

6. General-interest politics

Problem 1: The Meltzer-Richard Model

Problem 1 [Chapter 6 / Exercise 1, P&T (2000)]

Consider an economy in which a proportional tax on labor income is used to finance lump-sum transfers to the citizens. Individual i 's preferences over consumption, c , and leisure, x , are described by

$$\omega^i = c^i - a(b - x^i)^2. \quad (1)$$

The private budget constraint is $c^i = (1 - \tau)l^i + f$, and the government budget constraint is $f = \tau l$. The individual is also subject to a time constraint $1 + e^i = l^i + x^i$. The individual productivity parameters e^i are distributed by a density function linearly decreasing from 2 at $e^i = 0$ to 0 at $e^i = 1$.

Problem 1: The Meltzer-Richard Model

- a) Compute each individual's labor supply as well as the total labor supply, given the tax rate. Compute the equilibrium tax level.
- b) Assume that only citizens with income above 0.05 are allowed to vote, which excludes approximately 10% of the lowest-income earners from the electorate. Compute the new equilibrium tax rate.
- c) Now suppose that 10% of the citizens of each income level were to retire and thus be moved to productivity $e^j = 0$. Compute the new equilibrium tax rate.
- d) Finally, assume that tax collection is costly, and that of any unit of taxes collected, a fraction $1 - \theta$ would be used to pay for the administration of tax collection. Compute the new equilibrium tax rate.

Problem 2: Pensions

Problem 2 [Chapter 6 / Exercise 2, P&T (2000)]

Consider the model of section 6.2. There are three generations: young, middle-aged, and old. The population grows at rate n . The government finances a pension scheme with lump-sum transfer f to the old generation with a proportional tax, τ , on labor. The government budget constraint is

$$f = \tau l^{iY} (1 + n)^2 + \tau l^{iM} (1 + n). \quad (2)$$

The subjective discount rate β equals the real interest rate ρ , and all individuals may save assets at the real interest rate. A young individual i 's lifetime utility from the pension scheme is

$$\omega^{iY} = U(c^{iY}) + \frac{U(c^{iM})}{(1 + \beta)} + \frac{c^{iO}}{(1 + \beta)^2} + V(x^{iY}) + \frac{V(x^{iM})}{(1 + \beta)}, \quad (3)$$

and a young individual's intertemporal budget constraint is

$$c^{iY} + \frac{c^{iM}}{(1 + \beta)} + \frac{c^{iO}}{(1 + \beta)^2} = l^{iY} (1 - \tau) + \frac{l^{iM} (1 - \tau)}{(1 + \beta)} + \frac{f}{(1 - \beta)^2}. \quad (4)$$

Problem 2: Pensions

- a) Solve for the individual's optimal consumption path and labor supply.
- b) What is the total present value of the pension scheme to a young person of productivity e^i ?

What is the pension scheme's net value to a young person of average productivity? How much larger is the net present value of an individual of productivity $e^m < e$ relative to that of an individual of average productivity? Describe how these two values relate to redistribution between and within generations.

Write down the equation describing the tax rate preferred by a young individual with productivity e^i and relate the terms in the expression to the above discussion.

Problem 2: Pensions

- c) Suppose that productivity is higher for middle-aged individuals than for young individuals. In particular, a young individual with productivity e^{iY} will achieve productivity

$$e^{iM} = e^{iY} + \frac{(1+n)(2+n)}{2+\beta} [\tau L(\tau^i) + L(\tau^i)] \quad (5)$$

when middle aged (τ^i is the tax rate preferred by the individual with productivity e^{iY}). Therefore, the share of young voters with productivity lower than e^{iY} equals the share of middle-aged voters with productivity lower than

$$e^{iY} + \frac{(1+n)(2+n)}{2+\beta} [\tau L(\tau) + L(\tau)]. \quad (6)$$

The distribution of productivities is $F(e^{iY})$ for the young. Show how the share of young and middle-aged voters who support higher taxes in equilibrium depends on n . Discuss how large a share of the young and middle-aged voters will support higher taxes in equilibrium when $n = 0$ and when n becomes very large.

Problem 2: Pensions

- d) Suppose that voting rights are extended to a generation of very young individuals who have no labor income and receive no pension transfers. These individuals will be young in the next period and know what their productivity parameters will be. Find the tax rate that an individual with productivity e^{iY} in this group would prefer. Describe how the productivity of the new median voter will differ from the productivity of the median voter before the extension of voting rights. Discuss the equilibrium tax rate.

Problem 2: Pensions

- e) Suppose that voting rights are curtailed to exclude people with very low incomes. The people excluded from the franchise exist in equal proportion among the young, middle-aged, and old. Describe how the equilibrium tax rate would change. Discuss the relation to within- and between-generations redistribution.