Wealth Taxation and Wealth Accumulation: Theory and Evidence from Denmark

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New Interest in Wealth Taxes

Policy debate motivated by rising wealth inequality

- ▷ Progressive wealth taxes can redistribute wealth
- ▷ But how do they affect wealth accumulation?

Empirical challenges:

- ▷ Limited micro data on wealth
- ▷ Difficult to find compelling wealth tax variation
- ▷ Wealth is very concentrated $\rightarrow$ we need variation at the very top

Danish Data and Experiment

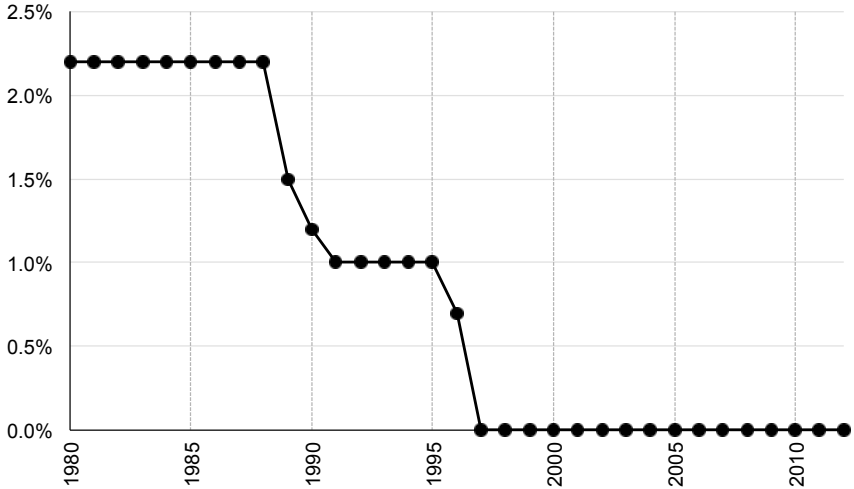
Data:

- ▷ Administrative micro data on wealth (third-party reported) for the full population since 1980

Experiment:

- ▷ Denmark used to have a wealth tax of 2.2% above an exemption threshold at around the 98th percentile of the wealth distribution
- ▷ The tax was reduced in 1989-91 and eliminated in 1996-97
- ▷ The design of the tax allows for DD strategies to capture responses at the very top of the wealth distribution

Wealth Tax Rate Over Time



Literature

Nascent literature on annual wealth taxes:

- ▷ Seim (2015) on Sweden
- ▷ Zoutman (2015) on the Netherlands
- ▷ Brülhart et al. (2017) on Switzerland

Large literature on capital income taxes and after-tax rates of return more broadly:

- ▷ Reduced-form saving and borrowing elasticities
- ▷ Structural elasticity of intertemporal substitution
- ▷ Wealth transfer taxes: inheritance tax, capital gains tax, etc.

Wealth Taxes vs Capital Income Taxes

Qualitatively similar, but the magnitudes are very different:

- ▷ Proportional wealth tax of 2.2% at a before-tax return of 4.4% corresponds to a capital income tax rate of 50%
- ▷ The Danish wealth tax experiment is therefore very large

Specificities of the wealth tax:

- ▷ Its impact depends on asset returns
- ▷ Less easy to avoid than capital income taxes at the very top
- ▷ If people accumulate wealth for status and power, it taxes this unmeasured return

Outline

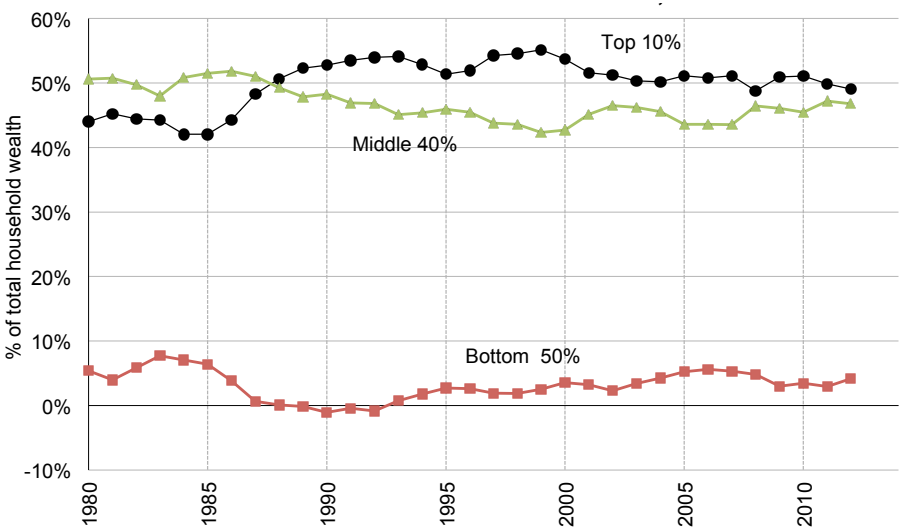
1. Wealth inequality in Denmark over time
   - ▷ Contrast Danish and US experiences
2. Theoretical effects of wealth taxes
   - ▷ What parameters govern the effect?
   - ▷ What does the reduced-form effect of wealth taxes identify?
3. Empirical effects of wealth taxes
   - ▷ Quasi-experimental evidence from wealth tax reductions
4. Connecting evidence and theory
   - ▷ Calibration of dynamic model

Wealth Inequality in Denmark

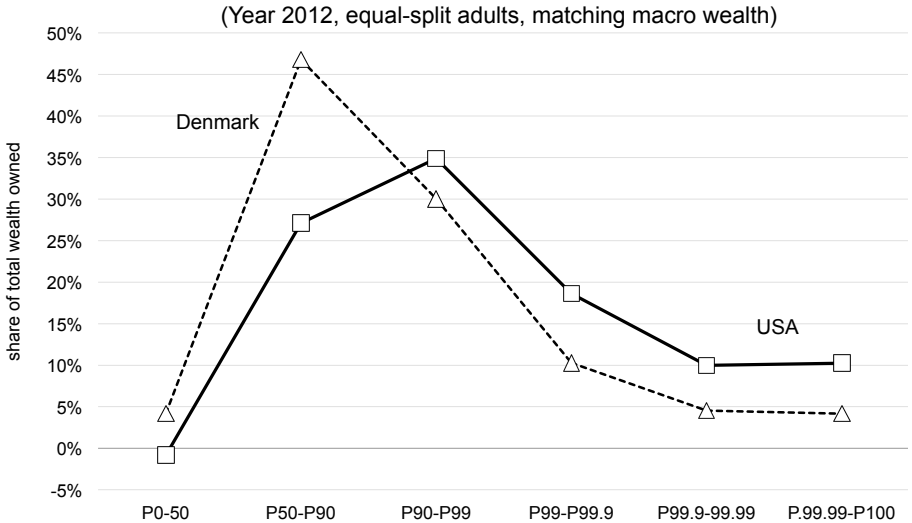
Distribution of Wealth at Market Value

- We match 100% of household wealth in the national accounts
- We start from population-wide admin wealth data (third-party reported) and impute wealth not reported by third parties
- We impute funded pension wealth, unlisted equities, and business assets using capitalization method
- End-product: homogeneous series that capture the full distribution and is comparable to the US (Saez & Zucman 2016)

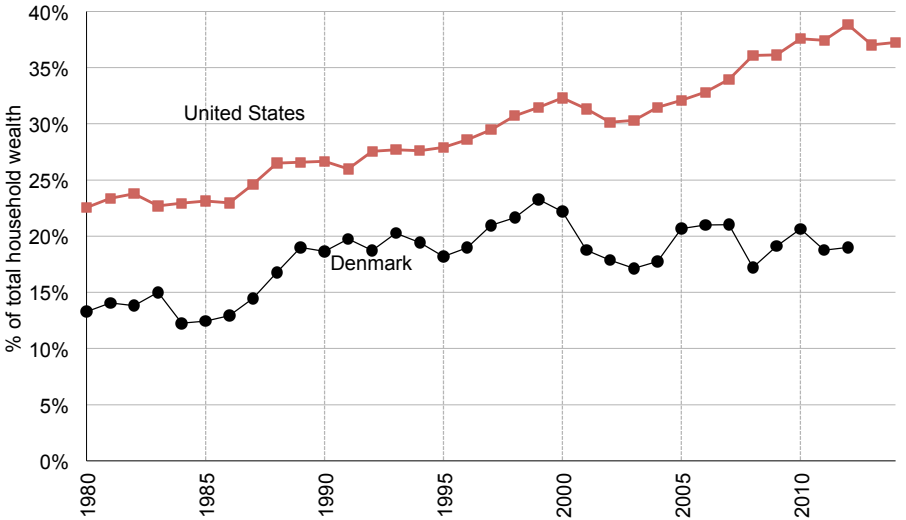
Wealth Distribution in Denmark



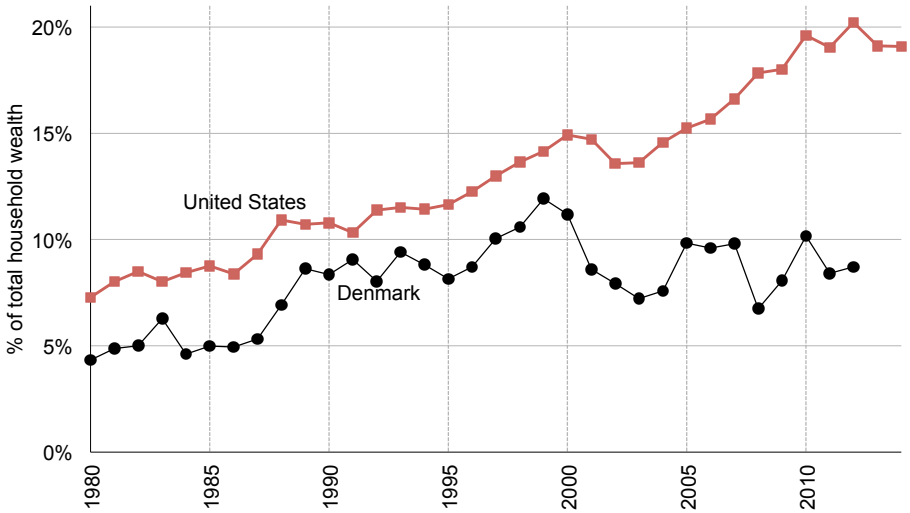
Wealth Distribution: Denmark vs US



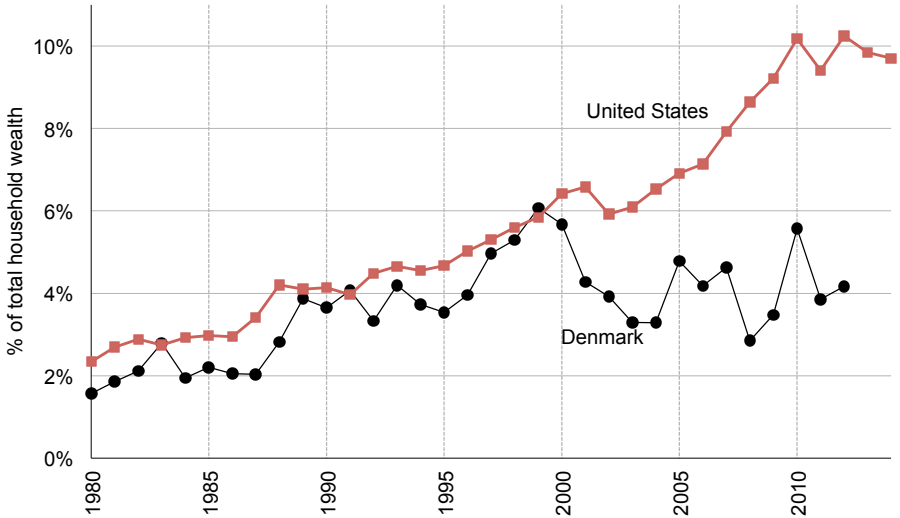
Top 1% Wealth Share: Denmark vs US



Top 0.1% Wealth Share: Denmark vs US



Top 0.01% Wealth Share: Denmark vs US



Effect of Wealth Taxes: Theory

Lifecycle Model With Utility of Wealth

Preferences over consumption and residual wealth:

$$\frac{\sigma}{\sigma-1}\sum_{t=0}^{T}\delta^{t}\left(c_{t}\right)^{\frac{\sigma-1}{\sigma}}+\delta^{T}V\left(W_{T+1}\right)$$

Utility of residual wealth:

$$V\left(W_{T+1}\right)=A\frac{\alpha}{\alpha-1}\left(\frac{W_{T+1}}{A}\right)^{\frac{\alpha-1}{\alpha}}$$

Period-t budget:

$$c_{t}=y_{t}+RW_{t}-\tau R\left(W_{t}-\bar{W}\right)-W_{t+1}$$

Period-1 Reduced-Form Effect (General)

$$\frac{dW_1}{d(1-\tau)}\frac{1-\tau}{W_0} = \sigma \cdot \left\{ \frac{\sum_{t=0}^{T} t q_t}{\sum_{t=0}^{T} q_t + q_b \frac{\alpha}{\sigma} c_0^{\alpha/\sigma - 1}} \frac{c_0}{W_0} \right\}$$
$$+\alpha \cdot \left\{ \frac{T q_b}{\sum_{t=0}^{T} q_t + q_b \frac{\alpha}{\sigma} c_0^{\alpha/\sigma - 1}} \frac{c_0^{\alpha/\sigma}}{W_0} \right\}$$
$$+\frac{dW_0^C}{d(1-\tau)}\frac{1-\tau}{W_0} \cdot \left\{ \frac{1}{\sum_{t=0}^{T} q_t + q_b \frac{\alpha}{\sigma} c_0^{\alpha/\sigma - 1}} \right\}$$

where $q_t \equiv \frac{(\delta(1-\tau)R)^{t\sigma}}{((1-\tau)R)^t}$ and $q_b \equiv \frac{A(\delta(1-\tau)R)^{T\alpha}}{((1-\tau)R)^T}$

- ▷ Substitution effect on consumption proportional to σ (positive)
- ▷ Substitution effect on bequests proportional to α (positive)
- ▷ Wealth effect (negative)

Period-1 Reduced-Form Effect (Simple)

Assuming $\alpha = \sigma$, we have

$$\frac{dW_1}{d(1-\tau)}\frac{1-\tau}{W_0} = \sigma \cdot \left\{ \frac{\sum_{t=0}^{T} t q_t + T A q_T}{\sum_{t=0}^{T} q_t + A q_T} \frac{c_0}{W_0} \right\} + \frac{dW_0^C}{d(1-\tau)}\frac{1-\tau}{W_0} \cdot \left\{ \frac{1}{\sum_{t=0}^{T} q_t + A q_T} \right\}$$

- ▷ Now there is only one substitution effect term (both consumption and bequest responses) and the wealth effect term

Period-t Reduced-Form Effect

$$\frac{dW_t/W_t}{d\left(1-\tau\right)/\left(1-\tau\right)} = dM + dB$$

- dM is a **mechanical effect** of larger net-of-tax returns on initial wealth and savings
- dB is a **behavioral effect** given by

$$dB = \sum_{j=0}^{t-1} \frac{q_j}{\left[\left(1-\tau\right)R\right]^{1-t}} \left\{ \frac{dW_1/W_0}{d\left(1-\tau\right)/\left(1-\tau\right)} \frac{W_0}{W_t} - j\sigma \frac{c_0}{W_t} \right\}$$

where $\frac{dW_1/W_0}{d(1-\tau)/(1-\tau)}$ is the one-period effect characterized above

Lessons From Theory

- Elasticity of wealth wrt. $1-\tau$ is far from a structural parameter
  - It is endogenous to all the parameters of the dynamic setting, and to the length of the time horizon being considered
- The size of reduced-form elasticities can be assessed in terms of the implied structural elasticities σ and α, but this requires parametric assumptions
- Due to the mechanical effects, "large" reduced-form effects does not necessarily imply that people are very elastic in behavior
- Theoretical results allow us to calibrate the model to (quasi-experimental) estimates of $\frac{dW_t/W_t}{d(1-\tau)/(1-\tau)}$ for the short/medium term, and then use model to assess the long term

Effect of Wealth Taxes: Evidence

Danish Wealth Tax and Reforms

Danish wealth tax:

- Taxable wealth equals total net wealth, excluding pensions
- Taxable components include deposits, bonds, equities, housing, large durables and business assets, net of any debts
- Mostly third-party reported, but some components self-reported

Reforms:

- **1989-91 Reform**: tax rate reduced from 2.2% to 1% and exemption threshold doubled for couples
- **1996-97 Reform**: wealth tax abolished

Focus on 1989-91 Reform

Data limitation:

- ▷ Self-reported wealth not recorded after 1997
  $\rightarrow$ break in taxable wealth series after wealth tax abolishment

Two approaches:

- ▷ Use *market-value wealth* and study both reforms
- ▷ Use *taxable wealth* and study only the 1989-91 reform
- ▷ We do the latter

Balanced panel analysis:

- ▷ Three DD strategies that compare treatments and controls defined by pre-reform (1986-88) variables

Three DD Strategies

Threshold DD

- ▷ Use exemption threshold located at 97.5p before reform
- ▷ Compare households below vs above threshold within top 5%

Ceiling DD

- ▷ Use tax ceiling: All personal taxes / income $\leq 78\%$
- ▷ Compare households bound vs unbound by ceiling within top 1%
- ▷ Both experience wealth effect $\rightarrow$ identify EIS

Couples DD

- ▷ Use doubling of exemption threshold for couples
- ▷ Compare singles vs couples between 97.5p - 99.5p

DD specification

Comparison groups differ by portfolio composition and income

- ▷ Violate parallel trends through asset price movements and heterogeneity in saving rates by income
- ▷ We control non-parametrically for this issue

Specification:

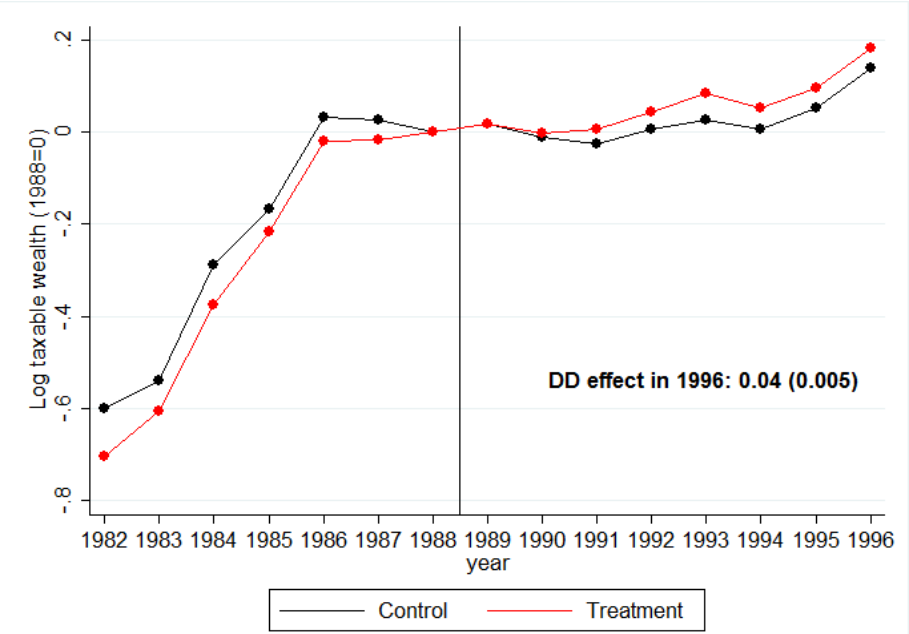
$$\log W_{it} = \sum_{j \neq 1988} \alpha_j Year_{j=t} + \sum_{j \neq 1988} \beta_j Year_{j=t} Treat_i + \gamma_i + X_{it}' \psi + \nu_{it}$$

where the controls X_{it}' include

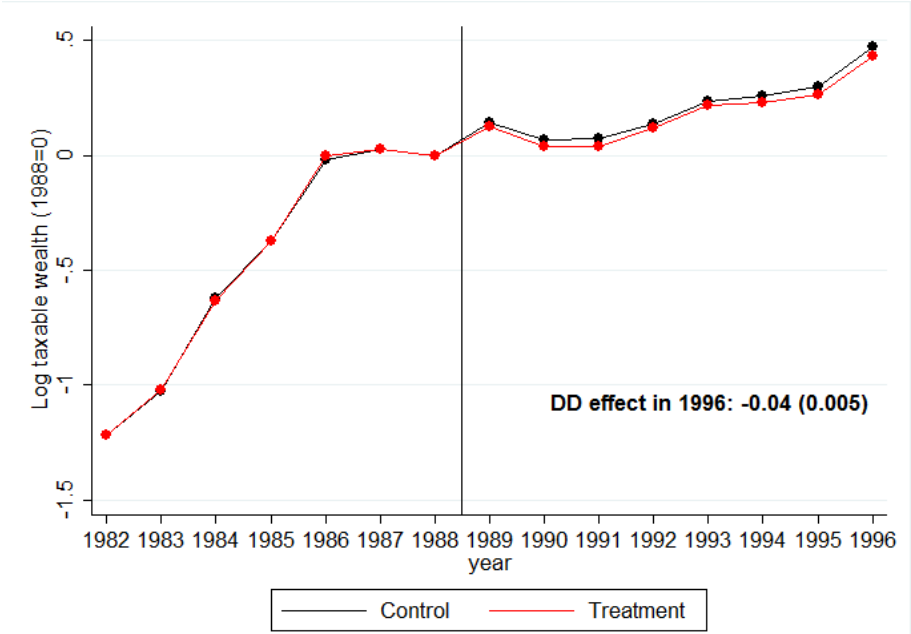
- ▷ 1988 housing share decile $\times$ year dummies
- ▷ 1988 equity share decile $\times$ year dummies
- ▷ 1988 income decile $\times$ year dummies

Strategy 1:
Above vs Below Threshold

Households Above vs Below Threshold Within Top 5% (Raw)

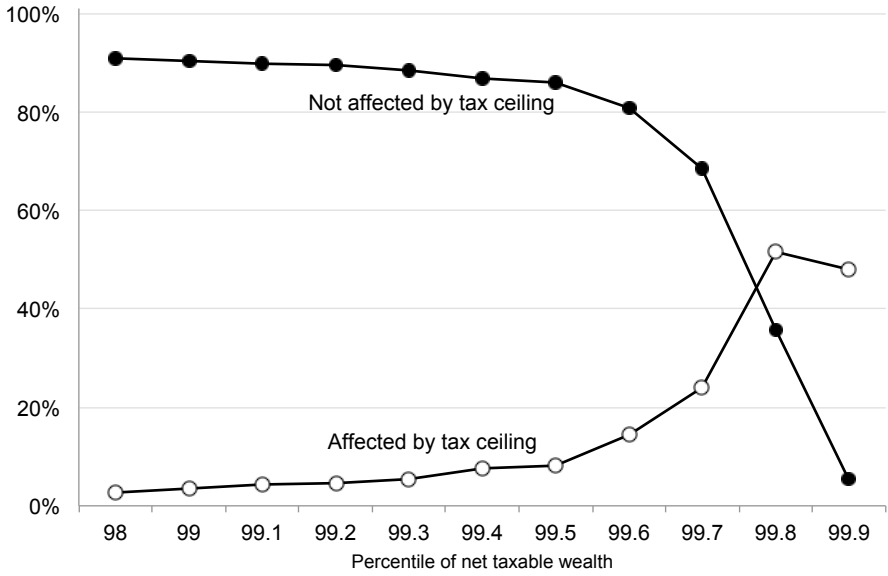


Households Above vs Below Threshold Within Top 5% (With Controls)

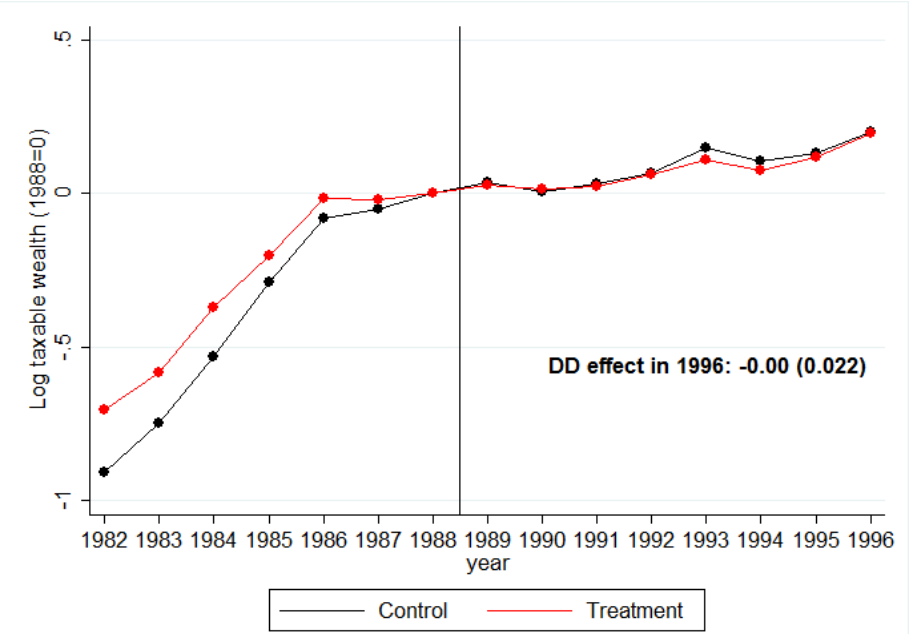


Strategy 2:
Unbound vs Bound by Ceiling

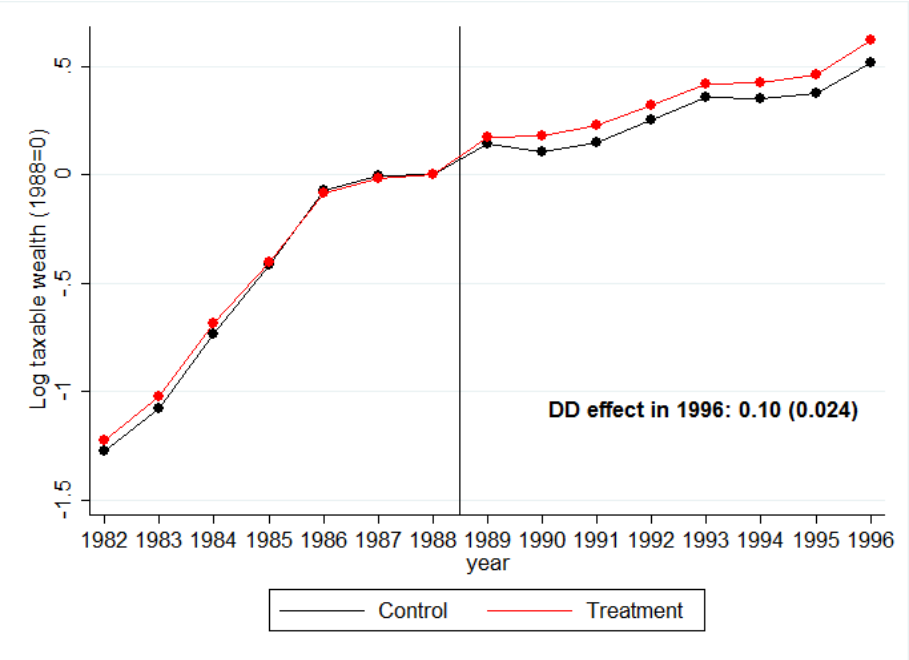
Fraction Bound vs Unbound by Ceiling



Households Unbound vs Bound by Ceiling Within Top 1% (Raw)

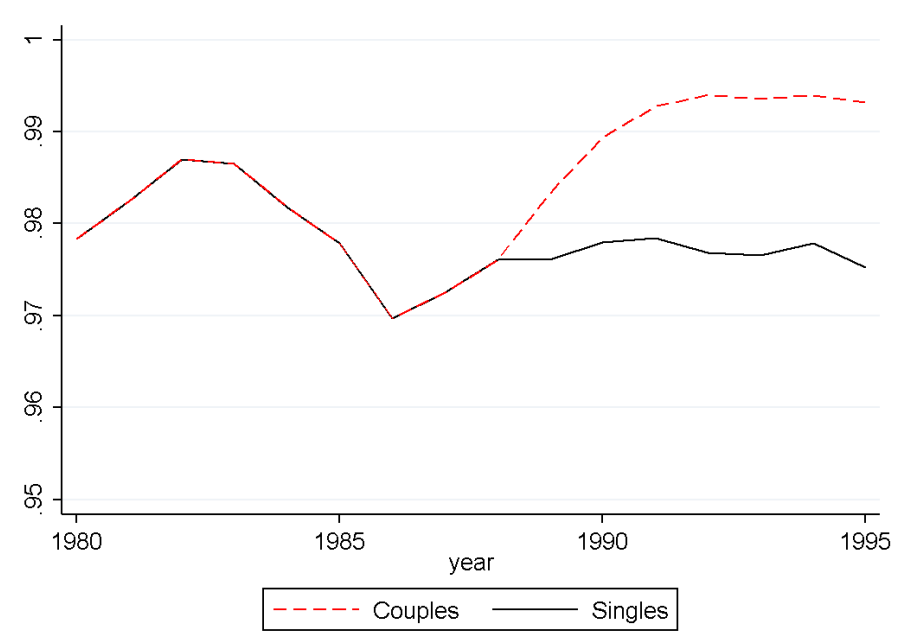


Households Unbound vs Bound by Ceiling Within Top 1% (With Controls)

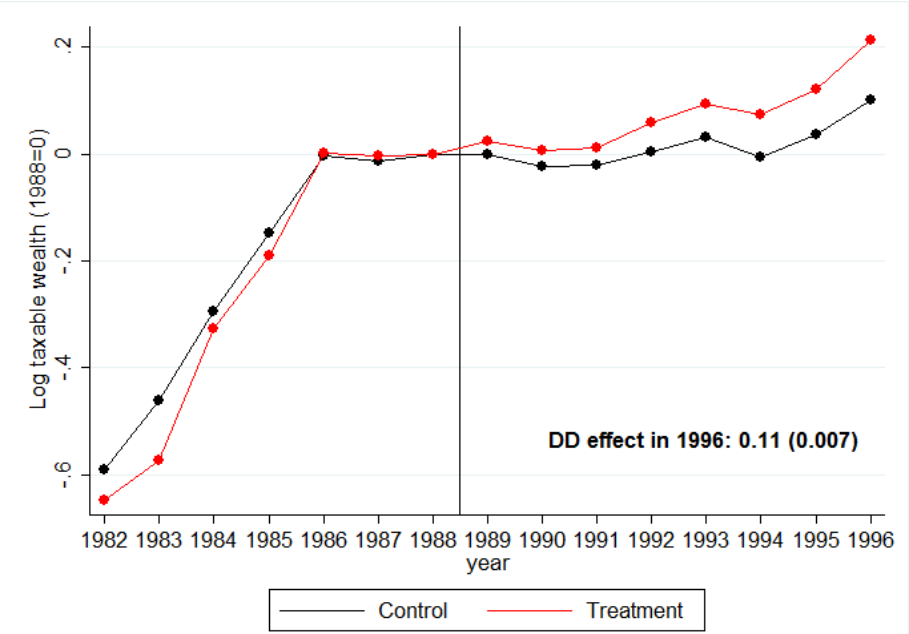


Strategy 3:
Couples vs Singles

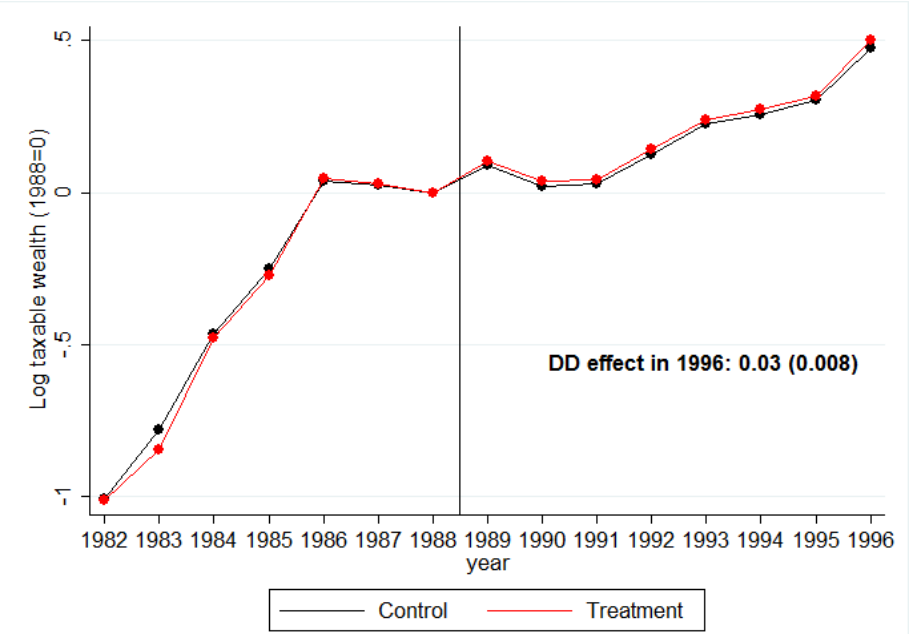
Exemption Threshold Over Time



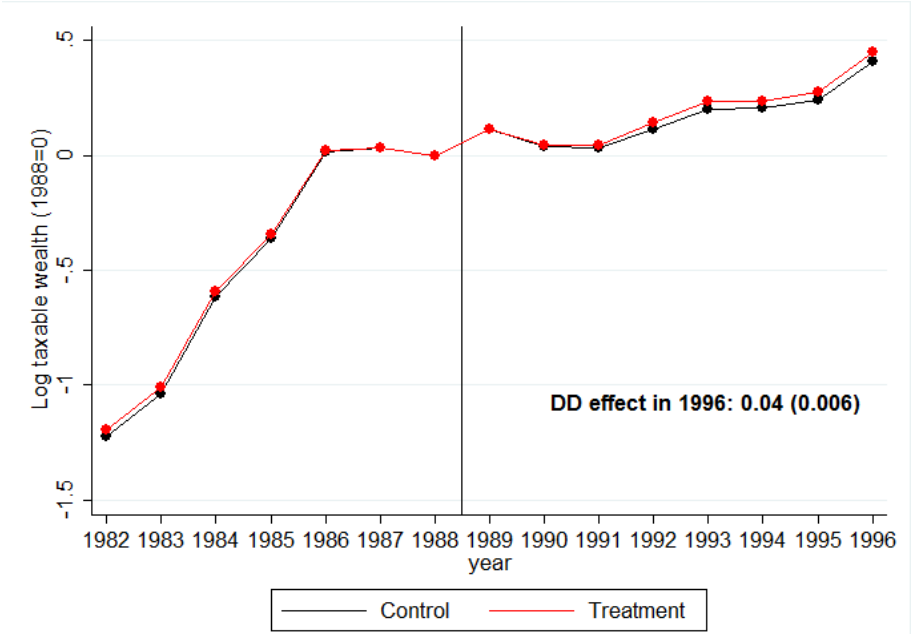
Couples vs Singles in Affected Range (Raw)



Couples vs Singles in Affected Range (With Controls)



Couples Inside vs Outside Affected Range Within Top 5% (With Controls)



Connecting Evidence and Theory

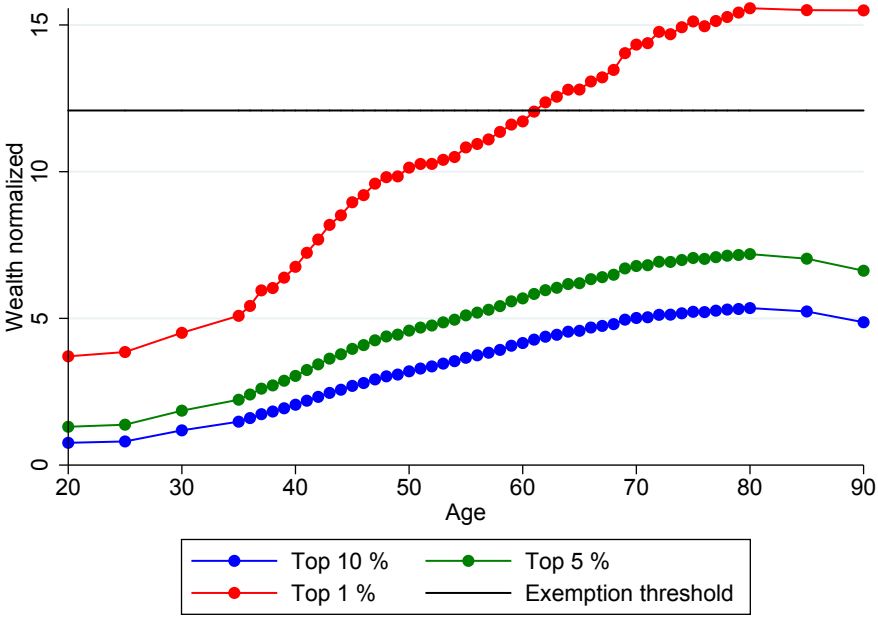
Calibration Approach

- We estimate $\hat{\beta} = \frac{dW_t/W_t}{d(1-\tau)/(1-\tau)}$ for $t = 8$ under different strategies
- Assuming $\sigma = \alpha$, we calibrate the structural elasticity to fit the reduced-form elasticity under the ceiling DD (no wealth effect)
- We calibrate A to fit end-of-life wealth, W_T
- We set δ and R to fit the stylized wealth profile between 0 and T

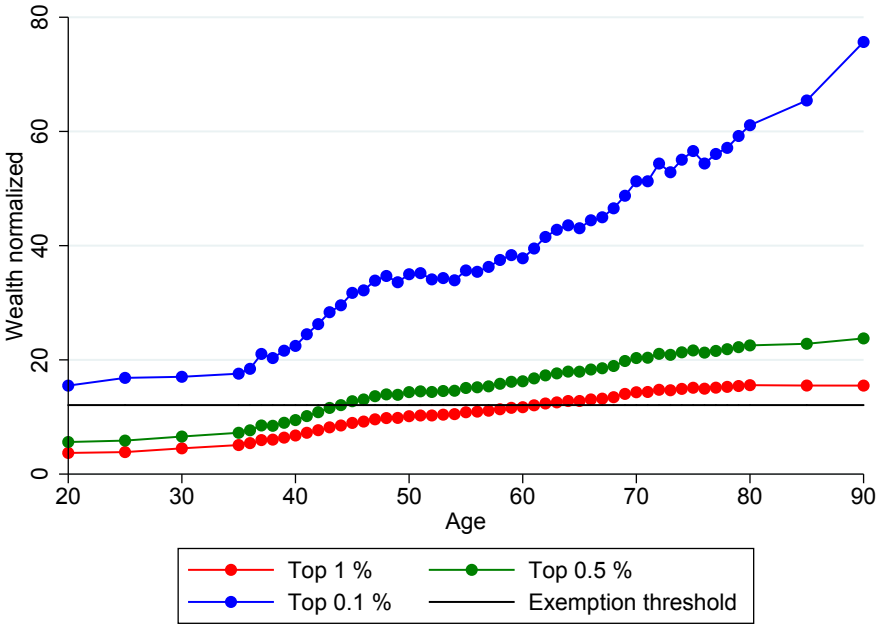
How Do Wealthy People Accumulate Wealth Over the Lifecycle?

- We consider empirical lifecycle profiles of (taxable) wealth in the top x% of the wealth distribution
- Methodology:
  - Include households observed in the top x% in any year t
  - Keep these households in all years observed, even if/when they are below the top x%
  - Plot average wealth at each age in this sample
- This gives the lifecycle profile of wealth among those *ever* in the top x% [we will calibrate to the top 1% profile]

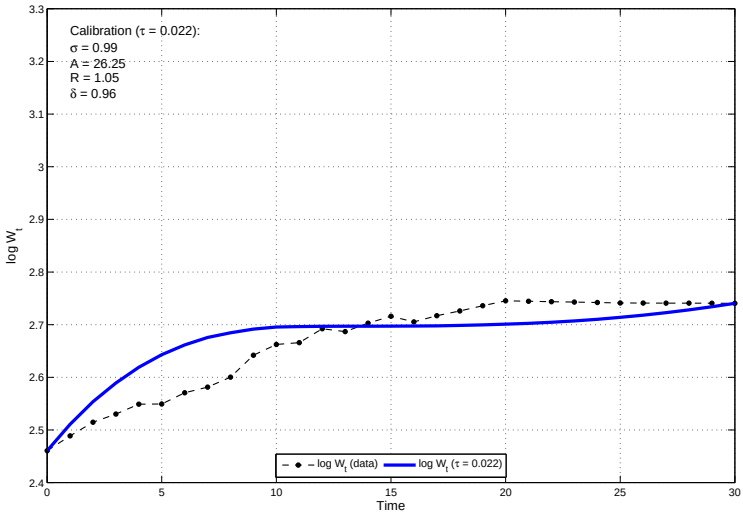
Empirical Lifecycle Profiles of Wealth



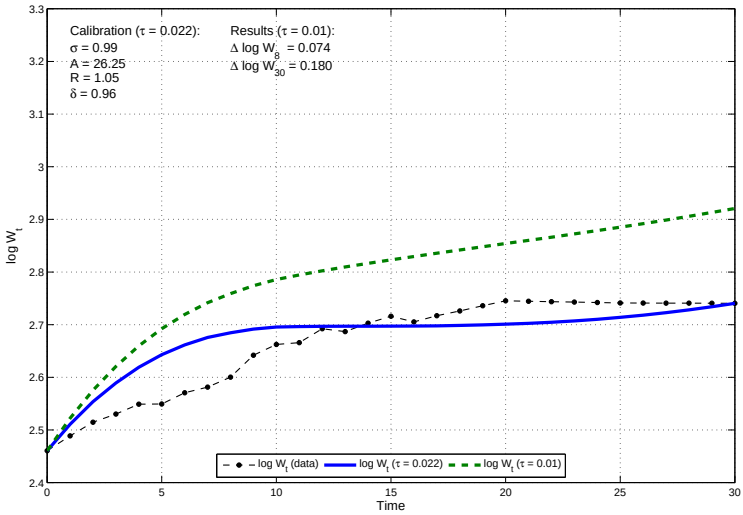
Empirical Lifecycle Profiles of Wealth



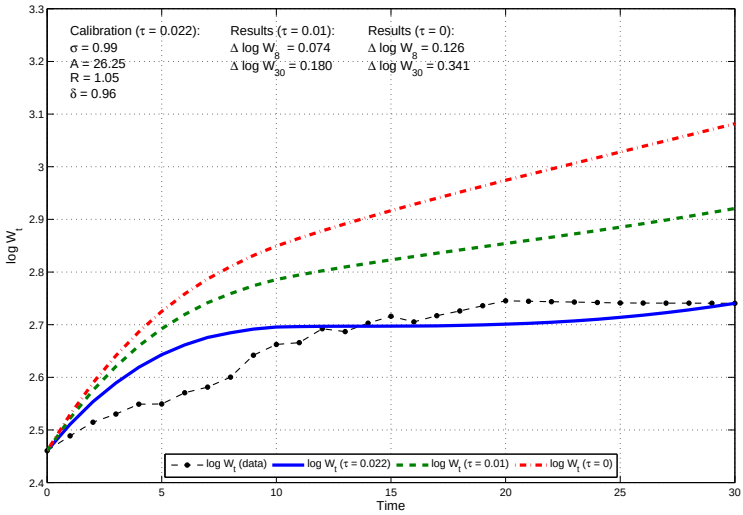
Baseline Calibration at 2.2% Tax



Long-Run Effect of Cutting Tax to 1%



Long-Run Effect of Cutting Tax to 0%



Conclusions

- Nascent literature studies wealth taxes empirically
  - We study the very wealthiest individuals
  - We exploit a very large wealth tax experiment
  - We develop a novel strategy based on a tax ceiling
  - We link reduced-form effects to structural parameters, and simulate long-run effects
- Our findings:
  - Evidence is consistent with sizeable structural elasticities
  - Abolishing wealth tax increases top 1% wealth share by 34% (from about 20% to 27%) over 30 years
  - Confounders (dot-com collapse and global financial crisis) kept the observed top 1% wealth share stable