Problem Set #5

MACSS 40000

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Problem 1
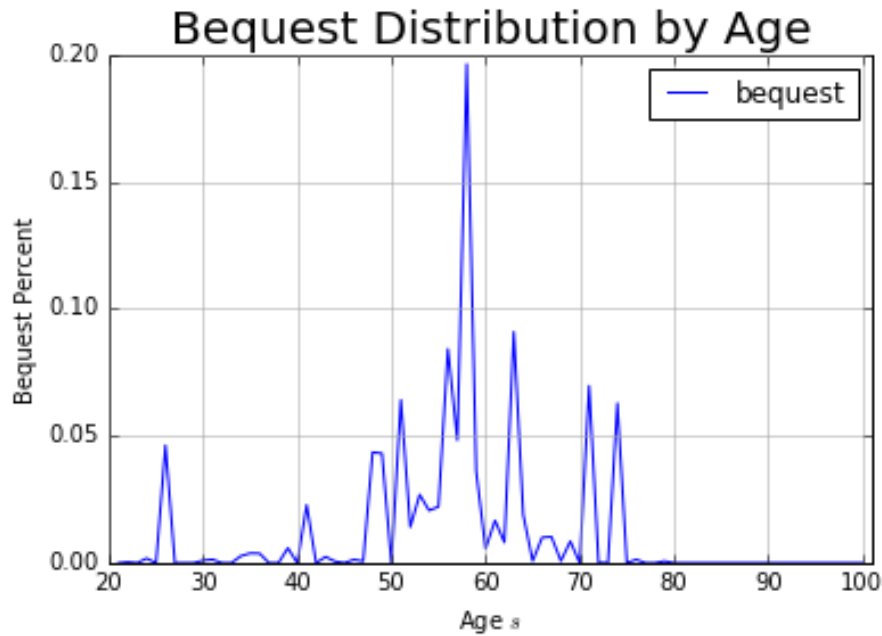
(a)

The histogram is shown as following:

Figure 1: Bequest Distribution by Age Group

For my graph, it's because we don't have the complete dataset on the bequest of each age group that cause this problem.

We can see that middle age people are the ones with the most bequest. People when they were young can also obtain a certain amount of bequest.

(b)

The subjects are divided into different net worth groups and age groups. The distribution is plotted as above. We can roughly see that the bequest amount increases as people's net worth increases.
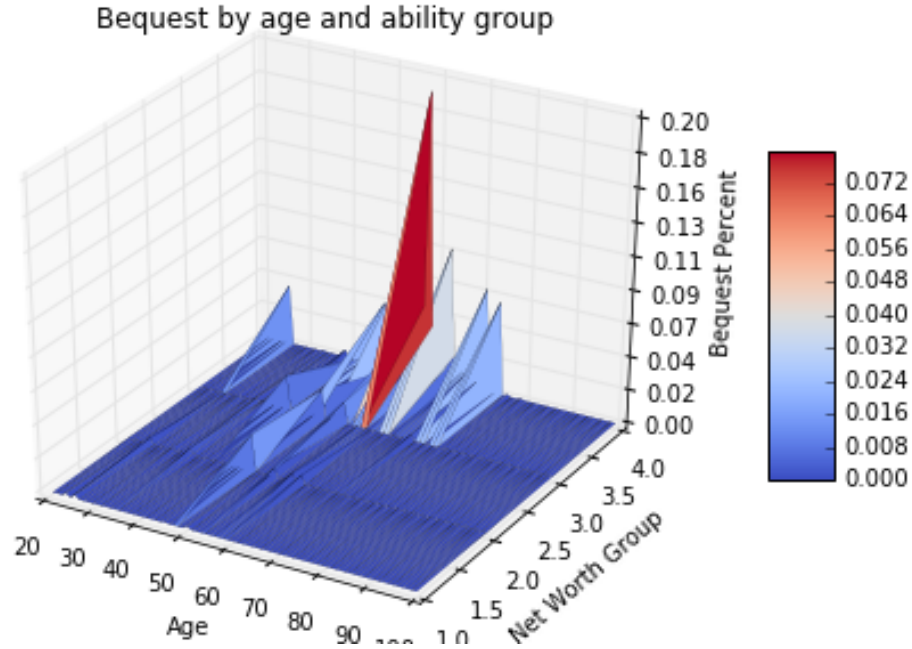
Figure 2: Bequest Distribution by Age Group and Net Worth

Problem 2

(a)

The steady state values are listed below:

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{'C_ss': 99.773614305029952,
 'EulErr_ss': array([ -7.56736784e-10,  -2.60173993e-10,  -3.80395715e-12,
          1.89993576e-11,  -4.88660223e-11,   1.04340092e-10,
          5.34248201e-11,  -3.39670514e-11,  -3.52529117e-12,
          2.10911288e-11,   6.72362166e-12,   1.91080485e-12,
          3.07798231e-12,   1.70670145e-11,  -1.88512539e-11,
          6.02029537e-12,  -5.73441294e-12,  -2.00417460e-12,
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         -2.60569344e-13,  -3.39173134e-13,  -4.11115586e-13,
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         -2.38780107e-11,  -2.87763147e-11,  -1.93498551e-11,
         -3.79831722e-11,   7.74094122e-11,   3.94251298e-12,
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        2.90144575e-11,  -3.08247206e-10,  -5.05365749e-10,
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       -9.45125866e-10,  -1.04426934e-09,  -4.77754059e-10,
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       -2.18228990e-10,   9.48211620e-10,   7.06597780e-10,
       -4.96422237e-10,  -4.25749658e-10,   1.05993214e-10,
        9.25516330e-11,  -9.83513271e-12]),
 'K_ss': 495.9876567358682,
 'RCerr_ss': 2.8421709430404007e-14,
 'Y_ss': 124.57299714182339,
 'b_ss': array([ 0.03790233,   0.07985297,   0.12514706,   0.17655286,
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        0.54932928,   0.62878675,   0.71385871,   0.80265081,
        0.89695377,   1.0002813 ,   1.11099463,   1.22794219,
        1.34691154,   1.47251811,   1.61213583,   1.75204505,
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        4.66860051,   4.97872163,   5.30447974,   5.71988192,
        6.10959256,   6.69546415,   7.11150373,   7.50839248,
        7.93581272,   8.37106237,   8.92521407,   9.41522839,
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       14.74788703,  15.53195806,  15.17735704,  14.81293012,
       14.43506733,  14.0448732 ,  13.64277766,  13.22652501,
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        3.54191508,   2.77796184,   1.98697432,   1.16792459]),
 'c_ss': array([ 1.32987551,  1.32769131,  1.32551069,  1.32333366,  1.32116021,
        1.31899032,  1.316824  ,  1.31466123,  1.31250202,  1.31034636,
        1.30819423,  1.30604564,  1.30390058,  1.30175904,  1.29962102,
        1.29748651,  1.29535551,  1.293228  ,  1.29110399,  1.28898347,
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        1.19511325,  1.19315039,  1.19119075,  1.18923432,  1.18728111,
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        1.17562904,  1.17369817,  1.17177048,  1.16984595,  1.16792459]),
```

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'r_ss': 0.037906520268219293,
'ss_time': 0.028443000000152097,
'w_ss': 1.3677778402396137}
```

It took 0.028 seconds for my code to get the steady state solution.

(b)

The following are the graphs of my steady-state distribution for consumption and saving.
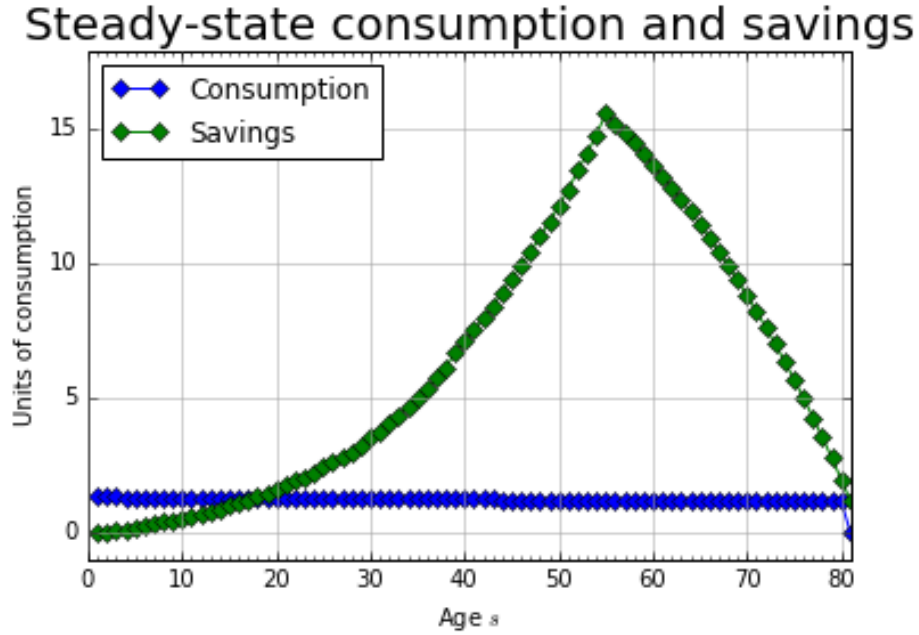

Figure 3: Steady State Consumption and Saving Distribution

Problem 3

(a)

Figure 4 - Figure 6 are the time path for capital stock $\{K_t\}_{t=1}^{T+5}$, wage $\{w_t\}_{t=1}^{T+5}$ and interest rate $\{r_t\}_{t=1}^{T+5}$.

(b)

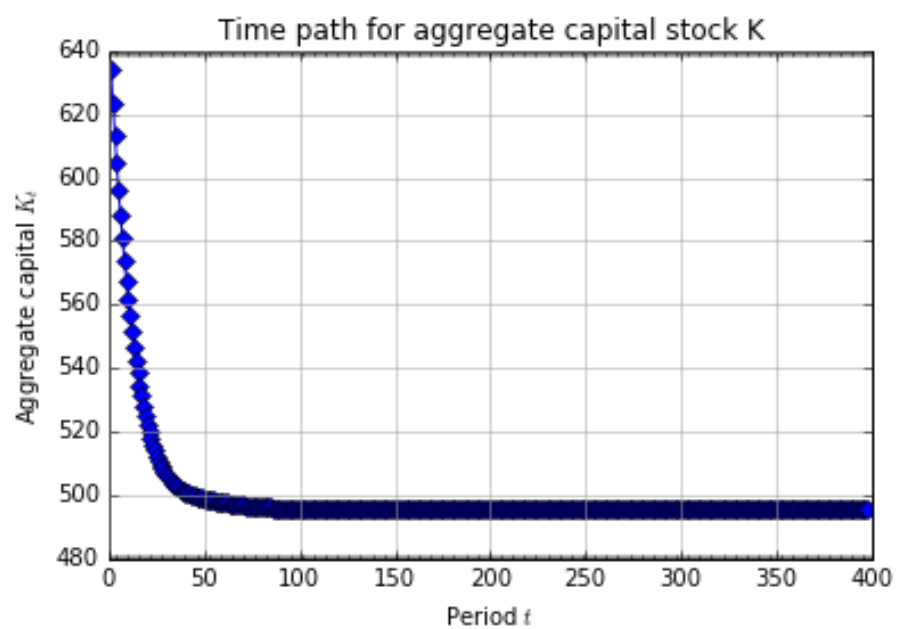Like shown in Figure 7. is the time path of saving for agent with $s = 25$:

Figure 4: Time Path of Saving
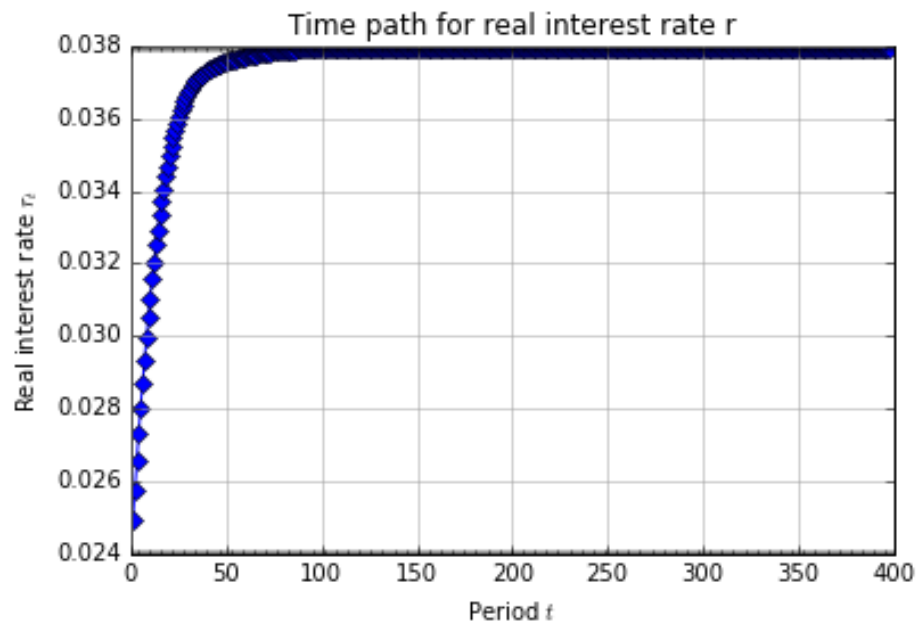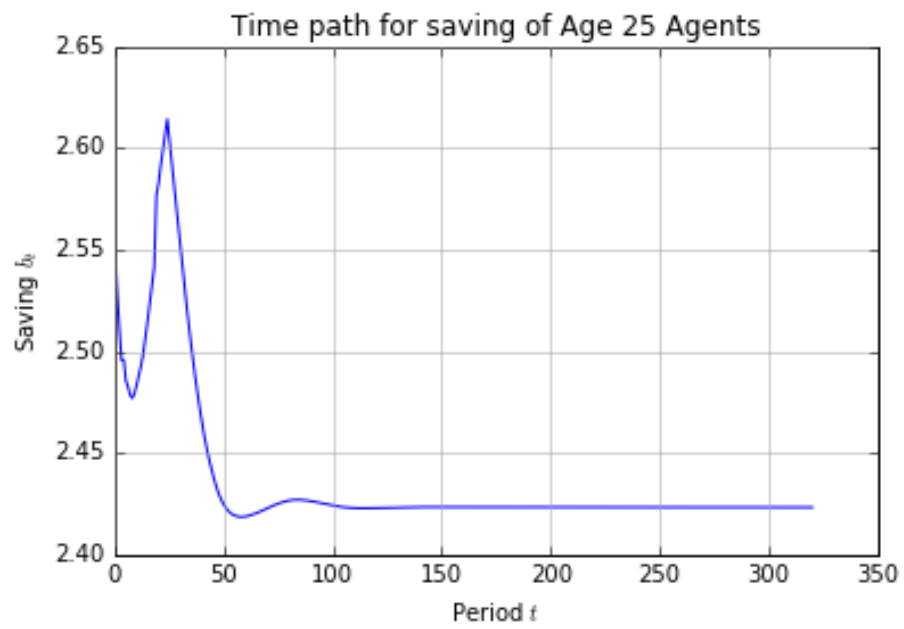

Figure 5: Time Path of Wage

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Figure 6: Time Path of Rent

Figure 7: Time Path of Saving for $s = 25$