The Optimal Tax on Capital is Greater than Zero

Joseph E. Stiglitz
Columbia University
Seminar in Memory of Anthony B. Atkinson

Early work

- Concerned that Ramsey tax seemed to imply that there should be high taxes on necessities like food
  - Low demand elasticities
  - Very regressive
- Ramsey model had a single individual
  - Optimal to have lump sum tax
- Atkinson-Stiglitz 1972 analyzed optimal taxes taking into account distributional effects
  - Derived Ramsey-like formula, with distributional weights
  - Generated expected results—reversed Ramsey's presumption

Optimal income tax and redistribution

- But when individuals differ in a systematic observable way, we may have better ways of addressing issues of distribution
- Mirrlees (1971) had solved for optimal income tax, trade-offs between benefits of redistribution and losses of efficiency from disincentive
  - Individuals differed in productivities; wages fixed
  - Most of results could be extended to the analysis of an Pareto efficient tax structure (Stiglitz, 1982, 1987)
- Obvious question: if we already have an optimal income tax, do we need any commodity taxation at all

Atkinson-Stiglitz (1976)

- Combined optimal commodity taxation with an optimal income tax (no restrictions on forms of either tax)
- *If there is separability between consumption of goods and leisure, then there should be no commodity taxation if there is an optimal income tax*
  - In the absence of separability, taxation of commodities had *nothing* to do with Ramsey taxation
  - Similar results hold even if the income tax is not optimal (e.g. a linear income tax)(Stiglitz, 2009)

- Mathematics: key question is how commodity taxation affects the self-selection constraints
    - Insight has important implications for key generalization—where commodity taxation can affect the distribution of income (e.g. between skilled and unskilled workers)
        - Desirable to impose commodity taxes that improve the market distribution of income
        - Less burden on redistribution
        - Real reason: loosens self-selection constraints

Wrong interpretation

- Treating consumption at different dates as different goods, Atkinson-Stiglitz 1976 implies that there should be no tax on interest (no capital taxation)
  - Separability assumption not plausible
  - In absence of separability, may be capital tax or subsidy
    - Depends on complementarity/substitutability between leisure and retirement consumption
- Wrong model to study the issue of capital taxation
  - Individuals differ in other respects
    - Inherited human and financial capital
    - Abilities to obtain returns out of financial assets
  - Capital taxation is directed at addressing these inequalities

Two class model

- Simplification of a more general model with individuals inheriting different amounts of financial capital, and some individuals only saving for life-cycle purposes, others leaving bequests to children
  - Workers: overlapping generations
    - All identical
    - Maximize two period utility, working only first period
  - Capitalists: so much wealth that we can ignore wage income
    - Dynastic utility function

Capital tax used to fund public education

- Fixed labor supply, normalized at unity
- Productivity of labor depends on public expenditure on education (1) $Q = F\left(K, \phi(K_g)\right)$

where $\phi(K_g)$ describes the increased productivity from public education K_g on labor, i.e. $\phi(K_g)$ is the effective labor supply, with $\phi'(K_g) \geq 0$ and $\phi''(K_g) \leq 0$

Tax rate determines effective capital labor ratio

(2) $$Q = \phi f(K/\phi) = \phi f(k)$$

where $k = \frac{K}{\phi}$, the capital-"effective labor" ratio.

Capital tax on wealth of capitalists

LR equilibrium k depends only on capitalists, so long as they exist

$$f' - \eta - \tau = \delta$$

can be solved for k as a function of τ

$$k = \psi(\tau)$$

Solving for w

(3) $$w = \phi\left(K_g\right) g(k) = \phi\left(K_g\right) (f - kf')$$

Where

(4) $$K_g = \tau\,(K - K_w) = \tau\left(\psi(\tau)\,\phi\left(K_g\right) - K_w\right)$$

And

(5) $$K_w = s_w(r)\,\phi\left(K_g\right) g(k) = s_w(\delta + \tau)\phi\left(K_g\right)g(k)$$

(4) and (5) can be solved for K_g and K_w as function of τ and hence *w* as a function of τ, the solution to

(6) $$K_g = \tau\left[\psi(\tau)\,\phi\left(K_g\right) - s_w(\delta + \tau)\phi\left(K_g\right)g\left(\psi(\tau)\right)\right] = H(\tau)$$

Solving for w and maximizing workers' welfare

(7) $$w = \phi\big(H(\tau)\big)g\big(\psi(\tau)\big)$$

If there is enough inequality, and enough inequality aversion in social welfare function, maximizing social welfare maximizes welfare of workers, represented by indirect utility function

(8) $$\mathrm{V}^{\mathrm{w}} = V^{w}(w,r) = V\Big(\phi\big(H(\tau)\big)g\big(\psi(\tau)\big), \tau + \delta\Big)$$

If ϕ' is large enough, then $\frac{dV}{d\tau} > 0$

Optimal tax rate

Can also use tax revenue for public capital goods

- Public investments can reduce adverse incidence of capital tax—or reverse, if (a) public capital goods are productive enough, and (b) are complementary to labor

Pure transfers may be welfare reducing

- Adverse incidence effect

Can easily solve for optimal tax rate

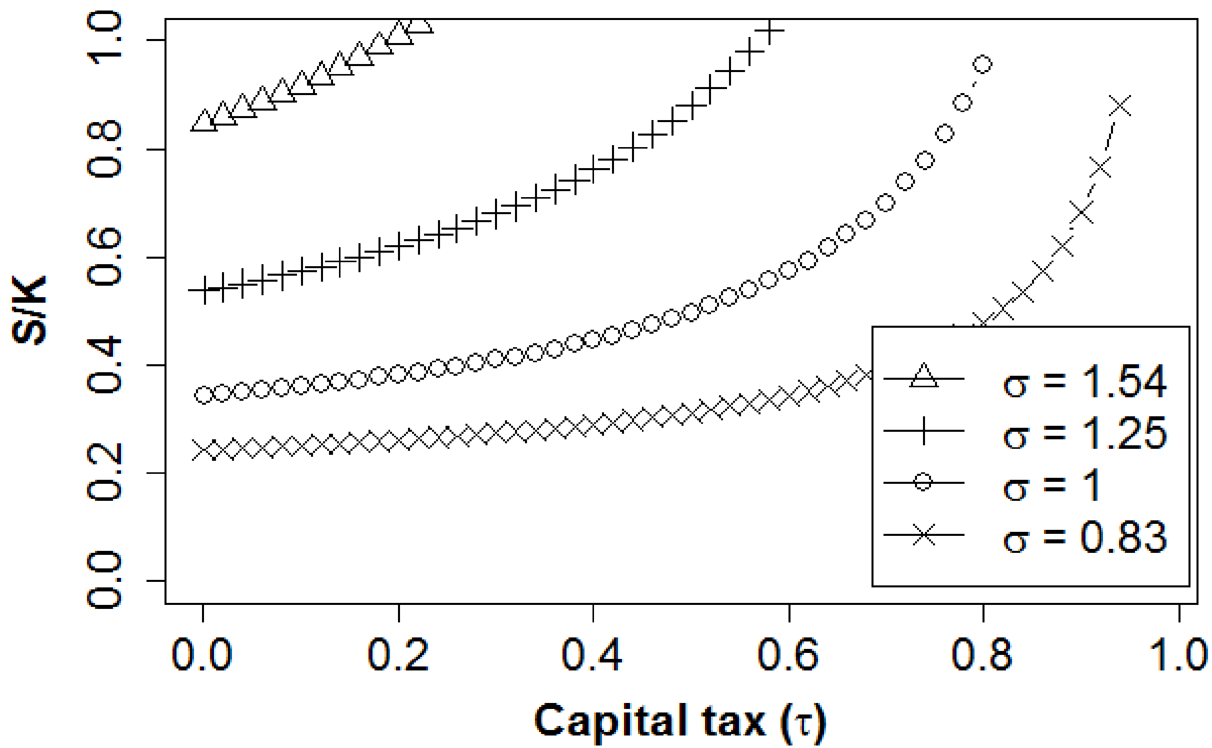
Upper bound

- There is an upper bound to the tax rate
- Upper bound can be established by looking at tax rate at which capitalists get extinguished, i.e. $K_w = K$, the solution to

(9) $s_w(\delta + \tau)\phi(0)g(\psi(\tau)) = \psi(\tau)\phi(0)$

Can solve numerically

- In case where workers have logarithmic utility function, additively separable, with discount rate δ_w *(fixed savings rate)*
- And capitalists have fixed savings rate



S/K
0.0
0.2
0.4
0.6
0.8
1.0
Capital tax (τ)
σ = 1.54
σ = 1.25
σ = 1
σ = 0.83

Conclusions

- Wrong to conclude for Atkinson-Stiglitz 1976 that there should be no taxation of capital: there should be
- If we could, we would tax transfers of wealth across generations
  - In practice, we don't
  - Large fraction of wealth inherited
- This model takes into account the incidence of the tax on wages
  - Main factor limiting taxation
- Always desirable to impose tax on capital provided we can avoid adverse incidence effect, which we can through investments in education and public goods
- I believe Tony would have agreed with, and liked, this result