Problem Set #3

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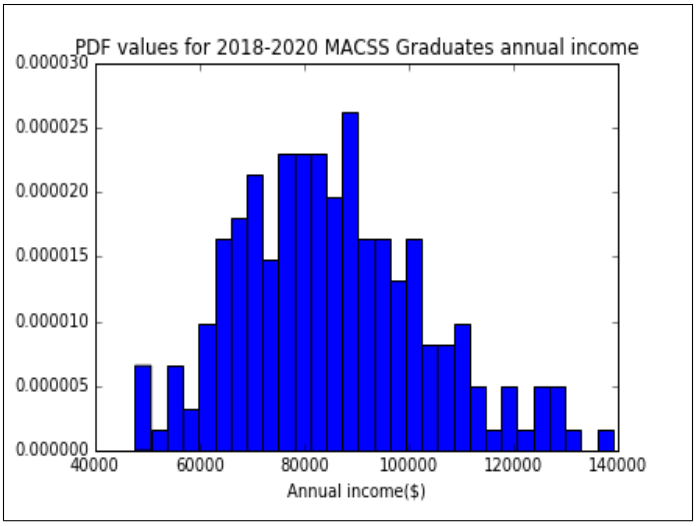
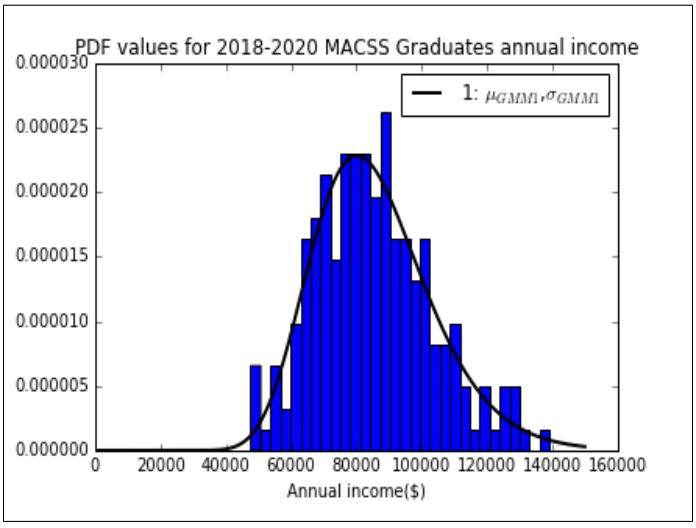
Problem 1 Some income data, lognormal distribution, and GMM

Part (a).



Part (b).

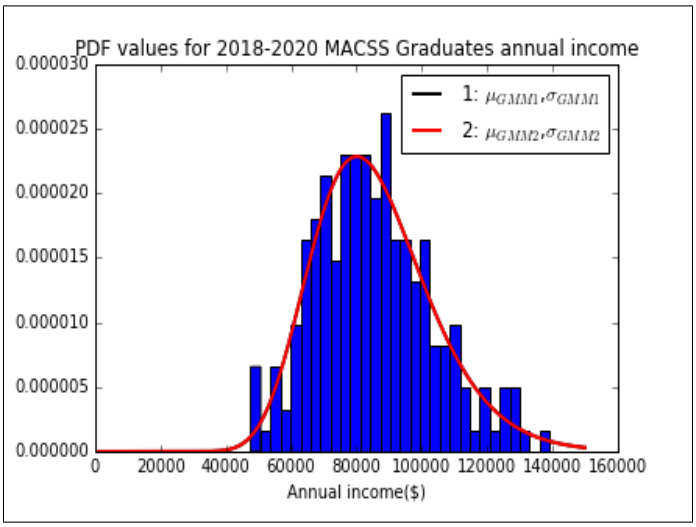


mu_GMM1 = 11.3369099322; sig_GMM1 = 0.213027109332

The value of GMM criterion function at the estimated parameter values is: 1.7094356618222634e-13

Mean of points = 85276.8236063; Standard deviation of points = 17992.542128
Mean of model = 85276.79108975342; Standard deviation of model = 17992.5392521
The two data moments and two model moments at the estimated parameter values are very close.

Part (c).



mu_GMM2 = 11.336910055; sig_GMM2 = 0.213027281754

The value of two-step GMM criterion function at the estimated parameter values is: 0.0024178955197849406

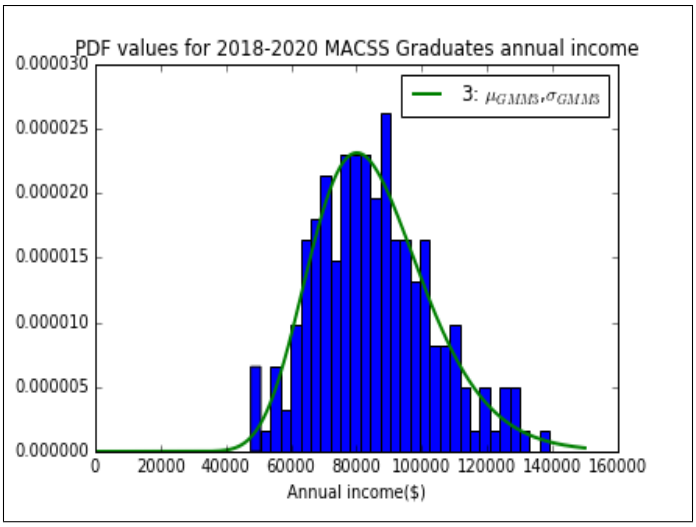
Mean of points = 85276.8236063; Standard deviation of points = 17992.542128
Mean of model = 85276.80042797624; Standard deviation of model = 17992.5537271
The two data moments and two model moments at the estimated parameter values are very close.

Part (d).

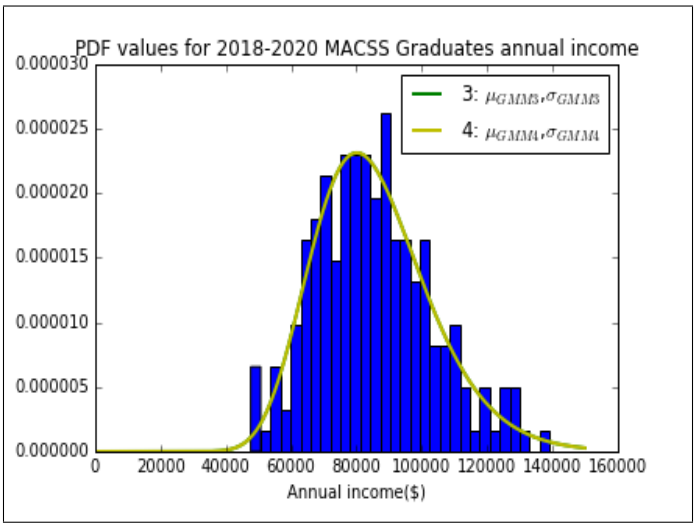
mu_GMM3 = 11.3356813274; sig_GMM3 = 0.21059845372

The value of three-moment GMM criterion function at the estimated parameter values is: 2.534799336021991e-11

Data moments are: 0.3, 0.5, 0.2
Model moments are: 0.30000000363261103, 0.5000000058563142, 0.1999999905110739
The three data moments and three model moments at the estimated parameter values are very close.



Part (e).



mu_GMM4 = 11.3356813287; sig_GMM4 = 0.210598456209

The value of two-step GMM criterion function at the estimated parameter values is: 59.69002431499915

Data moments are: 0.3, 0.5, 0.2
Model moments are: 0.30000000375621777, 0.5000000013125114, 0.19999999493126996
The three data moments and three model moments at the estimated parameter values are very close.

Part (f).
The estimation from parts (e) fits the data best.
All the four estimations are very close. Comparing the differences between data mo-

ments and model moments, we find that estimation in (c) is better than that in (b), and estimation in (e) is better than that in (d). Comparing the plots of estimation in (c) and that in (e), we find that the (e) covers slightly more in the right tail of the data distribution. Therefore, we conclude that the estimation from part (e) fits the data best.

Problem 2 Linear regression and GMM

Part (a).
β_0: 0.251644736296, β_1: 0.0129334514766, β_2: 0.400501176506, β_3: -0.00999169611924
The value of GMM criterion function at the estimated parameter values is: 0.0018212898173507732