Announcements

- Prelim 2 on Thursday, April 20

- Review session in class on Tuesday, April 18

- Practice Prelim 2 due in class on Tuesday, April 18

1   Topic 9 Review: Money

- Fisher equation: $i = R + \pi$ How can this hold in practice?

- Quantity Theory of Money: $M_t V_t = P_t Y_t$ Does this hold in practice?

2   Review Questions: Money

a. If the velocity of money is constant, the government does not print new money, and output grows, what happens to the price level?

b. What are the three ways a government can fund a fixed level of expenditures, $\bar{G}$?

c. Related to the previous question: what tends to happen to inflation during wars?

d. What is the neutrality of money, and what is its policy implication? Is money neutral?

3   Pareto optimality and pollution (Prelim 2 Spring 2016)

Consider a one-period economy where households have preferences

$$U(c, l) = \ln c + \gamma \ln l$$

over consumption c and leisure l. Consumers face the budget constraint

$$c + \phi P = w(h - l)$$

where w is the wage rate, h is the household's endowment of hours, P is the amount of pollution in the economy and $\phi < 1$ household expenditure per unit of pollution (e.g., otherwise unnecessary air and water filters). Pollution is proportional to the total production in the economy by a factor $\pi < 1$, or

$$P = \pi Y$$

Firms produce output Y using a linear production technology that only uses labor:

$$Y = F(N) = N, \quad N = h - l$$

3a. Write out the optimization problem of the household and producer. Characterize the competitive equilibrium allocations for consumption and leisure (c^*, l^*) by stating the first-order conditions of the household and producer.

[Hint: Remember that households choose their optimal consumption/leisure bundle "as if" their labor supply has no effect on pollution. That means, substitute in the equation for pollution after you take first order conditions, not before.]

3b. Solve explicitly for the equilibrium level of leisure l^* as a function of (h, γ, ϕ, π).

Now consider a benevolent Social Planner that optimally chooses consumption and leisure to maximize the household's utility subject to an aggregate resource constraint for the economy,

$$c = F(N) - \phi P$$

and the aggregate pollution constraint,

$$P = \pi Y = \pi F(N)$$

3c. Write out the optimization problem of the Social Planner, and then characterize the first-best allocations for consumption and leisure (c^{SP}, l^{SP}) by stating the first-order conditions.

[Hint: The Social Planner takes into account that the household's labor supply has an effect on pollution. That means, substitute in the equation for pollution before you take first order conditions, not after.]

3d. Solve explicitly for the socially efficient level of leisure l^{SP} as a function of (h, γ, ϕ, π). Compare l^* and l^{SP}. Which is larger? Why?

4   Problem Set 6, Problem 1

1a. Interpret the following equation: $u'(c_1) = \beta(1 + R)u'(c_2)$. What is the equation called?

1c. Suppose that there are two groups of consumers in the economy: one whose consumption behavior is explained by the equation above, another whose consumption behavior is explained by the following inequality: $u'(c_1) > \beta(1 + R)u'(c_2)$. What must be true about the second group of consumers? How is the effect of lump sum transfers different in this environment?