ECON 611

Spring 2022

Instructor: Pedro Bento

Second Term Test − Tuesday April 5

Instructions:

1. Read each question carefully before attempting to answer.
2. Incomplete answers are eligible for partial points. Don't leave any questions blank!
3. Explain all of your answers.
4. Be concise.
5. Make all extra assumptions that you consider necessary, but make sure to state them clearly.
6. Make sure to label all your diagrams appropriately.
7. You can keep this exam sheet, just hand in your booklet.
8. Each question specifies the total number of points and their allocation across subparts.
9. The total number of points possible for this exam is 105/100. 5 of these are extra credit.
10. Exam duration: 75 minutes.

1. (30 points) Consider the simple model of firm choice developed in class. The firm maximizes after-tax profits π by choosing labor N, taking the wage w as given. The production function available to the firm is

$$zK^{\alpha}N^{1-\alpha}, \quad \alpha \in (0,1),$$

where K is exogenous and z is total factor productivity. The firm faces a proportional tax rate t on its profits.

   (a) (20) Solve for the firm's optimal demand for labor, then illustrate the firm's labor demand curve in a graph.

   (b) (10) Explain how the firm's demand for labor changes if the tax rate t increases. How will this affect the firm's after-tax profits?

2. (70 points) Consider the closed-economy one-period macroeconomic model developed in class. There is a representative consumer/worker endowed with h units of time, which can be used for labor or leisure. The consumer chooses consumption C, leisure ℓ, and labor N_s to maximize utility, subject to his/her budget constraint. Utility is described as follows;

$$U = C^{\gamma}\ell^{1-\gamma}, \quad \gamma \in (0,1).$$

The government spends G, financed with a proportional tax t on wage income. There is no lump-sum tax. A representative firm produces output according to $Y = zN_d$, where Y is aggregate output, z is TFP, and N_d is total labor demanded by the firm.

   (a) (20) Find the consumer's optimal choice of consumption, leisure, and labor, given the wage w and firm profits π.

   (b) (15) Find the firm's optimal demand for labor N_d, as a function of w.

   (c) (30) Solve for the equilibrium allocation (C, ℓ, N, Y) and equilibrium wage w, all as functions of exogenous variables and parameters.

   (d) (10) Without solving for the Pareto Optimal allocation, offer an argument for why you think the equilibrium allocation is or is not Pareto Optimal.