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MPSE DEEQA 2003

FINAL EXAM

Available Time: 1h30

We consider a matching economy with the usual notation: u is unemployment, v is vacancies, total labor force is normalized to 1, the matching function is $m(u,v)$, with $q(\theta) = m(1/\theta, 1)$. $m(u,v)$ is increasing and concave in each of its arguments and has constant returns to scale. The cost of posting a vacancy per unit of time is c. The worker's value is V_e, the firm's value is J, an unemployed worker's value is V_u. The total net surplus of the match, denoted by $W = (V_e + J - V_u)$, is split between the firm and the worker so that $V_e = V_u + \varphi W$ and $J = (1-\varphi)W$. The wage is denoted by w. The unemployed earn a benefit b per unit of time. We ignore the financing problems of unemployment benefits, i.e. assume b is manna from heaven. The production of a match per unit of time is equal to y_0. Each job is destroyed with a constant probability per unit of time s. There is free entry in posting vacancies.

1. Show that in steady state the equilibrium value of $\theta = v/u$ is equal to θ_0, where θ_0 is the solution to

$$(1-\varphi)(y_0 - b) = (r+s)\frac{c}{q(\theta_0)} + \varphi\theta_0 c.$$

What is the equilibrium unemployment rate?

Assume the economy is in such a steady state and that a *new technology* is introduced, such that all matches formed after the new technology is introduced yield an output per unit of time equal to $y_1 > y_0$.

2. Show that labor market tightness θ jumps to $\theta_1 > \theta_0$, where θ_1 is solution to

$$(1-\varphi)(y_1 - b) = (r+s)\frac{c}{q(\theta_1)} + \varphi\theta_1 c. \tag{1}$$

3. Assume that

$$y_0 > b + \frac{\theta_1 \varphi c}{1-\varphi}.$$

Show that upon introduction of the new technology, all existing matches which use the old technology continue to exist, and gradually die out. What is the evolution along time of (i) the stock of employment in the old technology, (ii) the stock of employment in the new technology, (iii) unemployment? Does introduction of the new technologie harm or benefit employment? What is its effect on wages for workers who still use the old technology? How do wages for

workers who use the new technology compare with wages of workers who remain with the old technology? Why?

4. What happens if

$$y_0 < b + \frac{\theta_1 \varphi c}{1 - \varphi}. \tag{2}$$

Explain.

5. Using (1) and (2), discuss whether or not it is more likely that the introduction of the new technology destroys jobs, when:
(i) The new technology is more productive relative to the old, i.e.y_1 is higher
(ii) Unemployment benefits are more generous, i.e. b is higher
(iii) The bargaining power of workers is higher, i.e. φ is higher

BONUS QUESTION (If you have time or are stuck with the previous exercise)

You are an economist at the IMF and are sent in emergency to the Republic of Miranda (Latin America). Miranda used to peg its currency and is now under a severe speculative attack. It is quickly running out of reserves. You come with a 10,000,000,000 $ aid package and you have the choice between two ways of spending it to help the country fight the speculative attack.
A. Give it to the Central Bank as additional foreign exchange reserves
B. Give it to the government under the condition that it will use it to reduce its debt.
Your objective is to make sure that the exchange rate peg remains in operation at least for a while.
Which option do you choose?
Your answer must be justified by rigorous economic analysis.