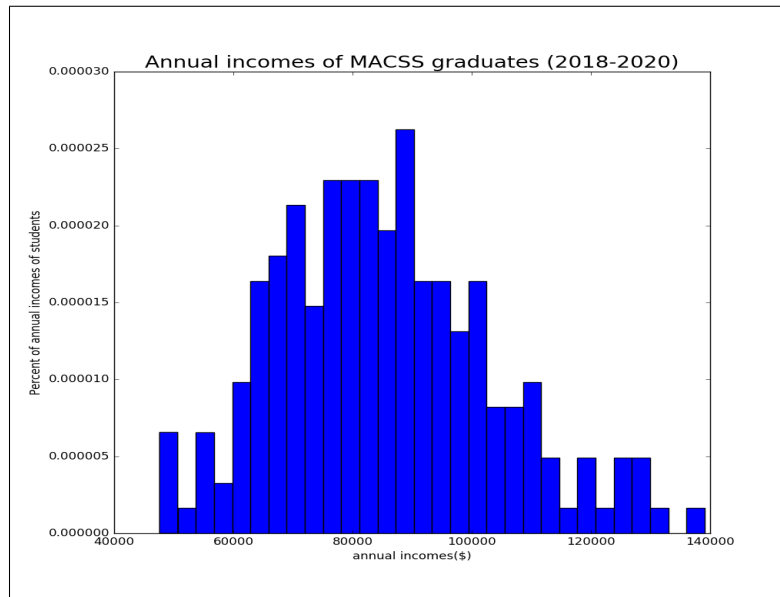# Problem Set #[4]
MACS 30100, Dr. Evans
Zhuo Leng

Problem 1
Part (a).Plot a histogram

The histogram of annual incomes of students who graduated in 2018, 2019, and 2020 from the University of Chicago MACSS program is as below:
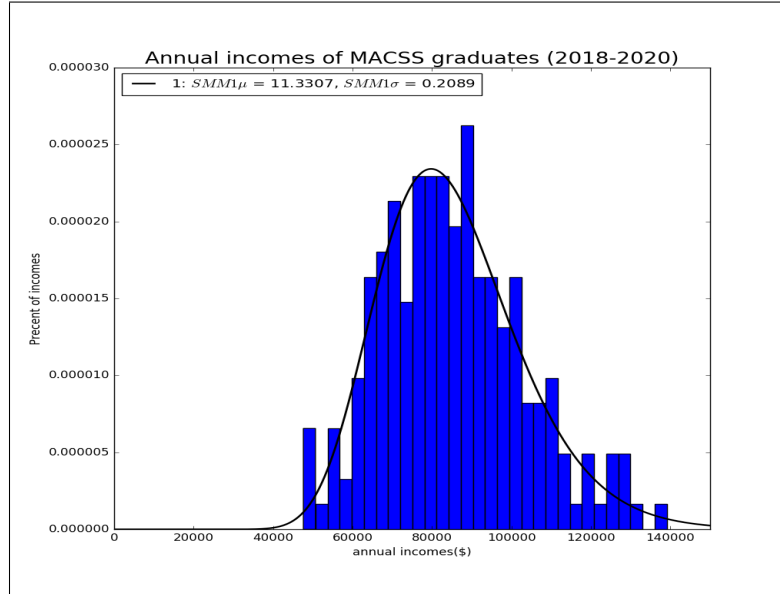

Part (b).test function testing result is:

$$\begin{bmatrix} 0.0019079 & 0.00123533 \\ 0.00217547 & 0.0019646 \end{bmatrix}$$

The shape of test result is the same as input xvals.
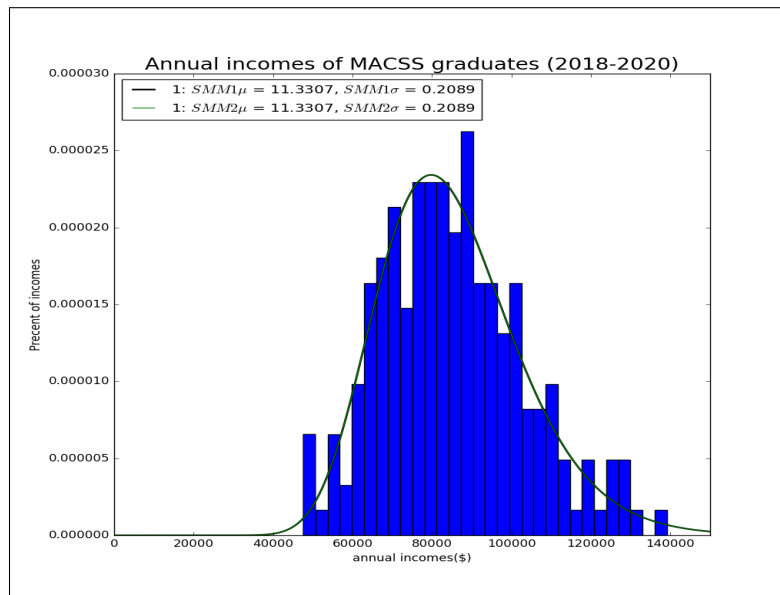
Part (c).SMM estimation

The parameters for SMM estimation is: $\mu = 11.3307$, $\sigma = 0.2089$.
The data moments are: $\mu = 85276.8236$, $\sigma^2 = 323731572.2295$.
Model moments at the estimated parameter values are: $\mu = 85276.8464$, $\sigma^2 = 323731565.5129$.
The value of GMM criterion function at the estimated parameter values is: $7.20176829e-14$.

Part (d).Two-step SMM

The parameters for two-step SMM estimation is: $\mu = 11.3307$, $\sigma = 0.2089$.
The data moments are: $\mu = 85276.8236$, $\sigma^2 = 323731572.2295$.

Model moments at the estimated parameter values are: $\mu = 85276.8516$, $\sigma^2 = 323732951.8189$.
The value of GMM criterion function at the estimated parameter values is: 0.0106692292508.