Problem Set #3
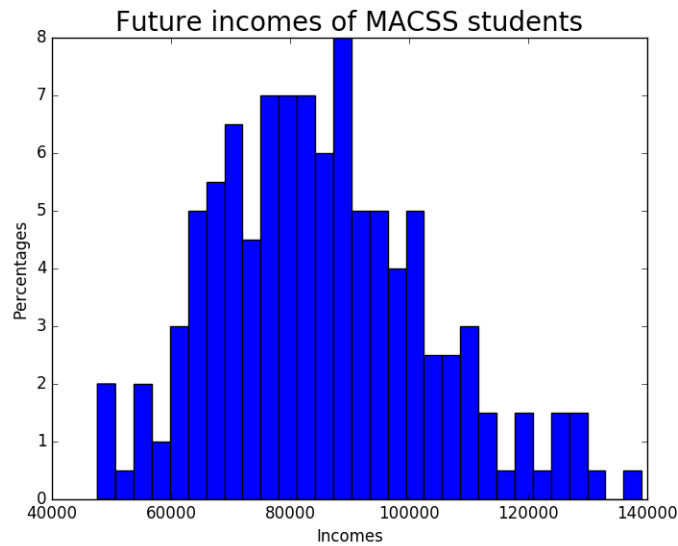MACS 30000, Dr. Evans
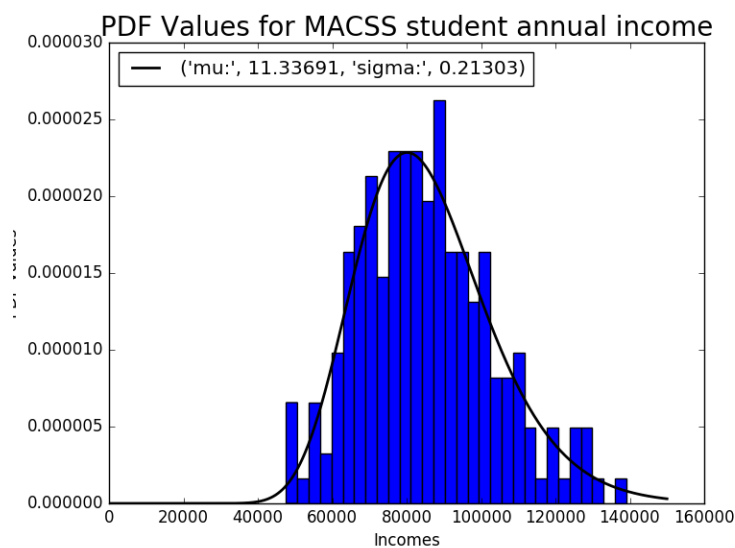Chelsea Ernhofer

1   Question 1

Part A

Part B
    Value of GMM criterion: 3.93976891598e-13
    Mean of points: 85276.8236063 , Standard Deviation of points: 17992.542128
    Mean of model: 85276.79520525591 , Standard Deviation of model: 17992.5325554

Part C

Mu: 11.3369101002 Sigma: 0.213027153204

Value of GMM criterion: 1.98135845465e-10

Mean of points: 85276.8236063 , Standard Deviation of points: 17992.542128

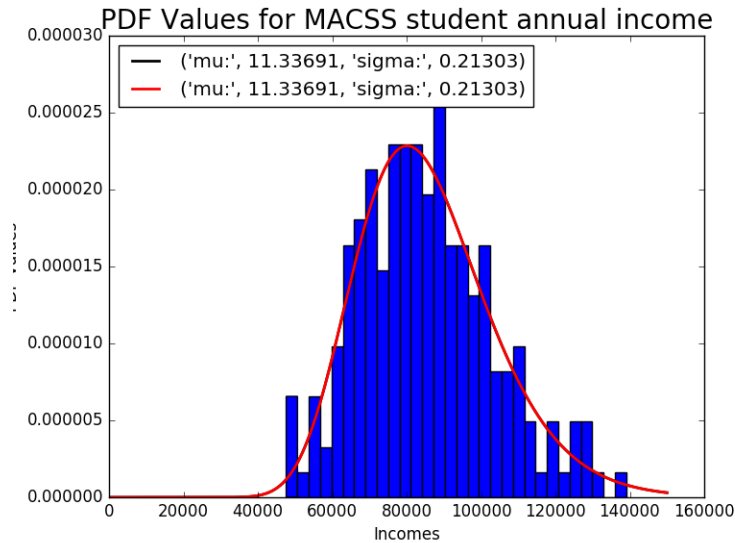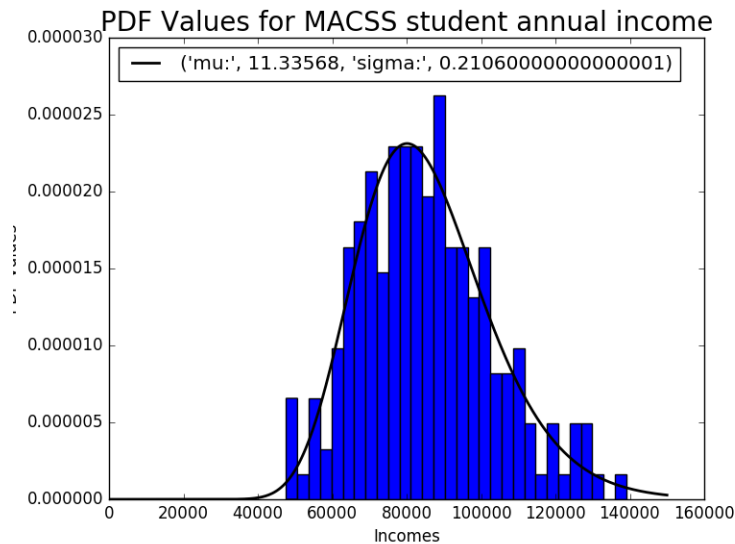Mean of model: 85276.79520525591 , Standard Deviation of model: 17992.5325554

PDF Values for MACSS student annual income

Legend:
- ('mu:', 11.33691, 'sigma:', 0.21303)
- ('mu:', 11.33691, 'sigma:', 0.21303)

X-axis: Incomes

Part D

Value of GMM criterion function: 2.53478608263e-11

Data moments: 0.3 0.5 0.2

Model moments: 0.30000000363261237 0.5000000058562879 0.19999999051109946

PDF Values for MACSS student annual income

Legend:
- ('mu:', 11.33568, 'sigma:', 0.21060000000000001)

X-axis: Incomes

Part E

Mu: 11.3369101002 Sigma: 0.213027153204

Value of GMM criterion function: 1.37654618972e-10
Data moments: 0.3 0.5 0.2
Model moments: 0.30000000363261237 0.5000000058562879 0.19999999051109946
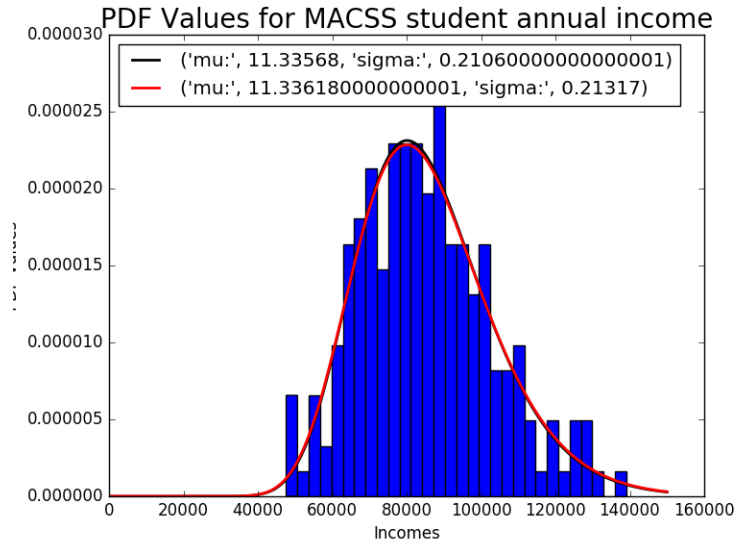
Part F

    The model that best fits the data is the one generated using the 3 data quantiles and the inverse of the variance-covariance matrix as a weighting matrix. In other words, the last model I generated. This model can be seen in the image in part E, represented by a red line.

    My reasoning is as follows: Visually, all of the models look incredibly similar and they all appear to fit the data well. The models from part B and C actually seem quite identical and the models from parts D and E are only very slightly different. One thing that does change quite a bit from model to model, however, is the value generated by the criterion function. This value gives added insight to the fit of the model. Out of all the models I generated, the last had the lowest criterion function value, and since the models are almost identical otherwise, I used this value to judge which was best.

2 Question 2

Part A

    Beta0: 0.252200183502
    Beta1: 0.013022300596
    Beta2: 0.399781736997
    Beta3: -0.0100594936065
    Value of GMM criterion function: 1.37654618972e-10