

ECON 453
In-Class Exercise 10
November 28, 2023

Please download the file "IC10.gdt", a gretl data file. This dataset comes from the Gallup Poll and the Bureau of Labor Statistics. The dataset contains monthly information from January 2009 to December 2016 (96 observations) for the following variables: presidential approval rating (Barack Obama), U.S. unemployment rate, and the Gallup Poll's Economic Confidence Index. The index measures how Americans feel the economy is doing and where it is headed. Negative numbers indicate a pessimistic outlook.

1. First, look at time-plots for the approval and economic variables (**View -> Graph specified vars -> Time series plot**). Look at unemployment and approval, then economic confidence and approval. Comment on trends in the variables, and whether it looks like there is a relationship between approval ratings and the two economic indicators.
2. Run a regression where **approval** is the dependent variable and **unemployment** and **econ_confidence** are the regressors.
 - a. Summarize the findings of this regression
 - b. Check the Durbin-Watson test and discuss briefly whether there is an issue.
3. Let's work on accounting for trends in our regression. Add a time trend variable to your dataset (**Add -> Time-trend**)
 - a. Regress the **approval** variable on the time trend variable (only the time trend variable). Save the fitted values from this regression (**Save -> Fitted values** from the regression results window). Call these **linear_fit**.
 - b. Regress the **approval** variable on the time trend variable and the squared version of the time trend variable (a quadratic trend model).
 - i. Save the fitted values from this regression. Call these **quadratic_fit**.
 - ii. What does your quadratic model predict President Obama's approval rating would be in January 2017?
 - c. Compare the results of the two models. View a time-plot with approval ratings and the fitted values from each of the models on one plot. Which is the better way to model the trend in approval ratings?
4. Next, run a regression using **approval** as the dependent variable and the following regressors: time trend, squared time trend, **unemployment**, and **econ_confidence**.
 - a. Save the residuals from this regression.

- b. Comment on the findings of the model. What does this model predict about the role of economic factors in the president's approval ratings?
 - c. View a time plot of the residuals from your regression.
 - i. Does this seem to indicate a serial correlation problem?
 - ii. Do you notice anything regarding the dates that might help us explain/model trends in presidential approval ratings?
 - d. Check the correlogram of the residuals from your model and the Durbin-Watson statistic from your regression. Are we gonna have a problem here?
- 5. Let's try a first-differences model instead. Create the differenced variables for approval, unemployment, and economic confidence (**Add -> First differences of selected variables**).
 - a. Regress the differences in approval on the differences in unemployment and economic confidence.
 - b. Comment on the findings of this model.
 - c. Based on the Durbin-Watson test, do we have a problem with serial correlation in this model?
 - d. Check other tests of autocorrelation (from the regression results select **Tests -> Autocorrelation**). You can use the default option of 12 lags. The null in each of these tests is "no problem". Overall, do we seem to have a problem with serial correlation?
- 6. Let's try to account for some unique time periods. Create dummy variables for the second term (starting January 2013), the month of May in 2011, and the re-election period (let's call it September 2012 to January 2013).
 - a. Run a regression using first-differences of approval as the dependent variable, and the following explanatory variables: first-differences of unemployment and economic confidence, your 3 time-period dummies.
 - b. Comment on what we learn from these results.