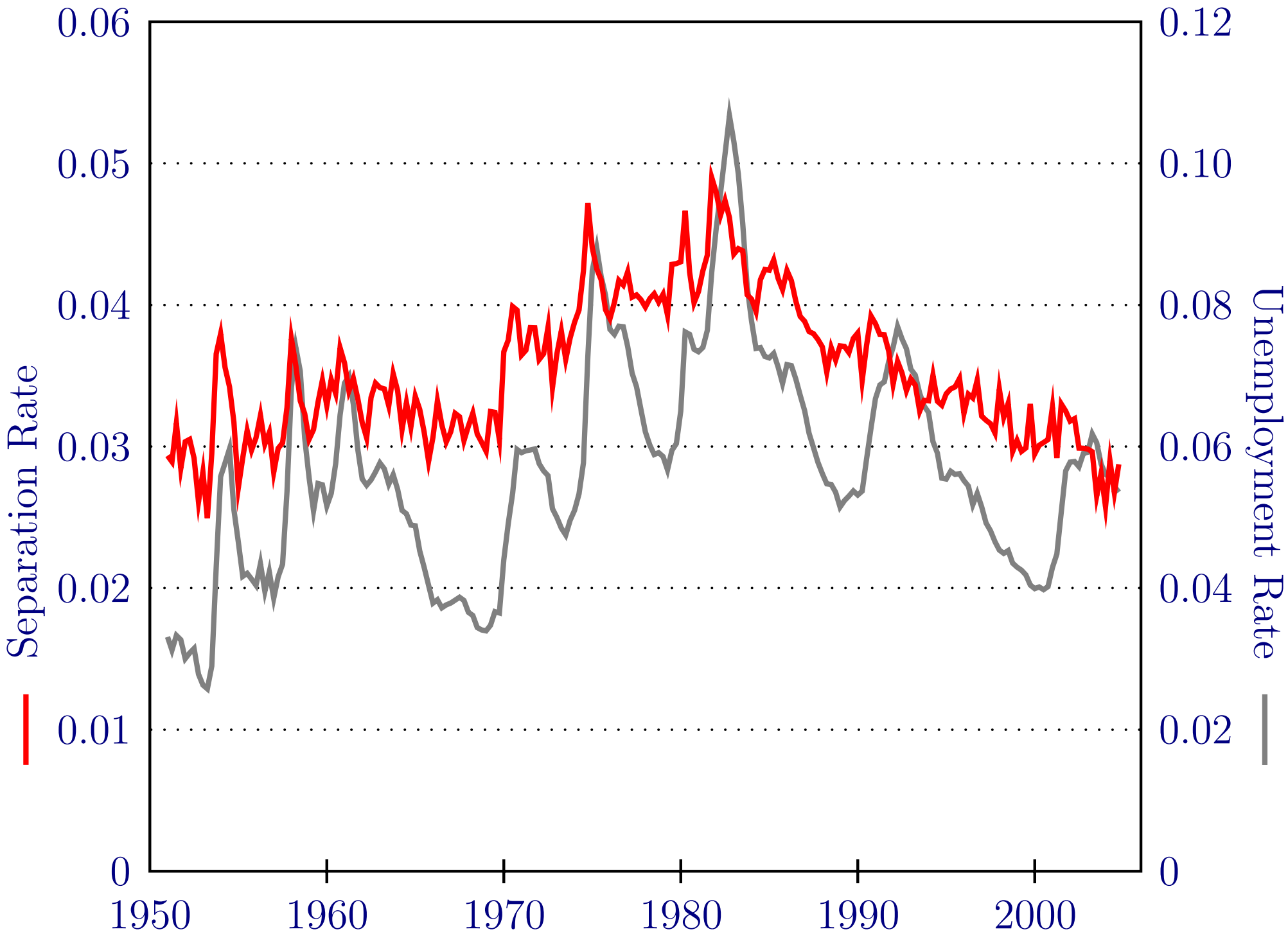
Fact 1

The correlation between the cyclical components of the job finding and unemployment rates is -0.97.

The Separation Rate

- Goal: Construct an analogous measure of the separation rate.
- Suppose we know U_t, E_t, and f_t.
- Then the separation rate must solve $U_{t+1} - U_t = E_t s_t - U_t f_t$.


0.06
0.05
0.04
0.03
0.02
0.01
0
Separation Rate
1950
1960
1970
1980
1990
2000


0.06
0.05
0.04
0.03
0.02
0.01
0
0.12
0.10
0.08
0.06
0.04
0.02
0
1950
1960
1970
1980
1990
2000
Separation Rate
Unemployment Rate

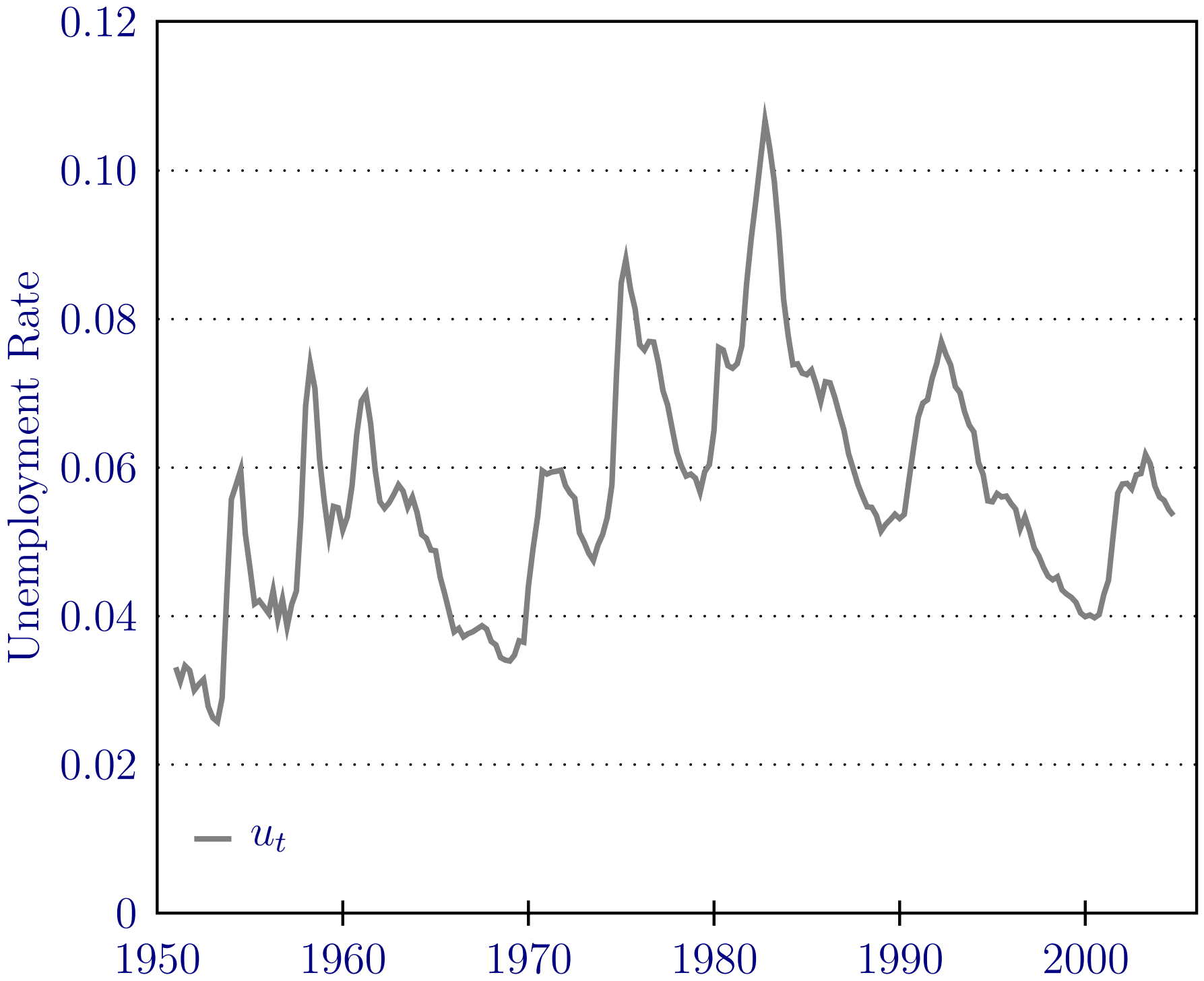
Fact 2

The correlation between the cyclical components of the separation and unemployment rates is 0.65.

Labor Market Flows and Labor Market Stocks

In Steady State $E_t s_t = U_t f_t$.

Compare $u_t \equiv \dfrac{U_t}{U_t + E_t}$ with $\dfrac{s_t}{s_t + f_t}$.


0.12
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0.06
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0.02
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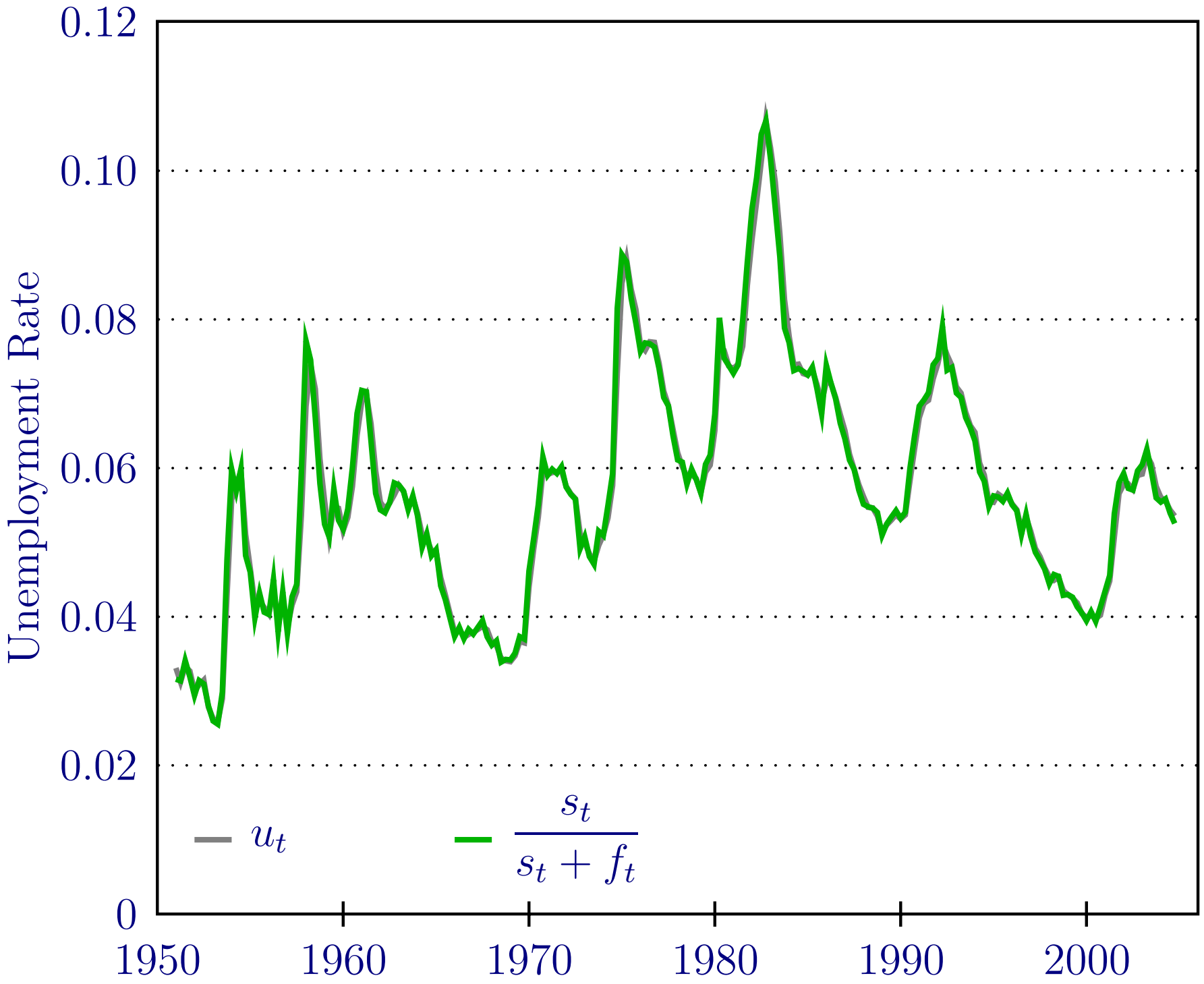
Unemployment Rate
u_t
1950
1960
1970
1980
1990
2000

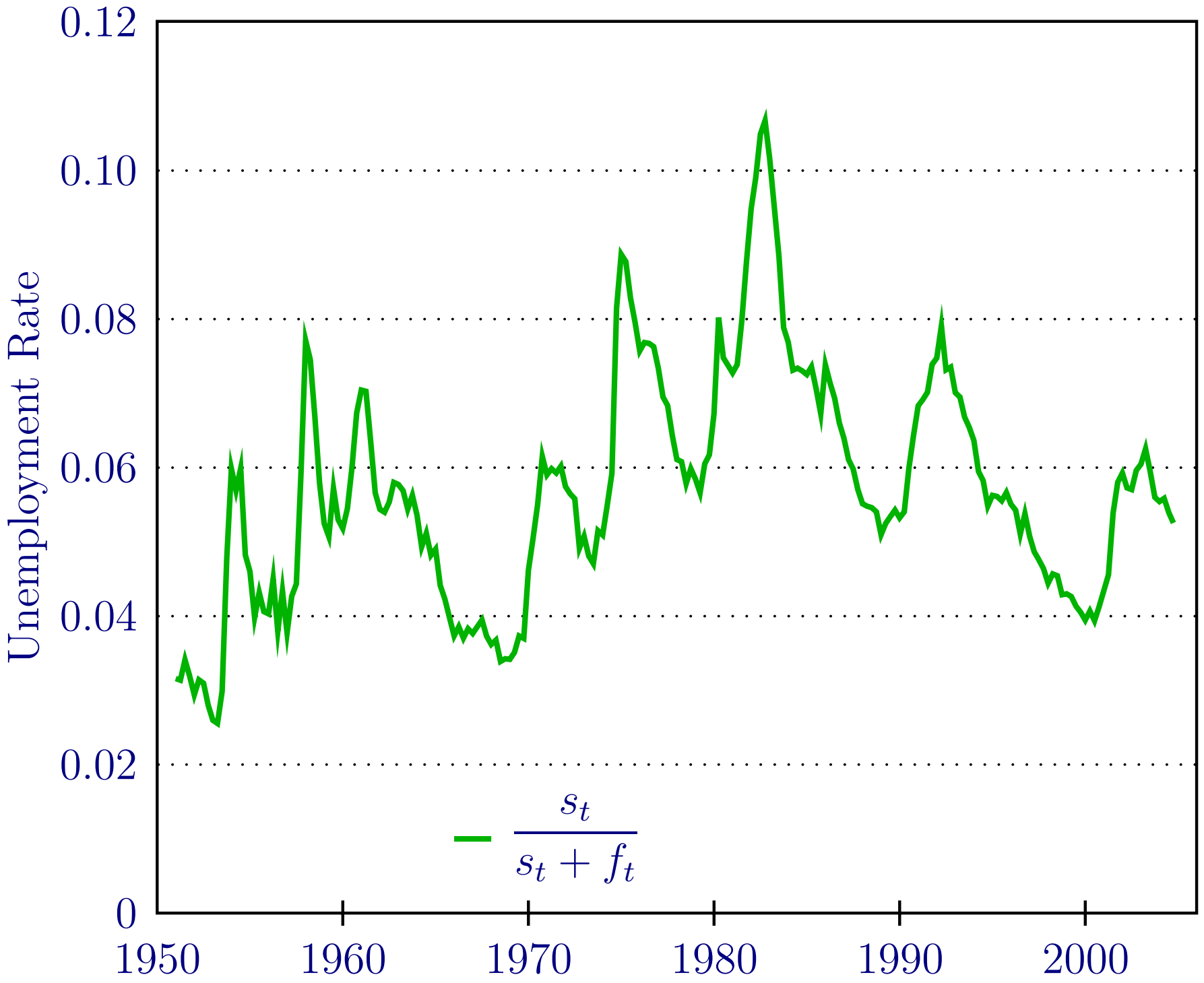

0.12
0.10
0.08
0.06
0.04
0.02
0
Unemployment Rate
1950
1960
1970
1980
1990
2000
u_t
$\frac{s_t}{s_t + f_t}$

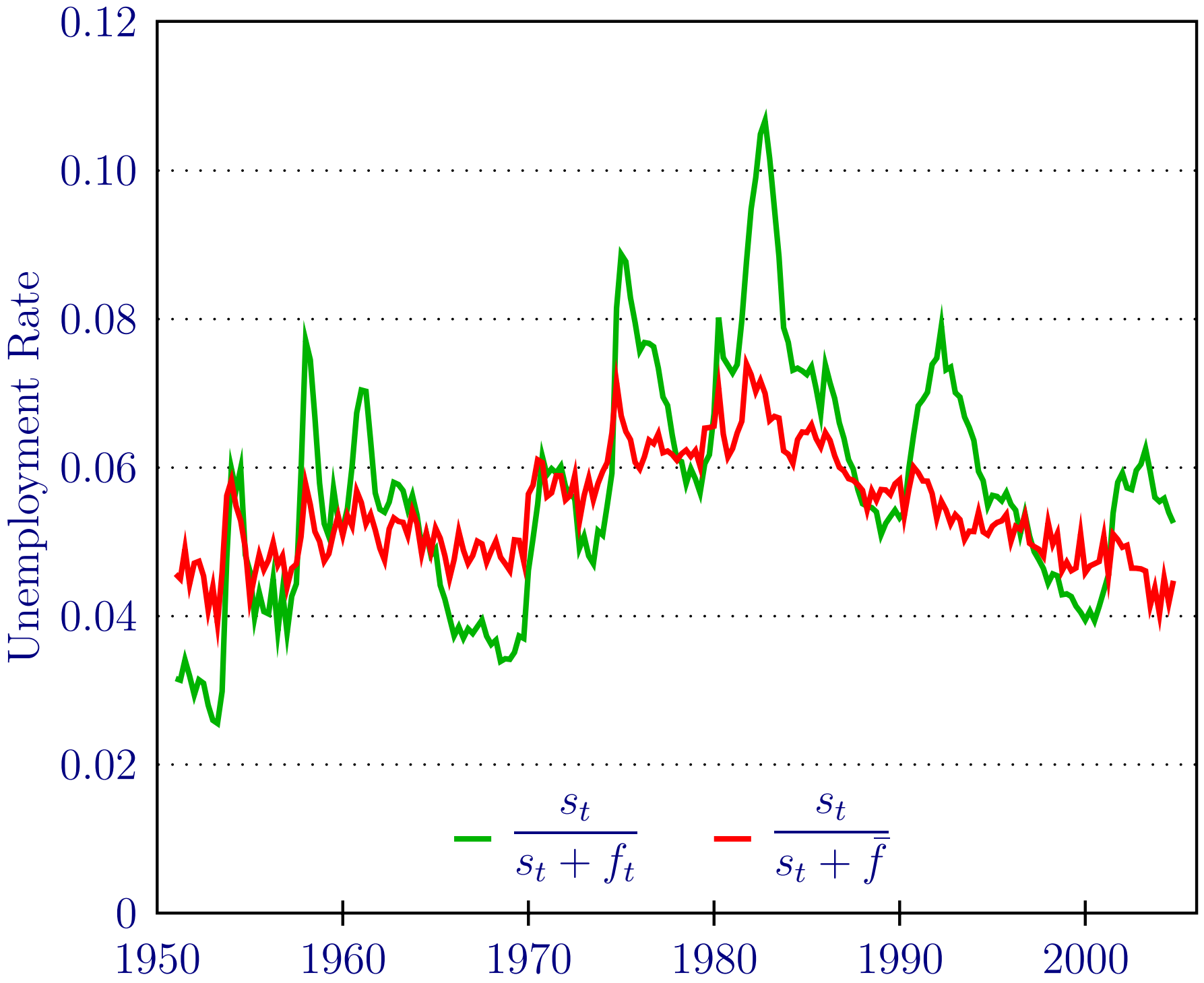
Fact 3

Unemployment is Always in Steady State.

The Effect of f_t and s_t on Unemployment

$$\text{Compare } \frac{s_t}{s_t + f_t} \text{ with } \frac{s_t}{s_t + \bar{f}} \text{ and } \frac{\bar{s}}{\bar{s} + f_t}.$$


0.12
0.10
0.08
0.06
0.04
0.02
0
Unemployment Rate
1950
1960
1970
1980
1990
2000
$\frac{s_t}{s_t + f_t}$


0.12
0.10
0.08
0.06
0.04
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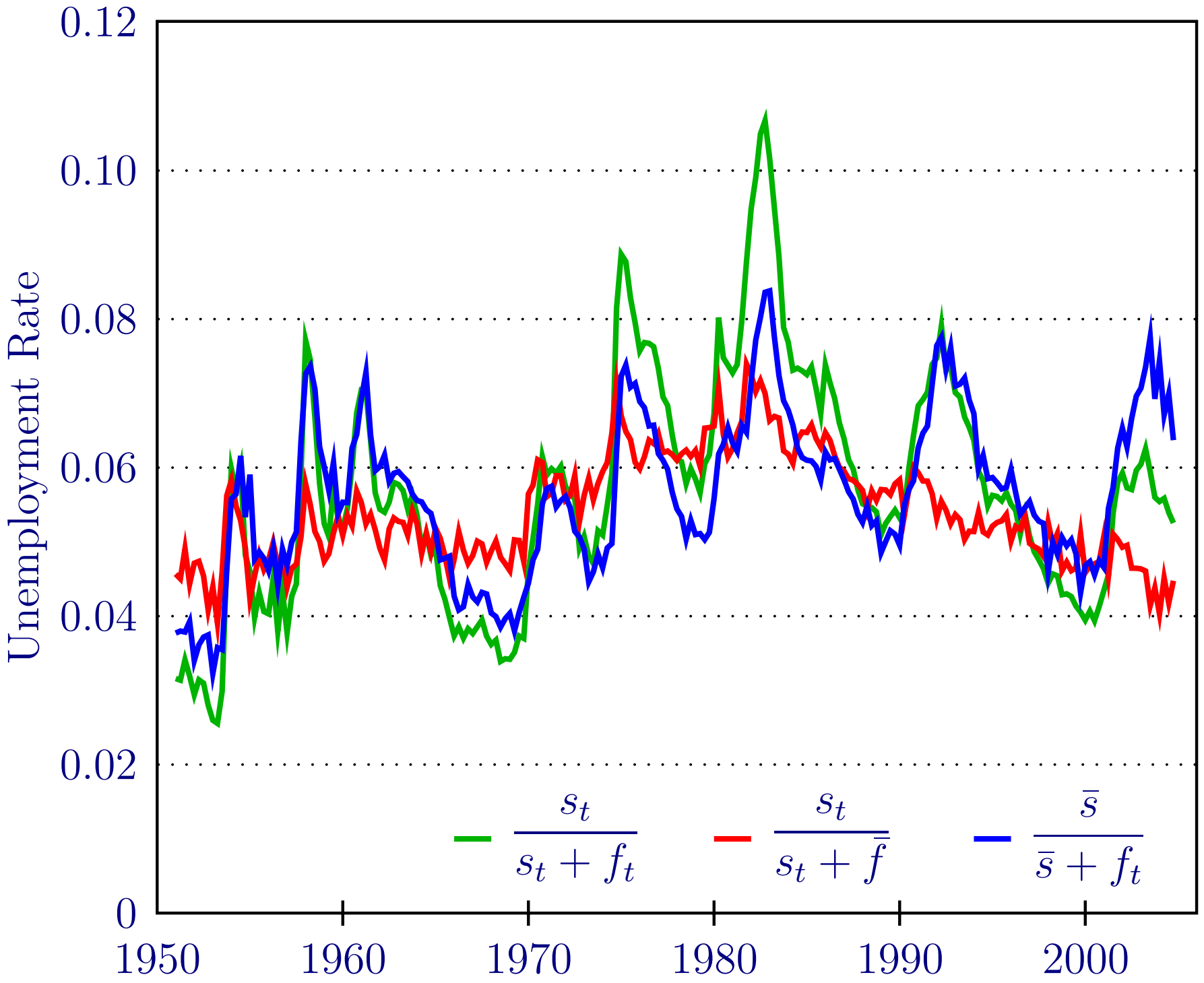
0
Unemployment Rate
1950
1960
1970
1980
1990
2000
$\frac{s_t}{s_t + f_t}$
$\frac{s_t}{s_t + \bar{f}}$


0.12
0.10
0.08
0.06
0.04
0.02
0
Unemployment Rate
1950
1960
1970
1980
1990
2000
$\frac{s_t}{s_t + f_t}$
$\frac{s_t}{s_t + \bar{f}}$
$\frac{\bar{s}}{\bar{s} + f_t}$

Fact 4

The Job Finding Rate Accounts for 79% of Unemployment Fluctuations.

Fact 4′

The Job Finding Rate Accounts for 95% of Unemployment Fluctuations since 1985.

What Causes Job Finding Rate Fluctuations?

Pissarides (1985) posits a stable, CRS matching function $m(u, v)$.

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$$f_t = \frac{m(u_t, v_t)}{u_t} = m(1, \theta_t), \text{ where } \theta_t = \frac{v_t}{u_t}.$$

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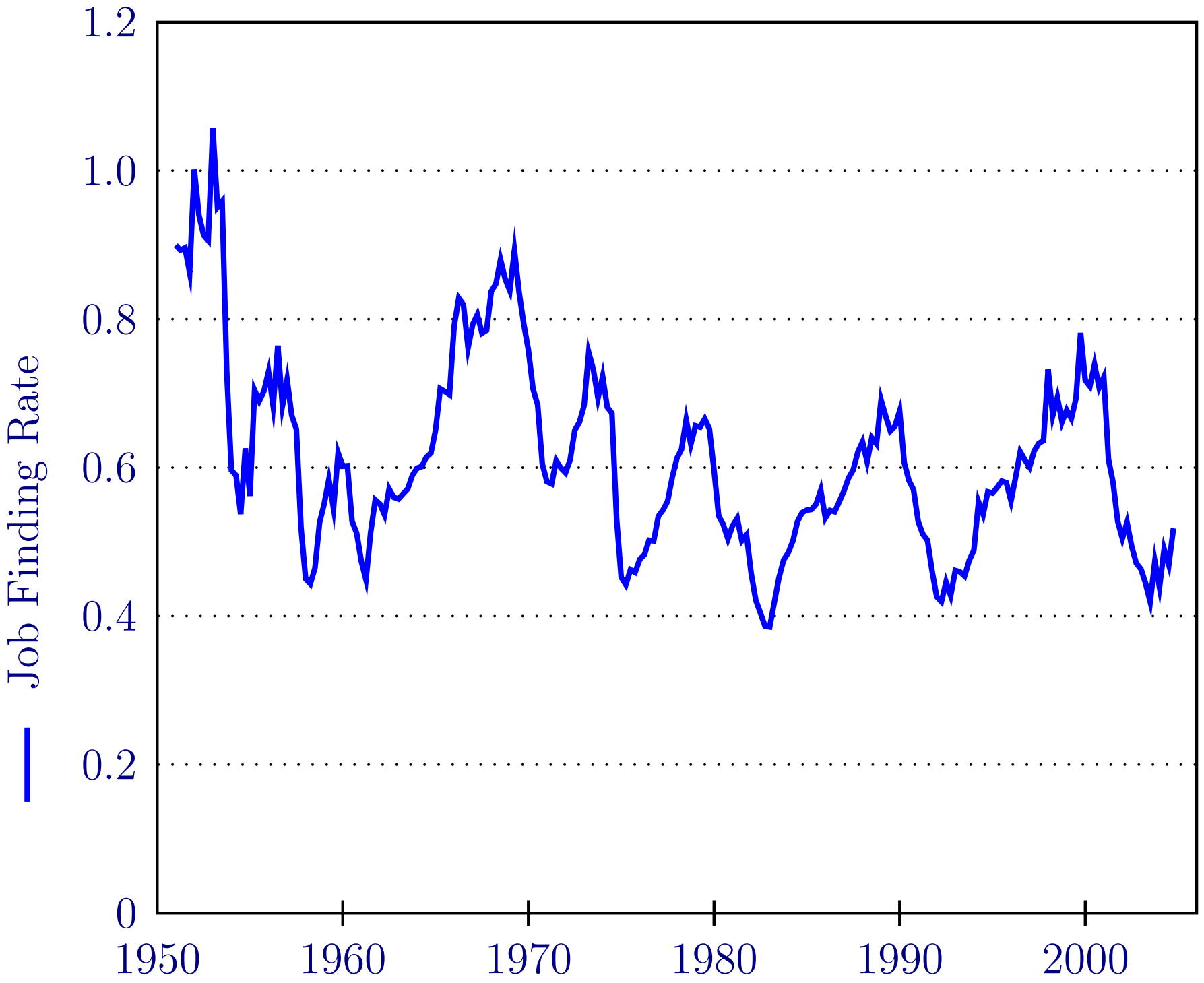
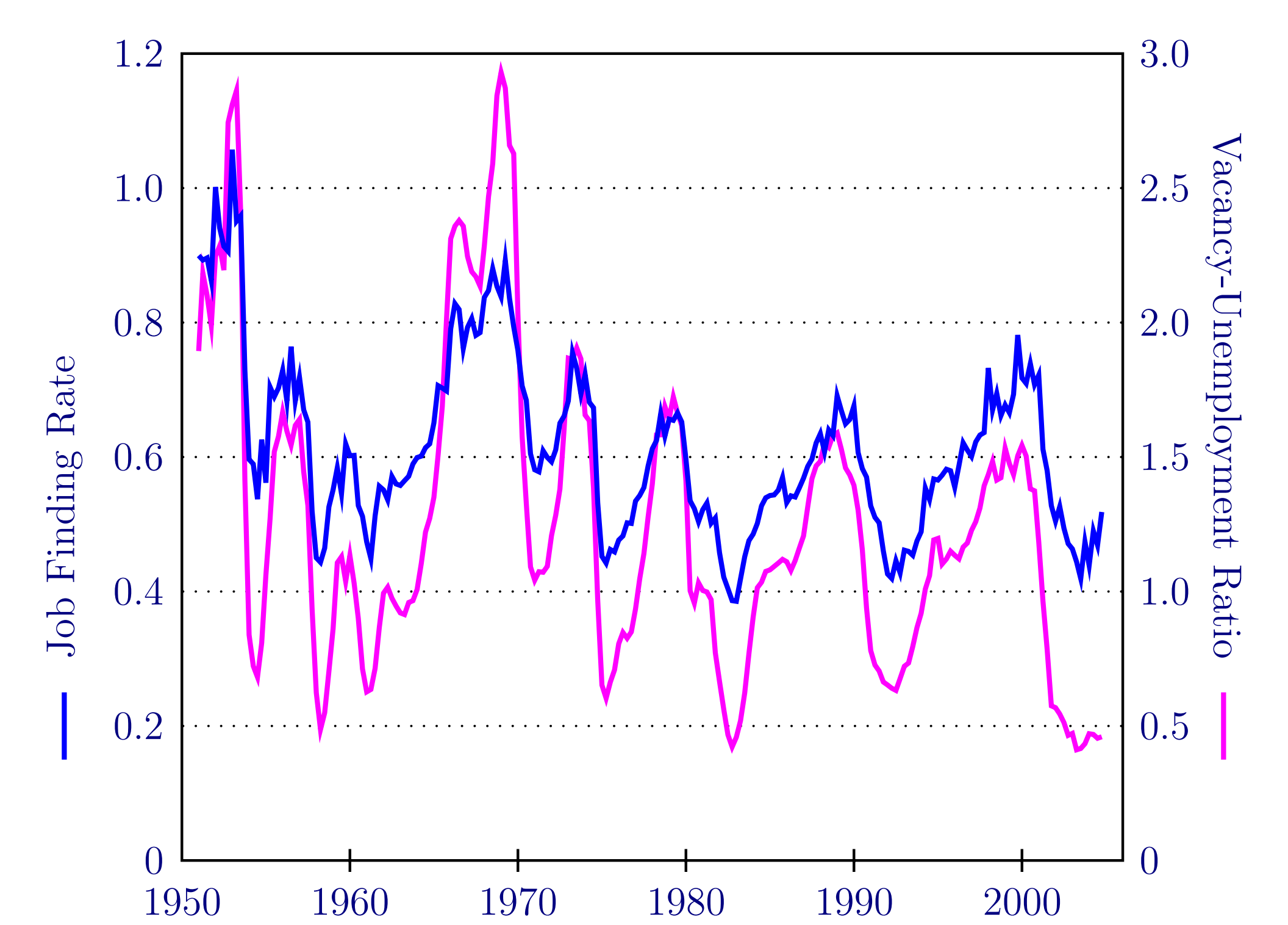
Measure v_t as the Conference Board Help-Wanted Advertising Index.


Job Finding Rate
1.2
1.0
0.8
0.6
0.4
0.2
0
1950
1960
1970
1980
1990
2000


1.2
1.0
0.8
0.6
0.4
0.2
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3.0
2.5
2.0
1.5
1.0
0.5
0
1950
1960
1970
1980
1990
2000
Job Finding Rate
Vacancy-Unemployment Ratio

Fact 5

The correlation between the cyclical components of the job finding rate and v-u ratio is 0.96.

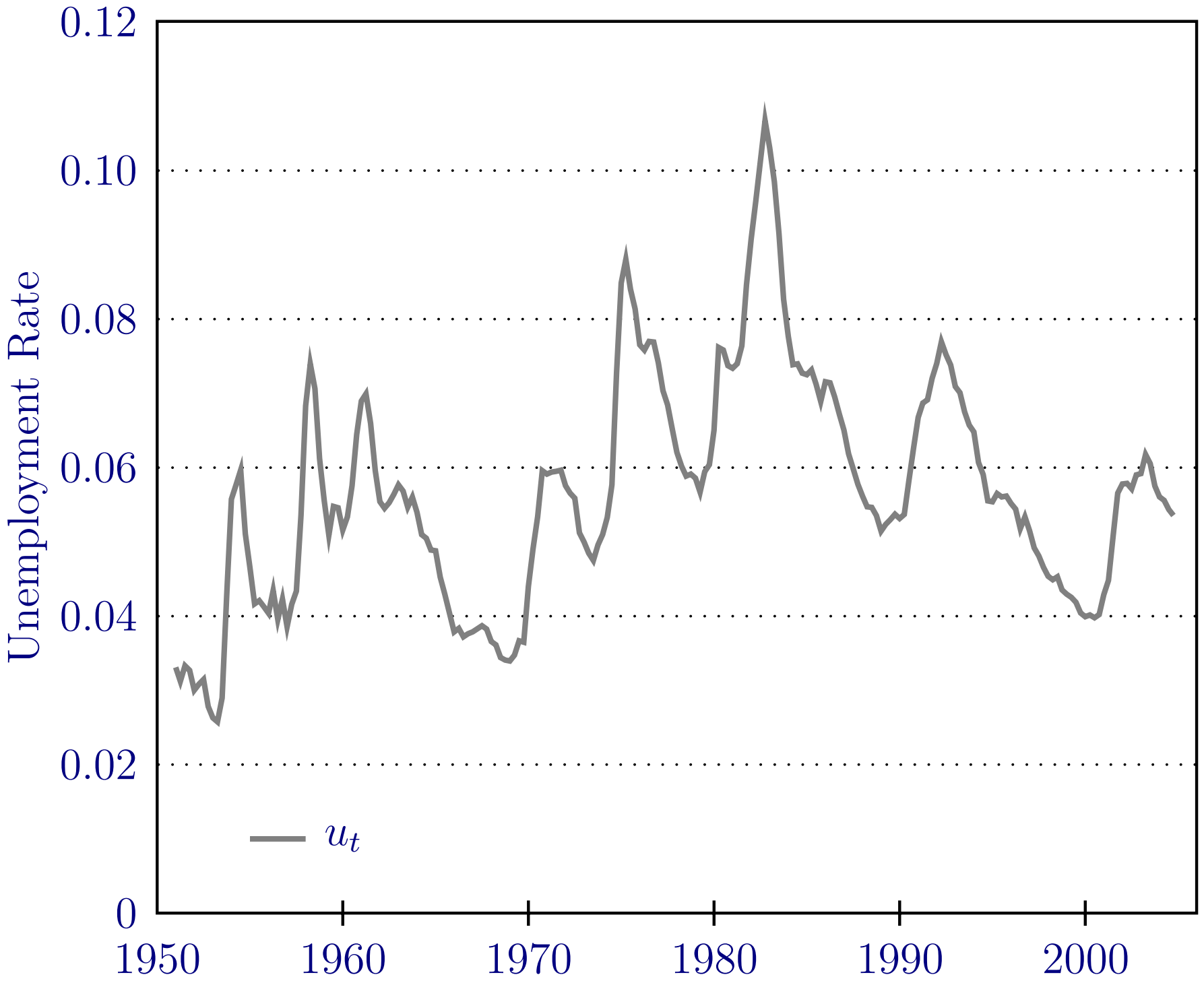
Vacancies Drive the Unemployment Rate

Construct $\tilde{u}_{t+1} = \tilde{u}_t + (1 - \tilde{u}_t)\bar{s} - m(\tilde{u}_t, v_t)$.

Vacancies Drive the Unemployment Rate

Construct $\tilde{u}_{t+1} = \tilde{u}_t + (1 - \tilde{u}_t)\bar{s} - m(\tilde{u}_t, v_t)$.

$$m(\tilde{u}_t, v_t) = 0.017\, \tilde{u}_t^{0.5} v_t^{0.5}.$$


0.12
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Unemployment Rate
u_t
1950
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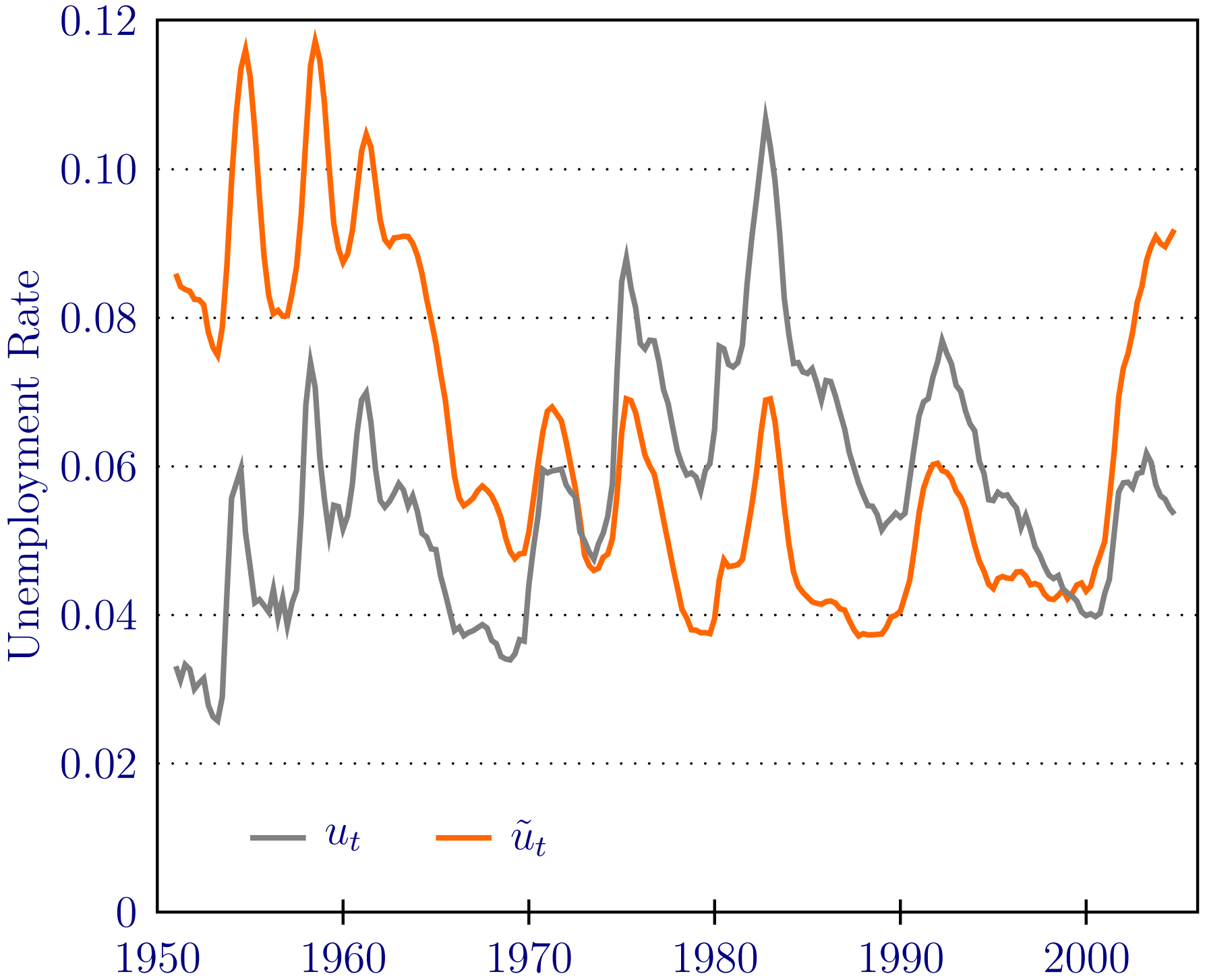
1970
1980
1990
2000


0.12
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0.04
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0
Unemployment Rate
u_t
$\tilde{u}_t$
1950
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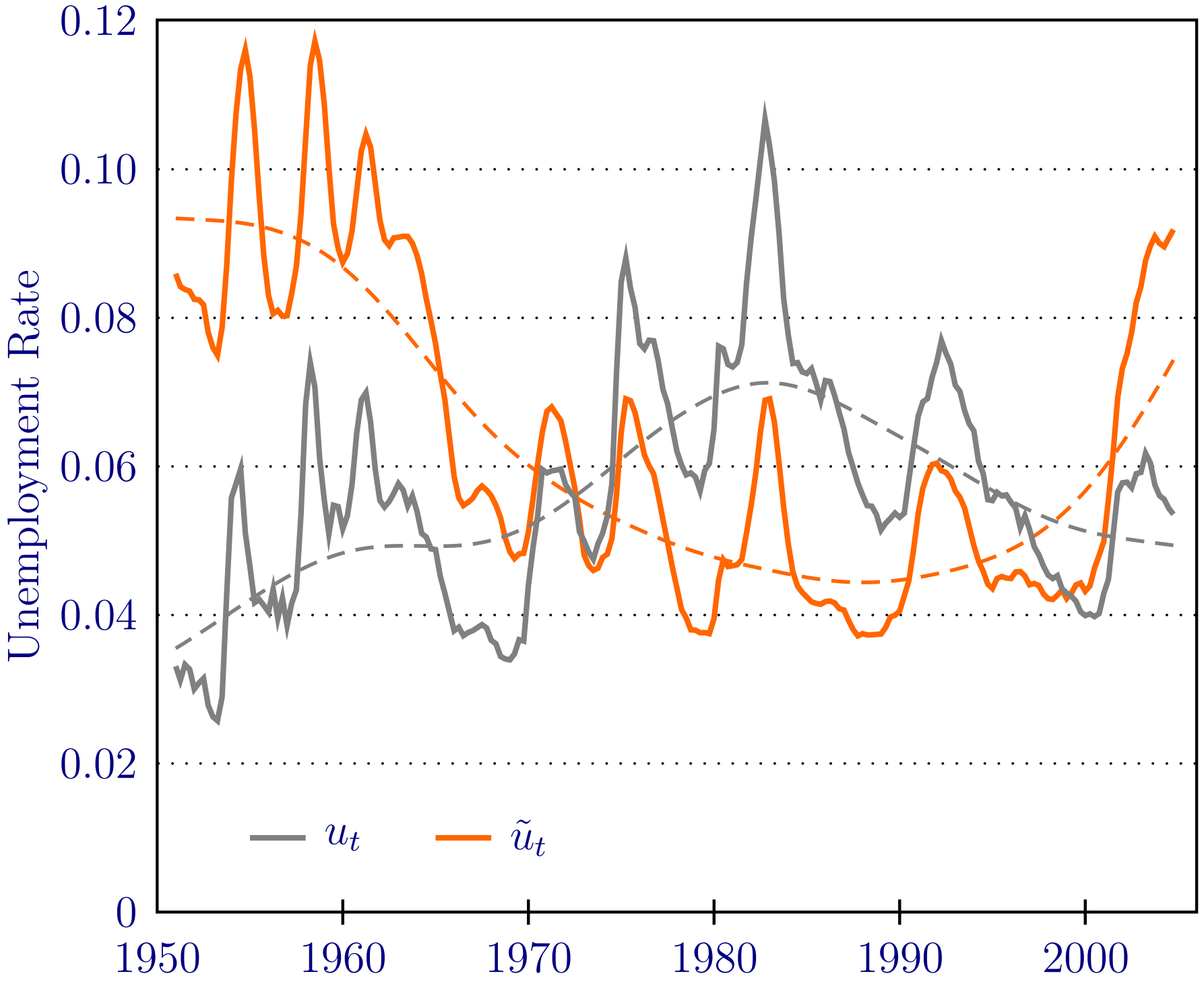
1970
1980
1990
2000


0.12
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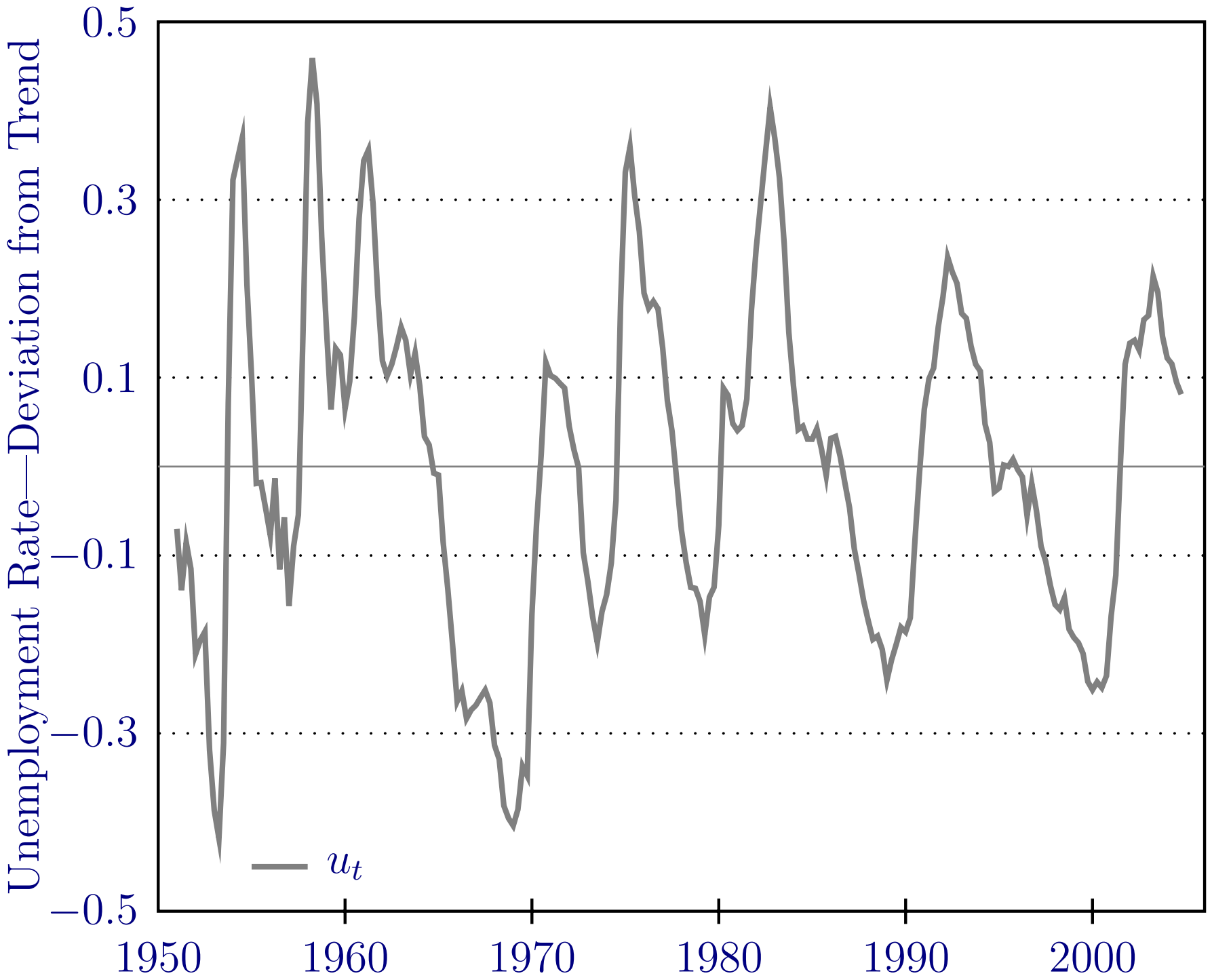
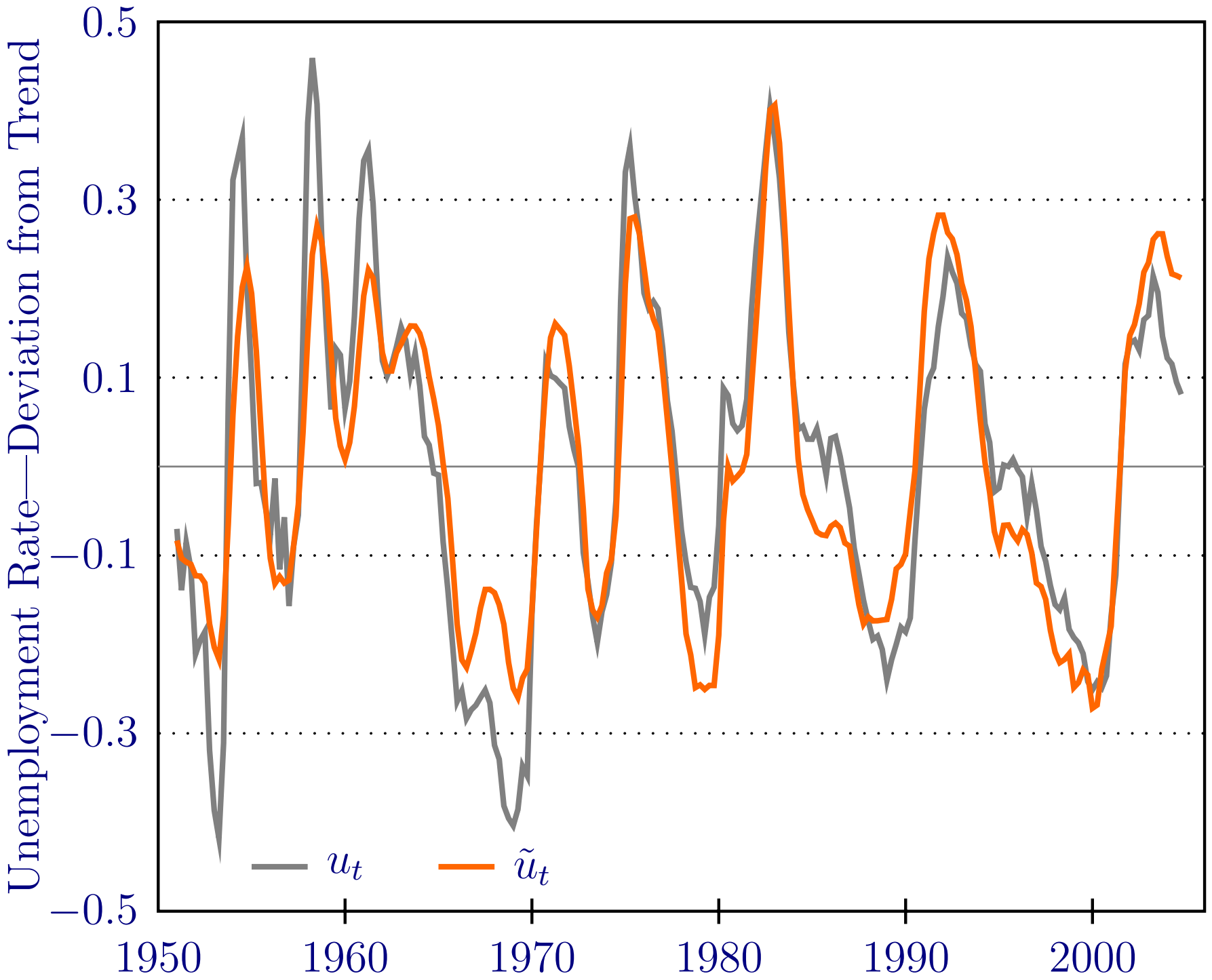
0.02
0
Unemployment Rate
1950
1960
1970
1980
1990
2000
u_t
$\tilde{u}_t$


Unemployment Rate—Deviation from Trend
0.5
0.3
0.1
−0.1
−0.3
−0.5
1950
1960
1970
1980
1990
2000
u_t


Unemployment Rate—Deviation from Trend
0.5
0.3
0.1
−0.1
−0.3
−0.5
1950
1960
1970
1980
1990
2000
u_t
$\tilde{u}_t$

Fact 6

To explain fluctuations in unemployment,
we need to explain fluctuations in vacancies.

Benchmark Model

- Pissarides (1985) with productivity (p) shocks.
- Risk neutral workers supply labor inelastically.
- Profit maximizing firms use a technology that is linear in labor.
- If profitable, they create vacancies to recruit workers.
- The firm keeps a fraction $1 - \beta$ of the value of match surplus.
- There are shocks to the productivity of all jobs.

Benchmark Model

- Recursive equation for the value of match surplus:

$$rV(p) = p - \big(z + f(\theta(p))\beta V(p)\big) - sV(p) + \lambda\big(\mathbb{E}(V(p')|p) - V(p)\big).$$

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$$rV(p) = p - \big(z + f(\theta(p))\beta V(p)\big) - sV(p) + \lambda\big(\mathbb{E}(V(p')|p) - V(p)\big).$$

- Free entry condition for vacancies:

$$c = \frac{f(\theta(p))}{\theta(p)}\,(1-\beta)V(p).$$

Benchmark Model

Standard Deviations

	U.S. Data	Model
Log Productivity	0.020	0.020
Log V-U Ratio	0.382	0.035

Critical assumption: $z = 0.4\bar{p}$.

How Can the Benchmark Model Be Fixed?

- Make wages more rigid
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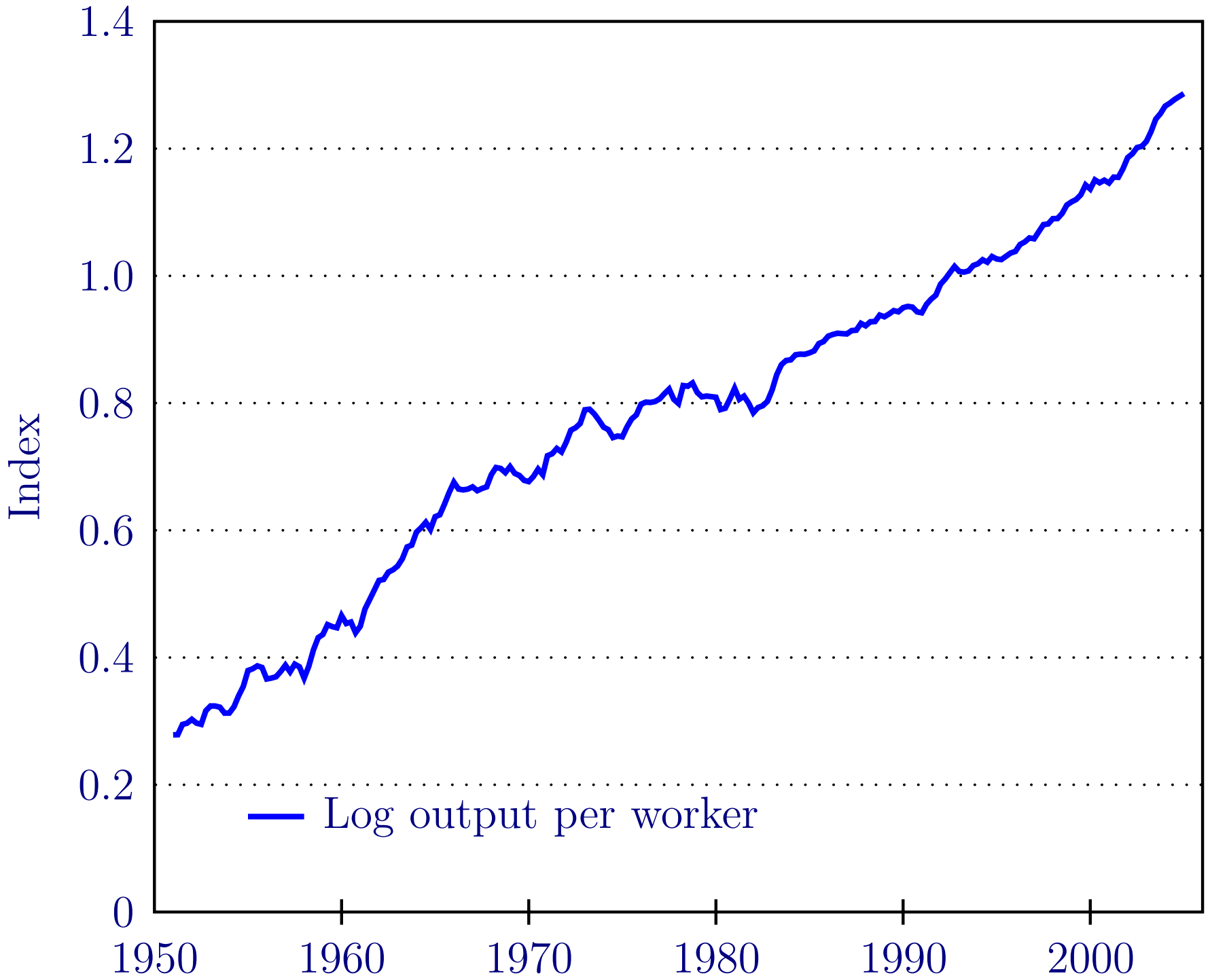
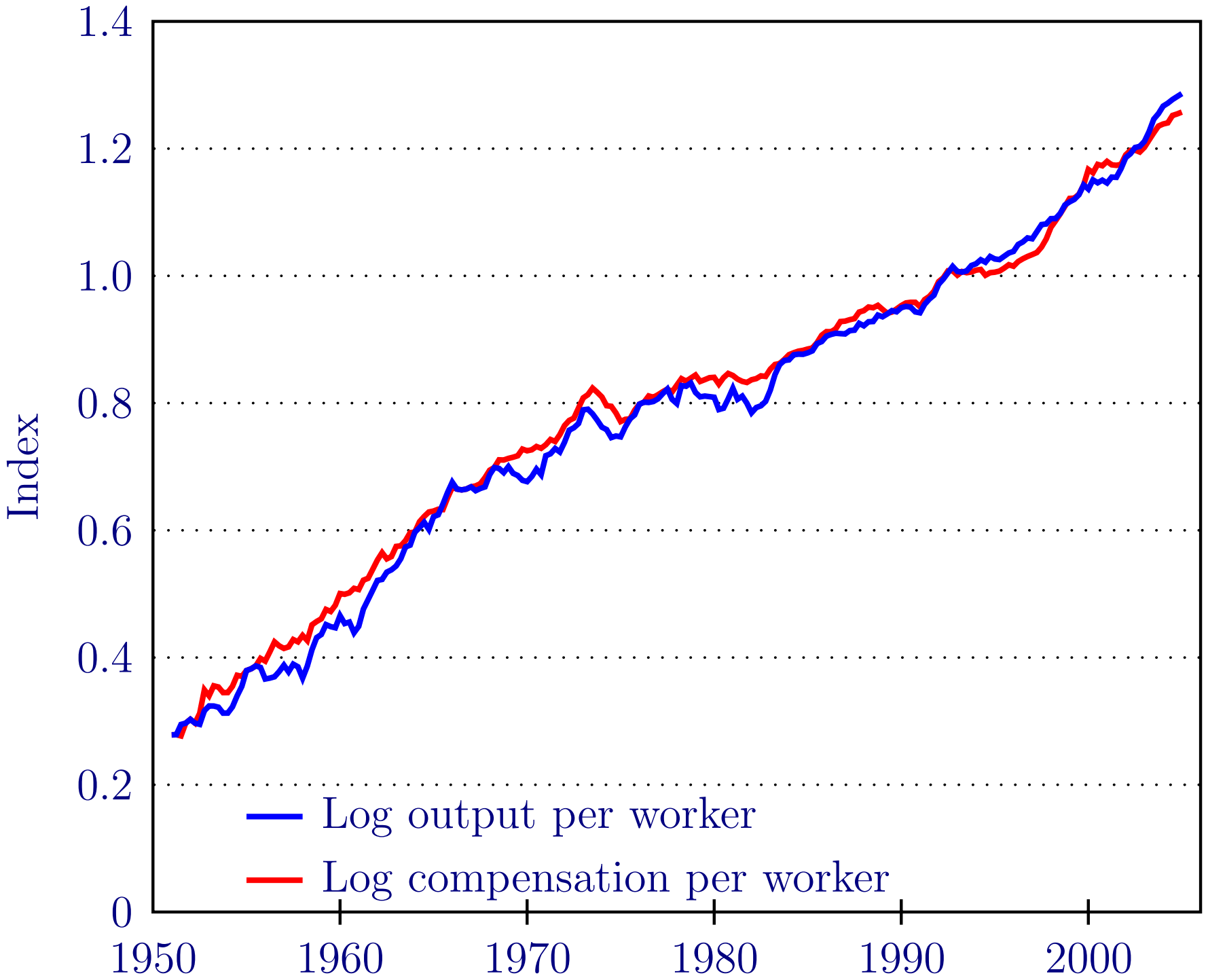
- Make wages more rigid
  - ◇ Hall, *American Economic Review* 2005.
  - ◇ This definitely makes the v-u ratio more volatile.
- But are wages too flexible in the benchmark model?
  - ◇ Look at data on real output and compensation per worker.


1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
Index
1950
1960
1970
1980
1990
2000
Log output per worker


1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
Index
1950
1960
1970
1980
1990
2000
Log output per worker
Log compensation per worker

How Can the Benchmark Model Be Fixed?

Standard Deviations

	U.S. Data	Model*
Log Productivity	0.020	0.020
Log V-U Ratio	0.382	0.035
Log Compensation	0.016	0.020

*Assumes wages are continually renegotiated.

How Can the Benchmark Model Be Fixed?

Standard Deviations

	U.S. Data	Model*	Model†
Log Productivity	0.020	0.020	0.020
Log V-U Ratio	0.382	0.035	0.035
Log Compensation	0.016	0.020	0.005

*Assumes wages are continually renegotiated.

†Assumes wages are bargained only in new matches.

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  - ◇ Risk-aversion and intertemporal substitution.
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  - ◇ Shocks to the productivity of new jobs only.
  - ◇ On-the-job search.
  - ◇ Asymmetric Information.

The Cyclical Behavior of Labor Markets

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