14.41 Public Finance & Public Policy
Final Exam
Wednesday, December 18th, 2019

Last Name (Please Print): _____

First Name: _____

Kerberos ID: _____

MIT ID number: _____

Instructions. Please read carefully
This exam has a total of **180 points**. You will have **180 minutes** to complete this exam. This is a closed book exam. Blank pages marked as ungraded may be used for scrap work - do not write final answers on those sheets as they will NOT be graded. You are not allowed to discuss the exam before receiving the grade. ALL EXAM SHEETS MUST BE TURNED IN.

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1 True/False/Uncertain (36 points)

For each of the statements below evaluate whether they are true, false or uncertain. Provide brief explanations.

1. (4 points) If individual preferences for a public good are single-peaked, then the median voter theorem tell us that majority voting leads to the efficient level of provision of the public good.

2. (4 points) The donut hole on Medicare part D is an efficient way of dealing with moral hazard concerns in health insurance.

3. (4 points) The Tiebout model tells us that education should be provided and funded by local governments.

4. (4 points) A negative externality of smoking comes from the fact that it damages the health of the smoker.

5. (4 points) We know from basic principles of tax incidence that the statutory burden of payroll taxes is irrelevant, that is, there would be no real economic consequences from shifting the statutory burden from employers to employees or vice-versa.

6. (4 points) Assuming a competitive labor market, the wage rate is the appropriate measure to value driving time saved.

7. (4 points) Government intervention in the credit market for student loans for higher education has led to a potentially unsustainable burden of student debt on recent graduates. This large debt burden is not a problem because it reflects optimal financial investments by young people in their education.

8. (4 points) Governmental procedures for the evaluation of the budgetary impacts of public policy usually take into account a limited time window, from five to ten years. As a result, legislators are sometimes able to manipulate these rules. A stark example is the introduction of Roth IRAs, which had large budgetary costs further in the future.

9. (4 points) Empirical evidence suggests that unemployed workers in the US are a lot more likely to exit unemployment the week that UI benefits end, than in any earlier week. This is, by itself, definitive evidence of moral hazard.

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2 Short essay questions (20 points)

1. **Child care taxes (10 points)**

   Comment on the advantages and disadvantages of taxing the child care services that are provided by the child's own family. Be sure to evaluate both efficiency and redistributive consequences.

2. **Contingent valuation methods (10 points)**

   Comment on the pros and cons of using contingent valuation methods compared to revealed preferences approaches.

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3 Health Insurance (44 points)

MIT has made an agreement with the insurance company Yellow Cross Yellow Shield of Massachusetts to provide full coverage health insurance contracts for their employees and students. Assume that the market for insurance is perfectly competitive.

MIT has provided Yellow Cross with anonymized data where one can see the distribution of past medical expenses of their employees and students, when they did not have an insurance plan. Yellow Cross recognizes in the data that some people visit doctors very often, while others visit them very sparsely.

In particular there are two types of employees and students, and each type accounts for half of the population. The first type has a probability of visiting the doctor of $p_H = 0.5$ and the other type has a probability of $p_L = 0.1$. A visit to the doctor costs 5000 dollars, and the full coverage plan covers it fully.

Further, assume that all employees and students have the same expected utility function, that is, without insurance their utility is:

$$U = -p(W - L)^{-1} - (1 - p)(W)^{-1}$$

where p is the probability of suffering a health event that calls for medical attention (that is, p_H for the high risk type, and p_L for the low risk type). W is their initial wealth and L is how much they spend if have a health issue and must see the doctor. If they sign up for the insurance plan they have to pay insurance premiums, regardless of whether they use medical services or not. Assume everyone has a initial wealth of $W = \$10000$ and a medical visit costs $L = \$5000$.

1. Assume the insurance company can observe the types of students and employees (high risk and low risk).

   (a) (2 points) Calculate the actuarially fair price for full insurance for each type of student/employee.

   (b) (2 points) Calculate the expected utility for each type, under the full insurance contract. Which types will buy insurance and why?

2. Assume now that the insurance company cannot observe the types, and therefore has to charge the same price for the full insurance contract.

   (a) (5 points) At what price does the insurance company break even?

   (b) (5 points) What is each type's expected utility now? Assuming the government is utilitarian (the social welfare function is the sum of each individual utility function) what happened to social welfare relative to the situation where types could be observed?

3. (5 points) Consider now that the insurance company could also offer different contracts other than full insurance. Intuitively, without doing any math, explain why the insurance company would want to offer an additional contract. Describe what this contract would look like.

4. (5 points) Suppose MIT decides to subsidize health insurance. Why would MIT want or not want to do that? What would be the minimal subsidy that generates an efficient provision of full coverage health insurance contracts?

5. Now the company has carefully decided on the price, and it is offering only the full insurance contract. The company has noticed that everyone's insurance claims have risen considerably relative to what was observed in the data set they received, when no one had insurance.

   (a) (4 points) How could you set up an empirical strategy, using the data the insurance firm has now, to see what effect the new contract has on medical spending?

(b) (4 points) Based on past evidence, what do you expect from your empirical results? How do you expect health insurance to affect health care utilization and health outcomes?

6. (a) (4 points) What are some ways that MIT could regulate health care contracts to better deal with adverse selection?

(b) (4 points) What could MIT do to take care of moral hazard concerns?

(c) (4 points) How do policies that are designed to deal with adverse selection and moral hazard interact?

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4 Taxation on labor supply and savings (40 points)

Individuals in Neverland live for two periods and leave no bequests. They work for a wage w, consume and save (at an interest rate r) in the first period and consume in the second period. Each individual has a utility function given by:

$$U = c_1 + \beta ln(c_2) - \frac{2}{3}L^{3/2}$$

where $c_1 > 0$ is consumption of period 1, $c_2 > 0$ is consumption of period 2 and $L > 0$ is labor. $\beta \in [0, 1]$ is a preference parameter. Assume that wages are high enough so that you don't have to worry about consumption being negative.

1. (2 points) Write down the intertemporal budget constraint of each individual.

2. (a) (2 points) Write down the maximization problem of each individual.

   (b) (4 points) Compute consumption for each period and labor supply.

3. (a) (2 points) What happens to hours of work when wages go up? Explain the intuition.

   (b) (4 points) What is the elasticity of labor supply? How does this number relate to the empirical evidence on labor supply elasticities?

4. (a) (2 points) Compute savings.

   (b) (2 points) What happens to savings when interest rates go up? Why? Explain in terms of income and substitution effects?

(c) (4 points) What does your finding imply for the effectiveness of tax subsidies to retirement savings? What is the available evidence on tax subsidies versus other tools to increase retirement savings?

5. (a) (4 points) Considering the results that you found in parts 3 and 4, what does this imply about the optimal tax on labor versus savings? How does this relate to the existing taxation of labor and savings in the US today?

(b) (4 points) What are the arguments in favor of the relative balance of taxation on savings and labor in the US today? What are the arguments against that relative balance?

6. Now suppose the government implements a social security program aimed at increasing the overall savings in the economy. The program is financed by a tax τ on labor in the first period, and it provides a flat cash transfer T to each household in the second period.

   (a) (3 points) How will this impact labor supply? Explain intuitively and solve. Assume that wages are high enough so that you don't have to worry about consumption being negative.

   (b) (3 points) How will this impact savings? Explain intuitively and solve.

(c) (4 points) How do these effects compare to the empirical evidence on the impacts of the Social Security program?

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5 Taxes and Externalities (40 points)

In Jersey city, individuals consume only two beverages, beer and orange juice. The local government raises its revenues through separate excise taxes on these two beverages, t_b and t_j. The beverages each cost \$1 before tax. So the tax levels and tax rates are the same (e.g. a 50 cent tax is a 50% tax).

1. (3 points) The mayor has hired some econometricians that have estimated that individual demand for beer follows the following formula: $B = \alpha \cdot (p_B)^{-\beta}$, while the demand for orange juice is given by: $J = \gamma \cdot (p_J)^{-\delta}$, where B is the amount beer consumed, and J is the amount of orange juice consumed. p_A and p_J are the final consumer prices that include excise taxes t_B and t_J Prices are measured in dollars per liters. Compute elasticities of demand for these two goods.

2. (3 points) The econometricians, without estimating it, said that the supplies of orange juice and beer in Jersey city are basically perfectly elastic. Comment on why this assumption may or may not be reasonable.

3. (5 points) The mayor asks for your advice on the ratio of optimal taxes on beer and juice. Compute that ratio and explain to the mayor which market would have higher taxes and why. *Ignore externalities in this question, and assume supply is perfectly elastic.*

4. (a) (4 points) The mayor of Jersey City hires an economist who mentions that alcohol has negative externalities because its consumption increases the number of accidents and decreases the productivity of not just the workers who consume it but also their co-workers. Each additional liter of consumption of alcohol is responsible, on average, for accidents and other harms costing around one thousand dollars and occurring with a probability of 0.05%. How should the presence of the externality impact the ratio of optimal taxes across these goods? Explain intuitively and solve for the new optimal tax ratio.

(b) (6 points) When the mayor was about to enact the corrective taxation on top of the tax rates you computed before, she realized that she would raise too much revenues, in excess of the amount she needs to raise. She also wonders whether the ratio of the taxes she found before was right. Are her worries well grounded? What should be t_B as a function of t_J, elasticities, and the externalities? Explain.

5. (6 points) The citizens of Jersey City, outraged with the tax reform the mayor has enacted, decide to hold a series of referendums over different tax plans. Suppose preferences for alcohol and orange juice are perfectly negatively correlated in the population, there is just a small fraction of the population who are heavy consumers of alcohol, and more than half the population does not consume alcohol in any measure. What is the likely outcome of the votes? What else could happen in this process?

6. Another economist has noticed that most alcohol that is consumed in Jersey City comes from local breweries, and therefore it is unreasonable to assume that the supply of alcohol is perfectly inelastic. She has estimated elasticity of supply of alcohol in Jersey City is actually 0.5. Local breweries use land, capital and labor as inputs in their productive process.

   (a) (3 points) If the government uses the taxes you found in question 4, would it raise more or less taxes than expected?

   (b) (3 points) Who will bear the burden of those taxes in the short, medium and long run?

   (c) (3 points) How your answer for (b) would change if there is a minimum wage for Jersey City workers? What if beer producers had previously lobbied for minimum beer prices?

(d) (3 points) How are tax burdens different if most of the beer consumed in Jersey City is not produced in Jersey City itself but in the nearby city of Newark?

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