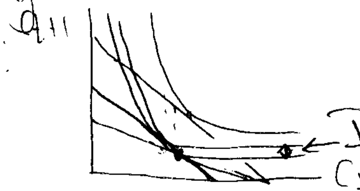
Optimal taxes should be direct - land/head tax (Physiocrats)
Observed taxes are indirect
The French revolution was inspired by the ideology that supports direct taxes. The revolution failed. Did not get rid of control of leaders who had free market ideology.
- Extreme free trade for this period - had several military losses.
- Later, when this ideology was discarded, and there was a move towards less free trade, France boomed.

Discussion of tax paradoxes

Late 19th century - growth of interventionist countries
- Economists said "these countries are screwing up"
  - They basically recreated old conclusions: First Welfare Thm
- Part of the Laissez-Faire theorem is that if there are to be taxes, they need to be direct.

Taxing savings:



Lump sum tax would be more efficient

After the depression, Keynes was [illegible] over

Why should one investment be taxed at a different rate than another? Consider the following: (without depreciation)

I_{tax}: t = tax rate

I_1: R_{11} R_{21} R_{31} . . . . . . $\frac{R_1}{1+r} + \frac{R_2}{(1+r)^2} + \ldots = V_1^0$

Value after tax: $\frac{R_{11}(1-t)}{1+r} + \frac{R_{21}(1-t)}{1+r} + \ldots = (1-t)V_1^0 \equiv V_1^1$

Similarly, $V_2^1 = (1-t)V_2^0$

Tax neutrality: $\frac{V_1^1}{V_2^1} = \frac{V_1^0}{V_2^0}$ But we do not observe this in the real world

With depreciation: 1-period investment (depreciation allowance write-up)

$$V_1^1 = \frac{(1-t)R_{11}}{1+r} + (t \underbrace{V_1^1}_{\text{assuming full depreciation}}) \frac{1}{1+r}$$

$$\Rightarrow V_1^1\left[1 - \frac{t}{1+r}\right] = V_1^1\left[\frac{1+r-t}{1+r}\right] = \frac{(1-t)R_{11}}{1+r}$$

$$\Rightarrow V_1^1 = \frac{1-t}{1-t+r} R_{11}$$

$$\frac{(1-t)(1+r)}{1-t+r}\frac{R_{11}}{1+r} = \frac{1-t}{\frac{1+r}{1+r} - \frac{t}{1+r}}\frac{R_{11}}{1+r} = \frac{1-t}{1-\frac{t}{1+r}}\underbrace{\frac{R_{11}}{1+r}}_{V_1^0} \approx V_1^0$$

Long-term investment: perpetuity (no depreciation)

$$V_2^1 = (1-t)V_2^0$$

Thus, $\frac{V_1^1}{V_2^1} = \frac{\frac{1-t}{1-\frac{t}{1+r}}V_1^0}{1-t \quad V_2^0} = \frac{1}{1-\frac{t}{1+r}}\frac{V_1^0}{V_2^0} \neq \frac{V_1^0}{V_2^0}$ $\Rightarrow$ No tax neutrality

Samuelson wanted to explain the depreciation allowance

Suppose you can have tax deductibility of interest.

Perpetuity with tax deductibility of interest

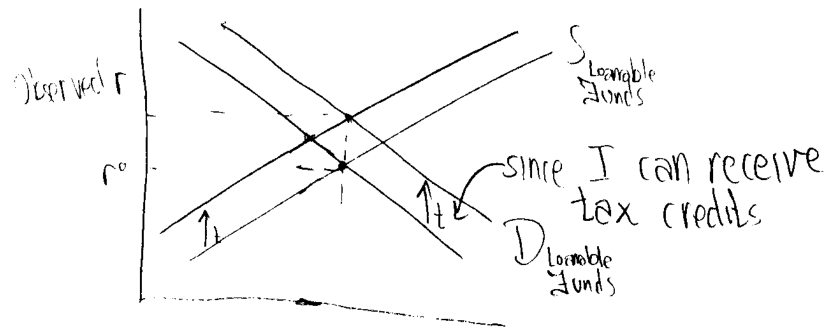
$$V_2^1 = \frac{R(1-t)}{1+r(1-t)} + \frac{R(1-t)}{[1+r(1-t)]^2} + \dots = \frac{1}{1+r(1-t)} \cdot \frac{1}{1-\frac{1}{1+r(1-t)}} R(1-t) = \frac{1}{1+r(1-t)} \frac{1}{\frac{1+r(1-t)-1}{1+r(1-t)}} R(1-t)$$

$$= \frac{R(1-t)}{r(1-t)} = \frac{R}{r} = V_2^0$$

$$V_1' = \frac{1-t}{1-\frac{t}{1+r(1-t)}} \; \frac{R_{11}}{1+r(1-t)} = \frac{R_{11}}{1+r} = V_1^0$$

$$\Rightarrow \frac{V_2'}{V_1'} = \frac{V_2^0}{V_1^0} \Rightarrow \text{Tax neutrality}$$

Riddle: How does this collect income?



Thus, we had no real reason to go from r to $r(1-t)$ in the above analysis
$\Rightarrow r(1-t) \rightarrow \frac{r^0}{1-t}(1-t) = r^0$

$$r^0 = r(1-t) \Rightarrow r = \frac{r^0}{1-t}$$

Stiglitz and Samuelson are missing out on the tax on the lender.

Why do we violate tax neutrality? Who cares. Let's look at truly efficient taxes.

Optimal tax on I_1: $R_{11}, R_{21}, R_{31}, \ldots$

$$I \rightarrow \underset{\text{value at } t=0}{V_{10}}, V_{11}, V_{12}, V_{13}, \ldots \quad \text{capital value stream}$$

Defense externality D in every period. Optimal tax on I_1 is:

$$PV(\tau_{10}) = \frac{V_{10}}{1+r}D + \frac{V_{11}}{(1+r)^2}D + \ldots$$

$$= D\underbrace{\left[\frac{V_{10}}{1+r} + \frac{V_{11}}{(1+r)^2} + \ldots\right]}_{\text{PV capital value stream}} = D[PV_{I_1}]$$

This, rather than tax neutrality, should be the goal.

Income tax with a depreciation allowance

$$PV_{\text{income tax on investment } I} = tV_{10} - t\left[\frac{V_{10} - V_{11}}{(1+r)}\right] - t\left[\frac{V_{11} - V_{12}}{(1+r)^2}\right] - \cdots$$

where t = income tax rate.

$$= t\left[V_{10}\left(1 - \frac{1}{1+r}\right) + \frac{1}{1+r}V_{11}\left(1 - \frac{1}{1+r}\right) + \quad\right]$$

$$= t\left[V_{10}\frac{r}{1+r} + \frac{r}{(1+r)^2}V_{11} + \cdot\right]$$

$$= rt\left[\frac{V_{10}}{1+r} + \frac{V_{11}}{(1+r)^2} + \frac{V_{12}}{(1+r)^3} + \cdots\right]$$

$$= rt\left[PV_{K_1}\right] = \tau^*\left[PV_{K_1}\right] \Rightarrow \tau^* = rt$$

Taxes investments according to PV capital implied by the investment.

If $\tau^* = D$, then you have an optimal income tax

To compute a good income tax rate let $t = \frac{D}{r}$

- Income tax rate is much larger than capital tax rate. (ie $t \approx 20D$)

What kind of tax structure consistently reflects the defense externality?

If you are only earning subsistence, you are so poor that you have no defense externality. Give those people tax exemptions.

Also allow for write offs for business expenditures not related to new capital accumulation

Corporations can increase capital stock tacitly by "saying" that there expenditures are spent on other stuff to escape these taxes

- High market value versus book value as a result
- There are taxes that are levied on corporations to ensure taxation of this capital.

Paper: 1974 JPE paper - "Taxation and National Defense"

Democracy knows how to produce good policy.

Progressive tax rates

- Bleeding heart argument - poor people just can't afford high levels of tax.
- Thompson - coveted human capital is held by the rich.