Problem Set 3 Solution

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Question 1

(a) I use the mean asset from age 2 to T (exclude age 1 because there is no variation in asset at T=1), and regression coefficients from regressing consumption on income and asset from t=1 to t=T-1 (exclude t=T because people will consume everything on hand). I use the coefficient in front of income from age 1 to (T-1), and coefficient in front of asset from age 2 to (T-1) (exclude t=1 because there is no variation in asset at t=1).
Intuitively speaking, the average asset slope over life cycle captures both impatience and the rate of intertemporal substitution. The regression model approximates the structural consumption policy function. Both the functional form restriction and nonlinearity help parsing out β and γ.

(b) It took 58 seconds. This wasn't fast. If the code gets more parallelized, it can run faster !

user system elapsed
55.836 0.660 57.900

(c)

```
> oout <- optim(par=c(0.98,1.5),fn=getCriterionFunction,WeightMatrix=solve(dataMomentsVCM),
lower=lb,upper=ub,control=list(maxit=100), method="L-BFGS-B")
> # print out estimate
> print(oout)
$par
[1] 0.9799989 1.4999658
```

(d)

```
> standerr <- sqrt(diag((1+1/1)*solve(t(dMoment)%*%solve(dataMomentsVCM)%*%dMoment)))
> print(standerr)
[1] 0.0004055623 0.0191063105
```

(e)

The sensitivity measures show regression coefficients for income are critical for identifying beta and gamma. Beta is most sensitive to regression coefficient for income at t=1 and Gamma is most responsive to regression coefficient

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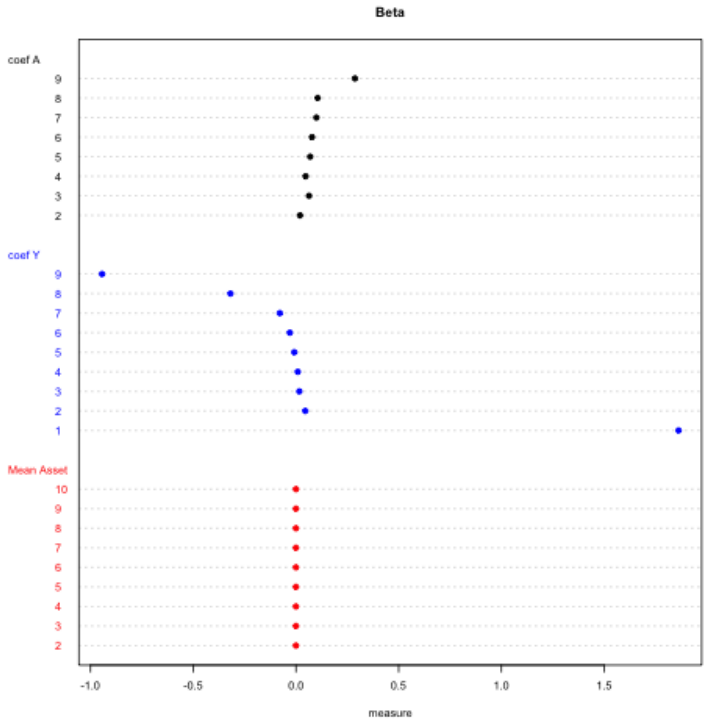
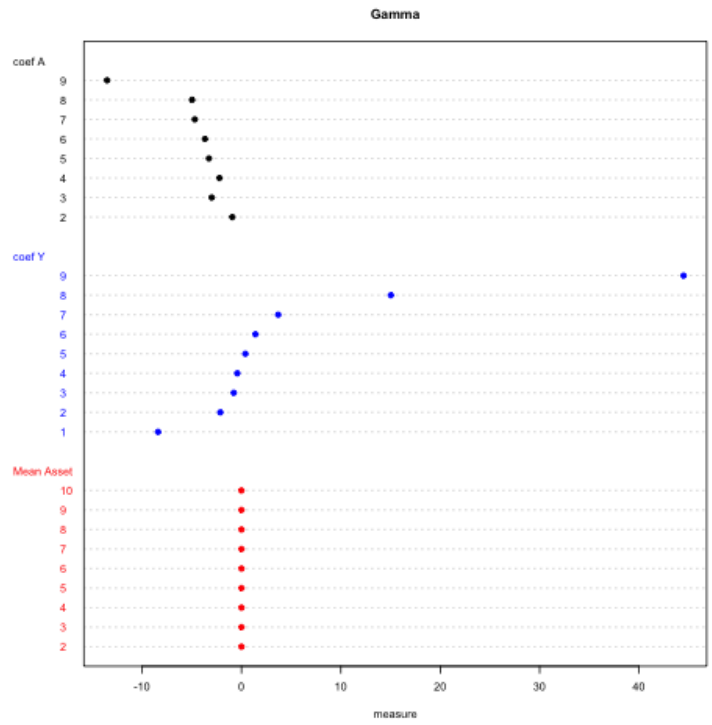
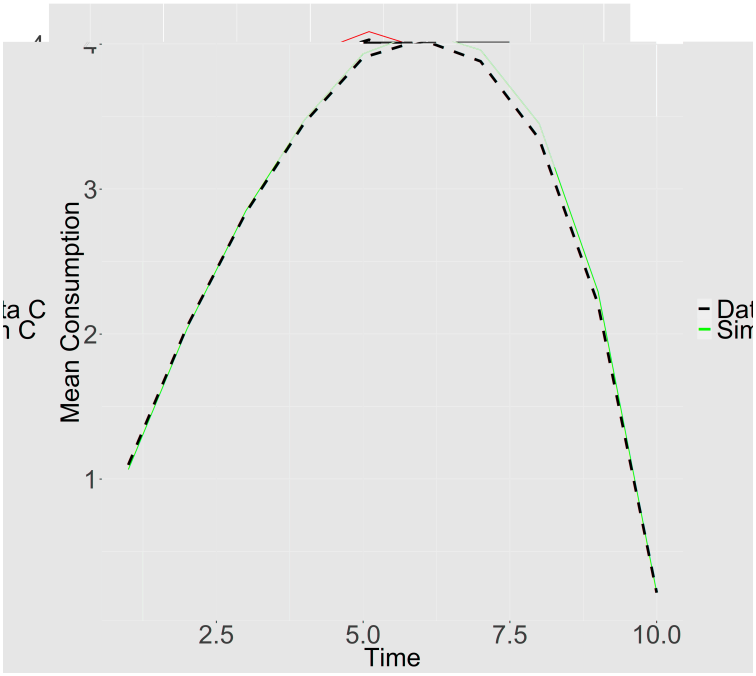
for income at t=T-1. The sensitivity to mean asset is close to 0, so does not help much identification.

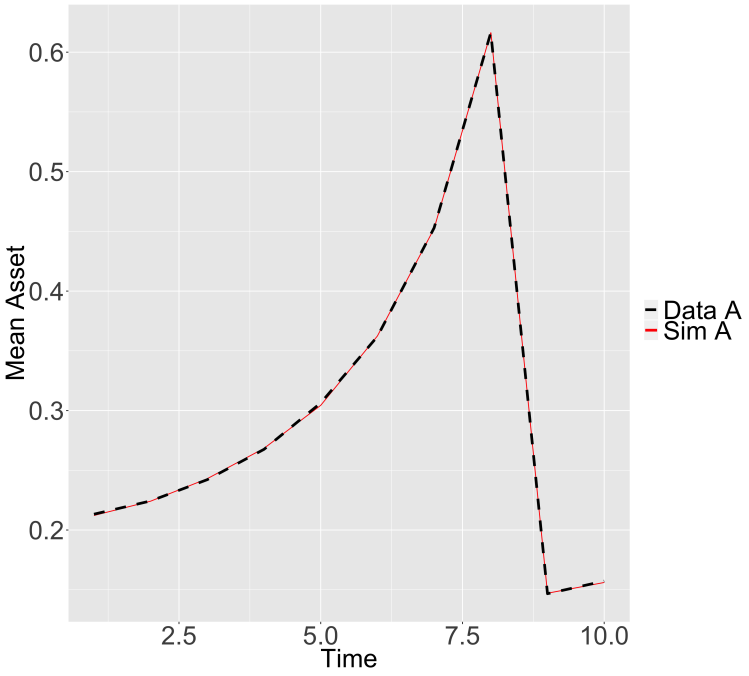




(f)

The estimated parameter generates data which match actual data very well.




0.6
0.5
0.4
0.3
0.2
Mean Asset
2.5
5.0
7.5
10.0
Time
Data A
Sim A