

## Estimating Taylor Rules

Here are some basic theoretical relationships that will be important in understanding the coefficients from the regressions you will run. First, the Fisher equation:

$$\text{Nominal interest rate} = \text{real interest rate} + \text{inflation rate}$$

Taylor rule regression:

$$\text{Federal funds rate} = \text{constant} + \beta * \text{inflation} + \gamma * \text{gap}$$

Remember, you can interpret the coefficients in the following way. A one-unit increase in inflation, leads to a  $\beta$ -unit change in the federal funds rate. Likewise for the “gap” variable.

- Estimate the Fed’s response to inflation and the output gap using regression. Paste this table into a Word document.
- In the regression window, go to View, then “Actual, Fitted, Residual Graph”. This graph shows the relationship between the actual federal funds rate and the federal funds rate that would be predicted by your regression (based on the output gap and inflation data). Paste this graph into your Word document.
- Estimate the Fed’s response to economic conditions (inflation and the output gap) for sub-samples for the following chairmen: Arthur Burns (1970:1-1978:1), Paul Volcker (1979:3-1987:3, and Alan Greenspan (1987:4-2005:4). Paste these three tables into a Word document.
- Estimate the regression from question 1 for the Greenspan sub-sample, but include the lagged federal funds rate as an explanatory variable. You can do this by adding FFR(-1) to the list of explanatory variables. Paste this table into a Word document.
- “Actual, Fitted, Residual Graph” into your Word document.
- Print out the results from these exercises.

### Questions

1. Before looking at your results, do you expect the coefficients on inflation and the output gap to be positive or negative? Explain briefly.
2. How does the Fed respond to a one percentage point increase in the inflation rate? What does this imply about the change in the real interest rate?
3. How does the Fed respond to a one percentage point increase in the output gap?
4. Looking at the R-squared and the plot, does the regression do a good job of explaining the Fed’s behavior?
5. Answer question 2 and 3 for each of the Fed chairmen based on your sub-sample regression results.
6. How do your overall results compare with those of the Taylor paper? Describe briefly.
7. Several researchers have opted to include the lagged federal funds rate as an explanatory variable in the regression, claiming this captures the Fed’s slow reaction to economic conditions. Does adding this variable improve the fit of the regression? You should look at your “actual, fitted, residual” graph, as well as the “adjusted R-squared”.
8. How does the change in #7 affect your coefficient estimates for the output gap and inflation?