The Evolution of the Welfare State

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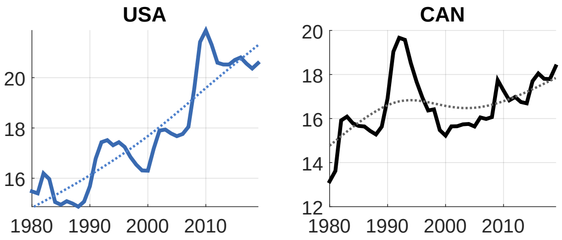

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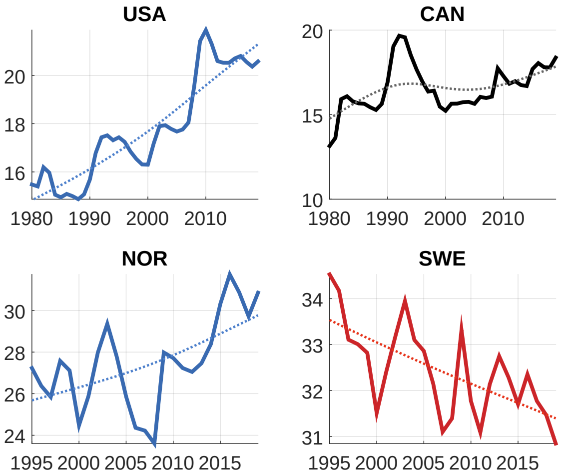

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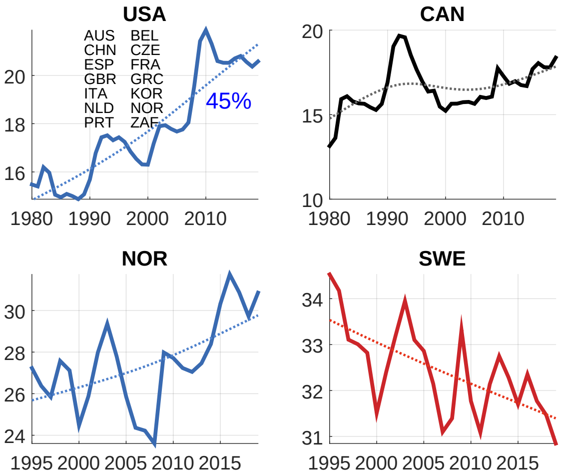

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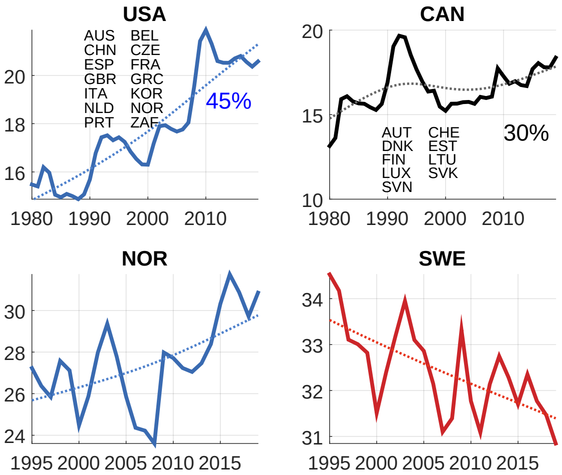

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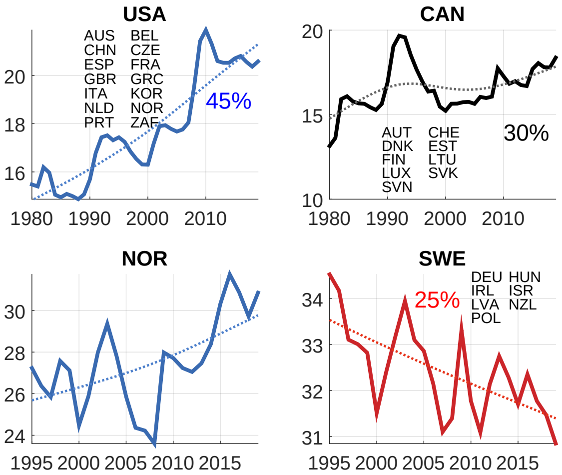

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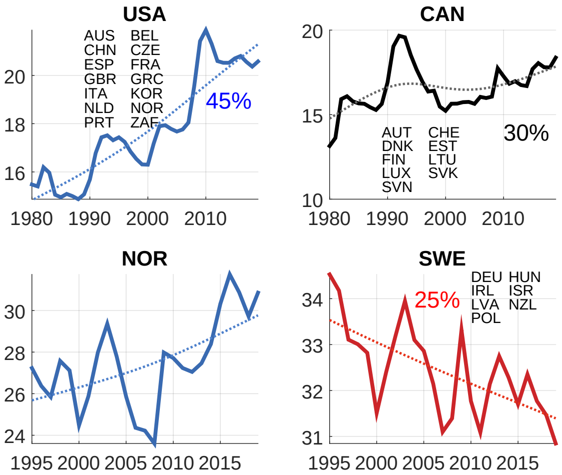

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Net soc. ben.

What explains the evolution of the Welfare State?

- **Many possible factors** country-specific shocks, government changes, demographics, convergence ...

What explains the evolution of the Welfare State?

- **This Paper**

Wealth Distribution

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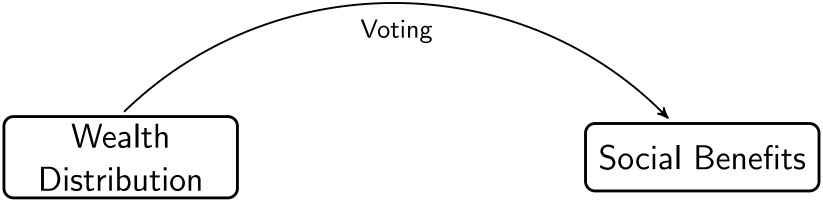

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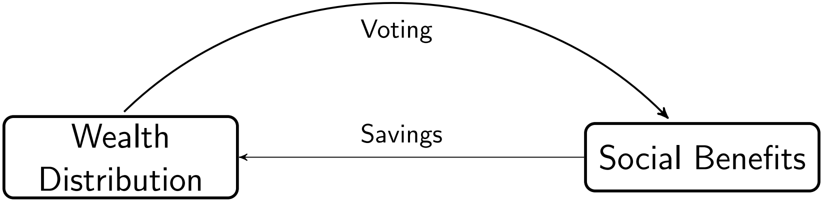

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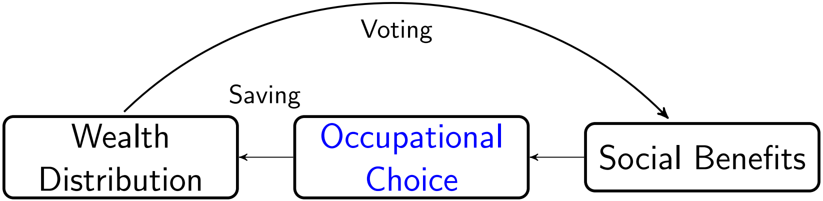

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2. **Anticipatory Voting**

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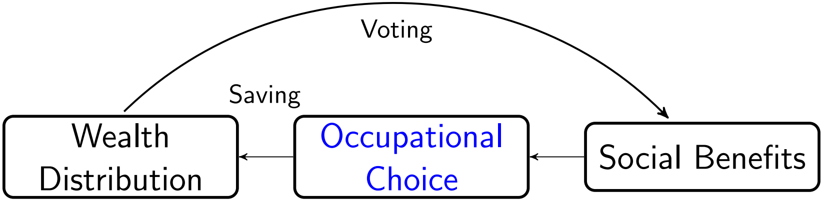

1. **Inequality-Policy Link**
2. **Anticipatory Voting**

- The **Inequality-Policy Link** predicts a large fraction of countries

Main Theoretical Results

1. Size of Welfare State depends on Middle class of **Aspirational** voters

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   Wealthy but ↑ inequality: social benefits increase over time (e.g. US).

   Wealthy but ↓ inequality: social benefits decrease over time (e.g. Sweden).

Quantitative Result

- Theory PREDICTS trends of social benefits in 18 out 24 countries
    1. Calibration based on observed wealth distribution in 1995
    2. Simulation of next 25 years given the 1995's distribution

Contributions to the Literature

1. Theory that explains the differences in the evolution of the Welfare State
   Alesina and Rodrik (1994); Alesina and Angeletos (2005); Hassler et al. (2003)

2. Tractable model with heterogeneous agents, occupational choice, and politics
   Krusell et al. (1996); Krusell and Rios-Rull (1996, 1999); Nuño and Moll (2018); Itskhoki and Moll (2019)
   - Theoretical results for transition dynamics

Plan

1. The Model
2. Equilibrium Social Benefits
3. The Evolution of the Welfare State
4. Quantitative Exercise
5. Conclusions

The Model

The Model

- Continuum of agents heterogeneous in wealth $a_t \sim \Gamma_t(a)$

$$\max_{\{c_t\}_{t=0}^{+\infty} } \left\{ \int_0^{\infty} e^{-\rho t} \log(c_t) dt \right\}$$

$$s.t. \qquad \dot{a}_t = (r - \tau_t)a_t - c_t + \begin{cases} w_t \ell + \boldsymbol{T_t} & \text{if worker} \\ \Pi_t & \text{if entrepreneur} \end{cases}$$

$$a_t \geq \underline{a}$$

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  - Transfer rate: $b_t \geq -\underline{b}$ (social benefits, % of GDP)

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Spending Trade-off: Evidence

Two Technologies

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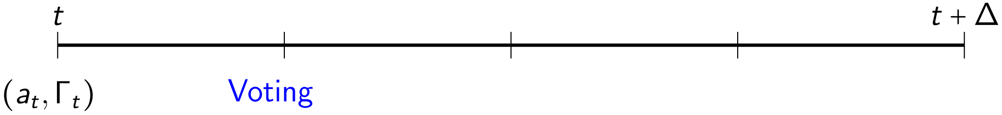
   Individual profits: $\Pi_t = p_t R - rI$

Timing of individual decisions



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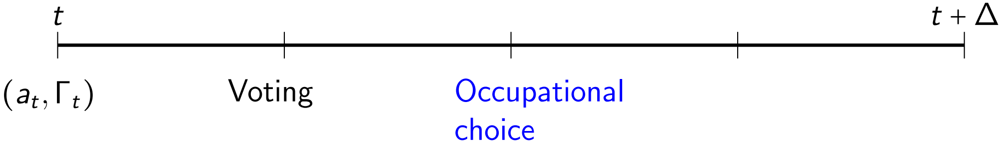

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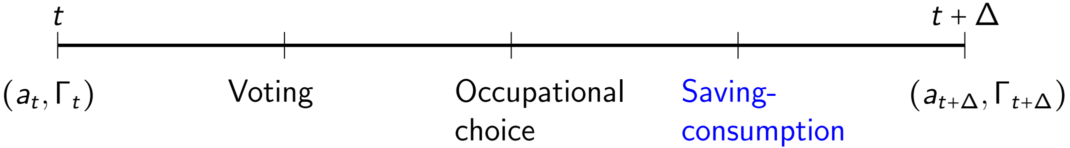

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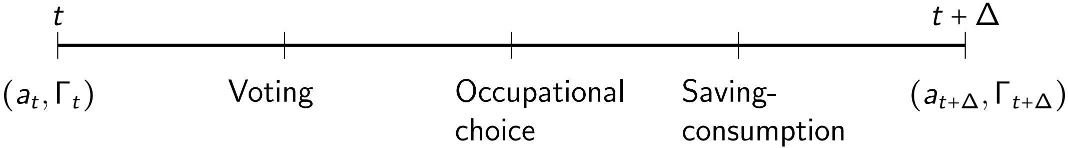

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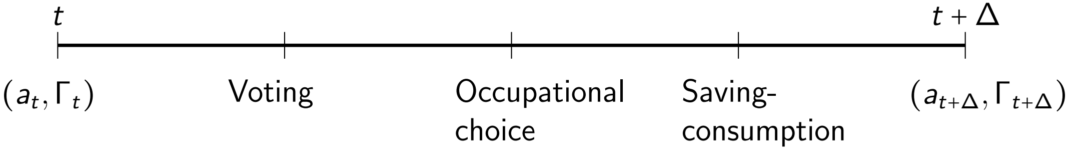

- Agents expect social benefits to remain stable (do not predict $\{b_s, \Gamma_s\}_{s=t}^{+\infty}$)
  Benabou and Ok (2001); Alesina and La Ferrara (2005)
- *Alternative:* fully-rational equilibrium (numerical)
  Krusell and Rios-Rull (1996, 1999); Quadrini and Rios-Rull (2023)

Occupational Choice

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- Occupational constraint: $\Pi_t \geq w_t \ell + T_t$

Occupational Choice

- Occupational threshold: $\tilde{a}(b_t, \Gamma_t)$

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- Credit constraints à la Holmstrom and Tirole (1997):

$$\Pi_t + ra \geq (I - a) + w_t \ell + T_t$$

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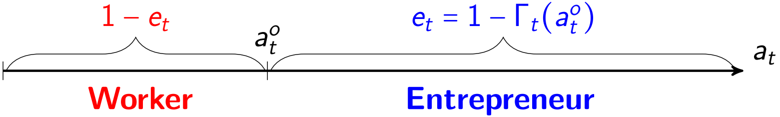

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2. Maximum Sustainable transfer rate: $\overline{b}(\Gamma_t)$

Plan

Equilibrium Social Benefits: Roadmap

1. Individual Preferences
2. Probabilistic Voting (Persson and Tabellini, 2000)
3. Equilibrium Social Benefits

Individual Preferences

Individual preferred transfer rate: $b(a;\Gamma_t)$

- Agents observe a and Γ_t, and maximize disposable income at t:

$$b(a;\Gamma_t) = argmax_{b\in[\underline{b},\overline{b}]}\ y_t(a,b;\Gamma_t) = \begin{cases} y_t^W & \text{if } a < a^o(b,\Gamma_t) \\ y_t^E & \text{if } a \geq a^o(b,\Gamma_t) \end{cases}$$

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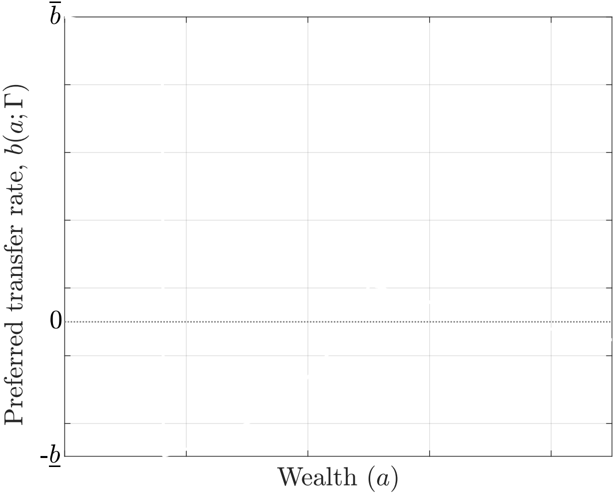
- Agents anticipate occupational mobility prospects at t

Individual preferred transfer rate



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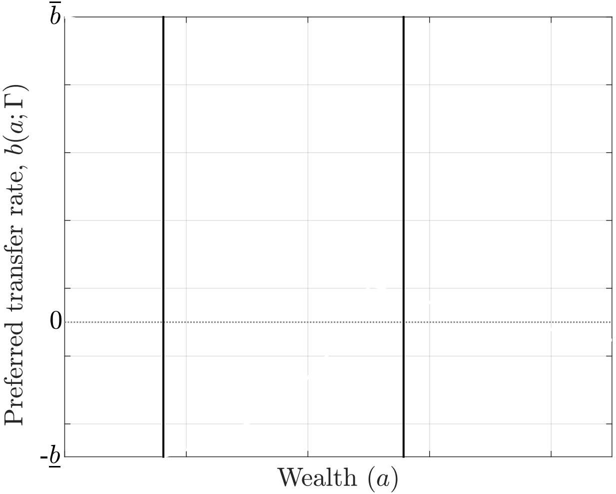
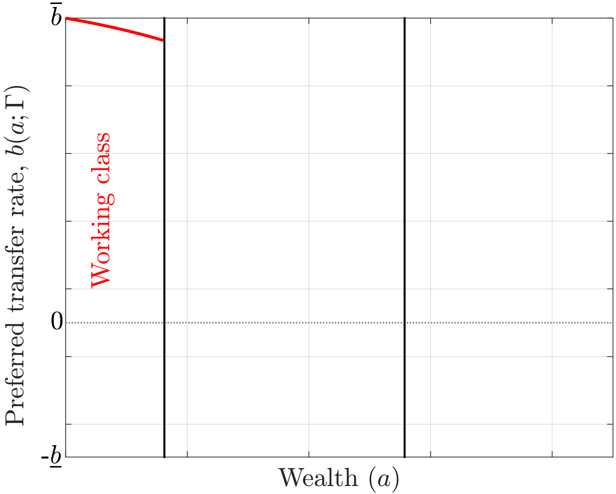


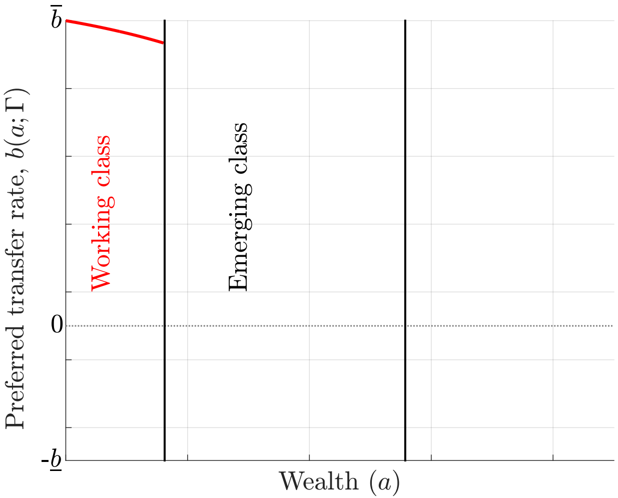
Individual preferred transfer rate

- **Working Class:** high social benefits



Individual preferred transfer rate

- **Emerging Class:** either Workers or Entrepreneurs



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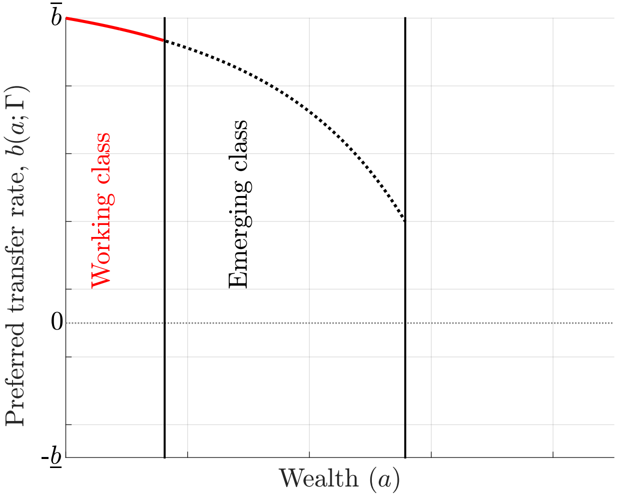

Individual preferred transfer rate

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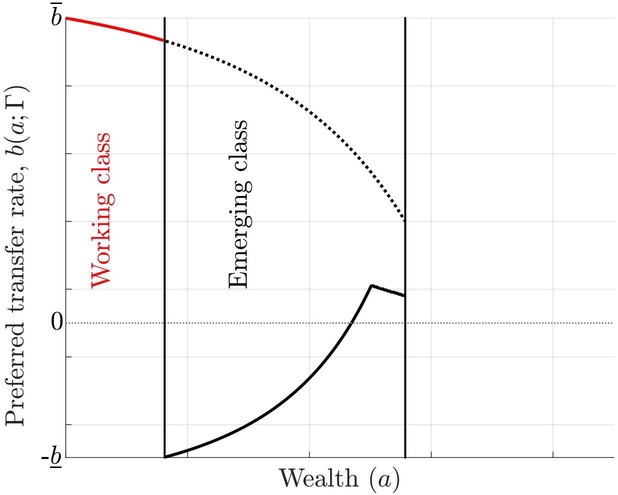

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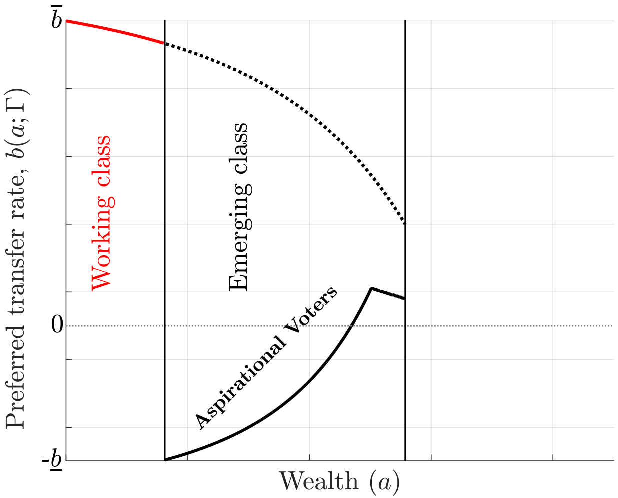
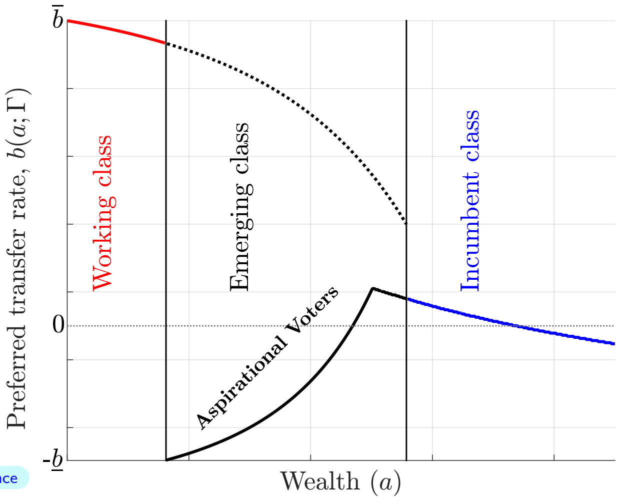


Individual preferred transfer rate

- **Incumbent Class:** less pro-business policy



Income function Evidence

Probabilistic Voting

Electoral competition under uncertainty

- Two parties choose b_t^1 and b_t^2 to maximize expected share of votes

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  p: idiosyncratic political preference (Uniform, (ϕ^W, ϕ^E))
- Symmetric Nash equilibrium:

$$b_t = argmax_b \left\{ \int_{a<a_t^o(b)} y(a,b)d\Gamma_t(a) + \underbrace{\frac{\phi^E}{\phi^W}}_{\equiv \phi} \int_{a \geq a_t^o(b)} y(a,b)d\Gamma_t(a) \right\}$$

Equilibrium Social Benefits

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- Maximize weighted income ($\phi \geq 1$ Political weight):

$$\max_b \left\{ w_t \ell \cdot (1 - e_t) + \phi \Pi_t \cdot e_t \right\}$$

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- Equilibrium policy b_t:

$$\boxed{\mathbf{1 - \Gamma_t(a^o(b_t, \Gamma_t)) = e^* \quad (PE)}}$$

  - $e^* = \Psi(Z, r, \alpha, R, I, \ell, \phi) \in (0, \alpha)$

Forward looking gov. PE: 2-D diagram

Plan

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Equilibrium Definition

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$$d_t \Gamma_t(a) = H(\Gamma_t, s_t, a_t^o) \qquad (KFE)$$

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$$a_t^o = \max\{\hat{a}_t, \tilde{a}_t\} \qquad (OC)$$

$$e^* = 1 - \Gamma_t(a_t^o) \qquad (PE)$$

$$\tau_t \cdot A_t = T_t \cdot (1 - e^*) \qquad (BB)$$

Stationary Equilibrium

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1. Unique stationary tax rate: $\boldsymbol{\tau^* = r - \rho}$ $(\theta(\tau^*) = 0)$

2. Set of stationary distributions: $\boldsymbol{\Gamma^*}$

SS details

Transition Dynamics

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- Six possible patterns for the joint dynamics of (b_t, τ_t, A_t) details

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1. Γ converges to one Γ^*

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Given Γ_0 and $r - \rho$:

1. Γ converges to one Γ^*
2. Γ diverges
3. Γ converges to a degenerate distribution

Transition Dynamics

- Six possible patterns for the joint dynamics of (b_t, τ_t, A_t) details

Main takeaway

1. If $\tau(\Gamma_0) < r - \rho \Rightarrow b$ increasing over time
2. If $\tau(\Gamma_0) > r - \rho \Rightarrow b$ decreasing over time

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- Six possible patterns for the joint dynamics of (b_t, τ_t, A_t) details

Main takeaway

1. If $\tau(\Gamma_0) < r - \rho \Rightarrow$ b increasing over time
2. If $\tau(\Gamma_0) > r - \rho \Rightarrow$ b decreasing over time

Question Which properties of Γ_0 give rise to each case?

Question Which properties of Γ_0 imply that $\uparrow b$ or $\downarrow b$?

- Problem Characterizing distributions is analytically cumbersome

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- **Solution** Construct Γ_0 perturbing stationary distributions Γ^*

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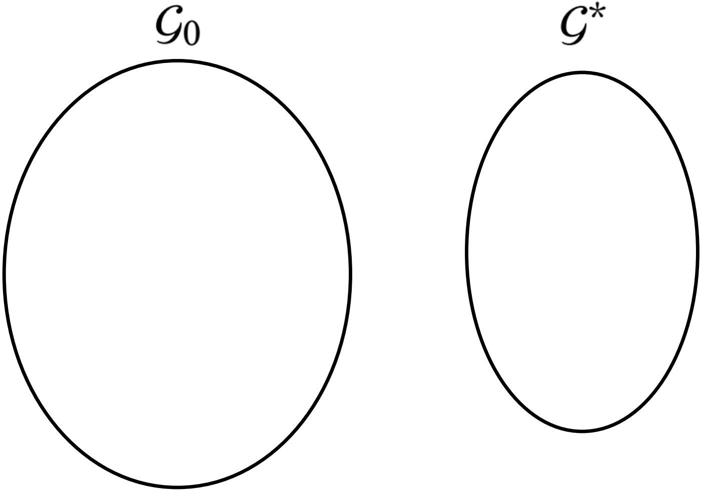
- Problem Characterizing distributions is analytically cumbersome

- **Solution** Construct Γ_0 perturbing stationary distributions Γ^*

  Apply an MPS on Γ^* to obtain Γ_0 (MIT shock)
  MPS around the mean (Rothschild and Stiglitz, 1971)

The MPS approach



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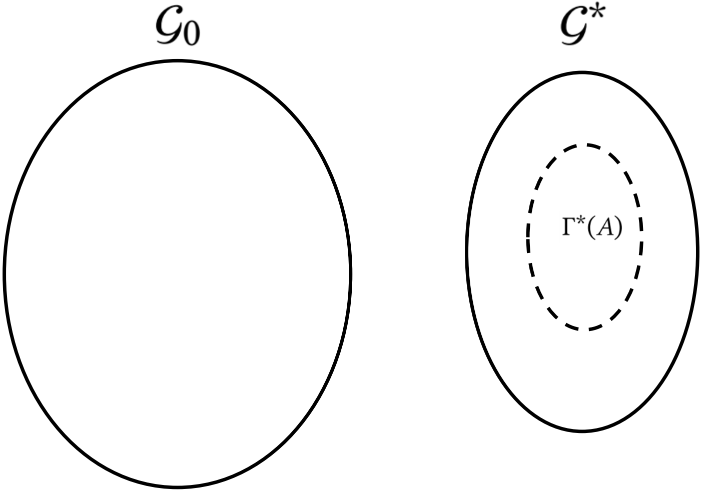

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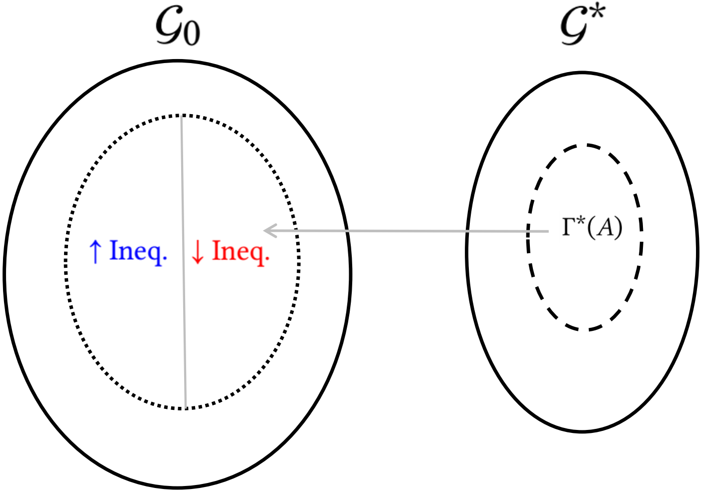

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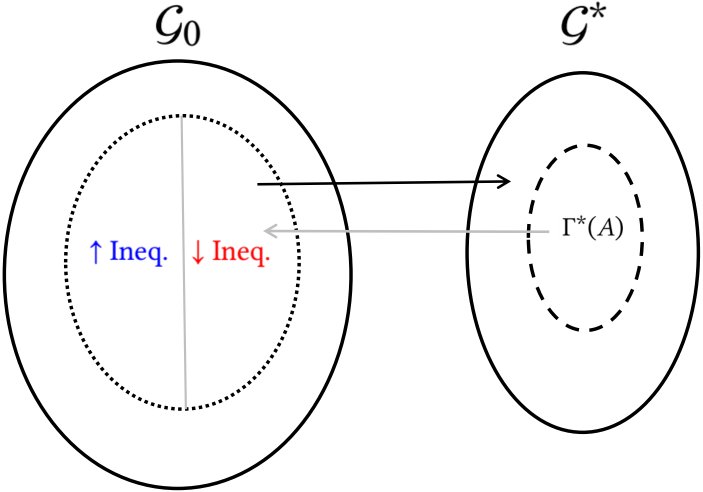
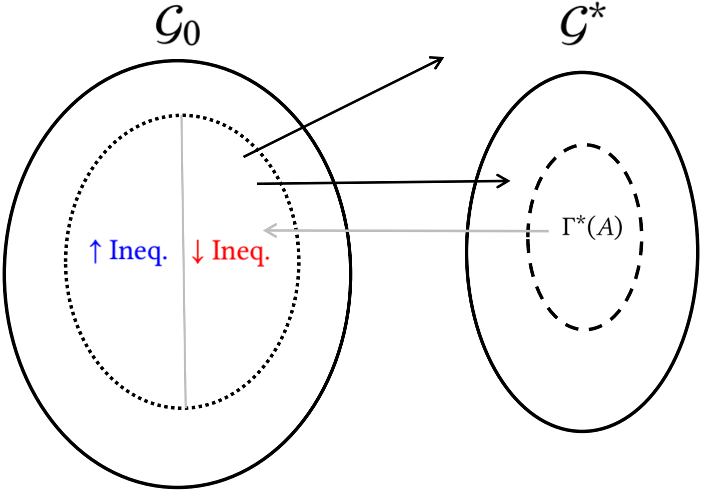


The MPS approach



The Evolution of the Welfare State: Wealthy Countries

$\uparrow$ **Inequality**: USA (1970-2019)

Increasing social benefits

The Evolution of the Welfare State: Wealthy Countries

↑ **Inequality**: USA (1970-2019)

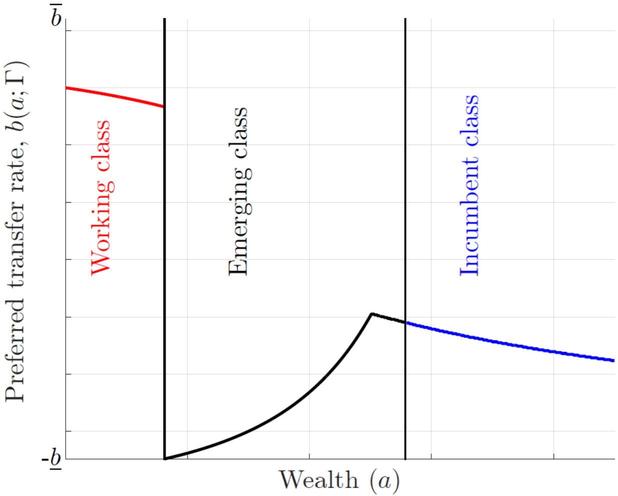
Increasing social benefits

↓ **Inequality**: Sweden (1995-2019)

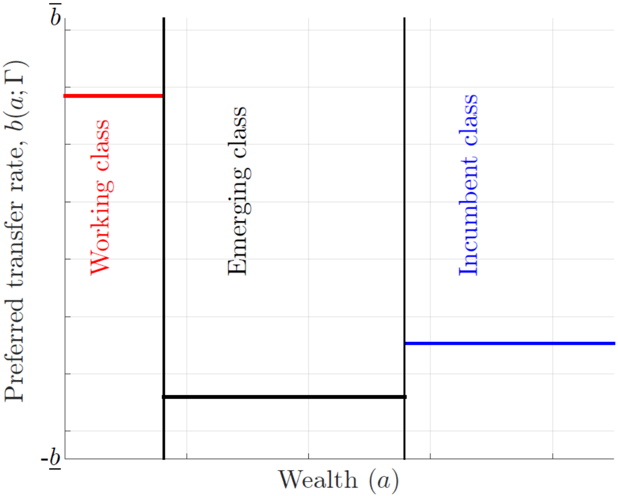
Decreasing social benefits

The American Experience (1970-2019)

American Experience: Intuition

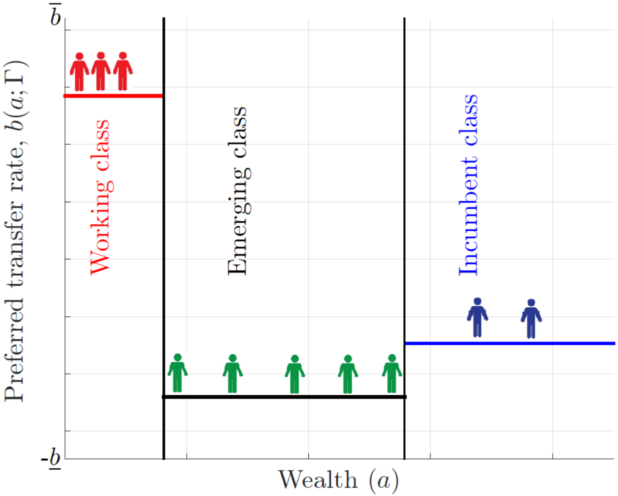


American Experience: Intuition



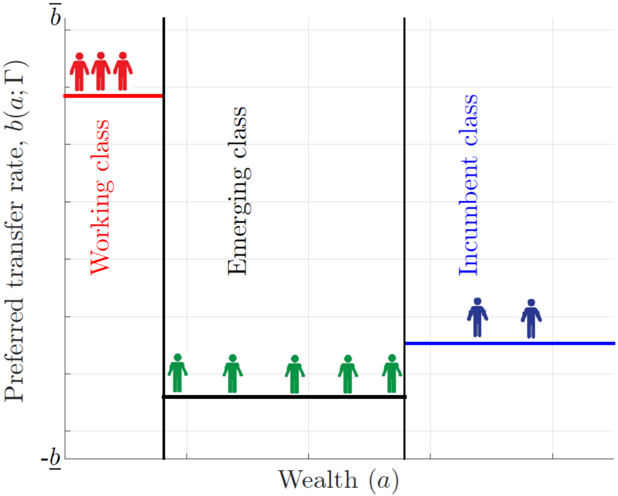
American Experience: Intuition

- $t = 0$: Wealthy and Unequal $\Rightarrow$ Many Aspirational Voters (AV)



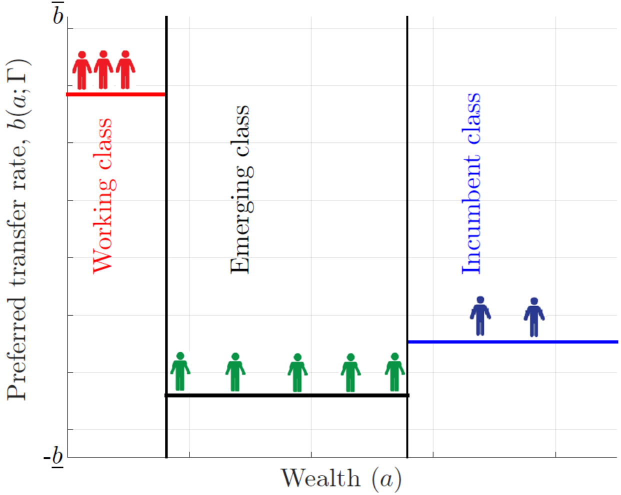
American Experience: Intuition

- $t = 0$: Wealthy and Unequal $\Rightarrow$ Many Aspirational Voters (AV) $\Rightarrow$ Low b



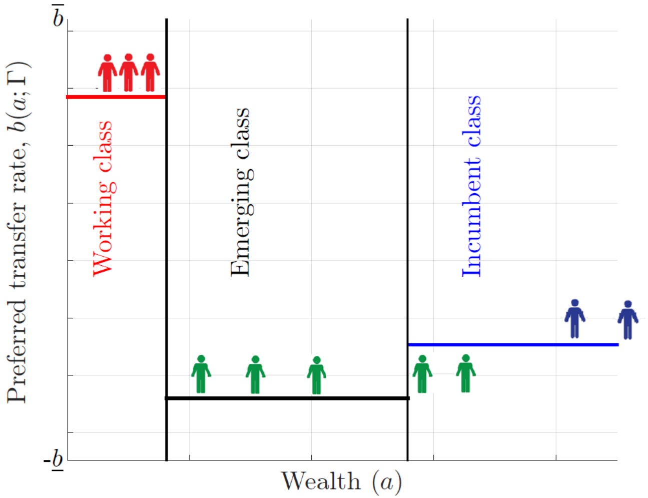
American Experience: Intuition

- $t = 0$: Low b $\Rightarrow$ Low τ $\Rightarrow$ Agents save



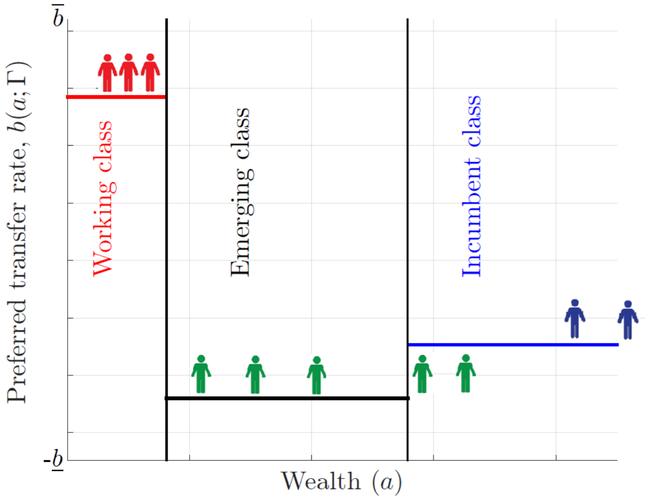
American Experience: Intuition

- $t = 0$: Low b $\Rightarrow$ Low τ $\Rightarrow$ Agents save $\Rightarrow$ Γ shifts right



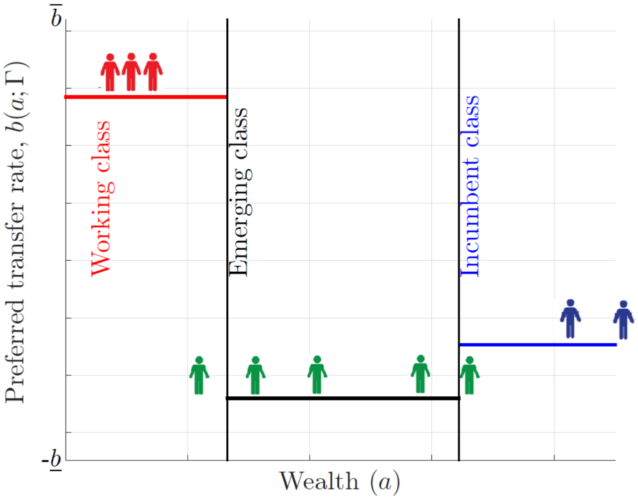
American Experience: Intuition

- $t = \Delta : \Gamma$ shifts right $\Rightarrow$ Everyone wealthier



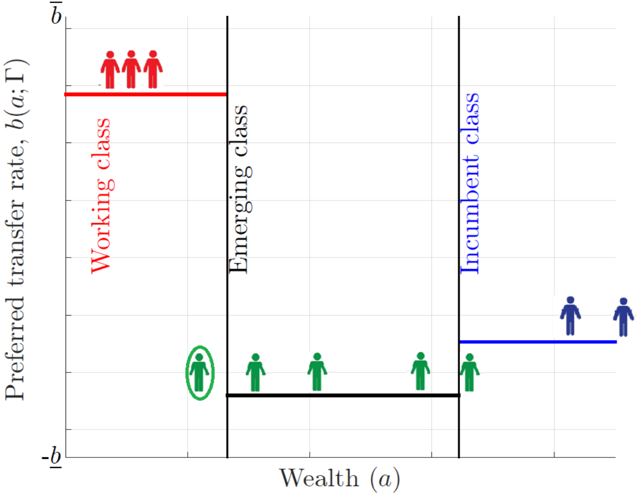
American Experience: Intuition

- $t = \Delta$: Γ shifts right $\Rightarrow$ Everyone wealthier $\Rightarrow \uparrow a^o$



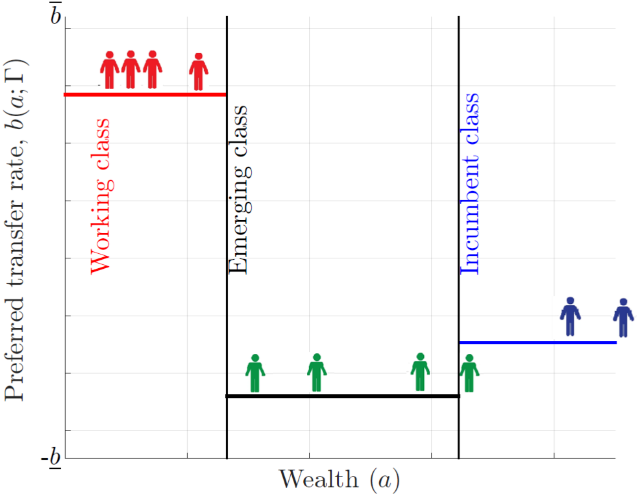
American Experience: Intuition

- $t = \Delta$: Poorest AV didn't save enough



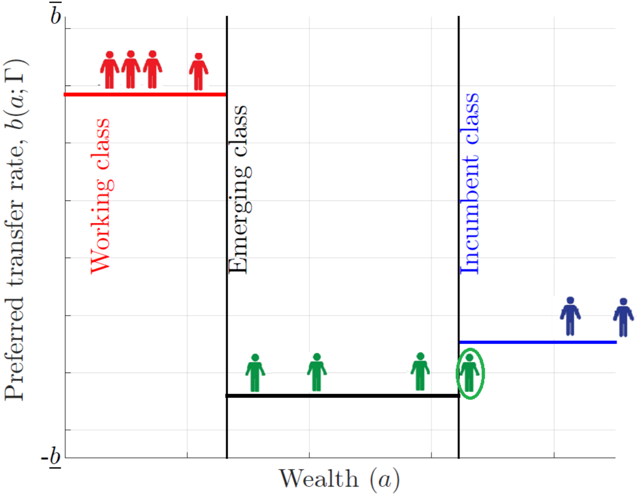
American Experience: Intuition

- $t = \Delta$: Poorest AV didn't save enough $\Rightarrow$ join the Working Class



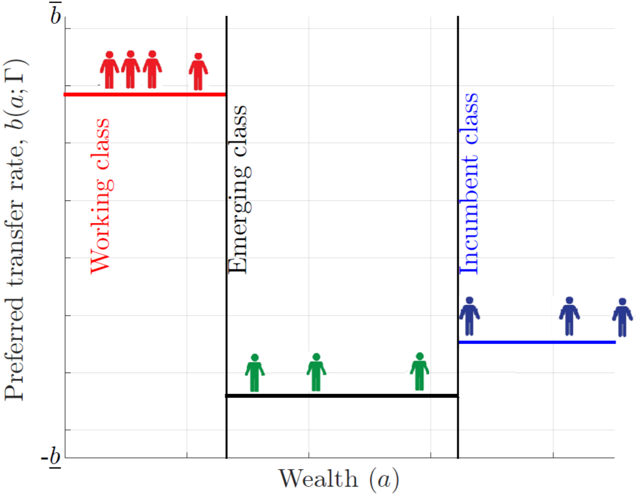
American Experience: Intuition

- $t = \Delta$: Wealthiest AV saved enough



American Experience: Intuition

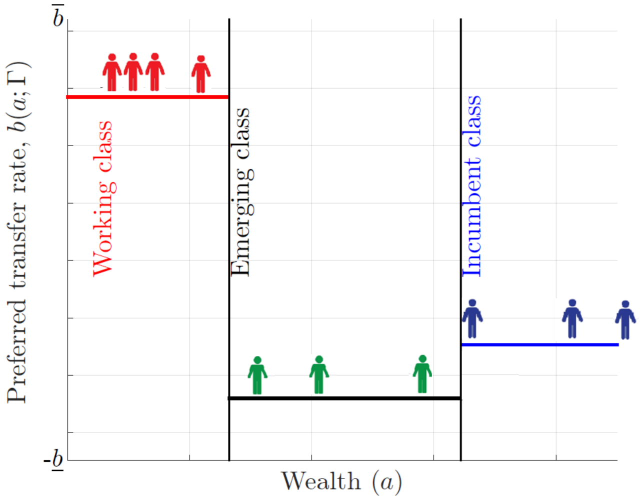
- $t = \Delta$: Wealthiest AV saved enough $\Rightarrow$ join the Incumbent Class



American Experience: Intuition

- $t = \Delta$: Mass of AV shrinks $\Rightarrow$ b goes up

Mathematical intuition



American Experience: Intuition

1. $t = 0$: Wealthy and unequal

   Many AV $\Rightarrow$ Low social benefits

American Experience: Intuition

1. $t = 0$: Wealthy and unequal

   Many AV ⇒ Low social benefits

2. $t = 1, 2, ..$ Poorest AV join the Working Class
   Wealthiest AV join the Incumbent Class

American Experience: Intuition

1. $t = 0$: Wealthy and unequal

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   Mass of AV shrinks over time $\Rightarrow$ Increasing path of social benefits

American Experience: Intuition

1. $t = 0$: Wealthy and unequal

   Many AV $\Rightarrow$ Low social benefits

2. $t = 1, 2, ..$ Poorest AV join the Working Class
   Wealthiest AV join the Incumbent Class

   Mass of AV shrinks over time $\Rightarrow$ Increasing path of social benefits

   Question Can the model predict the trends in the data?

Plan

1. The Model
2. Equilibrium Social Benefits
3. The Evolution of the Welfare State
4. Quantitative Exercise
5. Conclusions

Quantitative Exercise

Quantitative Exercise (1995-2019)

Inputs

1. Starting wealth distribution: Γ_{1995}
   World Inequality Database (WID)

Quantitative Exercise (1995-2019)

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1. Starting wealth distribution: Γ_{1995}
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2. Production function and productivity: $\alpha, \{Z_t\}_{t=1995}^{2019}$

Quantitative Exercise (1995-2019)

Inputs

1. Starting wealth distribution: Γ_{1995}
   World Inequality Database (WID)

2. Production function and productivity: $\alpha, \{Z_t\}_{t=1995}^{2019}$
   2.1 Solow Residual (24 countries)
       Penn World Table

Quantitative Exercise (1995-2019)

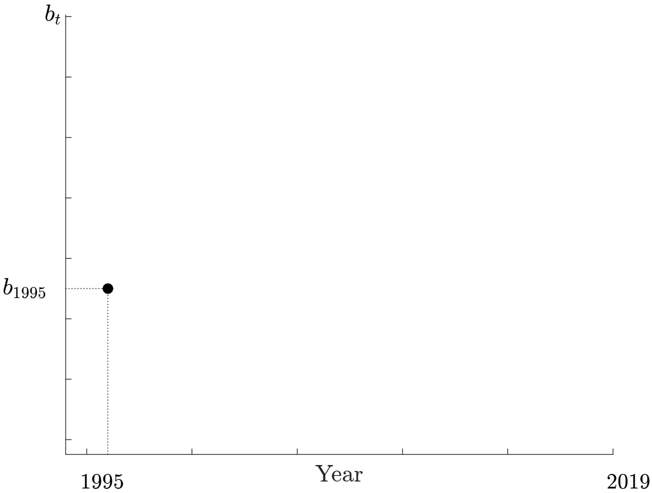
Inputs

1. Starting wealth distribution: Γ_{1995}
   World Inequality Database (WID)

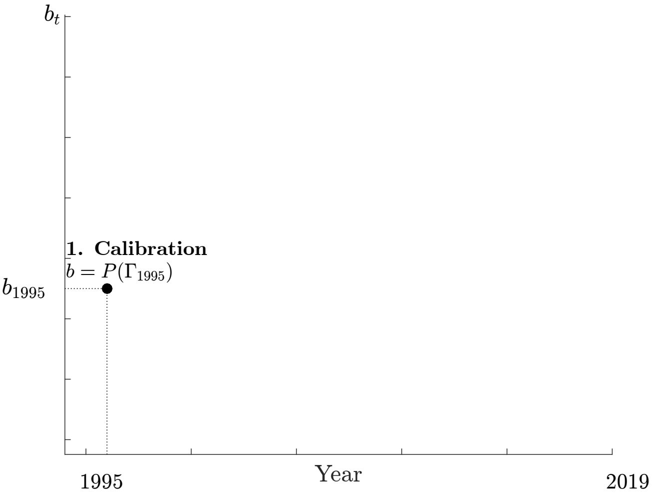
2. Production function and productivity: $\alpha, \{Z_t\}_{t=1995}^{2019}$
   2.1 Solow Residual (24 countries)
   Penn World Table

   2.2 Olley and Pakes (1996): control for selection/simultaneity (17 countries)
   COMPUSTAT North America and COMPUSTAT Global

Quantitative Exercise (1995-2019)

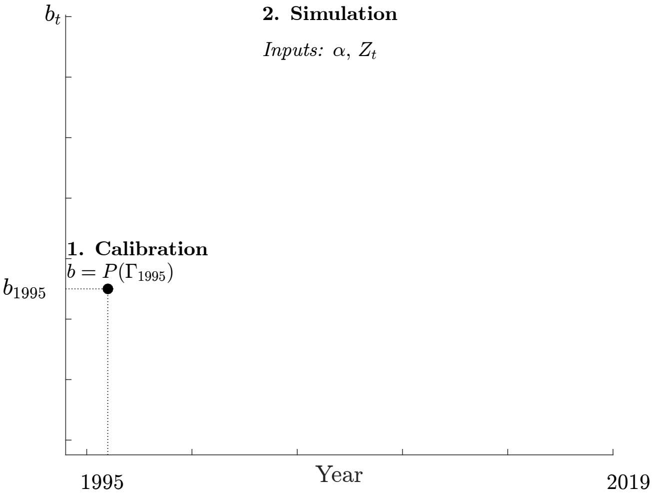


Quantitative Exercise (1995-2019)

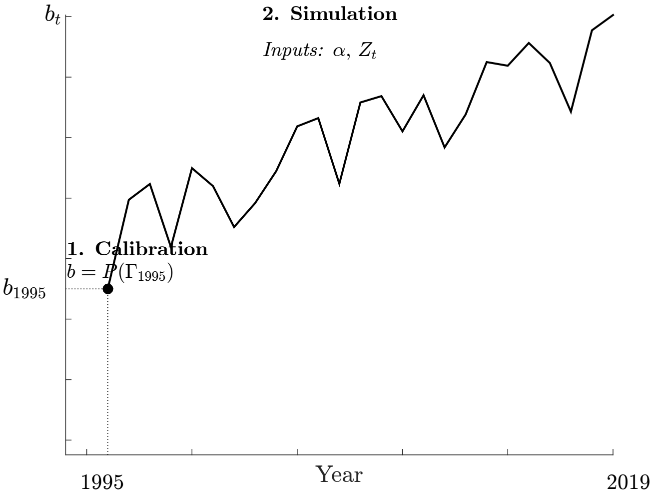


Calibration method

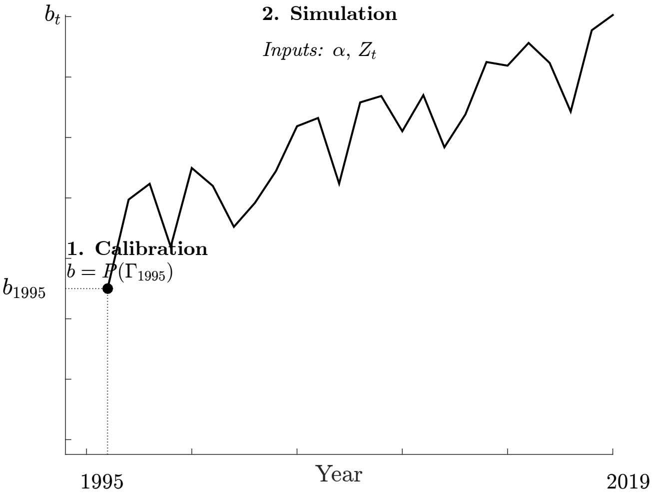
Quantitative Exercise (1995-2019)



Quantitative Exercise (1995-2019)

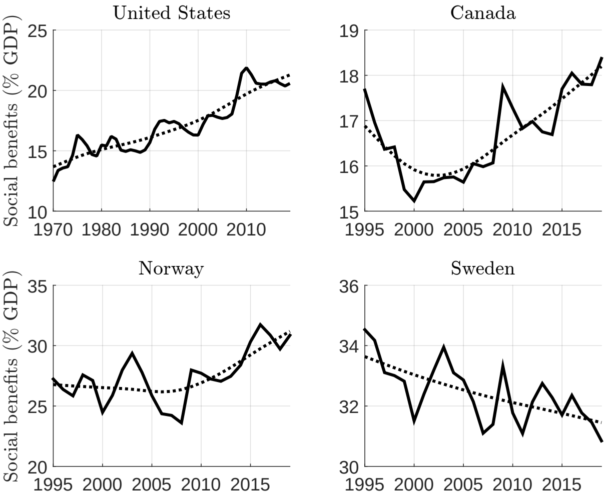


Quantitative Exercise (1995-2019)



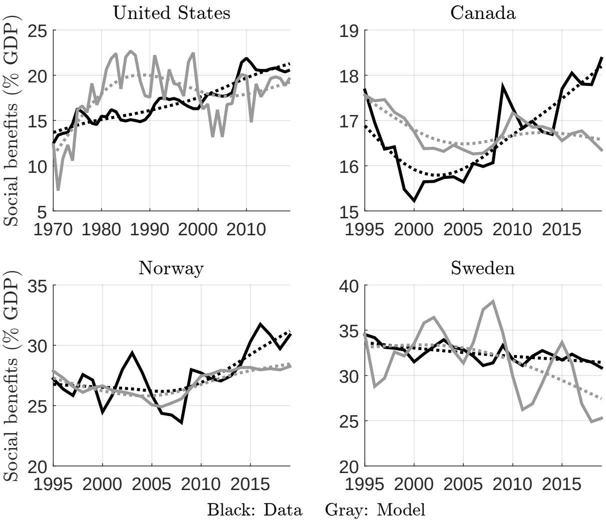
Result: the model predicts the trend of **18 out of 24** countries

Countries in the Intro: Data versus Model

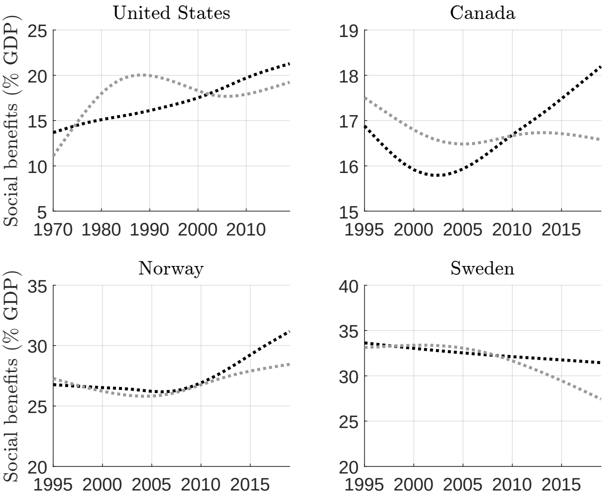


Black: Data

Countries in the Intro: Data versus Model



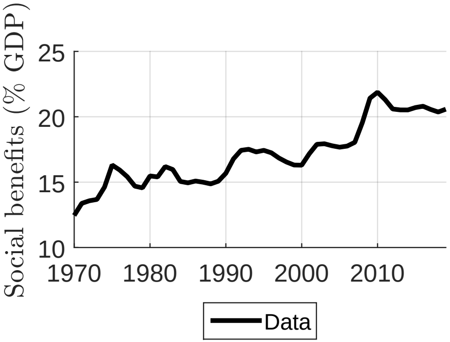
Countries in the Intro: Data versus Model

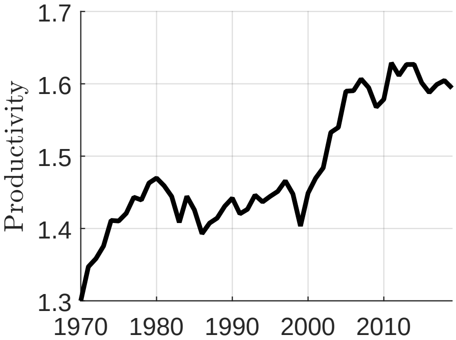


Black: Data Gray: Model

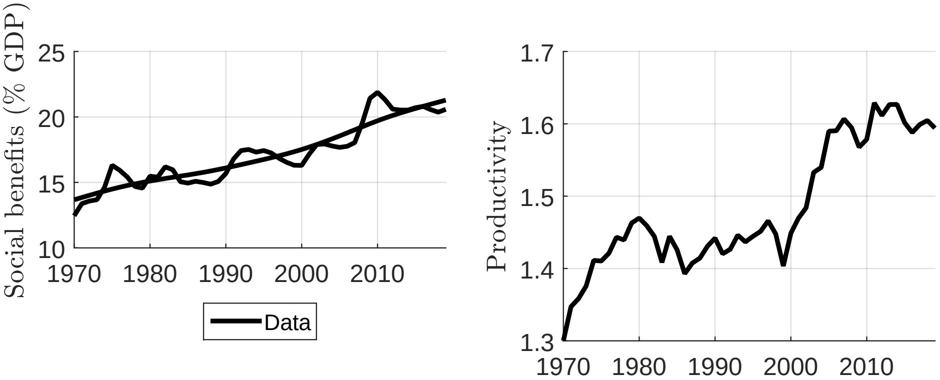
The Role of Productivity

United States: Social benefits and Productivity

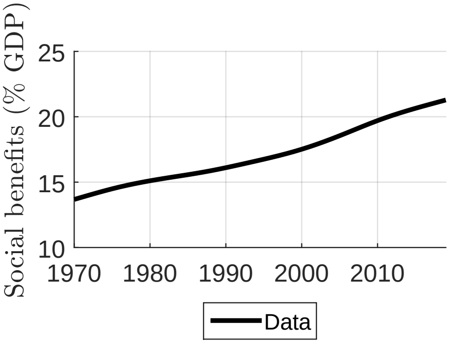


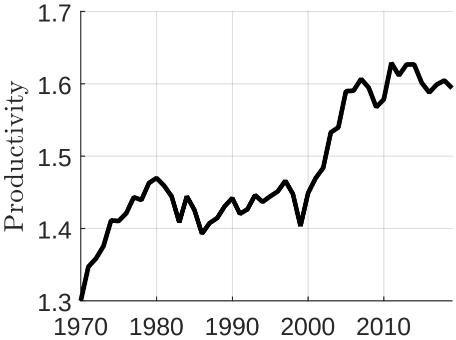


United States: Social benefits and Productivity



United States: Social benefits and Productivity





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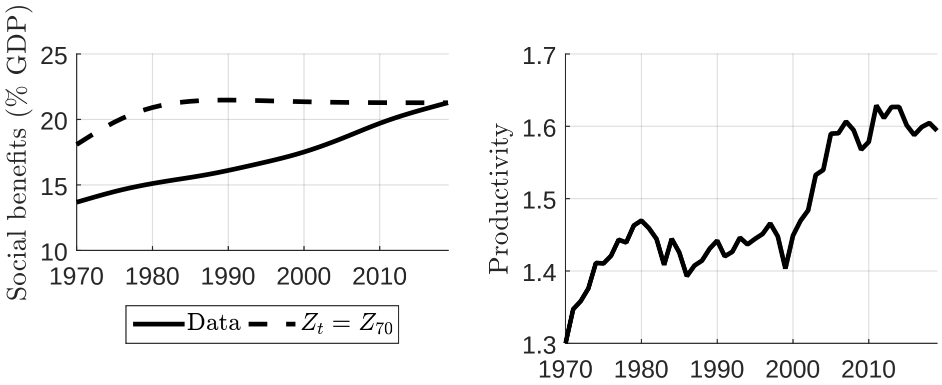
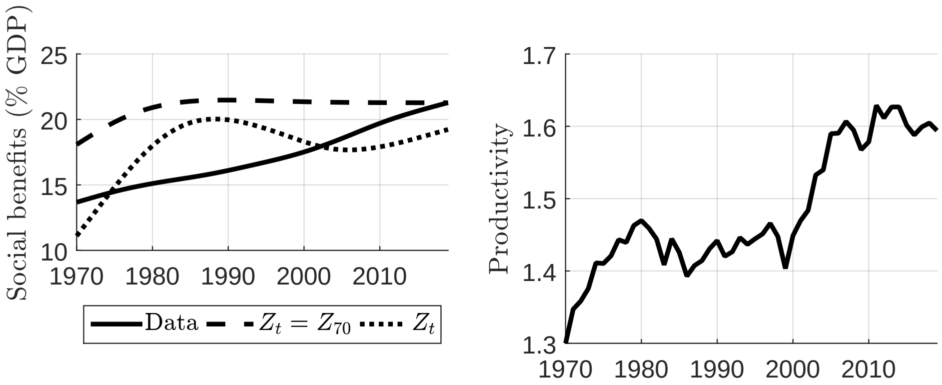
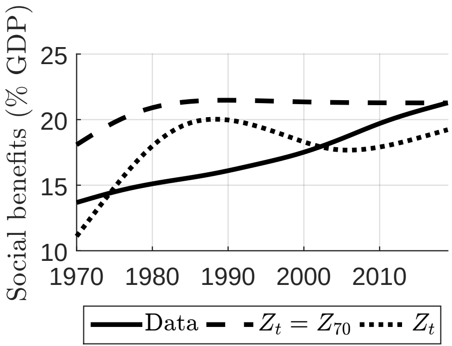


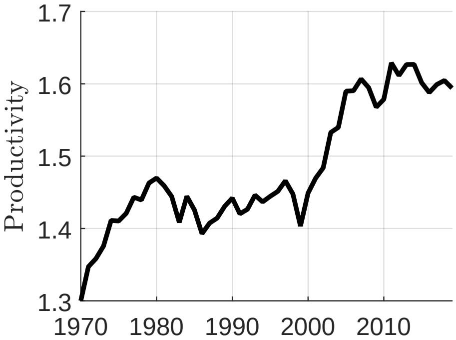
United States: Social benefits and Productivity



United States: Social benefits and Productivity

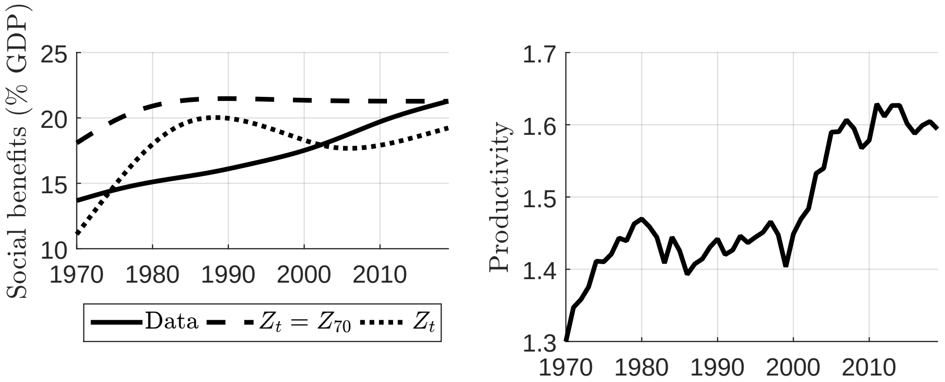
- Effects of increasing productivity?





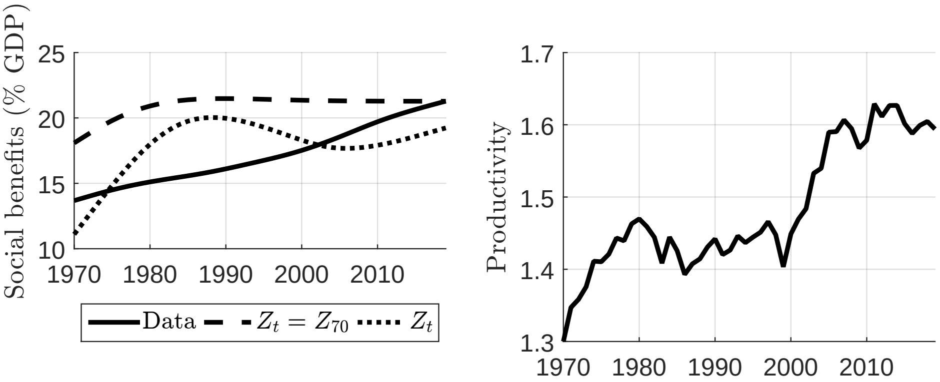
United States: Social benefits and Productivity

- 1st order effect: $\uparrow Z \Rightarrow \uparrow \Pi$ and $\downarrow a^o$



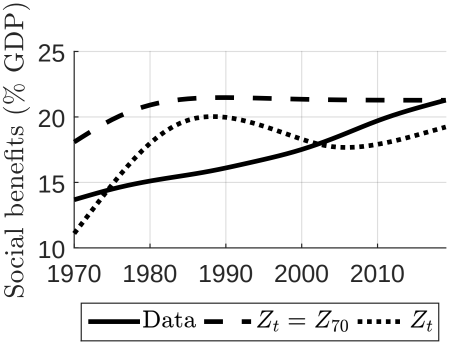
United States: Social benefits and Productivity

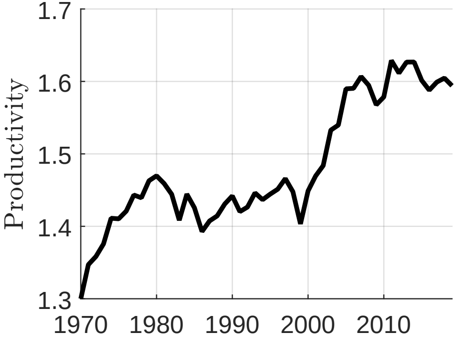
- 1st order effect: $\uparrow Z \Rightarrow \uparrow \Pi$ and $\downarrow a^o \Rightarrow \uparrow$ AV $\Rightarrow \downarrow b$



United States: Social benefits and Productivity

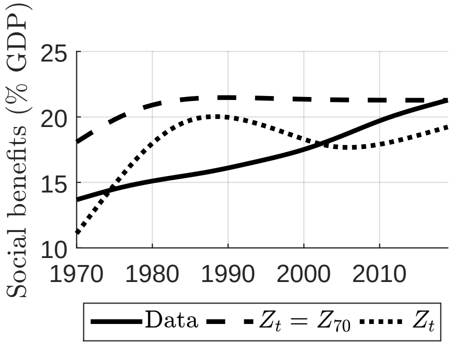
- Why social benefits going up despite increasing productivity?

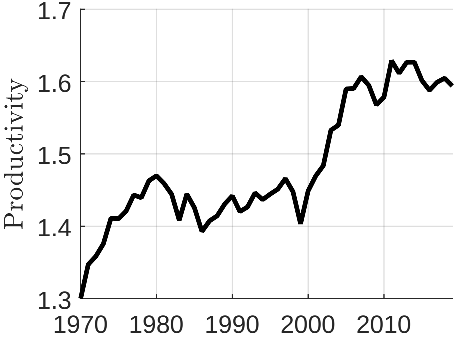




United States: Social benefits and Productivity

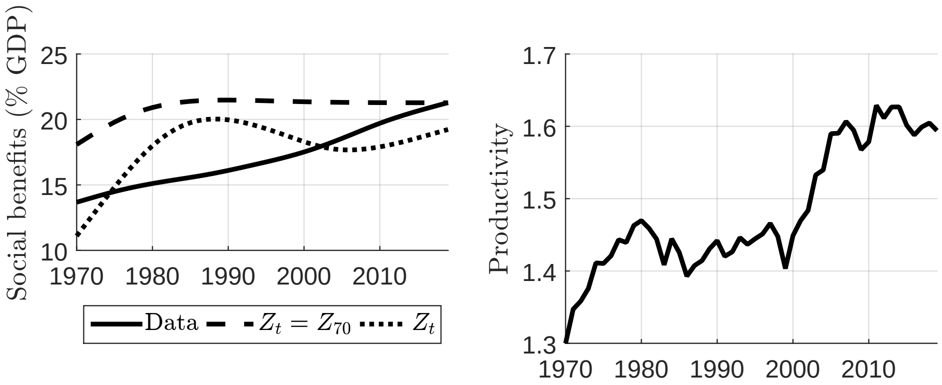
- 2nd order effect: $\downarrow b \Rightarrow \downarrow \tau \Rightarrow$ Agents save





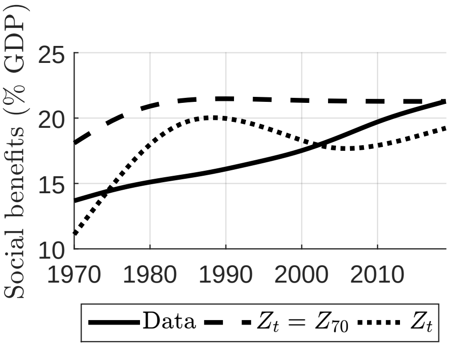
United States: Social benefits and Productivity

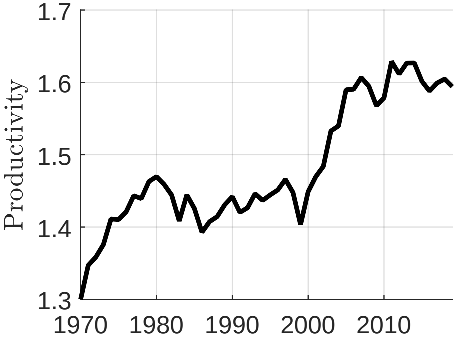
- 2nd order effect: $\downarrow b \Rightarrow \downarrow \tau \Rightarrow$ Agents save $\Rightarrow \downarrow$ mass of AV $\Rightarrow \uparrow b$



United States: Social benefits and Productivity

- 2nd order effect has dominated in the US!





Extensions

Extensions

Theory

Extensions

Theory

1. Labor and capital tax $\surd$

Extensions

Theory

1. Labor and capital tax $\surd$
2. Transfers to entrepreneurs and workers $\surd$

Extensions

Theory

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Quantitative Exercise

Extensions

Theory

1. Labor and capital tax $\surd$
2. Transfers to entrepreneurs and workers $\surd$

Quantitative Exercise

1. Simulations using only social benefits in cash $\surd$

Extensions

Theory

1. Labor and capital tax $\surd$
2. Transfers to entrepreneurs and workers $\surd$

Quantitative Exercise

1. Simulations using only social benefits in cash $\surd$
2. Counterfactual Analysis (Canada, USA, Sweden) $\surd$

Extensions

Theory

1. Labor and capital tax $\surd$
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Quantitative Exercise

1. Simulations using only social benefits in cash $\surd$
2. Counterfactual Analysis (Canada, USA, Sweden) $\surd$
    - Limited role of government changes in the trend of the Welfare State!

Extensions

Theory

1. Labor and capital tax $\surd$
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Quantitative Exercise

1. Simulations using only social benefits in cash $\surd$
2. Counterfactual Analysis (Canada, USA, Sweden) $\surd$
   - Limited role of government changes in the trend of the Welfare State!
3. *Future work:* Role of immigration (e.g. Canada and Sweden), aging population, ...

Conclusions

- Size of the Welfare State depends on Middle class of Aspirational voters
- Evolution of the Welfare State depends on Wealth & Inequality
- Theory predicts the trends of social benefits in 18 out 24 countries

Thanks!!!

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__ **and** __ , "On the Size of US Government: Political Economy in the Neoclassical Growth Model," *American Economic Review*, 1999, *89* (5), 1156–1181.

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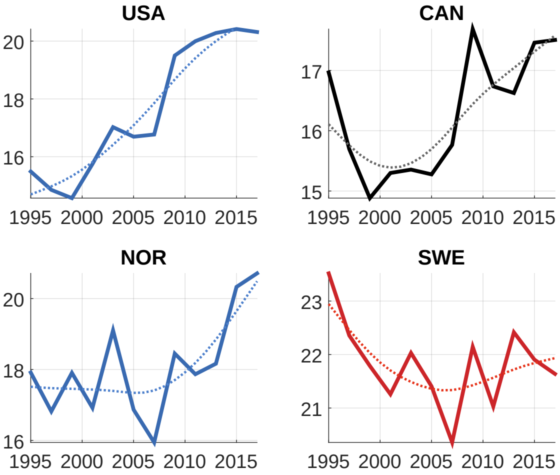
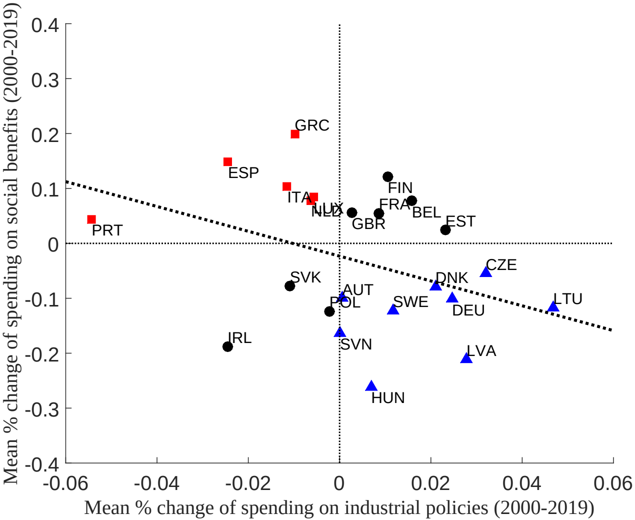
Supplementary Material

The Evolution of Net Social Benefits

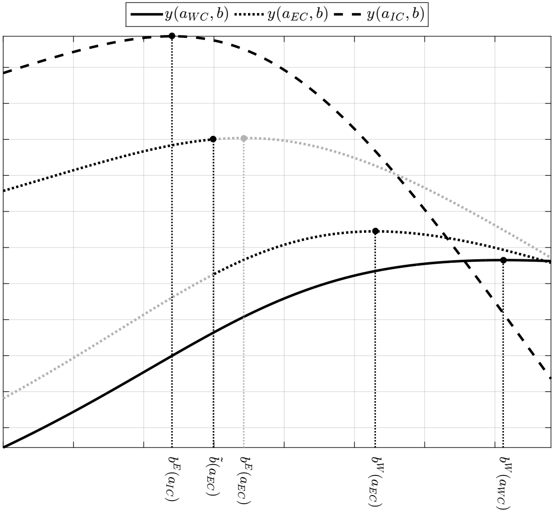


Main

Social Benefits versus Business Policies



Main



Main

The Three Classes: Related Literature

- Emerging Class: Prospects of Upward Mobility Hypothesis
  Benabou and Ok (2001); Checchi and Filippin (2004); Alesina and La Ferrara (2005)

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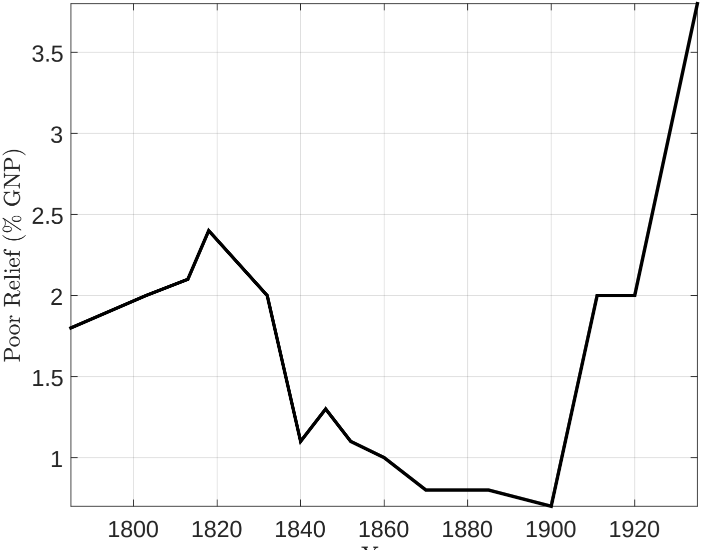
The Three Classes: Related Literature

- Emerging Class: Prospects of Upward Mobility Hypothesis
  Benabou and Ok (2001); Checchi and Filippin (2004); Alesina and La Ferrara (2005)

- Incumbent Class: Interest group theories of financial development
  La Porta et al. (2000); Rajan and Zingales (2003); Rajan and Ramcharan (2011)

Main

The Three Classes: The Industrial Revolution in Britain



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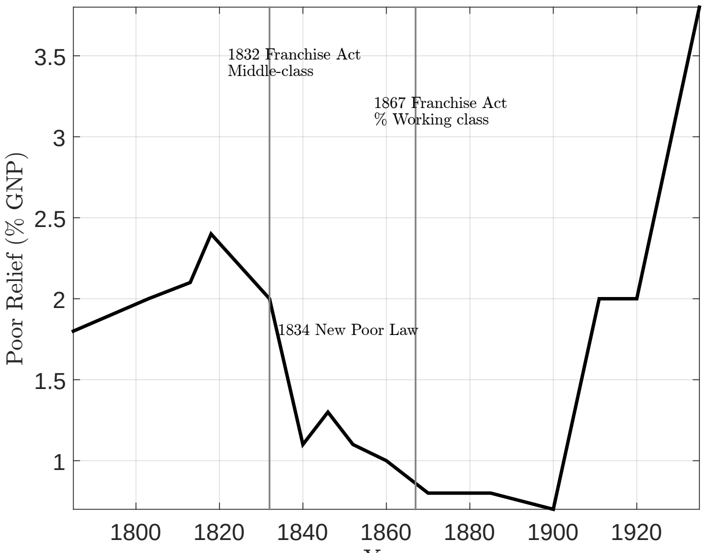
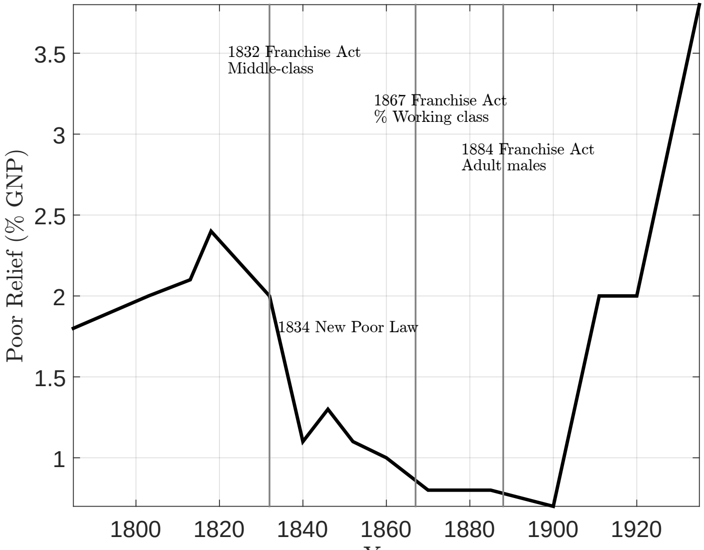


Main

The Three Classes: The Industrial Revolution in Britain



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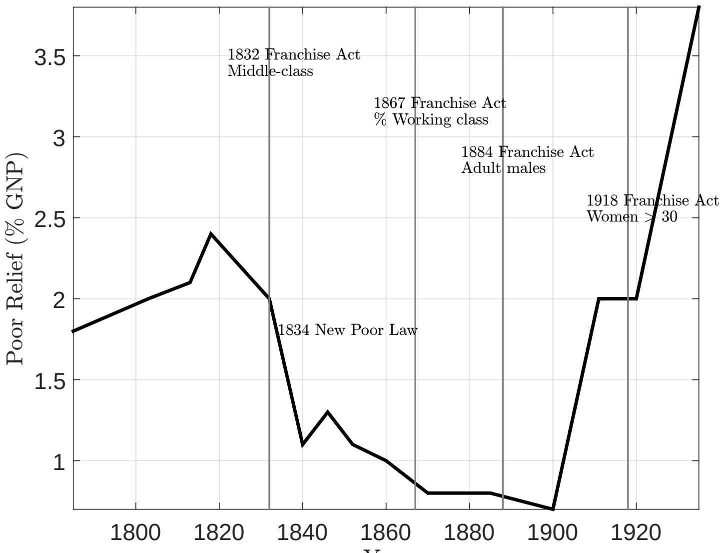
The Three Classes: The Industrial Revolution in Britain



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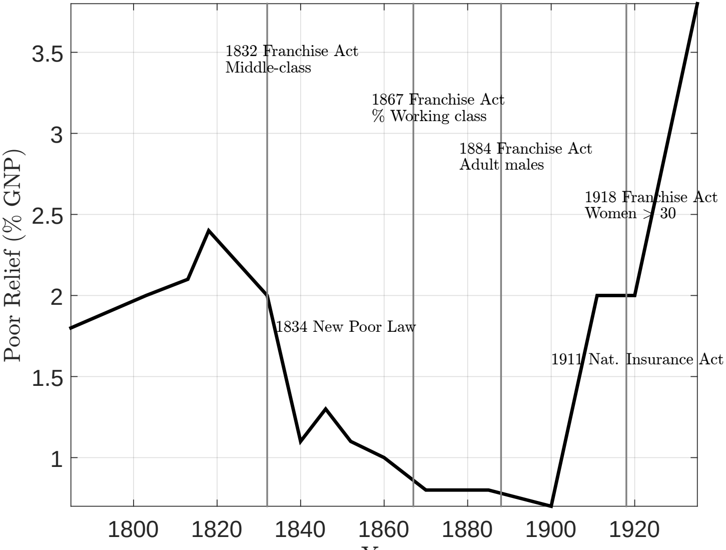
The Three Classes: The Industrial Revolution in Britain



Main

Forward-looking government

- The government solves:

$$max_b\{\int v_t(a,b)d\Gamma_t(a)\}$$

- The PE condition is:

$$\int_{a<a^o(b,\Gamma_t)} \frac{(d_b w_t \ell + d_b T_t)}{y_t(a)} d\Gamma_t(a) + \int_{a\geq a^o(b,\Gamma_t)} \frac{d_b p_t}{y_t(a)} d\Gamma_t(a) = d_b\tau_t \int \frac{a}{y(a)} d\Gamma_t(a) + e^{\rho t}\left(\int_t^{+\infty} d_b\tau_s \frac{1}{r-\tau_s} e^{-\rho s} ds\right) + \frac{1}{\rho}$$

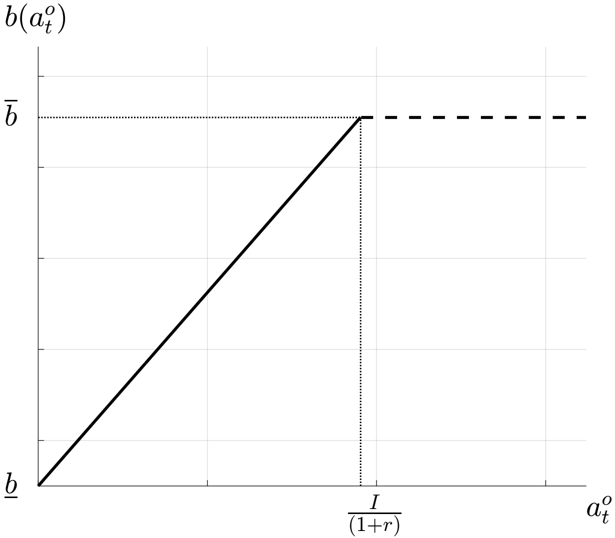
- **Observation** The evolution of b depends on Γ evaluated at each a

Main

The inequality → policy link: $$\boxed{1 - \Gamma_t(a^o(b_t, \Gamma_t)) = e^*}$$

The inequality → policy link: $$a_t^o = \Gamma_t^{-1}(1 - e^*)$$

The **inequality** → **policy** link: $a_t^o = \Gamma_t^{-1}(1 - e^*)$



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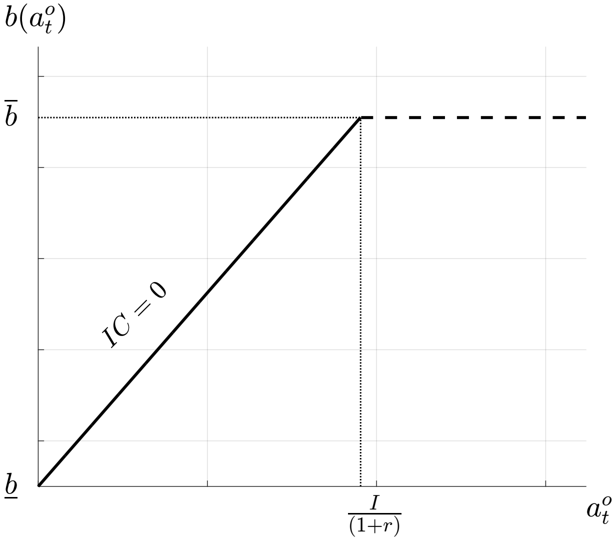

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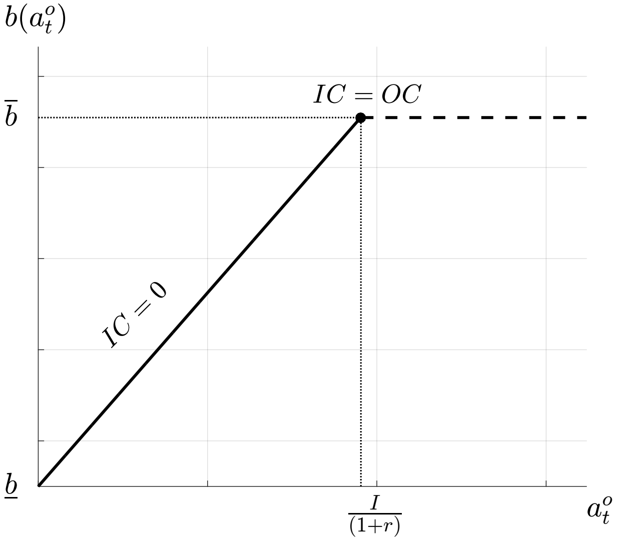

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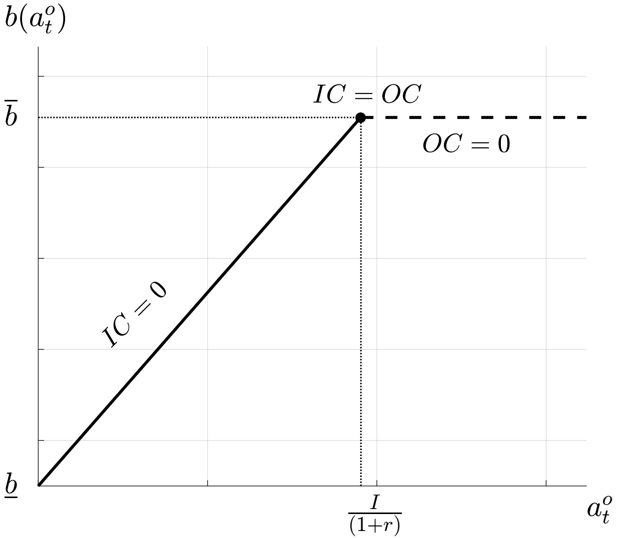

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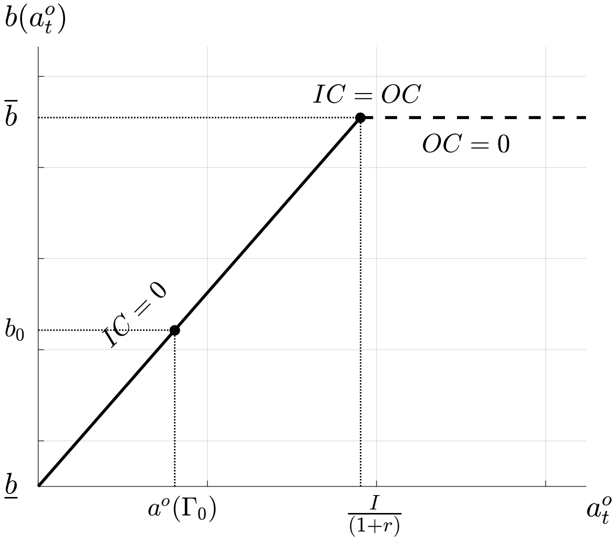

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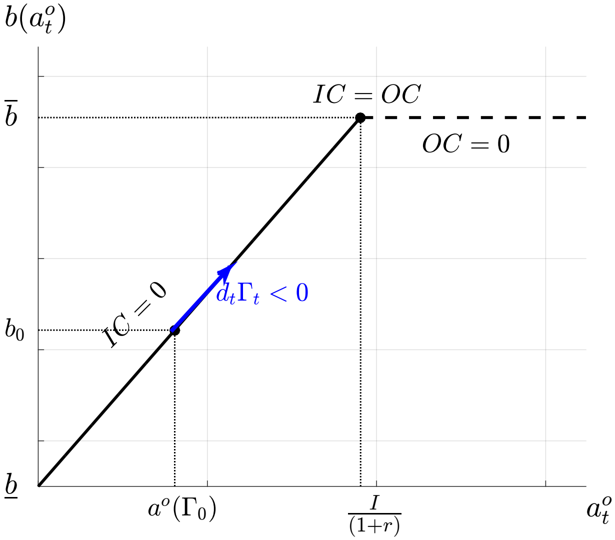

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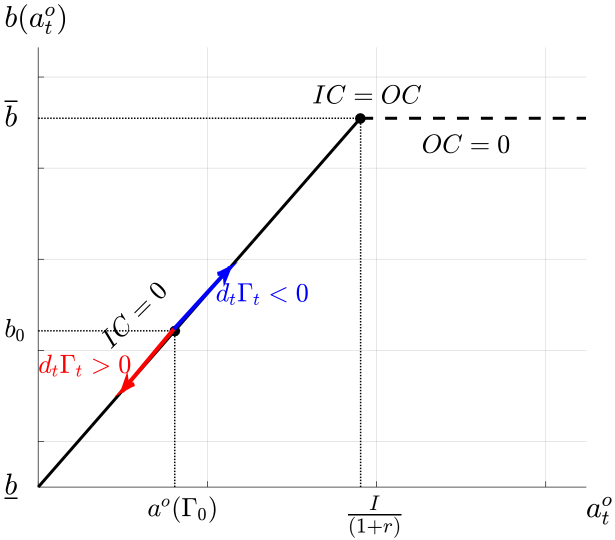
Main



Stationary Equilibrium

Steady-state: $d_t \Gamma_t(a) = 0$

$$\tilde{H}(\Gamma^*, s = \theta^* \cdot y) = 0 \qquad (HJB) + (KFE)$$

$$\Rightarrow \theta^* = 0$$

$$\Rightarrow \boxed{\tau^* = r - \rho}$$

- **Result** *There is a unique stationary tax-rate:* τ^*

Stationary Equilibrium

Steady-state distribution (Γ^*)

$$r - \rho = \frac{b^* \Gamma^*(\hat{a}^*) \cdot y(\Gamma^*)}{A^*} \qquad (BB)$$

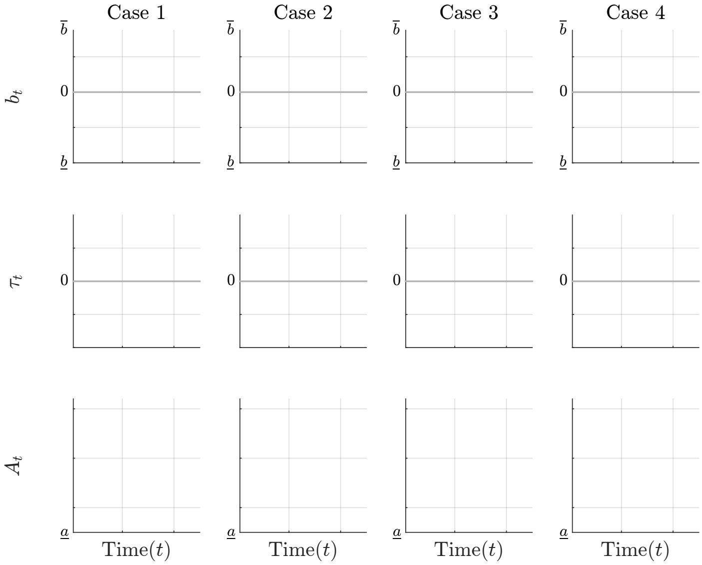
$$a^o* = \tilde{\psi}(\Gamma^*) \qquad (OC)$$

$$b^* = \tilde{\phi}(\Gamma^*) \qquad (PE)$$

- **Result** Γ^* *is non-unique:* there is a set (A^*, Γ^*) that solves the system.
  - Similar result in the neoclassical model + politics.
    Krusell and Rios-Rull (1996, 1999)

Main

Cases are function of $r - \rho$ and Γ_0



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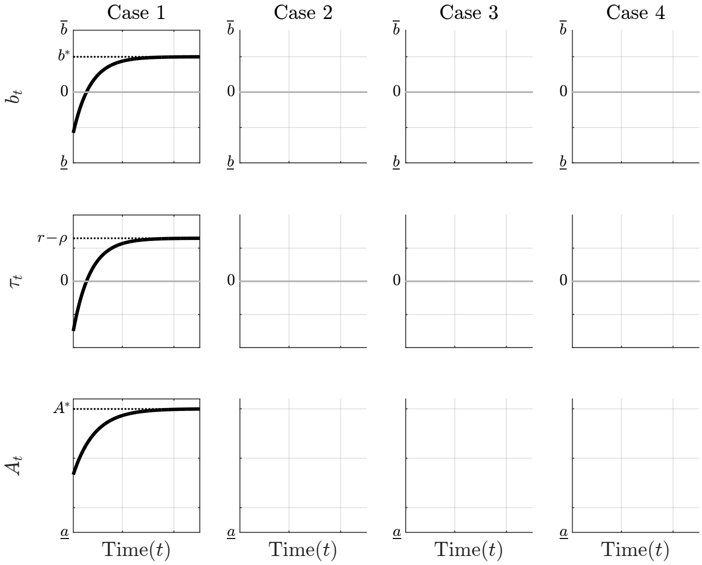

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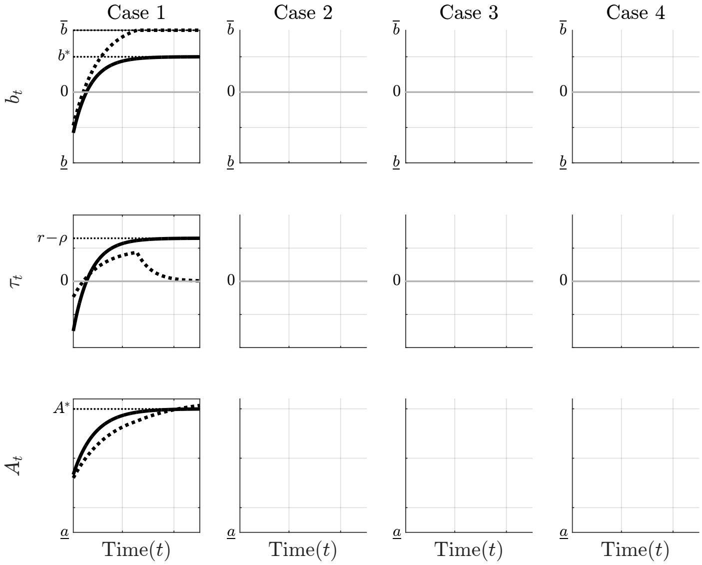

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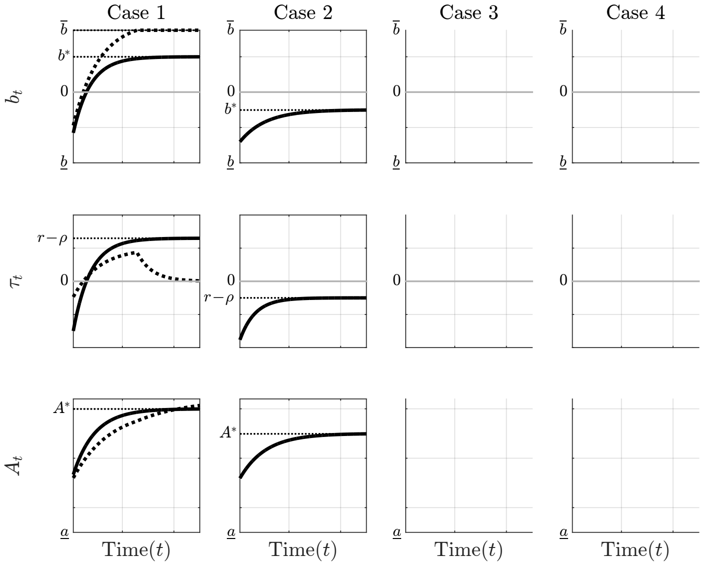

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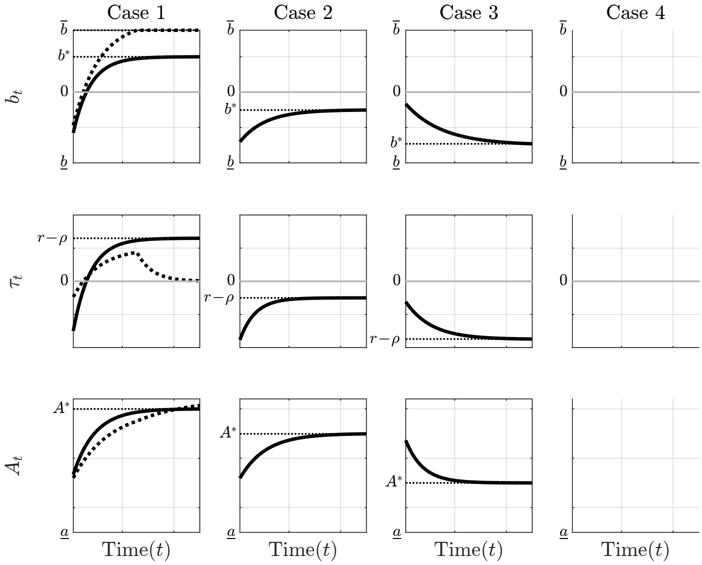

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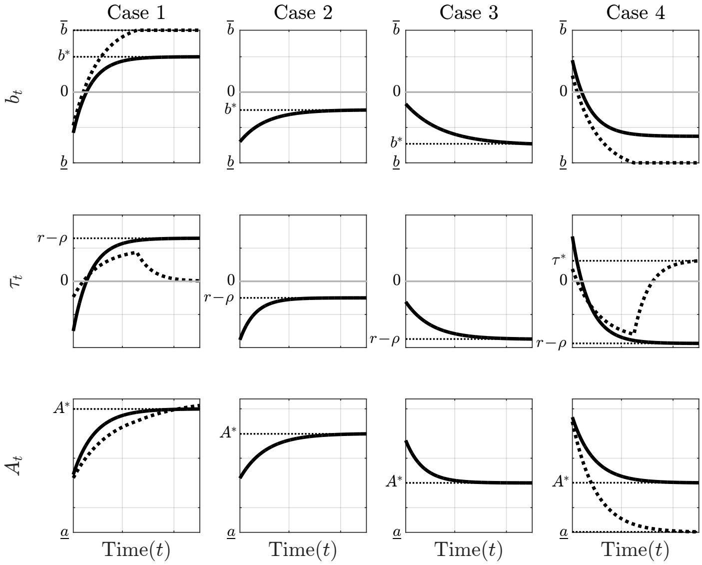

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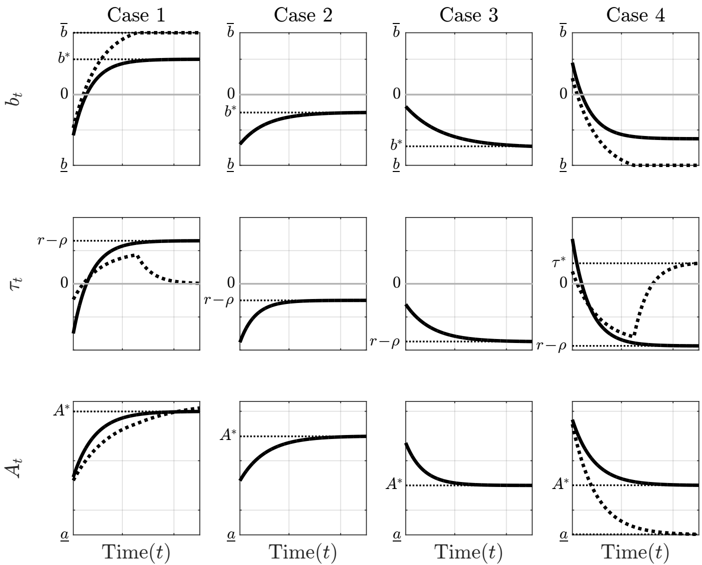
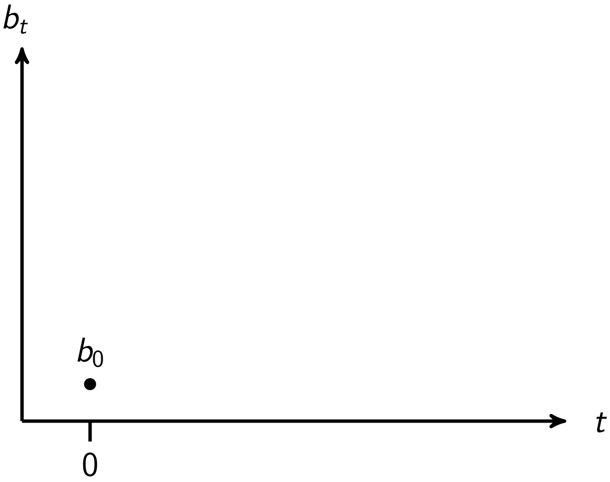
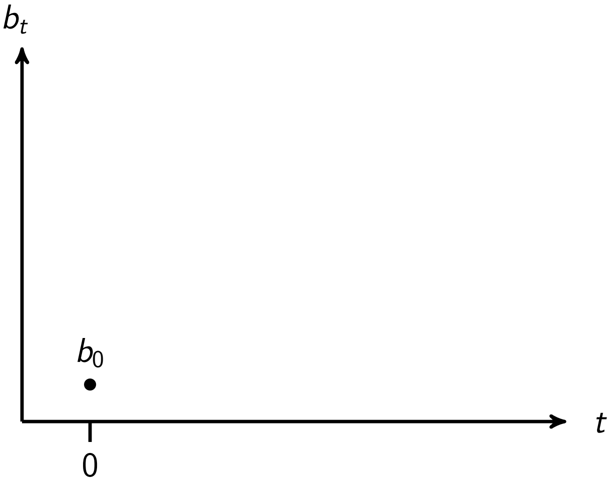


Details Main

Transfer rate dynamics: Γ_0 such that $\tau_0 < r - \rho$

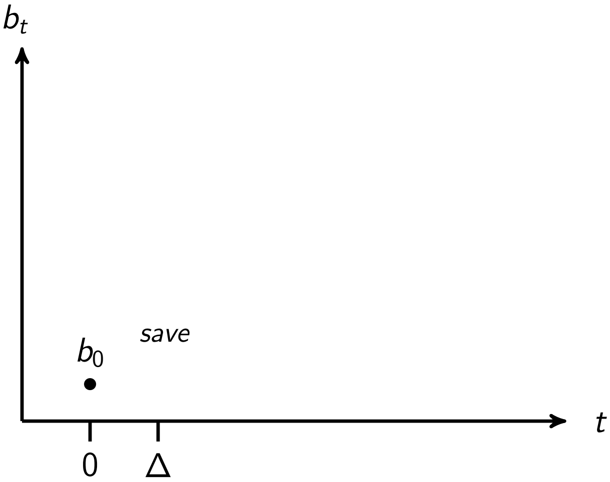


Transfer rate dynamics: Γ_0 such that $\tau_0 < r - \rho$



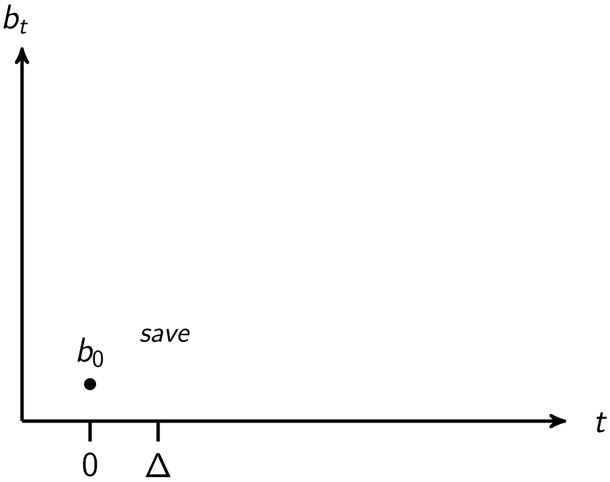
- $\tau_0 < \tau^* = r - \rho$
  - $\theta_0 > 0 \Rightarrow$ agents save

Transfer rate dynamics: Γ_0 such that $\tau_0 < r - \rho$



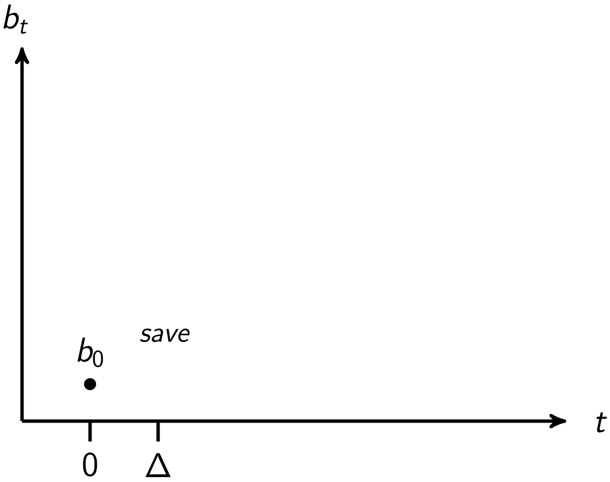
- $\tau_0 < \tau^* = r - \rho$
  - $\theta_0 > 0 \Rightarrow \Gamma_\Delta$ FOSD Γ_0 (Γ shifts right)

Transfer rate dynamics: Γ_0 such that $\tau_0 < r - \rho$



1. More entrepreneurs: $1 - \Gamma_\Delta(a^o(b_0, \Gamma_0)) > e^*$

Transfer rate dynamics: Γ_0 such that $\tau_0 < r - \rho$



1. More entrepreneurs: $1 - \Gamma_\Delta(a^o(b_0, \Gamma_0)) > e^*$
2. More competition ($\downarrow \Pi$): $a^o(b_0, \Gamma_\Delta) > a^o(b_0, \Gamma_0)$

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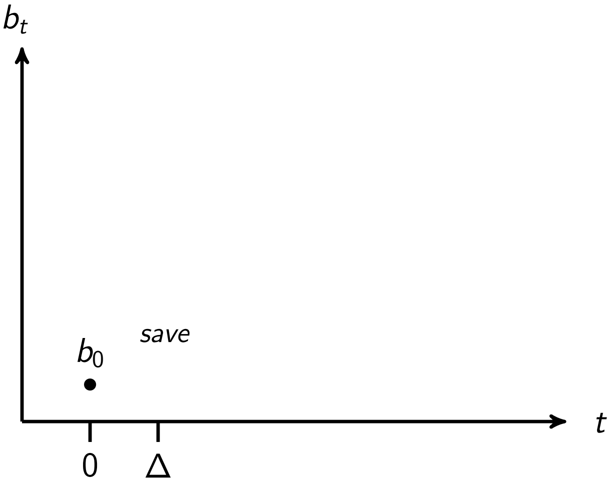
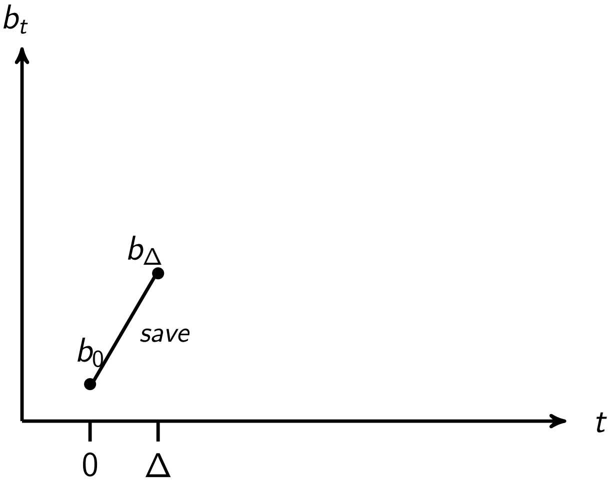


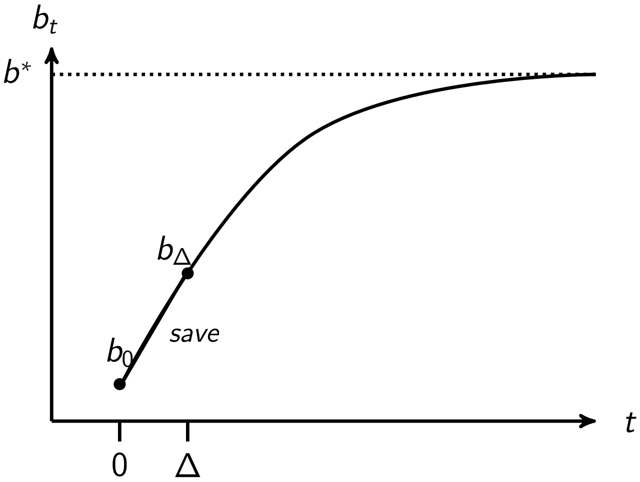
1. More entrepreneurs: $1 - \Gamma_\Delta(a^o(b_0, \boldsymbol{\Gamma_\Delta})) > e^*$ (net effect)
2. More competition ($\downarrow \Pi$): $a^o(b_0, \Gamma_\Delta) > a^o(b_0, \Gamma_0)$

Transfer rate dynamics: Γ_0 such that $\tau_0 < r - \rho$



- Too many entrepreneurs: $1 - \Gamma_\Delta(a^o(b_0, \Gamma_\Delta)) > e^*$
  - Government: increases b to raise $a^o \Rightarrow$ $\boldsymbol{b_\Delta > b_0}$

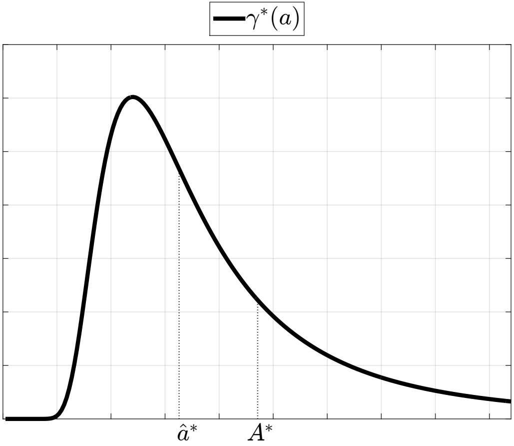
Transfer rate dynamics: Γ_0 such that $\tau_0 < r - \rho$



- b_t keeps increasing as long as $\theta_t > 0$
  - When $\theta_t = 0 \Rightarrow b_t = b^*$ Main

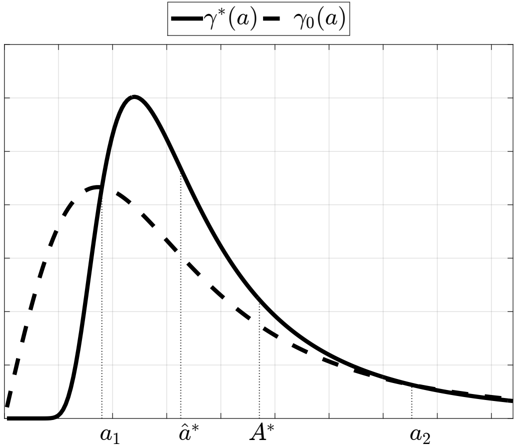
MPS in a Wealthy Country

- Capital unconstrained country ($A^* > \hat{a}^*$)



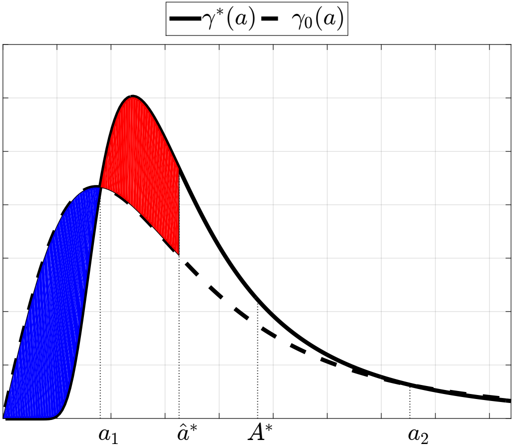
MPS in a Wealthy Country

- γ_0 more unequal than γ^* (*double-crossing*)



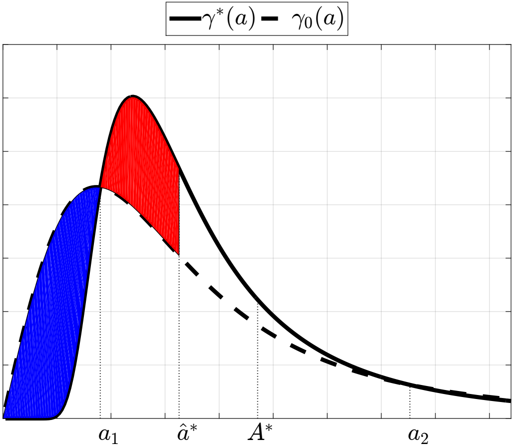
MPS in a Wealthy Country

- More unequal $\Rightarrow$ Less entrepreneurs: $1 - \Gamma_0(\hat{a}^*) < 1 - \Gamma^*(\hat{a}^*)$



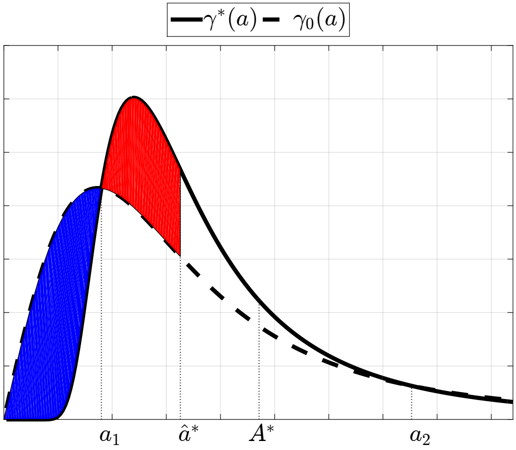
MPS in a Wealthy Country

- Net effect: $1 - \Gamma_0(\hat{a}_0) < 1 - \Gamma^*(\hat{a}^*) \Rightarrow \boldsymbol{b_0} < \boldsymbol{b^*} \Rightarrow \tau_0 < r - \rho$



MPS in a Wealthy Country

- $\tau_0 < r - \rho \Rightarrow$ *b* increasing over time



Main

Calibration Method

- Set of parameters $\Psi = (r, \phi, I, R, \ell, \rho, \omega)_{1x7}$

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  - ω: "government responsiveness" to ΔZ

- Set of moments:

$$m(\Psi|\Gamma_0) = \begin{bmatrix} \boldsymbol{b_0 - P(\Gamma_0, \Psi)} \\ K_0/L_0 - K/L(\Gamma_0, \Psi) \\ I_0/Y_0 - Inv(\Gamma_0, \Psi) \\ Giniy_0 - Giniy(\Gamma_0, \Psi) \\ b_0 - P(\Gamma_\Delta, \Psi) \\ \mathbb{E}[a|\Gamma_0] - \mathbb{E}[a|\Gamma_\Delta] \\ Var[a|\Gamma_0] - Var[a|\Gamma_\Delta] \\ Gini[a|\Gamma_0] - Gini[a|\Gamma_\Delta] \end{bmatrix}_{8x1}$$

Calibration Method

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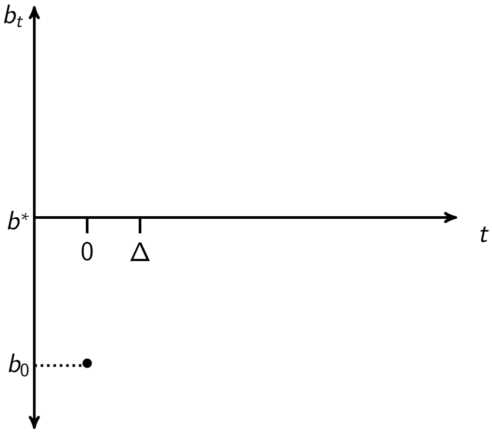
- Solve: $\hat{\Psi} = argmin_\Psi \{m(\Psi|\Gamma_0)' \; W \; m(\Psi|\Gamma_0)\}$

Main

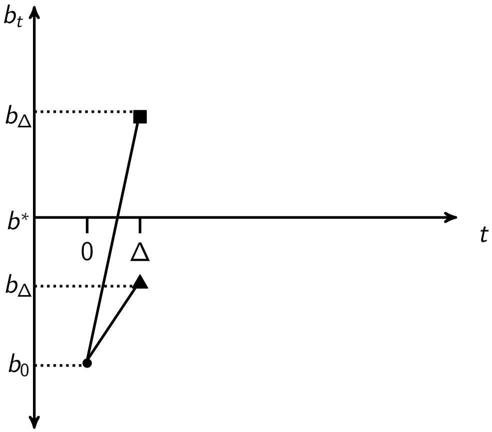
A permanent increase of productivity (MIT shock)

- At $t = 0$: $\uparrow Z \Rightarrow \uparrow e^* \Rightarrow 1 - G_0(\hat{a}(b^*)) < e^* \Rightarrow \downarrow \boldsymbol{b}$



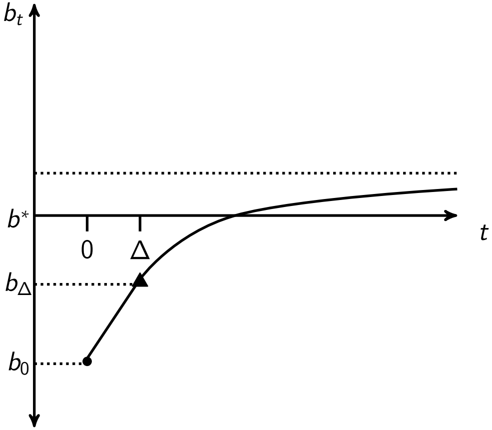
A permanent increase of productivity (MIT shock)

- At $t = \Delta$: $\boldsymbol{G}$ shifts right $\Rightarrow \uparrow \boldsymbol{b}$
  - $1 - G_\Delta(\hat{a}(b_0)) > e^*$



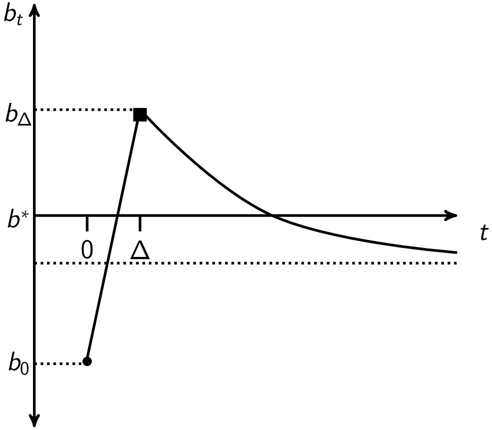
A permanent increase of productivity (MIT shock)

Case 1



A permanent increase of productivity (MIT shock)

Case 2



Main

The "Oscillatory" Behavior of τ

- *Example:* Suppose that $\uparrow b_t$ and $\uparrow A_t$. Recall:

$$\tau_t = \frac{b_t}{A_t} \cdot (1 - e^*) \cdot y(e = e^*)$$

The "Oscillatory" Behavior of τ

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  - τ may oscillate over time $\Rightarrow$ b may hit the PC before $\tau_t \to \tau^*$

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  - τ may oscillate over time $\Rightarrow$ b may hit the PC before $\tau_t \to \tau^*$

- The dynamics of b can still be characterized!

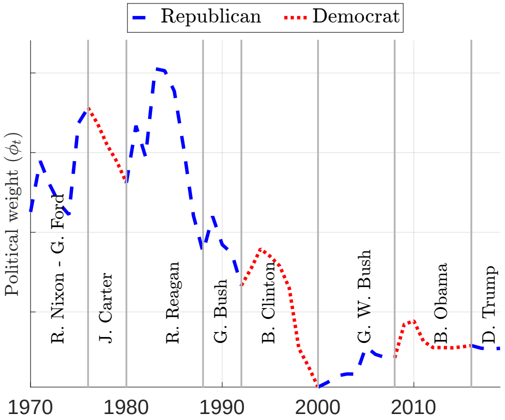
Counterfactual Analysis

Question Role of Politics in the Evolution of the Welfare State?

Counterfactual Analysis for the US

1. Find the sequence of Political Weights $\{\phi_t\}_{1970}^{2019}$ that matches $\{b_t\}_{1970}^{2019}$
2. Simulate the model for "extreme" alternative paths around $\{\phi_t\}_{1970}^{2019}$
3. **Question** Does the trend of social benefits change?

USA:The Evolution of the Political Weight



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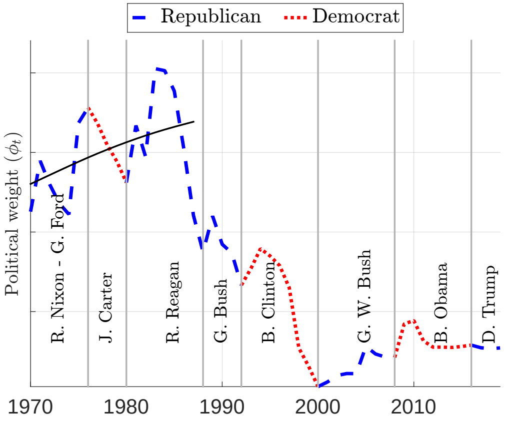
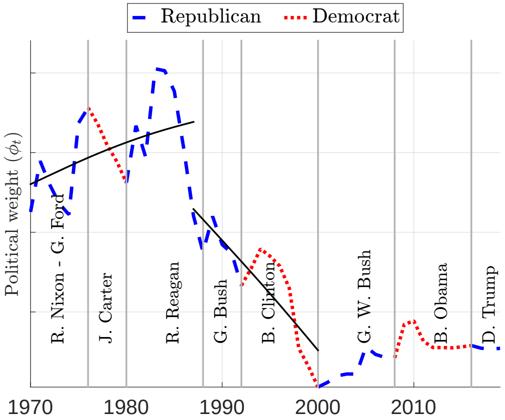


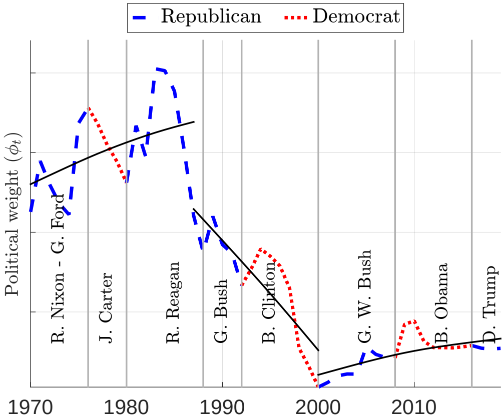
- 1970-1990: Pro-business trend ($\uparrow \phi$)

USA:The Evolution of the Political Weight



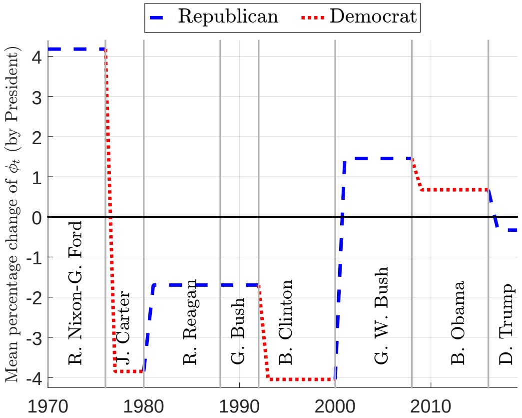
- 1990-2000: Pro-worker trend ($\downarrow \phi$)

USA:The Evolution of the Political Weight



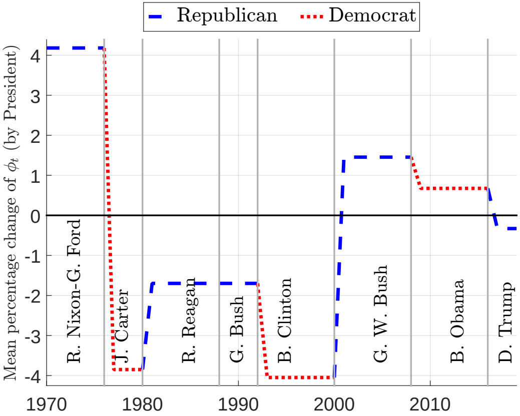
- 2000-present: moderate Pro-business trend ($\nearrow \phi$)

USA:The Evolution of the Political Weight



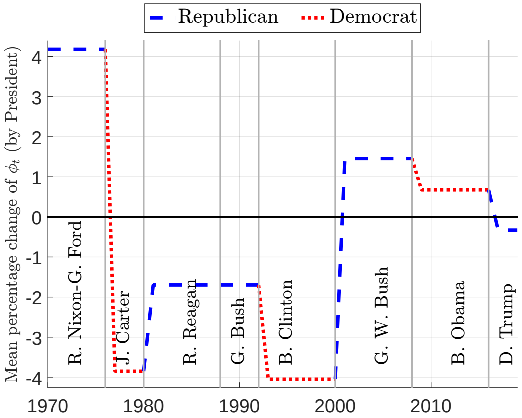
- **Republicans:** largest increases of ϕ

USA:The Evolution of the Political Weight



- **Democrats:** largest decreases of ϕ

USA:The Evolution of the Political Weight



- Behavior of ϕ consistent with partisan political perspectives

Question What would have been the evolution of b if?

1. Pro-worker scenario (Low ϕ): $\phi_t \times$ largest % drop

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2. Pro-business scenario (High ϕ): $\phi_t \times$ largest % increase

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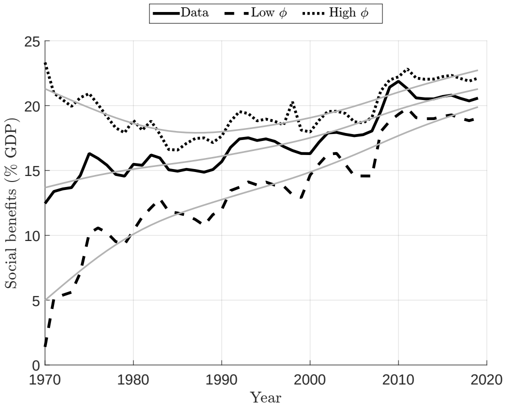

Question What would have been the evolution of b if?

Main

- Trend of b would have remained positive since 1990

- **Main message:** Limited role of politics in the evolution of the welfare state