

Public Economics: Lecture 15

Optimal Capital Income Taxation

Cameron LaPoint

Columbia University

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Should we tax capital income?

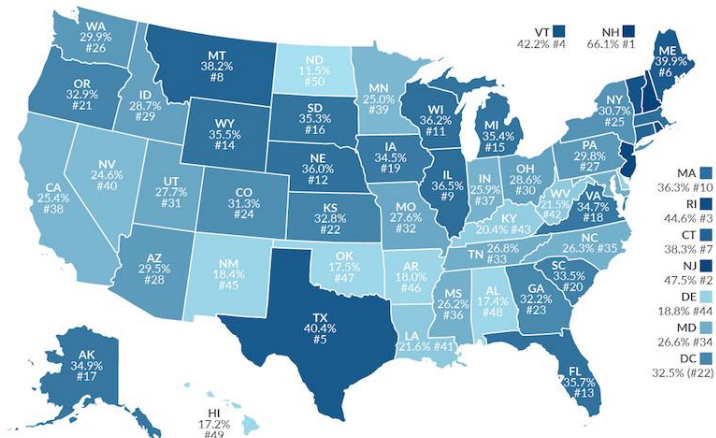
- Capital income \approx 25% of national income
- Distribution of capital and capital income is much more unequal than labor income – should we tax it more than labor?
- Efficiency cost of capital taxation may be high
 - ▶ Capital accumulation correlated with growth (Solow model)
 - ▶ Tax on interest income might lead economy down slower output growth path by disincentivizing saving
- Taxing capital is challenging because there are many avoidance and evasion opportunities
- Incidence of capital tax might fall on workers because capital is more internationally mobile than labor

Capital income taxation in the U.S.

- Corporate income tax: 35% federal tax rate on corporate profits (effective tax rate much lower due to industry-specific rules)
- Many forms of individual capital income taxed at federal/state level
 - ▶ Preferential treatment for realized capital gains and dividends
 - ▶ Exemption for imputed rent of homeowners, returns on pension funds, interest on state/local bonds
- Estate tax: applies to estates with combined gross assets and prior taxable gifts exceeding \$5.45 million when the owner dies (2016)
 - ▶ Gifts between spouses are tax-exempt \implies tax avoidance
- Local property taxes: on average about 0.5% of market value of real estate (functions like a 10% tax on imputed rents)
 - ▶ Lock-in effect: some states/counties use purchase price as a base for the local property tax

To What Extent Does Your State Rely on Property Taxes?

Property Tax Collections As a Percent of Total State and Local Tax Collections, FY 2014



Note: Percentages may not add to 100 due to rounding.
Source: Census Bureau; Tax Foundation calculations.

Percent of Total State & Local
Collections from Property Taxes



Relationship between wealth and capital income

- Capital income = returns from wealth holdings
- Law of motion for wealth W_{t+1} :

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

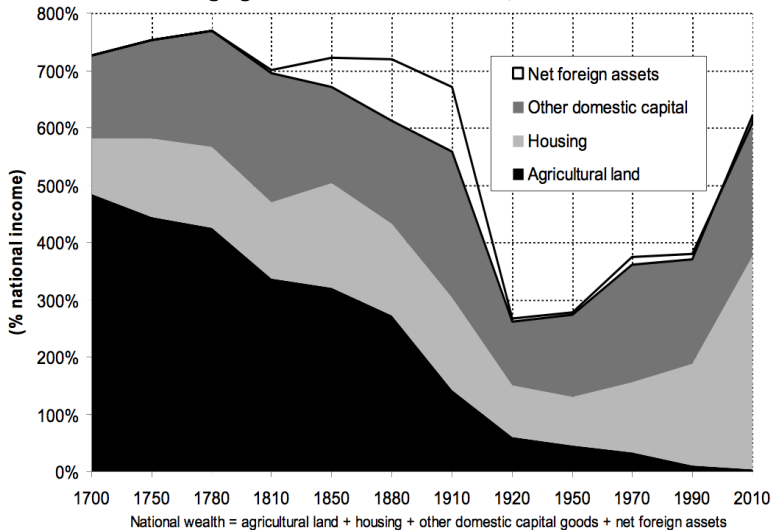
where C_t is consumption, E_t is labor income, r_t is the average net rate of return on investments and net inheritances I_t

- Differences in wealth and capital income arise due to...
 - ▶ Age
 - ▶ Past earnings
 - ▶ Past savings behavior
 - ▶ Net inheritances received
 - ▶ Rates of return on assets

What does wealth consist of?

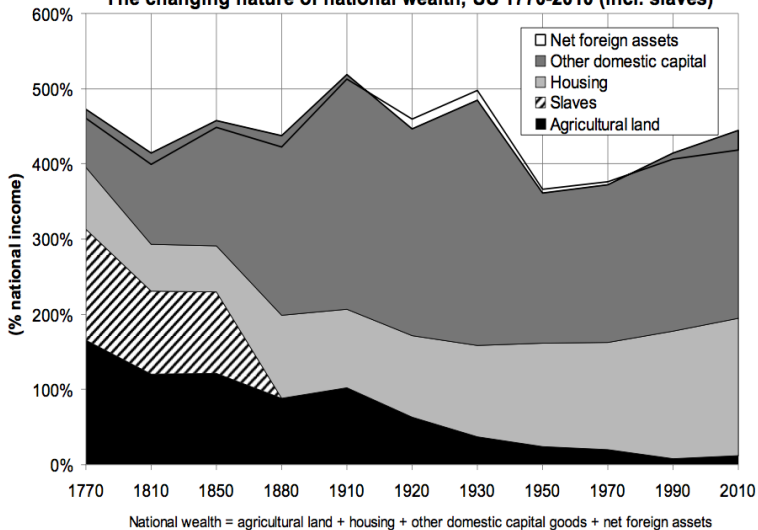
- Aggregate U.S. personal (not including govt.) wealth $\approx 4 \times$ GDP
- Tangible assets: residential real estate (income = rents), unincorporated business and farm assets (income = profits)
- Financial assets: corporate stock and fixed claim assets (e.g. corporate and govt. bonds) – income from earned interest
- Liabilities/debts: mortgages, student loans, consumer credit
- Substantial amount of financial wealth is held indirectly through pension funds, mutual funds, and insurance reserves

The changing nature of national wealth, France 1700-2010



Source: Piketty & Zucman (2014), "Capital is Back: Wealth-income Ratios in Rich Countries 1700 - 2010," *Quarterly Journal of Economics*

The changing nature of national wealth, US 1770-2010 (incl. slaves)



Source: Piketty & Zucman (2014), "Capital is Back: Wealth-income Ratios in Rich Countries 1700 - 2010," *Quarterly Journal of Economics*

Simple intertemporal choice framework

- Two periods (1,2) with consumption c_1 and c_2
- Per-period budget constraints in terms of savings:

$$c_1 = y_1 - s \qquad c_2 = y_2 + s \cdot (1 + r \cdot (1 - t))$$

- We can combine the two per-period constraints into a single *intertemporal budget* constraint that c_1^*, c_2^* must satisfy:

$$c_1 + \frac{c_2}{1 + r \cdot (1 - t)} = y_1 + \frac{y_2}{1 + r \cdot (1 - t)}$$

- Increase in the tax on interest income has two effects:
 - ① Substitution effect: price of c_2 increases $\implies c_2^* \downarrow, c_1^* \uparrow \implies s^* \downarrow$
 - ② Income effect: price of c_2 increases $\implies c_1^* \downarrow, c_2^* \downarrow \implies s^* \uparrow$
- Overall impact of tax change on savings is ambiguous without knowing the individual's preferences

Adding in labor supply

- Suppose income comes from labor supply ℓ chosen each period, so $y_1 = w_1 \cdot \ell_1$ and $y_2 = w_2 \cdot \ell_2$
- Assume individuals have a utility function of the form:

$$u(c_1, \ell_1) + \beta u(c_2, \ell_2)$$

- Intertemporal budget constraint with a tax on interest income is similar to the previous case

$$c_1 + \frac{c_2}{1 + r \cdot (1 - t)} = w_1 \cdot \ell_1 + \frac{w_2 \cdot \ell_2}{1 + r \cdot (1 - t)}$$

- The tax on interest income only distorts the savings choice and not labor supply \implies same ambiguous effect on savings due to competing substitution and income effects

Consumption taxes vs. labor income taxes

- Budget constraint with consumption tax (same rate in both periods):

$$(1 + t_c) \cdot \left(c_1 + \frac{c_2}{1 + r} \right) = w_1 \cdot \ell_1 + \frac{w_2 \cdot \ell_2}{1 + r}$$

- Budget constraint with tax on labor income:

$$c_1 + \frac{c_2}{1 + r} = (1 - t_\ell) \cdot \left(w_1 \cdot \ell_1 + \frac{w_2 \cdot \ell_2}{1 + r} \right)$$

- Uniform consumption and labor taxes result in the same optimal choices (i.e. have the same efficiency properties) if:

$$1 + t_c = \frac{1}{1 - t_\ell}$$

- If the tax rate on consumption is different in each period, then there is a distortion in savings behavior (why?)

Why don't we have consumption taxes in the U.S.?

- Many other rich countries rely on consumption taxes or value-added taxes (VAT) – what is the rationale for this?
- U.S. instead relies on income tax on earnings and capital income
- For instance, with one comprehensive income tax τ :

$$c_1 + \frac{c_2}{1 + r \cdot (1 - \tau)} = (1 - \tau) \cdot \left(w_1 \cdot \ell_1 + \frac{w_2 \cdot \ell_2}{1 + r \cdot (1 - \tau)} \right)$$

- This double tax τ distorts both labor supply and savings decisions!
- But a switch from a double income tax to a consumption tax would impose double taxes on the transitional generation
- Similar to the dilemma with Social Security reform – one generation has to be made worse off than the others

What is missing from this simple framework?

- The role of inflation and inflation risk: taxes are levied on nominal rather than real interest rates
- Liquidity/borrowing constraints: people may not be able to borrow or the interest rate for borrowing may be higher than the rate for lending
- Precautionary saving/bequests: uncertainty leads to higher and less tax-elastic saving
- Crowd-out of private saving due to receiving benefits from social insurance and welfare programs
- Other issues we discussed previously in the course: self-control and internalty problems, shifting savings between accounts (personal vs. employer pensions)

Approaches to optimal capital taxation

- Unlike the optimal income tax problem studied in previous lectures, there is no unified framework for optimal capital taxation
- Here we will discuss four types of approaches for deriving an optimal capital tax rule
 - ① **Commodity taxation**: treat consumption in different periods as two separate goods
 - ② Infinite horizon: analyze how individuals accumulate assets over the very long-run
 - ③ **Redistribution**: add in multiple consumption goods to the optimal income tax framework
 - ④ Add uncertainty: taxing assets provides incentive to work and helps government provide insurance against future income risk

Approach #1: commodity taxation

- Treat consumption in period 1 as a completely different good from consumption in period 2
- Tax on capital is any set of tax rates such that $t_1 < t_2$ (relative price of consumption is higher in period 2)
- Standard inverse elasticity rule from the optimal commodity tax problem then applies
 - ▶ Compare the elasticity of consumption in period 1 to the elasticity of consumption in period 2 with respect to a tax change
 - ▶ Impose a higher tax rate on the relatively inelastic good
- If the elasticity of consumption is the same in both periods, no reason to impose a tax on savings ($t_1 = t_2$)

Approach #2: infinite horizon

- General equilibrium framework where taxpayers live forever:

$$\sum_{t=0}^{\infty} \beta^t u(c_t, \ell_t)$$

- Individuals accumulate assets a_t and face taxes on labor income $t_{\ell,t}$ and interest income $t_{k,t}$:

$$a_{t+1} = \left(1 + r \cdot (1 - t_{k,t})\right) \cdot \left(a_t + w_t(1 - t_{\ell,t}) \cdot \ell_t - c_t\right)$$

- Government requires revenue G_t and can borrow to meet this target
- Aggregate budget constraint in this economy must hold:

$$F(k_t, \ell_t) = c_t + G_t + \left(k_{t+1} - (1 - \delta) \cdot k_t\right)$$

- Where investment with capital stock depreciation rate δ is $k_{t+1} - (1 - \delta) \cdot k_t$

Infinite horizon model – implications

- As usual, assume govt. cannot implement lump-sum taxes
- Chamley-Judd result: in the long run capital income tax rates converge to zero ($t_{k,t} \rightarrow 0$)
- Intuition: when $t_{k,t} \neq 0$, the distortions on savings choices accumulate and compound over time

$$\prod_{i=t+1}^{t+n} \left(1 + r \cdot (1 - t_{k,i}) \right) \rightarrow \infty, \text{ as } n \rightarrow \infty$$

- Caveat – result is not robust to how elastic consumption today is to consumption tomorrow
- What does the govt. do to implement this solution?
 - ▶ Accumulate assets early on using capital taxes, finance spending from return on govt. investments and revenue from the labor tax

Approach #3: redistribution

- Same optimal income tax framework as before, but now individuals have preferences over consumption today and tomorrow: $u(C_1, C_2, L)$
- Government wants to effect redistribution, but now has an additional taxable good (savings)
- **Atkinson-Stiglitz theorem:** if taxpayers have preferences separable in labor supply and consumption, $u(v(C_1, C_2), L)$, then optimal to only tax labor income
- Intuition for the result: inequality due solely to differences in earnings ability can be addressed directly by taxing labor income
- If observing savings decision does not provide any new information about the ability to pay (w_i), capital income taxes only generate additional efficiency costs

Why might Atkinson-Stiglitz fail?

- Mathematically: if utility function features substitution or complementarity between labor supply and saving (i.e. non-separable utility) \implies optimal to tax both goods
- In practice, many types of capital income inequality not fully explained by differences in reported earnings:
 - ▶ Differences in savings rates
 - ▶ Differences in rates of returns on investment across individuals
 - ▶ Differences in opportunities for shifting labor income into capital income (employee stock options)
 - ▶ Differences in inherited wealth
 - ▶ Differences in tax evasion opportunities (e.g. access to off-shore bank accounts or unscrupulous accountants)

Approach #4: adding uncertainty

- Individuals face risk and borrowing constraints
- Typical optimality condition between consumption today vs. consumption tomorrow:

$$u'(c_t) = \beta(1 + r) \cdot \mathbb{E}_t[u'(c_{t+1})]$$

- But with borrowing constraints and a tax on interest income:

$$u'(c_t) \geq \beta \left(1 + r \cdot (1 - t) \right) \mathbb{E}_t[u'(c_{t+1})]$$

- Intuition: precautionary saving boosts overall saving above the dynamically efficient level – aggregate negative externality from saving due to lack of insurance
- Optimal policy: capital tax to discourage saving and bring economy closer to dynamically efficient level

Realized returns vs. accrued returns

- Consider a two-period model where individuals make an investment of \$1 carrying one-period net interest rate r
- Taxing accrued returns (interest income):

$$\left(1 + r \cdot (1 - t)\right)^2 = 1 + 2(1 - t) \cdot r + (1 - t)^2 \cdot r^2$$

- Taxing realized returns (capital gains):

$$(1 + r)^2 - t \cdot \left((1 + r)^2 - 1\right) = 1 + 2(1 - t) \cdot r + (1 - t) \cdot r^2$$

- The after-tax ROIs differ by $t \cdot (1 - t) \cdot r^2$ (higher for capital gains)
- In the second case, government holds on to the extra interest amount $t \cdot r$ and earns a one-period return on it

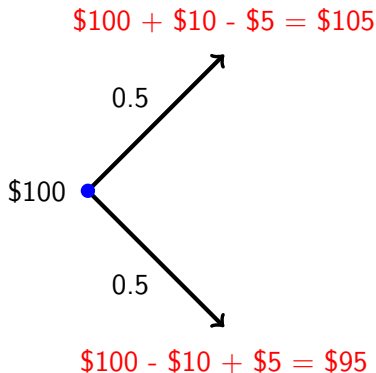
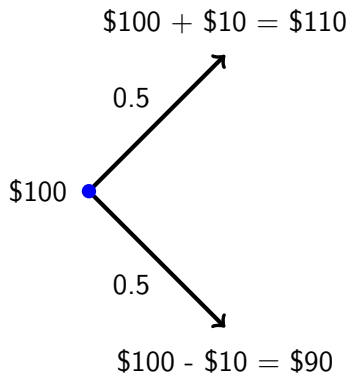
To defer or not to defer?

- **Lock-in effect:** taxes on capital gains can encourage taxpayers to hold on to their assets and discourage investment
 - ▶ Example: earn return of $1 + r \cdot (1 - t)$ if sell asset while alive, but earn $1 + r$ if held until death (and no bequest tax)
- From the taxpayer's perspective, whether accrued interest is taxed and how it is taxed is important in many tax planning contexts
- Examples:
 - ▶ Decision to realize capital gains – selling a stock/company, flipping a house vs. waiting for the asset to appreciate further
 - ▶ Choice between tax-deferred and taxable accounts (IRA vs. Roth IRA)
 - ▶ Deferred compensation schemes
 - ▶ Retention of profits within a firm (reinvest profits vs. paying out dividends to shareholders)
 - ▶ International taxation and repatriation of profits

Domar-Musgrave effect

- Idea: government acts as a “silent investment partner” by taxing capital income
- Example: consider an investment of \$100 that can pay \$110 or \$90, each with probability 0.5
 - ▶ Without any tax the expected value of the gamble is \$100, with variance \$100
 - ▶ Suppose the return is taxed at 50% and losses are 50% deductible
 - ▶ Then the after-tax expected value is still \$100, but the variance of after-tax earnings is only \$25
 - ▶ Since the pre-tax gamble is a mean-preserving spread of the post-tax gamble, any risk-averse investor would rather take the post-tax gamble!
- Example shows how a tax on capital income can encourage entrepreneurs to take on risky projects
- Argument breaks down when winnings are taxed at a much higher rate than losses are subsidized (true in practice)

Domar-Musgrave effect – illustration



- The left-hand gamble without taxes is a *mean-preserving spread* of the right-hand gamble with a tax and deductible loss
- If \tilde{x} is the gamble, variance is: $\text{var}(\tilde{x}) = \mathbb{E}[\tilde{x}^2] - \left(\mathbb{E}[\tilde{x}]\right)^2$

Taxing different components of capital income

- Consider an investment of \$1 that carries an annual return of $1 + r$, but what is r ?
- Idea: can decompose the net return r into three pieces:

$$r = \bar{r} + x + \epsilon$$

- \bar{r} is a normal (risk-free) rate of return – common empirical proxy is a long-run time series average of govt. treasury bill rates
- x represent abnormal returns due to monopolistic profits, insider trading, compensation from the employer shifted to capital income
- ϵ is a risky component: $\mathbb{E}[\epsilon] > 0$ could indicate a risk premium, or compensation for risk that is priced in an asset market
- Which component should we tax? Taxing ϵ might generate a D-M effect, and taxing x could improve competitiveness of venture capital

Estate taxation in the U.S.

- Inheritances or gifts from living parents raise two difficult issues:
 - ▶ Should we redistribute from those who received inheritances to those who did not?
 - ▶ Should we impose additional taxes (on top of income) on donors who worked hard to pass on wealth to their offspring?
- Public support for the estate tax is weak in the U.S. (hence its nickname, the “death tax”)
- Clear evidence that public does not understand that the tax only affects the extremely wealthy and exempts charitable/spousal giving
- Kuziemko et al. (2015): use Amazon’s mTurk platform to conduct an online randomized survey experiment
 - ▶ Support for the estate tax triples (from 17% to 53%) after participants learn only the wealthiest pay an estate tax
 - ▶ Indicates bigger political economy issue: public support for policies too often based on incorrect/biased information

TABLE 5—EFFECT OF OMNIBUS TREATMENT ON POLICY PREFERENCES

	Top rate (1)	\$1M tax (2)	Estate (3)	Petition (4)	Min. wage (5)	Trust (6)	Scope (7)	Dem 2012 (8)
Treated	0.931* [0.549]	0.0502** [0.0126]	0.357*** [0.0140]	0.0648*** [0.0156]	0.0325** [0.0141]	-0.0292** [0.0115]	0.132*** [0.0339]	0.0152 [0.0125]
Control mean	30.21	0.740	0.171	0.234	0.690	0.158	3.076	0.529
Scaled effect	0.0914	0.111	2.043	0.394	0.0995	1.250	0.110	0.0246
Observations	3,741	3,704	3,673	3,060	3,690	3,702	3,704	3,703

Notes: “Top rate” is continuous (respondents’ preferred average tax rate (in percent) on the richest 1 percent). “Scope” is also continuous (a 1–5 variable, increasing in the preferred scope of government activities). All other variables are binary. “\$1M tax” and “Estate” indicate the respondent wants income taxes on millionaires and the estate tax to increase, respectively. “Petition” indicates she would write her Senator to increase the estate tax. “Min. wage” indicates support for increasing the minimum wage. “Trust” indicates trust in government and “Dem 2012” indicates the respondent plans to vote for the Democrat (Obama) in the 2012 presidential election. “Covariates” and “scaled effects” are as specified in the notes to Table 4. The row “Control mean” reports the mean of the outcome variable in the control group. All regressions in this and subsequent tables include control variables as defined in Table 4.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

Source: Kuziemko et al. (2015), “How Elastic Are Preferences for Redistribution? Evidence from Randomized Survey Experiments,” *American Economic Review*

TABLE 6—RESULTS FROM THE FOLLOW-UP SURVEY ONE MONTH LATER

	Increase estate tax		Government scope		Trust government		Inequality very serious	
	First (1)	Follow-up (2)	First (3)	Follow-up (4)	First (5)	Follow-up (6)	First (7)	Follow-up (8)
Treated	0.337*** [0.0953]	0.195*** [0.0910]	0.259 [0.207]	0.364* [0.200]	-0.122** [0.0611]	-0.0691 [0.0582]	0.00833 [0.0809]	0.102 [0.0770]
Control mean	0.180	0.179	2.995	2.910	0.122	0.128	0.283	0.218
Observations	145	145	145	145	145	145	145	145

Notes: All outcomes and terms are as defined in Tables 4 and 5. For each dependent variable, column “First” is the result from the first survey, while column “Follow-up” is the result from the follow-up survey one month after the initial survey. We use a more limited set of control variables given the small sample size. All regressions are run on the subsample of respondents who entirely completed the follow up survey.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

Source: Kuziemko et al. (2015), “How Elastic Are Preferences for Redistribution? Evidence from Randomized Survey Experiments,” *American Economic Review*

Behavioral responses to an estate tax

- Consider three possible behavioral responses to an increase in the estate tax, or a decrease in the threshold value at which it applies
 - 1 Reduces wealth accumulation of philanthropists and hence reduces the tax base (limited evidence)
 - 2 Reduces labor supply of altruistic donors who are less motivated to work if cannot pass on their wealth to heirs (limited evidence)
 - 3 Induces recipients of gifts to work more through income effects (“Carnegie effect”)
- To determine an “optimal estate tax” need to determine the main motivation for bequests
 - ▶ Accidental (untimely death), altruistic, or driven by social pressure?

Empirical evidence for why bequests occur

- Kopczuk & Kupton (2007): only 1/3 of people state bequests as their main reason for wealth accumulation (accidental bequests common)
- Very little evidence on altruistic bequests: but important to realize Atkinson-Stiglitz theorem breaks down
 - ▶ Recipients of an inheritance have additional resources that labor income alone cannot capture
 - ▶ Suggests an additional bequest tax on top of a labor income tax would help redistribute from high to low-ability types
- Manipulative bequests: Bernheim, Shleifer, & Summers (1985) show number of visits to parents correlated with inheritable wealth but uncorrelated with annuitized wealth of parents
- Social pressure: estates are very often divided equally but gifts are not (Wilhelm 1996, Light & McGarry 2004)

Summary

- Recent trends in wealth inequality appear to have mirrored trends in income inequality, but wealth is more difficult to measure
- No clear theoretical benchmark for determining an optimal capital income tax rule
- Four approaches to determining optimal capital income taxes: for each approach need to ask what is gained by taxing capital income rather than labor income
- Need to also consider differential effects based on which kinds of capital income are taxed
 - ▶ Tax on realized returns can generate lock-in effects
 - ▶ Taxing investments can encourage risk-taking in some cases