



**Stockholm
University**

Department of Economics

Course name: Public Finance
Course code: EC2106
Type of exam: Main
Examiner: David Seim
Number of credits: 7,5 hp
Date of exam: January 10th, 2020
Examination time: 09.00-12.00 (3 hours)
Aids: No aids are allowed.

Write your identification number on each answer sheet (the number stated in the upper right hand corner on your exam cover).

Start each new question on a new answer sheet.

Explain notions/concepts and symbols. If you think that a question is vaguely formulated, specify the conditions used for solving it. Only legible exams will be marked.

The exam consists of 4 questions. 100 points in total. Each question is worth 25 points, 100 points in total. For the grade E 45 points are required, for D 50 points, C 60 points, B 75 points and A 90 points.

Your results will be made available on your Ladok account (www.student.ladok.se) within 15 working days from the date of the examination.

Good luck!



Question 1. True / False / Uncertain (25 points, 5 points per question)

Explain your answer in **five sentences or fewer**. Your grade depends entirely on the substance of the justification, not on whether you are correct in writing "True" or "False".

- a) Income inequality in the US has been roughly constant in level over the past 40 years and there is thus no cause for alarm.
- b) According to labor supply theory, a decrease in the income taxes should increase labor supply.
- c) In the basic economic model with perfect competition, the free market equilibrium with no government intervention maximizes total economic surplus and hence is the most socially desirable outcome.
- d) If supply is relatively more elastic, demand bears the burden of a tax.
- e) Letting third-parties report tax statements to the Tax Authority increases tax evasion.

Question 2. Labor income taxation (25 points)

Let all individuals have the same utility function over consumption and labor given by:

$$U(c, l) = c - \frac{l^2}{2}$$

where c represents consumption and l represents hours of labor. Suppose the only income that individuals have is from labor income, and that they work at an hourly wage w which is taxed at rate τ_0 .

- a) Write down and draw the budget constraint faced by the individual.
- b) Solve for the individual's optimal labor supply as a function of the wage w and the tax rate τ_0 .
- c) Show that the tax rate that maximizes government revenue is $\tau_0^*=0.5$.
- d) Suppose the government uses all the collected revenue to give people universal basic income (an experiment recently implemented in Finland), that is, a lump-sum transfer $T>0$ to each individual. How is the individual's optimal labor supply affected? Discuss income and substitution effects, and draw their new budget constraint.
- e) Suppose now that individuals face different wage rates, w . To support redistribution, the government reforms the tax schedule by imposing tax progressivity so that τ_1 is the marginal tax rate facing individuals with earnings above a threshold z^* and $\tau_0 < \tau_1$. Draw the new budget set.
- f) Show graphically how this affects individuals' choices. Explain how progressivity can help uncover an elasticity of earnings with respect to the net-of-tax rate, $(1 - \tau)$.

Question 3. Social insurance (25 points)

Suppose individuals have utility function given by



$$U(c) = \sqrt{c}.$$

Individuals earn a wage w when employed and have no earnings when unemployed. The probability of being unemployed is p .

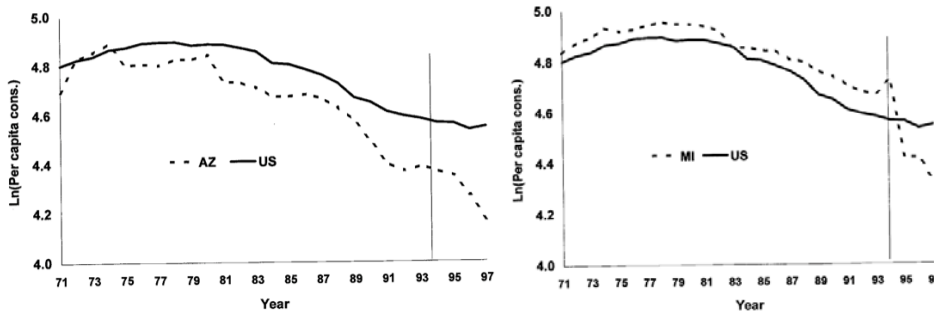
- a) Write down the individual’s expected utility.
- b) Suppose an insurance company offers unemployment insurance at an actuarially fair rate (insurance company makes zero profit). How much insurance would individuals buy (no need for calculation)?
- c) Present the previous graphically, making sure to label the axes correctly.
- d) When individuals have their own, unobservable to private insurers and to the government, probability of unemployment, p_i , the government may need to intervene in the insurance market. Explain why.

Let us now assume that the government intervenes and provides unemployment insurance benefits b to the unemployed. This is financed by a payroll tax t paid by the employed.

- e) Write down the government’s constraint for a balanced budget and individuals expected utility as a function of p , w and b .
- f) When the likelihood of being unemployed depends positively on the generosity of UI benefits, should the government provide full or partial insurance? Explain.

Q4. Empirical application: Evans, Ringel and Stech (1999): "Tobacco taxes and public policy to discourage smoking" ask how prices on cigarettes are influenced by tobacco taxes.

- a) Explain the research design employed in the paper. Present the key assumptions.



- b) The two graphs above present a visual test of the underlying assumptions. Are they fulfilled?

TABLE 2
OLS Estimates, Retail Price Model: Tobacco Institute Data

Independent variable	Average state retail price, 1985–1996		Net retail price in Tennessee, 1970–1994	
	Nominal (1)	Real (2)	Nominal (3)	Real (4)
Nominal/real tax	1.01 (0.04)	0.92 (0.04)		
Nominal/real wholesale price			1.07 (0.02)	0.86 (0.04)
R^2	0.972	0.933	0.989	0.963
Observations	612	612	25	25

c) This table shows the basic effects. Interpret the first column. Explain what it means.