Statistics for economics
Computer test 1

School of Economics, University College Dublin

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Download `elnino.RData` from the blackboard website and load it in R. The dataset contains information on the El Niño cycle which influences global weather. It includes the following variables

- `Year`, indicating the year
- `temp.anomaly`, a standardised measure for global average temperature relative to the mean. Positive values indicate above average temperatures.[1]
- `elnino`, a dummy indicator for El Niño years
- `elnino.l`, the temporal lag of the El Niño indicator[2]
- `elnino.strength`, a categorical variable for the strength of the El Niño.
- `ond`, the temperature anomaly for the months October, November, December
- `ond.above`, a binary indicator for above average temperature for October-December

Use the data to answer the questions in the next section. Each question is worth one point for a total of 10 points. Write your answers down in your favourite word processor and include the figures you produce. When you're done you need to send the document with your answers to stijn.vanweezel@ucd.ie

[1] Similarly negative values indicate below average temperatures. The anomaly itself is calculated subtracting the average temperature for 1950-2016 from the average for a given year and dividing by the standard deviation.

[2] i.e. whether the previous year was an El Niño year.

Questions

1. What is the average and standard deviation of the temperature anomaly?
2. Use a boxplot to visualise the distribution of the temperature anomaly. Describe the distribution.
3. Produce a line plot of the temperature anomalies over time. What does the data show?
4. How many El Niño years are there in total? What percentage of years is an El Niño year?
5. How many years experienced at least a strong El Niño?
6. If there is an El Niño, what is the probability that it is a very strong El Niño?
7. If there was an El Niño last year, what is the probability that there will not be an El Niño this year?
8. Use a boxplot to plot the anomaly for the temperature between October-December against the strength of the El Niño. Which conclusions can you draw from the data?
9. What is the probability that a year with higher than average OND temperatures does not correspond with an El Niño?
10. What is the probability that a year with below average temperatures for October-December experiences a moderate to strong El Niño?