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

\[ Q = F \left( K, \phi(K_g) \right) \]

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

\[(2) \quad Q = \phi f(K/\phi) = \phi f(k)\]

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 \(\tau\)

\[k = \psi(\tau)\]
Solving for $w$

(3) \[ w = \phi(K_g) g(k) = \phi(K_g) (f - kf') \]

Where

(4) \[ K_g = \tau (K - K_w) = \tau (\psi(\tau) \phi(K_g) - K_w) \]

And

(5) \[ K_w = s_w(\tau) \phi(K_g) g(k) = s_w(\delta + \tau) \phi(K_g) g(k) \]

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

(6) \[ K_g = \tau [\psi(\tau) \phi(K_g) - s_w(\delta + \tau) \phi(K_g) g(\psi(\tau))]] = H(\tau) \]
Solving for $w$ and maximizing workers’ welfare

\begin{equation}
(7) \quad w = \phi(H(\tau))g(\psi(\tau))
\end{equation}

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

\begin{equation}
(8) V^w = V^w(w, r) = V(\phi(H(\tau))g(\psi(\tau)), \tau + \delta)
\end{equation}

If $\phi'$ 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

\[ s_w (\delta + \tau) \phi'(0) g(\psi(\tau)) = \psi(\tau) \phi(0) \]

Can solve numerically

• In case where workers have logarithmic utility function, additively separable, with discount rate $\delta_w$ (fixed savings rate)

• And capitalists have fixed savings rate
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