

Political Methodology Comprehensive Examination
January 2011
Department of Political Science, George Washington University

Part I

1. You are evaluating the effectiveness of an GRE test prep course by comparing the average scores (Verbal + Quantitative only) of two groups with the following sample statistics: the 180 GRE prep course takers had a mean of 1100 and a standard deviation of 200; the 190 non-prep course takers had a mean of 1050 and a standard deviation of 230.
 - (a) Using an alpha level of .05, perform a significance test to assess whether the prep course takers score higher on the GRE on average than those who do not take the prep course.
 - (b) What additional information would be useful in deciding whether the difference observed is spurious or not?
2. In recent years, there has been a revival of the linear regression model rather than using a probit or logit model when confronting a dichotomous dependent variable. What accounts for this revival? What are the advantages and disadvantages of linear regression vis a vis probit/logit?
3. Given a correctly specified regression model $y_i = \beta_0 + \beta_1 \cdot foo_1 + \beta_2 \cdot foo_2 + u_i$:
 - (a) What are the implications for $\hat{\beta}_0$, $\hat{\beta}_1$, & $\hat{\beta}_2$ if u_i is not normally distributed?
 - (b) Now, assuming you have estimated the equation via OLS and assuming $\hat{\beta}_1 > 0$ & $\hat{\beta}_2 > 0$, draw a correlation matrix for y_i , foo_1 , foo_2 , \hat{y}_i , \hat{u}_i . If you only know the sign of the correlation, enter “+” or “-” for the sign; otherwise enter the exact correlation. If you lack sufficient information, enter a “?”
4. After presenting a paper with the main model specification being a linear regression model, your discussant objects to your interpretation of the main independent variable of interest. She argues that the variable might be endogenous, which would lead to biased and inconsistent estimates. To counter this critique, what statistical analyses and tests could you conduct? What are the advantages and disadvantages of the techniques you could apply?
5. A colleague comes to you with event history data but has no idea how to examine it. S/he asks for your expertise and guidance. The data contain time-varying covariates. Provide a sufficiently detailed discussion of the advice you would give your colleague, including understanding the data structure, issues in selecting the right model for the substantive research question, model specification, and interpretation of the results.
6. Forrest Maltzman, Professor and Department Chair, has asked you to give a presentation to the department on one of two methods: TSCS/panel data or multilevel modeling. The goal of the presentation is to spread awareness of more advanced methodological issues to faculty and graduate students who have an interest in some of these methodological issues but do not have the time to take an entire course on the topic. You have 45 minutes to give the presentation, which will be followed by a question-and-answer session. Choose one of the methods (either TSCS/panel data methods or multilevel modeling) and provide an outline and discussion of the key topics on which you would present. How would you explain each topic to the audience? Remember that you want to give the audience a holistic understanding of the broad issues relevant to either type of data structure.

Part II

Either submit an empirical research paper along with the exam or schedule an oral exam after the written exam.