Quantitative Macroeconomics - Problem Set IV

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Introduction

In what follows are my (first-attemp) of results for PS5. I've focused on solving the General Equilibrium part.

It's included results for Partial Equilibrium for infinitely-lived agents with Precautionary Savings for both type of utilities.

Also, GE results are for infinitely-lived agents with Liquidity Constraints and Quadratic Utility.

In all my results I've used discrete method to approximate functions.

I've also uploaded a code for solving PE with continue method (linear piecewise splines). However, this code is not working properly yet, since I get a "weird-looking" value function[1].

For replicating the Aiyagari Model, I'm still working on it[2] and I will base my results on my code for GE with for infinitely-lived agents with Liquidity Constraints and CRRA Utility, parametrized accordingly to the paper. It should be updated shortly.

Finally, I am still working on the other questions on the PS. I will report when I have updated, complete and "satisfying" results for the entire PS.

Methodology and Coding

I've pretty much followed our lecture notes. As I complement, I used *Nakajima's notes* as well[3].

Codes:

borrowing_const.m

lincoef_spline.m

piecewise_locate.m

vspline.m

PS5_1s2.m

PS5_2pe_u1.m

PS5_2pe_u2.m

PS5_5ge_u1.m

[1] Even though it runs

[2] Specifically, I am modifying the Markov Chain

[3] Notes

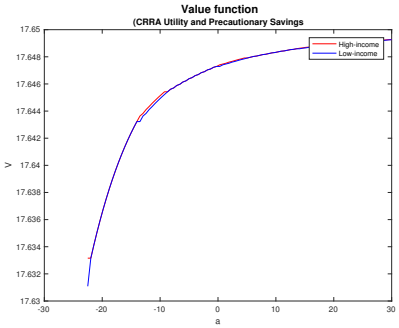
PE with Precautionary Savings and CRRA Utility[4]

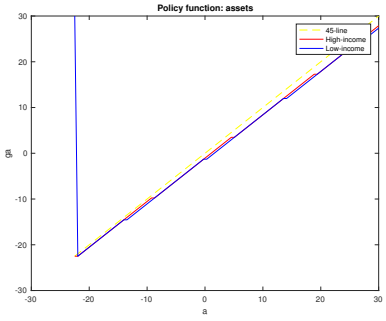
Elapsed Time: 0.03 Seconds

Iterations until convergence (value function fixed point): 120

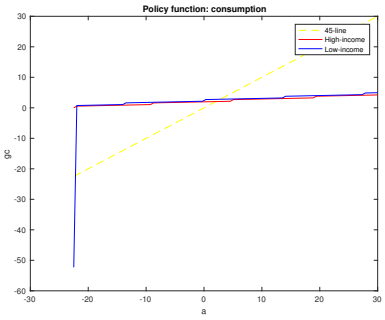
Parameters:

$$r = .04; \rho = .06; \beta = 1/(1+\rho); \bar{c} = 100; \sigma = 2; \sigma_y = .1; \gamma = 0$$





[4]Code: $PS5\_2pe\_u1$



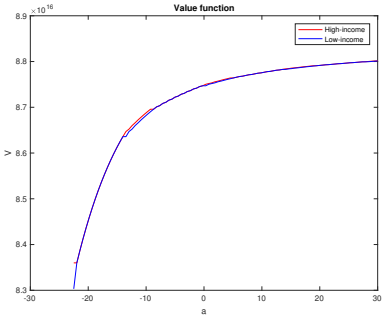
PE with Precautionary Savings and Quadratic Utility[5]

Elapsed Time: 0.06 Seconds

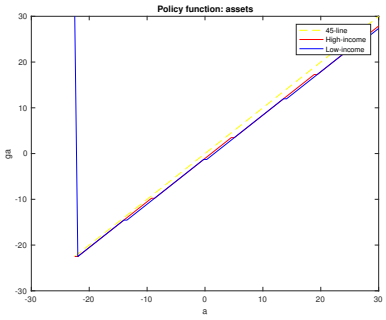
Iterations until convergence (value function fixed point): 400

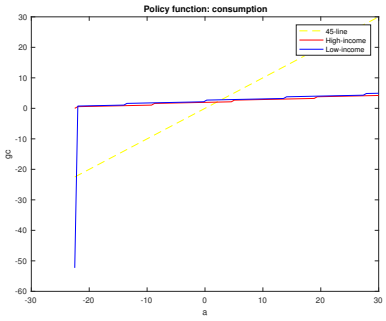
Parameters:

$$r = .04; \rho = .06; \beta = 1/(1+\rho); \bar{c} = 100; \sigma = 2; \sigma_y = .1; \gamma = 0$$



[5]Code: $PS5\_2pe\_u2$





GE with Liquidity Constraint and Quadratic Utility [6]

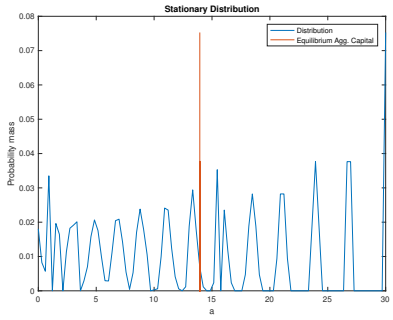
Equilibrium rental rate: 0.0467

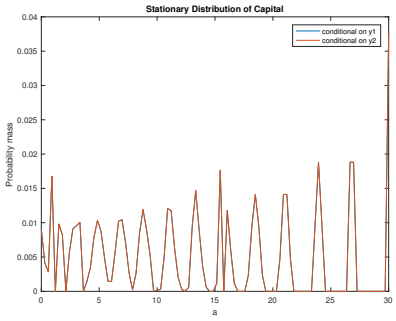
Iterations until GE: 35

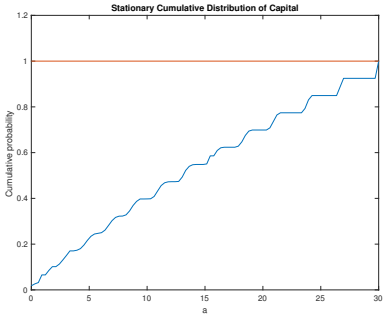
Parameters:

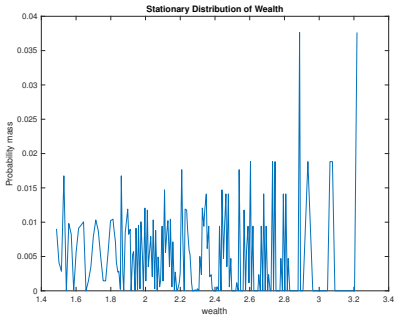
$$r = .04; \rho = .06; \beta = 1/(1+\rho); \bar{c} = 100; \sigma = 2; \sigma_y = .1; \gamma = 0; \delta = .02; \theta = .36$$

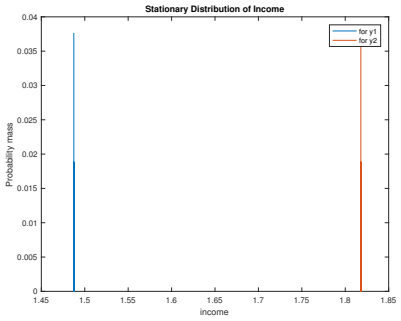
[6] Code: $PS5\_5ge\_u2$

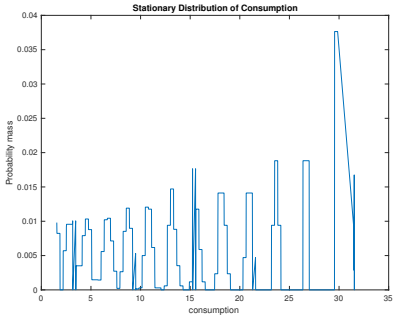

Stationary Distribution
Distribution
Equilibrium Agg. Capital
Probability mass
a

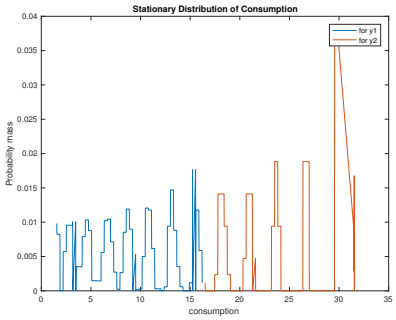

Stationary Distribution of Capital
conditional on y1
conditional on y2
Probability mass
a


Stationary Cumulative Distribution of Capital
Cumulative probability
a


Stationary Distribution of Wealth
Probability mass
wealth
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.2
3.4


Stationary Distribution of Income
for y1
for y2
Probability mass
income
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
1.45
1.5
1.55
1.6
1.65
1.7
1.75
1.8
1.85


Stationary Distribution of Consumption
Probability mass
consumption
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
0
5
10
15
20
25
30
35


Stationary Distribution of Consumption
for y1
for y2
Probability mass
consumption
0
0.005
0.01
0.015
0.02
0.025
0.03
0.035
0.04
0
5
10
15
20
25
30
35