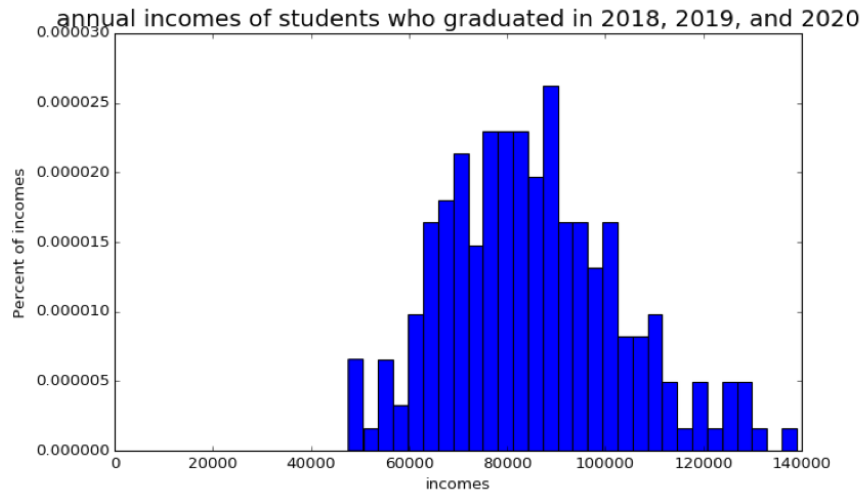# Problem Set #3

MACS 30100, Dr. Evans
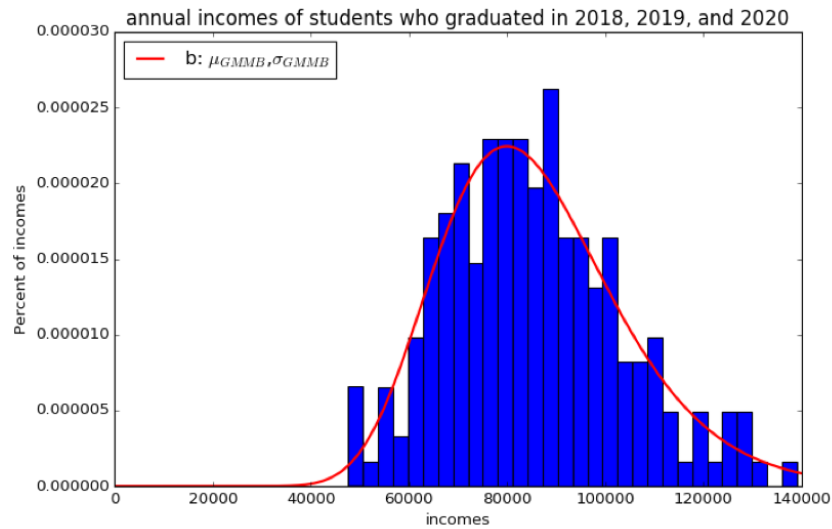
Wanlin Ji

Problem 1

(a).

(b)

The value of GMM criterion function at the estimated parameter values is 2.15207252e-15

Estimated parameter values:

$\mu_{GMMB} = 11.337109190940749$

$\sigma_{GMMB} = 0.2192527544843165$

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

Mean of incomes $= 85276.823606258113$ Variance of incomes $= 323731572.2295289$

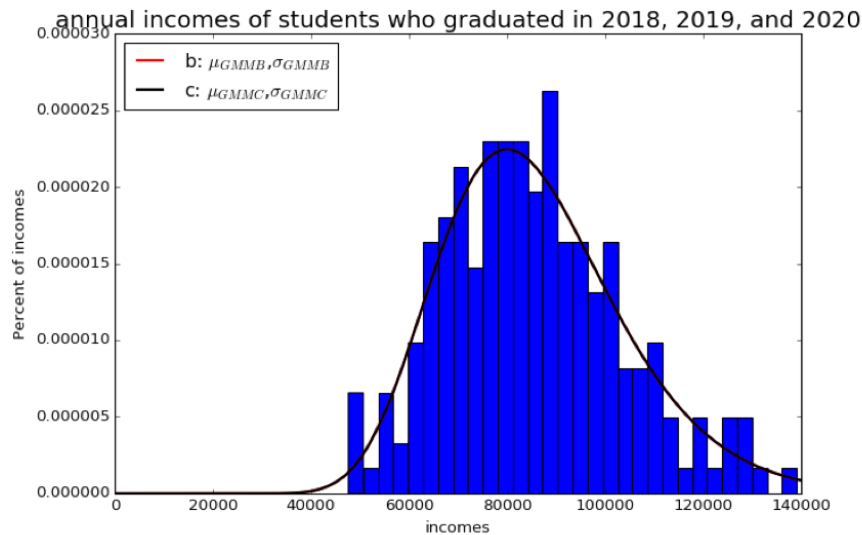Mean of model $= 85276.82616084014$ Variance of model $= 323731560.7624381$

The mean of model is slightly bigger than mean of incomes, the variance of model is slightly smaller than variance of incomes.

(c)

Estimated parameter values:

$\mu_{GMMC} = 11.337109191207636$ $\sigma_{GMMC} = 0.2192527544843165$

The value of GMM criterion function at the estimated parameter values is 69.41160749

annual incomes of students who graduated in 2018, 2019, and 2020

Part cs curve is the same with part bs curve.

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

Mean of incomes $= 85276.823606258113$ Variance of incomes $= 323731572.2295289$ Mean of model $= 85276.82616084014$ Variance of model $= 323731560.7624381$ The mean of model is slightly bigger than mean of incomes, the variance of model is slightly smaller than variance of incomes.

(d)

Estimated lognormal PDF against the histogram from part (a):

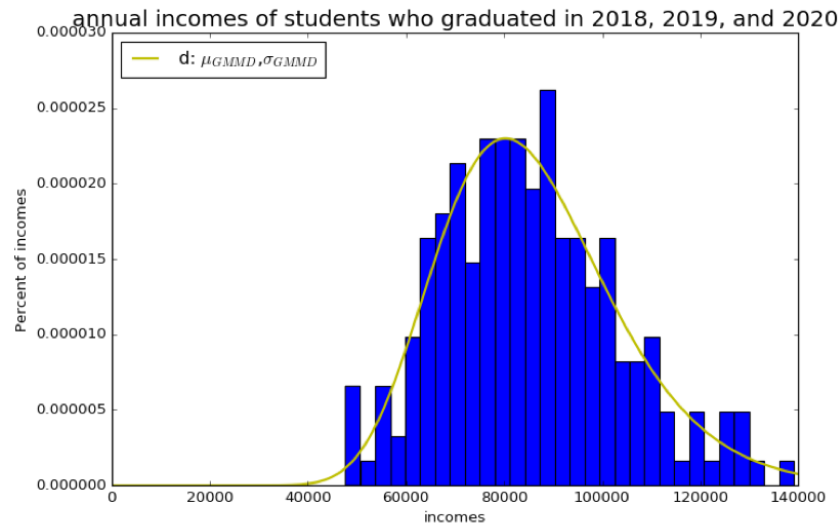The value of My GMM criterion function at the estimated parameter values. is $2.44110005e\text{-}11$

Estimated parameter values:

$\mu_{GMMB} = 11.338533709249997$

$\sigma_{GMMB} = 0.21313332028526361$

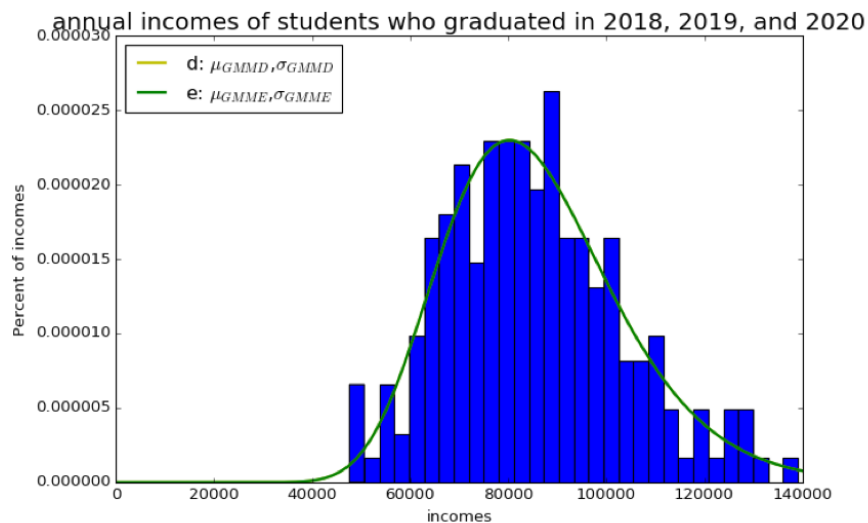Report and compare your three data moments against your two model moments at the estimated parameter values.:

Three data moments: $(0.3, 0.5, 0.2)$ Three model moments: $(0.3000000033098537, 0.5000000060166191, 0.19999999067352683)$

annual incomes of students who graduated in 2018, 2019, and 2020

The third data moment is slightly bigger than the third model moment, the other data moments are slightly smaller than the model moments.

(e)

Estimated lognormal PDF against the histogram from part (a) and part (d):

annual incomes of students who graduated in 2018, 2019, and 2020

Part ds curve is the same with part es curve.

The value of My GMM criterion function at the estimated parameter values. is 60.13483577

Estimated parameter values: $\mu_{GMMB} = 11.338533709249997$ $\sigma_{GMMB} = 0.21313332028526361$

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

Three data moments: (0.3, 0.5, 0.2) Three model moments: (0.3000000033098537, 0.5000000060166191, 0.19999999067352683)

The Third data moment is little bigger than the third model moment, the other data moments are little smaller than the model moments.

(f)
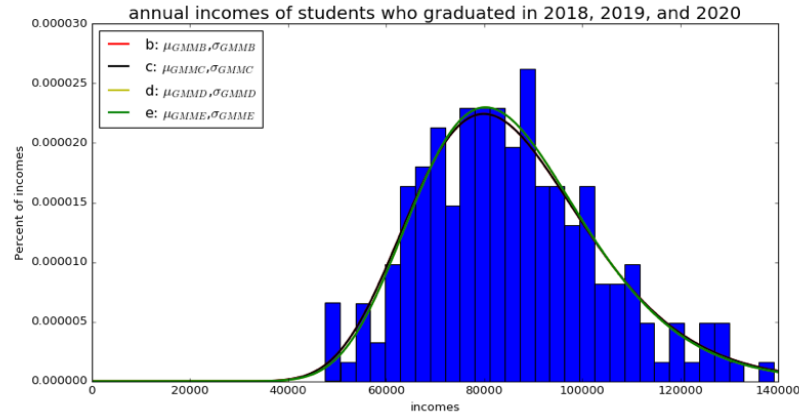
d and e are the same curve, from the figure above, we can know that d and e is the best.

Problem 2

(a).

Beta estimates b1, b2, b3, b4 are: $[0.25164554\ 0.01293354\ 0.40050037\ -0.00999177]$

Criterion function value with GMM estimates $= 0.0018212898156$