

Macroeconomic Analysis
Econ 506 Fall 1997
H.W. 4
C. Swanson

1. Read the attached article by Mary Anastasia O'Grady.

A. Does this author approve/disapprove of devaluations? (Say yes or no and give quotes or paraphrases to support your answer. You cannot sit on the fence.)

B. Describe the dilemma that the bankers of Brazil face. (Give yourself a good page for this one. For each condition there is pressure to do something and for each something done there is a negative impact of it. Try to describe the source of the pressure, the things that might be done and the potential negative impacts.)

C. Describe what sterilization is in this situation, and why the central bankers might be inclined to engage in it and what effect it might have. (Be very specific. For example, you might say that "Sterilization is the purchase of potato chips by the government for gold pieces. It is done for the purposes of raising the price of potato chips. It has the negative effect of reducing the government's stock of gold. Potato chip makers like this policy, but potato chip eaters do not." Of course, sterilization is about something other than potato chips, but you get the idea.)

For all of the RATS questions below, give me the printout, but also give me an answer that is written as if I did not have the printout available to me. (Do not say: "See the printout." Work the numbers into your answers. Thus, you might say something like, "Since the coefficient on inflation lagged one period is -1.7 with a t-value of -2.5, we see that inflation has a negative effect on...")

2. The Fisher equation. The Fisher equation is the statement that the nominal interest rate is the inflation rate plus the real interest rate. It has the form

$$i_t = \pi_t + r_t$$

where i_t is the nominal interest rate, π_t is the inflation rate and r_t is the real interest rate. For example, in the third quarter of 1997, inflation was 1.4% and the short-term riskfree interest rate (Federal Funds rate) was about 5.4%. The real interest rate therefore was 4%.

Testing this hypothesis: run the regression

$$tbill_t = a_0 + a_1\pi_t + \epsilon_t$$

(To get inflation data, use the CPI data series in our data set: $\pi_t = \text{inflat}$.)

$$\text{set inflat} = \log(\text{CPI}) - \log(\text{CPI}\{1\})$$

(Don't forget to put the large spaces after the equals sign where the starting and ending values might go.)

A. Use linreg. Report the results and significance levels, including diagnostic results.

B. Do the same using AR1. Again, report the results.

C. Is the Fisher equation supported?

3. Find the non-dividend nominal return on stock prices:

$$\text{set rr} = \log(\text{sp500}) - \log(\text{sp500}\{1\})$$

A. Run the same regressions as for tbills. Use linreg and AR1. Report the results, including whether the AR1 command was desirable or necessary.

B. Are the results in conformity with the Fisher equation? (Note that rr is the rate of return on risky stocks whereas tbill is the rate of return on riskless treasury bills. Note also that coefficient values for tbill should be 400 times larger than for rr. The 100 times is the percentage rate correction and the 4 is the annualization of quarterly data. The Fisher equation theory says that if the price of everything goes up by 10%, the price of all things, including stock prices, should rise by 10%. We would like to know if this happens.)

4. We wish to know how and why previous period rates of return on treasury bills and stocks affect output, consumption and investment. First, make a series for the growth rates of output, consumption, and investment.

$$\begin{aligned}\text{set yg} &= \log(\text{gdp}) - \log(\text{gdp}\{1\}) \\ \text{set ig} &= \log(\text{in}) - \log(\text{in}\{1\}) \\ \text{set cg} &= \log(\text{c}) - \log(\text{c}\{1\})\end{aligned}$$

A. Run the regression

$$\text{yg}_t = a_0 + a_1 \text{rr}_t + a_2 \text{rr}_{t-1} + b_1 \text{tbill}_t + b_2 \text{tbill}_{t-1} + \epsilon_t$$

Report the values, significance levels and Durbin-Watson and significance levels on Q. Do this for linreg and AR1.

B. Run the same regressions with ig and cg instead of yg (four more regressions). Report the significance levels, etc.

C. Tell the story. (For example, does the rate of return on stocks affect output or investment? What effect does a high rate of return on stocks have on consumption and investment, and what is the net effect on output. If there is good news, do people invest more or consume more?)

5. The growth model (Ramsey's model). The real interest rate is

$$r_t = \frac{1}{2} + \rho g_{c,t}$$

Test this theory with the regression

$$\hat{r}_t = a_0 + a_1 \ln \text{inf lat}_t + a_2 g_{c,t} + \epsilon_t$$

- A. Do this with \hat{r}_t equal to the tbill rate. Use linreg then AR1.
- B. Do this with \hat{r}_t equal to rr (the stock return). Again, use linreg and AR1.
- C. Do this with \hat{r}_t equal to $rr0: (\text{set } rr0 = .80*rr + .2*(\text{tbill}/100)/4)$, the weighted average of the two rates of return.

For A through C, report the coefficient and t-values, \hat{R}^2 ; Durbin-Watson and significance levels on Q.

D. Appraise the results in A through C. (You might want to say that the theory seems to be valid when variable x is used, but not when variable y is used—and say what x and y are. You might also want to speculate as to why some variables work and others do not.)

6. You want to forecast GDP growth. Regress output growth on values that are known at the time of the forecast. (You can't use 1998 data to forecast 1998 events—you must use data from 1997 and before.) Use the stepwise regression command. Your command should look like:

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stepwise yg
#constant in#at{1 to 4} ig{1 2} cg{1 2} yg{1 2}
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A. Which values are most significant and important for forecasting? Is the constant term needed?

B. Can you improve upon my selection of variables? (This is not a yes or no question.)

7. Inflation and the money supply. We have repeatedly encountered the proposition that money supply growth causes inflation. We wish to test this proposition.

A. Run the regression

$$\ln \pi_t = a_0 + a_1 mg_t + a_2 mg_{t-1} + a_3 mg_{t-3} + a_4 mg_{t-4} + \epsilon_t$$

Do this for mg_t equalling money growth between $t-1$ and t ; where money is M1: (use $\text{set } m1g = \log(M1) - \log(M1\{1\})$). Report the results. Use AR1 if necessary.

B. Repeat the experiment for M2. Use AR1 if necessary.

C. Appraise the results. Does money growth drive inflation? (Again, this is more than just a yes or no question.)