

**Intermediate Social Statistics: Hilary 2012**

**Homework 1**

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# 1 Homework Questions

## Question 1

I have estimated a logistic model to explore how judicial selection procedures impact court rulings for or against the governor when he or she is a party in the case (governors are named in many cases). My main independent variable is whether the judge is elected or appointed. I also know whether the judge is the same party as the governor named in the case.

Data: 1000 rulings on cases in which governors are named as a party in the case. Drawn from 42 states over 10 years.

Dependent Variable: coded 1 for a ruling for the governor and 0 for a ruling against.

Independent variables: Elected = 1 if judge was elected, 0 if appointed Party = 1 if judge is same party as governor 0 if otherwise

Table 1: Results

| Result        | Coefficient |
|---------------|-------------|
| Elected       | .07         |
| Party         | 1 .61       |
| Party*Elected | .21         |
| Constant      | .01         |

1. What is the difference in the expected probability of ruling in the governors' favor between two judges who are both from the governor's party but one of whom is elected and the other appointed?
2. What is the difference in the expected probability of ruling in the governor's favor between two judges, both of whom are elected, but one who is from the governor's party and one who is not?
3. Comment on the strengths and weaknesses of this model in this situation

## Question 2

Download the file nagler.asc.dta from my web site ([www.raymondduch.com](http://www.raymondduch.com)). This file contains 98,857 cases (welcome to large n research!) from the 1984 Current Population Survey, analyzed by Jonathan Nagler in two articles: The Effects of Registration Laws and Education on Voter Turnout in *American Political Science Review*, 1991, 85:1393–1405; Scobit: an alternative estimator to logit and probit *American Journal of Political Science*, 1994,

38:230–255. The data in the file comprise the following variables (in column order): turnout 1 if the respondent reports turning out to vote in the 1984 presidential election, 0 otherwise. educ 1 for 0-4 yrs education; 2 for 5-7 yrs; 3 for 8 yrs; 4 for 9-11 yrs; 5 for 12 yrs; 6 for 1-3 yrs college; 7 for 4 yrs college; 8 for 5+ yrs college age age of respondent, in years south 1 if respondent live in the South, 0 otherwise. govelec 1 if a gubernatorial election coincided with the presidential election closing number of days before election day that voter registration closes in the respondents state The following questions ask to you to estimate a series of logistic regression models. Construct a publication-quality table with the parameter estimates and standard errors for each the models, along with some summary information (e.g., goodness-of-fit, deviance, etc).

1. Estimate a logit model predicting turnout with the predictors educ and age and the square of each of these predictors. Provide a brief write-up of the parameter estimates (i.e., assess statistical significance and substantive implications) and the goodness-of-fit of the logistic regression model.
2. How many unique predicted probabilities are produced by this model? Explain how you derived your answer.
3. Compare the predicted probabilities from the logit model with the corresponding predicted probabilities from a probit model. How and why do they differ, if at all? Is there any statistical basis for preferring logit over probit or vice-versa?
4. Augment your logit model from the first part of this question with the following additional contextual predictors: south, govelec, and closing, and interactions between the two education variables (educ and educ2) and the closing date variable (i.e., make the effects of closing date quadratically conditional on the categorical education measure). Discuss the estimates and goodness-of-fit of this model in contrast with those obtained from the model for the previous question. Report a likelihood ratio test of the joint significance of the new predictors.
5. Using the estimates from the second model, consider a hypothetical nonsoutherner, in a state without a gubernatorial election, who has 12 years of education and has the median age of a non-southerner with 12 years of education. Plot the predicted probability of turnout for this person, as the closing date requirement varies over the range of closing date requirements observed in non-southern states. Overlay 95 percent confidence intervals around the point estimates.
6. Using the estimates from the second model, consider a hypothetical nonsoutherner, in a state without a gubernatorial election, who has 5+ years of college and has the median age of a non-southerner with 5+ years of college. Plot the predicted probability of turnout for this person, as the closing date requirement varies over the range of closing date requirements observed in non-southern states. Overlay 95 percent confidence intervals around the point estimates. Briefly compare the answers from this question with those from the previous question.

### Question 3

Use the ESS measurement dataset that is on my website ([www.raymondduch.com](http://www.raymondduch.com)) to do the following: 1) calculate the Cronbach's Alpha for 10 variables related to trust (in people and in political institutions); 2) use principal-component factor analysis to check how many underlying factors there are.

Due Thursday, Week 5.