

# Labor Economics Term Paper

Reio TANJI 23A18014

Due date: 2/1

## Q1

(1) The value functions of the worker are:

$$\begin{cases} rW = w + \lambda(\bar{u} + f_e - W) & \text{for employment} \\ r\bar{u} = z + \theta q(\theta)(W - \bar{u}) & \text{for unemployment} \end{cases}$$

$W$  and  $\bar{u}$  are the values of employment and unemployment.  $w$  and  $z$  are the instantaneous utility of employment and unemployment, respectively.  $r$  is the discount factor, and  $q(\theta)$  is the matching function of  $\theta = \frac{v}{u}$ .  $v$  and  $u$  is the vacancy rate and the unemployment rate of the workers, satisfying  $q'(\theta) < 0$ . When a worker was dismissed, they receive  $f_e$  as the severance payment.

(2) The value functions of the firm are:

$$\begin{cases} rJ = (p - w) + \lambda(V - f_e - f_a J) & \text{for having a vacancy filled} \\ rV = -c + q(\theta)(J - W) & \text{for vacancy} \end{cases}$$

$J$  and  $V$  are the values of vacancy filled and vacancy.  $p$  is the the instantaneous productivity of the worker and  $w$  is the instantaneous wage.  $c$  is the expected hiring cost. When a firm fire a worker, then it have to pay the severance payment  $f_e$  to the worker, and  $f_a$  as the related cost for firing.

(3) By the free-entry/exit condition,  $V = 0$  holds. Then, the value function of vacancy is rewritten as follows:

$$J = \frac{c}{q(\theta)}$$

Then, substituting this into the value function of having vacancy filled,

$$\begin{aligned}
rJ &= p - w + \lambda(V - f_e - f_a - J) \\
p - w &= (r + \lambda) \left( \frac{c}{q(\theta)} \right) - \lambda(f_e + f_a) \\
p - w &= \frac{(r + \lambda)c - \lambda(f_e + f_a)}{q(\theta)},
\end{aligned}$$

which corresponds to the job creation condition.

(4)

**Q2**

(1)

(2)

(3)

(4)

**Q3**

(1)

(2)

(3)

(4)