

1. Suppose there is an increase in lump sum taxes.

(a) (8 points) Describe and illustrate the impact on consumers' optimal choices for consumption and leisure.

(b) (8 points) Describe and illustrate the impact on *equilibrium* outcomes for wages, employment, and real GDP.

(c) (8 points) Given consumers' optimal choices, will the equilibrium result with a labor income tax be socially optimal? Why or why not?

2. Suppose the government collects a proportional tax $\tau \in (0, 1)$ on labor income.
- (a) (4 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) (8 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) (8 points) Compare the impact on consumption and leisure from the increase in labor income tax in this problem and the increase in the lump-sum tax in the previous problem. Explain why they are different.
- (d) (8 points) Given consumers' optimal choices, will the equilibrium result with a labor income tax be socially optimal? Why or why not?

3. Suppose the government collects a proportional tax on business profit at rate $\tau \in (0, 1)$. Answer the following questions from the point of view of a producer that chooses labor demand to maximize profits.

(a) (4 points) Write down an equation for producers after-tax profits.

(b) (8 points) Suppose the government increases the tax rate on business profits. Describe and illustrate the impact on producers' labor demand and production decisions.

(c) (8 points) Do producers optimal decisions result in a socially optimal outcome? Why or why not?

4. President Bernie Sanders has just signed the Free College Education for Everyone Act (FCEEA) which provides an additional \$500 billion in government expenditures to provide college education for everyone. It is paid for with an equivalent increase in taxes on business profits. Suppose as a result that the more educated workforce becomes more productive.

(a) (8 points) Describe and illustrate the impact of the policy on a one-period general equilibrium model with no distorting taxes or market failures. Include in your description the impact on real GDP, employment, consumption, leisure, wages, and total welfare. Some of these endogenous variables will be indeterminate.

(b) (8 points) Do you agree or disagree with the policy? Use results from the model analysis above to inform your answer.

5. (12 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.