

1. Suppose there is a decrease in the wage rate. Answer the following questions from the point of view of a consumer that chooses consumption and leisure to maximize utility.

(a) (10 points) Illustrate the income and substitution effects for consumers' optimal choices for consumption and leisure.

(b) (5 points) Describe the economic intuition for the income and substitution effects.

2. (5 points) Suppose there is an increase in dividend income. Describe and illustrate the impact on consumers' optional choices for consumption, leisure, and labor supply.

3. Suppose the government collects a proportional tax  $\tau \in (0, 1)$  on labor income.
- (a) (5 points) Write down an equation for the consumers' budget line that includes the labor income tax. Graph the budget line and report the slope.
  
  - (b) (10 points) Suppose the government increases the labor income tax rate. Describe and illustrate the impact on utility maximizing choices for consumption and leisure. If substitution and income effects are work in opposite directions, assume that substitution effects dominate.
  
  - (c) (5 points) Suppose the government increases the labor income tax rate. Describe and illustrate the impact on *equilibrium* outcomes for wages, employment, and real GDP.
  
  - (d) (5 points) Given consumers' optimal choices, will the equilibrium result with a labor income tax be socially optimal? Why or why not?

4. Suppose the government collects a proportional tax on business profit at rate  $\tau \in (0, 1)$  (Hint: apply this tax rate to *both the revenue function and the cost function*).

(a) (5 points) Write down an equation for producers' after-tax profits.

(b) (10 points) Suppose the government increases the tax rate on business profits. Describe and illustrate the impact on producers' labor demand and production decisions.

(c) (5 points) Suppose the government increases the tax rate on business profits. Describe and illustrate the impact on *equilibrium* outcomes for wages, employment, and real GDP.

(d) (5 points) Do producers' optimal decisions result in a socially optimal outcome? Why or why not?

5. (10 points) Suppose there is an increase in government expenditures on national defense. Describe and illustrate the effect on the socially optimal outcomes (using a social planner framework) for consumption, leisure, labor demand, and production. Report also the effect on the marginal product of labor and consumer welfare.

6. (10 points) Suppose there is an increase in global energy prices that results businesses in being less productive with their existing resources. Describe and illustrate the effect on the socially optimal outcomes (using a social planner framework) for consumption, leisure, labor demand, and production. Report also the effect on the marginal product of labor and consumer welfare.

7. (10 points) Describe five of the nine conditions that will cause unregulated, competitive markets to be socially optimal. For each condition, describe a situation in which the condition may not hold.