

Final Exam

Search Theory and the Labour Market

Instructions: The exam is one and half hours long. You are required to answer two out of the three questions listed below. Each question carries equal weight.

1. On-the-job search (Burdett, 1978). Consider a labour market in which unemployed and employed workers search for jobs opportunities. Search is random and sequential. Let λ_u denote the offer arrival rate of unemployed workers and λ_e the offer arrival rate of employed workers. Let δ denote the rate at which workers are laid off and ϕ the rate at which they leave the labour market. Assume that after leaving the labour market the continuation payoff of a worker is zero. Assuming both employed and unemployed workers face the same offer distribution $F(w)$.

- (a) Show that the reservation wage of unemployed workers is given by

$$R = z + (\lambda_u - \lambda_e) \int_R^{\bar{w}} \frac{1 - F(w)}{\phi + \delta + \lambda_e[1 - F(w)]} dw.$$

- (b) Note that $R \geq z$ when $\lambda_u \geq \lambda_e$ and $R < z$ otherwise. Give an economic interpretation of this result.
 - (c) Show that R is increasing in z and decreasing in δ . Give an economic interpretation of these results.
2. In the basic Diamond-Mortensen-Pissarides (DMP) model (Pissarides, 2001, chapter 1), the free entry condition implies that labour market tightness $\theta = v/u$, where v and u denote the number of vacancies and unemployed workers, respectively, is the unique solution to:

$$(1 - \beta)(x - z) = \frac{[r + \delta + \lambda(\theta)\beta]c}{\lambda(\theta)/\theta},$$

where the properties of the matching function implies that the RHS is increasing in θ . The solution for θ can then be used to solve for wages, unemployment and vacancies using

$$w^* = (1 - \beta)z + \beta(x + c\theta^*).$$

and

$$u^* = \frac{\delta}{\delta + \lambda(\theta^*)}$$

$$v^* = u^*\theta^*.$$

- (a) Using the above equations show and explain what would be the effect on θ , w , u and v after a one time (unexpected) increase in the productivity of the match, x .
- (b) Using the above equations show and explain what would be the effect on θ , w , u and v after a one time (unexpected) increase in the job destruction rate, δ .
- (c) Shimer (AER, 2005) argued that, quantitatively, an increase in x would generate a small change in the equilibrium values of u and v . He also argued that by introducing wage rigidities (for example wages were not allowed to move with productivity), the model will be able to generate a larger change in θ , u and v . Using the above equations, explain the intuition behind Shimer's claim.

3. Efficiency in the DMP model.

- (a) There are two types of externalities in the DMP model. The congestion and the thick-market externalities. Explain the nature of these externalities.
- (b) Hosios (ReStud, 1990) showed that the equilibrium outcome of the decentralized economy in the DMP model is inefficient. In particular, if $\beta > \eta$, where η denotes the elasticity of the job finding rate with respect θ , then there is too little job creation and the unemployment rate is above the social efficient level. If $\beta < \eta$ then there is too much job creation and the unemployment rate is above the social efficient level. Explain the intuition behind this result.
- (c) Moen (JPE, 1997) proposed a mechanism that solves the inefficiency of the DMP model by segmenting the labour market into (potentially) many sub-markets each with its own matching function. Further, all firms in a particular sub-market post the same wage. Unemployed workers can then direct their search to the sub-market of their choice. (i) Explain what is the main trade-off faced by workers in deciding which sub-market to visit. (ii) Explain why this mechanism solves the inefficiency in the DMP model.