

# Problem 5.2

Olivier Kooi

University of Chicago

October 2021

## Question a

- Question: What can you say about the partial derivatives of the indirect utility function?

Next Slide

## Question a

- Indirect utility:

$$v(t, r; h) \equiv \max u((1 - t)hn + r, n)$$

- Applying the envelope theorem yields:

$$\frac{\partial v}{\partial \tau} = -\frac{\partial u}{\partial c}hn \quad \text{and} \quad \frac{\partial v}{\partial r} = \frac{\partial u}{\partial c}$$

Next Slide

## Question b

- Question: Accounting for the government budget constraint, what can you say about the effect of the tax rate  $\tau$  on the lump-sum transfer  $r$ ? How is it related to the equilibrium average income  $Y$ ?

Next Slide

## Question b

- Budget balance implies:

$$r + g = (1 - \tau) \int h(q)n(q)dq$$

- Totally differentiating yields

$$dr = (Y(\tau) + \tau \frac{\partial Y}{\partial \tau})d\tau$$

- Rewriting yields

$$\frac{dr}{d\tau} = Y(\tau)(1 + \epsilon_{\tau}^y)$$

- $\epsilon_{\tau}^y$  is the elasticity of taxable income

## Question c

- Question: Beginning from a tax rate of  $t$ , it is proposed to increase the tax rate to  $t+dt$ , recognizing that such a change will affect the amount of redistribution  $r$ . Will all consumers agree about the desirability of the proposal? Evaluate desirability using  $v$ .

Next Slide

## Question c

- Let us totally differentiate the indirect utility function

$$dv = \frac{\partial u}{\partial c}adr - \left(\frac{\partial u}{\partial c}hn\right)d\tau$$

- Substitute in the total derivate of the government budget constraint to obtain:

$$\frac{dv}{d\tau} = Y(\tau)\frac{\partial u}{\partial c}(1 + \epsilon_{\tau}^y - s(q))$$

- Where  $s(q) = \frac{h(q)n(q)}{Y}$
- Individual benefits from redistribution when  $1 + \epsilon_{\tau}^y > s(q)$
- That individual needs to earn sufficiently much below average income
- The "sufficiently much" part is driven by the response of the tax base, i.e the laffer curve

Next Slide

## Question d

- Question: Would a person of average income ever prefer a tax increase? What about the median person ( $q = \frac{1}{2}$ )?

Next Slide

## Question d

- The key condition was

$$1 + \epsilon_{\tau}^y > s(q)$$

- This condition is never satisfied for those earning average income  $s(q) = 1$
- This condition can be satisfied by the median income if it is sufficiently much lower than the average
- Sufficiently much depends on the elasticity of the local tax base

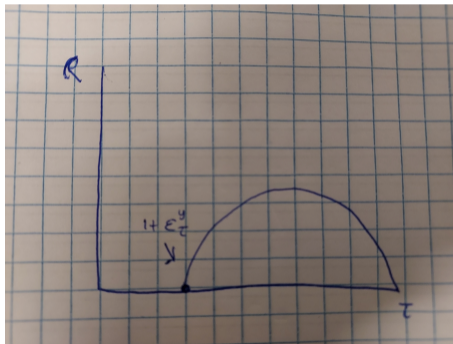
Next Slide

## Question e

- It is possible that everyone prefers no redistribution ( $r = 0$ )?

## Question e

- The poorest individual does not favor redistribution if  $1 + \epsilon_{\tau}^Y < s_I(0)$
- This happens if an increase in taxes incurs a sufficient amount of marginal deadweight losses compared to any redistributionary gains.
- Key insight:  $r = 0$  does not imply  $\tau = 0$



## Question f

- Question: What features of this model determine the size of the coalition that prefers  $t+dt$  to  $t$ ? Does your finding have anything to say about James Madison's assertion that *"democracies...have ever been found incompatible with personal security or the rights of property."*

Next Slide

## Question f

- Madison realized that the median voter is poorer than the average.
- If one lives in a world without deadweight losses they would always want to redistribute
- However with behavioral responses we obtain  $1 + \epsilon_T^Y - s_Y(q)$
- There are also some other considerations
  - ▶ The state is an important institution in safeguarding personal security and property rights. States run on taxes
  - ▶ Property rights expand the economic pie, to poor benefit from that more if there are a system of redistribution.
  - ▶ Many European welfare states arguably developed to prevent communist revolutions. I.e. to combat threats to property rights
  - ▶ By making the system work for many people redistribution through taxes might substitute from redistribution through expropriation

Next Slide

## Question f

- As stated: sufficiently poor people do like income redistribution
- Is income redistribution inconsistent with personal security or rights of property?
- If one thinks right of property are violated through taxation directly: yes, mechanically
- There are also some other considerations
  - ▶ The state is an important institution in safeguarding personal security and property rights. States run on taxes
  - ▶ Property rights expand the economic pie, to poor benefit from that more if there are a system of redistribution.
  - ▶ Many european welfare states arguably developed to prevent communist revolutions. I.e to combat threats to property rights
  - ▶ By making the system work for many people redistribution through taxes might substitute from redistribution through expropriation

Next Slide