

# POLS6382 Methods III HM1 Review

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# Overall Comments on HM1

- ▶ Clean/well organized data reports! Everyone did a good job!
- ▶ Replicability of R code: Some students reported R code that are not consistent with the reported statistical results.
- ▶ Markdown presentation: R Code-Chunck setting, “warning=FALSE, message=FALSE, echo=TRUE”

## Question 1

- ▶ The issue of losing country names, when loading data using package “haven.”
- ▶ Scatter plot: Full sample vs. by country.

## Question 2 Grid Search

- ▶ Poisson Likelihood vs. Poisson log-Likelihood
- ▶ Data:  $y_i = (2, 2, 4, 1, 0, 1, 3, 2)$
- ▶  $\sum y_i = 15$
- ▶  $\prod y_i! = 1152$
- ▶ The likelihood is:  $L(\lambda|y_1, y_2 \dots y_8) = \frac{e^{-8\lambda} \lambda^{\sum y_i}}{\prod y_i!}$
- ▶ The Log-Likelihood is:  $\text{Log}\left[\frac{e^{-8\lambda} \lambda^{\sum y_i}}{\prod y_i!}\right] = -8\lambda + \log(\lambda^{15}) - \log(\prod y_i!)$

```
data<-c(2,2,4,1,0,1,3,2)
lambda <- seq(0, 4, 0.01)
# Likelihood Function
likelambda <- (exp(-8 * lambda) * lambda^15)/1152
# Log-Likelihood Function
loglike<--8 * lambda + log(lambda^15) - log(1152)
```

- ▶ They actually produce the same solution of  $\lambda$  in this case!
- ▶ When plotting the grid-search results, make sure that you label the Y-axis correctly.