Long Assignment for
Statistics for Decision Making
Economics 203

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Introduction to Faculty Colleagues

This assignment was developed for my Eco 203 – Statistics for Decision Making course. As the name suggests, this course is highly numerical, and thus the majority of my assignments up to this point have been focused nearly exclusively on data and statistical analysis. At the same time however, the majority of students in this course are business majors (i.e. marketing, management, accounting, etc). To be successful, these students need to learn not only the statistical tools needed to analyze a variety of data in their disciplines, but also how to explain and write a comprehensive analysis of this data for a variety of audiences. Many times, THEY will also need to be the ones who must develop the research question in order to answer some particular question. Given this, I should have the same goals for my assignments.

Therefore, I have developed a semester-long writing assignment with the goal of integrating more writing and analysis of the statistical results that students are already learning how to produce. This assignment is an extension of a single final paper that I have previously had students submit at the end of the semester. Specifically this extended assignment consists of 3 smaller assignments assigned throughout the semester, that ultimately lead up to a final (4th assignment) research paper due near the end of the term. The assignments are scaffolded so that each builds upon the previous piece, ultimately leading up to the final research analysis. In order to avoid students simply cutting/pasting the initial assignments to form the final written piece though, the specifics of the early assignments will be given so that the students are writing to different audiences for the various assignments.

Ultimately I believe this assignment(s) will help students:

- develop better statistical writing skills for a variety of audiences
- learn how to develop a statistical model which evaluates a particular research question
- analyze others’ empirical research and explain how their own research fits in to the previous literature
• conduct advanced statistical analysis, explain the results and think more deeply about the conclusions that may be drawn from these results

The Assignment I Distribute to Students
ECO 203 – Statistics for Decision-Making
Case Analysis Assignment

Purpose
The case analysis is the culminating project for this course. Given this, a well-constructed assignment should synthesize the most important course goals and objectives of the course. A review of the goals and objectives of this course can be summarized as follows (see syllabus):

• In this course we will learn how to correctly measure the size of the effect of a change in one variable on another.

• We will also learn how to correctly interpret statistical results, conduct appropriate hypothesis tests, develop confidence intervals and obtain forecasts for simulated future environments so we may observe the implications of our results.

Your work up to, and on this final case analysis will directly assess your ability to do each one of these things.

Process
You will work on pieces of this research question throughout the majority of this course. Specifically, you will turn in four separate assignments through the course of the semester relating to the final research paper. Each piece will ultimately help you to describe, motivate and offer support for your research question.

You will start with the development of a thesis question based on your own individual interests and aspirations for learning. Your question must seek to discover the determinants of something. Your thesis should come in the form:

In this paper I will investigate the determinants of ________.

Examples:
What determines students’ GPAs?
What determines prices of stocks?
What determines GDP growth rates of countries?

Here are some past research topics that students have explored:
\[ y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \epsilon, \]
where \( y \) is the percentage of people at the poverty level by state, \( x_1 \) is the average amount spent on education per student in the state, \( x_2 \) is the state unemployment rate, and \( x_3 \) is the amount of federal educational funding. The student was interested in whether or not the federal educational funding was a significant factor in reducing the percentage of poverty in a given state.

- \[ y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \epsilon, \]
where \( y \) is the amount of a tip left for a waiter at a restaurant, \( x_1 \) is the amount of the restaurant bill, \( x_2 \) is number of people dining, \( x_3 \) is time of the restaurant meal. The student was a waiter and was interested in which factors influenced the tip he received.

- \[ y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 D_1 + \beta_5 D_2 + \beta_6 D_3 + \epsilon, \]
where \( y \) is movie box office sales, \( x_1 \) is the movie budget, \( x_2 \) is highest paid actor or actress, \( x_3 \) is the number of movie theaters the movie was shown, \( D_1 \) is a dummy variable that takes the value of 1 if the movie is an action movie, \( D_2 \) is a dummy variable that takes the value of 1 if the movie is a comedy, and \( D_3 \) is a dummy variable that takes the value of 1 if the movie is a drama. The student was interested in which factors drove box office revenues.

Note: Be creative; do something different!! The originality of your topic is part of your grade. In the world outside of Elon, you will need to “sell” your ideas and work to others. Part of this assignment is to help you practice this skill.

Also remember that as you will be doing a statistical analysis, it is important that you can find DATA relating to your research question!!

Assignment #1
You will begin evaluation of your thesis early in the course by collecting data and doing a descriptive analysis. This initial descriptive analysis will ultimately help to describe and/or motivate your research question in your final research paper.

Assignment #1 Due Date: September XX, 2013

Assignment #2
As we move through the course, you will continue to go back to your research question and build upon your analysis. Once we have covered some basic inferential statistical methods, you will be asked to utilize some of these tools to conduct an initial test of your research question. You may use the data you collected initially, or you may need to collect new/additional data if necessary.

Assignment #2 Due Date: October XX, 2013
Assignment #3
As we near the final state of your research project, you will need to employ some more sophisticated empirical techniques to analyze your research question. Before you begin work on the final paper, you will first write a prospectus outlining your research question, data and control variables, methodology and expected results based on your previous analyses. This prospectus will be peer-reviewed and the feedback you obtain should be used to further develop your final product.

Assignment #3 Due Date: November XX, 2013

Assignment #4 (FINAL CASE ANALYSIS)
The final piece of your thesis research is an application of multiple regression analysis where you will formulate a multiple regression model to test to see which factors are statistically significant in analyzing your original research question. You will utilize pieces of your first three assignments to both motivate and analyze the final model.

In particular, for the final piece of your research, you will do two things:

- Write a 5-7 page research paper where you motivate the question, research the previous literature, conduct the statistical analysis, and draw conclusions regarding your research hypothesis from your results.

- In addition to the final research paper, you must also construct a 2-3 minute 'elevator speech' describing your research question and findings. These speeches will be presented orally in class.

Assignment #4 Due Date: December XX, 2013

NOTE: Remember that this will be a project that you will be working on continuously throughout the semester, so be sure to pick a research question that you are 1) interested in and 2) can find data for! You will be limited in your ability to change topics after Assignment #1, and so be sure to put some serious thought into your research question in the beginning!

The Assignment Description I Give to Students for Case Analysis #1

ECO 203 – Statistics for Decision-Making

Case Analysis Assignment #1

Assignment #1
You will begin evaluation of your thesis early in the course by collecting data and doing a descriptive analysis. This initial descriptive analysis will ultimately help to describe and/or motivate your research question in your final research paper.
**Purpose**
To be able to collect and analyze appropriate data using basic descriptive statistics, and to be able to use this analysis to motivate an interesting question.

**Process**
Find data \((n \geq 35)\) that will help to describe or motivate the research question you proposed in the first step of this sequenced writing assignment. Simple correlations or descriptive charts/graphs are fine - your use of data at this point is descriptive only.

*Example: If you are looking to answer the research question “What determines students’ GPAs, you might hypothesize that the number of hours of sleep that a student gets is one of the determining factors. Collect data on student GPAs and the number of hours of sleep that each student gets and look to see if there appears to be a correlation (positive or negative) between these two variables and discuss.*

**Deliverable**
Imagine you are pitching your research question to the university as part of your application for a SURE (Summer Undergraduate Research Experience) grant. The SURE grants are actual grants offered by Elon University that offer funding to undergraduates to conduct research with faculty over the summer months. *(Do a good job and you may both apply for and receive one of these grants sometime in the near future!)* Write a short (1-page) summary of your research question, as well as an explanation as to why you feel the question is interesting and worthy of statistical analysis. Use your descriptive statistical analysis to motivate WHY you feel this is an interesting and important research question and to hypothesize the results you expect to find.