Public Economics

Final Exam, January 9, 2018 - 2 hours

The exam is 2 hours long and can be done either in French or English. ***No*** *document whatsoever is allowed.*

1 Questions (9 pts)

1. What are the rationales for capital taxation? (1 pt)
2. The modified golden rule is given by: $r^\star = \delta + \gamma \cdot g$.
   i) What is the meaning of a γ? (0.5 pt)
   ii) What is the implication of having $\delta > 0$? (0.5 pt)
3. To estimate the impact of air pollution on infant health, early studies would typically run the following OLS regression using cross-sectional data:

$$y_s = \alpha + \beta \cdot p_s + u_s$$

   where y_s is an infant health outcome (e.g. prematurity rate) in area s in a given year, p_s is the level of pollution in area s in the same year and u_s is the error term.
   i) Why is this approach likely to yield a biased estimate of the parameter of interest? (1 pt)
   ii) Suppose that measures of pollution levels and infant health outcomes in different areas were available in two different years. How could you improve on the previous estimation strategy? Can you think of a scenario under which this estimation strategy would still be invalid? (1 pt)
4. In the presence of labour supply responses along the extensive margin, are traditional welfare programmes with high phasing-out rates desirable? (2 pts)
5. What is a public good? Can public good be provided optimally by voluntary contributions? (1 pt)
6. Comment the sentence "VAT is usually paid by consumers". Is that belief supported by theory and empirical evidence? (2 pts)

2 The 2003 dividend tax cut in the U.S. (7 pts)

Part A: Theoretical framework (3 pts)

You, as a researcher, want to investigate theoretically the impact of dividend and corporate taxes. To answer this question, you develop a simple two period model with the following features.

Consider a firm that has initial cash holdings of X at the beginning of period 0. These cash holdings represent profits from past operations. The firm can raise additional funds by issuing equity (E).

The firm's manager can do two things with the firm's cash holdings: pay out dividends or invest the money in a project that yields revenue in the next period. Let I denote the level of investment and $D = X + E - I$ the firm's dividend payment in period 0. In period 1, the firm generates net profits of $f(I)$, where f is a strictly concave function. The firm then closes and returns its net-of-tax profits and principal to shareholders. The shareholders can also purchase a government bond that pays a fixed, untaxed interest rate of $r > 0$.

The firms' profits are subject to two types of taxes. First, the firm pays a corporate tax at rate t_c on its net profits in period 1, so that net-of-corporate-tax profits are $(1-t_c)f(I)$. Second, it pays a dividend tax at rate t_d on distributed profits in all periods. However, the principal invested by shareholders (E) is not subject to the dividend tax.

The manager's objective is to choose the level of equity issues and dividends (and investment) that maximize the value of the firm:

$$\max_{D,E} \; V = (1 - t_d)D - E + \frac{(1 - t_d)[(1 - t_c)f(X + E - D) + X - D] + E}{1 + r}$$

1) What are the net-of-tax payouts in period 0 and period 1? (0.5 pt) (hint: You don't need to solve any optimisation problem.)

2) Show that the firm will never issue equity and pay dividends simultaneously, i.e., never set $E > 0$ and $D > 0$ simultaneously. (0.5 pt)

Let's consider two types of firms. A cash-rich firm has retained profits X such that $(1 - t_c)f'(X) \leq r$, while a cash-constrained firm has retained profits X such that $(1 - t_c)f'(X) > r$.

3) Show that a cash rich firm will never issue equities and that the optimal choice of dividends satisfies the first order condition $(1 - t_c) \cdot f'(X - D^\star) = r$. Comment. (1 pt) (hint: Use the fact that a firm will never set $E > 0$ and $D > 0$ simultaneously by computing a) the marginal value of issuing equity when $D = 0$, b) by computing the marginal value of paying dividends when $E = 0$.)

In contrast with cash rich firms, cash-constrained firms will never pay dividends and their optimal choice of equities issues is given by:

$$E^\star = 0 \ \textit{if} \ (1 - t_d)(1 - t_c) \cdot f'(X) < r$$

$$(1 - t_d)(1 - t_c) \cdot f'(X + E^\star) = r \ \textit{if} \ (1 - t_d)(1 - t_c) \cdot f'(X) \geq r$$

4) What is the impact of the dividend tax and the corporate tax on the investment and dividend payments of cash rich firms? of cash-constrained firms? (1 pt)

Part B: Empirical estimation (4 pts)

Following the success of your theoretical model, the government asks you to estimate the impact of the dividend tax cut **implemented in 2003** and to assess whether it stimulated corporate investments. To do that, the government provides you cross-sectional data on U.S. corporate income tax returns for years 1996 to 2008.

5) One of your colleague (a theoretician economist) advise you to use the following regression specification:

$$INVESTMENT_{it} = \alpha_0 + \alpha_1 POST_t + \beta X_{i,t-2} + \varepsilon_{it}$$

where $INVESTMENT_{it}$ denotes scaled investment for firm i in a year t between 1998 and 2008, $POST_t$ denotes an indicator for year t being 2003 or later, $X_{i,t-2}$ denotes a vector of lagged firm controls. Scaled investment means that investment is divided by firm's tangible capital assets (expressed in $) averaged over the two preceding lags.

i) How does your colleague seem to interpret α_1? What would be the meaning of $\alpha_1 = 0.1$? (1 pt)

ii) Do you think the regression specification above is able to capture the causal relationship of the 2003 dividend tax cut on investments? Why? (0.5 pt)

6) Your dataset offers a decomposition of firms between C-corporations and S-corporations. C-corporations and S-corporations face similar corporate tax rates except that C-corporations are subject to dividend taxation while S-corporations are not.

i) What estimation strategy would you advocate to recover a causal estimate of the dividend tax cut on investments ? Report the regression specification. (1 pt)

ii) What is the identification assumption underlying this research design? (0.5 pt)

7) Your main result implies a precisely estimated elasticity of investment with respect to one minus the top statutory dividend tax rate of 0.00. What will you say to the government? Explain the reasoning by supporting your answer with the results of the theoretical framework. (1 pt)

3 Health insurance and genetic testing (4 pts)

Consider a country where the largest part of health insurance is provided by private insurers, e.g., the United States. Some health insurance companies would like to use genetic testing to have more information about the health status of their applications. Should the government allow them to do so?

Hint: You might want to consider two possible initial states for the insurance market before the introduction of genetic testing: (i) a separating equilibrium, (ii) a pooling equilibrium (enforced by a government mandate), and think about the following issues. Would genetic testing exacerbate or mitigate the problem of adverse selection in the health insurance market? Would it help or hurt those who have bad health prospects? Would it help or hurt those who have good health prospects?