

**Political Methodology Comprehensive Examination, September 2010**  
**Department of Political Science, George Washington University**

Instructions: You have five hours to complete the exam. Good luck!

**Part I**

1. Universities love rankings! In 1993, the National Research Council issued the last set of definitive rankings of political science Ph.D. programs. It gave each program a score that ranged from a high of 4.88 to a low of 0.33. The mean score was 2.66 with a standard deviation of .98. GW ranked 46<sup>th</sup>, with a score of 2.57. Say you wanted to know the probability that GW was actually the 20th best program in America (given that Indiana at 20th had a score of 3.45). What assumptions would you need to make to perform the calculation? Given these assumptions, what is  $P(\text{GW ranked in the top 20})$ ?
2. The upcoming election has been heralded as an opportunity for Republicans to take back the House and Senate. The following data are the number of seats that the president's party has lost in midterm elections since 1934.

| <u>Year</u> | <u>House Seats</u> | <u>Senate Seats</u> |
|-------------|--------------------|---------------------|
| 1934        | +9                 | +9                  |
| 1938        | -71                | -6                  |
| 1942        | -55                | -9                  |
| 1946        | -45                | -12                 |
| 1950        | -29                | -6                  |
| 1954        | -18                | -1                  |
| 1958        | -48                | -13                 |
| 1962        | -4                 | +3                  |
| 1966        | -47                | -4                  |
| 1970        | -12                | +2                  |
| 1974        | -48                | -5                  |
| 1978        | -15                | -3                  |
| 1982        | -26                | +1                  |
| 1986        | -5                 | -8                  |
| 1990        | -8                 | -1                  |
| 1994        | -52                | -8                  |
| 1998        | +5                 | 0                   |
| 2002        | +8                 | +2                  |
| 2006        | -30                | -6                  |

This year the Democrats have a 75-seat majority in the House (253 Democrats to 178 Republicans – there are 435 seats). The Democrats enjoy an 18-seat majority in the Senate (59 to 41). Given the average historical loss of 25.8 House seats by the president's party in midterm elections (standard deviation of 23.9) and 3.4 Senate seats (standard deviation of 5.6), what is the probability that:

- a. Republicans pick up a majority of seats in the House?
- b. Republicans pick up a majority of seats in the Senate?
- c. Democrats retain their current majority in the House?
- d. Democrats pick up a filibuster-proof 60 seats in the Senate?

3. You have a database of weekly survey results on President Obama's public support. You want to model the President's public approval as a function of external conditions like unemployment rate, battle deaths, and major legislation enacted, and internal factors like presidential press conferences and speeches. You estimate a model of presidential approval using ordinary least squares regression. What assumption(s) might pose a problem with your model? What impact does violating these assumptions have and how would you test for their violation? Are there any solutions that you impose?
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. Assume you want to model PAC contributions in US elections as a function of a set of political and economic variables. The unit of analysis is the contribution by a PAC to a candidate, and contributions can range from \$0 to \$5000 (the cap). What statistical models might you employ, given the characteristics of the dependent variable? What are the advantages and disadvantages of the different models?

**Part II** (Answer one of the two following questions)

- 6a. You have a large cross-national survey data dataset with respondents living in regions in countries. Because of the three level structure (individuals in regions in countries) of the data, you decide to fit a multilevel model to the data. Carefully write out a model that accommodates this structure and allows for varying slopes and intercept. Describe precisely how you can assess whether this model fits the data better than a fully pooled or partially pooled specification.
- 6b. You are studying the question of policy adoption in a set of countries over a 40 year time period. Since you are interested in whether or when a country adopts a policy, you decide to estimate a duration model, with your unit of analysis the country year. [For every year,  $y = 0$  if the policy is not adopted; if the policy is adopted,  $y = 1$  and no further observations of that country are included.] Describe the steps you would take to estimate the duration model and interpret its results. Should you estimate a continuous time model like the Cox model or a discrete time model, or does it not matter which one you choose to estimate?

**Part III**

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