The Preference for Wealth and Inequality: Towards a Piketty Theory of Wealth Inequality

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The immense accumulations of fixed capital which, to the great benefit of mankind, were built up during the half-century before the war, could never have come about in a society where wealth was divided equitably.

John Maynard Keynes
The Economic Consequences of the Peace (1919)

Wealth inequality

Stylized facts:

- The distribution of wealth is highly unequal, with a thick upper tail;
- The saving rate is increasing in wealth;
- Wealthy households consume less than their permanent income.

The desire to accumulate wealth, or to leave bequests, appears to be a key driver of the saving behavior of the rich.

What is the impact of the preference for wealth on the dynamics of wealth inequality?

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Wealth inequality

Model:

- Neoclassical growth model with a preference for wealth.

Partial equilibrium (with a fixed capital stock):

- Wealth inequality rises when $r > n + g$;
- Wealth inequality falls when $r < n + g$.

General equilibrium:

- Inegalitarian steady state:
- Egalitarian steady state.

Introduce **shocks** to the preference for wealth and investigate:

- Wealth levy;
- Progressive wealth tax;
- Progressive consumption tax.

Literature

Quantitative macro literature on wealth inequality:

- **Bequest motive** (Yaari 1964; Atkinson 1971; De Nardi 2004)
- **Heterogeneity in discount rates** (Ramsey 1928; Becker 1980; Krusell and Smith 1998; Carroll et al. 2017; Toda 2019)
- **Stochastic aging** (Wold and Whittle 1957; Castaneda, Diaz-Gimenez, and Rios-Rull 2003; Benhabib, Bisin, and Zhu 2016)
- **Heterogeneity in rates of return** (Champernowne 1953; Benhabib, Bisin, and Zhu 2011; Benhabib, Bisin, and Zhu 2015; Toda 2014; Nirei and Aoki 2016; Cao and Luo 2017)

Outline

1. **Model**
2. Partial equilibrium
3. General equilibrium
4. Preference for wealth shocks
5. Wealth taxation

Model: Firms

Time is continuous

Unit mass of households with

- Population size: $N_t = e^{nt}$
- Labor productivity: $G_t = e^{gt}$

Neoclassical production function:

$$\frac{Y_t}{G_t N_t} = f\left(\frac{K_t}{G_t N_t}\right)$$

Each factor is paid its marginal product:

$$\begin{aligned} r_t &= f'(k_t) - \delta \\ w_t &= f(k_t) - k_t f'(k_t) \end{aligned}$$

(where w_t denotes the wage rate relative to labor productivity)

Model: Households

Household $i \in [0, 1]$ has:

- Consumption c_t^i per efficiency unit of labor
- Wealth a_t^i per efficiency unit of labor
- Utility from consumption and wealth $u(c_t^i G_t, a_t^i)$

Balanced growth preferences *à la* King, Plosser, and Rebelo 1988:

$$u(c_t^i G_t, a_t^i) = \begin{cases} \frac{\exp\left((1-\sigma)\left[\ln\left(c_t^i G_t\right) + v\left(a_t^i\right)\right]\right) - 1}{1-\sigma} & \text{if } \sigma \neq 1 \\ \ln\left(c_t^i G_t\right) + v\left(a_t^i\right) & \text{if } \sigma = 1 \end{cases},$$

The preference for wealth is given by constant elasticity with respect to a reference point ζ, with $\zeta < 0$:

$$v\left(a_t^i\right) = \gamma \frac{\left(a_t^i - \zeta\right)^{1-\mu} - 1}{1-\mu}$$

When $\mu < 1$, wealth is a luxury goods.

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Model: Households

Let $\phi(\cdot, 0)$ denote the distribution of initial wealth a_0^i across households.

Household i's problem:

$$\max_{(c_t^i)_{t=0}^{\infty}} \int_0^{\infty} e^{-\rho t} N_t \frac{\exp\left((1-\sigma) \left[gt + \ln\left(c_t^i\right) + \gamma \frac{\left(a_t^i - \zeta\right)^{1-\mu} - 1}{1-\mu} \right] \right) - 1}{1-\sigma} dt$$

$$\text{subject to} \qquad \begin{aligned} &\dot{a}_t^i = \left(r_t - n - g\right) a_t^i + w_t - c_t^i \\ &a_0^i \text{ given} \\ &a_t^i \geq \underline{a} \end{aligned}$$

Model: Households

Solution to household i's problem:

$$\frac{\dot{c}_t^i}{c_t^i} \geq \frac{1}{\sigma}\left[r_t - \rho - \sigma g + \frac{\gamma\left(a_t^i - \zeta\right)^{-\mu}}{\left(c_t^i\right)^{-1}} + (1-\sigma)\gamma\left(a_t^i - \zeta\right)^{-\mu}\dot{a}_t^i\right]$$

and $a_t^i \geq \underline{a}$ with complementary slackness

$$\lim_{t\to\infty} e^{-(\rho-n-(1-\sigma)g)t+(1-\sigma)\gamma\frac{\left(a_t^i-\zeta\right)^{1-\mu}-1}{1-\mu}}\left(c_t^i\right)^{-\sigma}\left[a_t^i - \underline{a}\right] = 0$$

Model: Market clearing

Goods market clearing:

$$\dot{k}_t = f\left(k_t\right) - \left(\delta + n + g\right) k_t - \int_0^1 c_t^i di$$

Asset market clearing:

$$\int_0^1 a_t^i di = k_t$$

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3. General equilibrium
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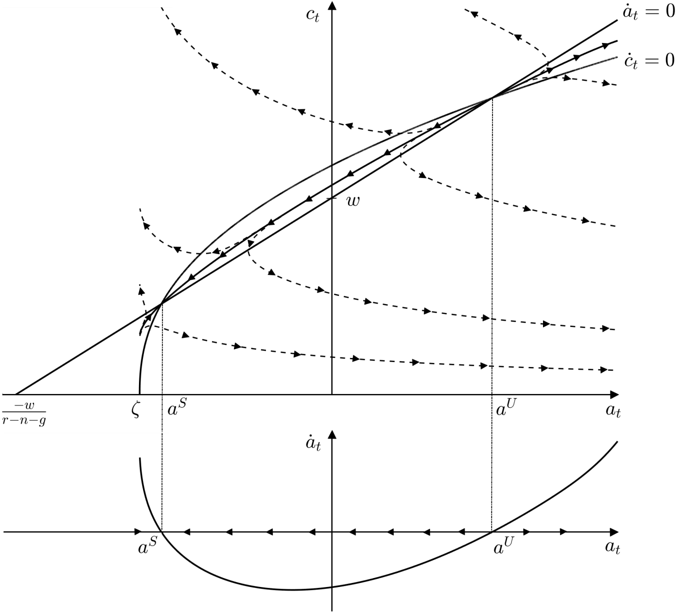
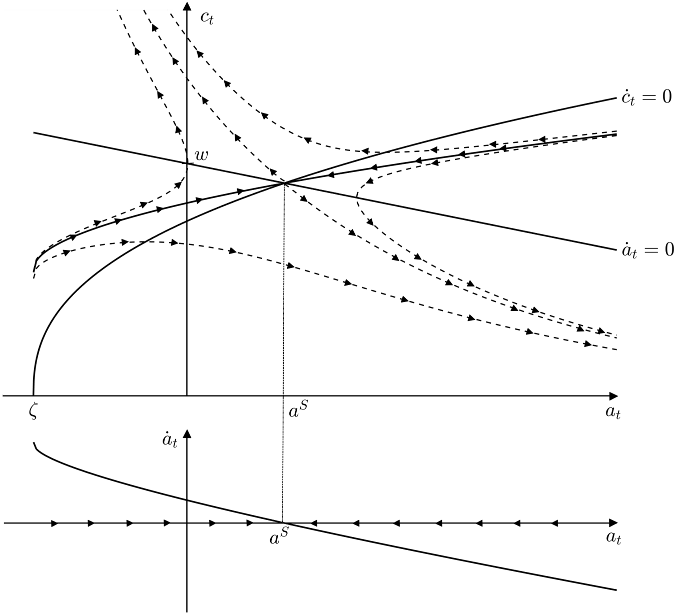
Partial equilibrium: $r > n + g$



Partial equilibrium: $r < n + g$



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General equilibrium

Capital accumulation:

$$\dot{k}_t = f\left(k_t\right) - \left(\delta + n + g\right) k_t - \int_0^1 c_t^i di$$

In steady state:

$$\int_0^1 c_t^i di = f\left(k_t\right) - \left(\delta + n + g\right) k_t$$

Golden rule level of the capital stock:

$$f'(k^*) = \delta + n + g.$$

Interest rate at the golden rule:

$$r^* = n + g.$$

Golden rule level of consumption:

$$c^* = f(k^*) - (\delta + n + g)k^*$$

General equilibrium

Egalitarian steady state equilibrium (c^E, k^E)

- Always exists and is unique;
- Locally stable if and only if

$$r^E < n + g + \frac{\mu c^E}{k^E - \zeta}$$

where $r^E = f'(k^E) - \delta$.

General equilibrium

Inegalitarian steady state equilibrium

- Can exist if and only if $r^E > n + g$;
- Interest rate converges to $n + g$;
- Capital stock converges to the **golden rule** level k^*;
- A zero mass of households with arbitrarily large wealth;
- A mass one of households with wealth $\max\left\{a^S(k^*), \underline{a}\right\}$ and consumption

$$\begin{aligned} w(k^*) &= f(k^*) - f'(k^*)k^*, \\ &= f(k^*) - (\delta + n + g)k^*, \\ &= c^*! \end{aligned}$$

General equilibrium

The economy converges to:

- $r^E \in (-\delta, n+g)$: Egalitarian steady state;
- $r^E \in \left(n+g, n+g+\frac{\mu c^E}{k^E-\zeta}\right)$: Either egalitarian or inegalitarian steady state;
- $r^E \in \left(n+g+\frac{\mu c^E}{k^E-\zeta}, \infty\right)$: Inegalitarian steady state.

The preference for wealth only generates inequality when the capital stock is below the golden rule level!

The preference for wealth induces the capital stock to converge to the golden rule level

- When $r^E > n+g$, wealth inequality raises the capital stock;
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Preference for wealth shocks

Two-state Poisson process:

- State W: The household has a preference for wealth
- State N: The household does not have a preference for wealth

State W

- 20% of households
- Lasts for 75 years on average

State N

- 80% of households
- Lasts for 300 years on average

Calibration

Parameter	Calibration	Moment
Capital intensity	$\alpha = 0.3$	Capital share
Scale parameter	$A = 2885$	U.S. GDP per household in 2012
Depreciation rate	$\delta = 7.55\%$	Average household wealth in 2012
Population growth rate	$n = 1\%$	Long-run U.S. average
Productivity growth rate	$g = 2\%$	Long-run U.S. average
Borrowing limit	$\underline{a} = 0$	**No borrowing**
Discount rate	$\rho = 4\%$	.
Complementarity parameter	$\sigma = 1$	Additively separable preferences
Reference wealth level	$\zeta = -66000$	6 months worth of GDP per household
Concavity parameter	$\mu = 0.23$	**Average wealth of bottom 90%**
Intensity parameter	$\gamma = 7.65 \cdot 10^{-6}$	**Average wealth of top 1%**
Transition rate from W to N	$\lambda_W = 1/75$	Average persistence of state W of 75 years
Transition rate from N to W	$\lambda_N = 1/300$	20% of households in state W

Simulation

Moment	Empirical	Model
U.S. GDP per household in 2012	132000	132000
Average wealth per household in 2012	343000	342000
Average wealth: Bottom 90%	84000	84000
Average wealth: Top 10%	2.56 mil.	2.67 mil.
Average wealth: Top 1%	13.84 mil.	13.82 mil.
Average wealth: Top 0.1%	72.8 mil.	84.06 mil.
Average wealth: Top 0.01%	371 mil.	348.67 mil.
Top 10% wealth percentile	660000	1.04 mil.
Top 1% wealth percentile	3.96 mil.	2.69 mil.
Top 0.1% wealth percentile	20.6 mil.	22.7 mil.
Top 0.01% wealth percentile	111 mil.	185 mil.
Wealth share: Bottom 90%	0.228	0.221
Wealth share: Top 10%	0.772	0.779
Wealth share: Top 1%	0.418	0.404
Wealth share: Top 0.1%	0.220	0.246
Wealth share: Top 0.01%	0.112	0.102
Share of households with $a \leq 0$	0.198	0.722

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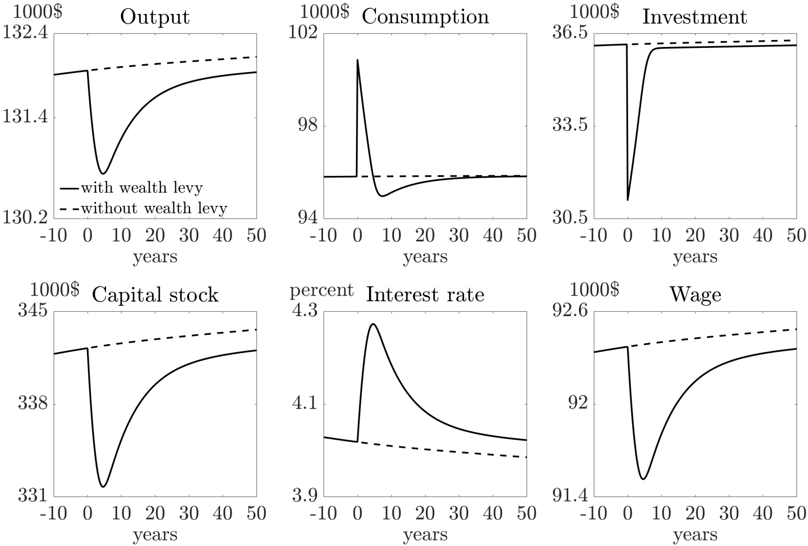
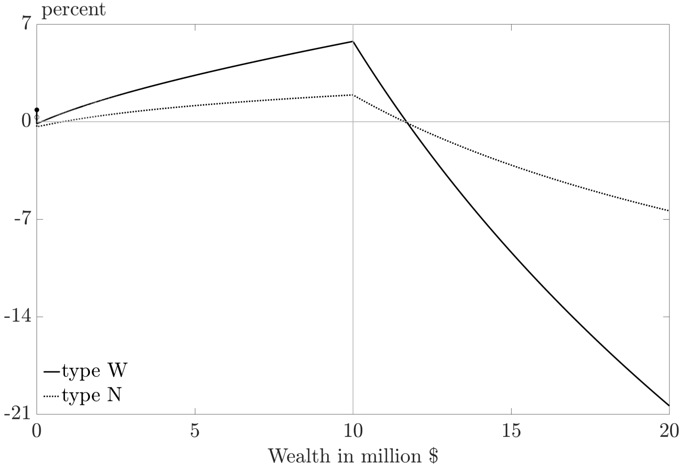
Wealth levy

- 20% levy above $10 million
- Lump-sum transfer of $22 199 to the borrowing constrained



Wealth levy: Consumption equivalent welfare gain



Wealth levy

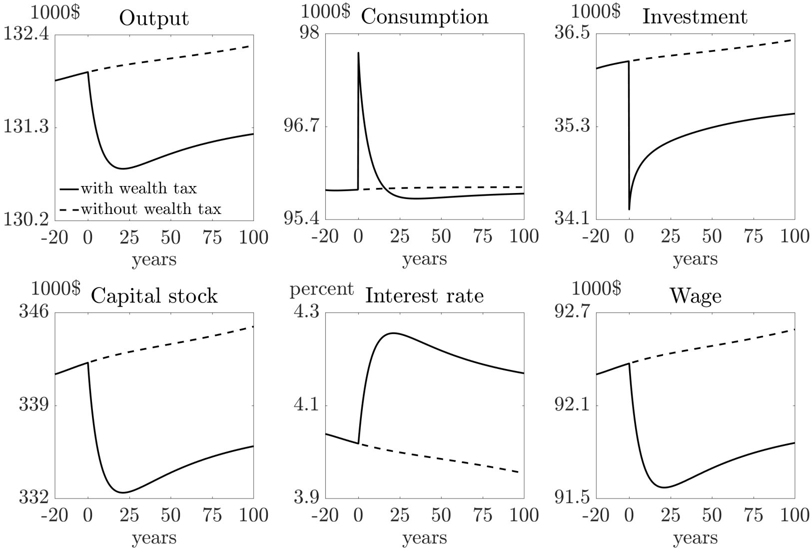
The wealth levy transforms a **stock of wealth** into a **flow of consumption**!

- The capital stock shrinks;
- Poor households who do not receive the transfer lose.

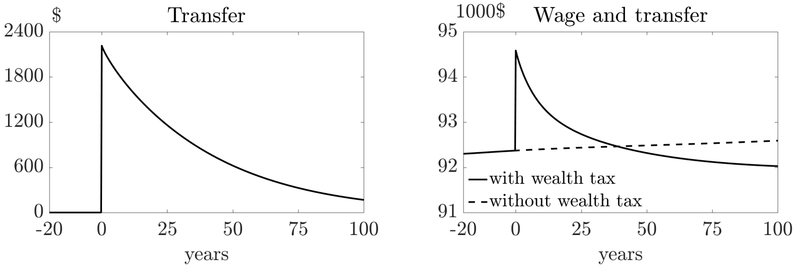
These results rely on the saving rate being increasing in wealth.

Progressive wealth tax

- 2% annual tax above $10 million
- Transfer to the borrowing constrained



Progressive wealth tax



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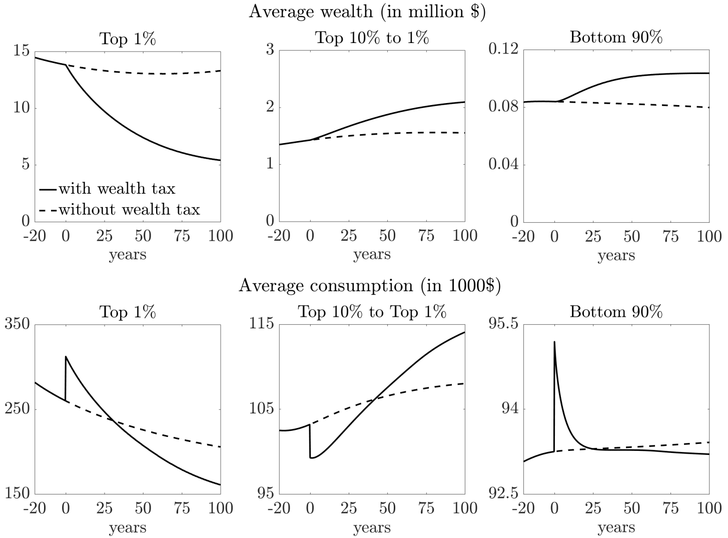


Over the long-run, the progressive wealth tax benefits not the poor, but the **property-owning upper-middle class**.

Social welfare

An infinitely-lived household should be interpreted as a **dynasty**.

- The social planner should care about future generations (Phelan 2006; Farhi and Werning 2007).

Social welfare is given by

$$W = \int_0^T \frac{\theta e^{-\theta t}}{1 - e^{-\theta T}} \bar{V}_t dt$$

where

- θ is the **social discount factor**;
- $\bar{V}_t$ is the welfare of generation t.

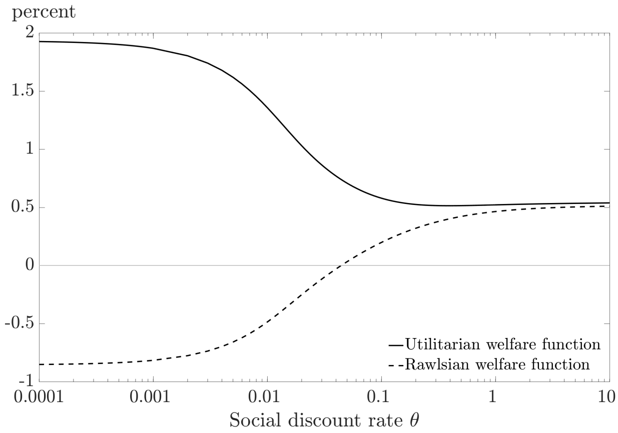
We have:

- $\theta = \infty$: $W = \bar{V}_0$;
- $\theta = 0$: $W = \frac{1}{T} \int_0^T \bar{V}_t dt$.

Progressive wealth tax

Welfare of generation t:

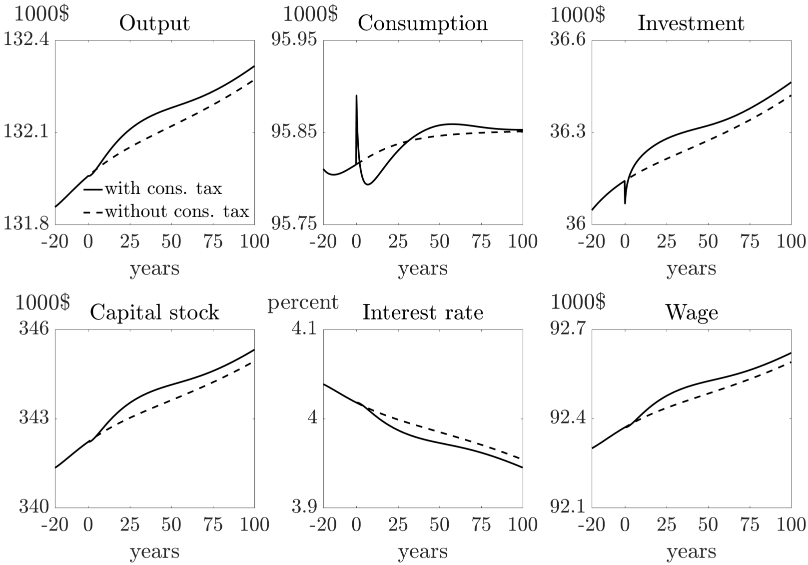
- Rawlsian: $\bar{V}_t = V_N(\underline{a}, t)$;
- Utilitarian: $\bar{V}_t = \int_{\underline{a}}^{\infty} [V_W(a,t)\phi_W(a,t) + V_N(a,t)\phi_N(a,t)]da$.



Rawlsian planner with $\theta = 0$ (meritocratic Rawlsian benchmark) rejects the progressive wealth tax!

Progressive consumption tax

- 50% tax on consumption above $200 000 per year
- Transfer to the borrowing constrained



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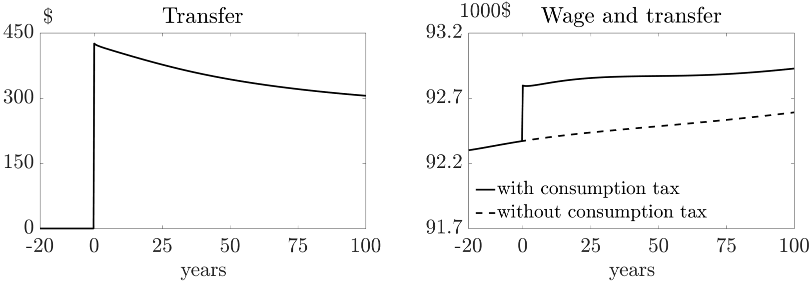

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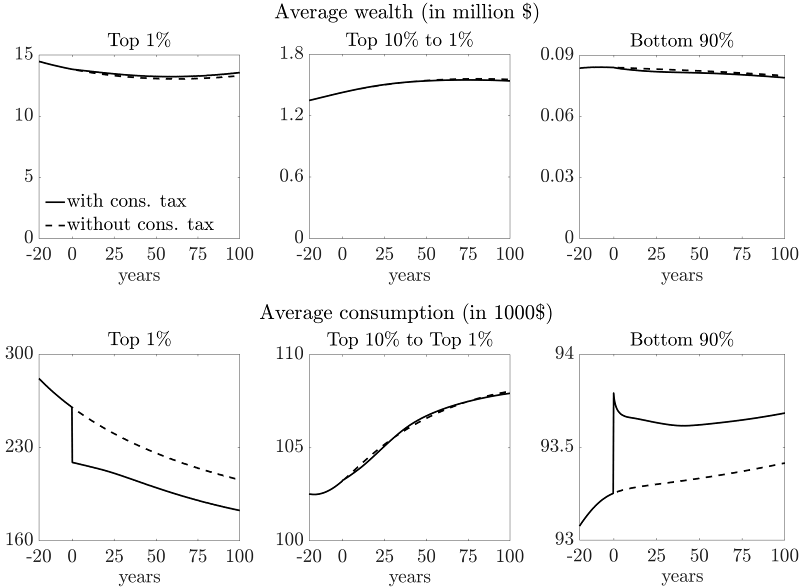

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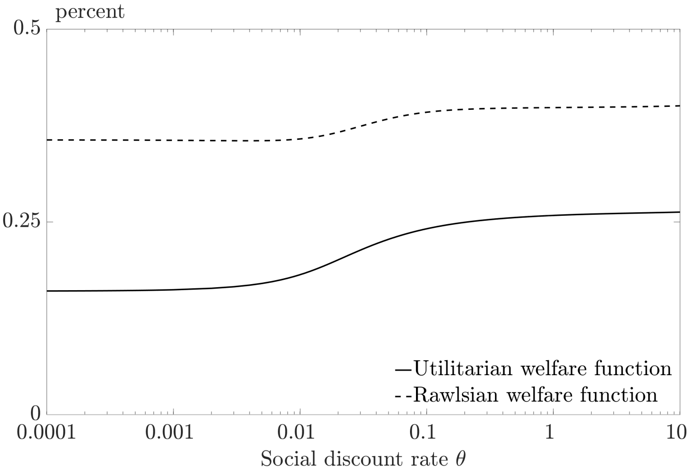

Conclusion

How to accumulate capital if most people do not want to save?

- By concentrating wealth in the hands of rich dynasties with a preference for wealth.

Greedy billionaires raise the capital stock, which is in the interest of future generations of workers.

- A strengthening of the invisible hand!

To redistribute from rich to poor, a progressive consumption tax is preferable to a progressive wealth tax.

- Reinvested income should *not* be taxed!

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