Assignment 5

Trends in Graduate Enrollment, Shifting Fields of Study, and Faculty Salary

Hard copy (8 pages maximum, including cover page and references) due at the beginning of class (9:30 am) on Wednesday 12/5. STAPLE YOUR ASSIGNMENT.

READ THROUGH THE ENTIRE ASSIGNMENT BEFORE YOU START.

For this assignment, **you may work in groups of 1 to 3 people**. You will submit ONE report for the group, and all individuals in groups will be given the same grade. All submitted reports will be graded equally, regardless of how many people were in the group. Make sure that the names of all people in the group are included on the cover page.

You will be creating a "Mini-Report" (8 pages maximum) based on the data analysis perform. **For this assignment, the presentation, format and communication of quantitative material are as important as accurate calculations and sound analyses.** You will ONLY be submitting your final report (we will not see your R scripts, code or markdown documents).

You should make decisions about how to best analyze and present the data you are asked to compare (e.g. graph type, number of graphs, appearance, error bars, statistical tests, how your will organize the overall report, etc.). Consider creating an outline of your report before putting it together – it should tell a cohesive story.

For Assignment 5, you will be exploring trends in graduate enrollment, doctoral degrees awarded, and salary.

Data for Assignment 5 are posted on GauchoSpace, and summarized below:

- 'Grad enrollment 1967 - 2015': Numbers for U.S. graduate enrollment by attendance status, sex, and control of institution. *SOURCE: U.S. Department of Education, National Center for Education Statistics, Higher Education General Information Survey (HEGIS), "Fall Enrollment in Colleges and Universities" surveys, 1967 through 1985; Integrated Postsecondary Education Data System (IPEDS), "Fall Enrollment Survey" (IPEDS-EF:86-99); IPEDS Spring 2001 through Spring 2016, Fall Enrollment component. Accessed at: https://nces.ed.gov/programs/digest/d16/tables/dt16_303.80.asp.*
- 'PhDs by Field 1985 - 2015': Numbers of doctorate recipients in the U.S. by broad field of study and sex (1985 - 2015). *SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Survey of Earned Doctorates. You can find more information here: https://www.nsf.gov/statistics/srvydoctorates/.*
- 'Median salary for doctoral recipients': Median basic annual salary for doctorate recipients with definite postgraduation plans in the United States, by field of study, type of postgraduation planas, and sex (2015). *SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Survey of Earned Doctorates, 2015.*
- 'Professor salaries (2008 - 2009 survey)': Survey data collected for 397 professors in the United States from 2008 - 2009, with information for rank (associate, assistant or full professor), discipline (A = "theoretical" department, B = "applied" department), years since receiving PhD (yrs.since.phd), years of service (yrs.service), sex and salary (9 month salary, dollars). *Source: Fox J. and Weisberg, S. (2011) An R Companion to Applied Regression, Second Edition Sage.*

For Assignment 5 you are asked to assess the following:

1) **Male and female graduate enrollment (1967 - 2015).** Compare trends in total graduate enrollment for males and females (including full-time/part-time and private/public universities) in the United States from 1967 - 2015. Describe your results statistically, graphically and in text.

2) **Shifts in female PhD recipients by field (1985, 2000, and 2015).** Describe if and how there was a shift in PhDs awarded to females in four fields (Physical and Earth Sciences, Engineering, Education, and Humanities & Arts) in 1985, 2000, and 2015. Describe your results statistically, in a graph or table, and in text. *Note: There are several ways that you can interpret this question. You are invited to decide which you think is/are most interesting. Just be really clear about what you are asking/answering in your report.*

3) **Male and female salaries for starting postdoctoral and other employment positions (2015).** Compare median salaries for male and female doctorate recipients in 2015. Answer these two questions: Does median salary differ significantly between male and female starting postdoc positions? Does median salary differ significantly between male and female PhD recipients in non-postdoc employment positions?

4) **Exploring academic salaries for professors in U.S. colleges.** Explore relationships between variables in the 'Faculty salary data (2008 - 2009 survey)' dataset. Develop a model describing faculty salary based on data for faculty sex, rank, years in current position, field, and number of years since doctoral degree was earned. **You** should make decisions regarding which variables should remain in your final model. Describe the results qualitatively and quantitatively (i.e., don't just report the statistical results of the model – make sure you describe interesting findings in text). You can also discuss any concerns that you have with the model(s) you present, if any.

DESCRIBE YOUR FINDINGS FROM PARTS 1 - 4 ABOVE IN A COHESIVE REPORT (8 PAGES MAXIMUM) THAT INCLUDES THE FOLLOWING SECTIONS:

- A professional, well-formatted cover page
- Introduction – A brief introduction in which you provide the reader with sufficient background information (WITH REFERENCES) to understand what you will be presenting in your report and provide motivation for the work.
- Data, Data Analysis and Statistical Methods – A brief summary of the data (source, description) and methods (including programs) used for statistical analyses.
- Results and Discussion (can have these sections combined, or separate) – The graphical and statistical results of your data analysis, and interpretation of the results. Include both qualitative descriptions of visual observations or trends, as well as statistical results. The order in which you present the graphs, results in text, and statistical results do not have to be in the order that they are listed above. You should organize the data in a way that you think is clearest for the audience. Make sure that you read the "Communicating Statistical Results" documents on the course website. Your report should NOT just be a series of statistical results and tables/figures.
- Conclusion/summary (1 – 2 short paragraphs or bulletpointed summary of the main findings of your work)
- References (professionally formatted)

IF THERE ARE OTHER GRAPHICAL REPRESENTATIONS, RELATIONSHIPS OR STATISTICAL COMPARISONS THAT YOU THINK WOULD BE IMPORTANT OR INTERESTING TO EXPLORE, YOU CAN INCLUDE THEM. (Not required).

WHAT YOU WILL SUBMIT FOR THIS ASSIGNMENT: Your professional, complete, accurate report including all sections listed above. That's it. We don't want any other materials you used to complete it. Print in color if that's how you would intend it to be seen by a client.

You will be graded on:

- The format, appearance, and level of professional presentation of your entire report
- The accuracy, completeness, and professional appearance and communication of your graphs, tables (see above – you do NOT have to include your name in the graphs or tables for this assignment), statistics and figure captions.
- The accuracy, interpretation, and communication of quantitative results
- The accuracy, interpretation and communication of statistical analyses (see documents on GauchoSpace for examples)
- The overall clarity of your report (including how statements in the conclusion relate to the data and statistics presented in the results)
- Your ability to explain and interpret your results in the context of existing peer-reviewed literature (i.e., find and cite valid references that enhance your report)
- How well your report is organized into a cohesive piece of work
- The inclusion and correct formatting of references