Designing tax & benefit systems: new results on capital taxation

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Designing tax & benefit systems

• What have we learned since 1970?
• We have made some (limited) progress regarding optimal labor income taxation
• But our understanding of optimal capital tax is close to zero...virtually no useful theory...

→ in this presentation, I will present new results on optimal capital taxation & try to convince you that they are useful

Optimal labor income taxation

- Pre-tax labor income: \( y = \theta l \) (\( \theta \) = productivity)
- Disposable income: \( c = y - T(y) \)
- Mirrlees-Diamond-Saez formula:
  \[
  \frac{T'}{1-T'} = \frac{1}{e} \left[ \frac{1-F(y)}{yf(y)} \right]
  \]
  → this is a useful formula, because it can be used to put numbers and to think about real-world tax policy & trade-offs in an informed way (or at least in a more informed way than in the absence of theory...)
  (=minimalist definition of a useful theory)
• (1) If elasticity $e = \text{flat}$, then **marginal tax rates } T'(y) \text{ should follow a U-shaped pattern: high at bottom & top, but low in the middle, because high pop density; but } e \text{ might be higher at bottom (extensive participation effects): study of work-credit trade-offs etc.}

• (2) As $y \to \infty$, $T' \to 1/(1+ae)$ ($a = \text{Pareto coeff}$) ($a=2.5 \to 1.5 \text{ in US since 70s: fatter upper tail}$) $\to$ if $a=1.5 \text{ & } e=0.1$, $t'=87\%$; but if $e=0.5$, $t'=57\%$

• **Main limitation:** at the top, $e$ has little to do with labor supply; tax enforcement issues; rent extraction issues; marginal product illusion
Optimal capital taxation

• Standard theory: optimal capital rate $\tau_K=0\%$... 
  (Chamley-Judd, Atkinson-Stiglitz)
• Fortunately nobody seems to believe in this extreme result: nobody is pushing for the complete supression of corporate tax, inheritance tax, property tax, etc.
• Eurostat 2010: total tax burden EU27 = 39% of GDP, including 9% of GDP in capital taxes
• The fact that we have no useful theory to think about these large existing capital taxes is one of the major failures of modern economics
A Theory of Inheritance Taxation

• Inheritance = 1\textsuperscript{st} key ingredient of a proper theory of optimal capital taxation

• Imperfect K markets = 2\textsuperscript{nd} key ingredient (to go from inheritance tax to lifetime K tax)

• With no inheritance (100\% life-cycle wealth) \textbf{and} perfect K markets, then the case for $t_\mathcal{K}=0\%$ is indeed very strong: $1+r =$ relative price of present consumption $\rightarrow$ do not tax $r$ (Atkinson-Stiglitz: do not distort relative prices, use redistributive labor income taxation only)
• Key parameter: $b_y = B/Y = \text{aggregate annual bequest flow} \ B/\text{national income} \ Y$

• Very large historical variations:
  $b_y = 20-25\% \ \text{of} \ Y \ \text{until WW1} \ (=\text{very large})$
  $b_y < 5\% \ \text{in} \ 1950-1960 \ (=\text{Modigliani lifecycle story})$
  $b_y \ \text{back up to} \ \sim 15\% \ \text{by} \ 2010$

• See « On the Long-Run Evolution of Inheritance – France 1820-2050 », Piketty WP’10, forth.QJE’11

• $r > g \ \text{story}: \ g \ \text{small} \ & \ r \gg g \ \rightarrow \ \text{inherited wealth capitalizes faster than growth} \ \rightarrow \ b_y \ \text{high}
Figure 9: Observed vs simulated inheritance flow B/Y, France 1820-2100

- Observed series
- Simulated series (2010-2100: g=1.7%, (1-t)r=3.0%)
- Simulated series (2010-2100: g=1.0%, (1-t)r=5.0%)
Why Chamley-Judd fails with inheritances?

C-J in the dynastic model implies that inheritance tax rate $\tau_K$ should be zero in the long-run

(1) If social welfare is measured by the discounted utility of first generation then $\tau_K=0$ because inheritance tax creates an infinitely growing distortion but this is a crazy social welfare criterion that does not make sense when each period is a generation.

(2) If social welfare is measured by long-run steady state utility then $\tau_K=0$ because supply elasticity $e$ of inheritance wrt to price is infinite but we want a theory where $e$ is a free parameter.
Why Atkinson-Stiglitz fails with inheritances?

A-S applies when sole source of lifetime income is labor: \[ c_1 + c_2 / (1+r) = \theta l - T(\theta l) \]

Inheritances provide an additional source of life-income:
\[ c + b(\text{left}) / (1+r) = \theta l - T(\theta l) + b(\text{received}) \]

\( \Rightarrow \) conditional on \( \theta l \), high \( b(\text{left}) \) is a signal of high \( b(\text{received}) \) [and hence low \( u_c \)] \( \Rightarrow \) “Commodity” \( b(\text{left}) \) should be taxed even with optimal \( T(\theta l) \)

**Extreme example:** no heterogeneity in \( \theta \) but pure heterogeneity in bequests motives \( \Rightarrow \) bequest taxation is desirable for redistribution

Note: bequests generate positive externality on donors and hence should be taxed less (but still >0)
A Good Theory of Optimal Inheritance Tax

Should follow the optimal labor income tax progress and hence needs to capture key trade-offs robustly:

1) **Welfare effects:** people dislike taxes on bequests they leave, or inheritances they receive, but people also dislike labor taxes → interesting trade-off

2) **Behavioral responses:** taxes on bequests might (a) discourage wealth accumulation, (b) affect labor supply of inheritors (Carnegie effect) or donors

3) Results should be **robust** to heterogeneity in tastes and motives for bequests within the population and formulas should be expressed in terms of estimable “sufficient statistics”
Simplified 1-period model

- Agent $i$ in cohort $t$ (1 cohort = 1 period = $H$ years)
- Born at the beginning of period $t$
- Receives bequest $b_{ti}$ at beginning of period $t$
- Works during period $t$
- Receives labor income $y_{Lti}$ at end of period $t$
- Consumes $c_{ti}$ & leaves bequest $b_{t+1i}$
- Max $U(c_{ti}, b_{t+1i}) = (1-s_{Bi}) \log(c_{ti}) + s_{Bi} \log(b_{t+1i})$
  s.c. $c_{ti} + b_{t+1i} \leq y_{Lti} + b_{ti} e^{rH}$ ($H$ = generation length)
  $\rightarrow b_{t+1i} = s_{Bi} (y_{Lti} + b_{ti} e^{rH})$
• Steady-state growth: \( Y_t = K_t^\alpha H_t^{1-\alpha} \), with \( H_t = H_0 e^{gt} \) and \( g \) = exogenous productivity growth rate

• Assume \( E(s_{Bi} | y_{Lti}, b_{ti}) = s_B \) (i.e. preference shocks \( s_{Bi} \) i.i.d. & indep. from \( y_{Lti} \) & \( b_{ti} \) shocks)

• Then the aggregate transition equation takes a simple linear form:

\[
B_{t+1} = s_B (Y_{Lt} + B_t e^{rH})
\]

\[
b_{yt} = B_t / Y_t \rightarrow b_y = s_B (1-\alpha)e^{(r-g)H} / (1-s_B e^{(r-g)H})
\]

• \( b_y \) is an increasing function of \( r-g, \alpha \) & \( s_B \)

• \( r-g=3\%, H=30, \alpha=30\%, s_B=10\% \rightarrow b_y=23\% \)

• \( b_y \) indep. from tax rates \( \tau_L \) & \( \tau_B \) (elasticity \( e=0 \))
Optimal inheritance tax formulas

- Rawlsian optimum, i.e. from the viewpoint of those who receive zero bequest ($b_{ti} = 0$)
- Proposition 1 (pure redistribution, zero revenue)
  Optimal bequest tax: $\tau_B = \frac{[b_y - s_B (1-\alpha)]}{b_y (1+s_B)}$
  - If $b_y = 20\%$, $\alpha = 30\%$, $s_B = 10\%$, then $\tau_B = 59\%$
  - I.e. bequests are taxed at $\tau_B = 59\%$ in order to finance a labor subsidy $\tau_L = \frac{\tau_B b_y}{(1-\alpha)} = 17\%$
  → zero receivers do not want to tax bequests at 100\%, because they themselves want to leave bequests → trade-off between taxing successors from my cohort vs my own children
• Proposition 2 (exo. revenue requirements $\tau_Y$)
  $\tau_B=\frac{b_y-s_B(1-\alpha-\tau)}{b_y(1+s_B)}$, $\tau_L=(\tau-\tau_Bb_y)/(1-\alpha)$

• If $\tau=30\%$ & $b_y=20\%$, then $\tau_B=73\%$ & $\tau_L=22\%$
• If $\tau=30\%$ & $b_y=10\%$, then $\tau_B=55\%$ & $\tau_L=35\%$
• If $\tau=30\%$ & $b_y=5\%$, then $\tau_B=18\%$ & $\tau_L=42\%$

→ with high bequest flow $b_y$, zero receivers want to tax inherited wealth at a higher rate than labor income (73% vs 22%); with low bequest flow they want the opposite (18% vs 42%)
• The level of the bequest flow $b_y$ matters a lot for the level of the optimal bequest tax $\tau_B$

• Intuition: with low $b_y$ (high $g$), not much to gain from taxing bequests, and this is bad for my children; i.e. with high $g$ what matters is the future, not the rentiers of the past

• but with high $b_y$ (low $g$), it’s the opposite: it’s worth taxing bequests & rentiers, so as to reduce labor taxation and to allow people with zero inheritance to leave a bequest...
• Proposition 3 (any utility function, elasticity $e>0$)
  \[ \tau_B = \frac{b_y - s_{B0}(1-\alpha-\tau)}{b_y(1+e+s_{B0})} \]
  With $s_{B0} =$ aver. eff. saving rate of zero receivers
  $e =$ elasticity of bequest flow $b_y$ wrt $1-\tau_B$

• If $b_y=10\%$, $s_{B0}=10\%$, and $e=0$ then $\tau_B=55\%$ & $\tau_L=35\%$
• If $e=0.2$, then $\tau_B=46\%$ & $\tau_L=36\%$
• If $e=0.5$, then $\tau_B=37.5\%$ & $\tau_L=37.5\%$
• Behavioral responses matter but not hugely as long as elasticity is reasonable
• Note that if $s_{B0} = 0$ (zero receivers never want to leave bequests), we obtain $\tau_B=1/(1+e)$, the classical revenue maximizing inverse elasticity rule
From inheritance tax to capital tax

- With perfect K markets, it’s always better to have a big tax $\tau_B$ on bequest, and zero lifetime tax $\tau_K$ on K stock or K income, so as to avoid intertemporal distortion.

- However in the real world most people prefer paying a property tax $\tau_K=1\%$ during 30 years rather than a big bequest tax $\tau_B=30\%$

- Total K taxes = 9% GDP, but bequest tax <1%

- In our view, the collective choice in favour of lifetime K taxes is a rational consequence of K markets imperfections, not of tax illusion.
• Other reason for lifetime K taxes: fuzzy frontier between capital income and labor income, can be manipulated by taxpayers

• Proposition 4: With fuzzy frontier, then \( \tau_K = \tau_L \) (capital income tax rate = labor income tax rate), and bequest tax \( \tau_B > 0 \) iff bequest flow \( b_y \) sufficiently large

\[ \rightarrow \] comprehensive income tax system + bequest tax = what we observe

\[ \rightarrow \] but k-labor frontier not entirely fuzzy; see property tax example; one needs K market imperfections to explain obs. tax preferences
• Two kinds of K market imperfections:

(1) Liquidity pbs: paying $\tau_B = 30\%$ might require successors to sell the property (borrowing constraints + indivisibility pb)

→ empirically, this seems to be an important reason why people dislike inheritance taxes (« death taxes ») much more than property taxes & other lifetime K taxes
(2) Uninsurable uncertainty about future rate of return on inherited wealth: what matters is \( b_{ti} e^{rH} \), not \( b_{ti} \); but at the time of setting the bequest tax rate \( \tau_B \), nobody has any idea about the future rate of return during the next 30 years… (idiosyncratic + aggregate uncertainty)

→ with uninsurable uncertainty on \( r \), it’s more efficient to split the tax burden between one-off transfer taxes and flow capital taxes paid during entire lifetime
• In case the intertemporal elasticity of substitution is small, and liquidity pb and/or uninsurable uncertainty on future r is substantial, then maybe it’s not too surprising to find that lifetime capital taxes dominate one-off transfer taxes in the real world.
• Proposition 5. Depending on parameters, optimal capital income tax rate $\tau_K$ can be $> \ or < \ than \ labor \ income \ tax \ rate \ \tau_L$; if IES $\sigma$ small enough and/or by large enough, then $\tau_K > \tau_L$ (=what we observe in UK & US until the 1970s)
• True optimum: K tax exemption for self-made wealth (savings accounts); but this requires complex individual wealth accounts
• Progressive consumption tax cannot implement rawlsian optimum (bc labor & inheritance treated similarly by $\tau_C$)
Conclusion

• Main contribution: simple, tractable formulas for analyzing optimal tax rates on inheritance and capital

• Main idea: economists’ emphasis on $1+r=\text{relative price}$ is excessive

• The important point about $r$ is that it’s large ($r>g \rightarrow \text{tax inheritance, otherwise society is dominated by rentiers}$), volatile and unpredictable ($\rightarrow \text{use also lifetime K taxes for insurance reasons}$)