10

Choosing How to Present Statistical Results

SUGGESTED COURSE EXTENSIONS

■ A. REVIEWING

1. Find a journal article in your field about an application of an OLS model.
   a. Which approaches to presenting statistical significance results do the authors use?
   b. Do the authors label those approaches adequately in the text (e.g., identifying the type of test statistic)? In the tables?
   c. If the authors used more than one approach to presenting statistical significance results, are those approaches complementary or redundant with one another?
   d. Would a different or additional approach be more suitable for that intended audience? If so, name it and, if the information in the article is sufficient, calculate it for each variable in one of their models.
   e. Do the authors mention whether their statistical tests are 1-tailed or 2-tailed?
   f. Do the authors specify the number of degrees of freedom for their models?

2. Does the article used in question A.1 address any hypotheses *other than* the null hypothesis (e.g., $\beta_i = \beta_j$, or tests across models)?
   a. If so, do the authors provide information such as test statistics or variance-covariance matrices to test those hypotheses formally? Are their explanations of those hypothesis test results clear?
   b. If they don't test other hypotheses, are there others that would suit their research question? If you had access to their data, what approach would you use to present results of those hypothesis tests to the same audience?

3. Find a journal article in your field about an application of an OLS model with standardized coefficients.
   a. Which approaches to presenting statistical significance results do the authors use?
   b. Are the units of the statistical test information consistent with the units of the standardized coefficients? If not, suggest a correct alternative for presenting statistical test results.

4. Find a journal article in your field about an application of a logistic regression of a binary dependent variable.
   a. Which approaches to presenting statistical significance results do the authors use?
   b. Are the units of the statistical test information consistent with the units in which they present the effects' estimates (log-odds or odds ratios)? If not, suggest a correct alternative for presenting statistical test results.

5. Obtain a copy of a leading journal in your field.
   a. Which approaches to presenting statistical significance results are specified in the instructions for authors for that journal?
   b. If they do not specify a particular approach to presenting statistical significance, which ones are mostly widely used in the journal?
   c. Critique those choices, given the intended audience for that journal.

6. Find a report about a survey in your field or at Web sites such as the Census or Bureau of Labor Statistics.
   a. Which approaches to presenting statistical significance results are used?
   b. Who is the intended audience for that report or Web site?
   c. Do the approaches used to present statistical significance suit that audience?

■ B. APPLYING STATISTICS

Note: These questions use the regression output from the "applying statistics" questions in the suggested course extensions to chapter 9. See notes to those questions for additional information about the types of variables and notation used below.

1. Using the OLS regression output from question B.4 in the suggested course extensions for chapter 9, identify or calculate each of the following for each of the coefficients in the model. Most of these pieces of information can be requested as part of the computerized output.
   a. The standard error
   b. The test statistic (name it)
   c. The p-value based on a 2-tailed test
   d. The p-value based on a 1-tailed test
   e. The 95% confidence interval
   f. The 99% confidence interval
   g. The symbol denoting level of statistical significance, assuming a 2-tailed test, if ** denotes $p < 0.01$ and * denotes $p < 0.05$.

2. Create tables to present results of the OLS model in the preceding question for each of the following audiences or objectives, using the criteria in chapters 5 and 10 and appendix B of *Writing about Multivariate Analysis*:

   a. A paper to be submitted to the journal you used in question A.5
   b. A 15-page report for a nonstatistical audience interested in the issues you study
   c. A five-minute presentation to a lay audience interested in the issues you study

3. Use the same data and variables Y_1 and *CATEGVAR* as in question B.5 from the suggested course extensions for chapter 9 to perform the calculations below. (Reminder: Y_1 is a continuous dependent variable and *CATEGVAR* is a three-category independent variable from which two dummy variables [denoted *CAT1* and *CAT2* in the equations below] have been created; label yours to reflect their actual content!)

   a. Estimate a model of the form $Y_1 = \beta_0 + \beta_1 CAT_1 + \beta_2 CAT_2$, requesting the variance-covariance matrix for the model.
   b. Perform a ballpark assessment of whether $\beta_1 = \beta_2$, using the approach described on page 250 of *Writing about Multivariate Analysis*.
   c. Use information from the variance-covariance matrix to calculate the test statistic for whether $\beta_1 = \beta_2$, following the instructions under "Standard Error of the Difference" on page 248 of *Writing about Multivariate Analysis*.
   d. Write a sentence to report the conclusions of that test, with reference to the specific variables and concepts in your model.
   e. Reestimate the same model as in part a, requesting a formal statistical test for $\beta_1 = \beta_2$. Compare your conclusion based on this approach to your conclusion based on the method used in part c.

4. Using the same data and variables as in question B.4 in the suggested course extensions for chapter 9, estimate stratified models (one for the subset of cases for whom *DUMMY* = 1, a separate model for cases for whom *DUMMY* = 0) of the form $Y_1 = \beta_0 + \beta_1 X_1$. (Reminder: Y_1) a continuous dependent variable and X_1 is a continuous independent variable.)

   a. Calculate the statistic to test whether β_1 is statistically significantly different across the models for the two subsamples. (This is one way to test whether *DUMMY* and X_1 interact in their association with Y_1.}
   b. Compare your conclusions about the statistical significance of this interaction based on the stratified models test with your conclusions based on the test statistics for the interaction term between *DUMMY* and X_1 in the model estimated for question B.4 in the suggested course extensions for chapter 9.

5. Using the logistic regression output from question B.6 in the suggested course extensions for chapter 9, identify or calculate each of the following for each of the coefficients in the model. Most of these pieces of information can be requested as part of the computerized output.
    a. The standard error
    b. The test statistic (name it)
    c. The *p*-value based on a 2-tailed test
    d. The *p*-value based on a 1-tailed test
    e. The 95% confidence interval for the coefficient (e.g., the 95% CI around the log-odds point estimate)
    f. The odds ratio
    g. The 95% confidence interval for the odds ratio
    h. The symbol denoting level of statistical significance, assuming a 2-tailed test, if ** denotes $p < 0.01$ and * denotes $p < 0.05$

6. Create tables to present results of the logistic regression model from the preceding question for each of the following audiences or objectives, using the criteria in chapters 5 and 10 and appendix B of *Writing about Multivariate Analysis*.
    a. A paper to be submitted to the journal you used in question A.5
    b. A 15-page report for a nonstatistical audience interested in the issues you study
    c. A five-minute presentation to a lay audience interested in the issues you study

■ C. WRITING AND REVISING

1. Repeat questions A.1 and A.2 for a results section you have written previously that describes results of an OLS regression.

2. Revise or create tables to present results of that OLS model for each of the following audiences or objectives, using the criteria in chapters 5 and 10 and appendix B of *Writing about Multivariate Analysis*.
    a. A paper to be submitted to a leading journal in your field
    b. A 15-page report for a nonstatistical audience interested in the issues you study
    c. A five-minute presentation to a lay audience interested in the issues you study

3. Repeat question A.4 for a results section you have written previously that describes results of a logistic regression analysis of a binary dependent variable.

4. Repeat question C.2 with the results of that logistic regression.