Public Economics

Lecture 6: Taxation of capital

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1. Introduction
2. Taxes in an intertemporal framework
3. Optimal capital income taxation
4. Taxation of inheritances

1. Introduction
    - Specific features of capital
    - From flows to stock
    - Wealth distribution
    - Taxes affecting wealth accumulation
    - Life cycle wealth or inheritance wealth?
    - Key elements of the debate on capital taxation
2. Taxes in an intertemporal framework
3. Optimal capital income taxation
4. Taxation of inheritances

Specific features of capital

- Capital income is about $\frac{1}{3}$ of national income (labor income is about $\frac{2}{3}$) but distribution of capital income is much more unequal than labor income.
  Capital income inequality is due to differences in savings behavior but also inheritances received.
  Equity suggests it should be taxed more than labor.
- Capital Accumulation correlated strongly with growth (although causality link is not obvious) and capital accumulation might be sensitive to the net-of-tax return.
  Efficiency cost of capital taxation might be high.

- Capital more mobile internationally than labor.
  Most national income tax systems are residence based.
  Incidence falls on the owner who can only escape tax through tax evasion (tax heavens) or changing residence.
  Incidence is then partly shifted to labor if capital is mobile.
- Capital taxation is extremely complex and provides many tax avoidance opportunities.

From flows to stock

- Saving is a flow and wealth is a stock.
- Three saving flows:
  - Personal saving:
    Individual income less individual consumption;
  - Corporate saving:
    Retained earnings = after tax profits − dividends;
  - Government saving:
    Taxes − expenditures.
- Taxes on savings might affect different savings flows differently: Savings subsidy through a tax credit can increase individual savings but decrease public saving.

Wealth

- Capital income is the returns from wealth holdings.
- Wealth is made from:
    - Tangible assets:
      Residential real estate (land and buildings whose income is rents) and unincorporated business and farm assets (whose income is profits);
    - Financial assets: corporate stocks (whose income is dividends and retained earnings), fixed claim assets (corporate and govt bonds, bank accounts whose income is interests);
    - Liabilities: mortgage debt, loans, consumer credit, ...

Wealth dynamic

$$W_t = W_{t-1} + r_{t-1} W_{t-1} + E_t + I_t - C_t,$$

where:

- W_t is wealth at time (or age) t;
- C_t is consumption expenditure;
- E_t is (net of taxes) labor income;
- r_{t-1} is the average (net) rate of return of investments during previous period;
- I_t is net inheritances (received gifts and bequests minus gifts given).

- W_{t-1} can be written as:

$$W_{t-1} = W_{t-2} + r_{t-2}W_{t-2} + E_{t-1} + I_{t-1} - C_{t-1}.$$

- Thus, W_t can be rewritten as:

$$\begin{aligned} W_t = \quad & E_t + I_t - C_t \\ & + (E_{t-1} + I_{t-1} - C_{t-1})(1 + r_{t-1}) \\ & + W_{t-2}(1 + r_{t-2})(1 + r_{t-1}). \end{aligned}$$

- Finally, assuming that W_0 is null, we obtain:

$$W_t = \sum_{k=1}^{t} (E_k + I_k - C_k) \prod_{j=k}^{t-1} (1 + r_j)$$

$$W_t = \underbrace{\sum_{k=1}^{t} (E_k - C_k) \prod_{j=k}^{t-1} (1 + r_j)}_{\text{Life-cyle wealth}} + \underbrace{\sum_{k=1}^{t} (I_k) \prod_{j=k}^{t-1} (1 + r_j)}_{\text{Inheritance wealth}}$$

Differences in wealth and capital income due to:

- Age, past earnings, and past saving behavior:
- Net Inheritances received;
- Investment's rates of return.

Wealth distribution

- Wealth inequality is very large.
- Financial wealth is more unequally distributed than (net) real estate wealth.
- Share of real estate wealth falls at the top of the wealth distribution.
- In the United States (situation is slightly better in France, but order of magnitude is similar), households' wealth is divided $\frac{1}{3}$, $\frac{1}{3}$, $\frac{1}{3}$ for the top 1%, the next 9%, and the bottom 90%. Bottom $\frac{1}{3}$ households hold almost no wealth.
- Wealth is more unequally distributed than income:
  Top 1% wealth income share in the United States is around 20%. Top 1% labor income share is around 15%.

Taxes affecting wealth accumulation

- Taxes on flows:
  - Corporate income tax;
  - Individual income tax on capital income;
  - Taxes on capital transfers (e.g. housing transactions, giving to children).
- Taxes on stock:
  - Property tax.

Beside taxes, other factors affect wealth dispersion:

- Heterogeneity in tastes for saving: discount rate, time inconsistency, financial education;
- Rates of returns received on assets: traditional risk aversion, luck, but also financial education;
- Net inheritances and gift received.

Life cycle wealth or inheritance wealth?

Which one is the most important to explain wealth inequality?
The question can be reformulated from two perspectives:

- Academic perspective:
  What accounts for wealth accumulation and inequality? Is widely used life-cycle model with no bequests a good approximation?
- Policy perspective:
  Should we tax capital income and/or inheritance? How should we design pension systems?

Key elements of the debate on capital taxation

Academic debate:

- Distributional concerns: capital income accrues disproportionately to higher income families;
- Efficiency concerns: capital tax distorts savings, business creation, capital mobility across countries.

Public policy debate:

- Should we tax income rather than consumption?
- Should we encourage savings by cutting tax on capital income or with tax-favored savings vehicles?

Basic mechanisms

- Any individual lives two periods and maximizes:

$$\mathbb{U} = u\left(c_1, l_1\right) + \delta u\left(c_2, l_2\right),$$

where c_t is consumption in period t and l_t is labor supply in period t.

- Saving technology allows to transfer wealth s from one period to the next:

$$\begin{aligned} s = & \quad w_1 l_1 - c_1, \\ c_2 = & \quad w_2 l_2 + (1+r)s, \end{aligned}$$

where w_t is wage rate in period t and r is the interest rate.

- The intertemporal budget constraint can be written as:

$$c_1 + c_2 \frac{1}{1+r} \leq w_1 l_1 + w_2 l_2 \frac{1}{1+r}.$$

- With a tax τ_c on consumption, the budget constraint becomes:

$$(1+\tau_c)\left[c_1 + c_2\frac{1}{1+r}\right] \leq w_1 l_1 + w_2 l_2 \frac{1}{1+r}.$$

- With a tax τ_l on labor income, the budget constraint becomes:

$$c_1 + c_2\frac{1}{1+r} \leq \left[w_1 l_1 + w_2 l_2 \frac{1}{1+r}\right](1-\tau_l).$$

- Consumption and labor income taxes are equivalent if

$$1+\tau_c = \frac{1}{1-\tau_l}.$$

- Both taxes distort only the labor-leisure choice.

- With a tax τ_k on capital income, the budget constraints becomes:

$$c_1 + c_2 \frac{1}{1 + r(1-\tau_k)} \leq w_1 l_1 + w_2 l_2 \frac{1}{1 + r(1-\tau_k)}.$$

- The capital income tax distorts only the intertemporal consumption choice.
- With a comprehensive tax τ on income, the budget constraint becomes:

$$c_1 + c_2 \frac{1}{1 + r(1-\tau)} \leq \left[w_1 l_1 + w_2 l_2 \frac{1}{1 + r(1-\tau)} \right] (1-\tau).$$

- The comprehensive tax distorts both the labor-leisure and the intertemporal consumption choices.
- The comprehensive tax imposes a "double" tax on earnings and savings.

Taxes and the dynamic of wealth

- What is the effect of taxation on capital accumulation?
- Transit through savings.

Capital income taxation

- Same reasoning as for a change in the interest rate.
- Assume that labor supply is fixed and r goes up:
  - Substitution effect:
    The relative price of c_2 decreases, so c_2 goes up and c_1 goes down: savings increase.
  - Wealth effect:
    The total price of consumption decreases, so c_1 and c_2 go up: savings decrease.
  - Human wealth effect:
    The present discounted value of labor income decreases, both c_1 and c_2 decrease: saving increase.
- Total net effect is theoretically ambiguous.
- Capital income taxation has ambiguous effects on savings.

Labor and consumption taxes

- Labor and consumption choices are equivalent under τ_c and τ_l if
$$1 + \tau_c = \frac{1}{1 - \tau_l},$$
but savings pattern is different.
- For simplicity, assume $w_2 = 0$ and $l_1 = 1$.
- Under consumption tax, the (binding) budget constraint is:
$$(1 + \tau_c)\left[c_1 + c_2 \frac{1}{1 + r}\right] = w_1.$$
And consumption is:
$$c_1^c = \frac{w_1 - s_c}{1 + \tau_c} \text{ and } c_2^c = s_c \frac{1 + r}{1 + \tau_c}.$$

- Under labor income tax, the budget constraint is:

$$c_1 + \frac{c_2}{1+r} = (1-\tau_l)w_1.$$

And consumption is:

$$c_1^l = w_1(1-\tau_l) - s_l \text{ and } c_2^l = (1+r)s_l.$$

- Since consumption at times 1 and 2 is equal across cases:

$$s_l = \frac{s_c}{1+\tau_c}.$$

- Savings are higher with the consumption tax than with the labor income tax. This arises because of taxation timing.

Optimal capital income taxation

Complex problem with many different academic approaches:

- Life-cycle models with linear and non-linear tax;
- Models with bequests (including the infinite horizon model);
- Models with future earnings uncertainty.

Bigger gap between theory and policy practice than in the case of static labor income taxation.

Ramsey tax in a life cycle model

Mervyn A. King, 1980. "Savings and Taxation," NBER Working Papers 0428, National Bureau of Economic Research, Inc.

- Ramsey model with a representative agent and linear taxes on labor and savings to raise an exogenous amount of revenue.
- The representative agent chooses c_1, c_2, and l in order to maximize:

$$u(c_1, c_2, l),$$
$$\text{s.t. } c_1 + \frac{c_2}{1+r(1-\tau_k)} = wl(1-\tau_l).$$

- This leads to the indirect utility function:

$$V\left(q, w(1-\tau_l)\right),$$

where $q = \frac{1}{1+r(1-\tau_k)}$ is the post-tax price of c_2.

- Optimal tax rates can be obtained by solving the standard Ramsey problem, i.e. choose τ_l and τ_k in order to maximize:

$$\begin{aligned} & V\left(q, w(1-\tau_l)\right), \\ \text{s.t. } & wl\tau_l + (q-p)c_2 \geq g, \end{aligned}$$

where g is exogenous tax revenue requirement and $p = \frac{1}{1+r}$ is the pre-tax price of c_2.

- Combining the two first order conditions and getting rid of the Lagrange multiplier, we get:

$$\frac{r\tau_k}{1+r}(\sigma_{l2}-\sigma_{22})=\frac{\tau_l}{1-\tau_l}(\sigma_{ll}-\sigma_{2l}),$$

where:

$$\sigma_{ll}=\frac{w(1-\tau_l)}{l}\frac{\partial l}{\partial w(1-\tau_l)}>0$$

is the compensated elasticity of labor supply with respect to the net wage rate, and:

$$\sigma_{22}=\frac{q}{c_2}\frac{\partial c_2}{\partial q}<0,$$
$$\sigma_{l2}=\frac{q}{l}\frac{\partial l}{\partial q},$$
$$\sigma_{2l}=\frac{w(1-\tau_l)}{c_2}\frac{\partial c_2}{\partial w(1-\tau_l)}.$$

- Formula defines relative optimal rates of taxation on labor and capital (absolute levels depend on g).
- As we known little about cross elasticities, let us assume that they are zero.
- The optimal formula simplifies to:

$$-\frac{r\tau_k}{1+r}\sigma_{22} = \frac{\tau_l}{1-\tau_l}\sigma_{ll}.$$

- Inverse elasticity rule:
  If $\sigma_{ll} << |\sigma_{22}|$, then τ_k should be small relative to τ_l.
- What matters is the relative size of elasticities.

Endogenous capital stock

- The optimal dynamic capital stock k is given by the modified Golden rule:
$$r = f'(k) = \delta,$$
where δ is the discount rate.
- Optimal k can be attained in steady state using public debt policy.
- In that case, optimal τ_k and τ_l are given by previous rule.

- If the government cannot use debt policy, then optimal dynamic capital level may not be attained because savings equal capital $s_t = k_t$.
- In that case, tax formulas need to be modified and optimal tax rates reflect:
  - The trade-off between conventional (intra-generational) efficiency losses;
  - The failure to achieve the dynamic optimality condition on capital stock (inter-generational efficiency trade-off).
- Effect on capital tax rate level is actually ambiguous.

Remarks on the previous model

- No redistributive concerns:
  The model can be extended to the multi-person case. τ_k will be higher if capital (and capital income) is concentrated among the rich.
- No bequests:
  This model does not capture an important aspect of wealth accumulation and justification for redistribution.
- Only a two period model:
  If more periods are introduced, then optimal tax formula would be more complex.
- No heterogeneity in the population:
  If individuals differ in ability (wage rate) and discount rate, then it may be optimal to introduce a small savings tax on high earners or a small savings subsidy on low earners.

Limits of the life cycle framework

- It may seem fair to not discriminate against savers if labor earnings is the only source of inequality and is already taxed non-linearly.
- In reality, capital income inequality is also due to:
    - Difference in rates of returns;
    - Shifting of labor income into capital income;
    - Inheritances.

- Definitions: donor is the person giving, donee is the person receiving.
- Inheritances and inter-vivos transfers raise difficult issues:
  - Inequality in inheritances contributes to economic inequality: Seems fair to redistribute from those who received inheritances to those who did not;
  - However, it seems unfair to double tax the donors who worked hard to pass on wealth to children
- Double welfare effect: inheritance tax hurts donor (if donor is altruistic to donee) and donee (which receives less).

Behavioral responses

Potential behavioral response effects of inheritance tax:

- Reduces wealth accumulation of altruistic donors (and hence tax base). No very good empirical evidence.
- Reduces labor supply of altruistic donors (less motivated to work if cannot pass wealth to kids). No very good empirical evidence.
- Induces donees to work more through income effects. Some empirical evidence.

Its important to understand why there are inheritances to decide on optimal inheritance tax policy. There are four main models of bequests: (i)accidental, (ii) warm glow, (iii) manipulative bequest motive, (iv) dynastic.

Accidental bequests

- People die with a stock of wealth they intended to spend on themselves. Such bequests arise because of imperfect annuity markets.
- Annuity is an insurance contract converting lump-sum amount into a stream of payments till end of life (insurance against risk of living too long).
- Annuity markets are imperfect because of adverse selection or behavioral reasons (inertia, lack of planning).
- Public retirement programs are in general annuities.
- Bequest taxation has no distortionary effect on behavior of donor and can only increase labor supply of donees (through income effects).
- Strong case for taxing bequests heavily.

Warm glow or altruistic bequests

- Let us consider the following utility function:

$$u(c) - h(l) + \delta v(b),$$

  where c is life-time consumption, l is labor supply, b is net-of-tax bequests left to next generation, and $v(b)$ is warm glow utility of bequests.

- Neglecting taxes on labor income, the budget constraint can be written as:

$$c + \frac{b}{(1+r)(1-\tau)} \leq wl,$$

  where r is the interest rate and τ the tax on bequest.

- Suppose first that b is not really bequeathed but used for "after-life" consumption (e.g., funerary monument of no value to next generation).
- Then b should not be taxed: $\tau = 0$.
- Suppose now that b is given to a heir who derives utility $v^{\text{heir}}(b)$.
- This means that b creates a positive externality and should be subsidized: $\tau < 0$.
- But, if past inheritances come from untaxed labor income, then it is desirable to tax inheritances.

Manipulative bequests

- Parents use potential bequest to extract favors from children.

Bernheim, B Douglas & Shleifer, Andrei & Summers, Lawrence H, 1985. "The Strategic Bequest Motive," Journal of Political Economy, University of Chicago Press, vol. 93(6), pages 1045-76, December.

- Show that number of visits of children to parents is correlated with bequeathable wealth but not annuitized wealth of parents.
- Bequest becomes one additional form of labor income for donee and one consumption good for donor.
- Inheritances should be taxed as labor income for donees.

Further readings

- On inheritances:

  Thomas Piketty, 2011. "On the Long-Run Evolution of Inheritance: France 1820–2050," The Quarterly Journal of Economics, Oxford University Press, vol. 126(3), pages 1071-1131.

- On tax heavens:

  Gabriel Zucman, 2013. "The missing wealth of nations: Are Europe and the U.S. net debtors or net creditors?," The Quarterly Journal of Economics, Oxford University Press, vol. 128(3), pages 1321-1364.

- On income inequality:

  Thomas Piketty, 2003. "Income Inequality in France, 1901-1998," Journal of Political Economy, University of Chicago Press, vol. 111(5), pages 1004-1042, October.

  Thomas Piketty & Emmanuel Saez, 2003. "Income Inequality In The United States, 1913-1998," The Quarterly Journal of Economics, MIT Press, vol. 118(1), pages 1-39, February.

End of lecture.

Lectures of this course are inspired from those taught by R. Chetty, G. Fields, N. Gravel, H. Hoynes, and E. Saez.