

Problem Set 3

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Question 1

Part (a)

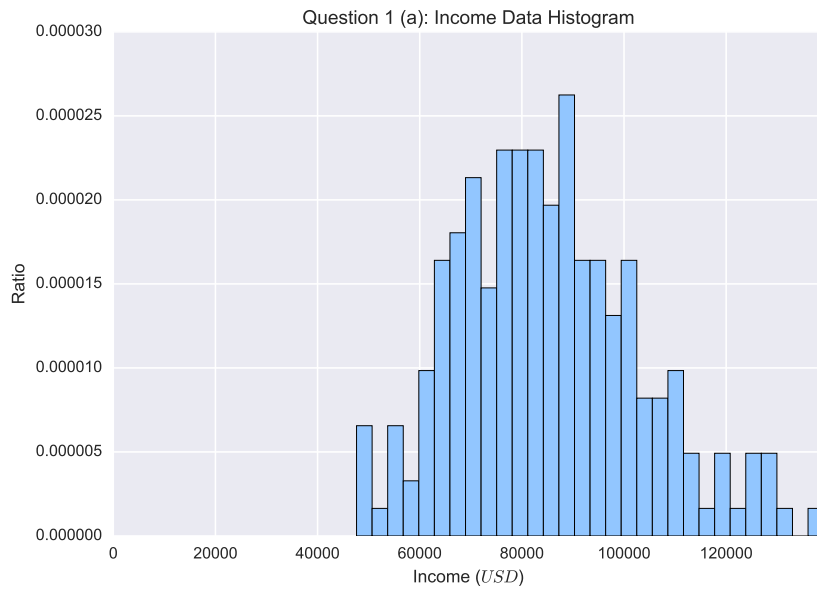


Figure 1: Question 1 (a) histogram

Part (b)

The the two moments, one step GMM estimate of $\mu = 11.35$ and $\sigma = 0.22$, has a criterion function value of $2.55\text{e-}13$. This gives a relatively good fit, which is evident both from the criterion function's low value, order of 10^{-13} and how well the PDF matches the histogram.

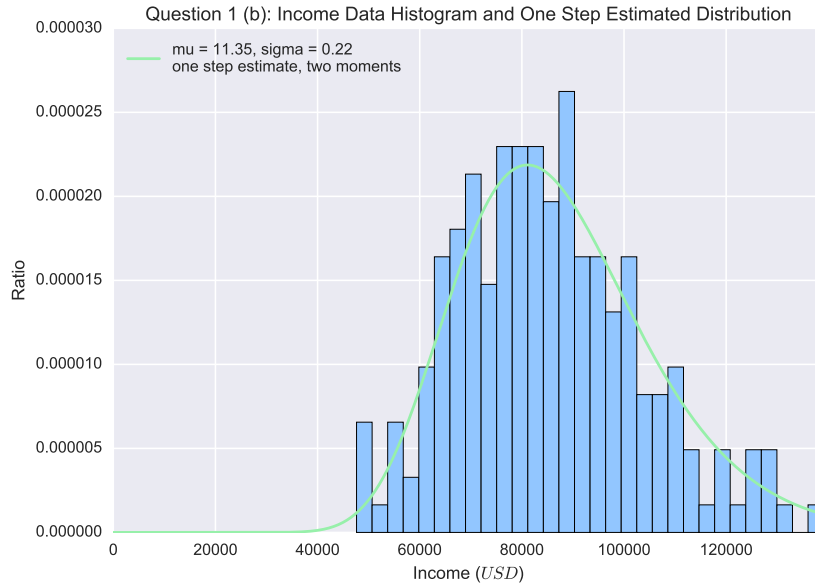


Figure 2: Question 1 (b) plot

Part (c)

The the two moments, two step GMM estimate of $\mu = 11.35$ and $\sigma = 0.22$, has a criterion function value of $2.40\text{e-}02$. This gives a Similar fit to part (b), although with a larger criterion, since this appears to be a strong minuma for both μ and σ . The values of the moments from both approaches are:

Source	mean	std
data	85276.824	323731572
one step	85276.853	323731691
two step	85276.827	323731559

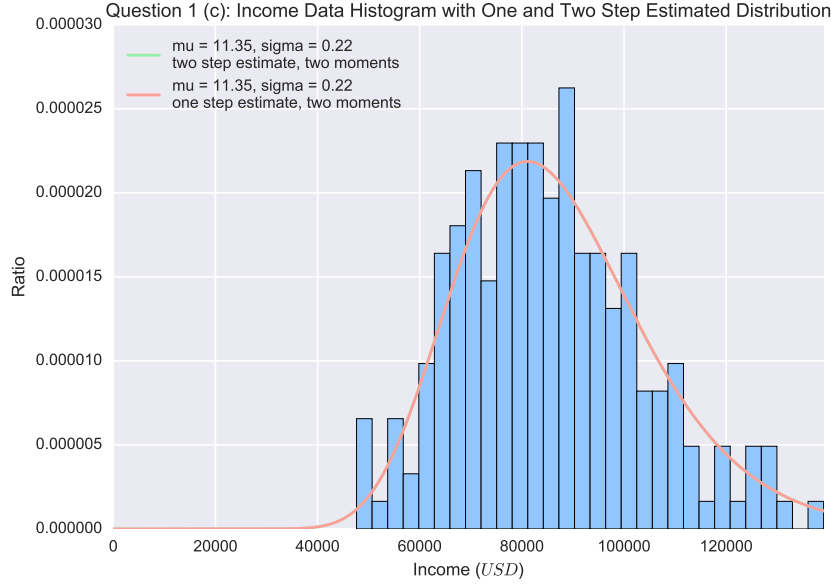


Figure 3: Question 1 (c) plot

Part (d)

The the three moments, one step GMM estimate of $\mu = 11.34$ and $\sigma = 0.21$, has a criterion function value of $4.50\text{e-}13$. This gives a relatively good fit, which is evdent both from the citerion function's low value, order of 10^{-13} and how well the PDF matchs the histogram.

Part (e)

The the two moments, two step GMM estimate of $\mu = 11.34$ and $\sigma = 0.21$, has a criterion function value of $7.00\text{e-}06$. This gives a Similar fit to part (b), although with a larger criterion, since this appears to be a strong minuma for both μ and σ . The values of the moments from both approaches are:

Source	Fraction Low	Fraction Medium	Fraction High
data	0.300000	0.500000	0.200000
one step	0.300000	0.500000	0.200000
two step	0.299979	0.500004	0.200000

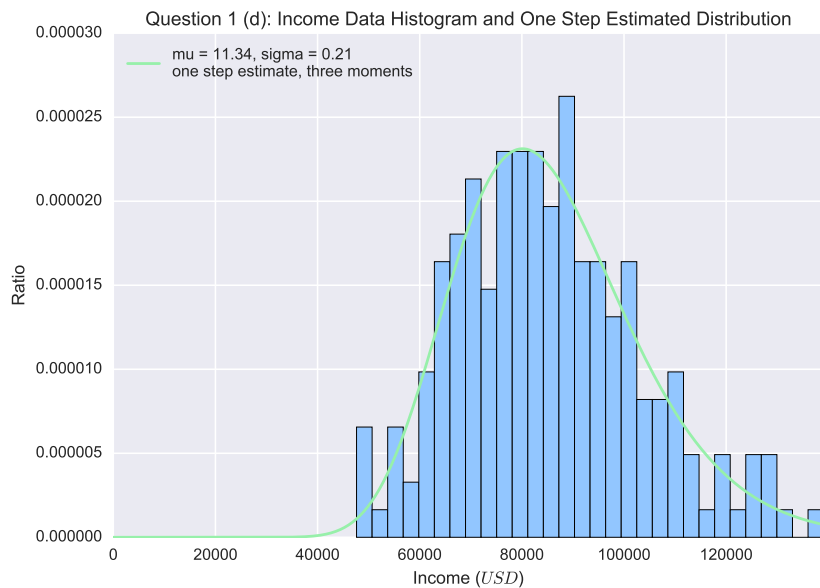


Figure 4: Question 1 (d) plot

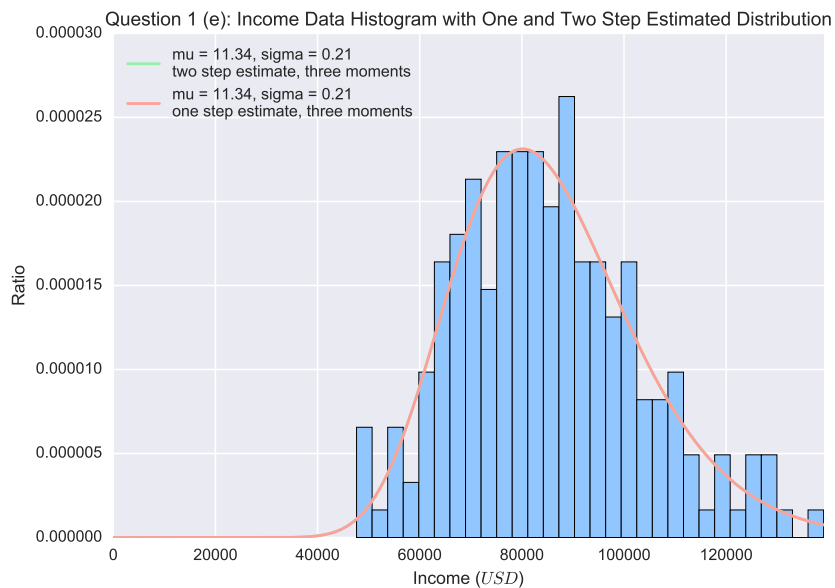


Figure 5: Question 1 (e) plot

Part (f)

All four methods I used result in criterion function values below 10^{-5} and thus in very similar estimations. This is, as noted before due to a strong minuma being found, determining if it is a global minuma is beyond the scope of the assignment. But if I had to choose a best fit to use I would use the one step, thee moment fit as it matches the data to 6 decimal places and is much faster to compute than the two moment ones, although I believe removing the integrals and using an analytically derived CDF would increase the run time considerably.

Question 2

Part (a)

The estimated values, with a criterion function value of 1.82e-03 are:

```
Beta_0 = 0.252  
Beta_1 = 0.013  
Beta_2 = 0.401  
Beta_3 = -0.010  
sigma = 1.000
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