Discussion of “Benefits from U.S. Monetary Policy Experimentation”

James Hamilton

Model 1 (Samuelson-Solow):

$$U_t = \beta_0 + \beta_1 U_{t-1} + \beta_2 \pi_t + \varepsilon_t$$

Model 2 (Lucas):

$$U_t = \beta_0 + \beta_1 U_{t-1} + \beta_2 (\pi_t - \hat{E}_{t-1} \pi_t) + \varepsilon_t$$

OLS estimation (1948:III to 1963:I)

When π_t is explanatory variable:

$$R^2 = 0.74$$

When $(\pi_t - \hat{\pi}_t)$ is explanatory variable:

$$R^2 = 0.74$$

Model 2 (Lucas):

$$U_t = \beta_0 + \beta_1 U_{t-1} + \beta_2(\pi_t - \hat{E}_{t-1}\pi_t) + \varepsilon_t$$

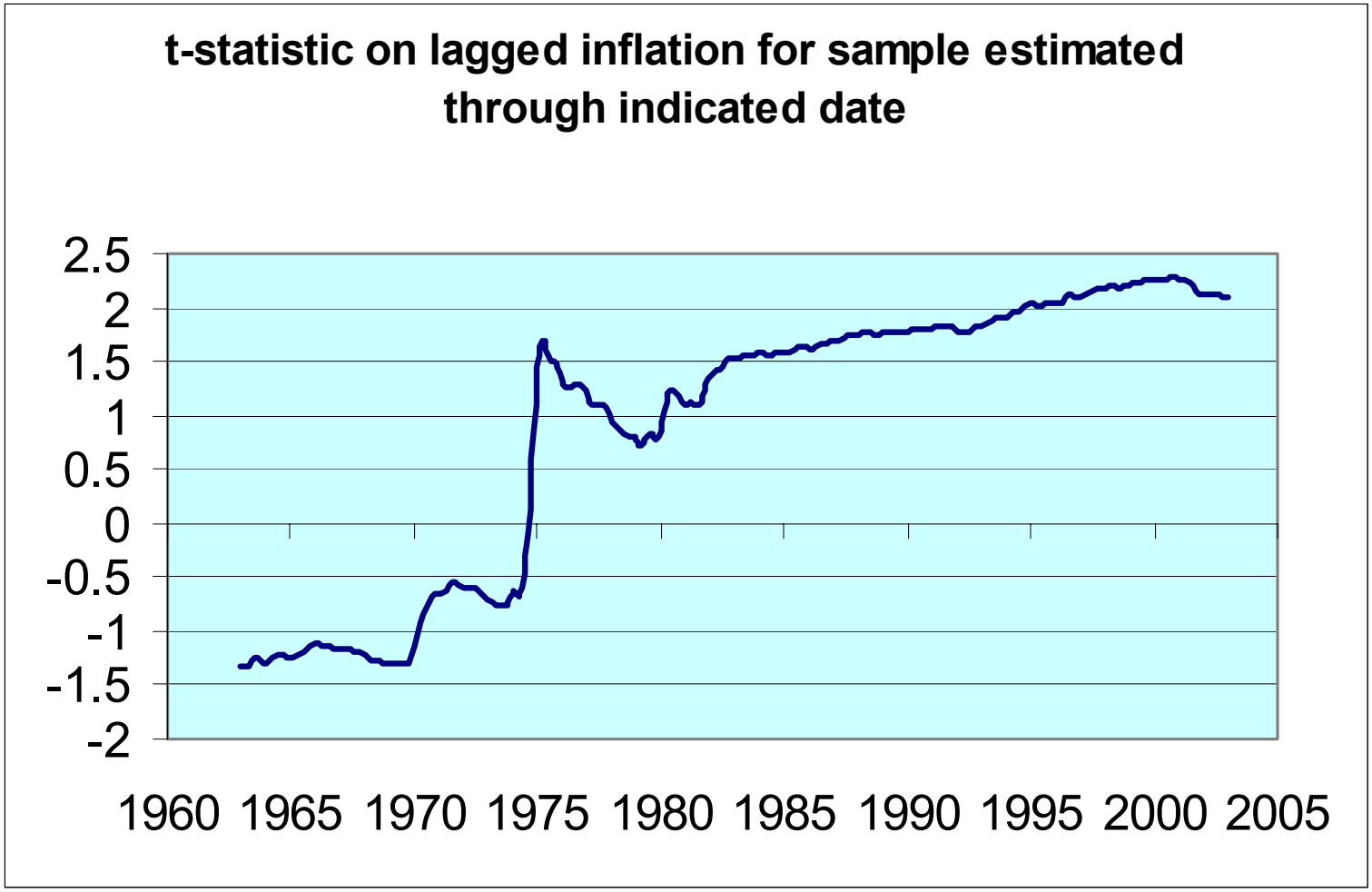
$$U_t = \beta_0 + \beta_1 U_{t-1} + \alpha_1 \pi_{t-1} + \varepsilon_t$$

t-test for 1948:III to 1963:I of $H_0 : \alpha_1 = 0$

$$-1.33$$

If estimate through 1963:II

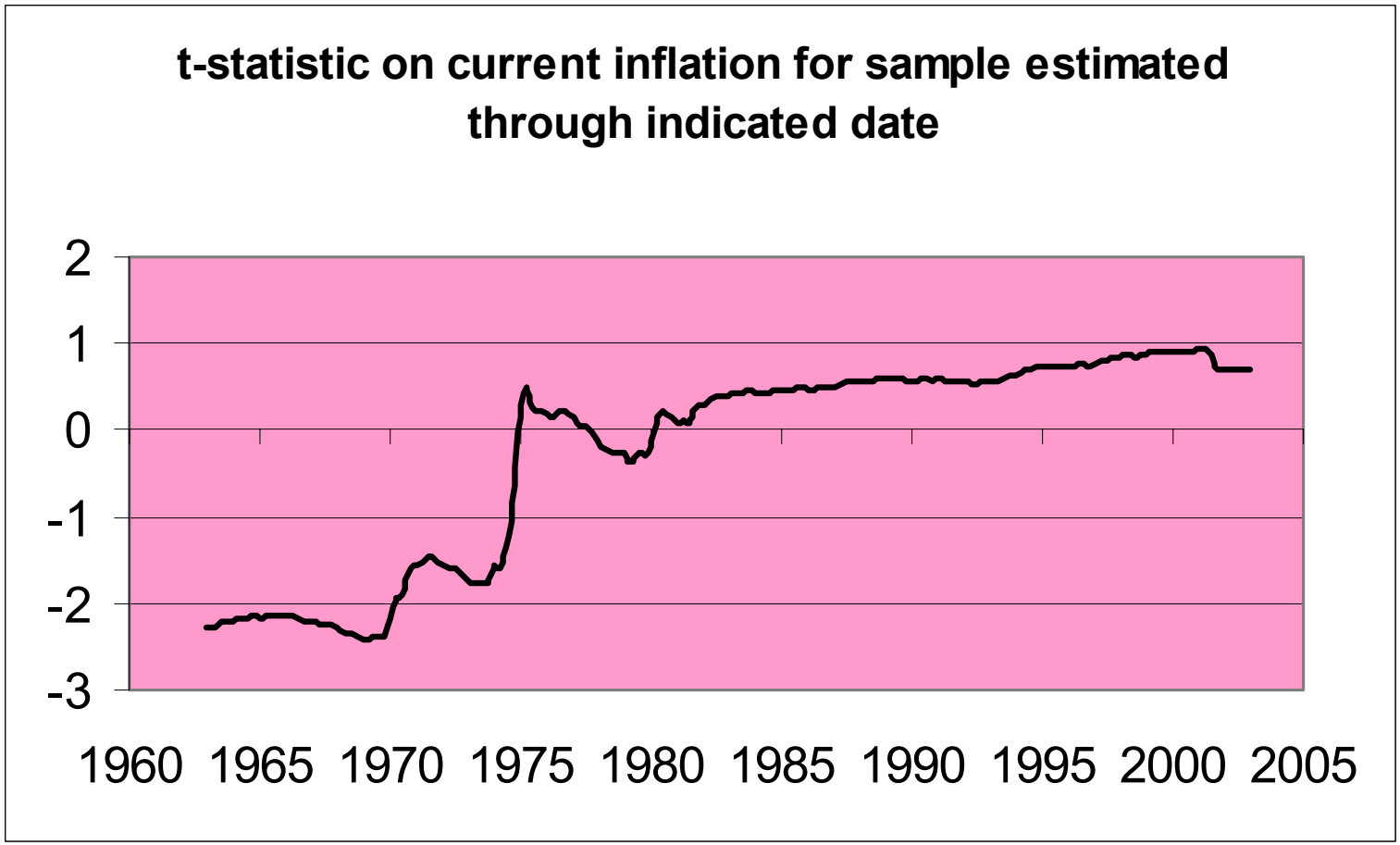
$$-1.34$$


t-statistic on lagged inflation for sample estimated through indicated date
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005

Model 1 (Samuelson-Solow):

$$U_t = \beta_0 + \beta_1 U_{t-1} + \beta_2 \pi_t + \varepsilon_t$$

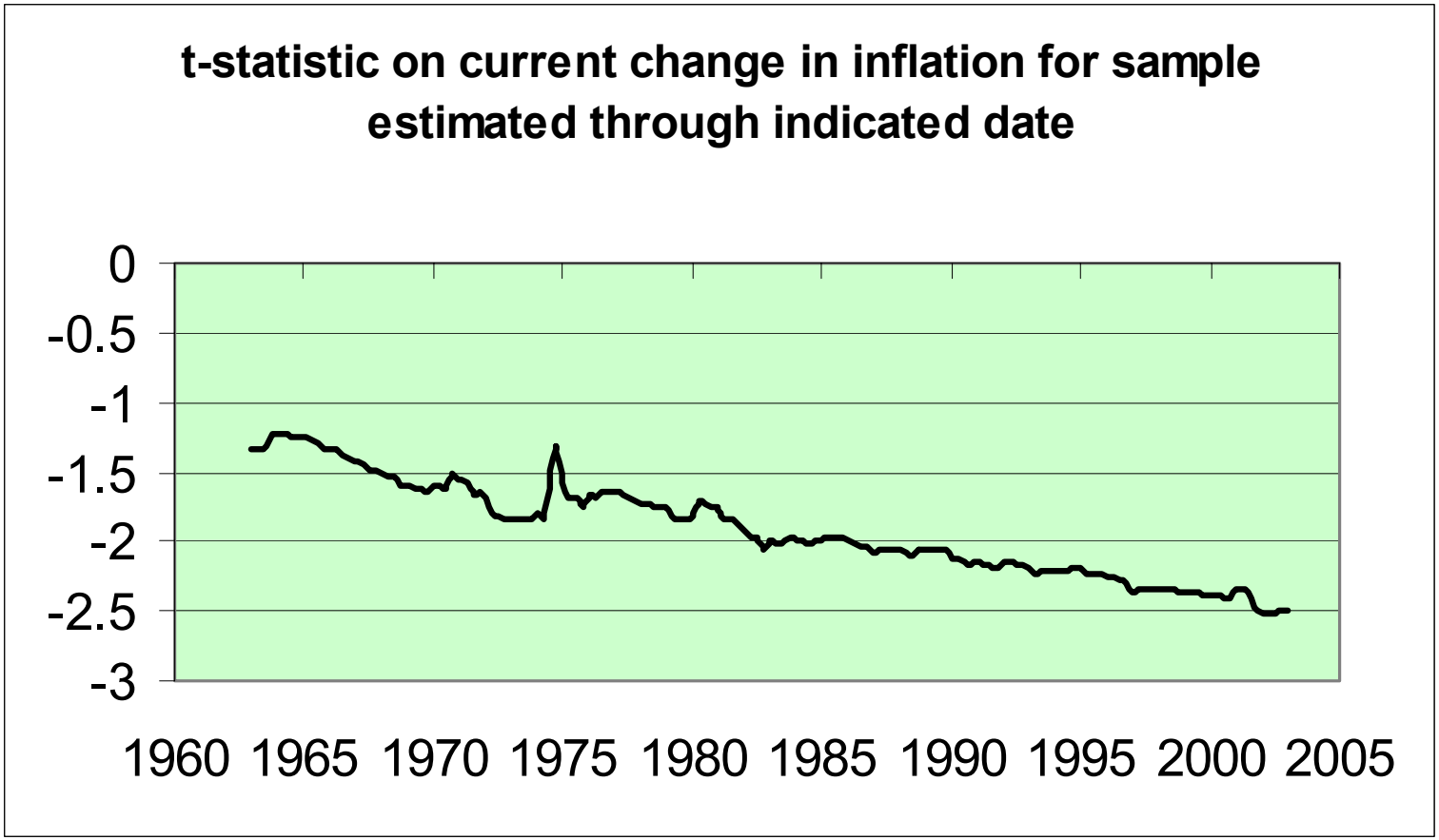
t-test of $\beta_2 = 0$


t-statistic on current inflation for sample estimated through indicated date
2
1
0
-1
-2
-3
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005

Model 3 (Solow-Tobin):

$$U_t = \beta_1 U_{t-1} + \beta_2 U_{t-2} + \beta_3 \Delta\pi_t + \beta_4 \Delta\pi_{t-1} + \beta_5 \Delta\pi_{t-2} + \varepsilon_t$$

t-test of $\beta_3 = 0$

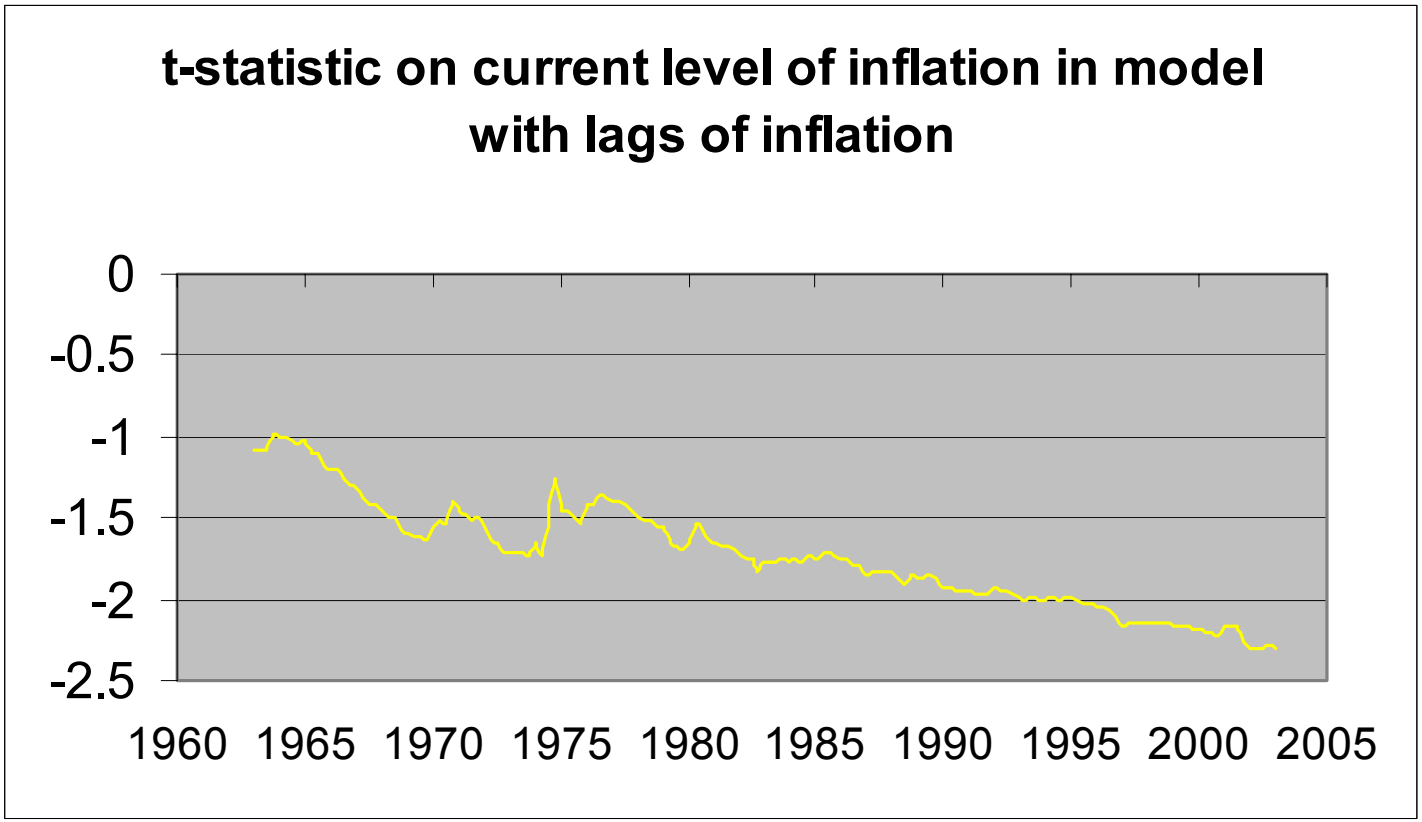

t-statistic on current change in inflation for sample estimated through indicated date
0
-0.5
-1
-1.5
-2
-2.5
-3
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005

Model 3 (Solow-Tobin):

$$U_t = \beta_1 U_{t-1} + \beta_2 U_{t-2} + \beta_3 \Delta\pi_t + \beta_4 \Delta\pi_{t-1} + \beta_5 \Delta\pi_{t-2} + \varepsilon_t$$

Model 4 (lags):

$$U_t = \beta_1 U_{t-1} + \beta_2 U_{t-2} + \beta_3 \pi_t + \beta_4 \pi_{t-1} + \beta_5 \pi_{t-2} + \beta_6 \pi_{t-3} + \varepsilon_t$$


t-statistic on current level of inflation in model with lags of inflation
0
-0.5
-1
-1.5
-2
-2.5
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005

Model 1 (Samuelson-Solow):

$$U_t = \beta_0 + \beta_1 U_{t-1} + \beta_2 \pi_t + \varepsilon_t$$

Model 4 (lags):

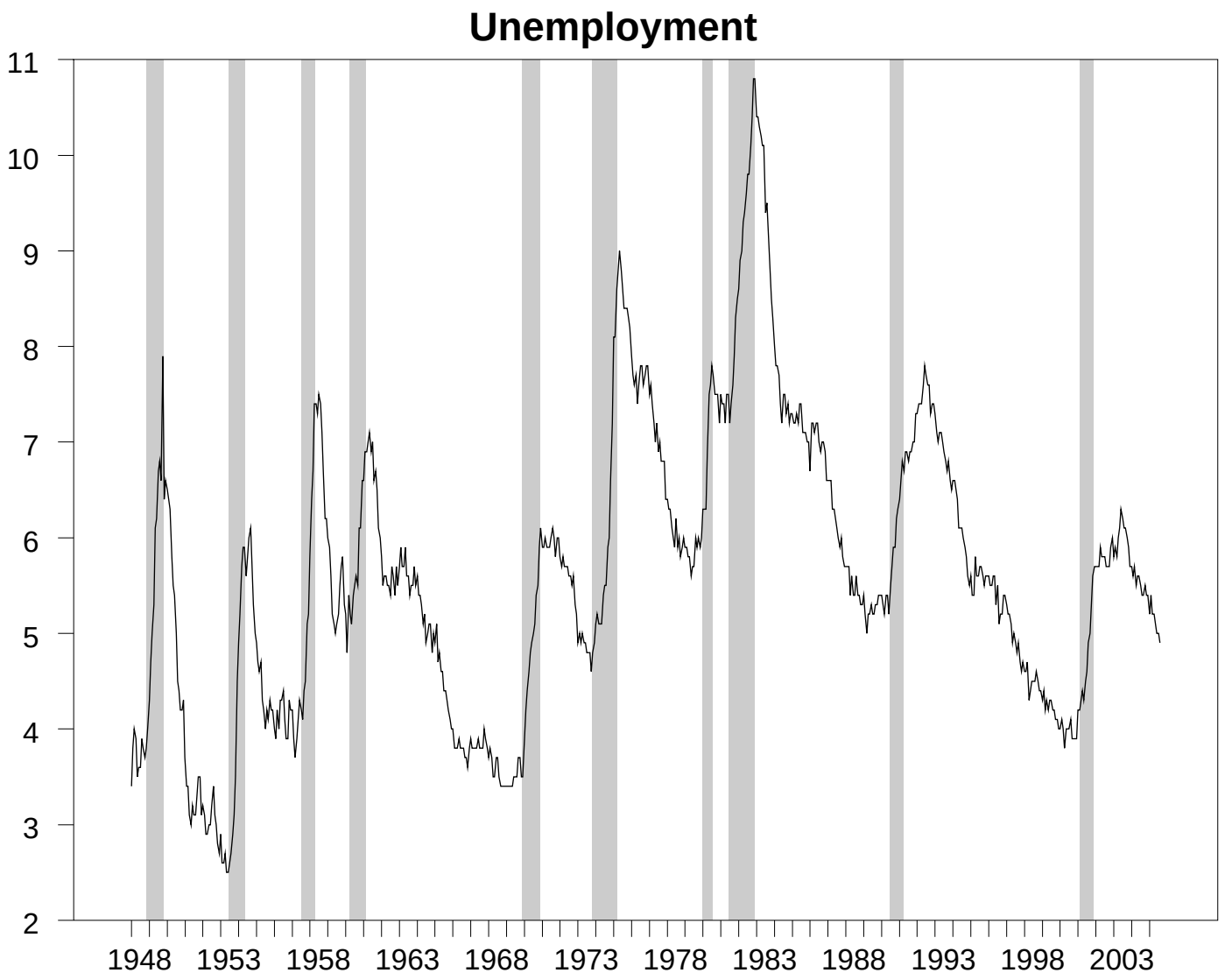
$$U_t = \beta_1 U_{t-1} + \beta_2 U_{t-2} + \beta_3 \pi_t + \beta_4 \pi_{t-1} + \beta_5 \pi_{t-2} + \beta_6 \pi_{t-3} + \varepsilon_t$$

Objective function: minimize

$$U_t^2 + \lambda \hat{\pi}_t^2$$

where U_t is deviation of unemployment from exponentially smoothed value ("natural rate")

Is negative U_t really a bad thing?


Unemployment
11
10
9
8
7
6
5
4
3
2
1948
1953
1958
1963
1968
1973
1978
1983
1988
1993
1998
2003