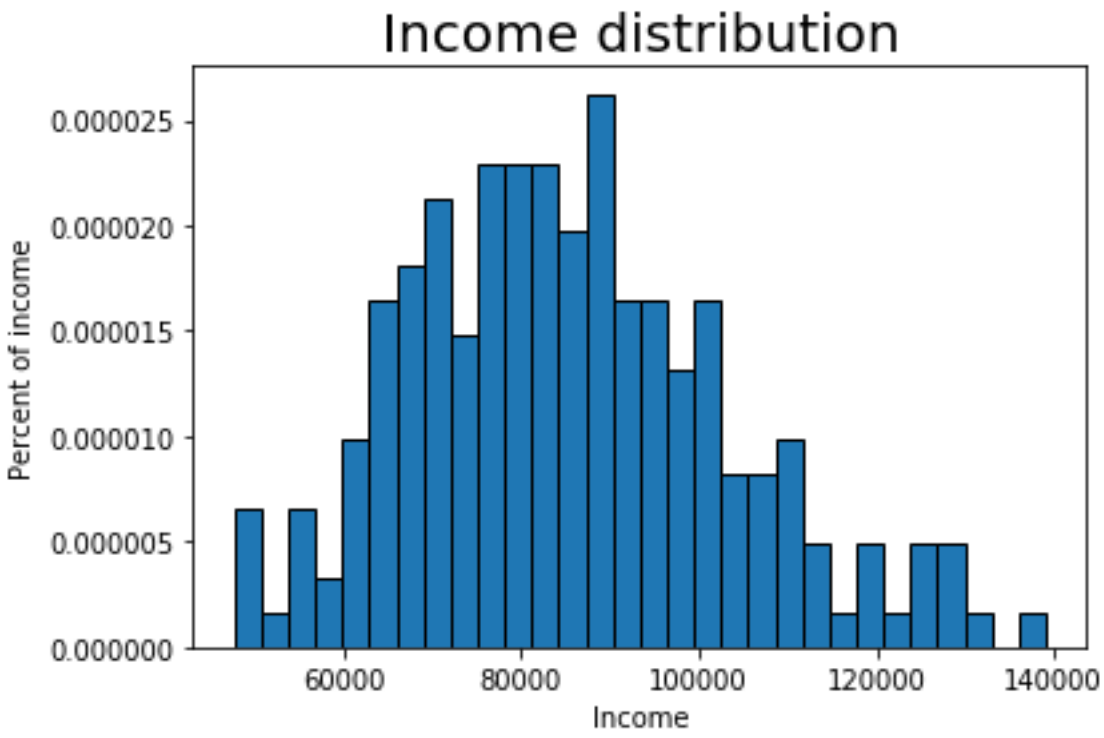
Problem Set #3

MACS 30100, Dr. Evans

Due Wednesday, Jan. 24 at 11:30am

Ques 1: Some income data, lognormal distribution, and GMM

a)



b)

Plot your estimated lognormal PDF against the histogram from part (a)

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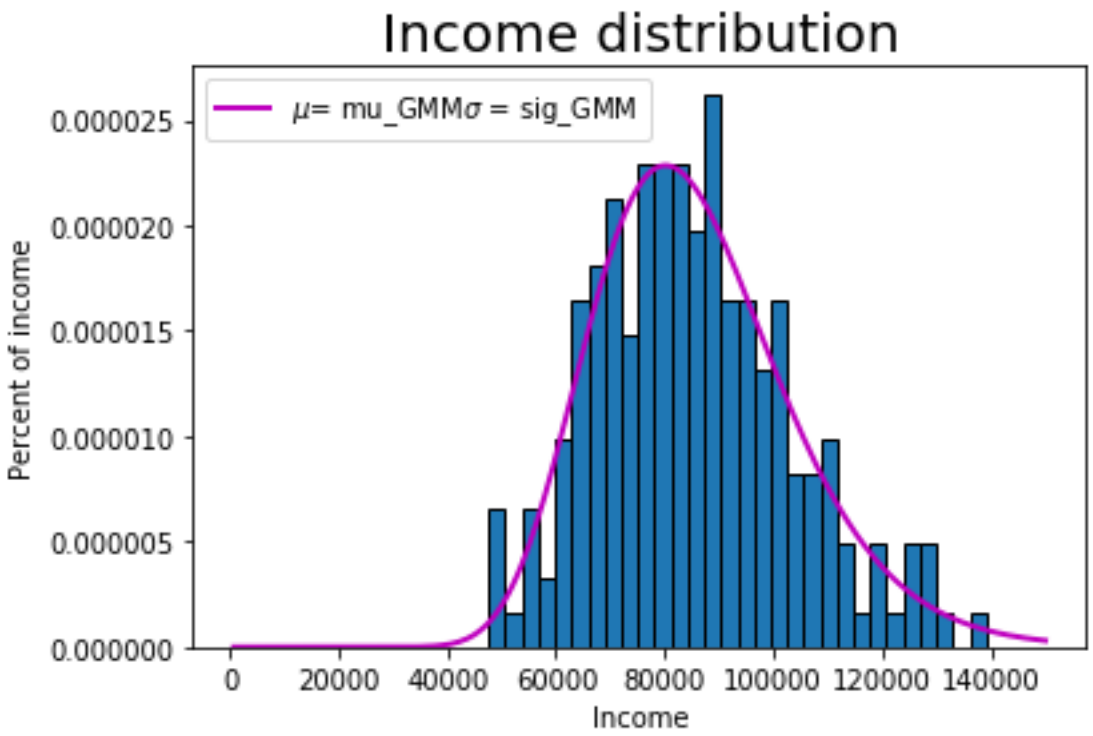

Report the value of your GMM criterion function at the estimated parameter values. Report and compare your two data moments against your two model moments at the estimated parameter values.

GMM criterion function: [[5.99512455e-12]]

Data momemnt: [85276.82360626 17992.54212805]

Model moments: [85276.81353707 17992.58613143]

Comparing data and model moments by error term: [[-1.18076479e-07]

[2.44564562e-06]]

c)

Report your estimates as well as the criterion function value at these estimates.

mu_GMM2= 11.336910344 sig_GMM2= 0.213027071327

criterion value: [[5.77687987e-16]]

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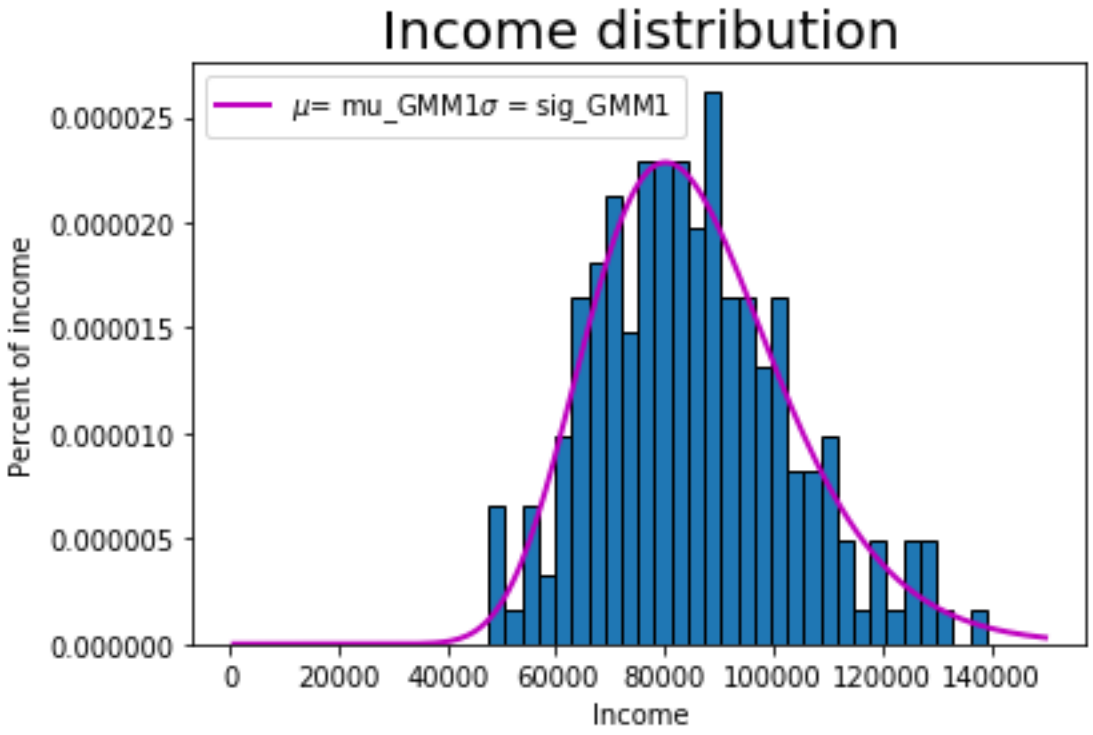
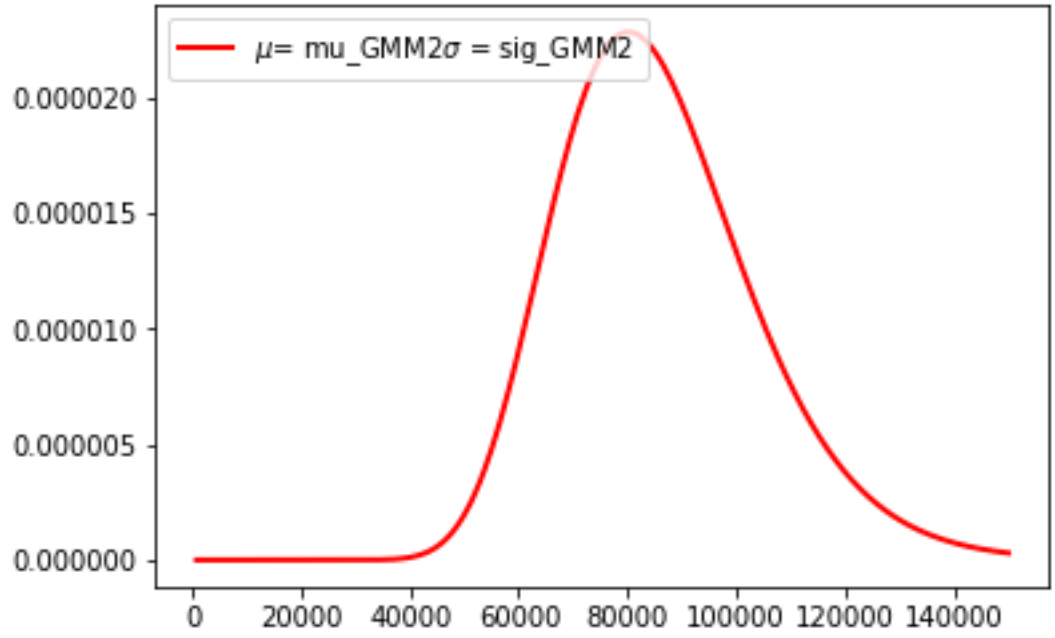
Plot your estimated lognormal PDF against the histogram from part (a) and the estimated PDF from part (b).





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Report and compare your two data moments against your two model moments at the estimated parameter values:

Data momemnt: [85276.82360626 17992.54212805]

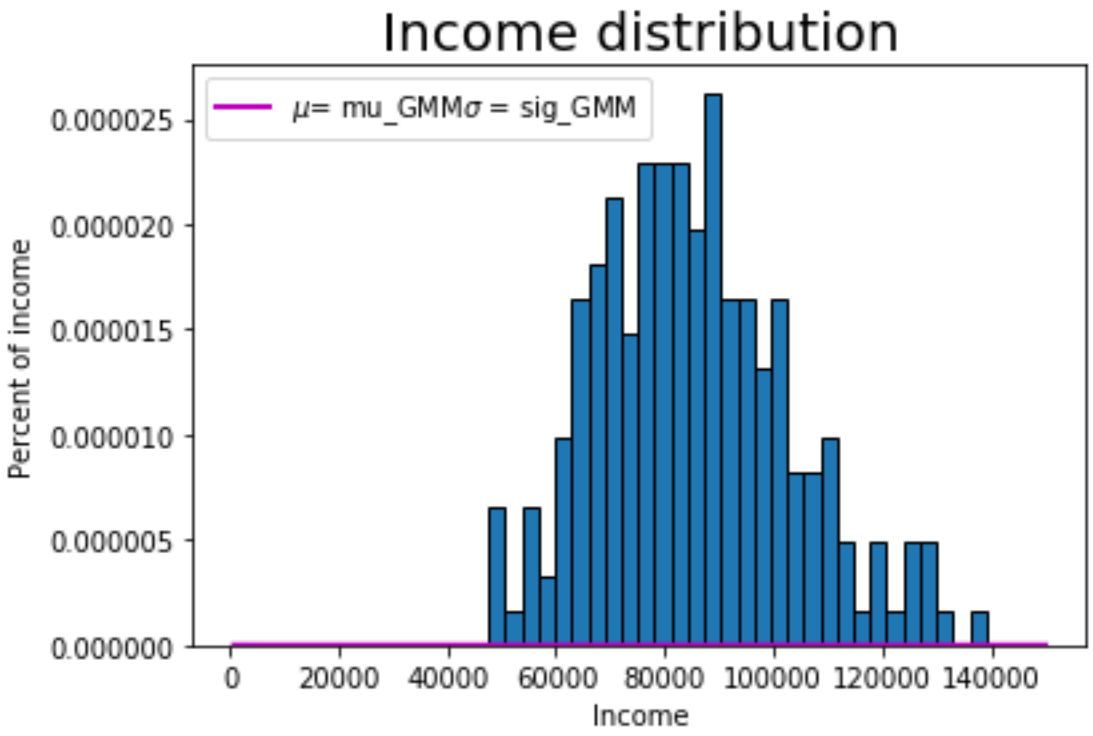
Model moments 2: [85276.82348498 17992.54169635]

Comparing data and model moments by error term 2: [[-1.42219264e-09]

 [-2.39930272e-08]]

d)

Plot your estimated lognormal PDF against the histogram from part (a).



Report the value of your GMM criterion function at the estimated parameter values.

GMM estimates: mu_GMM1_3= 3091.92398608 sig_GMM1_3= 1026.93674883

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Value of criterion function: [[6270.69337372]]

Report and compare your three data moments against your three model moments at the estimated parameter values.

Data momemnt: [0.3 0.5 0.2]

Model moments: [0.3228321 0.10797269 0.21616837]

Comparing data and model moments by error term: [[7.61069871]

[-78.40546287]

[8.08418399]]

e)

Report your estimates as well as the criterion function value at these estimates.

Estimates: ([3091.92398039, 1026.93672041])

Value of criterion function: [[6270.69337367]]

Plot your estimated lognormal PDF against the histogram from part (a) and the estimated PDF from part (d).

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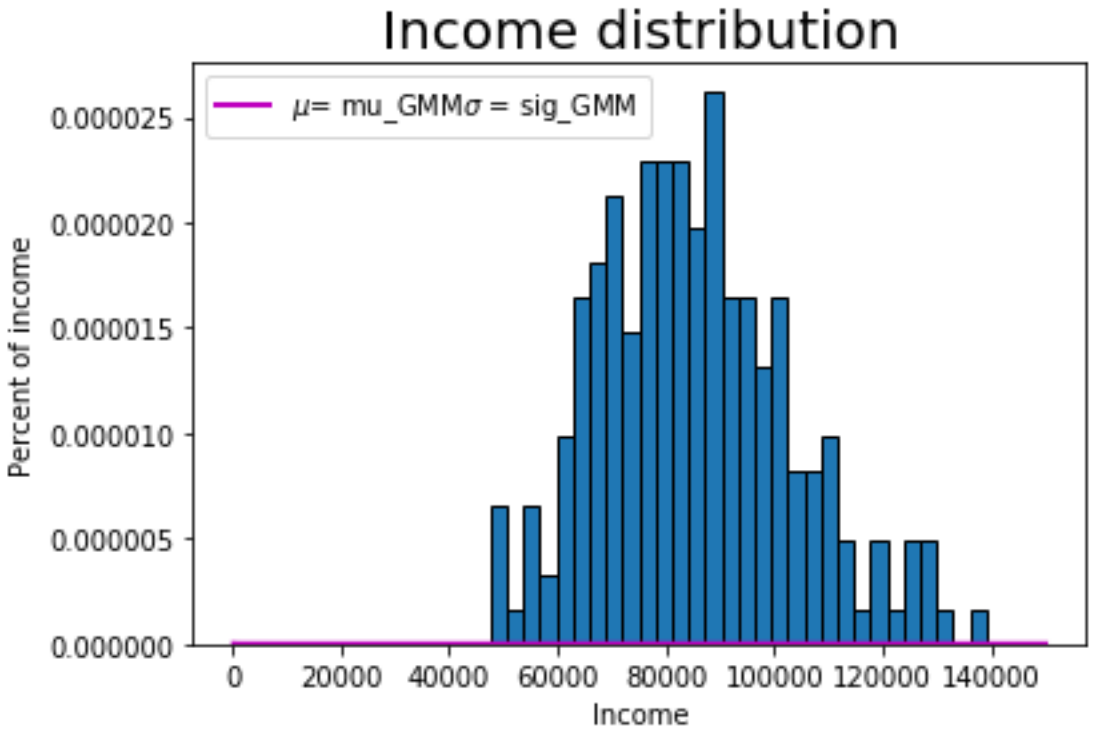

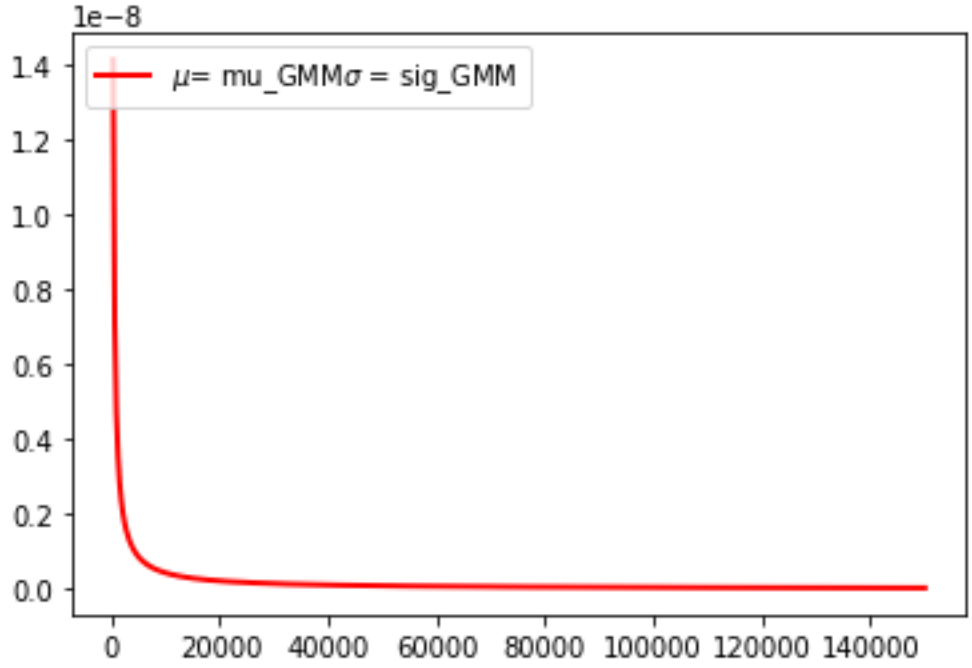

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Report and compare your three data moments against your three model moments at the estimated parameter values.

Data momemnt: [0.3 0.5 0.2]

Model moments: [0.32283203 0.10797266 0.21616832]

Comparing data and model moments by error term: [[7.61067665]

[-78.40546729]

[8.08416187]]

(f) Which of the four estimations from parts (b), (c), (d), and (e) fits the data best? Justify your answer.

Looking at the plots, part (c) fits the data best.

Ques 2: Linear regression and GMM

Report your estimates and report the value of your GMM criterion function

GMM estimates: b0_GMM= 0.252223519449 b1_GMM= 0.013023189117 b2_GMM= 0.399763546306 b3_GMM= -0.010060362975

Value of criterion function: 148.567895466