

### Assignment #1- solutions

1. "Canada's pool of unemployed labour is growing deeper – eroding the underpinning of the federal government's expanded temporary foreign worker program. There are now 6.5 unemployed people for every job opening in the country, compared with 6.1 a year earlier, Statistics Canada data showed this week, with the number of vacant jobs falling to the lowest level since record-keeping began in March, 2011." (*The Globe and Mail*, April 2013)
  - Refer to the excerpt above to explain the changes in unemployed workers' search intensity for a job as a result of fewer job openings. Discuss the consequences on the equilibrium in the labour market and in the goods market.

(5 points)

**Search intensity is in our model denoted by  $e$  and it is included in the matching function. Fewer job openings would signal job seekers that employers are less willing to hire.**

**The probability function ( $p_c$ ) is decreasing in  $\theta$ , meaning that the likelihood of finding a job decreases when there are more workers competing for a job. This negatively affects the intensity of job searching as workers get discouraged. Production and consumption decrease, as the economy is not producing at capacity and the level of income decreases as well.**

2. Consider a one period economy<sup>1</sup>. Define the number of unemployed workers  $u$  and the number of job openings  $v$ . The ratio of the two,  $\theta = \frac{u}{v}$ . Define the number of matches that occur in that period, as  $m(u, v) = ku^\alpha v^{1-\alpha}$ .
  - Explain what the ratio  $\theta = \frac{u}{v}$  means, intuitively.
  - For an individual unemployed worker, what is the probability of being matched (finding a job), given  $\theta$ ?
  - For a firm, what is the probability of finding an employee, given  $\theta$ ?

**NOTE:** Write the 2 probabilities as functions of  $\theta$  and constants.

Notice the changed notation.

(10 points)

**The ratio  $\theta = \frac{u}{v}$  is the measure for unemployment to job vacancy ratio. It is the inverse of the market tightness ratio explained in class, it measures the number of job seeking workers relative to the number of job vacancies. It shows how many workers are competing for the same job. The article from question 1 refers to such a measure. Also, for more info on how Stats Canada reports this ratio, please read**

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<sup>1</sup> We could also say that we focus on what happens in the labour market in one period of time  $t$ , and we ignore what happened in the past  $t - 1$ , or what will happen in the future  $t + 1$ . OR, we could assume that all processes are repetitive, and it is enough to look at one period in order to understand the history and predict the future.

For the unemployed worker, the probability of finding a job, given the matching function is:

$$p_c = \frac{ku^\alpha v^{1-\alpha}}{u} = k \frac{v^{1-\alpha}}{u^{1-\alpha}} = k\theta^{\alpha-1} = k \frac{1}{\theta^{1-\alpha}}$$

For the employer, the probability of hiring, given the matching function is:

$$p_f = \frac{ku^\alpha v^{1-\alpha}}{v} = k \frac{u^\alpha}{v^\alpha} = k\theta^\alpha$$

3. Assume an unemployed worker can earn  $B$  while being unemployed (these earnings include the value of leisure, non-market production, unemployment money benefits, public health services...). All workers start out unemployed.

We are looking at a 2 period economy, this time. In the first period,  $t$ , the unemployed get  $B$ . During this first period, they either find a job, or they don't. If they find a job, it starts in period  $t + 1$ , with the wage  $W(p)$ . Denote the worker's value function as  $U(p)$ .

- Write down the value function of the unemployed worker. Use the probability function you solved in question 2.

**(5 points)**

The payoff of searching for work is:

$$U(p) = pW(p) + (1 - p)B = k\theta^{\alpha-1}W + (1 - k\theta^{\alpha-1})B = B + k\theta^{\alpha-1}(W - B).$$

4. In the DMP model, explain how wages are set through Nash Bargaining. (use the textbook and your notes).

**(5 points)**

**Page 184 in the textbook.**