Use It Or Lose It: Efficiency Gains from Wealth Taxation

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Wealth vs Capital Taxation

- Capital income and wealth taxation are usually equivalent
  - Capital income tax: $\tau_k rk$
  - Wealth tax: $\tau_a k(1+r)$
  - Equivalent at $\tau_a = \frac{r}{1+r}\tau_k$
- wealth k and rate of return r
- To raise the same amount G, after-tax rates of return are equal

$$(1 + r(1 - \tau_k))k = (1 - \tau_a)(1 + r)k$$

- If rates of return r differ by individuals, then this equivalence no longer holds

Wealth vs Capital Example

- Simple example with two people: rates of return $r^1 = 0 < r^2$
  - Both have k unit of wealth
- Person 1 has no capital income: $r^1 k = 0$
  - Pays no capital income taxation $(1 - \tau_k) r^1 k = 0$
  - Would pay wealth taxes $(1 - \tau_a) k > 0$
- To raise revenue G:
  - Capital income tax: all paid by person 2: $\tau_k = \frac{G}{r^2 k}$
  - Wealth tax paid by both: $\tau_a = \frac{G}{2k + r^2 k}$
- A revenue-neutral change to a wealth tax shifts burden from person 2 to person 1

Wealth vs Capital Example

- Next period: person 2 has more capital under the wealth tax
  - capital income tax: person 2 pays the entire revenue G
  - wealth tax: person 1 pays a share of the revenue
- More wealth to person 2 means a higher total return, total wealth grows faster
  - Higher revenues as well then
- Wealth taxes shift the burden to low r people

Model

- Remainder of this paper:
  1. Evaluate the impacts of wealth vs capital income taxation
  2. Build a model to match the U.S. wealth distribution
- Things going on:
  - Productivity changes - lifecycle and inherited
  - Wage changes - lifecycle, inherited, random
  - Social security

Model

- Preferences:
$$\mathbb{E}_0 \sum_{h=1}^{H} \beta^{h-1} \phi_h u(c_h, l_h)$$
- ϕ_h: survival probability
  - Upon death, replacement offspring inherits all wealth
  - No bequest motives, all accidental
  - Live H years maximum
- c_h: consumption
- l_h: leisure (between 0 and 1)

Labor Supply

- Time varying *wages*: $\log(y_{ih}) = \theta_i + \kappa_h + e_{ih}$
- θ_i: permanent component
  - Inherited from parent: $\theta^{child} = \rho_\theta \theta^{parent} + \epsilon_\theta$
  - $\epsilon_\theta \sim \mathcal{N}(0, \sigma_\theta)$ i.i.d.
- κ_h: lifecycle component (common to all)
- e_{ih}: AR(1)
  - $e_{ih} = \rho_e e_{ih-1} + \epsilon_e$
  - $\epsilon_e \sim \mathcal{N}(0, \sigma_{\epsilon_e})$ i.i.d.
- Work all periods until retirement R
- Hours worked $n_{ih} = 1 - l_{ih}$
  - Labor supply is $n_{ih} y_{ih}$

Entrepreneurship

- Entrepreneurial skill: z_{ih}
- Base rate $\bar{z}_i$
  - Inherited from parent: $\log(\bar{z}_i^{child}) = \rho_z \log(\bar{z}_i^{parent}) + \epsilon_{\bar{z}_i}$
  - $\epsilon_{\bar{z}_i} \sim \mathcal{N}(0, \sigma_{\bar{z}})$ i.i.d.
  - Inheritance mismatches (entrepreneurial) skill and wealth
- Lifecycle state $\mathbb{I}_{ih} \in \{\mathcal{H}, \mathcal{L}, 0\}$

$$z_{ih} = \begin{cases} (\bar{z}_i)^\lambda & \text{if } \mathbb{I}_{ih} = \mathcal{H} \\ \bar{z}_i & \text{if } \mathbb{I}_{ih} = \mathcal{L} \\ 0 & \text{if } \mathbb{I}_{ih} = 0 \end{cases}$$

- $\lambda > 1$
- If above median base $\bar{z}_i$, start in $\mathcal{H}$
- Stochastically transition downward

$$\begin{bmatrix} 1 - p_1 - p_2 & p_1 & p_2 \\ 0 & 1 - p_2 & p_2 \\ 0 & 0 & 1 \end{bmatrix}$$

Production

- Final Good: $Y = Q^{\alpha} L^{1-\alpha}$
  - Labor: $L = \int y_{ih} n_{ih}$
  - Intermediates: $Q = \left(\int x_{ih}^{\mu}\right)^{1/\mu}$
  - Competitively produced
- Agent i's intermediate good $x_{ih} = z_{ih} k_{ih}$
  - k_{ih}: capital
  - z_{ih}: agent i's productivity
  - price $p_{ih} = \alpha x_{ih}^{\mu-1} Q^{\alpha-\mu} L^{1-\alpha}$
- Market for capital:
  - r: interest rate
  - **Borrowing constraint**

$$k_{ih} \leq \vartheta(z_{ih}) a_{ih}$$

  - a_{ih}: assets

Social Security

- Retires at age R
- Receive social security income $y^R(\theta, e) = \Phi(\theta, e)\bar{E}$
- $\bar{E}$: average earnings of working population
- $\Phi(\theta, e)$: replacement ratio
  - Depends on θ and last e shock

Taxes

- Taxes:
  - τ_k: capital income tax
  - τ_a: wealth tax
  - τ_L: linear labor income tax
  - τ_c: consumption tax
- Budget requirement G as well as social security payments
- No bequest taxes
- Welfare analysis done with certainty equivalent:
  - CE_1: aggregate CE across all households
  - CE_2: Transfer so that average utility are the same

Quantitative Analysis

Calibration

- Tax rates: $\tau_k = 25\%$, $\tau_l = 22.4\%$, $\tau_c = 7.5\%$, $\tau_a = 0$ (benchmark).
- Production:
  - intermediate input share: $\alpha = 0.4$.
  - CES curvature $\mu = 0.9$ (markup $= 11\%$).
  - Depreciation $\delta = 5\%$.
- Consumer:
  - CRRA $\sigma = 4$. Discount $\beta = 0.95$.
  - Consumption share: $\gamma = 0.46$.
  - Max age $H = 81$. Retirement age $R = 45$. (born at 20).
  - Inherited labor productivity: $\rho_\theta = 0.5$, $\sigma_{\varepsilon_\theta} = 0.3$.
  - Own idiosyncratic labor efficiency: $\rho_e = 0.9$, $\sigma_{\varepsilon_e} = 0.2$.
  - Inherited entrepreneurial ability: $\rho_z = 0.1$.

Benchmark model: wealth inequality

FIGURE 1 – Pareto Tail - Wealth above 1 Million

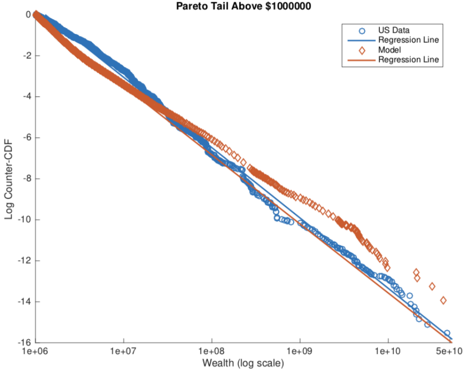

Figure: Wealth inequality

- "Realistic" Pareto tail.

Very top inequality

TABLE V – Wealth Concentration in the Benchmark Model

	U.S. Data	Benchmark
Top 0.1%	0.14	0.23
Top 0.5%	0.27	0.31
Top 1%	0.36	0.36
Top 10%	0.75	0.66
Top 50%	0.99	0.97
Wealth Gini	0.82	0.78

- Top 0.1% owns 23% of wealth in model $>>$ 14% in data.
- Data: Merged SCF and Forbes 400 (Vermeulen, 2016).

Tax Reform: Replacing Capital Income Tax by Wealth Tax

The experiment

- Set $\tau_k = 0$.
- Problem: pension benefits function of labor income $\rightarrow$ constant revenue implies unbalanced budget.
- Two approaches
  - "Revenue neutral": Keep pension income same, set τ_a to get same tax revenue as before.
  - "Balanced budget": Let pension change, set τ_a to have balanced budget.

After-tax returns

TABLE IX – Changes in the Return Distribution

	P10	P50	P90	P95	P99
	Before-tax				
Benchmark	2.00	2.00	17.28	22.35	42.36
Wealth Tax	1.74	1.74	14.62	19.04	36.91
	After-tax				
Benchmark	1.50	1.50	12.96	16.76	31.77
Wealth Tax	0.59	0.59	13.32	17.69	35.35

Wealth more concentrated at top

TABLE VIII – Key Variables: Benchmark Calibration vs. Tax Reform

	Data	Benchmark	Tax Reform
Top 1%	0.36	0.36	0.46
Top 10%	0.75	0.66	0.72
Wealth/Output	3.00	3.00	3.25
Average hours	0.40	0.40	0.41
Std of log earnings	0.80	0.80	0.80
Bequest/Wealth	1–2%	0.99	1.07

Wealth redistributed towards productive agents

TABLE X – Tax Reform from τ_k to τ_a: Change in Wealth Composition

	Productivity group (Percentile)						
Top x%	0-40	40-80	80-90	90-99	99-99.9	99.9-99.99	99.99+
1	-12.0	-13.0	-10.8	10.5	11.2	9.8	6.9
5	-8.2	-3.3	1.6	8.3	8.9	8.1	6.2
10	-6.4	-1.3	2.9	6.4	6.9	6.3	5.0
50	-2.5	0.9	1.8	1.6	1.2	1.1	1.1

Welfare

Welfare analysis

- CE_1: consumption equivalence at individual level aggregating up using stationary distribution

$$V_0\left((1+CE_1(s))c^*_{US}(s), l^*_{US}(s)\right) = \mathbb{V}_0\left(c(s), l(s)\right)$$

$$\overline{CE_1} = \sum_s \Gamma_{US}(s) \times CE_1(s)$$

- CE_2: consumption equivalence to keep average utility constant

$$\sum_s \Gamma_{US}(s) \times V_0\Big((1+\overline{CE}_2)c^*_{US}(s), l^*_{US}(s)\Big) = \sum_{s_0} \Gamma(s) \times \mathbb{V}_0(c(s), l(s))$$

Read paper for details.

Average welfare gain

	Baseline	
	$\overline{CE}_1$	$\overline{CE}_2$
Average CE for newborns	7.40%	7.86%
Average CE	3.14%	5.14%
% in favor of reform	67.8%	

Welfare gain distribution

	Productivity group (Percentile)						
Age	0-40	40-80	80-90	90-99	99-99.9	99.9-99.99	99.99+
20	7.0	7.3	7.9	8.9	10.6	11.6	12.4
21–34	6.5	6.3	6.3	6.6	7.0	6.9	5.7
35–49	5.1	4.4	3.9	3.3	1.7	0.4	-2.2
50–64	2.3	1.8	1.4	0.8	-0.6	-1.7	-3.5
65+	-0.2	-0.3	-0.4	-0.6	-1.2	-1.7	-2.7

- Wealth tax hurts saving of unproductive agents
- Older high productivity entrepreneurs have low welfare gains because some have lost their productivity.
- Wealth tax $\rightarrow$ many unhappy old people...

Welfare gain distribution

	Productivity group (Percentile)						
Age	0-40	40-80	80-90	90-99	99-99.9	99.9-99.99	99.99+
20	7.0	7.3	7.9	8.9	10.6	11.6	12.4
21–34	6.5	6.3	6.3	6.6	7.0	6.9	5.7
35–49	5.1	4.4	3.9	3.3	1.7	0.4	-2.2
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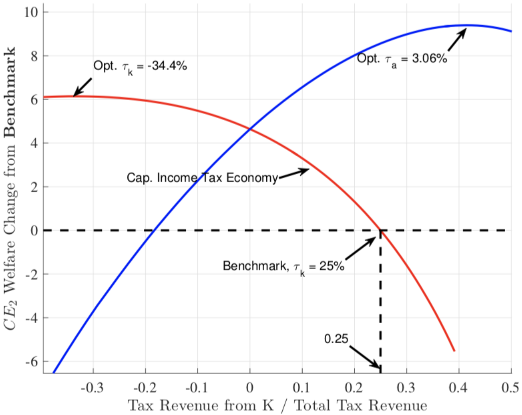
- Wealth tax hurts saving of unproductive agents
- Older high productivity entrepreneurs have low welfare gains because some have lost their productivity.
- Wealth tax $\rightarrow$ many unhappy old people...
- ...but can be fixed with social security reforms, so old people can also enjoy the more efficient economy.

Optimal Taxation

Welfare gain from Optimal Taxes

FIGURE 2 – Welfare Gain from Optimal Taxes



- Optimal capital tax: -34.4%. Optimal wealth tax: 3.06%.

Mechanisms

- Capital income tax mainly distorts incentives for productive agents.
  - misallocation is more severe $\rightarrow$ Q drops more than $\overline{k}$.
  - $\overline{k}$ drop more for capital income tax than wealth tax.
- Since wealth tax is less distortionary, can lower labor tax more.
  - After tax wage bills rise for wealth tax.
- Individuals relying on labor income benefit. Individuals relying mainly on wealth are hurt.
- The latter is fewer $\rightarrow$ optimal wealth tax to max welfare of newborn is close to rate to max after-tax wage.
- The optimal capital income tax to maximize wage bill is negative.

Robustness

TABLE XX – Robustness: **Tax Reform** Experiments

	Baseline	Prog. Labor Tax	Constant z	No Constr.	$\mu = 0.8$	Estate Taxes	Present Value	CKK
τ_a	1.13%	0.90%	1.23%	1.65%	1.24%	0.95%	1.26%	1.92%
				Welfare Gain from Tax Reform				
CE_1 (All)	3.14	2.79	2.29	0.44	3.07	3.56	2.47	0
CE_1 (New born)	7.40	6.48	5.46	1.86	7.54	8.22	6.07	0
CE_2 (All)	5.14	4.68	2.92	0.36	5.06	5.85	4.21	0
CE_2 (New born)	7.86	7.06	5.36	1.43	7.85	8.80	6.48	0
Vote (%)	67.7	69.0	68.3	55.9	70.2	68.4	66.9	-
				Percentage Change in Aggregates				
$\bar{k}$	19.37	21.27	9.56	6.28	16.43	21.05	15.60	0
Q	24.79	25.61	22.37	6.28	21.25	27.90	19.87	0
w	8.70	9.25	7.66	2.10	7.77	9.75	7.08	0
Y	10.10	10.01	9.54	3.02	8.38	11.25	8.18	0
L	1.28	0.69	1.75	0.91	0.57	1.37	1.04	0
C	10.01	10.01	11.25	2.93	8.33	11.31	8.17	0

Progressive income tax: $T(y) = y - (1 - \tau_l)y^{\phi}$

- $\phi = 0.815$ (from Heathcote, Storesletten and Violante (2014))
- Not much change

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C	10.01	10.01	11.25	2.93	8.33	11.31	8.17	0

Constant $z_{ih} = \bar{z}_i$ (no high-low-zero state)

- Generates less self-made rich people
- Easier to self-finance (high productivity later in life)

Robustness

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No constraint

- Welfare gain is quite small
- Why?

Robustness

- Borrowing constraint was key to give people with different productivity z_{ih} different rates of return:

$$k \leq \vartheta(z)a$$

- Without borrowing constraints, the (pre-tax) return to assets is always $1 + r$, regardless of z_{ih}

- Entrepreneurial profit is exogenous to the entrepreneur's problem

$$\pi^*(z) = \max_k \left(Q^{\alpha-\mu} L^{1-\alpha}\right)(zk)^{\mu} - (r + \delta)k$$

- Taxed at different rates under capital income τ_k and τ_a

- Returns to wealth decreased $(1 + r(1 - \tau_k)) > (1 - \tau_a)(1 + r)$