

PROBLEM SET #5

1. Consider the problem faced by an unemployed worker searching for a job. Every period that the worker searches, she receives a job offer with the wage  $w$  drawn independently from the time invariant probability distribution  $F(v) = \text{prob}(w \leq v)$ ,  $v \in [0, B]$ ,  $B > 0$ . After receiving the wage offer  $w$  the worker faces the choice (1) to accept it or (2) to reject it, receive unemployment benefit  $b$ , and search again next period. That is,

$$y_t = \begin{cases} w & \text{if job offer has been accepted} \\ b & \text{if searching} \end{cases} .$$

The worker solves

$$\max E \sum_{t=0}^{\infty} \beta^t y_t$$

where  $1 > \beta > 0$ . Once a job offer has been accepted, there are no fires or quits.

- a) Formulate the worker's problem as a dynamic programming problem by writing down Bellman's equation.
- b) Using Bellman's equation from part a, characterize the value function  $V(w)$  in a graph and argue that the worker's problem reduces to determining a reservation wage  $\bar{w}$  such that she accepts any wage offer  $w \geq \bar{w}$  and rejects any wage offer  $w < \bar{w}$ .
- c) Consider two economies with different unemployment benefits  $b_1$  and  $b_2$  but otherwise identical. Let  $\bar{w}_1$  and  $\bar{w}_2$  be the reservation wages in these two economies. Suppose that  $b_2 > b_1$ . Prove that  $\bar{w}_2 > \bar{w}_1$ . Provide some intuition for this result.
- d) Consider two economies with different wage distributions  $F_1$  and  $F_2$  but otherwise identical. Let  $\bar{w}_1$  and  $\bar{w}_2$  be the reservation wages in these two economies. Define a mean preserving spread. Suppose that  $F_2$  is a mean preserving spread of  $F_1$ . Prove that  $\bar{w}_2 > \bar{w}_1$ . Provide some intuition for this result. Explain why expected utility is higher in the economy with wage distribution  $F_2$  than it is in the economy with wage distribution  $F_1$ .