Written Exam for the B.Sc. or M.Sc. in Economics summer 2013

Public Finance

Final Exam

June 25, 2013

(3-hour closed book exam)

Please note that the language used in your exam paper must correspond to the language of the title for which you registered during exam registration. I.e. if you registered for the English title of the course, you must write your exam paper in English. Likewise, if you registered for the Danish title of the course or if you registered for the English title which was followed by "eksamen på dansk" in brackets, you must write your exam paper in Danish.

If you are in doubt about which title you registered for, please see the print of your exam registration from the students' self-service system.

You are supposed to answer ALL questions. The assignments (**1A**)–(**3C**) all carry the same weight in the assessment.

Part 1: Tax pressure (in Danish: Skattetryk)

Answer "yes" or "no" to each of the questions below, and provide an explanation for your answer.

(**1A**) Do two countries with the same tax pressure necessarily have the same total efficiency loss from taxation?

(**1B**) Does two countries with the same tax pressure necessarily have the same degree of redistribution?

(**1C**) Does the tax pressure vary with the business cycle in a country with a proportional tax system where all income is taxed at the same given rate τ?

Part 2: Social insurance

We consider a social planner that wishes to implement an unemployment insurance system for workers characterized by a tax t while working and an after-tax benefit level b when unemployed. The workers are identical but random events imply that each worker is either employed or unemployed in each period. The probability of becoming employed depends on the search effort level e chosen by the worker (before realization of the employment/unemployment shock), and we assume for simplicity that the employment probability is equal to e. The effort level e is private information of the worker and is unobservable to the social planner. A worker earns z when working and has no earnings when unemployed. The realized utility of a worker equals $u(c) - v(e)$, where $u(c)$ is a strictly concave function representing utility from consumption c (equal to income), while $v(e)$ is a strictly convex function representing disutility from effort e. Each worker chooses the effort level e that maximizes the expected utility

$$\Omega = e \cdot u(z - t) + (1 - e) u(b) - v(e). \tag{1}$$

The solution of the social planner has to obey the government budget constraint

$$e \cdot t - (1 - e) b \geq 0. \tag{2}$$

(**2A**) Describe the two concepts "adverse selection" and "moral hazard". Is the social planner facing a moral hazard problem or an adverse selection problem?

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(**2B**) Show that the optimal choice of effort level of each worker is characterized by

$$u\left(z-t\right)-u\left(b\right)=v'\left(e\right),\tag{3}$$

and provide and economic interpretation of this result.

The first-best allocation (corresponding to the social planner choosing not only t and b but also e) is characterized by

$$z-t=b\tag{4}$$

(**2C**) Provide an economic interpretation of (4). Demonstrate (or argue thoroughly) why it is impossible for the social planner to implement an unemployment insurance system characterized by (4) if e is unobservable to the social planner.

Without information of e, the social planner maximizes (1) subject to (2) and (3). The solution is (approximately) characterized by

$$\gamma\frac{\Delta c}{c}=\frac{\varepsilon}{e},\tag{5}$$

where γ is the coefficient of relative risk aversion, $\Delta c/c$ denotes the relative consumption loss if becoming unemployed, e is the employment rate, and ε is the elasticity of unemployment $(1-e)$ with respect to the benefit level (b).

(**2D**) Provide an economic interpretation of (5) and describe how the formula may provide guidance for practical policy making.

(**2E**) Describe the method used to empirically identify effects of unemployment insurance benefits on unemployment by Card, Chetty and Weber in their article in the Quarterly Journal of Economics in 2007. Describe also the empirical results illustrated below in Graph 1 and Graph 2, which are from the aforementioned article.
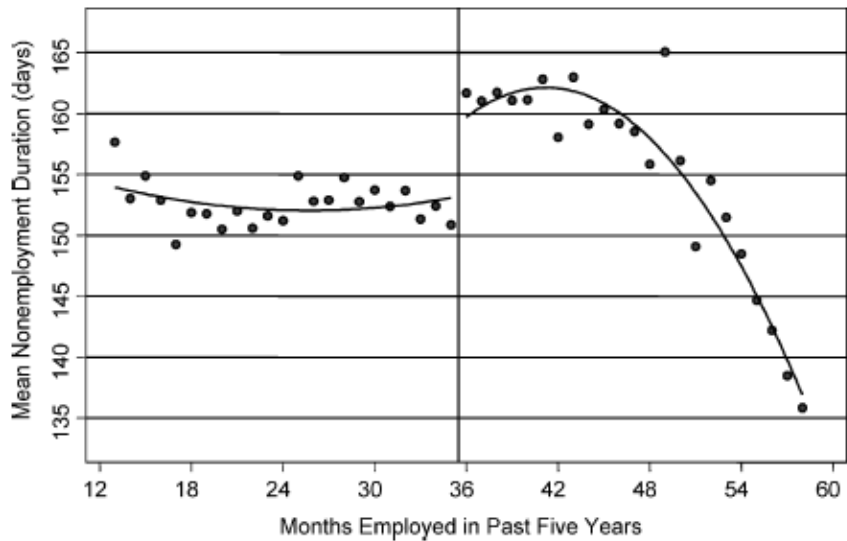
Graph 1

FIGURE VIIIa
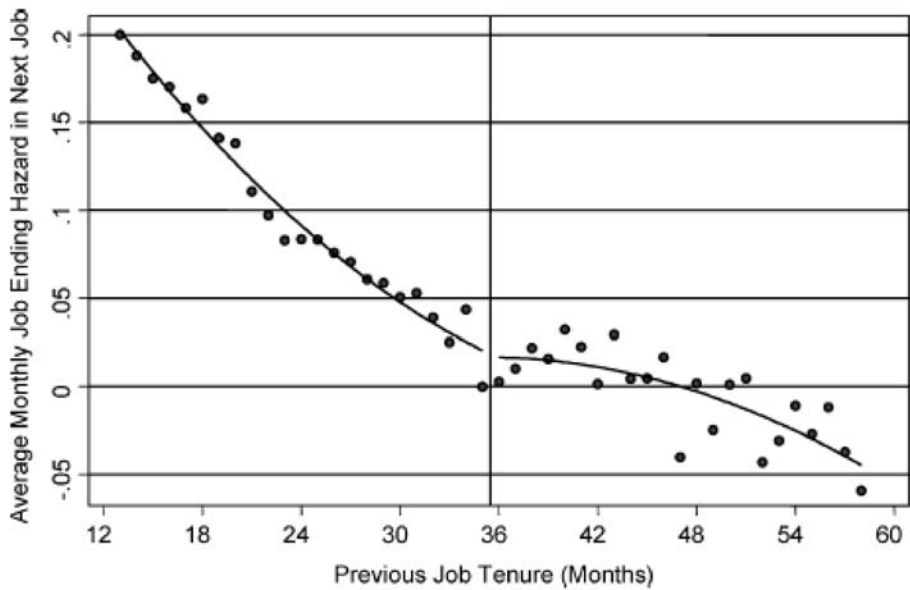Effect of Benefit Extension on Nonemployment Durations

Graph 2

FIGURE Xb
Effect of Severance Pay on Subsequent Job Duration

From Card, Chetty and Weber (2007)

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Part 3: Redistribution policy

Consider a country where policy makers wish to obtain an estimate of the elasticity of taxable income for high-income individuals, defined as individuals having income z above a certain threshold $\bar{z}$, implying that they are paying top tax. The effective marginal tax rate above $\bar{z}$ is equal to m_H, while individuals with income below $\bar{z}$ are facing a marginal tax rate of m_L.

3A) Provide a definition of the elasticity of taxable income.

3B) Would it be possible to identify empirically the elasticity of taxable income by estimating the equation

$$\ln(z_i) = \beta_0 + \beta_1 \ln(1 - m_i) + \varepsilon_i,$$

where z_i and m_i are the income and marginal tax rate, respectively, of each individual in a given year, while ε_i is an error term? Explain your answer.

Consider two other types of variation that may be exploited empirically:

(i) The country had previously a proportional tax system with tax rate m_L. A tax reform raised the marginal tax rate from m_L to m_H for income above $\bar{z}$. Data on individual income exists both before and after the tax reform.

(ii) The policy makers are willing to carry out a randomized experiment, assigning tax rates m_L and m_H to individuals randomly, in order to obtain an estimate of the elasticity of taxable income, but only for tax payers who currently have income above $\bar{z}$.

3C) Describe how you would exploit each of these two opportunities to estimate the elasticity of taxable income. Would you prefer (i) or (ii) if you had to choose? Explain why.