

POLS 602 Homework 5

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This homework assignment is due November 28th via email to the SI. The assignment is worth 100 points total, with each problem and its subsequent parts labeled with their respective worth. You are allowed to collaborate on this assignment and use online resources, so long as you turn in your own work and clearly attribute others' ideas. In your email, please include the .pdf file with your answers and any code used to produce your answers and the .pdf.

Problem 1: Time Series (50 points)

1.1 (10 points)

Read in `data1.csv`. Using `aTSA::adf.test()`, test each variable for the presence of a unit root (i.e., stationarity). Show the output of each test and briefly state if the variables appear stationary or not.

1.2 (15 points)

Estimate a model between the two variables (i.e., $y_t = \beta_0 + \beta_1 x_t + \varepsilon_t$). Elaborate on any concerns you may have with this model and its results given your tests for stationarity.

1.3 (25 points)

Difference each variable you found to be non-stationary. Estimate a new model. Do you come to different conclusions about the relationship between these variables?

Problem 2: Binary Dependent Variables (50 points)

2.1 (20 points)

Read in `data2.csv`. Supposing the relationship $y_i = \beta_0 + \beta_1 x_i + \varepsilon_i$, estimate a linear probability model (LPM). Interpret the coefficient you estimate for β_1 .

2.2 (30 points)

Estimate the same relationship with a logit model, using the function `stats::glm(..., formula=binomial(link="logit"))`. Make a well-formatted table that displays the results of the LPM and logit model together. Interpret the logit estimate of β_1 and briefly compare it to $\hat{\beta}_1$ from your LPM.