

Exam - Tax Policy - Fall 2016

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: Firm taxation

(1A) Consider a firm with retained profits of X . At the beginning of period 0, the firm decides how many dividends to pay out to the shareholders, D , how much new equity to raise, E , and how much to invest, I . Investment generates profits of $f(I)$ in the course of period 0 where $f(\cdot)$ is a strictly concave function. The firm is liquidated at the beginning of period 1. At this stage, retained earnings of $X + f(I) - D$ are paid out to the shareholders as a dividend and E is returned as repayment of capital. Corporate profits are taxed at t^C and dividends are taxed at t^D . As an alternative to investing in the firm, shareholders can invest in bonds, which yield a tax free return of r . Assume that the firm's investment decision is designed to maximize firm value.

Q: Show how a change in the dividend tax affects firm investment and dividends under the new view of firm taxation and explain the result [*hint: you may assume that the firm finances marginal investment with retained earnings ($D > 0$) and does not raise new equity ($E = 0$)*] **Q:** How does a change in the dividend tax rate affect the value of the firm?

(1B) **Q:** Compare the tax treatment of C-corporations and S-corporations in the U.S. and explain how Yagan (2015) exploits the difference to estimate the effect of the dividend tax on corporate investment. Empirically, most large firms are C-corporations and most small firms are S-corporations. **Q:** Explain how Yagan (2015) addresses the concern that unobserved shocks to investment may correlate with firm size.

(1C) The results in Yagan (2015) are suggestive that dividend taxes do not affect investment outcomes. **Q:** Is this consistent with the new view of firm taxation? **Q:** Is it necessarily inconsistent with the old view?

Part 2: Income taxation

Consider an economy where the distribution of the individuals' pre-tax earnings is described by the cumulative distribution function $H(z)$ and the density function $h(z)$. Individuals have quasilinear preferences, which eliminates income effects of tax changes. The government has a preference for equality, in particular let $G(z)$ denote the average social welfare weight on individuals with income larger than z relative to the average social welfare weight across all individuals.

The government can implement a general non-linear income tax function $T(z)$. The marginal tax rate at a given income level z is thus given by $T'(z)$. Behavioral responses to taxation are captured by the elasticity of pre-tax earnings with respect to $1 - T'(z)$

$$e(z) = \frac{\partial z}{\partial 1 - T'(z)} \frac{1 - T'(z)}{z}$$

(2A) Consider a small increase in the marginal tax rate from $T'(z)$ to $T'(z) + \Delta\tau$ in the small income range between z and $z + \Delta z$. **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.

(2B) **Q:** Show that the optimal marginal tax rate at income level z is characterized by:

$$\frac{T'(z)}{1 - T'(z)} = \frac{1 - G(z)}{e(z)} \cdot \frac{1 - H(z)}{zh(z)}$$

Q: Explain the role of each element in the formula.

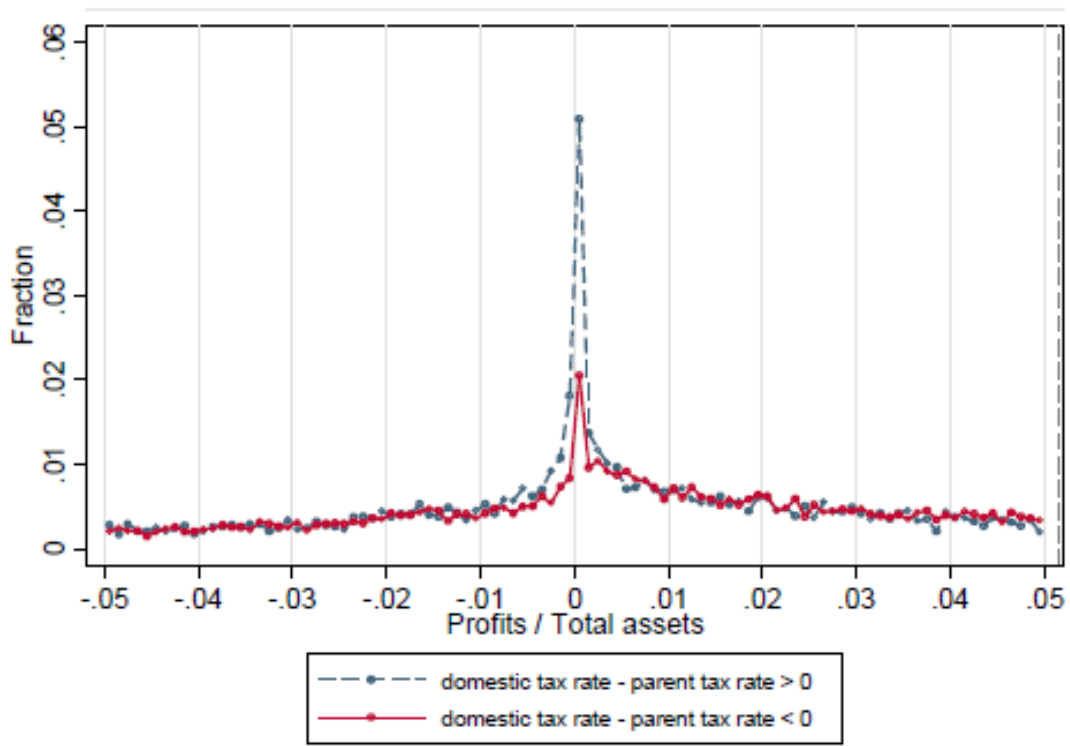
(2C) Saez (2010) develops a technique to estimating $e(z)$ empirically that relies on "bunching" of tax payers around the kinks of the tax schedule. **Q:** Explain why a kink in the tax schedule may create an excess mass of tax payers at the kink and how the amount of bunching can be used to make inference about the elasticity of taxable income.

Part 3: Shorter questions

(3A) Consider a simple model of the labor market where workers receive the wage w and a mandated benefit at cost t . The workers value the mandated benefit at αt . **Q:** Show algebraically how the cost of the mandated benefit t affects the equilibrium wage and how the result depends on the valuation of the mandated benefit α . **Q:** Discuss under what conditions mandated benefits can improve efficiency relative to tax financed benefits.

(3B) Johannesen, Tørsløv and Wier (2016) study tax avoidance by multinational firms. **Q:** Explain how the figure in Annex A is suggestive of aggressive tax avoidance in developing countries. **Q:** What are the limitations of the figure and how are they addressed in a regression framework?

(3C) Chetty, Looney and Croft (2009) study how the salience of sales taxes affects consumer choices in a controlled experiment. **Q:** Briefly account for the key features of the experimental set-up. **Q:** Explain the empirical strategy with reference to the table in Annex B and discuss whether the results are robust to shop-specific and product-specific shocks.



Annex A: Figure 1a from Johannesen, Tørsløv and Wier (2016)

TABLE 3—EFFECT OF POSTING TAX-INCLUSIVE PRICES: *DDD* ANALYSIS OF MEAN QUANTITY SOLD

Period	Control categories	Treated categories	Difference
<i>Panel A. Treatment store</i>			
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]
<i>Panel B. Control stores</i>			
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]
<i>DDD Estimate</i>			–2.20 (0.59) [19,764]

Annex B: Table 3 from Chetty, Looney and Croft (2009)