Eviews project #2 – Estimating the Taylor rule

ECON-630 Monetary economics

Fall 2012 – Prof. Starr

This project asks you to load up an Excel spreadsheet containing U.S> data on the variables that enter the Taylor rule, perform some variable transformations, and estimate the Taylor rule describing monetary policy for the period between 1982 and 2001. You are also asked to use your results to gauge whether the Fed’s adjustments in interest rates over the 2001-2008 expansions followed or departed from its previous rate-setting behavior.

The assignment is due on: November 6, in class.

1. Getting started

Go into Blackboard and in the Assignments & Tests section, find the Excel spreadsheet called “inflation-output.xls”. Click on the file, and save it to your local machine.

Launch eviews. From the pull-down menu, choose File > New > Workfile

* For “workfile structure type”, choose “Dated/Regular frequency” and indicate that the data are quarterly. The start date is 1982q4 and the end date is 2008q4.
* From the pull-down menu in the “Workfile” window, choose Proc > Import > Read text-lotus excel
* Find the file containing your data, indicate its file type [Excel \*.xls], and click “open”. Up pops a screen labeled “Excel spreadsheet import”
* Where it says “Names for series or Number if named in file”, enter “4” as the number of variables
* Click “OK”.
* Your workfile should now contain the data. You can create charts (as was done in the VAR project) to make sure the data have imported properly. The variables in the data set are:

agdp: real GDP in billions of chained 2005 dollars

pgdp: potential real GDP in billions of chained 2005 dollars

inflation: annual percent change in the PCE price deflator

ff: target Federal Funds rate (the Fed’s main policy interest rate)

Answer:

We named the file as Q1

1. Estimation of the Taylor rule

If you recall, empirical studies that estimate the Taylor rule estimate equations of the following form:

it = αo + ρ it-1 + α1 (πt- πt\*) +α2 (yt- yt\*) (1)

 where it = nominal policy interest rate

 πt = inflation rate

 πt\* = target inflation rate

 yt = growth of real GDP

yt\* = growth of potential real GDP

A lagged value of the policy rate is included on the right-hand side to reflect the fact that central banks ‘smooth’ when making adjustments to the policy rate.

To prepare the variables to estimate (1), you need to do the following:

* Compute the rates of growth of real and potential GDP. Select Genr >. In the dialogue box that pops up, write the equation for a new variable, gro\_a, which is year-over-year growth of actual GDP:

gro\_a = (agdp – agdp(-4))/agdp\*100 where x(-n) refers to the nth lag of the variable x

Repeat the procedure to compute the analogous term for potential GDP, gro\_p.

* Because the Fed had no specific target for inflation over this period (the Volcker-Greenspan years), we infer what the πt\* may have been by some means. One method is to use the trend estimated via the Hodrick-Prescott filter. Following the steps used in assignment #1:
* Click on “inflation”.
* In the small window containing the data, choose Proc > Hodrick-Prescott filter. In the box for “smoothed series”, write “infl\_targ”. In the box for “cycle series”, write “cycle”. Set the value for lambda to 1600 (an appropriate value for quarterly).

To run the regression:

* go back into the ‘Workfile’ window, roll your cursor over the variables to be included in the regression (ff, gro\_a, gro\_p, inflation, infl\_targ), and right click on Open > as group.
* Now in the ‘Group’ window, click on Proc > Make equation.
* In the box, type the basics of the equation you want to estimate:

ff ff(-1) (gro\_a-gro\_p) (inflation-infl\_targ) c

and set the ‘sample’ to “1982q4 2001q4”. Under ‘options’, click on ‘Heteroskedasticity consistent coefficient covariance’ and pick the ‘Newey-West’ option (this gives standard errors that are robust to heteroskedasticity and autocorrelation). Now click ‘OK’.

* Cut and paste the regression results into your assignment write-up. What do the coefficients tell us about how the Fed was reacting to incoming information on inflation and output?

Answer:

We observe that last quarter value of nominal policy interest rate is a significant predictor of current policy rate, $\hat{ρ}$=0.93,p<0.001 and corresponding to a unit increase in last year interest rate there is on the average an increase of 0.9283 in the current nominal policy interest rate.

Corresponding to a unit change in the growth of real FDP as compared to growth of potential real GDP there is on the average an increase of 0.2332 in current nominal policy interest rate, $\hat{α}\_{2}$=0.2332, p<0.001.

Corresponding to a unit change in the inflation rate as compared to target rate there is on the average an increase of 0.3942 in current nominal policy interest rate, $\hat{α}\_{1}$=0.3942, p=0.0076.

These three variables together explains 92.43% of the variability in the current nominal policy rate.

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| --- | --- | --- |
| Dependent Variable: FF |  |  |
| Method: Least Squares |  |  |
| Date: 11/06/12 Time: 14:49 |  |  |
| Sample (adjusted): 1983Q4 2001Q4 |  |
| Included observations: 73 after adjustments |  |
| HAC standard errors & covariance (Bartlett kernel, Newey-West fixed |
|         bandwidth = 4.0000) |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob.   |
|  |  |  |  |  |
|  |  |  |  |  |
| FF(-1) | 0.928308 | 0.048073 | 19.31057 | 0.0000 |
| GRO\_A-GRO\_P | 0.233211 | 0.053699 | 4.342967 | 0.0000 |
| INFLATION-INFL\_TARG | 0.394161 | 0.143415 | 2.748391 | 0.0076 |
| C | 0.297769 | 0.308531 | 0.965119 | 0.3379 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.927402 |     Mean dependent var | 6.094178 |
| Adjusted R-squared | 0.924246 |     S.D. dependent var | 2.025449 |
| S.E. of regression | 0.557475 |     Akaike info criterion | 1.722437 |
| Sum squared resid | 21.44370 |     Schwarz criterion | 1.847942 |
| Log likelihood | -58.86897 |     Hannan-Quinn criter. | 1.772453 |
| F-statistic | 293.8132 |     Durbin-Watson stat | 1.741647 |
| Prob(F-statistic) | 0.000000 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

1. Taylor’s complaint that the Fed left policy ‘too loose for too long’ during the 2000s expansion, contributing to the 2007-08 financial crisis

As we’ve discussed, John Taylor has argued that the Fed left interest rates too low for too long during the economic expansion of the 2000s, contributing to excessive borrowing by financial institutions, financial-market participants, and households and contributing to accumulation of excessive risk in the financial system. We can use the regression results to infer how the Fed would have been expected to have set interest rates in the 2002q1-2008q4 period, had it used the same sort of reaction function as it had in 1982q4-2001q4.

* In the ‘equation’ window, select Proc > Forecast.
* In the forecast box that pops up, set the ‘forecast name’ to ‘fff’, and set the ‘forecast sample’ to 2002q1 2008q4.
* Now go back into the ‘Workfile’ window, select “ff” and “fff”, and open them as a group.
* We will want to produce a chart of these two series focusing on the period of interest: Select ‘Sample’ in the group window, and in the top box replace what’s there with 2000q1 2008q4.
* Now graph both ff and fff in the same graph, and copy and paste this graph into your assignment.
* Now interpret your findings: Do they suggest that Taylor was right, that the Fed kept its policy rate below the levels that would have been expected, based on its prior patterns of reacting to incoming information on output and prices? Explain.

Answer:

From the following plot we observe that for 2003q1 to 2005 q4 Taylor was right, that the Fed kept its policy rate below the levels that would have been expected while for other periods it is reversed.

