Written Exam at the Department of Economics summer school 2019

Tax Policy

Final Exam

16 August 2019

(3-hour closed book exam)

Answers only in English.

This exam question consists of 5 pages in total (excluding the front page)

Falling ill during the exam

If you fall ill during an examination at Peter Bangs Vej, you must:

- contact an invigilator who will show you how to register and submit a blank exam paper.
- leave the examination.
- contact your GP and submit a medical report to the Faculty of Social Sciences no later than five (5) days from the date of the exam.

Be careful not to cheat at exams!

You cheat at an exam, if during the exam, you:

- Make use of exam aids that are not allowed
- Communicate with or otherwise receive help from other people
- Copy other people's texts without making use of quotation marks and source referencing, so that it may appear to be your own text
- Use the ideas or thoughts of others without making use of source referencing, so it may appear to be your own idea or your thoughts
- Or if you otherwise violate the rules that apply to the exam

Exam - Tax Policy - Summer 2019

Read carefully before you start:

The exam consists of three parts each with a number of subquestions. You are supposed to answer ALL questions and subquestions. Good luck!

Part 1: Tax salience

(1A) **Q**: Describe the field experiment conducted by Chetty, Looney and Kroft (2009) to investigate whether tax salience matters for consumer choices? **Q**: Describe the results with reference to the table attached in Annex A and explain the identifying assumptions underlying the difference-in-differences estimator (DiD) and the difference-in-difference-in-differences estimator (DiDiD) respectively

(1B) Chetty, Looney and Kroft (2009) also show theoretically that the salience of a tax matters for its efficiency properties. **Q**: Derive a formula for the excess burden of a commodity tax that incorporates the salience parameter θ under the simplifying assumption that preferences are quasi-linear ("no income effects") [*hint: base the derivation on a figure showing demand as a function of price changes, x(p,0), and demand as a function of tax changes, x(*p_0*,*t^N*)]*. **Q**: Explain intuitively why $\theta = 0$ implies that the tax has no excess burden when there are no income effeects, but has an excess burden when there are income effects.

Part 2: Income taxation

Following Emmanuel Saez (2002), consider an economy with I types of individuals: $i \in \{1, 2...I\}$. An individual of type i may choose to work in occupation i and earn $w_i > 0$ or not to work at all and earn nothing, $w_0 = 0$. Occupations are ranked such that $w_1 < ... < w_i < ... < w_I$. Each level of earnings is associated with a tax payment T_i. An individual of type i thus consumes $c_i = w_i - T_i$ if working and $c_0 = -T_0$ if not working (note: tax payments may be negative, in which case they are really government transfers). As a reduced-form model of the individuals' labor supply decision, we simply assume that an endogenous fraction $h_i = h_i(c_i - c_0)$ of the population chooses to work in occupation i. The first derivative of h_i is positive such that the labor supply in a each occupation is increasing in the consumption gain from working relative to not working. The government's preferences for redistribution are summarized by a vector of marginal social welfare weights $\{g_0, g_1, ..., g_I\}$ where g_i is the social value of a dollar to an individual in occupation i in terms of the value of public funds.

(2A) Consider a small increase in the tax to be paid by individuals of type i from T_i to $T_i + dT_i$. **Q:** Derive the mechanical revenue effect ("ΔM"), the behavioral revenue effect ("ΔB") and the social welfare cost ("ΔW") of this policy change and provide an interpretation of each of these expressions [*hint: it is useful to state* ΔB *in terms of the participation elasticity* $\eta_i \equiv \partial h_i / \partial (c_i - c_0) \cdot . (c_i - c_0)/h_i$]. **Q:** Discuss whether these three terms capture all the changes in welfare induced by the marginal tax change or whether the labor supply responses (some individuals of type i stop working in response to the increase in T_i) has an additional direct effect on utility.

(2B) **Q**: Combine the expressions derived under question (2A) to show that the following equation characterizes the optimal tax on income in occuption i:

$$\frac{T_i - T_0}{c_i - c_0} = \frac{1}{\eta_i}(1 - g_i)$$

Q: Describe what the equation implies for optimal taxation at the lowest earnings levels [*hint: use that the marginal social welfare weight averaged across all individuals in the economy equals one in any optimum,* $\sum_i g_i h_i = 1$]. **Q**: Provide an intuitive explanation for this result.

(2C) Emmanuel Saez (2002) adds an intensive margin of the labor supply decision to the model and simulates the optimal tax schedule as shown in the figure in Annex B. **Q**: Explain the role of the participation elasticity η in shaping the optimal tax schedule and how the simulation results can be used to motivate policies like the *Earned Income Tax Credit* (EITC) in the United States. In a different paper, Emmanuel Saez (2010) uses bunching methods to study behavioral responses to the EITC. **Q**: Briefly describe the empirical findings for wage earners and discuss what they imply for the tax sensitivity of the labor supply. **Q**: Discuss whether these results inform the choice of η in the simulation of the optimal tax schedule.

Part 3: Shorter questions

(3A) **Q:** Derive a formula for the incidence of a mandated benefit when w is the salary rate, t is the cost to the employers of providing the benefit and α is the workers' valuation of the benefit (e.g. they value it at cost when $\alpha = 1$ and they do not value it at all when $\alpha = 0$). [*hint: you may simplify the formula by evaluating at an initial equilibrium with no mandated benefits, t=0*]. **Q:** Explain intuitively who bears the economic burden of the mandated benefit when $\alpha = 1$ and $\alpha = 0$ respectively and illustrate the two polar cases in a simple diagram.

(3B) **Q:** Explain the identification strategy employed by Danny Yagan (2015) to estimate the effect of dividend taxes on corporate investment. **Q:** Discuss whether the results are consistent with the old and the new view of firm taxation.

(3C) Consider an economy with one individual who has preferences over consumption C and labor L given by:

$$U(C, L) = C - v(L)$$

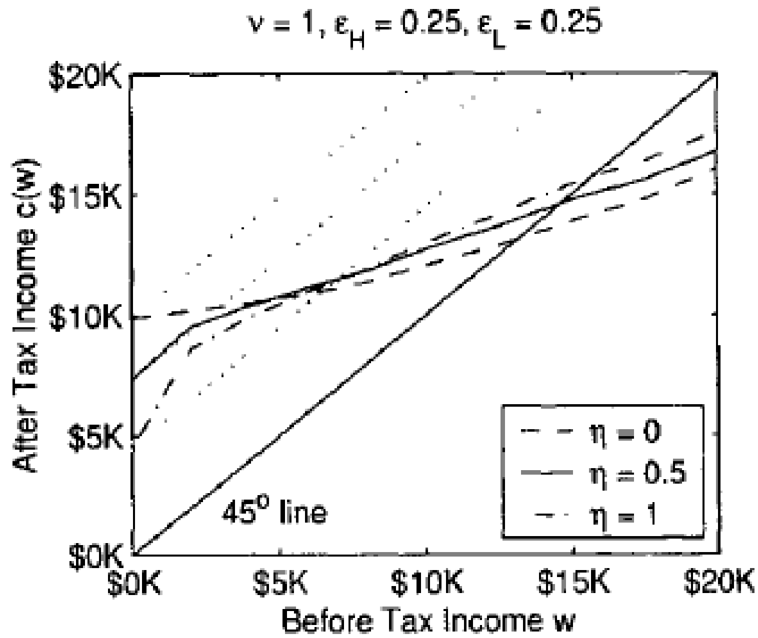
where $v(\cdot)$ is a convex function that captures the disutility of work. The government levies a constant marginal tax rate t on labor income. Consumption equals after-tax labor income $(1 - t)wL$ where w is the wage rate. Government revenue amounts to $R = twL$. **Q:** Show that a marginal increase in the tax rate reduces the individual's labor supply. **Q:** Compute how a marginal increase in the tax rate affects government revenue, R, and individual utility,U, respectively. **Q:** Identify the marginal excess burden and provide an intuitive explanation.

Annex A

Table 3— Effect of Posting Tax-Inclusive Prices: *DDD* Analysis of Mean Quantity Sold

Period	Control categories	Treated categories	Difference
Panel A. Treatment store			
Baseline (2005:1–2006:6)	26.48 (0.22) [5,510]	25.17 (0.37) [754]	−1.31 (0.43) [6,264]
Experiment (2006:8–2006:10)	27.32 (0.87) [285]	23.87 (1.02) [39]	−3.45 (0.64) [324]
Difference over time	0.84 (0.75) [5,795]	−1.30 (0.92) [793]	$DD_{TS} = -2.14$ (0.68) [6,588]
Panel B. Control stores			
Baseline (2005:1–2006:6)	30.57 (0.24) [11,020]	27.94 (0.30) [1,508]	-2.63 (0.32) [12,528]
Experiment (2006:8–2006:10)	30.76 (0.72) [570]	28.19 (1.06) [78]	−2.57 (1.09) [648]
Difference over time	0.19 (0.64) [11,590]	0.25 (0.92) [1,586]	$DD_{CS} = 0.06$ (0.95) [13,176]
DDD Estimate			−2.20 (0.59) [19,764]

Annex B


ν = 1, ε_H = 0.25, ε_L = 0.25
$20K
$15K
$10K
$5K
$0K
$0K
$5K
$10K
$15K
$20K
After Tax Income c(w)
Before Tax Income w
45° line
η = 0
η = 0.5
η = 1