

Exercises – Part B (i.e. After Midterm Exam)

I. Lecture V: Political Economy

1. Major League Baseball uses what is known as a 5-3-1 system to vote for the Most Valuable Player (MVP) in each league. Each voter gets to vote for three different players they consider worthy of the award. Their first place candidate gets 5 points, their second place candidate gets 3 points, and their third place candidate gets 1 point. Points are then added up across all voters, and the player with the most total points wins the award. Suppose there are three voters—Neyer, Law, and Philips – and five potential candidates for the award – Alex, David, Raffy, Manny, and Mario. The table below shows how each voter ranks the candidates. Raffy is embroiled in a substance abuse scandal. The “guilty” or “innocent” verdict will come out the day before voting, and a guilty verdict will ban him from MVP voting.

Rank	Neyer	Law	Philips
Best	David	David	Raffy
Second Best	Alex	Alex	Alex
Third Best	Raffy	Raffy	Manny
Fourth Best	Manny	Manny	Mario
Fifth Best	Mario	Mario	David

2. Stratmann (1995) documented a condition of “logrolling” in Congress, in which members of Congress trade votes on one bill for votes on another. Is logrolling efficient, or should it be banned? Explain.
3. When energy companies want to raise the rates they charge to their customers, they must first argue their case at a public hearing before a regulatory body. How does the free rider problem explain why energy companies are usually successful in getting permission to raise their rates?
4. Alfie, Bill, and Coco each value police protection differently. Alfie’s demand for the public good is $Q = 55 - 5P$, Bill’s demand is $Q = 80 - 4P$, and Coco’s demand is $Q = 100 - 10P$. If the marginal cost of providing police protection is \$13.50, what is the socially optimal level of police provision? Under Lindahl pricing, what share of the tax burden would each of the three people pay?
5. Carrboro has three equal-size groups of people: (1) Type A people consistently prefer more police protection to less; (2) Type B people prefer high levels of police protection to low levels, and they prefer low levels to medium levels; (3) Type C people most prefer medium levels to low levels, which they in turn prefer by a modest amount to high levels.

II. Lecture VI: State and Local Government Expenditures

6. The (identical) citizens of Boomtown have \$2 million to spend on either park maintenance or private goods. Each unit of park maintenance costs \$10,000.
 - a. Graph Boomtown’s budget constraint.

- b. Suppose that Boomtown chooses to purchase 100 units of park maintenance. Draw the town's indifference curve for this choice.
 - c. Now suppose that the state government decides to subsidize Boomtown's purchase of park maintenance by providing the town with one unit of maintenance for every two units the town purchases. Draw the new budget constraint. Will Boomtown purchase more or fewer units of park maintenance? Will Boomtown purchase more or fewer units of the private good? Illustrate your answer, and explain
7. Why does the Tiebout model solve the problems with preference revelation that are present with Lindahl pricing?
 8. Some have argued that diversity in communities and schools leads to positive externalities. What implications does this view have for the efficiency of a Tiebout equilibrium? What implications does it have for government policy?
 9. Think about two public goods—public schools and food assistance for needy families. Consider the implications of the Tiebout model. Which of the goods is more efficiently provided locally? Which is more efficiently provided centrally? Explain.

III. Lecture VII: Social Insurance

10. Suppose that you have a job paying \$50,000 per year. With a 5% probability, next year your wage will be reduced to \$20,000 for the year.
 - a. What is your expected income next year?
 - b. Suppose that you could insure yourself against the risk of reduced consumption next year. What would the actuarially fair insurance premium be?
11. The problem of adverse selection in insurance markets means that it is generally a bad deal for companies to offer insurance at the same price for all potential customers. Why then do we observe some insurance companies (such as those selling "trip insurance" that refunds money to people who purchase trips that they are unable to take) do exactly this?
12. Why does the government mandate individuals to purchase their own insurance in some cases—such as automobile liability insurance—but directly provide insurance to people in other situations— such as health insurance?
13. Currently, in order to receive workers' compensation, a claimant's injury claims must be verified by a physician of the claimant's choosing. Suppose that the workers' compensation policy changed so that only government-assigned physicians could verify injury claims. What is likely to happen to the rate of reported on-the-job injury? Explain.
14. There are two types of drivers on the road today. Speed Racers have a 5% chance of causing an accident per year, while Low Riders have a 1% chance of causing an accident per year. There are the same number of Speed Racers as there are Low Riders. The cost of an accident is \$12,000.
 - a. Suppose an insurance company knows with certainty each driver's type. What premium would the insurance company charge each type of driver?
 - b. Now suppose that there is asymmetric information, so the insurance company does not know with certainty each driver's type. Would insurance be sold if:

- i. Drivers self-reported their types to the insurance company?
 - ii. No information at all is known about individual driver's types?
- If you are uncertain whether insurance would be sold, explain why.

15. Your utility function is $U = 5 \log(2C)$, where C is the amount of consumption that you have in any given period. Your income is \$40,000 per year and there is a 2% chance that you will be involved in a catastrophic accident that will cost you \$30,000 next year.
- a. What is your expected utility?
 - b. Calculate an actuarially fair insurance premium. What would your expected utility be were you to purchase the actuarially fair insurance premium?
 - c. What is the most that you would be willing to pay for insurance, given your utility function?

IV. Lecture VII: Social Security

16. The government of Westlovakia has just reformed its social security system. This reform changed two aspects of the system: (1) it abolished the actuarial reduction for early retirement, and (2) it reduced the payroll tax by half for workers who continued to work beyond the early retirement age. Would the average retirement age for Westlovakian workers increase or decrease in response to these two changes, or can't you tell? Explain your answer.
17. What are the political and economic ramifications of investing a large part of the Social Security trust fund in the stock market, as has been recently proposed?
18. Lalaland is an extremely stable country with 200,000 residents, half of whom are young workers and half of whom are retirees. At the end of each "year," the 100,000 retirees die, the 100,000 young workers retire, and 100,000 new young workers are born. Workers earn a total of \$5,000 for the year. Lalaland operates a pay-as-you-go social security system, where each current worker is taxed \$2,500, and the revenue collected is used to pay a \$2,500 pension to each retiree. The neighboring country, Gogovia, is larger and more dynamic. Gogovia has an active stock market that Lalalandians could invest in and earn a 10% rate of return. It also has an active banking sector, which will gladly lend the Lalalandian government money, charging them 10% interest per year. Lalaland is considering moving to a system of personal accounts, where each Lalalander would take her \$2,500 and invest it in Gogovian markets (and earn a much higher rate of return!). The government would borrow \$250 million ($\$2,500 \times 100,000$) from Gogovian bankers to pay for current retirees. It would then tax retirees each year by just enough to pay the interest on this debt. Would this new system be better or worse for Lalaland.
19. For each of the reforms in the following list, briefly discuss the pros and cons of the reform, paying attention in particular to efficiency implications (through potential behavioral responses to the change) and equity implications (who wins and who loses). (Note that all reforms are intended to save the system money, so you do not need to list this as a benefit.)
- a. Increase the number of years used to calculate benefits from 35 to 40.
 - b. Reduce benefits for beneficiaries with high asset levels (wealth).
 - c. Add new state and local government workers to the pool of covered workers (i.e., they pay payroll taxes now and receive benefits when they are old).

- d. Gradually increase the normal retirement age (NRA) from 66 to 70 (under current laws, the NRA will gradually rise to 67 by 2022; the proposal is to speed up this process so the NRA will be 70 by 2022).

20. Consider an individual that lives for two periods. This individual has preferences over consumption and leisure in periods 1 and 2, given by:

$$U = u(c_1, l) + \beta u(c_2, 1); \beta \in (0, 1) \quad (1)$$

$$\text{where: } u(c, l) = \ln c + \phi \ln l; \phi > 0 \quad (2)$$

β is the time discount factor

c_t is consumption in period t ; $t \in \{1, 2\}$

l_t is in period 2; $t \in \{1, 2\}$

The individual works for a fraction h of her total available time in the first period for a nominal wage rate W and devotes her total available time to leisure in the second period. That is

$$l_1 = 1 - h \quad (3)$$

$$l_2 = 1 \quad (4)$$

The budget constraints facing her in each period are:

$$P_1 c_1 + S = (1 - \tau) W h \quad (5)$$

$$P_2 c_2 = (1 + i) S + B \quad (6)$$

where: P_t is the price of the consumption good in period t ; $t \in \{1, 2\}$

S is her savings during the first period

τ is the payroll tax rate

i is the nominal interest rate

B is the social security benefit the individual receives in the second period

Suppose that the individual chooses consumption in periods 1 and 2 and her fraction of time devoted to work in period 1 so as to maximize her utility in (1), subject to her budget constraints in (5) and (6) and the time constraints in (3) and (4).

- a. Characterize her choices for c_1 , c_2 , h and her real savings, $s = \frac{S}{P_2}$
- b. Show that her real savings are reduced with the payroll tax, τ and the real social security benefit, $b = \frac{B}{P_2}$.
- c. Explain the economic reasons behind the effects in (b).
- d. How your answers in (b) will change, if:

$$b = (1 + r) \tau w \quad (7)$$

where:

$$w = \frac{W}{P_1} \text{ is the real wage rate}$$

$$1 + r = \frac{1 + i}{1 + \pi} \approx 1 + i - \pi \text{ is the (gross) real interest rate}$$

$$\text{and } \pi = \frac{P_2 - P_1}{P_1} \text{ is the inflation rate}$$

- e. Based on your answers in (b) and (d) what can you say about the role of such a social security system if:

$$b < (1+r) \tau w \quad (8)$$

(Hint: Before finding the individual's optimal choices in (a), convert the budget constraints in real terms, by dividing through by the corresponding price level.)

V. Lecture IX: TAXATION

21. Why do most analysts assume that payroll taxes in the United States are borne by workers rather than by employers?
22. The demand for rutabagas is $Q = 2,000 - 100P$, and the supply of rutabagas is $Q = 2100 - 1200P$. Who bears the *statutory* incidence of a \$2 per unit tax on the sale of rutabagas? Who bears the *economic* incidence of this tax?
23. The demand for rutabagas is still $Q = 2,000 - 100P$, and the supply is still $Q = 2100 - 1200P$, as in Question 2. Governor Sloop decides that instead of imposing the \$2 sales tax described in Question 2, the government will instead force stores to pay the tax directly. What will happen to the "sticker price" on rutabagas? How will the size of the consumer tax burden change?
24. The demand for football tickets is $Q = 360 - 10P$, and the supply of football tickets is $Q = 20P$. Calculate the gross price paid by consumers after a per-ticket tax of \$4. Calculate the after-tax price received by ticket sellers.
25. The elasticity of demand for maracas is -2.0 , and the elasticity of supply is 3.0 . How much will the price of maracas change with a per-unit tax of \$2? Who bears the larger burden of the tax, consumers or producers?
26. Massive Products, Inc., is a monopolist whose cost of production is given by $10Q - 1Q^2$ (so its marginal cost curve—equivalently, its inverse supply curve—is given by $10 - 2Q$). Demand for Massive Products' massive products is $Q = 200 - 2P$.
 - a. What price will the monopolist charge, and what profits will the monopolist earn? What will the consumer surplus be?
 - b. How will the monopolist's price and profits change if a tax of \$15 per unit is imposed on the buyers of the product?
 - c. What is the deadweight burden of the tax?
27. The market demand for super-sticky glue is $Q = 5240 - 6P$ and the market supply is $Q = 60 + 14P$.
 - a. Calculate the deadweight loss of a tax of \$4 per unit levied on producers of super-sticky glue.
 - b. How does deadweight loss change if the tax is levied on consumers of super-sticky glue?
28. Luxury goods often have much higher elasticities of demand than do goods purchased by a broad base of people. Why, then, are governments more likely to tax luxuries than these "staple" goods?

29. What is the theoretical justification for the Laffer curve? Basing your view on the empirical evidence described in the text, should the United States raise or lower its tax rates in order to increase tax revenues? Explain.
30. The demand for snorkels in Berhama is given by $Q_S = 500 - 2P_S$, and the supply of snorkels in Berhama is given by $Q_S = 200 + 1.4P_S$. The demand for kayaks is given by $Q_K = 650 - 2.6P_K$, and the supply of kayaks is given by $Q_K = 50 + 1.5P_K$. Both goods are currently untaxed, but the government of Berhama needs to raise \$5,000 (to finance a new lighthouse) by taxing snorkels and kayaks. What tax should it levy on each of the two goods?