ECON4620 Spring 2026 – Exam

1 True/False Questions (20%)

You need to explain your answer, just a true false or "it depends" statement without any arguments, is not rewarded.

(a) The altruistic model of intergenerational transfers implies that children may receive different amounts of transfers from their parents.

Correct. In the altruistic model parents care not only about their own well-being but also about the well-being of their children. The altruistic model predicts different transfer amounts across children, favoring those who are worse off.

(b) Prior to 2006 in Norway, owners of small businesses found it profitable to switch to widely held firm organization.

Yes, this is correct. Then they avoid rules that tried to split income into labor vs capital components, the "split model", and gain access to more favorable dividend taxation. Labor income was taxed at high progressive rates, whereas capital income (including dividends) was taxed at a much lower flat rate

(c) In labor supply, the substitution effect is larger than the income effect.

It is not generally true that the substitution effect is larger, sometimes it is,

but we cannot rule out that the income effect dominates. It is an empirical question which of the two effects are largest.

(d) Equivalent variation (EV) is a more comprehensive measure of change in well-being, due to for example a tax reform, than change in income.

Yes, this is correct. EV is a more comprehensive measure of changes in well-being than income change as it captures overall effects on utility, not just effects on income. EV uses the base (pre-change) prices and asks what income change at those prices would be equivalent to the proposed change in terms of its impact on utility.

2 Optimal Commodity Taxation (40%)

Suppose the government must raise a given amount of revenue using commodity taxes.

Answer the following, with increasing depth:

a) Briefly describe the government's optimization problem in the theory of optimal commodity taxation.

b) Explain the intuition behind the Ramsey rule or inverse-elasticity logic.

c) Why does the theory emphasize compensated rather than uncompensated demand elasticities?

d) Explain why, in a simple efficiency-oriented framework, goods with less elastic demand may face higher tax rates. Relate your answer to the marginal efficiency cost of raising revenue.

e) Discuss at least three reasons why actual policy may deviate from the simple inverse-elasticity prescription.

f) Reflect briefly on whether differentiated commodity taxes are always desirable. In your answer, discuss equity concerns and the role of other tax instruments, such as labor income taxation.

Guideline

Part a

- The government chooses commodity tax rates to minimize welfare loss (excess burden)
- Subject to a revenue requirement and behavioral responses in demand
- A strong answer may frame this explicitly as a constrained optimization problem

Part b

- The Ramsey intuition is to tax more heavily where behavior changes less
- This tends to equalize the marginal efficiency cost of raising revenue across goods
- The objective is to minimize distortion for a given revenue target, not simply to tax necessities

Part c

- Compensated elasticities isolate substitution effects
- Welfare costs of taxation arise from substitution distortions rather than pure income effects

Part d

- When demand is less elastic, a given tax raises revenue with a smaller reduction in quantity
- Therefore, the marginal efficiency cost (deadweight loss per unit of revenue) is lower, other things equal

Part e

- Equity and distributional concerns
- Administrative simplicity and implementation costs
- Information problems: elasticities are difficult to estimate
- Political or legal constraints

- Externalities that justify deviations from Ramsey logic

Part f

- Differentiated taxation is not always desirable
- Uniform taxation may be preferred for administrative or distributional reasons
- The availability of other instruments (e.g. labor income taxation) may reduce the gains from differentiation
- A strong answer recognizes the trade-off between efficiency, equity, and feasibility

What a Strong Answer Should Show

- A clear formulation of the Ramsey problem as a constrained optimization problem
- Correct use of inverse-elasticity intuition and marginal efficiency cost reasoning
- Understanding of why compensated elasticities are central in theory
- Awareness of equity and implementation constraints in practice
- A balanced and critical final reflection rather than a mechanical application of rules

3 Elasticity of Taxable Income (40%)

A key parameter in public economics is the elasticity of taxable income with respect to the net-of-tax rate (ETI), which is defined as $\varepsilon = \frac{1-\tau}{z}\frac{\partial z}{\partial 1-\tau}$.

a) Explain what ε measures and why it is important in public economics.

- ε measures the percentage change in taxable income z in response to a 1% increase in the net-of-tax rate $(1-\tau)$.
- It is important because it is a sufficient statistic for the deadweight loss of income taxation: a higher ETI implies that taxpayers re-

spond more strongly to taxation, leading to larger efficiency costs, regardless of whether the responses are real or reporting in nature.

b) We can differentiate between real responses and reporting responses when estimating ε. Explain what is meant by a "real response" and a "reporting response", and refer to types of legal and illegal reporting responses.

- *Real responses* are actual changes in economic behavior in response to taxation, such as changes in hours worked, effort, or occupational choice.
- *Reporting responses* are changes in how income is reported without any underlying change in real economic activity. The two main types are:
  - *Tax avoidance*: legal reduction of reported taxable income, e.g., through deductions or income shifting
  - *Tax evasion*: illegal underreporting of income, e.g., failing to declare cash income or overreporting of deductions.

c) Kleven and Schultz (2014) find consistently higher ETI estimates for self-employed than for wage earners (see rows 2–4 in Table 1). Provide one possible mechanism for this result using your answer from (b).

Self-employed individuals likely have more opportunities for both real and reporting responses.

- *Real responses*: self-employed can more flexibly adjust their earned income compared to wage-earners who may not be able to adjust their hours worked or hourly pay in their employment contract.
- *Tax evasion*: unlike wage earners, whose income is third-party reported by employers, the self-employed largely report their own income. This makes it easier to underreport earnings when tax rates rise, generating a larger ETI via the evasion channel.
- *Tax avoidance*: self-employed taxpayers may have greater scope for avoiding taxes, e.g., because they have more deductible expenses or because they can reclassify labor income as capital income.

(One of the three mechanisms is sufficient.)

d) A common approach for estimating the ETI is using a simulated instrumental variable approach, where the mechanical change in τ is used as an instrument for the observed change in τ. Explain (i) what "mechanical change" means in this context and (ii) why we need an instrument for the observed change in τ.

   (i) The *mechanical change* in τ is the change in marginal tax rate that would result *solely* from the tax reform, holding each taxpayer's income fixed at its base-year level. It isolates the mechanical revenue effect from behavioral responses.

   (ii) We need an instrument because the *observed change* in τ is endogenous: as taxpayers change their income in response to the reform, they may move into a different tax bracket, changing their marginal rate. As a result, OLS estimates of ε are biased.

e) One concern when estimating the ETI is mean reversion. Explain what "mean reversion" means in this context and how it is typically addressed in ETI estimations. Which row(s) in Table 1 address this concern?

   Mean reversion refers to the tendency of taxpayers with temporarily high income in the base year to have lower income in subsequent years purely by chance, irrespective of any tax change. Since high-income earners face higher marginal tax rates, this creates a negative correlation between income growth and the net-of-tax rate, which biases the ETI estimate. It is typically addressed by including pre-reform income controls (e.g., log base-year income or splines thereof) in the regression. In Table 1, all rows 2–4 address this concern by adding different controls for base-year income.

f) Matikka (2018) uses changes in municipal income tax rates as an instrument for overall changes in marginal tax rates to estimate the ETI. What is the key characteristic of these municipal tax rates and why is this an advantage for the ETI estimation?

   The municipal tax rates are flat. A change in the municipal rate thus raises the marginal tax rate by the same amount for every taxpayer in the municipality, regardless of income level. This provides income-

independent variation in marginal tax rates. In the standard simulated instrumental variable approach, the mechanical tax change from a progressive reform is typically still correlated with base-year income. Flat municipal tax changes break this link: the instrument varies across municipalities and over time, but not across the income distribution.

Table 1: ETI estimates (Kleven and Schultz (2014), Tab. 3)

	Panel A. Wage earners		Panel B. Self-employed	
Socioeconomic controls	No	Yes	No	Yes
Pre-reform income controls				
(1) No pre-reform income controls	−0.203***	−0.191***	−0.171***	−0.155***
	(0.002)	(0.002)	(0.015)	(0.013)
(2) log base-year (period s) income	0.065***	0.060***	0.102***	0.095***
	(0.002)	(0.002)	(0.016)	(0.015)
(3) Splines of log base-year (period s) income	0.044***	0.042***	0.112***	0.100***
	(0.002)	(0.002)	(0.014)	(0.013)
(4) Splines of log $s-1$ income and log deviation between $s-1$ and s incomes	0.049***	0.046***	0.094***	0.090***
	(0.002)	(0.002)	(0.015)	(0.014)
Observations	29,568,870	29,568,870	1,646,270	1,646,270

Notes: The table shows elasticity estimates based on 2SLS regressions, where standard errors (shown in parentheses) are clustered by individual. The dependent variable in all specifications is the three-year growth rate in real wage earnings. The independent variable of interest is the three-year growth rate in the marginal net-of-tax rate, instrumented using the three-year growth rate in the simulated marginal net-of-tax rate under base-year behavior (i.e., mechanical tax variation from tax reforms). All elasticities in the table are based on specifications without income effects. Socioeconomic controls include labor market experience, experience squared, age, gender, marital status, number of kids aged 0–18 years, educational degree, industry, municipality, and local unemployment rate. All specifications also include base-year fixed effects. Regressions are weighted by labor income and restricts the sample to individuals with positive labor income (in addition to the sample restrictions described in Section III). "Splines" refer to a flexible piecewise linear functional form with ten components. Taxpayers close to kink points are defined as those who have an income within 5,000 DKK of the top kink, 3,000 DKK of the middle kink, or 2,000 DKK of the bottom kink.

***Significant at the 1 percent level

**Significant at the 5 percent level

*Significant at the 10 percent level.

(This is an extract from Table 3 in Kleven and Schultz (2014) with the original table notes, including only the columns for the broader sample definitions that comprise all taxpayers with positive income.)

References

Kleven, Henrik Jacobsen and Esben Anton Schultz (2014). "Estimating Taxable Income Responses Using Danish Tax Reforms". *American Economic Journal: Economic Policy* 6.4, 271–301. DOI: 10.1257/pol.6.4.271. URL: https://www.aeaweb.org/articles?id=10.1257/pol.6.4.271.

Matikka, Tuomas (2018). "Elasticity of Taxable Income: Evidence from Changes in Municipal Income Tax Rates in Finland". *The Scandinavian Journal of Economics* 120.3, 943–973. DOI: 10.1111/sjoe.12236. URL: https://onlinelibrary.wiley.com/doi/abs/10.1111/sjoe.12236.