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

James Hamilton
Model 1 (Samuelson-Solow):

\[ U_t = \beta_0 + \beta_1 U_{t-1} + \beta_2 \pi_t + \epsilon_t \]

Model 2 (Lucas):

\[ U_t = \beta_0 + \beta_1 U_{t-1} + \beta_2 (\pi_t - \hat{E}_{t-1} \pi_t) + \epsilon_t \]
OLS estimation (1948:III to 1963:I)

When $\pi_t$ 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
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

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
Model 3 (Solow-Tobin):

\[ U_t = \beta_1 U_{t-1} + \beta_2 U_{t-2} + \beta_3 \Delta \pi_t \]
\[ + \beta_4 \Delta \pi_{t-1} + \beta_5 \Delta \pi_{t-2} + \epsilon_t \]

Model 4 (lags):

\[ U_t = \beta_1 U_{t-1} + \beta_2 U_{t-2} + \beta_3 \pi_t \]
\[ + \beta_4 \pi_{t-1} + \beta_5 \pi_{t-2} + \beta_6 \pi_{t-3} + \epsilon_t \]
t-statistic on current level of inflation in model with lags of inflation
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?