Guidelines for 2. exam in ECON3620/4620, spring 2020

The exam consists of three problems, each counts 1/3. Because of this being a open book exam, the problems asked are somewhat different from previous exams.

Problem 1

i. Tax incidence was introduced under the discussion of the corporate tax (Lecture 6), and this question should be straightforwardly answered. Tax incidence can also be discussed graphically, of course.

Here are some excerpts from Lecture 6:

Demand for good x is $D(q)$ decreases with $q = p + t$

and supply for good x is $S(p)$ increases with p

Equilibrium condition: $Q = S(p) = D(p + t)$

Change in dt generates change in dp so that equilibrium holds

$S(p + dp) = D(p + dp + dt)$

and $S(p)+S'(p)dp= D(p)+D'(p)(dp + dt)$

Since $S(p)= D(p)$ we have $S'(p)dp= D'(p)(dp + dt)$

$$\frac{dp}{dt} = \frac{D'(p)}{S'(p) - D'(p)}$$

If $q/D = \frac{(p+t)}{D} \rightarrow \frac{dp}{dt} = \frac{\eta_D}{\frac{p+t}{p}\eta_S - \eta_D}$

$$\eta_D = \frac{D'(p)(dp + dt)(p + t)}{D(p + t)} \wedge \eta_S = \frac{S'(p)p}{S(p)}$$

If we evaluate at $t = 0$, we get $\frac{dp}{dt} = \frac{\eta_D}{\eta_S - \eta_D}$

Special cases:

1. Inelastic supply, $\eta_S = 0$, $\frac{dp}{dt} = -1$: The consumer price is unaffected, "producers bear the tax"

2. Inelastic demand, $\eta_D = 0$, $\frac{dp}{dt} = 0$: The produced price is unaffected,

consumer prices rise by the full amount, "consumers bear the tax"

3. Infinitely elastic supply, $\eta_S = \infty$, $\frac{dp}{dt} = 0$: The consumer price adjusts by the full amount,

"consumers bear the tax"

ii. Mirrlees reasoning with an extension to Atkinson-Stiglitz is relevant

- A (high-skilled) mimicker is better off pretending to choosing the income level of the low-skilled type
  - Still higher wage than the low-skilled type

  - But can work less (enjoy more leisure)
- Introducing a tax on consumption means that tax on earning is reduced
  - Revenue neutrality
- Assume that the high-skilled mimicker consumes more of the good
  - A larger tax burden on the high-skilled
- But only the smaller burden of the low-skilled type is compensated
  - The mimicker is under-compensated and is made worse off
    - Mimicking has become less attractive
    - Self-selection constrained relaxed

Here is how the Atkinson-Stiglitz theorem is presented in one of the lectures

- Introduce non-linear commodity taxes in a Mirrleesian framework
  - Non-linear tax on earnings is the alternative
  - All consumers have preferences that are separable between consumption and labor
  - Identical utility functions of consumption
  - No market imperfections
- Differental commodity taxation cannot accomplish any distinction between those with different earnings abilities
  - An additional distortion is added
- In a two-period model differential consumption taxation is the same as capital taxation
  - Thus, this suggests that taxation of capital income should not supplement an optimally set tax on labor (earnings)
  - Is this type of taxation (Mirrlees) realistic?

and

Taxation of consumption when there are three types consuming good k

x_1^k, x_2^k, x_m^k, where m is the mimicker

We introduce at tax on the good, which means that we can reduce the tax on on earnings, T

Then because of agens already in optimum, we have simply (envelope theorem)

$$x_1^k dt^k = -dT_1$$

$$x_2^k dt^k = -dT_2$$

$$x_m^k dt^k = -dT_1$$

Only if there is difference between x_m^k and x_1^k a tax on consumption can be justifed

$$\left(x_m^k - x_1^k\right) dt^k = -dT_1$$

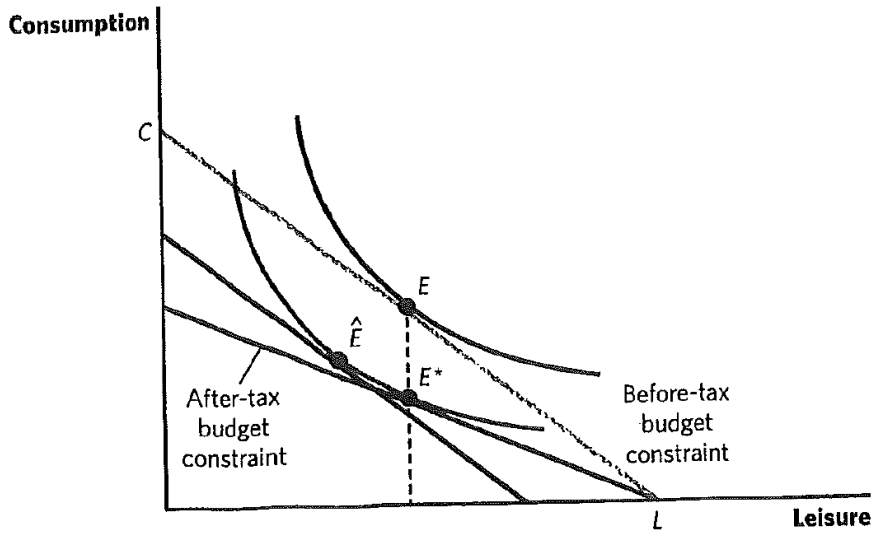
But Atkinson-Stiglitz theorem states that no extra information is achievable:

identical consumption function, separability between consumption and labor

Problem 2

A separate lecture is allocated to the means testing example, should be straightforwardly answered

i. Labour supply effects can graphically be discussed in a graph like the one beloe. The mian point is that child benefit results in a income effect, whereas means testing also involves a substitution effect (in addition to an income effects.



In the lecture on means testing the students can find this:

Uncompensated vs compensated labour supply elasticities

- Uncompensated (Marshallian) labour supply function $h^u(w, I)$, where w is the wage rate, I is the non-labour income
  - Uncompensated elasticity of labour supply: $\epsilon^u = (w/h)\partial h/\partial w$
  - % Change in hours when wage ↑ by 1 %
- Compensated (Hicksian) labour supply function $h^c(w, u)$, where w is the wage rate, u is utility
  - Compensated elasticity of labour supply: $\epsilon^c = (w/h)\partial h^c/\partial w > 0$
- Income effect parameter: $\eta = w\partial h/\partial I \leq 0$: \$ increase in earnings if person receives \$1 extra in non-labour income
- Slutsky equation: $\partial h/\partial w = \partial h^c/\partial w + h\partial h/\partial I \Rightarrow \epsilon^u = \epsilon^c + \eta$

ii. Very open question that can be illustrated by results from the lecture on the trade-off between redistribution and efficiency (labour supply. Could also mention child poverty, poverty traps, stigma.

Problem 3.

i. The Atkinson-Stiglitz reasoning is relevant here too. But could preferably mention the results of Chamley-Judd

A krone today is worth $(1+r)^T$ after T years

An investor is subject to tax rate, τ, on 22 percent on capital income (Norway, 2020)

Also assuming an interest rate, r, of 3%

Then an investor can convert one unit of consumption today into

$(1+(1-\tau)r)^T$ units after T years

Hence the tax wedge, $1-\frac{(1+(1-\tau)r)^T}{(1+r)^T}$ grows with T

After 10 years the tax wedge is 6.3% but after 40 years it is 22.7%

In order to avoid taxation to grow to infinity as the horizon extends, the optimal tax rate must go to zero

See also the paper by Diamond and Saez (2011) in the Additional material

ii. In the lecture on the dual income tax there is a long sequence on how income shifting will result in more dividends paid out. Thus it is the part of the graph showing increasing dividends before the reform which is important here. Also perhaps mentioning that there was a tax on dividends also in 2001.