Consider a discrete-time labor search model with discount rate β and linear utility in consumption. Vacancies are found by workers with probability $p(\theta)$ and vacancies find workers with probability $q(\theta)$ where θ is the ratio of vacancies to unemployed and $p(\theta) = q(\theta)\theta$, $p' > 0$, $p'' < 0$, $q' < 0$, $q'' > 0$. Separations occur at rate δ. A firm pays κ to post a vacancy. Because of free entry, there is zero expected value to a vacancy.

The productivity of a matched worker and firm is z, which is deterministic. If a worker is not matched, they get $b \in (0, z)$, but lose these benefits each period with probability $\lambda \in (0, 1)$, after which they get 0.

1. Write down the problems of matched and unmatched firms and each type of worker.

2. Clear the markets!

   (a) Use free entry of unmatched firms to derive a condition for tightness as a function of the value of a matched firm

   (b) Use Nash-Bargaining, with worker bargaining weight μ to set up and determine wages. Remember, there is no uncertainty about match productivity.

3. Suppose λ decreases. Show explicitly what happens to:

   (a) Wages

   (b) The expected duration of unemployment benefits in partial equilibrium, assuming they do not find a job.

   (c) The expected duration of unemployment (time before finding a job), taking in consideration the equilibrium effects.

   (d) BONUS: What is the change in the expected duration of benefits inequilibrium?

1