A Scrooge McDuck Theory of Wealth Dynamics

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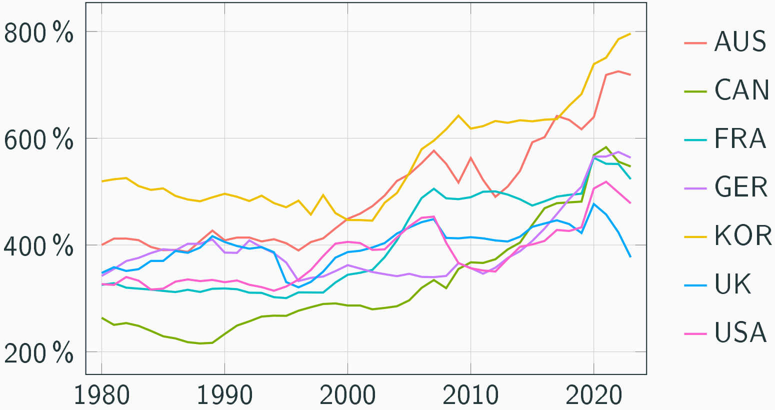
28/08/2025

EEA Congress - Bordeaux

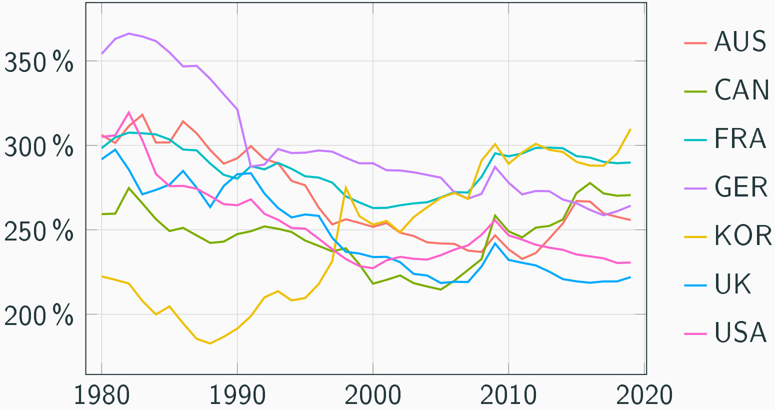
Motivation

Fact 1: Increase in the Wealth-to-Output Ratio



Source: World Inequality Database

Fact 2: No Increase in the Capital-to-Output Ratio



⇒ Increase in the wealth-to-output ratio driven by valuation effects

Source: IMF

Motivation: Inequality and Wealth Dynamics

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  - helps match high saving rates at the top (Gaillard et al., 2024)
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- **This paper**: insatiable preference for wealth to explain facts 1 and 2

$\hookrightarrow$ marginal utility of wealth always above a strictly positive value

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- They hold a surplus wealth without a consumption motive $\rightarrow$ supports a rational bubble
- Rate of return $>$ growth rate:
  - diverging bubble-to-output but converging capital-to-output
  - diverging wealth inequality
- **Policy relevance**: small wealth tax prevents bubble and $\nearrow$ capital

Relation to the Literature

- Preference for wealth: Carroll (2000), De Nardi (2004), Kumhof et al. (2015), Mian et al. (2021a), Elina and Huleux (2023), Morrison (2024), Fella et al. (2024), Michau et al. (2025)

  $\rightarrow$ Insatiable preferences to capture investmentless $\nearrow$ in wealth

- Inequality: Bourguignon (1981), Castañeda et al.(2003), Piketty (2014), Benhabib et al. (2015), Gabaix et al. (2016), Stachurski and Toda (2018), Cioffi (2021), Hubmer et al. (2021), Gaillard et al. (2024)

  $\rightarrow$ Non-zero mass of agents holding a diverging wealth

- Rational bubbles: Samuelson (1958), Tirole (1985), Ono (1994), Kamihigashi (2007), Farhi and Tirole (2012), Martin and Ventura (2012), Michau et al. (2023), Hirano and Toda (2024)

  $\rightarrow$ Unique bubbly equilibrium where $r^{bubble} > g$

Roadmap

Motivation

Model Setting

Numerical Illustration

Model Implications

Conclusion

Model Setting

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- Cobb-Douglas production function with **three factors of production**:
  - L_t: rent-generating factor infinitely-lived and in fixed supply, $L_t = 1 \; \forall t$, with price Q_t
  - K_t: capital stock, with return R_t
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- **Normalization** by $(Z_t N_t)^{\frac{1-\alpha-\gamma}{1-\alpha}}$, which grows at rate g_t: $x_t \equiv \frac{X_t}{(Z_t N_t)^{\frac{1-\alpha-\gamma}{1-\alpha}}}$

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- Two types of infinitely-lived agents, $i \in \{1, 2\}$:
  - ranked in decreasing order of labor supply, ζ^i, and initial endowments
  - holding K^i_{t+1} capital units and L^i_{t+1} units of the rent-generating factor at the end of period t
  - total wealth: $A^i_{t+1} \equiv K^i_{t+1} + Q_t L^i_{t+1}$

Preferences

- Utility function with insatiable preference for wealth ($\kappa > 0$)

$$\sum_{t=0}^{\infty} \beta^t U(c_t^i, a_{t+1}^i) \qquad \text{with} \qquad U(c, a) = \frac{c^{1-\theta}}{1-\theta} + \psi \frac{a^{1-\eta}}{1-\eta} + \kappa a$$

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- Insatiable preferences for wealth $\rightarrow$ upper bound on optimal consumption, $\overline{c}_t$

$$c_t^i \leq \overline{c}_t \qquad \text{with} \qquad \overline{c}_t \equiv \underbrace{\left[\frac{1}{1+g_{t+1}} \sum_{s=0}^{\infty} \beta^s \left(\prod_{j=1}^{s} \frac{R_{t+j}}{1+g_{t+j+1}} \right) \kappa \right]}_{\text{minimal marginal utility of saving}}^{-\frac{1}{\theta}}$$

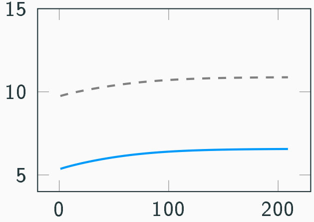
▸ HH Optimization Problem

Numerical Illustration

Consumption and Wealth - Type 1 Agents

- For sufficiently large κ, $\overline{c}_t$ binds...

c_t^1 - Low κ



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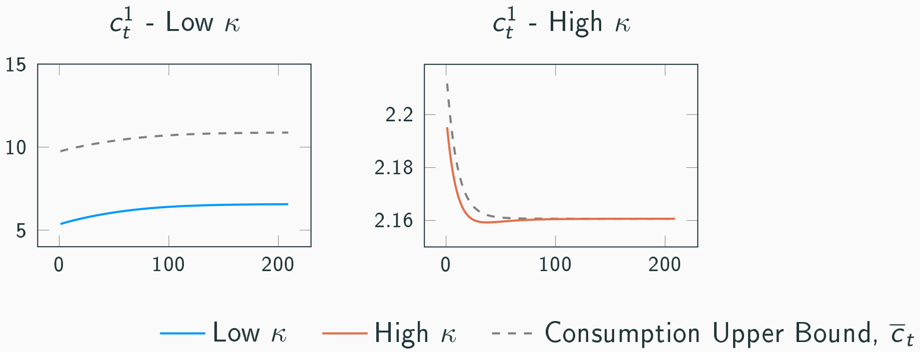

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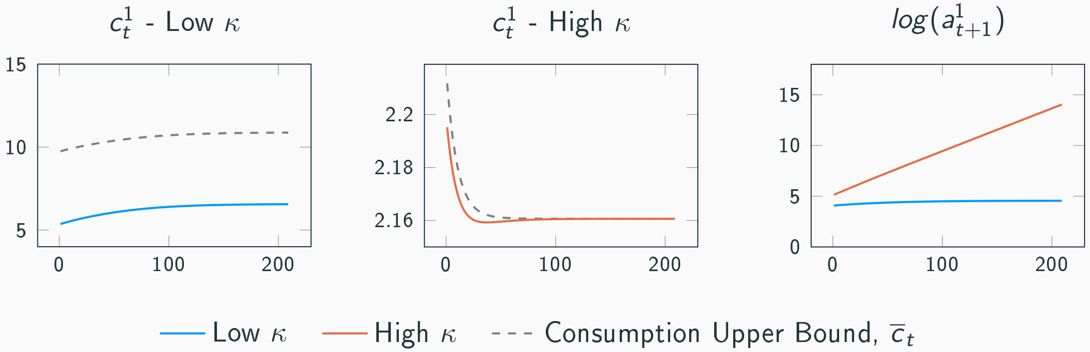

- ... and type 1 agents are Scrooge McDuck with diverging wealth / bounded consumption

Surplus Wealth and Rational Bubble

- Part of Scrooge McDuck agents' wealth does not finance consumption → surplus wealth

$$s^i_{t+1} \equiv a^i_{t+1} - \sum_{j=1}^{\infty} \frac{c^i_{t+j} - \zeta^i w_{t+j}}{\prod_{s=1}^{j} \widetilde{R}_{t+s}} \qquad \text{with} \quad \widetilde{R}_t \equiv \frac{R_t}{1+g_t}$$

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    - a fundamental component, f_t → present value of future dividends

$$q_t = \sum_{j=1}^{\infty} \frac{\gamma y_{t+j}}{\prod_{s=1}^{j} \widetilde{R}_{t+s}}$$

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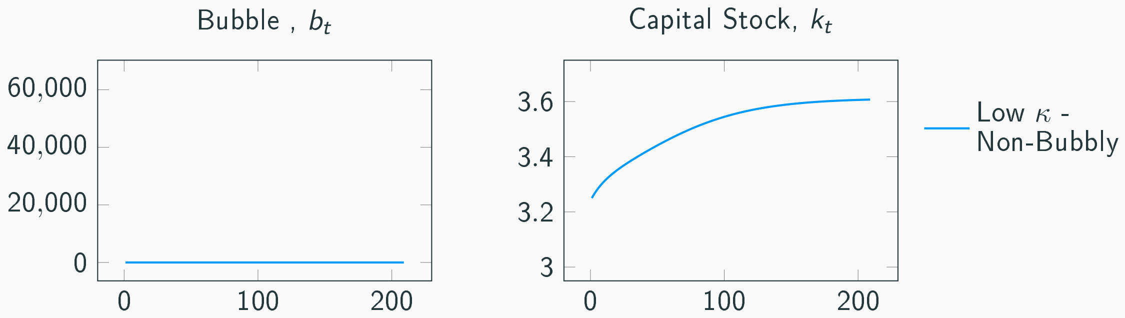
- **Proposition 1**: The rational bubble coincides with the aggregate surplus wealth.

Bubble and Capital Stock



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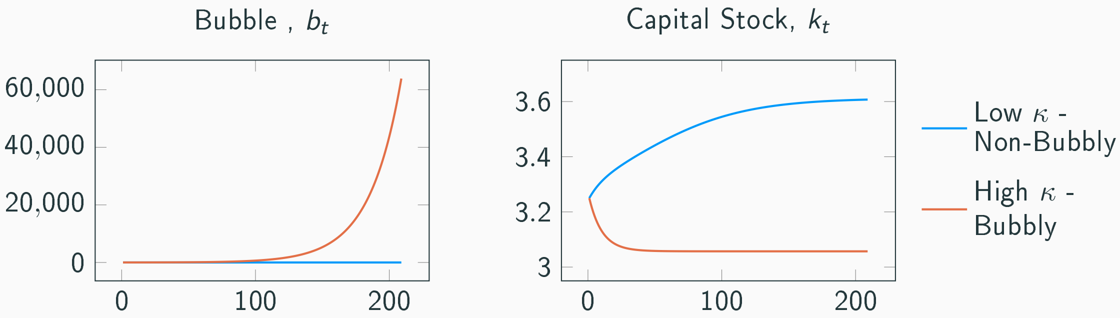

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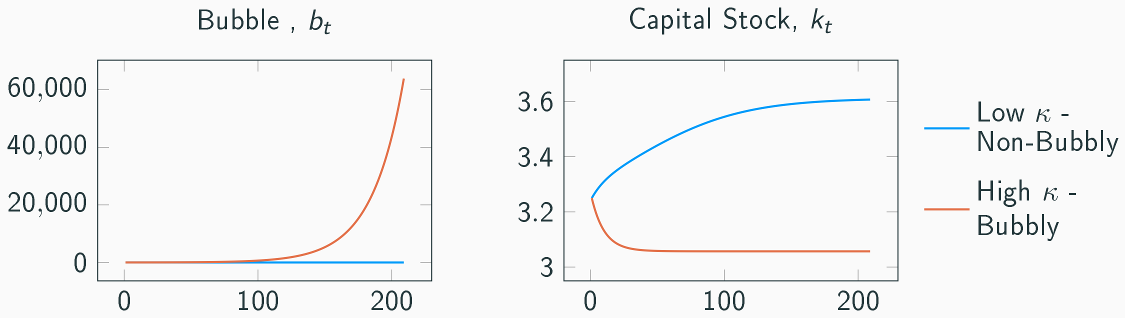

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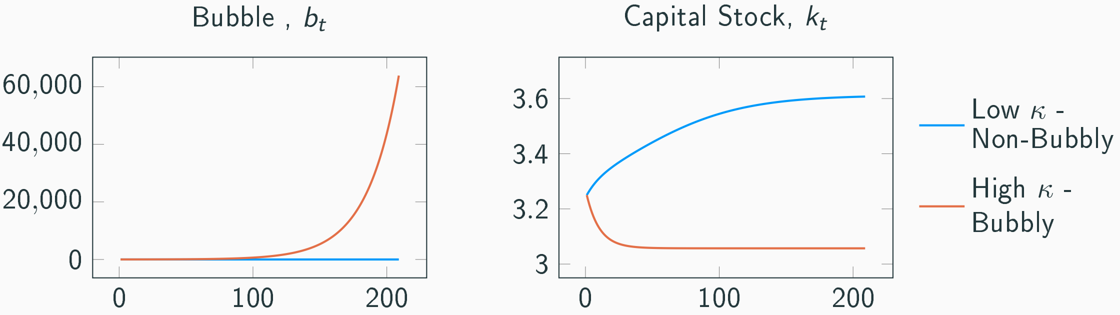

- If κ is large enough, diverging bubble (// Fact 1) and converging capital (// Fact 2)
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- Asymptotically, $R > 1 + g$ $\rightarrow$ lower capital stock $\iff$ lower consumption

Relation to Piketty (2014)

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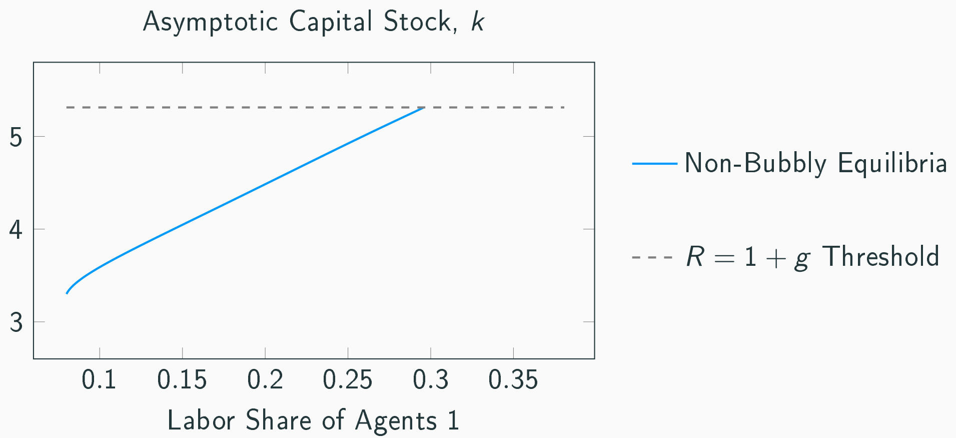
- **This paper:** general equilibrium model with $r > g$ and diverging wealth inequality

Model Implications

Inequality and Capital Stock



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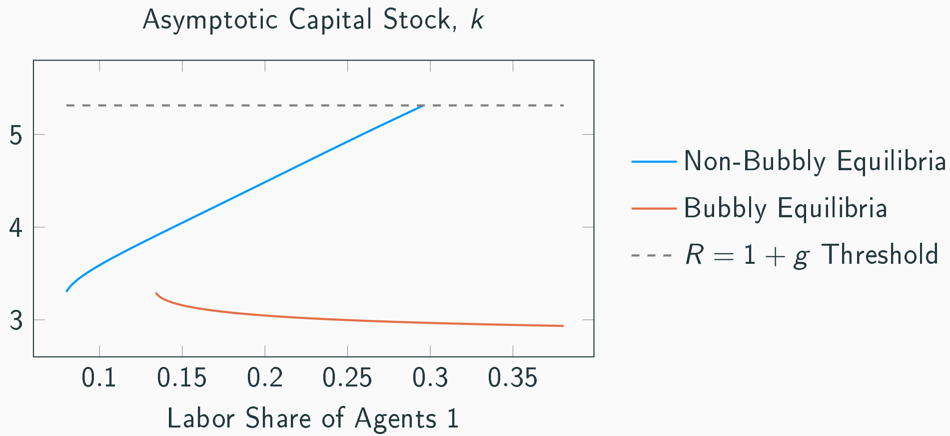

- $\nearrow$ income inequality can trigger a bubbly equilibrium

Wealth Tax

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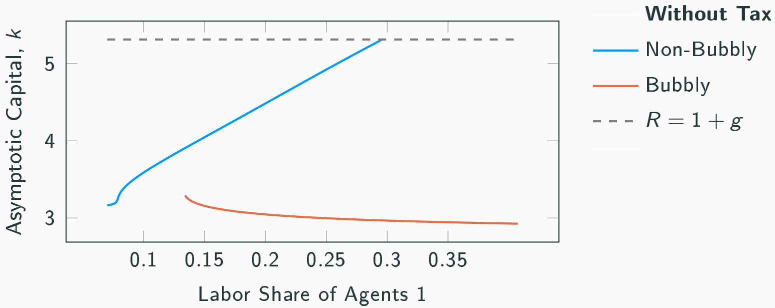

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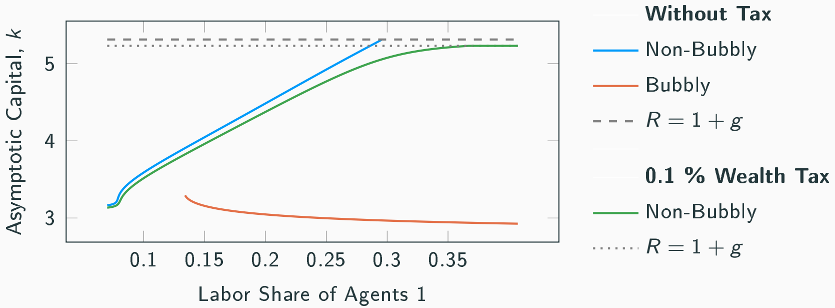

- Small wealth tax can $\nearrow$ capital stock by eliminating the bubble

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  - Small wealth tax $\rightarrow$ $\nearrow$ capital
- **Next steps**:
  - Quantitative and welfare exercises
  - Output gap in the case of an insufficiently large bubble + implications for public debt

Appendix - Household Optimization Problem

- Budget constraint:

$$c_t^i + a_{t+1}^i(1 + g_{t+1}) = R_t a_t^i + \zeta^i w_t$$

- **Euler equation**:

$$c_t^{i\,-\theta} = \beta R_{t+1} \frac{\left(c_{t+1}^i\right)^{-\theta}}{1 + g_{t+1}} + \psi \frac{(a_{t+1}^i - \underline{a})^{-\eta}}{1 + g_{t+1}} + \frac{\kappa}{1 + g_{t+1}}$$

- **Transversality condition**:

$$\lim_{t \to \infty} \beta^t \left[c_t^{i\,-\theta} - \frac{\left(a_{t+1}^i - \underline{a}\right)^{-\eta} + \kappa}{1 + g_{t+1}} \right] a_{t+1}^i = 0.$$

Back

Appendix - Capital Income Taxation

- Net-of-depreciation capital income and rents taxed at a rate τ_r

◂ Back

- Post–capital income tax rate of return, $R_{t+1}^{\text{post-KIT}} = 1 + (1 - \tau_r)(\alpha k_{t+1}^{\alpha-1} - \delta)$

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- Capital stock under wealth vs. capital income taxation (given asymptotic tax level):
  - Asymptotic equivalence between the two taxes when the initial equilibrium is non-bubbly
  - No equivalence in the bubbly case: wealth tax rules out a bubble