Assignment G-3

Estimate the determinants of the change in total employment in US counties over 2010-2015. Your sample consists of [one hundred counties](http://milesfinney.net/491/assign/count3.htm).

1. First, run four regressions: the log/log and linear version of each model below.

*A.* $\hat{y}= b\_{0}+b\_{1}x\_{1}+b\_{2}x\_{2}+b\_{3}x\_{3}+b\_{4}x\_{4}+b\_{5}x\_{5}$

*B.* $\hat{y}= b\_{0}+b\_{1}x\_{1}+b\_{2}x\_{2}+b\_{3}x\_{3}+b\_{4}x\_{4}+b\_{6}x\_{4}\*x\_{5}$

**Dependent variables:**

The dependent variable is county growth in total employment from 2010 to 2015. For the log/log model the dependent variable is the natural log of$ \frac{2015 total employment}{2010 total employment}$. In the linear specification, the dependent variable is $\frac{2015 total emp.-2010 total emp.}{2010 total emp. }$. Use the [County Business Patterns](https://www.census.gov/programs-surveys/cbp/data/tables.All.html) to construct the dependent variable.

**Independent variables:**

**x1** - percent of the state’s population over 50 years old in 2010

**x2** - proportion of the county’s residents over 25 who have attained a high school degree or less in 2010

**x3 -** total county population in 2010 (input in 1000’s)

**x4 -** mean January temperature of the state the county is within

**x5 =** 1 if county borders the Atlantic or Pacific Ocean, or the Great Lakes

 **=** 0 if not

Calculate x4 by averaging the mean recorded temperature across cities for each state. The statistics can be found in [City and County Data Book](https://www.census.gov/library/publications/2001/compendia/ccdb00.html). Construct x5 by using *Map 1* in this [academic article](http://milesfinney.net/491/hand/coastal.pdf). The remaining variables can be constructed from data found in the [US Census](http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t), [EPA](http://www.epa.gov/airquality/greenbook/) and the [Bureau of Labor Statistics](http://www.bls.gov/home.htm).

2. Turn in your SAS regression output as well as the constructed variables used to run the regressions. Also turn in your SAS programs.

3. Write a short paper interpreting the results, addressing the following points.

A. Justify the models. What effect do you expect each of the independent variables to have on the dependent variable? (Your expectation may differ from the estimated relationship).

B. Discuss your results. Do your results correspond with the expectations discussed in part A? Which results are statistically significant? Are your findings sensitive to model specification (log/log or linear)?

C. Which result do you find most surprising? Explain.

D. Does mean January temperature affect employment growth differently in coastal versus non-coastal counties? Perform tests of significance to answer this question.