Demographics, Wealth, and Global Imbalances in the Twenty-First Century

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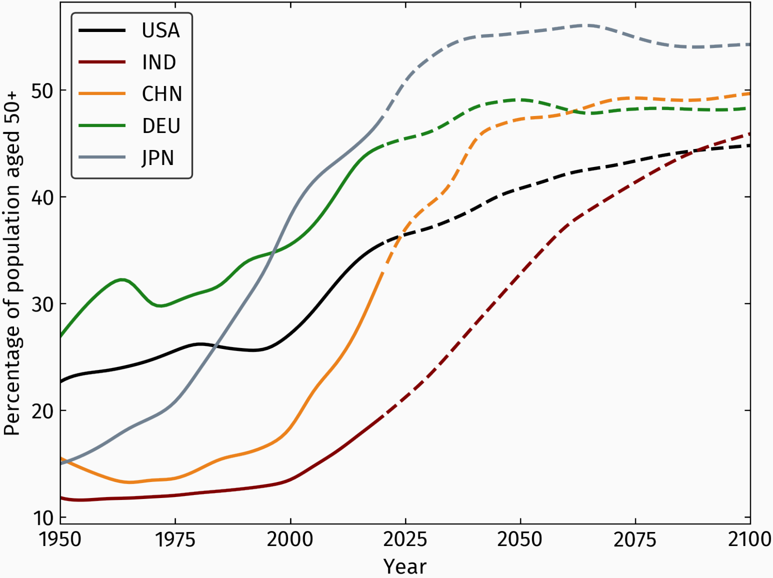
NBER Summer Institute, July 2020

The world population is aging...

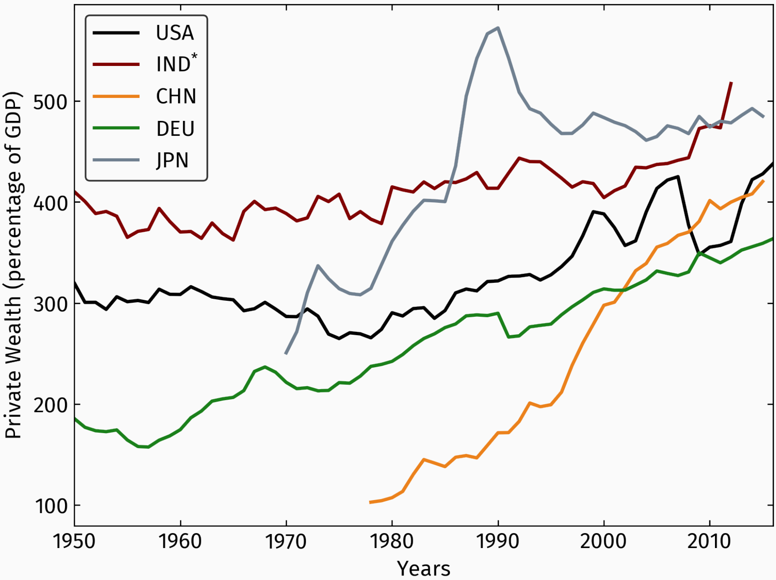
▸ 65+ ▸ World



Source: 2019 United Nations World Population Prospects

…wealth-to-GDP ratios are increasing…

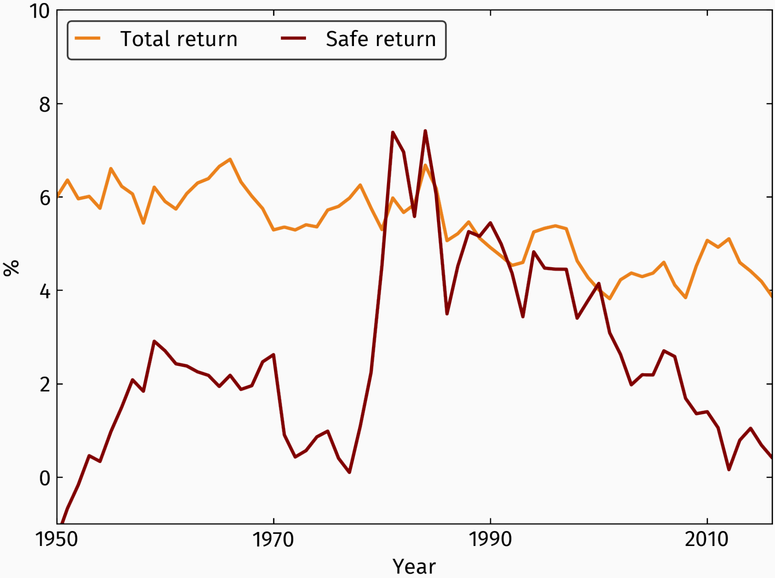
▸ National Wealth ▸ SCF vs WID



*IND: National rather than Private Wealth. Source: World Inequality Database (WID)

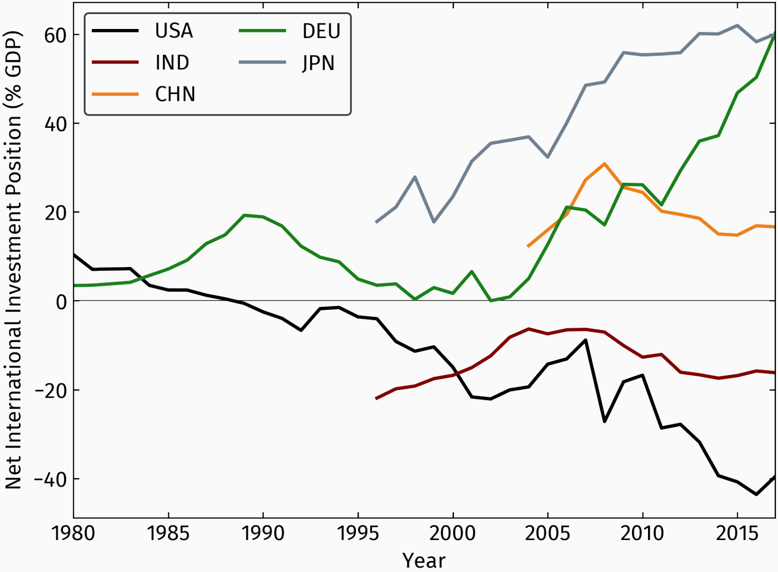
...rates of return on wealth are falling...

Definitions



Source: National Accounts, Flow of Funds, WID.

…and "global imbalances" are rising



Source: International Monetary Fund (IMF), Penn World Table (PWT) 9.1

How will demographics shape these trends in the 21st century?

- Broad agreement that population aging has contributed to trends in W/Y, real returns (r), and NFA positions in the past
- Much less agreement about likely direction for the future
- Popular view focuses on the savings rate in an aged population:
    - *"The **current phase** of population ageing is contributing to the trend decline in the underlying equilibrium real interest rate [...] While a large population cohort that is saving for retirement puts upward pressure on the total savings rate, **a large elderly cohort may push down aggregate savings** by running down accumulated wealth."* (Philip Lane, May 2020)
    - cf the "**asset market meltdown**" hypothesis [Poterba 2001]

This paper: a ratio of two shift shares to discipline GE

Q: What guidance do modern GE models give on the causal effects of demographics on global wealth accumulation and returns?

- We show that a **ratio of two shift-shares** provides a natural starting point for forecasts:

$$\left(\frac{W_t}{Y_t}\right)^{comp} = \frac{\sum_j \pi_{jt} a_{j0}}{\sum_j \pi_{jt} h_{j0}} \qquad t \geq 0$$

  - a_{j0}, h_{j0} are today's asset and labor income profiles by age j
  - π_{jt} are projections of the population share of age j in year t

Captures the **compositional effect** of aging on W/Y

Disciplines **general equilibrium counterfactuals**

1. Sufficient statistic for W/Y in special "balanced growth" SOE case
2. Gives direction of change in r and W/Y, and approx. magnitude of change in NFA/Y, in integrated world general case

A bridge between reduced-form and structural approaches

- Existing literature follows two broad approaches:

1. **Reduced-form**, based on shift-share exercises
    - **Numerator**: Projected asset demand [Poterba 2001, Mankiw-Weil 1989], projected savings rates [Summers-Carroll 1987, Auerbach-Kotlikoff 1990...]
    - **Denominator**: Projected labor supply [Cutler et al 1990], demographic dividend literature [Bloom-Canning-Sevilla 2003...]
2. **Structural**, based on fully specified GE OLG models
    - Demographics and **wealth** + social security [Auerback Kotlikoff 1987, İmrohoroğlu-İmrohoroğlu-Joines 1995, De Nardi-İmrohoroğlu-Sargent 2001, Abel 2003, Geanakoplos-Magill-Quinzii 2004, Kitao 2014...]
    - Demographics and **capital flows** [Henriksen 2002, Börsch-Supan-Ludwig-Winter 2006, Domeij-Flodén 2006, Krueger-Ludwig 2007, Backus-Cooley-Henriksen 2014, Bárány-Coeurdacier-Guibaud 2019...]
    - Demographics and **interest rates** [Carvalho-Ferrero-Necchio 2016, Gagnon-Johannsen-Lopez Salido 2016, Eggertsson-Mehrotra-Robbins 2019, Lisack-Sajedi-Thwaites 2017, Jones 2018, Papetti 2019, Rachel-Summers 2019...]

- Our **sufficient statistic approach** bridges the gap between both

What we find

$$\Delta_t^{comp} \equiv \frac{\sum_j \pi_{jt} a_{j0}}{\sum_j \pi_{jt} h_{j0}} - \frac{W_0}{Y_0}$$

1. **Measurement:**
   - Δ^{comp} is **positive, large and heterogeneous** across countries [in 2100: 85pp in Germany vs 305pp in India]

   a) Older individuals hold more wealth and earn less income

   b) Timing of aging transition uneven across countries

2. **Quantitative GE OLG model:** across range of calibrations
   - Δ^{comp} **closely approximates** W/Y transition of small open econ.
   - In integrated world, matching Δ^{comp} in each country implies:

   a) **returns on wealth** definitively fall and **wealth-GDP ratios** rise, but exact magnitudes are uncertain

   b) **global imbalances** rise dramatically by the end of the 21st century [2016-2100: ΔNFA/Y of -50pp in Germany vs 180pp in India]

Outline

1. The compositional effect of aging on W/Y
2. Measurement
3. General equilibrium implications

1. The compositional effect of aging on W/Y

Environment

- Economy with output Y_t experiencing demographic change
- Population of age j N_{jt}, total population $N_t \equiv \sum_j N_{jt}$
- Wealth

$$W_t = \sum_j N_{jt} A_{jt} \tag{1}$$

- Effective labor supply

$$L_t = \sum_j N_{jt} h_{jt} \tag{2}$$

- Suppose there is growth in labor productivity Y_t/L_t
  - We expect A_{jt} to scale with Y_t/L_t
  - Let $a_{jt} \equiv \frac{A_{jt}}{Y_t/L_t}$ denote productivity-normalized assets by age

Wealth-to-GDP ratio

- Rewrite wealth (1)

$$W_t = \frac{Y_t}{L_t} \sum_j N_{jt} a_{jt}$$

- Wealth-to-GDP ratio using (2)

$$\frac{W_t}{Y_t} = \frac{\sum_j \pi_{jt} a_{jt}}{\sum_j \pi_{jt} h_{jt}}$$

where $\pi_{jt} \equiv \frac{N_{jt}}{N_t}$ is share of population age j

- Three reasons for changing W_t/Y_t:
    1. Changing **population shares**: π_{jt}
    2. Changing **age profiles of productivity-normalized assets**: a_{jt}
    3. Changing **age profiles of labor efficiency**: h_{jt}

The compositional effect

- For any base year 0, define

$$\Delta_t^{comp} \equiv \frac{\sum_j \pi_{jt} a_{j0}}{\sum_j \pi_{jt} h_{j0}} - \frac{W_0}{Y_0}$$

- Can calculate Δ^{comp} **directly from micro data and pop. projns**

- **Why is this a natural starting point for macro projections?**

  1. It can be a **sufficient statistic** for W/Y in a demographic transition
     - Small open economy special case: a_{jt} and h_{jt} are *constant*
     - We say the economy ages without "behavioral effects"

  2. It is **always a component** of the total change in W/Y:

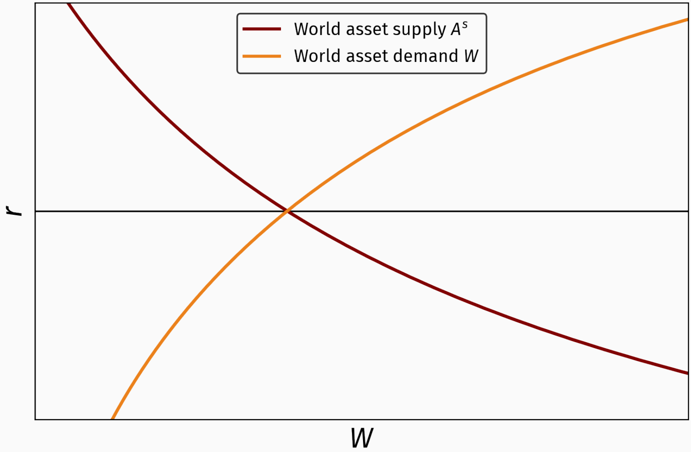
$$\underbrace{\frac{W_t}{Y_t} - \frac{W_0}{Y_0}}_{\equiv \Delta_t} = \Delta_t^{comp} + \underbrace{\frac{\sum_j \pi_{jt} a_{jt}}{\sum_j \pi_{jt} h_{jt}} - \frac{\sum_j \pi_{jt} a_{j0}}{\sum_j \pi_{jt} h_{j0}}}_{\Delta_t^{beh}}$$

$\rightarrow$ Benchmark to evaluate transition dynamics in any GE model

Let $\Theta \equiv$ demographics. Equilibrium in long-run world asset market:

$$W(r, \Theta) = A^s(r, \Theta)$$

Both W and A^s depend on Θ. Argument in the paper has 3 parts:

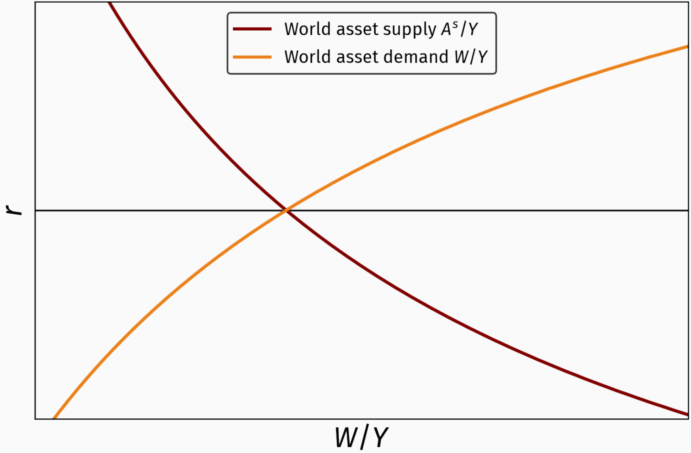


The compositional effect in GE: roadmap

Let $\Theta \equiv$ demographics. Equilibrium in long-run world asset market:

$$W/Y\,(r, \Theta) = A^s/Y\,(r)$$

Part 0: A^s/Y depends on technology and gov. policy, not Θ

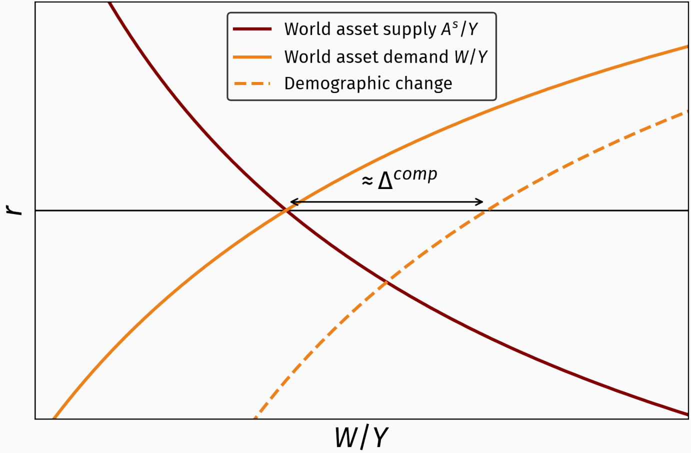


The compositional effect in GE: roadmap

Let $\Theta \equiv$ demographics. Equilibrium in long-run world asset market:

$$W/Y\,(r,\Theta) = A^s/Y\,(r)$$

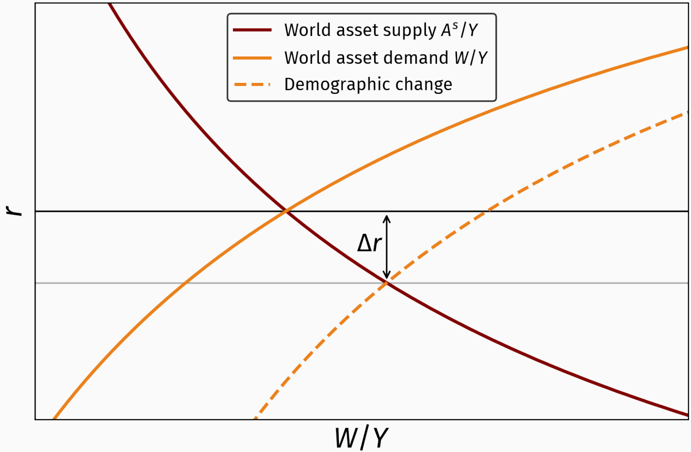
Part 1: for fixed r, $\Delta W/Y \simeq \Delta^{comp} \gg 0$ (ie. $\Delta^{beh|r} \simeq 0$)



Let $\Theta \equiv$ demographics. Equilibrium in long-run world asset market:

$$W/Y\,(r,\Theta) = A^s/Y\,(r)$$

Part 2: world r must fall: the opposite of an asset market meltdown!



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Let $\Theta \equiv$ demographics. Equilibrium in long-run world asset market:

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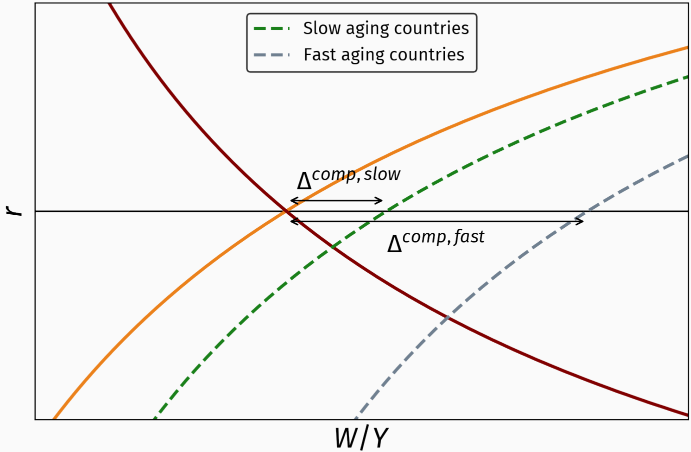
Part 3: after demeaning Δ^{comp}, we obtain close approx. to ΔNFA



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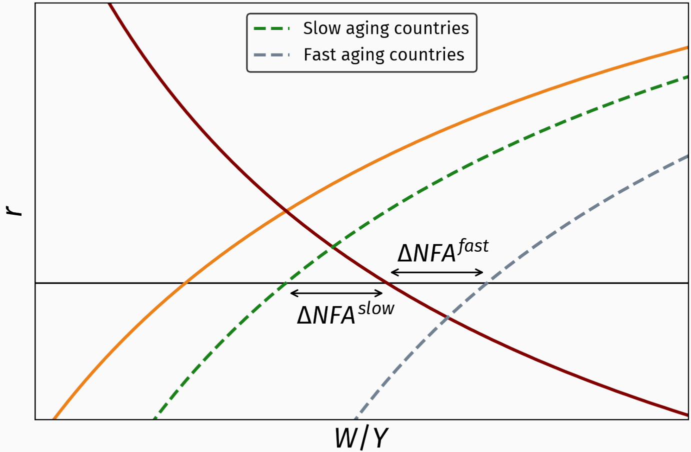


2. Measurement

Measuring Δ^{comp}

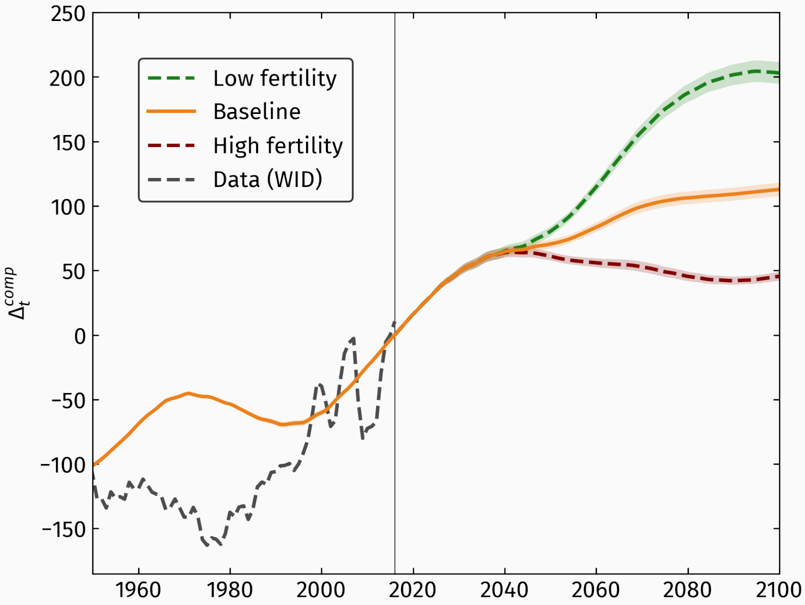
- Calculate shift-share Δ_t^{comp} for US and 24 other countries
- Implementation:
  - Normalize labor supply so that $\sum \pi_{j0} h_{j0} = 1$
  - Then a_{j0} is average wealth by age normalized by GDP per capita
  - Can measure relative h_{j0} from relative labor income
- Data:
  - π_{jt} : projections of age distributions over individuals

    2019 UN World Population Prospects, SSA and Gagnon et al. (2016)
  - a_{j0}, h_{j0} : age-wealth and labor income profiles in base year

    For US: SCF, LIS/CPS, and Sabelhaus-Henriques Volz (2019)
    a_{j0} rescaled to match total wealth from World Inequality Database
    a_{j0} includes funded part of DB pensions
    Household $\rightarrow$ individual j by attributing all wealth to hh head

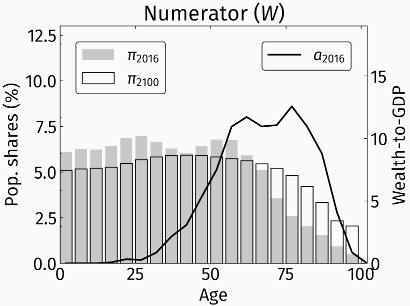
Δ^{comp} in the United States: 1950-2100

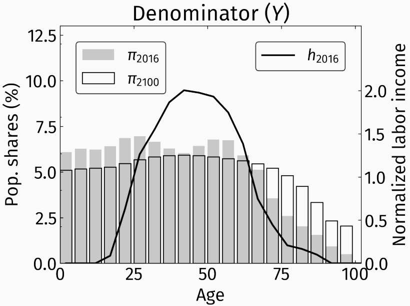
▸ Base year ▸ Historical



Where do these large effects come from?

▸ Alt. profiles

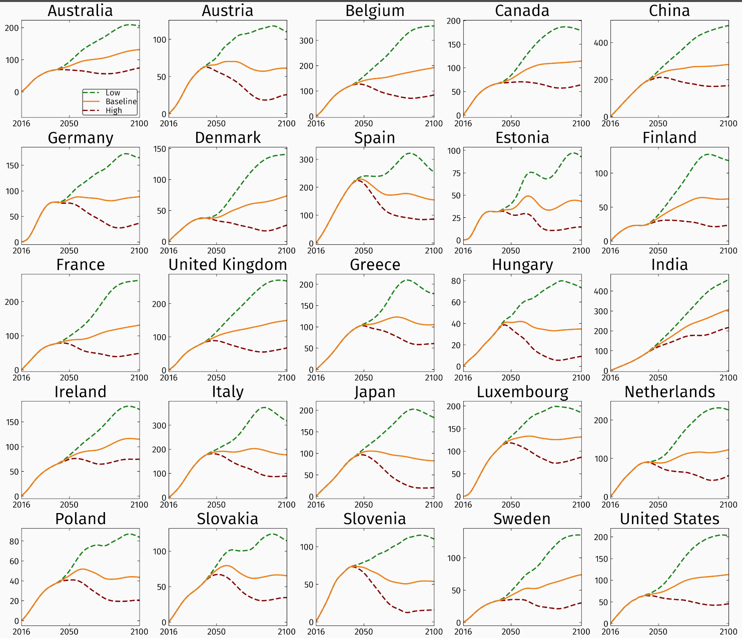




- In paper: separate contribution of numerator and denominator
  - W contributes $\sim 2/3$, Y contributes $\sim 1/3$ going forward
  - Historically demographic dividend pushed Y up, reversed in 2010

Global trends: large and heterogeneous Δ^{comp}

Details Historical Bar



3. General equilibrium implications

Environment: overview

- Standard multi-country GE OLG model featuring idiosyncratic income risk, intergenerational transmission of skills, bequests, and a social security system [eg Krueger-Ludwig 2007]
    - Output produced out of capital and effective labor
    - Perfect competition, free capital adjustment
    - Inelastic labor supply, exog. vary retirement & LFPR
    - Five reasons for savings:
        1. Life-cycle motive
        2. Bequest motive (warm-glow, nonhomothetic)
        3. Providing for children consumption (age dependent *mu* modifier)
        4. Precautionary motive against income risk
        5. Precautionary motive against longevity risk
    - Government follows a fiscal rule, can adjust taxes, social security benefits, spending, or debt

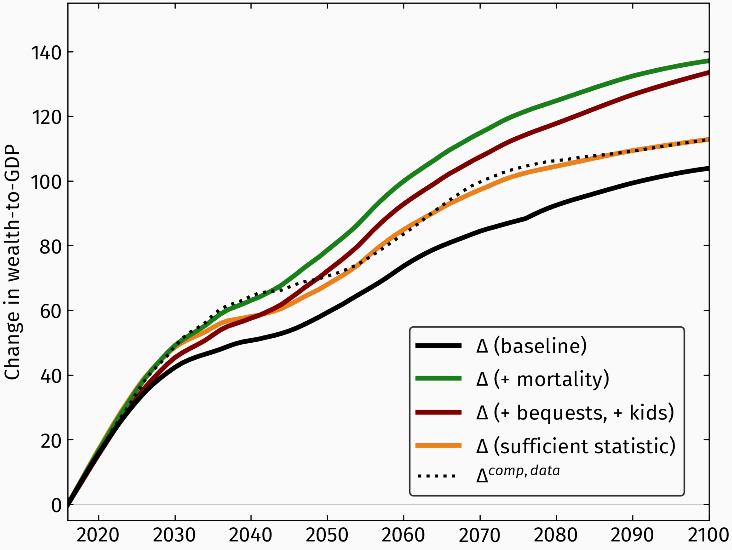
Behavioral responses

- Model has five forces for non-zero behavioral effects at given r:

  1. **Labor supply** effect (changing LFPR/retirement age)
  2. **Declining mortality** effect (mortality tables vary by cohort)
  3. **Cost of children** effect (mu_j varies with # of children)
  4. **Bequest dilution** effect (changing ratio of givers to receivers)
  5. **Social security balance** effect (adjust taxes or benefits)

- **Next**: evaluate quantitative magnitude of these effects
  - Start from sufficient statistic scenario, where 1–5 shut down
  - Progressively relax using quantitative model, fitted to:
    - **observed 2016 age distribution**
    - our **measure of Δ^{comp} for 2016-2100** (vs age-asset profile)

Part 1: in SOE, behavioral effects are small

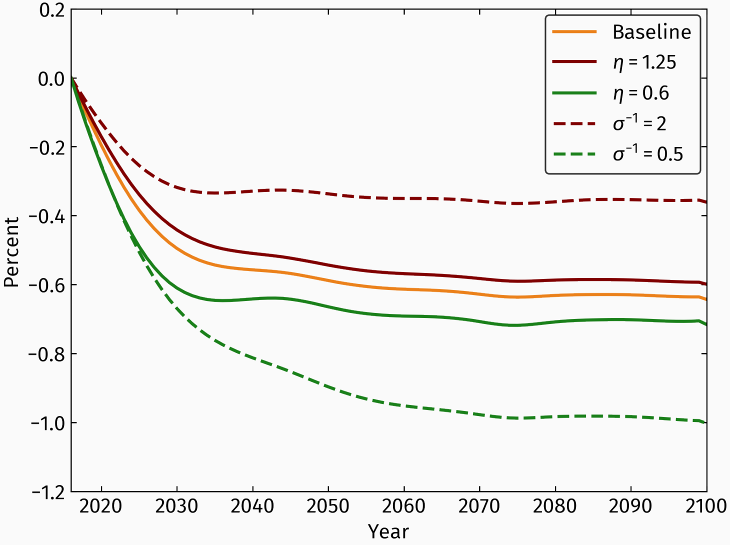


World economy counterfactual

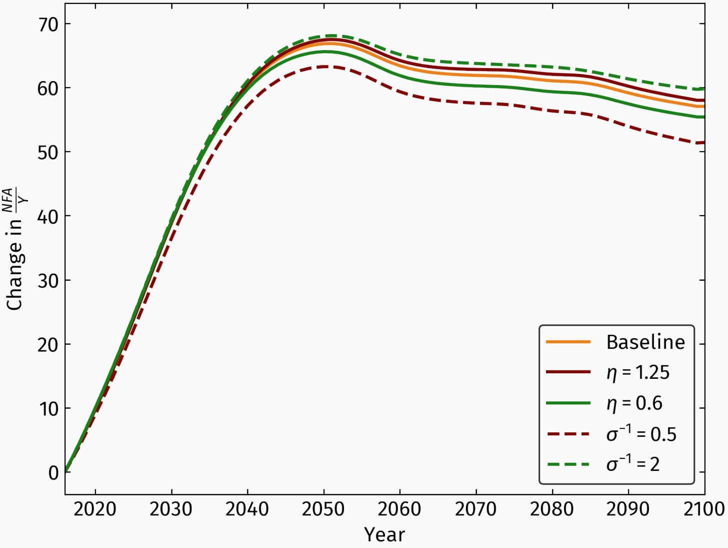
▸ Demog. ▸ Calibration ▸ Wealth profiles ▸ KJZZ

- Next solve for integrated world equilibrium
  - 12 countries that are at least 1% of GDP among our 25
- Country specific targets:
  - Demographics and social security
  - $\frac{W}{Y}$, $\frac{NFA}{Y}$ and Δ^{comp}
- Vary parameters that are not identified in the steady state:
  1. Elasticity of intertemporal substitution σ^{-1}
     - Wealth tax literature supports range between 0.5 and 2
  2. Elasticity of capital-labor substitution η
     - Existing literature supports range between 0.6 and 1.25

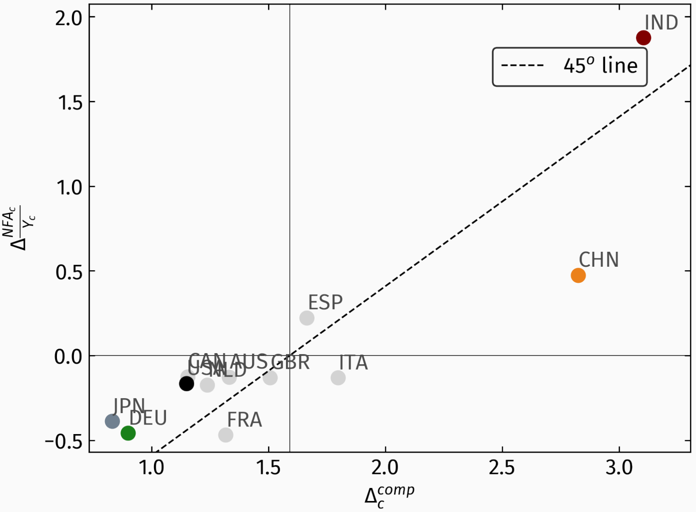
Part 2: world r falls, but magnitudes uncertain



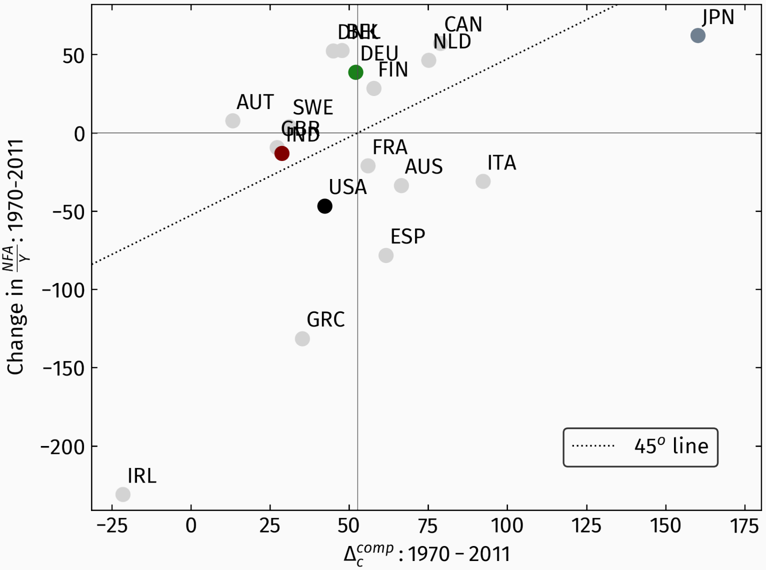
Change in NFA/Y for fast aging countries for alternative σ and η



Part 3: demeaned Δ^{comp} predicts NFAs — model 2016-2100



Historical performance of demeaned Δ^{comp} — data 1970-2011



Dissaving of the baby boomers?

- GE framework shows that thinking about savings rates is misleading for effects of aging on equilibrium asset returns
- In steady state

$$\frac{W}{Y} = \frac{s}{g}$$

- Savings rate s falls with aging, but growth rate g does too!
- Also, much harder to perform accurate shift-share on s than $\frac{W}{Y}$

Other extensions in paper

1. Accounting for historical movements in US W/Y and r
2. Reconciling literature findings on r^* effects of demographics
3. Multiple assets and rates of return
4. Housing
5. Population aging and wealth inequality

Conclusion

- How does population aging affect wealth-output ratios, real interest rates, and capital flows?
- Use compositional effect Δ^{comp} as starting point for forecasts
- Δ^{comp} are **large** and **heterogeneous** in the data
- For the 21st century, our approach:
  - Refutes the asset market meltdown hypothesis: r definitively falls
  - Suggests the global savings glut has just begun

Thank you!

Additional slides

US Wealth-to-GDP from SCF vs World Inequality Database

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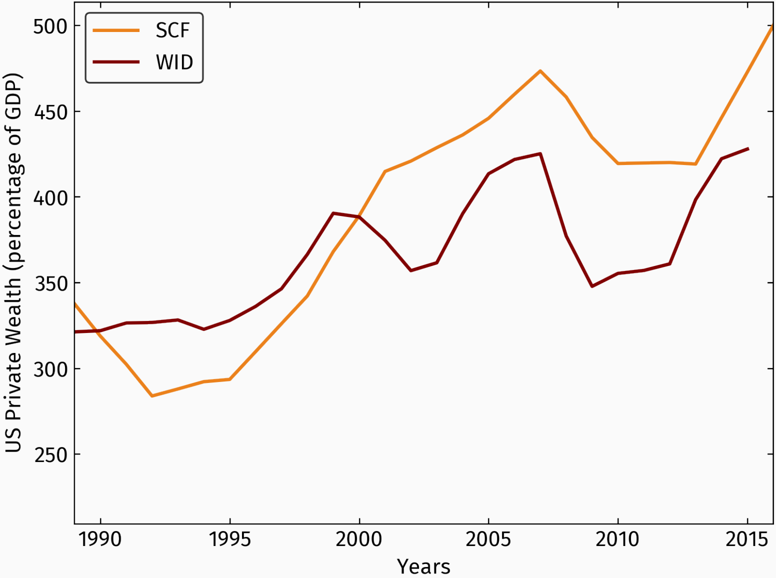

Source: World Inequality Database (WID), Survey of Consumer Finances (SCF)

Share of the population aged 65+

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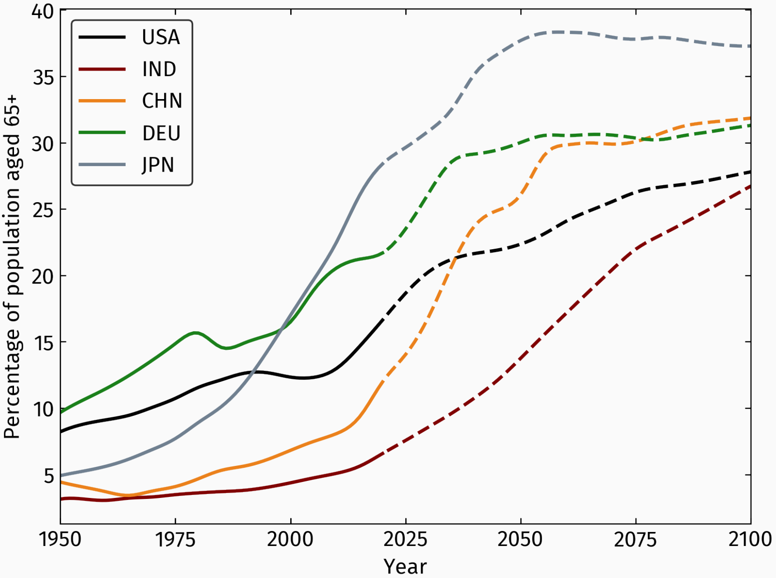

Source: 2019 United Nations World Population Prospects

Countries by income group

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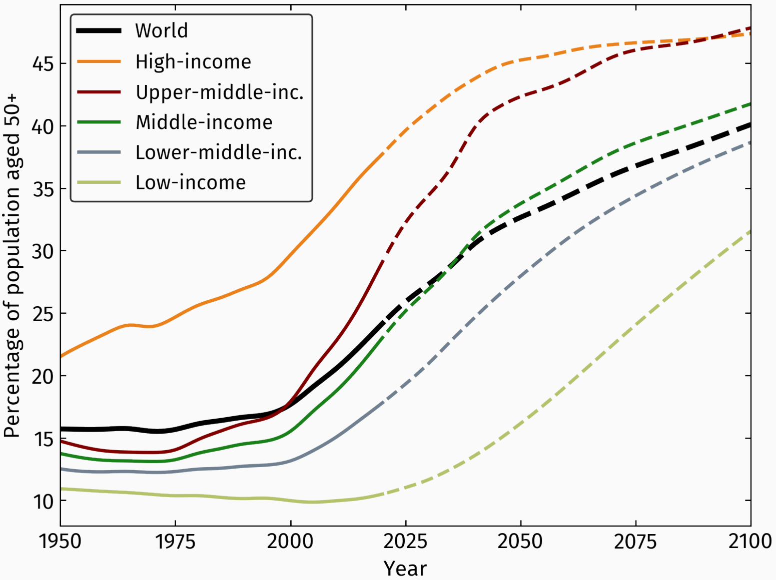
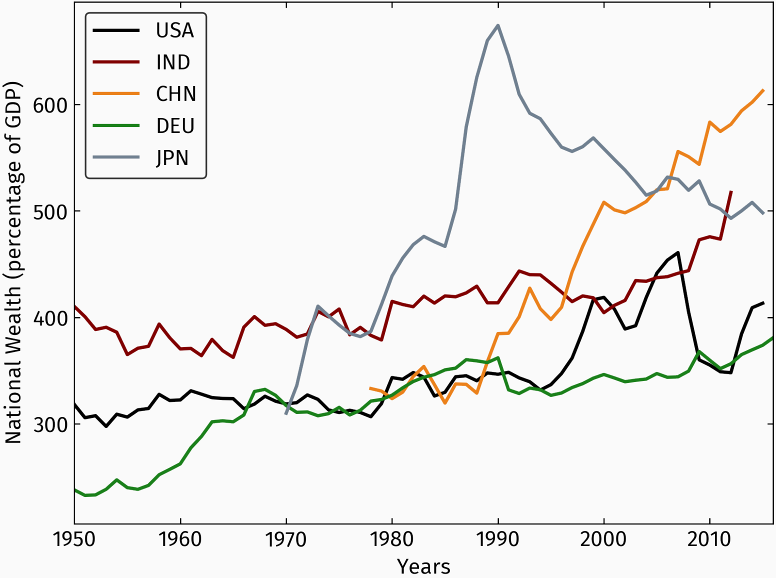


Source: 2019 United Nations World Population Prospects

National Wealth over GDP

◂ Back



Source: World Inequality Database (WID)

Rates of return on wealth

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- Baseline safe return r_t^{safe} is 10 year constant maturity interest rate minus HP-filtered PCE deflator

- Baseline total return is

$$r_t = \frac{(s_K Y - \delta K)_t + r_t^{safe} B_t}{W_t - NFA_t}$$

where $(s_K Y - \delta K)_t$ is net capital income

Age-wealth profiles

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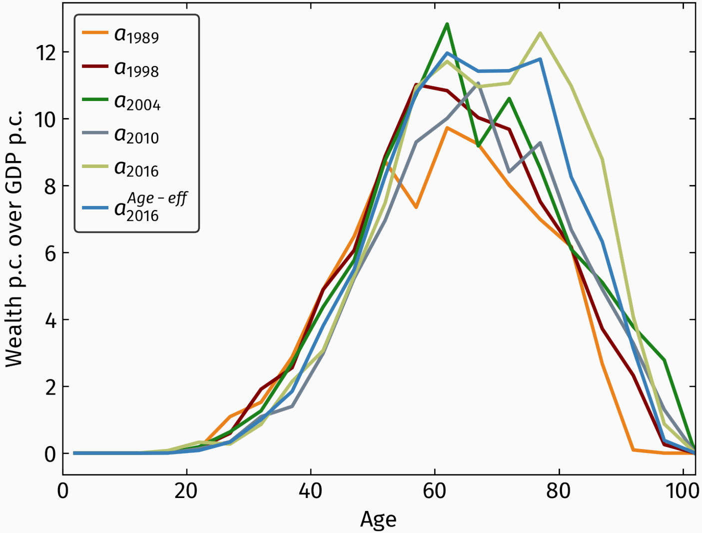

Age-labor income profiles

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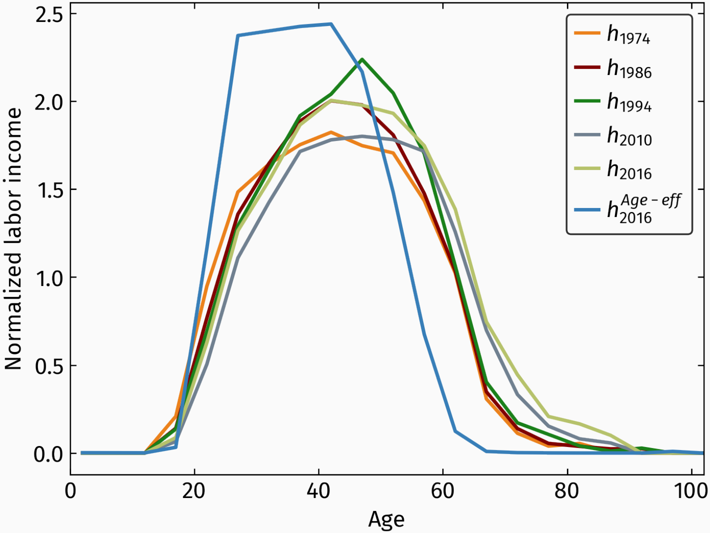

Contribution of fertility to aging in the 21st century

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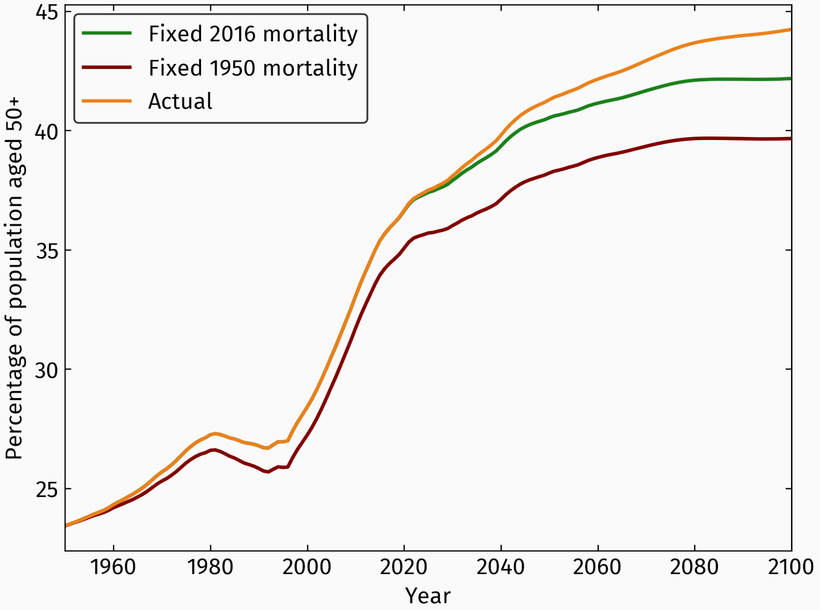

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- **Measuring age-labor income profiles** h_{jt}
  - Data from the Luxembourg Income Study (LIS)
  - h_{jt} is proportional to total labor income per person
  - In 2016: normalize aggregate effective labor per person

$$1 = L_{2016} = \sum_j \pi_{j,2016} h_{j,2016}$$

  - In t: L_t grows as aggregate labor input from the BLS $\frac{L_t^{BLS}}{L_{2016}^{BLS}}$
- **Measuring age-wealth profiles** $a_{jt} = \frac{A_{jt}}{Y_t/L_t}$
  - Data from the Survey of Consumer Finances (SCF)
  - Provide net worth by age at the household level
  - A_{jt} is aggregate household net worth over total individuals
  - Divide by Y_t/L_t^{BLS} to obtain a_{jt}

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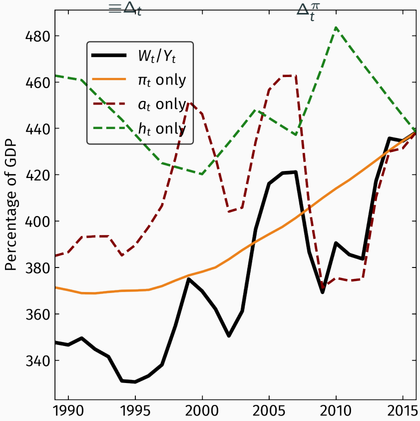
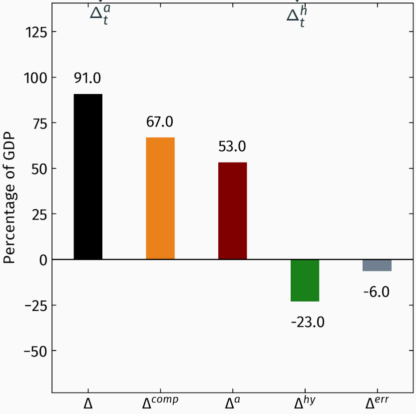
- To first order:

$$\underbrace{\frac{W_t}{Y_t} - \frac{W_0}{Y_0}}_{\equiv \Delta_t} = \underbrace{\frac{\sum_i \pi_{it} a_{io}}{\sum \pi_{it} h_{io}} - \frac{\sum_i \pi_{io} a_{io}}{\sum \pi_{io} h_{io}}}_{\Delta_t^\pi} + \underbrace{\sum_i \pi_{io} \left(a_{it} - a_{io}\right)}_{\Delta_t^a} - \underbrace{\sum_i \pi_{io} \frac{W_0}{Y_0} \left(h_{it} - h_{io}\right)}_{\Delta_t^h} + \Delta_t^{er}$$





Δ^{comp} around the world in 2100

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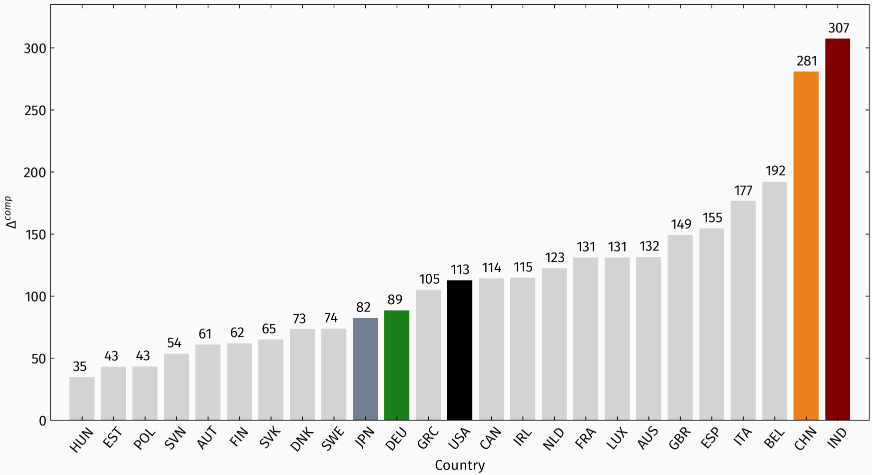

Robustness to baseline year for age profiles (past)

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Change in W/Y: 1950 to 2016

Rows: Age-wealth profile (SCF); Columns: Age-labor income profile (LIS)

	1974	1979	1986	1991	1994	1997	2000	2004	2007	2010	2013	2016	Age eff.
1989	68	70	72	71	70	69	71	68	67	64	63	64	97
1992	73	75	77	77	75	74	77	73	72	69	69	70	103
1995	76	77	80	79	78	77	79	76	75	72	72	73	105
1998	82	84	87	87	85	84	86	83	82	79	78	79	115
2001	84	86	89	89	87	86	89	85	84	81	81	81	116
2004	89	91	94	94	92	91	94	91	90	86	86	87	122
2007	96	99	102	102	100	99	102	98	97	93	93	94	131
2010	84	86	88	88	87	86	89	86	85	82	82	83	112
2013	87	89	92	92	91	90	92	89	88	85	85	86	118
2016	102	104	108	108	106	106	108	105	104	101	101	101	135
Age eff.	98	101	104	104	102	101	104	101	100	97	96	97	132

Robustness to baseline year for age profiles (future)

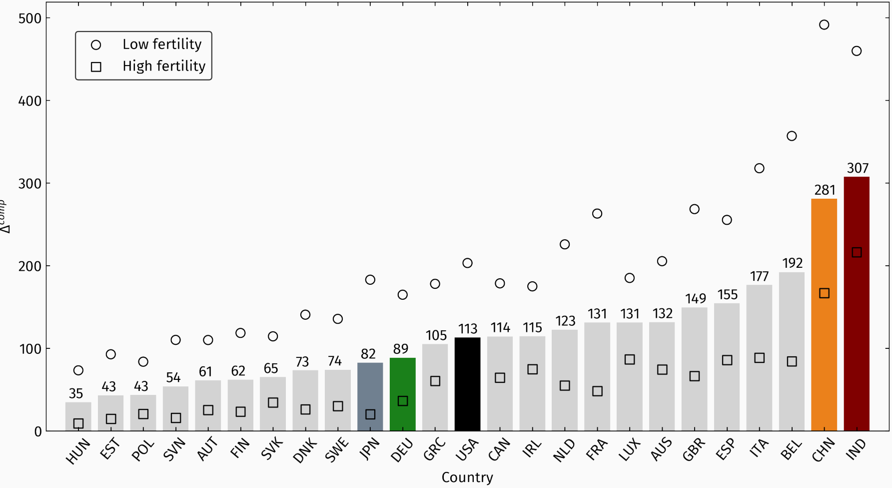
Back

Change in W/Y: 2016 to 2100

Age-wealth profile (SCF) \ Age-labor income profile (LIS)	1974	1979	1986	1991	1994	1997	2000	2004	2007	2010	2013	2016	Age eff.
1989	63	64	66	66	66	65	66	64	62	61	59	59	75
1992	65	66	68	68	68	68	68	66	65	63	61	61	77
1995	72	73	75	75	75	75	75	73	72	70	68	68	85
1998	74	75	76	77	77	76	77	75	73	72	70	69	87
2001	78	80	81	82	82	81	82	80	78	77	75	74	92
2004	87	88	90	91	91	90	91	89	87	86	83	83	102
2007	93	95	97	97	98	97	98	95	94	92	90	89	109
2010	83	84	86	87	87	87	88	85	84	83	81	80	97
2013	91	93	95	96	96	96	97	94	93	91	89	88	107
2016	115	117	120	121	121	121	122	120	118	116	114	113	133
Age eff.	101	103	105	106	106	106	107	104	103	101	99	98	118

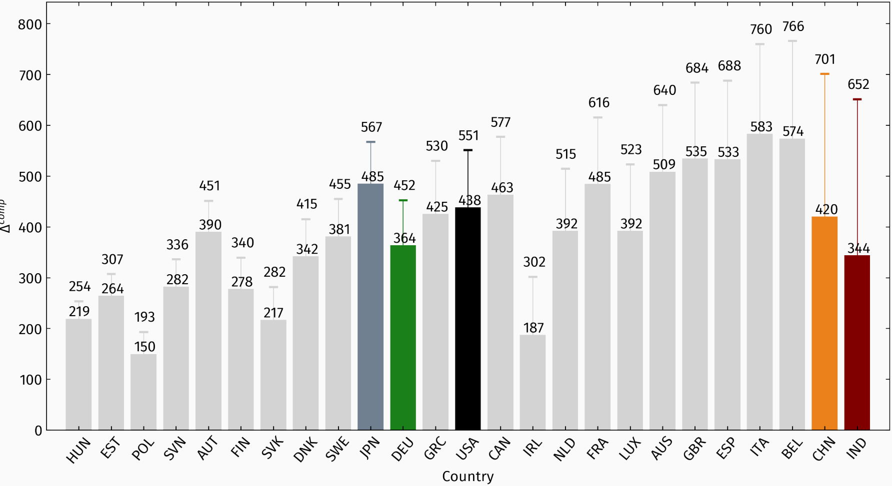
Low and high fertility scenarios

Back



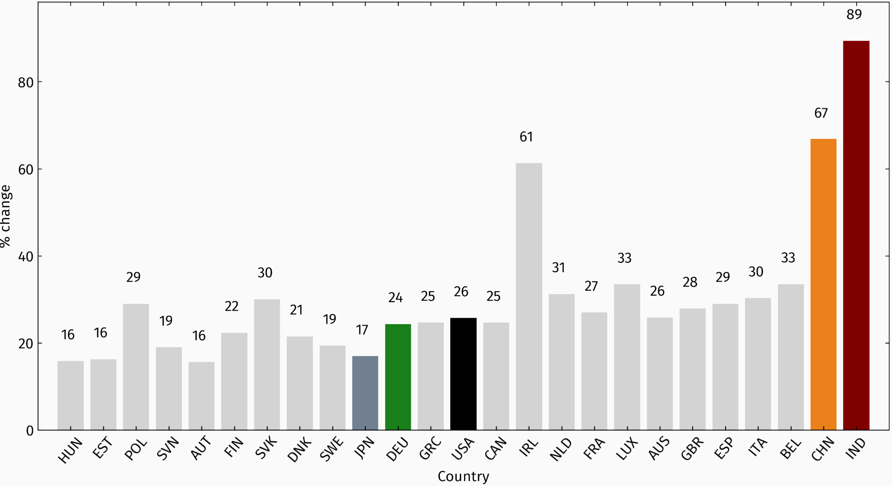
W/Y from shift-share in 2016 and in 2100

Back



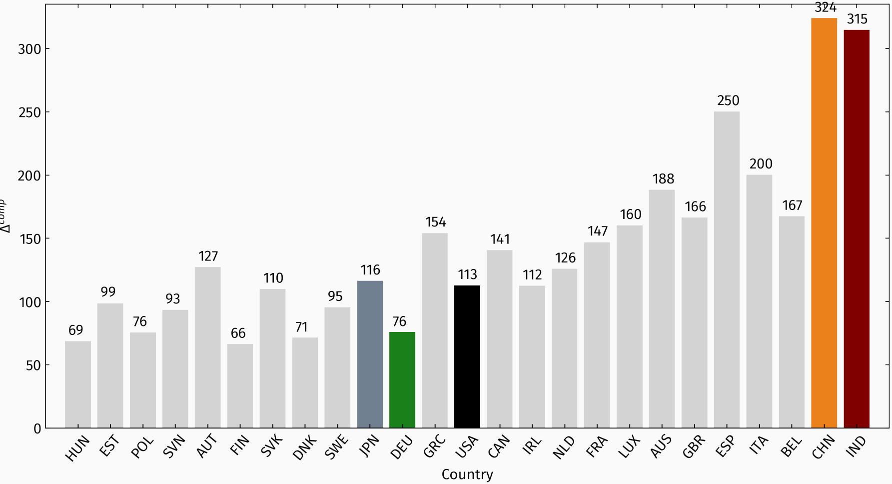
Percentage change in W/Y from shift-share

◂ Back



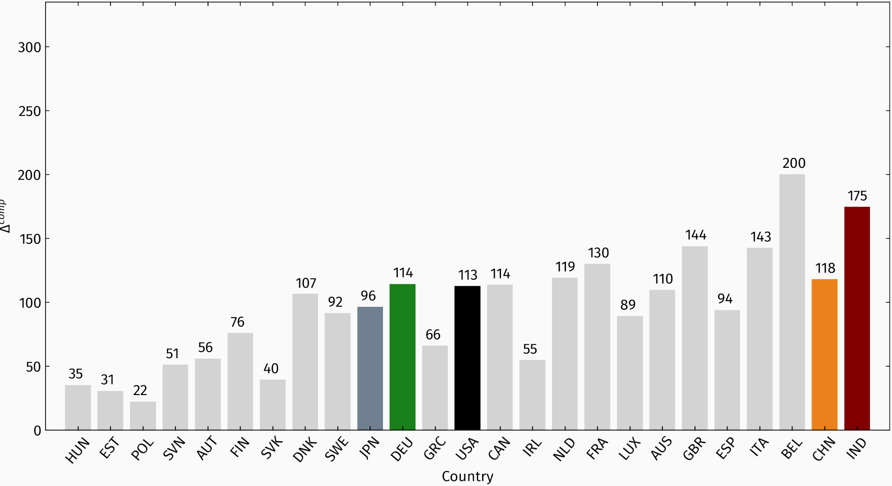
Shift-share at common age profiles (rescaled)

Back



Shift-share at common demographic change

Back



- Population evolves as

$$N_{jt} = \left(N_{j-1,t-1} + M_{j-1,t-1}\right) \phi_{j-1,t-1}$$

  where

  - N_{jt} denotes the numbers of individuals aged j in year t
  - $M_{j,t}$ is migration
  - $\phi_{j,t}$ are survival probabilities

- Total population is

$$N_t = \sum_j N_{jt}$$

- Population converges to a stationary distribution in the long run

Weight on children

Back

- Let $c = c^P + nc^C$ be the total cons. of parent and children
- Assume flow utility function of a parent is

$$\mathcal{U}\left(c^P, c^C\right) = u\left(c^P\right) + \lambda n^{\varphi} u\left(c^C\right)$$

- Utility maximization implies:

$$u'\left(c^P\right) = \lambda n^{\varphi - 1} u'\left(c^C\right)$$

$\Rightarrow$ total value of having children

$$W(c) = u\left(c^P\right) + \lambda n^{\varphi} u\left(c^C\right) = \left(1 + \lambda^{\frac{1}{\sigma}} n^{\frac{\sigma+\varphi-1}{\sigma}}\right)^{\sigma} u(c)$$

- Hence $\psi_i = \left(1 + \lambda^{\frac{1}{\sigma}} n_i^{\frac{\sigma+\varphi-1}{\sigma}}\right)^{\sigma}$
  - Children raise the m.u.c. if $\lambda > 0$ and $\varphi > 1 - \sigma$
  - n_i comes from empirical distribution of children for parent aged i

Retirement policy

◂ Back

- Retirement is phased at age T_t^r
- At age T_t^r, agents still work a fraction $\rho_t \in [0,1]$ of total hours
- Retirement policy is therefore

$$\rho_{jt} = \mathbb{1}_{j<T_t^r} + \rho_t \mathbb{1}_{j=T_t^r}$$

- Effective labor supply is

$$L_t \equiv \sum_{j<T_t^r} \pi_{jt} \widetilde{h_{jt}} + \rho_t \pi_{T_t^r t} \widetilde{h_{T_t^r t}}$$

- Effective share of retirees is

$$\mu_t^{ret} \equiv (1-\rho_t)\pi_{T_t^r t} + \sum_{j\geq T_t^r} \pi_{jt}$$

Government policy

Back

- Flow budget constraint

$$B_t + T_t = (1 + r_{t-1}) B_{t-1} + G_t$$

where B_t is debt, G_t are expenditures, T_t are net taxes

$$T_t = w_t N_t \Big((\tau_t^{ss} + \tau_t (1 - \tau_t^{ss})) L_t - (1 - \tau_t) \bar{d}_t \mu_t^{ret} \Big)$$

- Government sets retirement policy $\{\rho_{jt}\}$ and follows fiscal rules

$$\begin{aligned} \tau_t^{ss} &= \overline{\tau}^{ss} + \varphi^{ss}(B_t/Y_t - \overline{b}) \\ \tau_t &= \overline{\tau} + \varphi^{\tau}(B_t/Y_t - \overline{b}) \\ \frac{G_t}{Y_t} &= \overline{\frac{G}{Y}} - \varphi^{G}(B_t/Y_t - \overline{b}) \\ \overline{d_t} &= \overline{d} - \varphi^{d}(B_t/Y_t - \overline{b}) \end{aligned}$$

where $\overline{b}$ is the 2016 debt-to-GDP ratio

- Coefficients φ's regulate the aggressiveness of the adjustment

Extension 1: other sources of asset supply

- In simple cases, alternative assets just add to supply
- Allow for
  - Markups μ, capitalized monopoly profits
  - Government bonds with long-run rule $\frac{B}{Y} = b(r)$
- Then

$$\frac{a(r,\theta)}{y(r)} = \frac{k(r)}{y(r)} + b(r) + \left(1 - \frac{1}{\mu}\right)\frac{1}{r - (n+\gamma)}$$

- θ directly affects both W and market cap. through discounting
- Extra terms on RHS affect elasticity of asset supply ϵ^s
  - Similar formula still determines dr

Extension 2: Housing

Back

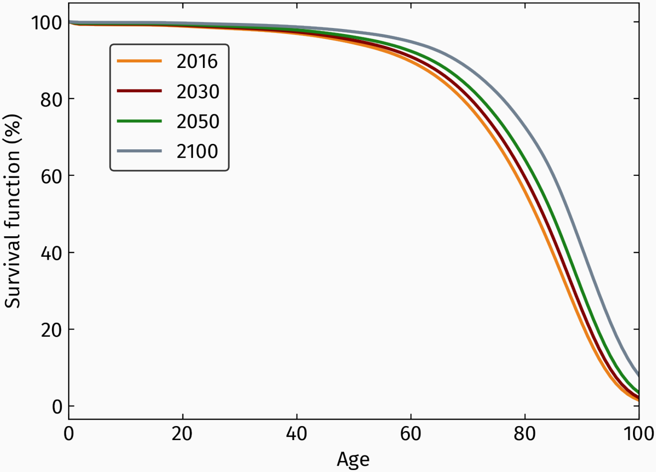
- Model housing by introducing Cobb-Douglas utility

$$\frac{1}{1-\sigma}\left(c^{1-\alpha_h}h^{\alpha_h}\right)^{1-\sigma}$$

- All households rent to a REIT who owns
  - fixed supply of land L, equilibrium price P^L
  - stock of dwellings H, depreciating at δ^H, investment price $=1$
  - $\beta = \frac{P^L L}{P^L L + H}$ is s.s. share of land
- Households invest in mutual fund that owns the REIT
- Housing supply in steady state adjusts so that

$$\frac{a(r,\theta)}{y(r)} = \frac{k(r)}{y(r)} + \frac{\alpha^h}{1-\alpha^h}\left(\frac{\beta}{r-(n+\gamma)} + \frac{1-\beta}{r+\delta^H}\right)\frac{\sum_i \pi_i(\theta)\frac{c_i(r,\theta)}{y(r)}}{\sum_i \pi_i(\theta)h_i}$$

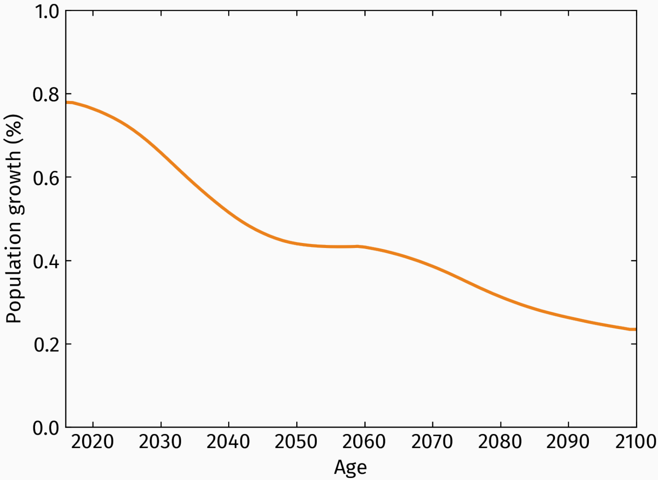
Back



Survival function (%)
100
80
60
40
20
0
0
20
40
60
80
100
Age
2016
2030
2050
2100

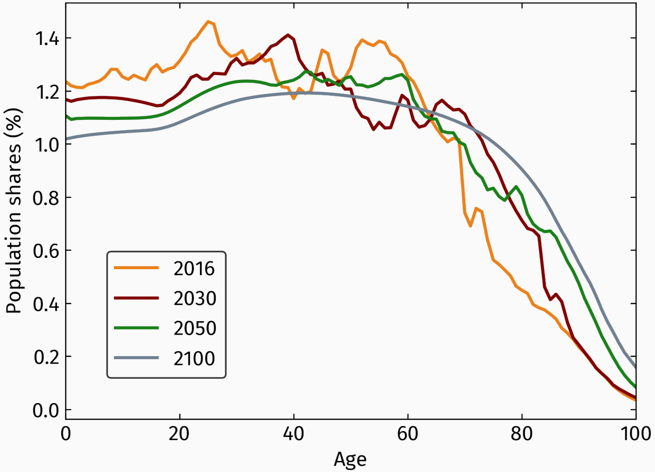
Projected population growth rate

Back



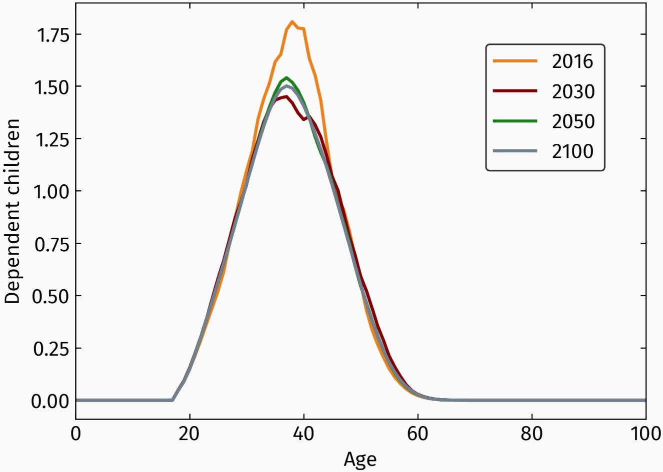
Projected population shares

◂ Back



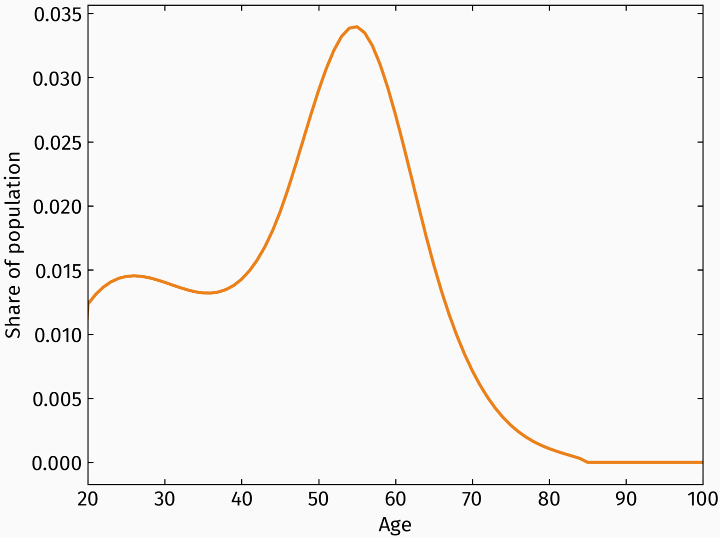
Distribution of children

Back



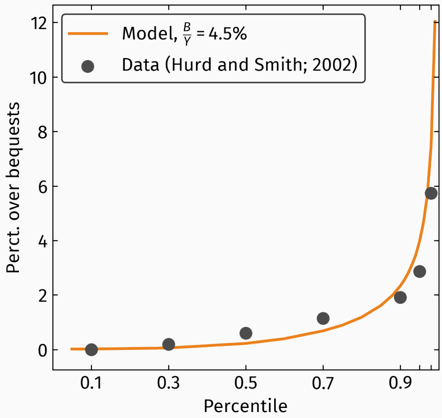
Distribution of bequests received

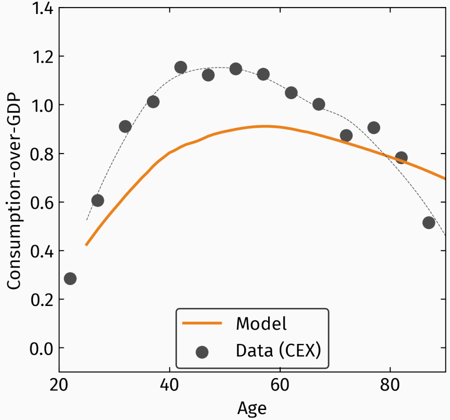
Back



Bequests distribution and consumption profile

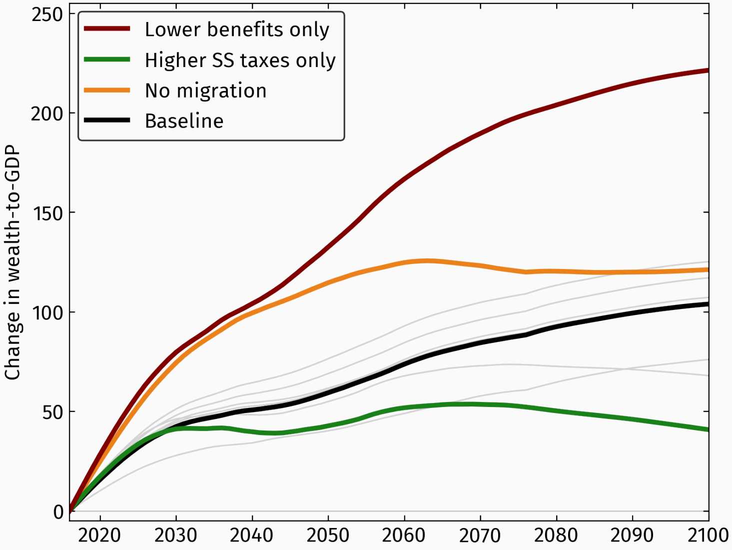
Back





Robustness

◂ Back



Historical exercise: inputs

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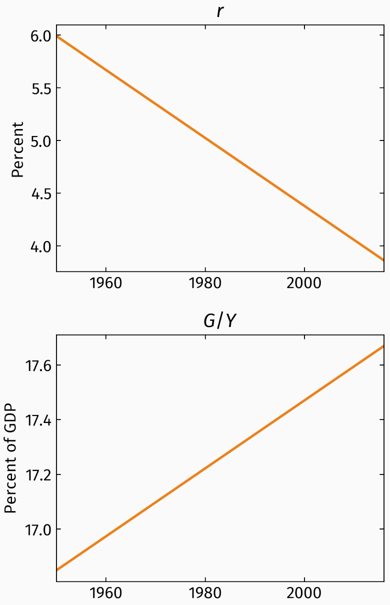

Historical exercise

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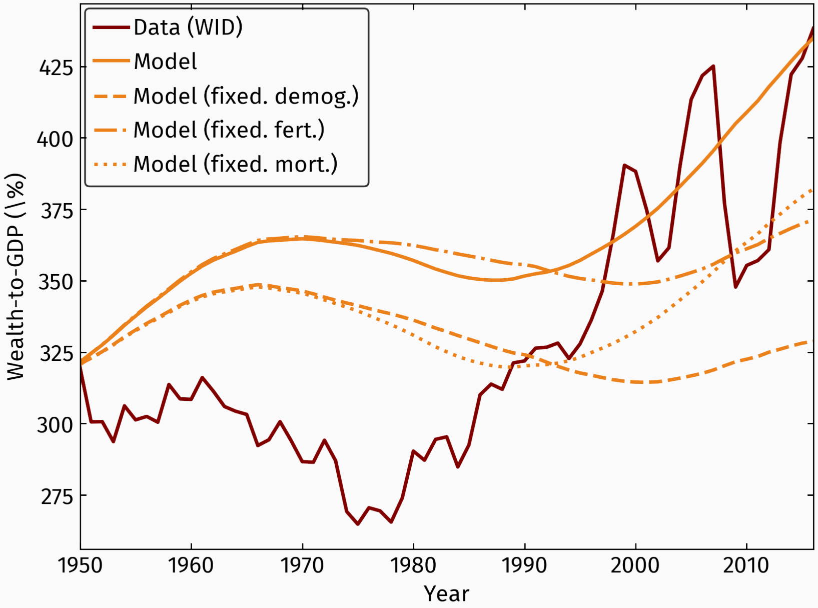

Historical trends in wealth

- We'll use our model primarily for prospective counterfactuals
- But: can the model account for trends in wealth since 1960?
- Concurrent developments to demographics over the period:
  - Falling real rates
  - Falling productivity growth
- We feed the model with observed trends in r, γ, B and G

Historical trends in wealth

Demographics: population distributions

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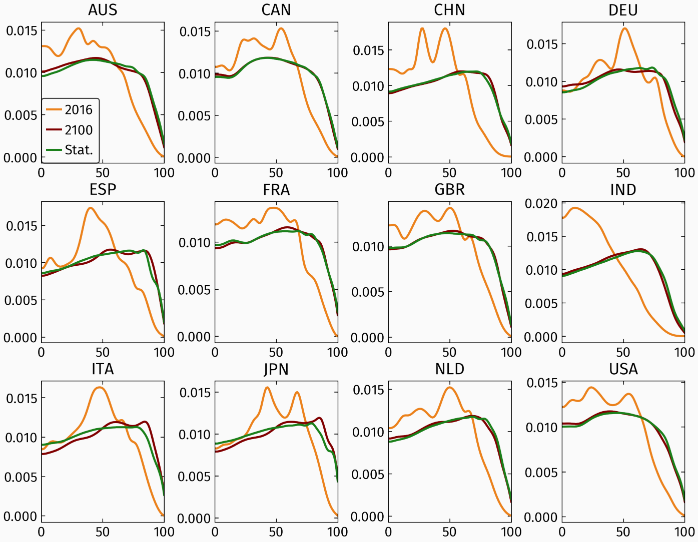

Demographics: population growth rates

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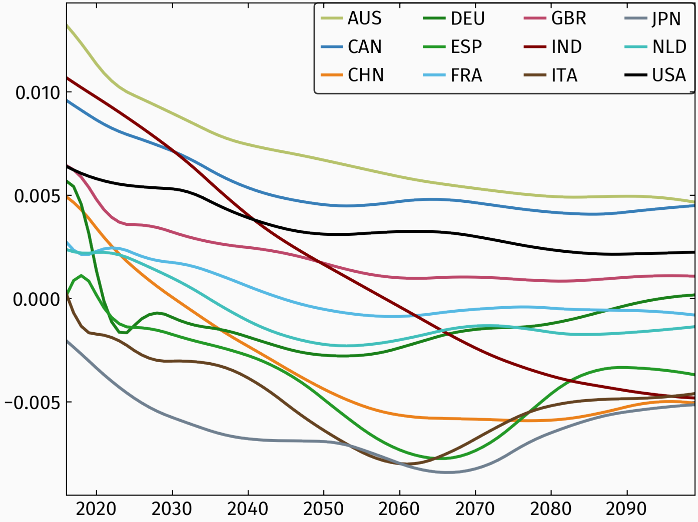

World economy calibration

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Country	Parameters β	Υ	$\frac{W}{Y}$ Model	Data	Δ^{comp} Model	Data
AUS	0.99	0.78	5.09	5.09	1.32	1.32
CAN	0.96	2.34	4.63	4.63	1.14	1.14
CHN	0.95	4.63	4.20	4.20	2.81	2.81
DEU	0.95	3.41	3.64	3.64	0.89	0.89
ESP	1.00	0.00	5.33	5.33	1.64	1.55
FRA	0.98	1.68	4.85	4.85	1.31	1.31
GBR	0.97	2.15	5.35	5.35	1.49	1.49
IND	0.95	3.28	3.44	3.44	3.07	3.07
ITA	1.00	0.61	5.83	5.83	1.77	1.77
JPN	0.96	1.68	4.85	4.85	0.82	0.82
NLD	0.95	3.93	3.92	3.92	1.23	1.23
USA	0.97	1.82	4.38	4.38	1.13	1.13

World economy calibration

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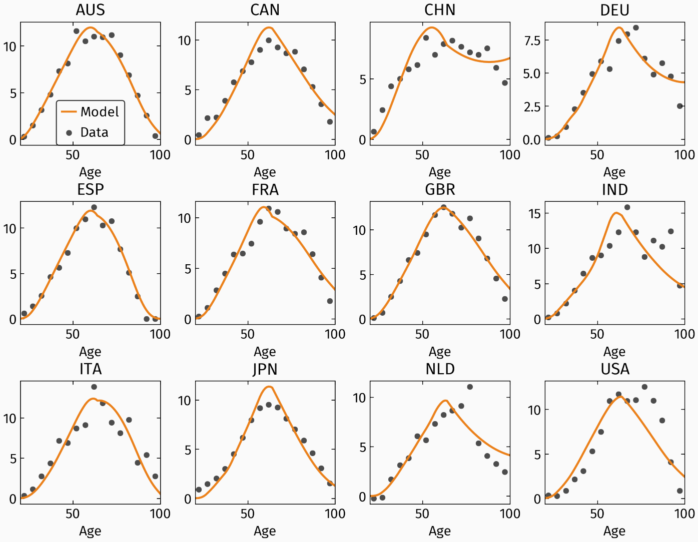
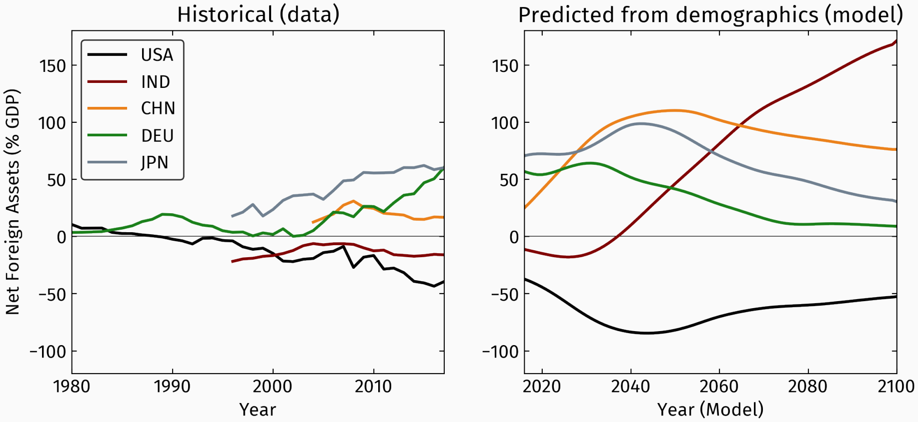
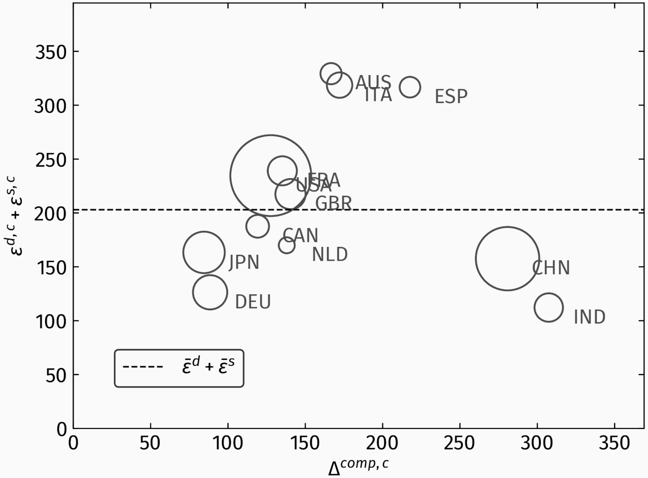


Predicted NFA/Y from demographics

◂ Back



Elasticities by country



Jakobsen et al. (2020) validation

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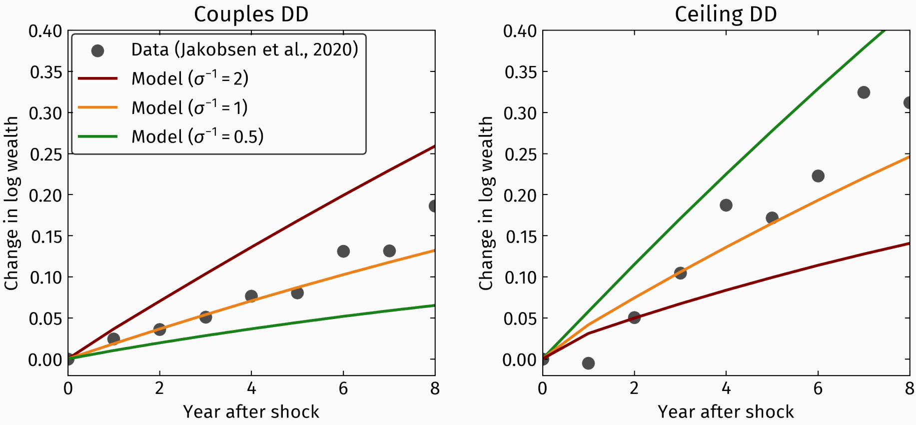

Note: Response of wealth to a reduction in the wealth tax. We replicate the model experiments of Jakobsen et al. (2020). The first (Couples DD) analyzes a reduction of the wealth tax from 2.2% to 1.2% on the top 1%. The second (Ceiling DD) analyzes the a reduction of 1.56 percentage points on the top 0.3%.