

For a worker in the matching model, utility while employed is  $w$  and utility while unemployed is  $b$ . The instantaneous probability of moving from unemployed to employed is the job-finding rate  $a$  while the instantaneous probability of moving from E to U is the separation rate  $\lambda$ . In a steady state, the value (lifetime expected discounted utility) of being in any state is constant.

Recall that the dynamic programming solution gives the steady-state flow return to being in state X as

$$rV_X = \text{flow of utility while in X} + (\text{probability of leaving X} \times \text{gain in V from leaving X}).$$

1. Write the equations for  $rV_E$  and  $rV_U$ .

For firms, they earn a flow of profit  $y - w - c$  from a filled job and  $-c$  from a vacant one. Vacant jobs are filled at the job-filling rate  $\alpha(t)$  and filled jobs become vacant at the separation rate  $\lambda$ .

2. Write the equations for  $rV_F$  and  $rV_V$ .