Use It Or Lose It:
Efficiency Gains from Wealth Taxation

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Taxing Capital

- **Question:** How does taxing income flow from capital differ from taxing stock of capital?
  - **Capital income tax:** $a_{\text{after-tax}} = a + (1 - \tau_k) \times ra$
  - **Wealth tax:** $a_{\text{after-tax}} = (1 - \tau_a) \times a + (1 - \tau_a) \times ra$
- **Standard Answer:** The two taxes are equivalent with $\tau_a = \frac{r\tau_k}{1+r}$ ... assuming r is the same for all individuals.
- **This Paper:** Take heterogeneity in r seriously and compare the two ways of taxing capital.
  - **Short Answer:** The two taxes have very different—sometimes opposite—implications.

Two Motivations for "Heterogeneous Returns"

1. Increasing evidence of large and persistent differences in returns across households:
   - Norway: Fagereng, et al (2016), US: Smith, Yagan, Zidar, Zwick (2017).
2. US wealth distribution extremely concentrated. So:
   - Top 1% pay 44% of capital taxes. Top 10% pay 79% of capital taxes.
   - But generating features of this wealth distribution is hard:
     - Data: Top 1% hold 35–40% (Models: 8–10%)
     - Data: Top 10% hold 75–80% (Models: 35–40%)
     - US billionaires: 54% are self made.
     - In most models that match top 1% share: few have more than $10M wealth
     - Even when generated, it takes many many (10+) generations to produce billionaires
   - Models with return heterogeneity can generate these facts.

This Paper

We study optimal taxation of wealth in a quantitative framework, which:

1. generates the high concentration of wealth at the very top
2. by modeling persistent heterogeneity in investment returns
   a. building on the power law inequality models, and
   b. recent empirical evidence documenting such heterogeneity.

(Quick!) Preview of Results

	Homogenous *r*	Heterogeneous *r*
	Optimal capital income tax	
Tax rate (τ_k)	Positive	Negative
Labor income tax	τ_ℓ	$> \tau_\ell$
Welfare	level loss	level gain
	distributional gain	distributional loss
	Optimal wealth tax	
Tax rate (τ_k)	same as above	Positive
Labor income tax	τ_ℓ	$< \tau_\ell$
Welfare	same as above	level gain
	same as above	distributional gain?!

Simple Example

Return Heterogeneity: Simple Example

- One-period model. Tax collected end of period.
- Two brothers, Fredo and Mike, each with $1000 of wealth.
- Key heterogeneity: in investment/entrepreneurial ability
  - (Fredo) Low ability: earns $r_f = 0\%$ net return
  - (Mike) High ability: earns $r_m = 20\%$ net return.
- Government taxes to finance $G = \$50$

Capital Income vs. Wealth Tax

	Capital income tax		Wealth tax	
	$W_{\text{after-tax}} = a + (1-\tau_k)ra$		$W_{\text{after-tax}} = (1-\tau_a)a + (1-\tau_a)ra$	
	Fredo ($r_f = 0\%$)	**Mike** ($r_m = 20\%$)	**Fredo** ($r_f = 0\%$)	**Mike** ($r_m = 20\%$)
Wealth	1000	1000	1000	1000
Before-tax Income	0	200	0	200
	$\tau_k = \frac{50}{200} = 25\%$		$\tau_a = \frac{50}{2200} \approx 2.27\%$	
Tax liability	0	50	$1000\tau_a = 22.7$	$1200\tau_a = 27.3$
After-tax return	0%	$\frac{200-50}{1000} = 15\%$	$-\frac{22.7}{1000} = -2.3\%$	$\frac{200-27}{1000} = 17.3\%$
After-tax $\frac{W_m}{W_f}$	$1150/1000 = 1.15$		$1173/977 \approx 1.20$	

Simple Example: Remarks

- Replacing capital income tax with wealth tax increases dispersion in after-tax returns.
- Potential effects:
  - Positive (+): Efficiency gain
    1. (Static): Capital is reallocated (mechanically) to more productive agents.
    2. (Dynamic): If savings rates respond to changes in returns, this could further increase reallocation of capital toward more productive agents.
  - Negative (-): Increased wealth inequality (but: ambiguous effect on consumption inequality when wage income present).
- Conjecture: positive effects will be first order and negative effects will be second order.

Outline

1. Model
2. Parameterization
3. Tax reform experiment
4. Optimal taxation
5. Robustness
6. Conclusions and current work

Model

Model

New Models of Inequality

- Build power law models (Benhabib, Bisin, et al (2011–2016), Jones and Kim (2016), etc.)
  - Persistent return heterogeneity: key for dynamics of wealth distribution (Gabaix, Lasry, Lions, and Moll (2016))
  - Fagereng, Guiso, Malacrino, and Pistaferri (2016): large heterogeneity and permanent differences in rate of returns.

Households

- OLG demographic structure.
- Individuals face mortality risk and can live up to H years.
- Let ϕ_h be the unconditional probability of survival up to age h, where $\phi_1 = 1$.
- Accidental bequests are inherited by (newborn) offspring.
- Each individual supplies labor in the market and produces a differentiated intermediate good using her capital (wealth) and borrowing from the credit market.
- Individuals maximize $\mathbb{E}_0 \left(\sum_{h=1}^{H} \beta^{h-1} \phi_h u(c_h, \ell_h) \right)$

1. Labor Market Productivity

- Labor market efficiency of household i at age h is

$$\log y_{ih} = \underbrace{\kappa_h}_{\text{life cycle}} + \underbrace{\theta_i}_{\text{permanent}} + \underbrace{\eta_{ih}}_{\text{AR(1)}}$$

- Individual-specific labor market efficiency θ_i is imperfectly inherited from parents:

$$\theta_i^{child} = \rho_\theta \theta_i^{parent} + \varepsilon_\theta$$

2. Entrepreneurial Productivity

- **Key source of heterogeneity:** in entrepreneurial ability z_i.
- Household i produces x_{ih} units of intermediate good i according to

$$x_{ih} = z_{ih} k_{ih},$$

  z_{ih} is idiosyncratic entrepreneurial ability and k_{ih} is capital.
- z_{ih} has a permanent and a stochastic component:

$$z_{ih} = f(\underbrace{z_i^p}_{\text{perm. comp.}}, \underbrace{\mathbb{I}_{ih}}_{\text{stoch. comp.}})$$

- z_i^p is constant over the lifecycle and inherited imperfectly:

$$\log(z^p_{child}) = \rho_z \log(z^p_{parent}) + \varepsilon_z.$$

- $\mathbb{I}_{ih}$ is governed by transition matrix Π_z, specified in a moment.

Competitive Final Good Producer

- Final good output is $Y = Q^{\alpha} L^{1-\alpha}$, where

$$Q = \left(\int_i x_i^{\mu} di \right)^{1/\mu}, \quad \mu < 1,$$

  and L is efficiency-adjusted aggregate labor input.

- Price of intermediate good i is

$$p_i(x_i) = \alpha x_i^{\mu-1} \times Q^{\alpha-\mu} L^{1-\alpha}.$$

- Wage rate (per efficiency unit of labor) is

$$w = (1-\alpha) Q^{\alpha} L^{-\alpha}.$$

Entrepreneur's Problem

- Individuals can **borrow** up to a limit to finance their production: $k \leq \vartheta(z) \times a$
  - Borrowing capacity is nondecreasing in ability: $d\vartheta(z)/dz \geq 0$
  - If $\vartheta(z) = 1 \Rightarrow$ cannot borrow or lend
- Individuals can **lend** at interest rate r, determined in equilibrium (zero net supply).
- Letting $\mathcal{R} = \alpha Q^{\alpha-\mu} L^{1-\alpha}$, without taxes, wealth after-production:

$$\max_{k \leq \vartheta(z) a} \{[\mathcal{R} \times (zk)^{\mu} + (1-\delta)k] - (1+r)(k-a)\}$$
$$= (1+r)a + \pi^*(a,z)$$

- **After-tax wealth:**

$$\Pi(a,z;\tau_k) = a + [ra + \pi^*(a,z)](1-\tau_k) \qquad \text{under capital income tax}$$
$$\Pi(a,z;\tau_a) = [(1+r)a + \pi^*(a,z)](1-\tau_a) \qquad \text{under wealth tax}$$

Individual's Budget Constraint

- During working life:

$$(1 + \tau_c)c + a' = \Pi(a, z; \tau) + (1 - \tau_\ell)\,(wy_h n)$$

and $a' \geq 0$ at all ages.

- During retirement:

$$(1 + \tau_c)c + a' = \Pi(a, z; \tau) + y_R(\theta, \eta)$$

- Without heterogeneity in z and with $\mu = 1$, the two tax systems are equivalent.

Government

The government budget balances. Two scenarios:

1. Taxing capital income and labor income:

$$G + SSP = \sum_{h,a,\mathbf{s}} \left[\tau_k \times (ra + \pi^*(z,a)) + \tau_\ell \times wy_h + \tau_c \times c_h(a,\mathbf{s})\right] \Gamma\left(a,\mathbf{s};h\right)$$

   where

$$SSP = \sum_{a,\mathbf{s},h \geq R} y_R(\theta,\eta)\Gamma(h,a,\mathbf{s}).$$

2. Taxing wealth and labor income:

$$G + SSP = \sum_{h,a,\mathbf{s}} \left[\tau_a \times (((1+r)a + \pi^*(z,a))) + \tau_\ell w y_h + \tau_c c_h(a,\mathbf{s})\right] \Gamma\left(a,\mathbf{s};h\right)$$

- $\mathbf{s} \equiv (\theta,\eta,z)$ and $\Gamma\left(a,\mathbf{s};h\right)$ is the stationary distribution of agents over states.

Parameterization

Functional Forms and Parameters

- Preferences:

$$u(c, \ell) = \frac{\left(c^{\gamma} \ell^{1-\gamma}\right)^{1-\sigma}}{1-\sigma}$$

- Pension system:
  - $y_R(\theta, \eta) = \Phi(\theta, \eta) \times \overline{Y}$ where $\overline{Y}$ is the average labor income in economy, and
  - $\Phi(\theta, \eta)$ is a concave replacement rate function taken from Social Security's OASDI system.

Entrepreneurial Ability: Stochastic Component

- The **lifecycle pattern of wealth accumulation** for the very rich matters greatly for the effects of wealth taxation:
  1. **steady accumulation of wealth:** the rich today have high expected returns tomorrow.
     - Wealthy are also more in favor of wealth taxation.
  2. **extremely fast growth that tapers off**: rich today have low expected returns tomorrow.
     - Wealthy are less supportive of wealth taxes.
- With fixed productivity, z^p, returns fall as wealth increases (since $\mu < 1$), but not sufficiently.
- So, we consider a process that allows for both scenarios.

Life Cycle Evolution of Entrepreneurial Ability

- Over the life cycle, entrepreneurial ability evolves as follows: $\mathbb{I}_{ih} \in \{H, L, 0\}$

$$z_{ih} = f(z_i^p, \mathbb{I}_{ih}) = \begin{cases} \left(z_i^p\right)^\lambda & \text{if } \mathbb{I}_{ih} = H \qquad \text{where } \lambda > 1 \\ z_i^p & \text{if } \mathbb{I}_{ih} = L \\ z_{min} & \text{if } \mathbb{I}_{ih} = 0 \end{cases}$$

with transition matrix:

$$\Pi_{z^s} = \begin{bmatrix} 1 - p_1 - p_2 & p_1 & p_2 \\ 0 & 1 - p_2 & p_2 \\ 0 & 0 & 1 \end{bmatrix}.$$

- λ : degree of superstar returns.
- p_1: annual probability of losing superstar returns
- p_2 : annual probability of losing investment ability completely $\rightarrow$ become a passive saver.

Calibration Target

- Goal: Match the fraction of Forbes 400 rich that are self-made (54%, we get 50%)
- Permanent z alone does not create enough self-made Forbes 400 rich.
  - It takes too long (many generations) to get into Forbes 400.
- We choose: $\lambda = 5$, $p_1 = 0.05$, and $p_2 = 0.03$.
- We also have robustness analysis with constant productivity: $\lambda = 1$, $p_1 = 0$, and $p_2 = 0$.

Parameters Set Outside the Model

Table 1: Benchmark Parameters

Parameter		Value
Curvature of utility	σ	4.0
Curvature of CES aggregator of varieties	μ	0.90
Capital share in production	α	0.40
Depreciation rate of capital	δ	0.05
Interg. persistence of invest. ability	ρ_{z^P}	0.10
Interg. persistence of labor efficiency	ρ_θ	0.50
Persistence of labor efficiency shock	ρ_η	0.90
Std. dev. of labor efficiency shock	$\sigma_{\varepsilon_\eta}$	0.20

$\tau_k = 25\%$, $\tau_\ell = 22.4\%$, and $\tau_c = 7.5\%$ (McDaniel, 2007)

Calibration Targets and Outcomes

- $\rho_{\bar{z}} = 0.1$ is set based on Fagereng et al (2016) for Norway. (We have also experimented with values up to 0.5)
- We calibrate 4 remaining parameters $(\beta, \gamma, \sigma_{\varepsilon_{zp}}, \sigma_{\varepsilon_\theta})$ to match 4 data moments:

Table 2: Benchmark Parameters Calibrated Jointly in Equilibrium

Parameter		Value	Moment	
Discount factor	β	0.948	Capital/Output	3.00*
Cons. share in *U*	γ	0.46	Avg. Hours	0.40*
σ of entrepr. ability	$\sigma_{\varepsilon_{zp}}$	0.072	Top 1% share	0.36*
σ of labor fix. eff.	$\sigma_{\varepsilon_\theta}$	0.305	σ(log(Earn))	0.80*

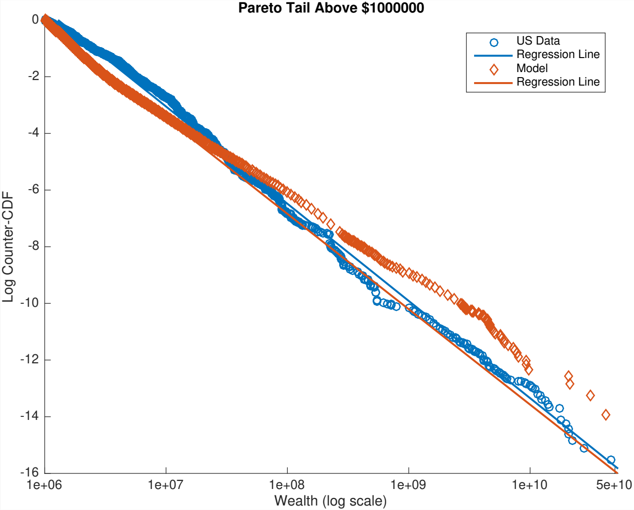
Moments

Table 3: Benchmark vs. Wealth Tax Economy

	US Data	Benchmark	Wealth Tax
Top 1%	0.36*	0.36	
Capital/Output	3.00*	3.00	
Bequest/Wealth	1–2%	0.99%	
σ(log(Earnings))	0.80*	0.80	
Avg. Hours	0.40*	0.40	

- Calibrated model generates:
  - total tax revenues: 25% of GDP (24.8% in the data - OECD 2011)
  - ratio of capital tax revenue to total tax revenue: 25% (28% in the data - OECD 2011)

$\mu = 0.9$ and Pareto Tail



Quantitative Results

Quantitative Results

Two Types of Experiments

1. **Tax reform:**
   1. Calibrate to current US economy **with** capital income taxes.
      - Baseline: Replace capital income taxes with wealth taxes so as to keep government revenue constant.
2. **Optimal taxation:** Government maximizes utilitarian social welfare choosing:
   1. linear labor income and capital income taxes, or
   2. linear labor income and wealth taxes,

Note:

- In all experiments 2.a to 3.b, we keep the **pension benefits fixed** at the baseline values.
  - Extension: Let SS benefits scale with economy. Will report some results.

Preview of Extensions We Have Studied

1. Progressive labor income taxes (Reform & Optimal)
2. Progressive wealth taxes–flat tax, single threshold (Optimal)
3. Unlimited borrowing (Reform & Optimal)
4. Unlimited borrowing, with $R^{\text{borrow}} \gg R^{\text{save}}$ (Optimal)
5. Log utility (Reform and Optimal)
6. $z_{ih} = z_i^p$ at all ages (Reform and Optimal)
7. $\mu = 0.8$ (Reform, Optimal—in progress)
8. Estate taxes, calibrated (Reform and Optimal, both in progress)
9. Consumption taxes (Optimal—in progress).
10. Some more extensions...

Summary: The substantive conclusions presented next are robust to these extensions.

Tax Reform

1. Tax Reform

- Replace capital income taxes with wealth taxes so as to keep government revenue constant.

Tax Reform: Wealth Distribution

Table 4: Benchmark vs. Wealth Tax Economy

	US Data	Benchmark	Wealth Tax
Top 1%	0.36*	0.36	**0.46**
Capital/Output	3.00*	3.00	**3.25**
Bequest/Wealth	1–2%	0.99%	1.07%
σ(log(Earnings))	0.80*	0.80	0.80
Avg. Hours	0.40*	0.40	0.41

Tax Reform: Aggregate Variables

Table 5: Benchmark vs. Wealth Tax Economy

	Benchmark	Wealth Tax	% Change
τ_k	25.0%	0.00	
τ_a	0.00	1.13%	
$\bar{k}$			19.4
Q			24.8
w			8.7
Y			10.1
L			1.3
C			10.0

Reallocation of Wealth Across Agents

Table 6: 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 Analysis: Two Measures

Let $\mathbf{s}_0 \equiv (\theta, z, a_0)$, and V_0 and $\mathbb{V}_0$ be lifetime value function in benchmark (US) and counterfactual economies, respectively.

- Measure 1: Compute individual-specific consumption equivalent welfare and integrate:

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

$$\overline{CE}_1 \equiv \sum_{\mathbf{s}_0} \Gamma_{US}(\mathbf{s}_0) \times CE(\mathbf{s}_0)$$

- Measure 2: Fixed proportional consumption transfer to all individuals in the benchmark economy:

$$\sum_{\mathbf{s}_0} \Gamma_{US}(\mathbf{s}_0) \times V_0((1+\overline{CE}_2)c^*_{US}(\mathbf{s}_0), \ell^*_{US}(\mathbf{s}_0)) = \sum_{\mathbf{s}_0} \Gamma(\mathbf{s}_0) \times \mathbb{V}_0(c(\mathbf{s}_0), \ell(\mathbf{s}_0)).$$

Tax Reform: Average Welfare Change

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

	Baseline		Baseline + SS	
	$\overline{CE}_1$	$\overline{CE}_2$	$\overline{CE}_1$	$\overline{CE}_2$
Average CE for newborns	7.40%	7.86%	**5.58%**	4.71
Average CE	3.14%	5.14%	4.95	4.10
% in favor of reform	67.8%		**94.8%**	

Tax Reform: Who Gains? Who Loses?

	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

Note: *Each cell reports the average of* $CE_1(\theta, z, a, h) \times 100$ *within each age and productivity group*

Sharing the Gains with Retirees

	Productivity group (Percentile)						
Age	0-40	40-80	80-90	90-99	99-99.9	99.9-99.99	99.99+
20	**4.9**	**5.3**	**6.0**	**7.2**	**9.3**	**10.4**	**11.4**
21–34	4.7	4.6	4.8	5.4	6.1	6.3	5.2
35–49	4.2	3.7	3.4	2.8	1.4	0.0	-2.8
50–64	4.9	4.3	4.0	3.2	**1.4**	**0.0**	-2.3
65+	**7.2**	**6.7**	**6.4**	**5.8**	**4.3**	**3.2**	**1.2**

Note: *Each cell reports the average of $CE_1(\theta, z, a, h) \times 100$ within each age and productivity group*

Political Support for Wealth Taxes

	Productivity group (Percentile)						
Age	0-40	40-80	80-90	90-99	99-99.9	99.9-99.99	99.99+
20	96.1	95.8	97.2	98.0	98.7	98.9	99.0
21–34	97.3	96.3	95.8	95.0	92.6	89.9	82.5
35–49	95.8	92.7	89.5	83.9	70.7	60.7	43.7
50–64	79.4	74.5	70.2	62.9	51.1	44.1	34.4
65+	8.0	9.5	9.5	8.8	7.3	6.2	4.8

Note: *Each cell reports the share of agents in each category (age-productivity) with positive welfare gain* $(CE_1(\theta, z, a, h) > 0)$.

Political Support with Retirees on Board

	Productivity group (Percentile)						
Age	0-40	40-80	80-90	90-99	99-99.9	99.9-99.99	99.99+
20	94.3	94.6	95.9	97.3	98.6	98.9	99.0
21–34	95.9	94.7	94.4	94.0	91.7	89.1	82.0
35–49	95.4	92.3	89.5	84.2	71.4	61.4	44.4
50–64	96.6	93.7	90.7	83.7	70.1	61.1	48.5
65+	99.5	98.6	97.5	92.8	82.0	73.9	60.3

Note: *Each cell reports the share of agents in each category (age-productivity) with positive welfare gain* $(CE_1(\theta, z, a, h) > 0)$.

Optimal Taxation

2. Optimal Taxation

Two Optimal Tax Problems

Compare:

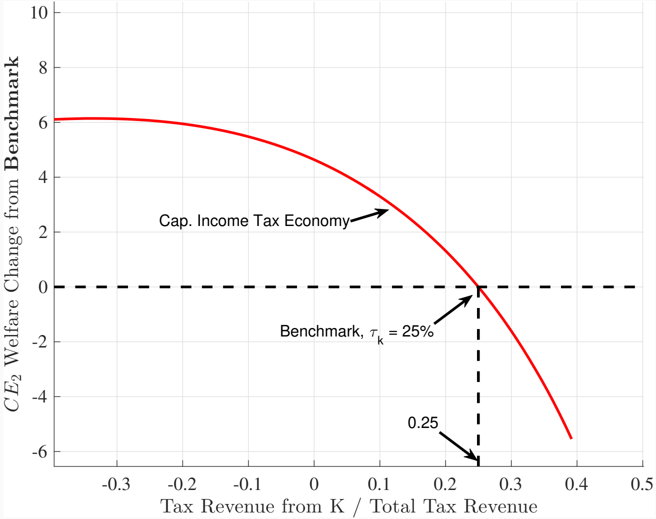
1. (linear) labor taxes and capital income taxes
2. (linear) labor taxes and wealth taxes.

The government maximizes ex ante (expected) lifetime utility of newborns.

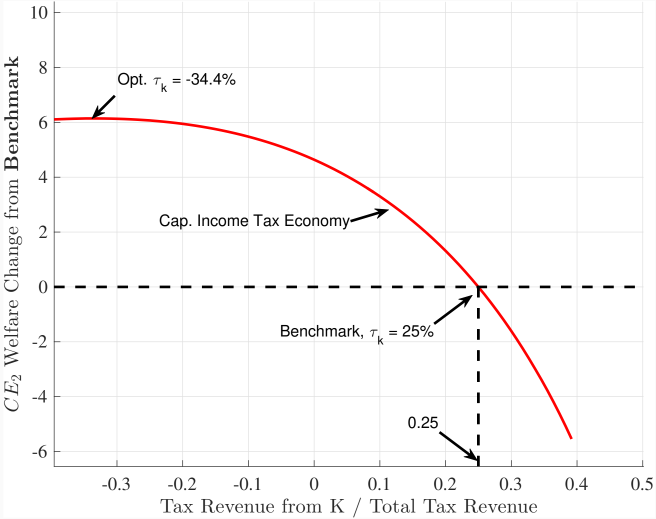
Then analyze:

- Benchmark vs. Optimal tax (either capital income or wealth)

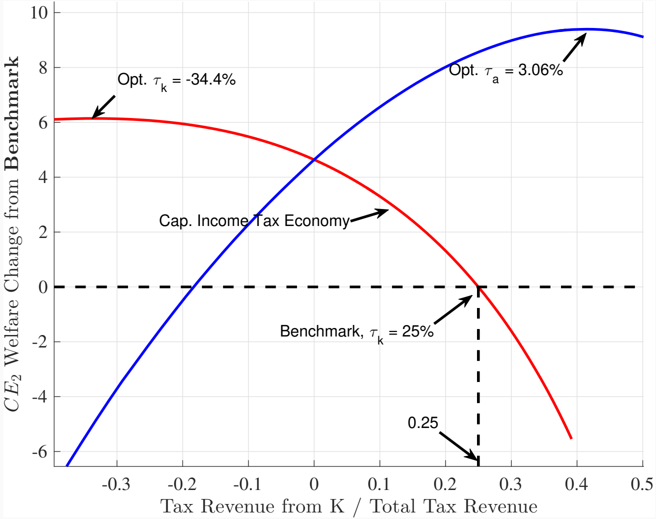
Welfare Change: Optimal Taxes



Welfare Change: Optimal Taxes



Welfare Change: Optimal Taxes



Optimal Tax Structure and Outcomes

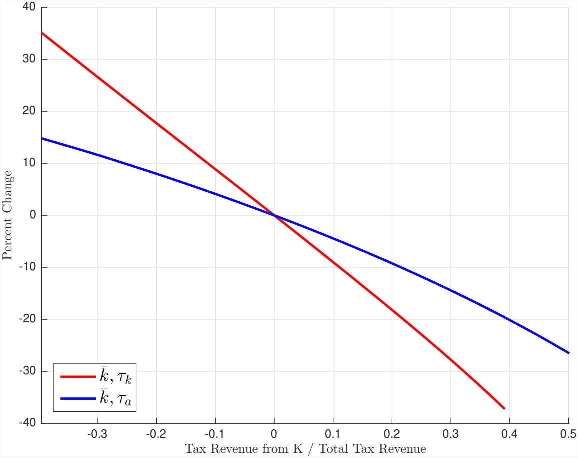
Baseline

	τ_k	τ_ℓ	τ_a	$\bar{k}/Y$	Top 1%
Benchmark	25%	22.4%	–	3.0	0.36
Tax reform	–	22.4%	1.13%	3.25	0.46
Opt. τ_k	**−34.4%**	**36.0%**	**–**	**4.04**	**0.56**
Opt. τ_a	–	14.1%	3.06%	2.90	0.47
Opt. τ_a w/ threshold	–	14.2%	3.30%	2.86	0.47
	$\frac{Threshold}{\bar{E}} = 25\%$			63% of pop. taxed	

Baseline

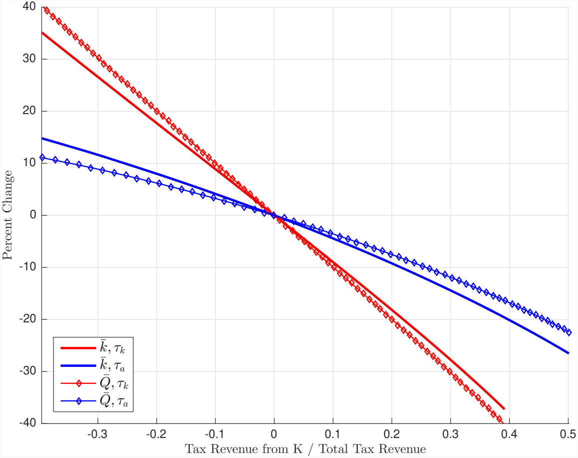
	τ_k	τ_ℓ	τ_a	$\bar{k}/Y$	Top 1%

Wealth Taxes – Distortions and Misallocation



- Wealth tax reduces $\overline{k}$ **less** than capital income tax.

Wealth Taxes – Distortions and Misallocation



- $\overline{Q}$, declines **less** than $\overline{k}$ under wealth taxes. Opposite under capital income taxes.

Optimal Taxes: Aggregate Variables

% change	ΔK	ΔQ	ΔL	ΔY	Δw	Δw (net)	Δr	Δr (net)
Tax reform	19.37	24.79	1.28	10.10	8.70	8.70	–0.25	–0.90
Opt. τ_k	**68.97**	79.57	−1.16	**25.51**	**26.97**	**4.72**	–1.51	–0.87
Opt. τ_a	**2.76**	10.26	3.90	6.40	**2.41**	**13.42**	0.68	–1.92
Opt. τ_a Threshold	0.41	8.12	3.67	5.42	1.70	12.48	0.78	–2.07

Optimal Taxes: Welfare

Baseline

	τ_k	τ_ℓ	τ_a	$\overline{CE}_2$ (%)	Vote (%)
Benchmark	25%	22.4%	–	–	–
Tax reform	–	22.4%	1.13%	7.86	
Opt. τ_k	−34.4%	36.0%	–	6.28	
Opt. τ_a	–	14.1%	3.06%	9.61	
Opt. τ_a	–	14.2%	3.30%	9.83	
Threshold	$\frac{Threshold}{\bar{E}} = 25\%$				

Welfare: Levels vs. Redistribution

	Tax Reform	Opt. τ_k	Opt. τ_a
CE_2 (NB)	**7.86**	**6.28**	**9.61**
	Consumption		
Total	8.27	5.90	11.02
Level	10.01	21.04	8.28
Dist.	−1.58	−12.51	2.53
	Leisure		
Total	−0.38	0.36	−1.27
Level	−0.66	0.73	−2.21
Dist.	0.27	−0.38	0.76

Formula

Optimal Capital Income Tax: Welfare

Optimal Capital Income Tax - Welfare Gain by Age/Productivity

	Productivity group (Percentile)						
Age	0-40	40-80	80-90	90-99	99-99.9	99.9-99.99	99.99+
20	**4.0**	**5.6**	**7.2**	**9.5**	**13.0**	**14.8**	**16.1**
21–34	3.7	5.0	6.2	7.9	10.4	11.4	11.2
35–49	2.7	3.3	3.8	4.0	3.5	2.7	0.7
50–64	1.1	1.4	1.6	1.5	0.6	-0.2	-1.9
65+	-0.1	0.1	0.2	0.2	-0.2	-0.7	-1.6

Political Support

Optimal Wealth Tax: Welfare

Optimal Wealth Tax - Welfare Gain by Age/Productivity

	Productivity group (Percentile)						
Age	0-40	40-80	80-90	90-99	99-99.9	99.9-99.99	99.99+
20	**10.0**	**9.7**	**10.1**	**11.1**	**13.1**	**14.3**	**15.3**
21–34	9.2	7.9	7.3	7.1	6.6	5.9	3.1
35–49	6.8	4.9	3.7	2.1	**-1.3**	**-3.9**	**-8.8**
50–64	2.7	1.4	0.6	**-0.8**	**-3.7**	-5.8	-9.3
65+	-0.6	**-0.9**	**-1.2**	**-1.8**	-3.2	-4.3	-6.3

Political Support Political Support + Threshold

Optimal Wealth Tax With Threshold: Welfare

	Productivity group (Percentile)						
Age	0-40	40-80	80-90	90-99	99-99.9	99.9-99.99	99.99+
20	9.9	9.8	10.3	11.4	13.4	14.6	14.5
21–34	9.1	8.0	7.4	7.2	6.6	5.6	5.9
35–49	6.7	4.9	3.6	1.9	-1.6	-4.9	-4.4
50–64	2.7	1.5	0.6	-0.8	-3.9	-6.5	-6.2
65+	-0.4	-0.7	-1.0	-1.6	-3.2	-4.6	-4.4

Optimal Taxes: Welfare

Baseline

	τ_k	τ_ℓ	τ_a	$\overline{CE}_2$ (%)	Vote (%)
Benchmark	25%	22.4%	–	–	–
Tax reform	–	22.4%	1.13%	7.86	67.8
Opt. τ_k	−34.4%	36.0%	–	6.28	69.7
Opt. τ_a	–	14.1%	3.06%	9.61	60.7
Opt. τ_a Threshold	–	14.2%	3.30%	9.83	78.9

Robustness

Robustness

Rate of Return Heterogeneity

Table 7: Benchmark vs. Wealth Tax Economy

	Percentiles of 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

Tax Reform: Aggregates

% Change	Baseline	No Shock	No Const.	Prog. Labour Tax
$\bar{k}$	19.37	9.56	6.28	21.27
Q	24.79	22.37	6.28	25.61
w	8.70	7.66	2.10	9.25
Y	10.10	9.54	3.02	10.01
L	1.28	1.75	0.91	0.69
C	10.01	11.25	2.93	10.01

Tax Reform: Welfare

	Baseline	No Shock	No Const.	Prog. Labour Tax
Wealth Tax Rate	1.13%	1.23%	1.65%	0.90%
CE_1 (All)	3.14	2.29	0.44	2.79
CE_1 (NB)	7.40	5.46	1.86	6.48
CE_2 (All)	5.14	2.92	0.36	4.68
CE_2 (NB)	7.86	5.36	1.43	7.06

Optimal Taxes

	τ_k	τ_ℓ	τ_a	Top 1%	$\overline{CE}_2$ (%)
Baseline	25%	22.4%	–	0.36	
Opt. τ_k	−34.4%	36.0%	–	0.56	6.28
Opt. τ_a	–	14.1%	3.06%	0.47	9.61
No Shock					
Opt. τ_k	-2.33%	29.0%	–	0.47	3.27
Opt. τ_a	–	18.5%	2.21%	0.46	5.80
No Constraint					
Opt. τ_k	13.6%	26.0%	–	0.39	0.41
Opt. τ_a	–	22.7%	1.57%	0.42	1.43

Optimal Taxes

	τ_k	τ_a	τ_ℓ	ψ	Top 1%	$\overline{CE}_2$ (%)
Baseline						
Opt. τ_k	−34.4%	–			0.56	6.28
Opt. τ_a	–	3.06%			0.47	9.61
Prog. Lab. Tax						
Benchmark	25%	–	15.0%	0.185	0.36	–
Tax reform	–	0.90%	15.0%	0.185	0.67	7.06
Opt. τ_k	-38.8%	–	29.3%	0.280	0.61	9.31
Opt. τ_a	–	2.40%	12.7%	0.280	0.53	10.71

Conclusions

Comparison To Earlier Work

- Conesa et al (AER, 2009) study optimal capital income taxes in incomplete markets OLG model
  - with idiosyncratic labor risk
  - without return heterogeneity
  - and find optimal $\tau_k = 36\%$
  - increase in welfare of CE = 1.33%.
- Why do we find optimal smaller τ_k or negative (but a large τ_w)?
  - In both Conesa et al and in our model, higher τ_k reduces capital accumulation and leads to lower output.
  - However, in our model, higher τ_k hurts productive agents disproportionately, leading to more misallocation, and further reductions in output.
  - With wealth tax, the tax burden is shared between productive and unproductive agents, leading to smaller misallocation and lower declines in output with τ_a.

Conclusions and Current work

- Many countries currently have or have had wealth taxes:
  - France, Spain, Norway, Switzerland, Italy, Denmark, Germany, Finland, Sweden, among others.
- However, the rationale for such taxes are often vague:
  - fairness, reducing inequality, etc...
  - and not studied formally
- Here, we are proposing a case for wealth taxes based on efficiency and distributional benefits and quantitatively evaluating its impact.

Conclusions and Current work

- Wealth tax has opposite implications of capital income tax.
- Revenue neutral tax reform from τ_k to τ_a:
  - reallocates capital from less productive wealthy to the more productive wealthy.
  - gives the right incentives to the right people to save.
  - increases output, consumption, wages, and welfare.
  - Welfare gains are substantial.
- Optimal wealth taxes are positive and large. Optimal capital taxes are negative or small.
  - Welfare gain is substantially larger under wealth taxes.

Conclusions and Current work

- Current work and extensions:
  - Complete the calibration of the stochastic component of entrepreneurial productivity.
  - Optimize over consumption taxes.
  - Introduce estate taxes and study optimality vs. wealth taxes.
  - Are global wealth taxes necessary?

Thanks!

Extra

Wealth Concentration by Assets

Table 8: Wealth Concentration by Asset Type

	Stocks w/o pensions	All stocks	Non-equity financial	Housing equity	Net Worth
Top 0.5%	41.4	37.0	24.2	10.2	25.6
Top 1%	53.2	47.7	32.0	14.8	34.0
Top 10%	91.1	86.1	72.1	51.7	68.7
Bottom 90%	8.9	13.9	27.9	49.3	31.3
			Gini Coefficients		
		Financial Wealth			Net Worth
		0.91			0.82

Source: Poterba (2000) and Wolff (2000)

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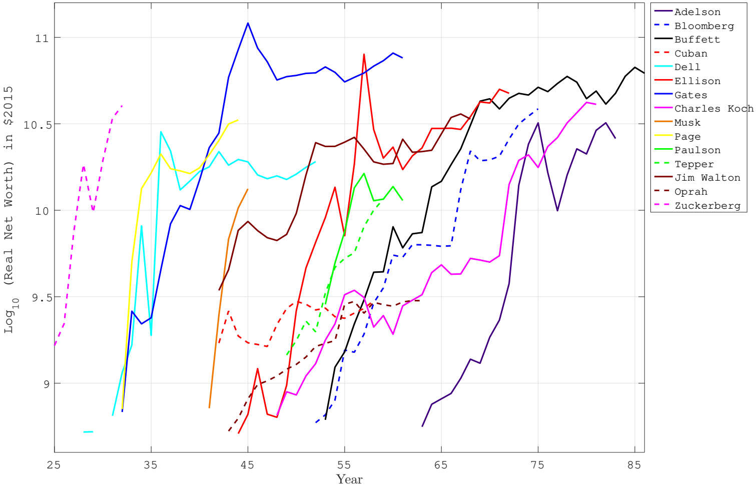
Evolution of Net Worth Among Forbes 400



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Information on Billionaires

	Calendar Year			
Name	80s	90s	00s	10s
Warren Buffett	44.37	18.57	0.02	5.81
Michael Dell		87.94	-5.58	2.97
Larry Ellison	54.09	31.31	4.90	8.06
Bill Gates	51.94	48.06	-7.54	5.46
Elon Musk				107.57
Larry Page			69.67	11.96
Mark Zuckerberg			33.81	62.24

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Welfare Gain Decomposition

Decompose welfare into consumption and leisure gain: CE_C and CE_L

$$1 + CE = (1 + CE_C)(1 + CE_L)$$

- CE_C is given by:

$$V_0((1 + CE_C(\mathbf{s}))c^*_{\text{US}}(\mathbf{s}), \ell^*_{\text{US}}(\mathbf{s})) = \widetilde{\mathbb{V}}_0(c(\mathbf{s}), \ell^*_{\text{US}}(\mathbf{s}))$$

- CE_C can be decomposed into level $\left(CE_{\overline{C}}\right)$ and distribution (CE_{σ_C}):

$$V_0((1 + CE_{\overline{C}}(\mathbf{s}))c^*_{\text{US}}(\mathbf{s}), \ell^*_{\text{US}}(\mathbf{s})) = \widehat{\mathbb{V}}_0(\widehat{c}(\mathbf{s}), \ell^*_{\text{US}}(\mathbf{s}))$$

  where $\widehat{c}(\mathbf{s}) = c(\mathbf{s})\frac{\overline{C}}{\overline{C}^*_{US}}$ and

$$\widehat{\mathbb{V}}_0\left((1 + CE_{\sigma_C})\,\widehat{c}(\mathbf{s}), \ell^*_{\text{US}}(\mathbf{s})\right) = \widetilde{\mathbb{V}}_0(c(\mathbf{s}), \ell^*_{\text{US}}(\mathbf{s}))$$

- CE_L is given by

$$V_0((1 + CE_L(\mathbf{s}))c^*_{\text{US}}(\mathbf{s}), \ell^*_{\text{US}}(\mathbf{s})) = \widetilde{\mathbb{V}}_0(c^*_{\text{US}}(\mathbf{s}), \ell(\mathbf{s}))$$

- Similar decomposition applies to leisure.

Political Support for Optimal Capital Taxes

	Productivity group (Percentile)						
Age	0-40	40-80	80-90	90-99	99-99.9	99.9-99.99	99.99+
20	95.4	98.6	99.3	99.6	99.8	99.8	100.0
21–34	96.3	97.7	97.7	97.3	96.0	94.9	92.3
35–49	91.7	92.8	91.1	87.8	80.3	74.5	63.7
50–64	74.2	76.2	73.8	69.4	60.3	53.8	43.8
65+	13.8	18.6	18.7	18.2	16.6	15.2	13.0

Note: *Each cell reports the share of agents in each category (age - productivity) with positive welfare gain* $(CE_1(\theta, z, a, h) > 0)$.

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Political Support for Optimal Wealth Taxes

	Productivity group (Percentile)						
Age	0-40	40-80	80-90	90-99	99-99.9	99.9-99.99	99.99+
20	94.5	93.1	93.3	94.6	95.8	96.1	95.8
21–34	95.7	92.6	90.5	88.8	84.2	79.4	67.0
35–49	91.3	82.8	76.5	68.2	53.6	44.6	34.0
50–64	72.6	62.9	56.1	**49.4**	39.8	34.5	27.2
65+	2.1	2.3	1.8	1.4	0.9	0.7	0.4

Note: *Each cell reports the share of agents in each category (age - productivity) with positive welfare gain* $(CE_1(\theta, z, a, h) > 0)$.

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Political Support for Wealth Taxes with Threshold

Age	Productivity group (Percentile)						
	0-40	40-80	80-90	90-99	99-99.9	99.9-99.99	99.99+
20	94.5	93.1	93.3	94.6	95.8	95.9	96.0
21–34	95.6	92.4	90.4	88.5	83.8	77.6	78.9
35–49	91.1	82.4	76.0	67.8	53.2	43.3	44.3
50–64	76.4	66.7	59.6	52.5	42.3	35.8	36.6
65+	75.9	68.6	63.7	57.9	48.7	42.1	42.9

Note: *Each cell reports the share of agents in each category (age - productivity) with positive welfare gain* $(CE_1(\theta, z, a, h) > 0)$.

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How Much Inequality in Aiyagari-Style Models?

	U.S. Data	Gaussian	GKOS benchmark
Parametrization:		$\rho = 0.985,\ \sigma^2 = 0.0234$	Rich process
Gini	0.85	0.58	0.66
Top 0.1%	**14.8%**	**1.1%**	**2.2%**
Frac > $10M	**0.4–0.5%**	≈ 0	**0.02%**
Top 1%	35.5%	7.0%	9.2%
Top 10%	75.0%	37.9%	41.6%
Top 20%	87.0%	48.2%	52.8%

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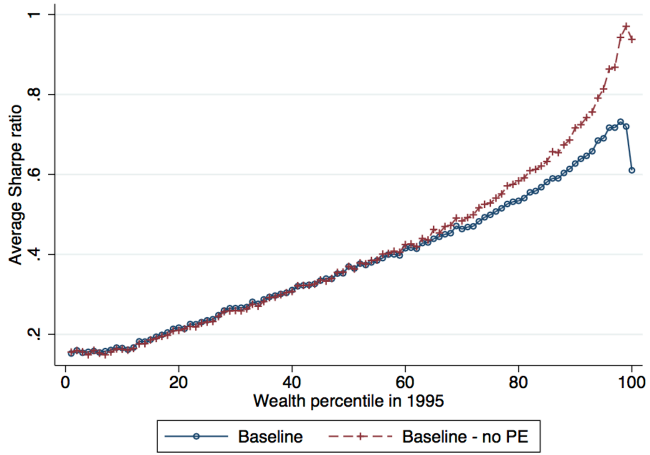
Return Heterogeneity in Norway

Figure 8. The Sharpe ratio and the level of wealth



Source: Fagereng, Guiso, Malacrino, and Pistaferri (2016)

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