Problem Set 8 Solution

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Question 1.

$$U_{i0} = \log\left(\exp\left(\frac{(\log(y+i)-\beta)}{\sigma_\epsilon}\right)+\exp\left(\frac{\log y}{\sigma_\epsilon}\right)\right)+\gamma \tag{0.1}$$

Question 2. (a)
FOC for s_{ij} gives

$$\frac{\lambda_{ij}}{s_{ij}} = \frac{(1-\lambda_{ij})}{(1-s_{ij})} \tag{0.2}$$

That is,

$$\lambda_{ij} = s_{ij} \tag{0.3}$$

(b)

$$U_i^{ij} = \log\left(\exp\left(\frac{\log(\lambda_{ij}(y+i))-\beta}{\sigma_\epsilon}\right)+\exp\left(\frac{\log(\lambda_{ij}(y+j))}{\sigma_\epsilon}\right)+\exp\left(\frac{\log(\lambda_{ij}(y+i+j))-\beta}{\sigma_\epsilon}\right)+\exp\left(\frac{\log(\lambda_{ij}y)}{\sigma_\epsilon}\right)\right)+\gamma \tag{0.4}$$

Question 3.
ij component of lambda matrix is a Pareto weight for man of type i married to woman type j. ij component of supplyMen(lambda) is the measure of man of type i married to type j woman.

```
> print(lambda) ### pareto weight
          [,1]      [,2]      [,3]
[1,] 0.5080414 0.4208015 0.3402642
[2,] 0.5834254 0.4982149 0.4130069
[3,] 0.6469040 0.5726133 0.4862121
> print(supplyMen(lambda)) ### marriage matching function
           [,1]       [,2]       [,3]
[1,] 0.08580019 0.08579804 0.08151608
[2,] 0.08477972 0.08602242 0.08214554
[3,] 0.08228699 0.08537034 0.08217204
```

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```
> print((measure_i - apply(supplyMen(lambda),1,sum))/measure_i ) ## prob of single men of each t
[1] 0.2406571 0.2411570 0.2505119
```

Question 4.

```
> print(lambda) ### pareto weight
          [,1]      [,2]      [,3]
[1,] 0.5037705 0.4140749 0.3371335
[2,] 0.5706512 0.4959575 0.4187586
[3,] 0.6186938 0.5608903 0.4678336
> print(supplyMen(lambda)) ### marriage matching function
           [,1]       [,2]       [,3]
[1,] 0.08762314 0.08639028 0.08310592
[2,] 0.08857347 0.09248115 0.09123446
[3,] 0.09056671 0.09725560 0.09064914
> print((measure_i - apply(supplyMen(lambda),1,sum))/measure_i ) ## prob of single men of each t
[1] 0.2286420 0.1831328 0.1645856
```

The value of single of man got lower due to higher income tax rate when single. Therefore, the bargaining weight for men of all types got lower. Being single is not good anymore, so the proportion of single got also lower, and this is more so for higher type men earning higher wage.