Final Exam ECON3715/4715 – Labour Economics Autumn 2020

This exam has 6 questions, with 14 sub-questions. Each sub-question counts equally.
When answering the questions on the exam you should be brief and to the point!
Make sure to write clearly. Difficult to decipher answers will not be counted!

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1. In this question you have to indicate whether you think the statement is true or false
   and explain why. You do not get any points if you only state whether the statement
   is true or false.

   (a) If the price of a substitutable input factor j rises, the demand curve for input i
       shifts down.

   (b) A profit maximizing firm chooses an optimal input mix of labor and capital
       at given prices. If the firm minimized costs, holding the output fixed at the
       optimal level, it may not necessarily choose the same mix of labor and capital.

   (c) Any allocation on an efficient contract curve satisfies Pareto efficiency, but not
       necessarily allocative efficiency.

2. Inequality has increased in the US in recent decades. In this question you are asked
   to discuss possible explanations for this increase.

   (a) There has been an increase in the supply of educated workers in the US. At
       the same time there has been an increase in the educational wage gap between
       educated and uneducated workers. In a simple demand and supply framework
       discuss how skill-biased technological change can rationalize these two findings.
       Has technological change always been skill-biased? Discuss.

   (b) Not all countries have experienced the same rise in inequality as the US, despite
       experiencing similar technological development. Discuss possible reasons.

3. This question is about the human capital model. Assume that an individual has to
   decide on how many years of schooling to take. The individual has the following

earnings function:

$$Y = exp(aS - \frac{1}{2}bS^2) \tag{1}$$

where Y is earnings and S is years of schooling. Assume that a and b are such that the earnings function monotonically increase in S and is concave in appropriate intervals of S.

(a) Assume that the individual faces a discount rate of r. What is the optimal level of schooling?

(b) Assume that you as a researcher observe two individuals, Anna and Benjamin, who have identical earnings functions but differ in their discount rate. You observe the educational choices and earnings of Anna and Benjamin but you do *not* observe their earnings function. How would you estimate the slope of earnings function in this simple case with two individuals? What is the formula for the estimated marginal rate of return to schooling for Benjamin using observed outcomes? Will this estimate be biased? Discuss why/why not.

4. This question is about: Fehr, E. and L. Goette. (2007). Do Workers Work More if Wages are High? Evidence from a Randomized Field Experiment. *American Economic Review* 97(1): 298-317. The authors consider the following lifetime utility maximization problem.

$$\max U_0 = \sum_{t=0}^{T} \delta^t u(c_t, e_t) \text{ subject to } \sum_{t=0}^{T} \frac{(\hat{w}_t e_t + y_t - \hat{p}_t c_t)}{(1+r)^t} = 0, \tag{2}$$

where u is strictly concave and twice differentiable in c and e, c_t is consumption in period t, e_t is labor supply in period t, $\hat{p}_t$ is the price of consumption good, $\hat{w}_t$ is the wage, δ is the discount rate, and r is the interest rate.

(a) At the optimal path, (2) can be equivalently represented as:

$$\max v(e_t) = \lambda w_t e_t - g(e_t), \tag{3}$$

where $w_t := \frac{\hat{w}_t}{\delta^t (1+r)^t}$, $g_e' > 0$, $g_e'' > 0$ and λ is the lifetime marginal utility of income. Interpret (3) and discuss the implications of an anticipated temporary wage increase.

(b) The authors also consider a model with nonseparable utility:

$$\max v(e_t, e_{t-1}) = \lambda w_t e_t - g(e_t(1 + \alpha e_{t-1})), \tag{4}$$

where e_{t-1} is labor supply in period $t - 1$. Interpret (4) and discuss why it is reasonable to assume $\alpha > 0$ in the context of this paper.

(c) Imagine that there are only two future time periods (period 1 and period 2). Assuming that workers have nonseparable utility (4) and that they don't work in period 0 ($e_0 = 0$), we can express the two-period utility as $U = v(e_1, 0) + v(e_2, e_1)$, when we ignore discounting. Workers can receive either a high wage (w^H) or a low wage (w^L), and for a given worker, the wage rate is constant over time. Derive the first-order conditions and discuss workers' labor supply choices.

5. This question is about: Staiger, D.O., J. Spetz, and C.S. Phibbs (2010). Is There Monopsony in the Labor Market? Evidence from a Natural Experiment. *Journal of Labor Economics* 28(2): 211-236. The authors consider the Salop model of competition around a circle, where the labor supply facing hospital i is as follows:

$$L_i = \alpha + \frac{1}{\tau} \left(w_i - \frac{w_{i-1} + w_{i+1}}{2} \right), i = 1, ..., N, \tag{5}$$

where w_i is the wage at hospital i, and w_{i-1} and w_{i+1} are wages at the two closest neighboring hospital.

(a) Suppose that the hospital sets wages to maximize profits $R(L_i) - L_i w_i$ subject to (5), where $R(L_i)$ is the revenue function and $R'_L > 0$. Derive hospital i's first-order condition and interpret the expression.

(b) Suppose $R(L_i) = L\beta$. Imagine that the distance between a hospital and its closest competitors increases, i.e., there is a higher α. How does this change monopsony power?

6. This question is about: Parey, M., Ruhose, J, Waldinger, F., and N. Netz. (2017). The Selection of High-Skilled Emigrants. Review of Economics and Statistics 99(5): 776–792. The authors estimate the following model:

$$\log w_{0i} = X_i \beta_0 + \varepsilon_{0i} \tag{6}$$

where w_{0i} are wages in Germany and X_i are individual characteristics.

(a) The authors estimate (6) and compute $\hat{\theta}_{0i} = X_i \hat{\beta}_0$. Why do the authors compute $\hat{\theta}_{0i}$? What is the interpretation of $\hat{\theta}_{0i}$, and how does this differ from θ_0 for movers and stayers, respectively?

(b) Interpret Figure 2 panel (a) in Parey et al. (2017). What does this tell us about sorting of migrants and are the results in line with the prediction in the Roy-model? Discuss.

Figure 2.—Predicted Earnings of Migrants and Nonmigrants

(a) CDF for Three and Five Groups of Countries