Problem Set 3

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1. State the recursive problem

Agents are trying to pick a' maximize the following function recursively.

$$v(s,a) = \max_{a' \in \Gamma(s,\underline{a})} u\left((s) + a - qa'\right) + \beta E_{s'|s}[v(s',a')]$$

The state variables are s, the state we're in today, q, the price of the bond, and a, the level of assets that the agent saves up.

The choice variable is a', the level of the asset that we have tomorrow. We can save or borrow to reach it, as long as it's above the lower bound $\underline{a}$

2. Value and Policy Functions

The Following are the Value Function, Policy Function, and wealth Distribution.

Gini Coefficients of Wealth and Income respectively

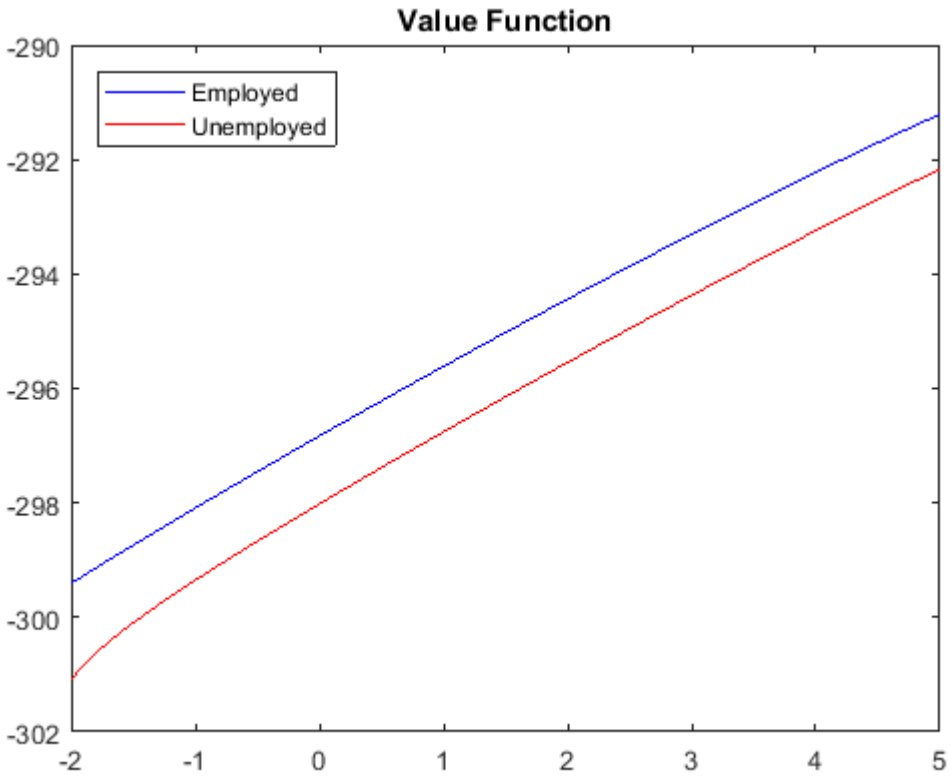
Value Function
Employed
Unemployed
-290
-292
-294
-296
-298
-300
-302
-2
-1
0
1
2
3
4
5

Figure 1:

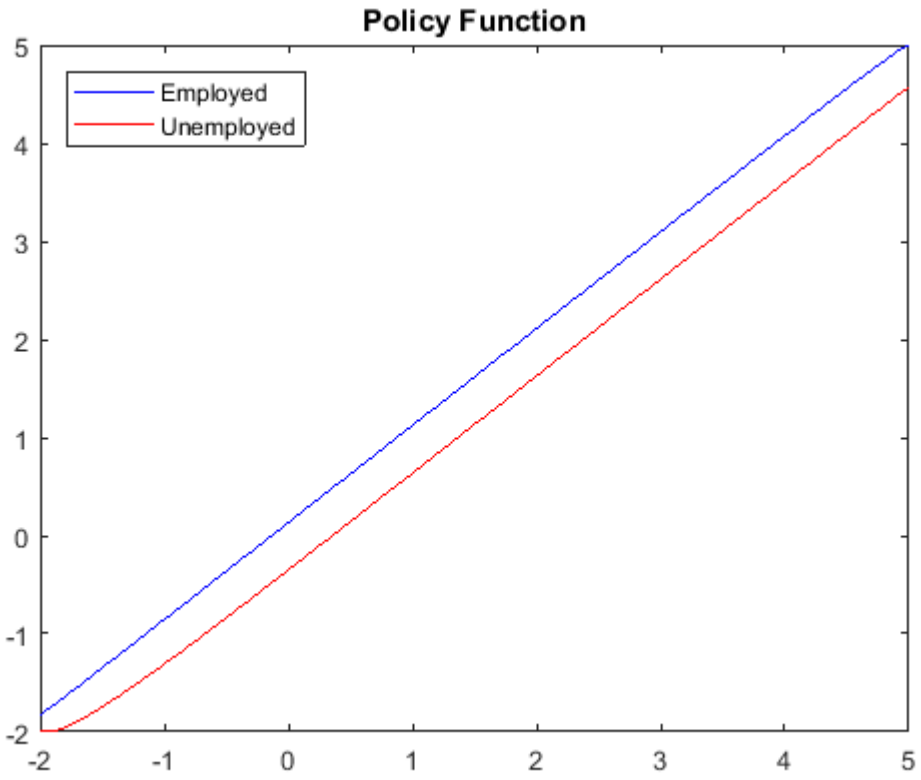

Figure 2:

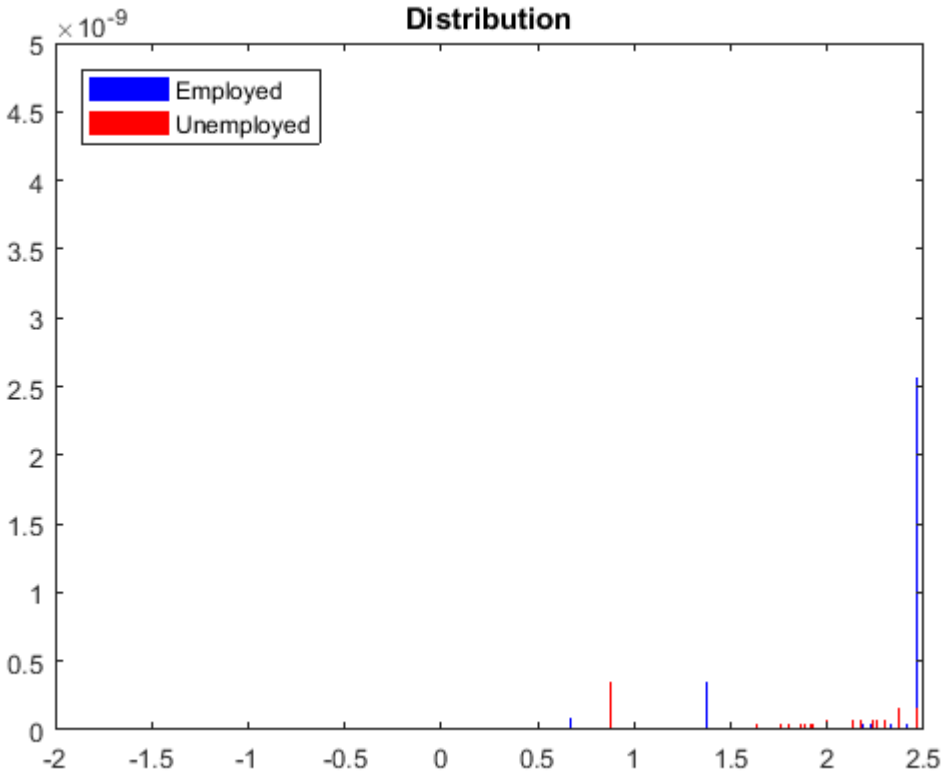
Distribution
×10^-9
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Employed
Unemployed
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5

Figure 3:

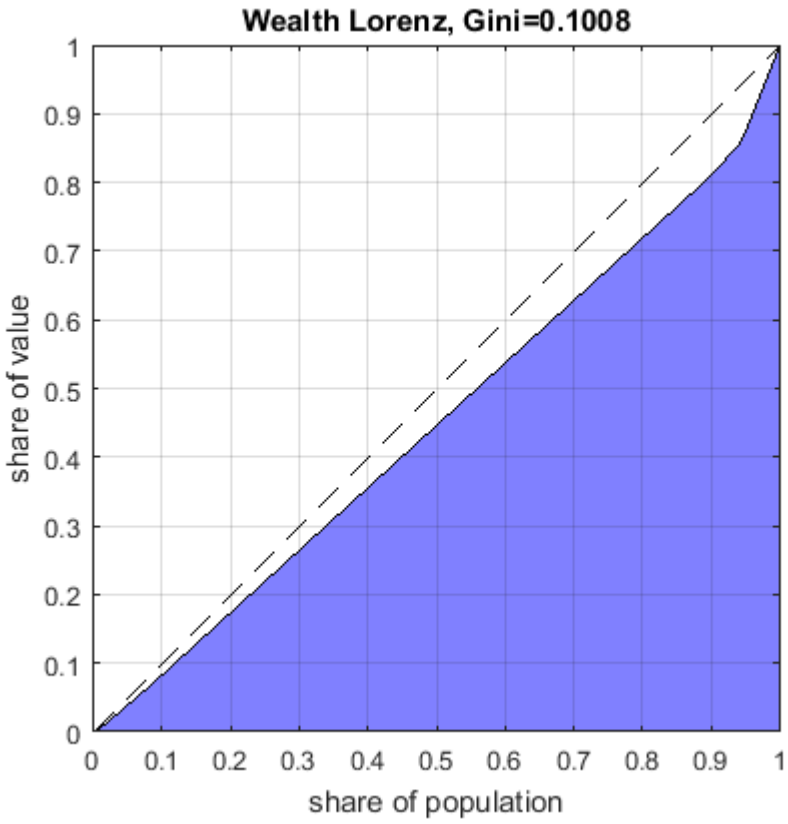
Wealth Lorenz, Gini=0.1008
share of value
share of population
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

Figure 4:

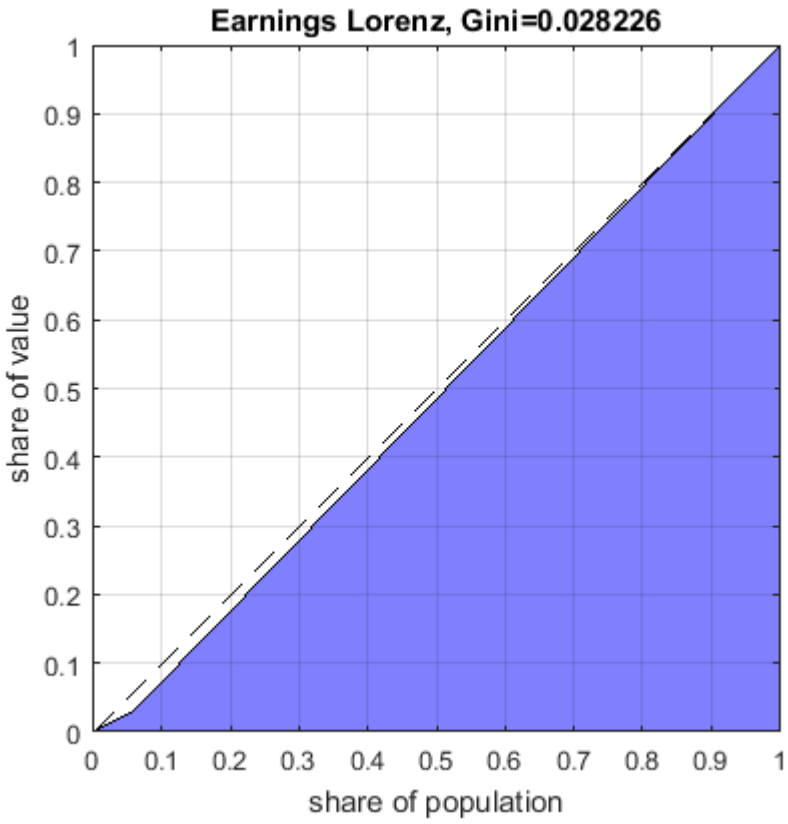
Earnings Lorenz, Gini=0.028226
share of value
share of population
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

Figure 5: