

Written Exam at the Department of Economics winter 2016-17

Tax Policy

Final Exam

14 February 2017

(3-hour closed book exam)

Please note that the language used in your exam paper must correspond to the language for which you registered during exam registration.

This exam question consists of 3 pages in total

NB: If you fall ill during the actual examination at Peter Bangsvej, you must contact an invigilator in order to be registered as having fallen ill. Then you submit a blank exam paper and leave the examination. When you arrive home, you must contact your GP and submit a medical report to the Faculty of Social Sciences no later than seven (7) days from the date of the exam.

Exam - Tax Policy - Fall 2016 - RESIT

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: Commodity taxation

Consider an economy with n goods that have fixed producer prices normalized to 1 so that the consumer price on good j equals $q_j = 1 + t_j$. There is a single individual who is endowed with unearned income Z , faces a fixed wage rate w and maximizes utility $u(X_1, \dots, X_n, L)$ over the consumption of the n goods and the labor supply L subject to the budget constraint. Utility maximization yields demand functions $X_j(q, Z)$ and the indirect utility function $V(q, Z)$ where $q = (w, q_1, \dots, q_n)$. Define $\alpha = \partial V / \partial Z$ as the marginal utility of income. The government sets the n commodity tax rates so as to maximize $V(q, Z)$ subject to the constraint that the tax revenue equals an exogenous requirement T .

$$\sum_{j=1}^n t_j X_j(q, Z) = T$$

(1A) **Q:** Show that the optimal commodity tax system satisfies:

$$\frac{\lambda - \mu}{\lambda} = -\frac{\sum_j t_j S_{jk}}{X_k} \text{ for } k = 1, \dots, n \quad (1)$$

where λ is the social marginal value of government revenue, $\mu \equiv \alpha + \lambda(\sum_j t_j \partial X_j / \partial Z)$ is the social net marginal value of private income and S_{jk} is the first-derivative of the compensated demand for good j with respect to the consumer price on good k [**Hint:** use the Slutsky equation: $\partial X_j / \partial q_k = S_{jk} - X_k \partial X_j / \partial Z$ and Roy's identity: $\frac{\partial V}{\partial q_k} = -\alpha X_k$]. **Q:** Interpret equation (1), which is known as the Ramsey rule.

(1B) **Q:** Restate the "Ramsey rule" on the form of the "Inverse elasticity rule" while making the necessary assumptions [**Hint:** Use that $S_{jk} = S_{kj}$]. **Q:** Provide a brief discussion of the assumptions necessary to derive the "Inverse Elasticity Rule".

(1C) The Ramsey model implicitly assumes that the incidence of commodity taxes is entirely on consumers, but this assumption does not necessarily hold empirically. Doyle and Samphanthrak (2008) estimate the incidence of a particular commodity tax, the gasoline tax, by studying the repeal and subsequent reinstatement of gasoline taxes in the U.S. states of Indiana and Illinois **Q:** Explain the empirical strategy and the identifying assumption of the paper with your own words. **Q:** Does this empirical strategy identify the short-term or long-term incidence of the gasoline tax and which of the two is more relevant for the optimal tax problem modelled in the Ramsey problem?

Part 2: Income taxation

Consider an economy with two types of individuals: a fraction γ of disabled individuals who cannot work and a fraction $1 - \gamma$ of workers. The workers have different productive abilities and thus receive different wages in the labor market. Specifically, wages are distributed according to the density function $f(w)$. The government considers treating the two types differently in terms of taxes and transfers. Specifically, it considers a transfer of G_A to disabled individuals; a transfer of G_B to workers; and a constant marginal tax on earned income of t . All individuals have the same preferences represented by the utility function $U(C, L) = C - g(L)$ where C is consumption, L is the labor supply and $g(\cdot)$ is a strictly convex function normalized such that $g(0) = 0$. Individuals face the budget constraint $C = G_i + (1 - t)wL$ where $G_i = G_A$ for disabled individuals and $G_i = G_B$ for workers.

(2A) Assume that disability is immutable. **Q:** Solve the utility maximization problem of disabled individuals and workers respectively and derive their indirect utility functions. **Q:** Discuss verbally how the utility maximization problem would change if disability were not immutable (e.g. if disabled individuals could become able workers by going through painful training)

(2B) The government maximizes a standard social welfare function:

$$W = \gamma \Psi(V(\omega, G_A)) + (1 - \gamma) \int_{\underline{w}}^{\bar{w}} \Psi(V(\omega, G_B)) f(w) dw$$

under the budget constraint:

$$(1 - \gamma) \int_{\underline{w}}^{\bar{w}} twL(\omega) f(w) dw - \gamma G_A - (1 - \gamma) G_B \geq R$$

where $\Psi(\cdot)$ is a strictly concave function.

Assume that disability is costlessly verifiable **Q:** Show that $G_A > G_B$ and explain why a differentiated transfer is part of the optimal policy. **Q:** Discuss verbally how the government's problem would change if disability were not at all verifiable.

(2C) The problem studied above is an example of a "tagging" model **Q:** Formulate the general insight from models of "tagging" and explain the intuition. **Q:** Discuss whether it would be desirable to apply different tax schedules to men and women based on the general insights from "tagging" models (hint: assume for the sake of the argument that individuals do not form couples).

Part 3: Shorter questions

(3A) **Q:** Define the *excess burden* of a tax and illustrate in a simple diagram that describes the market for a single good **Q:** Derive a simple expression for the excess burden based on the diagram and discuss the factors that determine its size.

(3B) Johannesen and Zucman (2014) study a form of cooperation with tax havens that aims to limit offshore tax evasion **Q:** What does the cooperation consist in and what are the weaknesses inherent to this form of cooperation? **Q:** Explain the main findings of the study with reference to the 2 graphs in Annex A.

(3C) Yagan (2015) studies the impact of dividend taxation on investment and dividend payouts. **Q:** Explain how the results are identified and whether the identification strategy is robust to shocks that differ across firms with different characteristics (e.g. size and industry).

Annex A: Figures 5-6 from Johannesen and Zucman (2014)

