Accounting for the determinants of wealth concentration in the US

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Wealth is highly concentrated

	Top 1% share	Top 0.1% share	Gini
earnings	0.19	0.06	0.58
income	0.23	0.08	0.67
net worth	0.37	0.14	0.85

- Wealth is highly concentrated, much more so than earnings and income.
- Its concentration has increased over the last few decades.

What determines wealth concentration?

Channels proposed by the literature:

- Earnings concentration (Castañeda, Díaz-Gimenez and Ríos-Rull 2003, Kindermann and Krueger 2016, Kaymak and Poschke 2016)
- Heterogeneity in return to saving (Quadrini 2000, Cagetti and de Nardi 2006, Benhabib, Bisin and Zhu 2011) or patience (Krusell and Smith 1998, Hendricks 2007)
- Bequests (de Nardi 2004)

Our contribution

Use statistics describing the **joint distribution of income, earnings and wealth** to measure the relative contribution of each channel.

Intuition:

- If earnings concentration channel dominates, top income earners should have significant labor income.
- If return heterogeneity channel dominates, top income earners should have mostly capital income.

Our contribution

Use statistics describing the **joint distribution of income, earnings and wealth** to measure the relative contribution of each channel.

Steps:

1. Carefully measure the labor income share of top income and wealth groups.
2. Calibrate a heterogeneous-agent, life-cycle model with incomplete markets and all three potential determinants of wealth concentration using this information.
3. Measure importance of different channels.
4. Illustrate identification: Show implications of different parameterizations for the joint distribution.

Key Results

Data:

1. Substantial correlation between earnings and wealth.
2. Labor income share sigificant even at the top of the income and wealth distributions.

Quantitative analysis:

1. Earnings concentration is the main driver of wealth concentration.
2. Modest contribution from bequests and return heterogeneity.
3. Scenarios with larger role for return heterogeneity generate strongly counterfactual joint distributions and earnings distributions.

This talk

1. Data
2. Model
3. Benchmark economy
   - calibration
   - joint distributions
   - life cycle patterns
4. Counterfactuals
   - Decomposition starting from benchmark economy
   - Alternative parameterizations

Data

Data source

Survey of Consumer Finances 2010 - 2016

Net worth: broad coverage of financial plus non-financial assets, minus debt

Market Income:

- $+$ wage and salary income (L)
- $+$ business and farm income (K+L)
- $+$ interest and dividend income, private pension withdrawals (K)
- $\pm$ capital gains (K)
- $-$ e.g. social security income, transfer income etc.

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Survey of Consumer Finances 2010 - 2016

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Challenges:

- $-$ Capital gains
  - Solution: Report both with and w/o capital gains and calibrate to average.
- $-$ Important role of business income, in particular at the top
  - Solution: impute wage income to households who report positive business income from active businesses, but no wages.
  - Key empirical patterns similar with other ways of splitting bus. income

The Joint Distribution of Wealth, Income and Earnings

1. Correlations of wealth with income and earnings
2. Wealth shares of top income and earnings groups
3. Labor income shares at the top of the income and wealth distributions

The Joint Distribution of Wealth, Income and Earnings

Correlation of wealth with...		
age group	all	21-64
... income	0.52	0.52
... earnings	0.30	0.35

Source.– Survey of Consumer Finances, 2010 and 2016. All households. Income includes capital gains. Figures excluding capital gains are similar.

marginal distributions

The Joint Distribution of Wealth, Income and Earnings

– Top earners are wealthy.

Top 1% Labor Income Share: SCF and IRS

	wages only		wages + some bus. inc	
Source	w KG	w/o KG	w KG	w/o KG
SCF	0.49	0.56	0.59	0.68
IRS	0.49	0.56	–	–

- Earnings is the major source of income for the top 1% in SCF.
- IRS agrees: wage income is the major source except for the top 0.1% or smaller (Piketty and Saez, 2006)
- Earnings account for 55% of income even for the top 1% of wealth.

details

Data: key patterns

1. Substantial correlation between earnings and wealth.
2. Top earners are wealthy.
3. Labor income main source of income except for top 0.1%.
4. Labor income share of top 1% significant:
   - 64% for top 1% of income
   - 55% for top 1% of wealth

Model

Model

Extend a standard incomplete market life cycle model (Imrohoroglu et al. 1995, Huggett 1996) to incorporate

- ... idiosyncratic labor income risk à la Castañeda et al. (2003)
- ... capital income risk à la Benhabib et al.
- ... non-homothetic bequests

Model is consistent with the observed wealth concentration.

Use the model to ask which feature is the main channel to generate the level of wealth concentration as we seen in the data.

Households

Differ in: age j, wealth k, productivity z, saving return κ.

- live from age 20 to 100 (max), 5-year periods
- retire at age 65
- age-dependent survival probability

- value consumption and bequests, dislike working
- decide every period how much to consume, work, and save

- productivity as workers depends on age and productivity state z (Markov process)
- return to saving κ follows a Markov process

Risks, saving motives, and wealth inequality

Saving motives:

- retirement
- bequest
- precautionary
- return to saving

Determinants of wealth inequality:

- heterogeneous bequests
- heterogeneous rate of returns
- heterogeneous saving motives by productivity

Worker's Problem

$$V_j^W(k,z,\kappa) = \max_{c,k'\geq 0, h\in[0,1]} \left\{ \frac{c^{1-\sigma_c}}{1-\sigma_c} - \theta \frac{h^{1+\sigma_l}}{1+\sigma_l} + \beta s_j \mathbb{E}[V_{j+1}^W(k',z',\kappa')|z,\kappa] \right.$$
$$\left. +(1-s_j)\phi(k') \right\}$$

subject to

$$(1+\tau_s)c + k' = y^d(z\varepsilon_j hw, r\kappa k) + k + Tr,$$
$$\phi(k) = \phi_1 \left[(k+\phi_2)^{1-\sigma_c} - 1 \right]$$
$$j < J_R - 1$$

Retirees ($j \geq J_R$):

- receive social security benefits b instead of labor earnings $zw\varepsilon_j h$

Calibration

Calibration strategy

Parameters are set to make the model consistent with a set of observations:

- Preset standard parameters
- Calibrate tax parameters to observed tax rates and revenue (top groups + average)
- Calibrate earnings process to data on
  - earnings distribution and dynamics
  - income composition (top groups)
- Calibrate return process to data on
  - wealth concentration (top groups)
  - intergenerational persistence of top wealth status
- Calibrate bequest parameters and process to
  - bequest distribution (bequest/wealth ratio and top bequest share)
  - intergenerational wealth correlation

Taxes, social security, government spending

Social security:

- piecewise linear as in the law
- caps on contributions and on benefits
- total social security and medicare spending as in national accounts

Government spending as in national accounts.

Taxes:

- linear taxes on corporate income (τ_c)
- progressive taxes on household income ($\tau_l, \tau_{\max}$)
- average taxes endogenous, so that the government budget is balanced.

details

Labor Productivity Process

Labor earnings are $z\varepsilon_j hw$.

Dynamics of productivity z:

$$\Pi_Z = \left(\begin{array}{c|cccc} & f_L + a & f_H + a & z_{awel} & z_{aweh} \\ \hline f_L + a & A & 0 & \lambda_{in} & 0 \\ f_H + a & 0 & A & \lambda_{in} & 0 \\ z_{awe_l} & \lambda_{out} & \lambda_{out} & \lambda_{ll} & \lambda_{lh} \\ z_{awe_h} & 0 & 0 & \lambda_{hl} & \lambda_{hh} \end{array}\right)$$

PSID provides panel data on non-top groups to estimate...

- "regular" earnings dynamics

PSID does not cover the top very well; so calibrate "awesome" earnings states and the transitional probability using data on

- top earnings shares
- income composition of top incomes and
- persistence of top earnings.

Capital Income Process

Capital income is $r\kappa k$.

- r is determined in equilibrium.
- $\kappa \in \{\kappa_L, \kappa_H, \kappa_{\text{top}}\}$ follows a Markov process.
- κ and z are independent.

$$\Pi_\kappa = \left(\begin{array}{c|ccc} & \kappa_L & \kappa_H & \kappa_{\text{top}} \\ \hline \kappa_L & \pi_{ll} & 1-\pi_{ll}-\pi_{in} & \pi_{in} \\ \kappa_H & 1-\pi_{hh}-\pi_{in} & \pi_{hh} & \pi_{in} \\ \kappa_{\text{top}} & 0 & 1-\pi_{top,top} & \pi_{top,top} \end{array}\right)$$

Calibrate return levels and persistence to match data on

- top wealth shares
- intergenerational persistence of top wealth status

Bequests

Households leave a bequest if they die, and value doing so at

$$\phi(k) = \phi_1[(k+\phi_2)^{1-\sigma_c} - 1].$$

ϕ_1 controls overall strength of the bequest motive.

$\phi_2 > 0$ implies that bequests are a luxury good.

Households receive a bequest at age 50 (mean age receiving bequest).

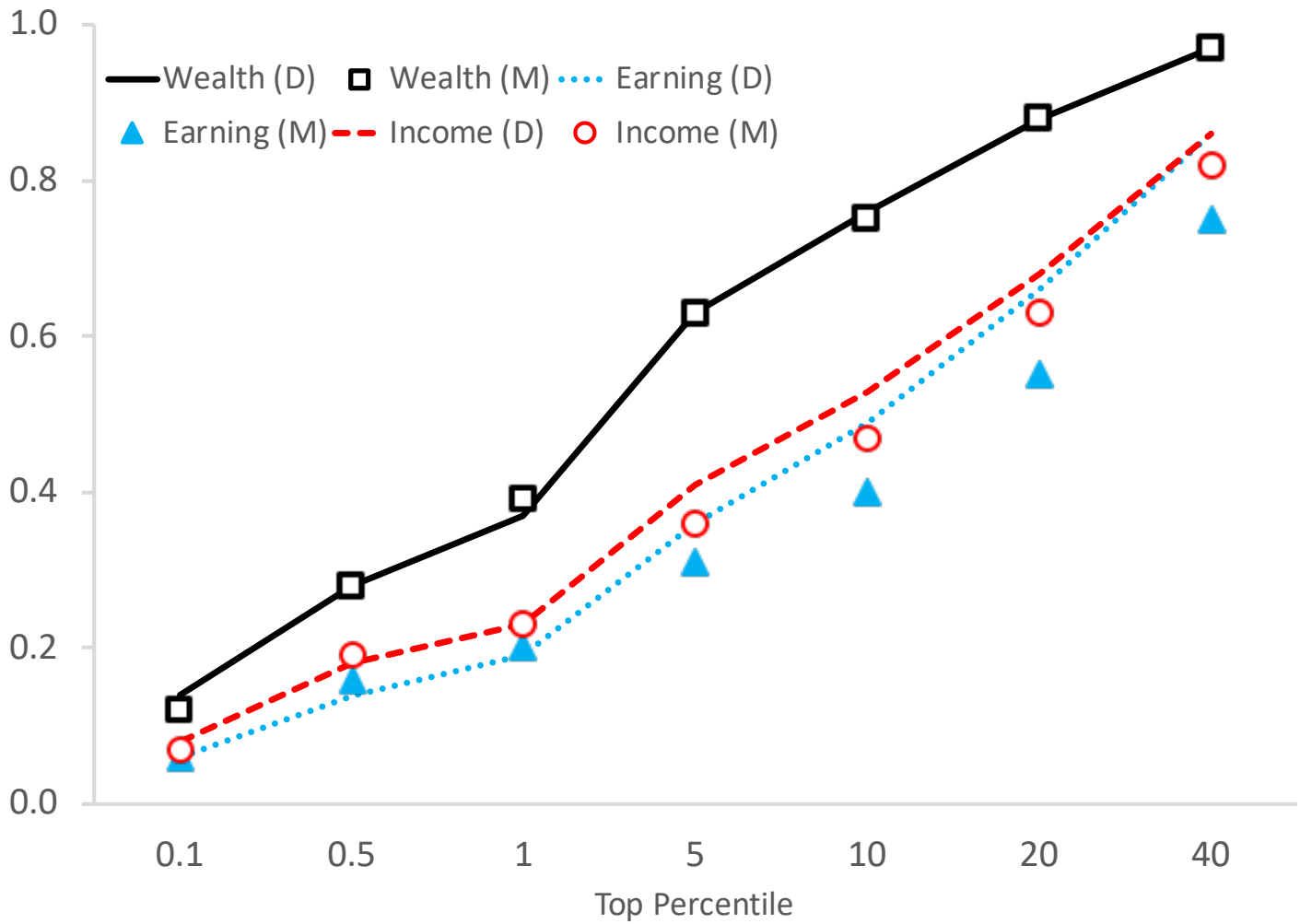
- The bequest is randomly drawn from a mixture of distributions of bequests left by those dying with (high / low) (fixed effect / return).
- Weights determined by intergenerational earnings correlation and intergenerational correlation of wealth.

Non-targeted moments

- joint distribution of income, earnings and wealth (except top labor income shares)
- mean of earnings, income and wealth over the life cycle
- inequality of earnings, income and wealth by age group
- age composition of top wealth groups

preset parameters

Model fit: Marginal distributions of wealth, earnings and income



figure

Model fit: Income composition

Share of income from labor:

	All	Top(%)		
	0-100	99-100	95-99	90-95
Data	0.82	0.64	0.78	0.88
Model	0.79	0.64	0.81	0.78

Parameters: Top earnings levels and transitions

Top productivity groups:

	z_7	z_8
z_j/mean regular z	37.5	266
share of population	0.63%	0.02%

Top relative to mean earnings:

	0.01%	0.1%	0.5%	1%
data	>170	60	28	19
model	204	60	33	20

Top earning dynamics:

	Prob. stay in top 1%
data	0.62
model	0.60

Data sources: SCF, Piketty and Saez (2003), Kopczuk, Saez and Song (2010) detail

The rate of return process

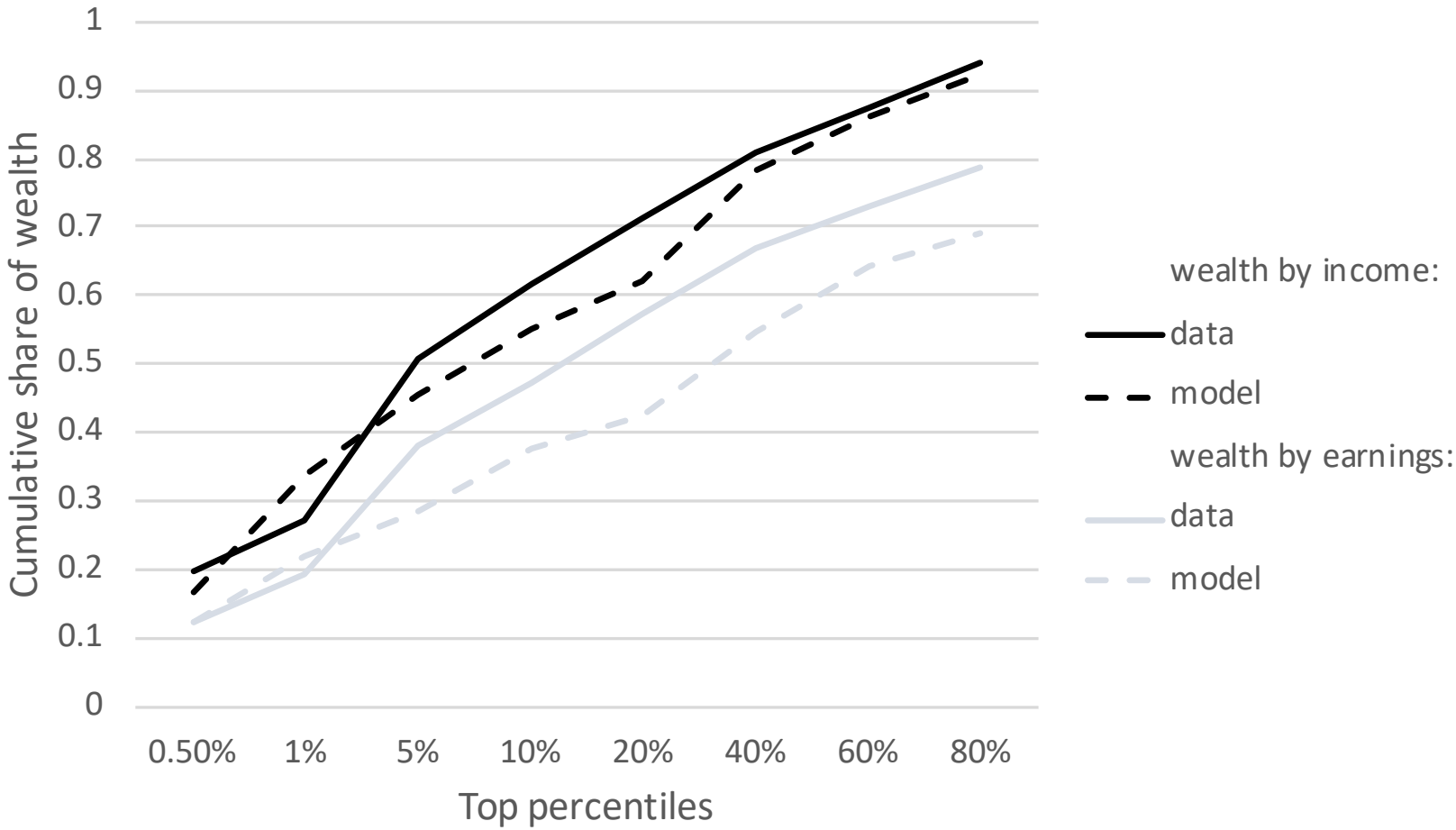
Transition matrix (probabilities in %):

	$r\kappa_L$	$r\kappa_H$	$r\kappa_{\text{top}}$
	1%	6%	24%
1%	99	0.975	0.025
6%	0.975	99	0.025
24%	0	10	90
pop. fraction	49.2	50.5	0.25

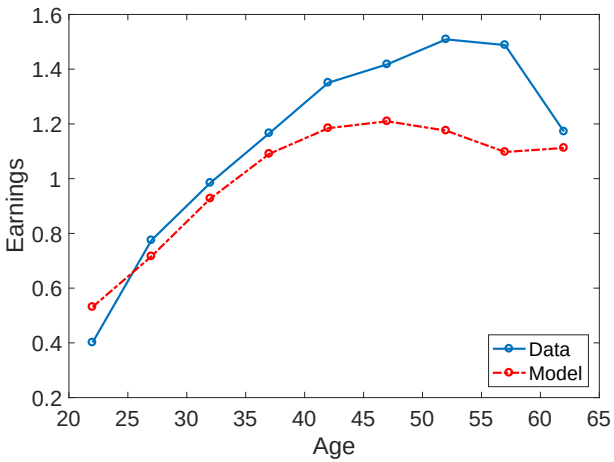
Non-targeted moments: Joint distributions

	Correlation of wealth with		LIS of top
	earnings (21-64)	income	1% of wealth
Data	0.35	0.52	0.55
Model	0.27	0.63	0.48

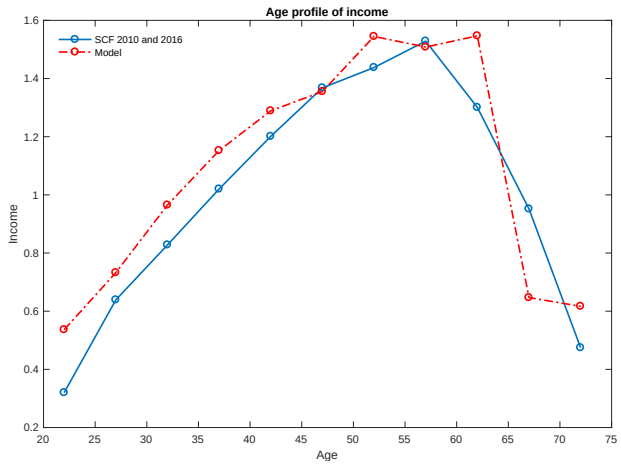
Non-targeted moments: Joint Distribution of Wealth by Income and Earnings



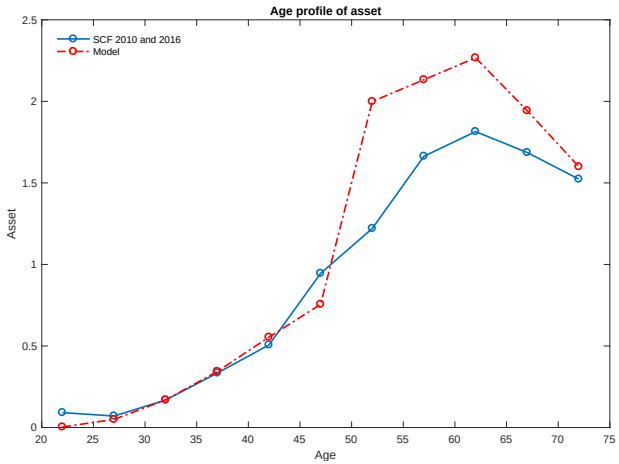
Additional moments: Earnings, Income and Wealth over the Life-Cycle



earnings

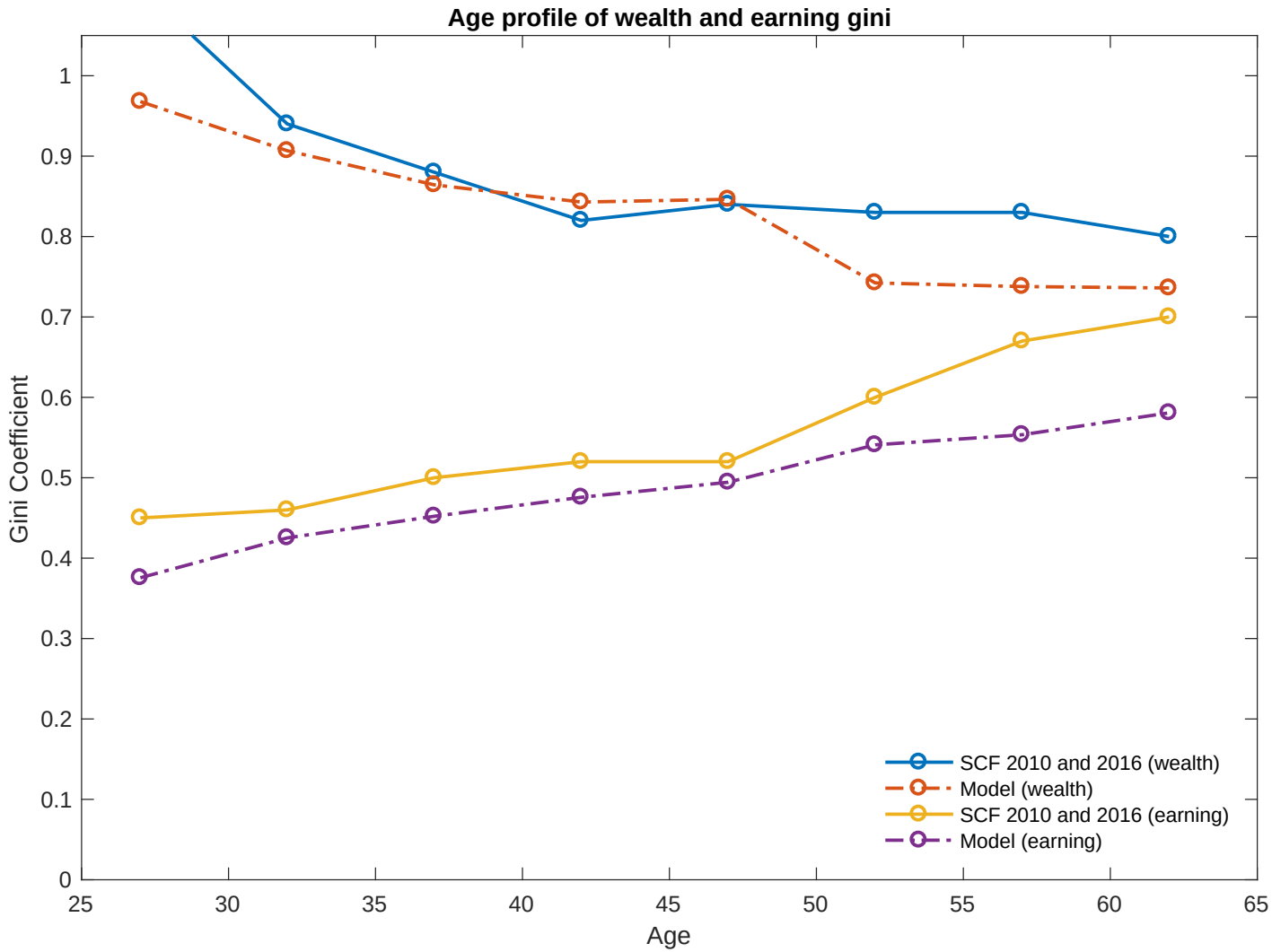


income



wealth

Additional moments: Earnings and wealth inequality over the Life-Cycle



Decomposition:

The Sources of Wealth Inequality

Counterfactuals: The Sources of Wealth Inequality

– In data, all channels present.

– Cannot see their individual contributions directly.

$\Rightarrow$ Use model to simulate counterfactual economies.

Three approaches:

1. Starting from benchmark economy, eliminate individual channels
2. Investigate paths of wealth accumulation
3. Alternative calibrations:
   - Find different top earnings/top return combinations generating top 0.1% wealth share of 14%.
   - Then evaluate fit of other dimensions.

Counterfactuals: Eliminating individual channels

	wealth	top wealth		top earnings		top 1%
	Gini	0.1%	1%	0.1%	1%	LIS
data	0.85	0.14	0.37	0.06	0.19	0.64
benchmark	0.83	0.14	0.38	0.06	0.18	0.63
no top earners	0.74	0.07	0.16	0.004	0.04	0.47
common return	0.79	0.11	0.34	0.06	0.18	0.72
equal bequests	0.73	0.11	0.30	0.06	0.19	0.69

- Eliminating top earners reduces top wealth shares by half or more.
  - Also too low top earnings and top LIS.
- Eliminating heterogeneous returns or imposing equal bequests reduces top wealth shares moderately.

figure

Counterfactuals: Eliminating individual channels

	wealth	top wealth		top earnings		top 1%
	Gini	0.1%	1%	0.1%	1%	LIS
data	0.85	0.14	0.37	0.06	0.19	0.64
benchmark	0.83	0.14	0.38	0.06	0.18	0.63
no top earners	0.74	0.07	0.16	0.004	0.04	0.47
common return	0.79	0.11	0.34	0.06	0.18	0.72
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figure

Why do heterogeneous returns have little impact?

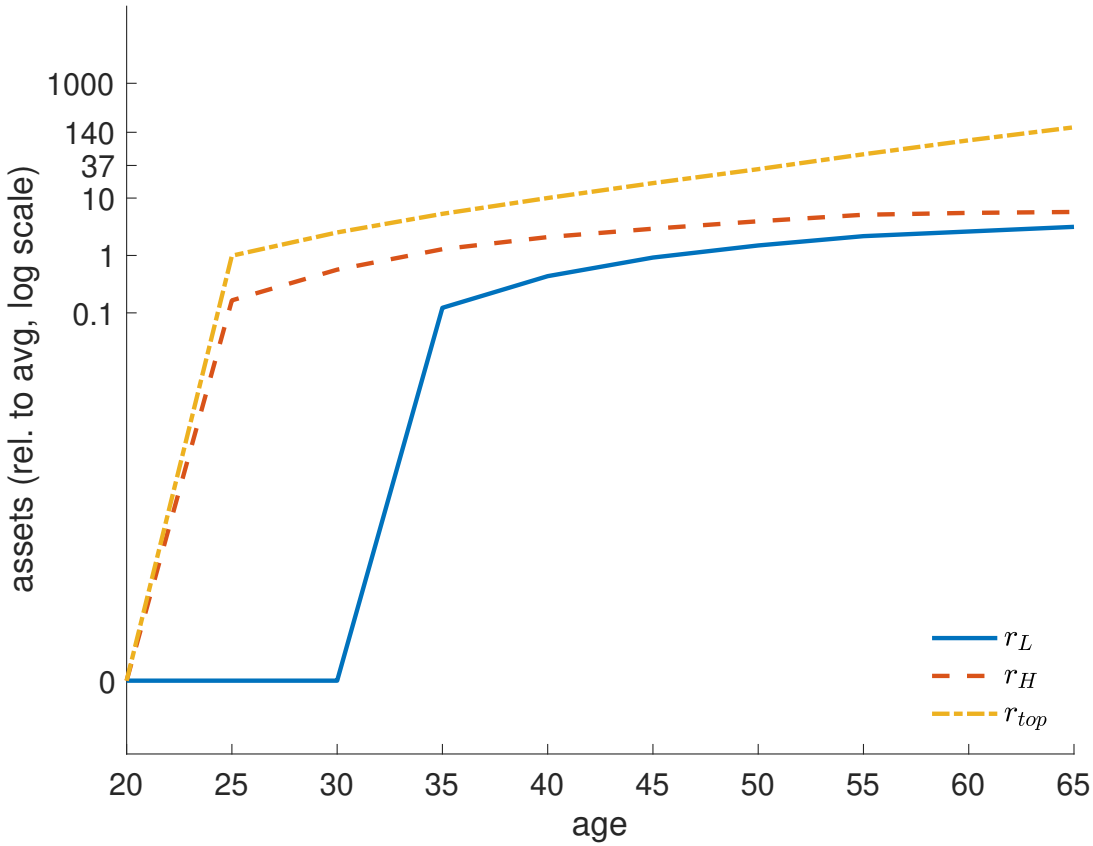


Figure: Path of assets if z always z_6, return fixed

Why do heterogeneous returns have little impact?

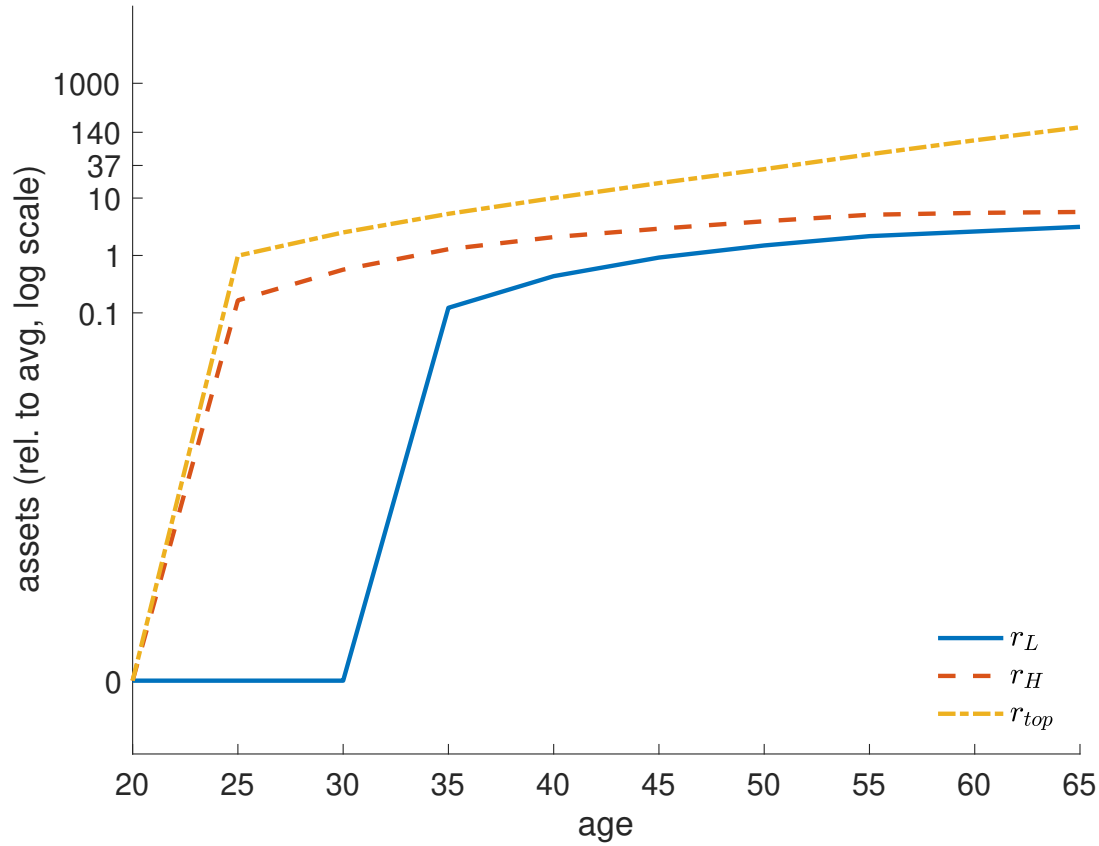


Figure: Path of assets if z always z_6, return fixed

Answer: because life is too short.

Reaching the top 0.1% takes 40 years at the top return of 24%.

High returns have an impact when applied to a larger base

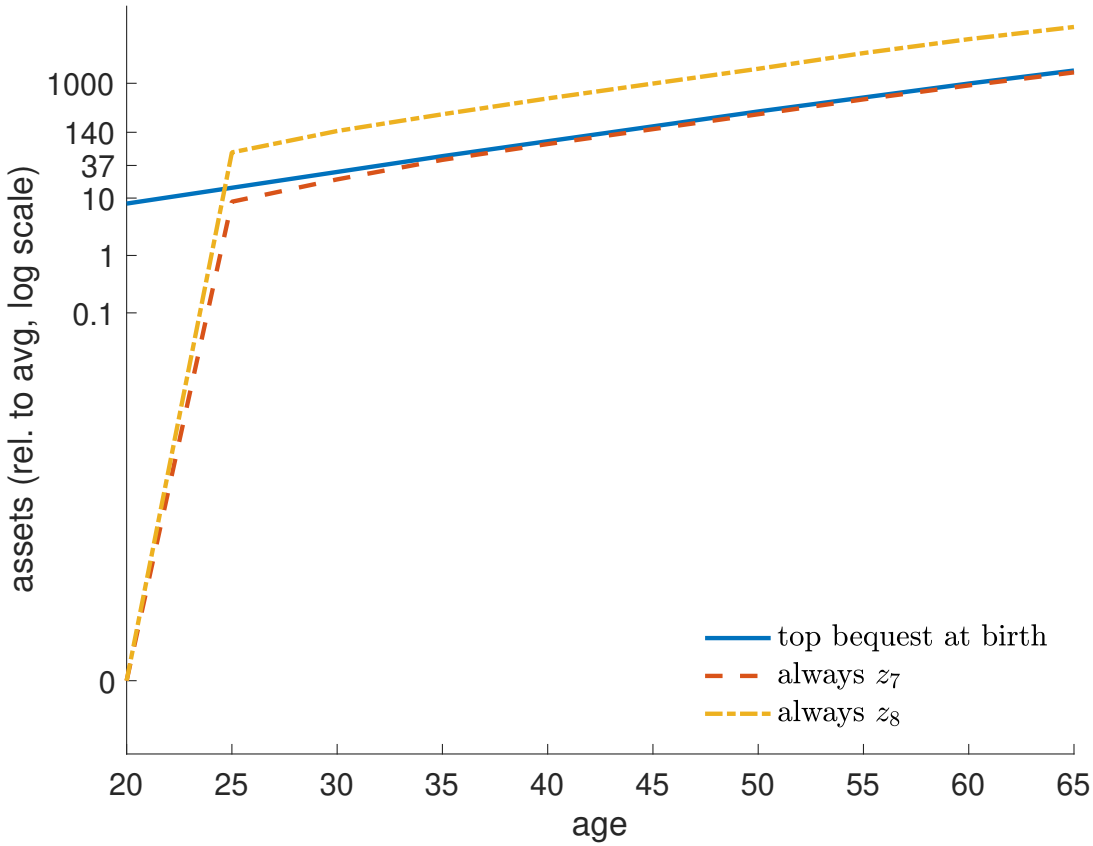
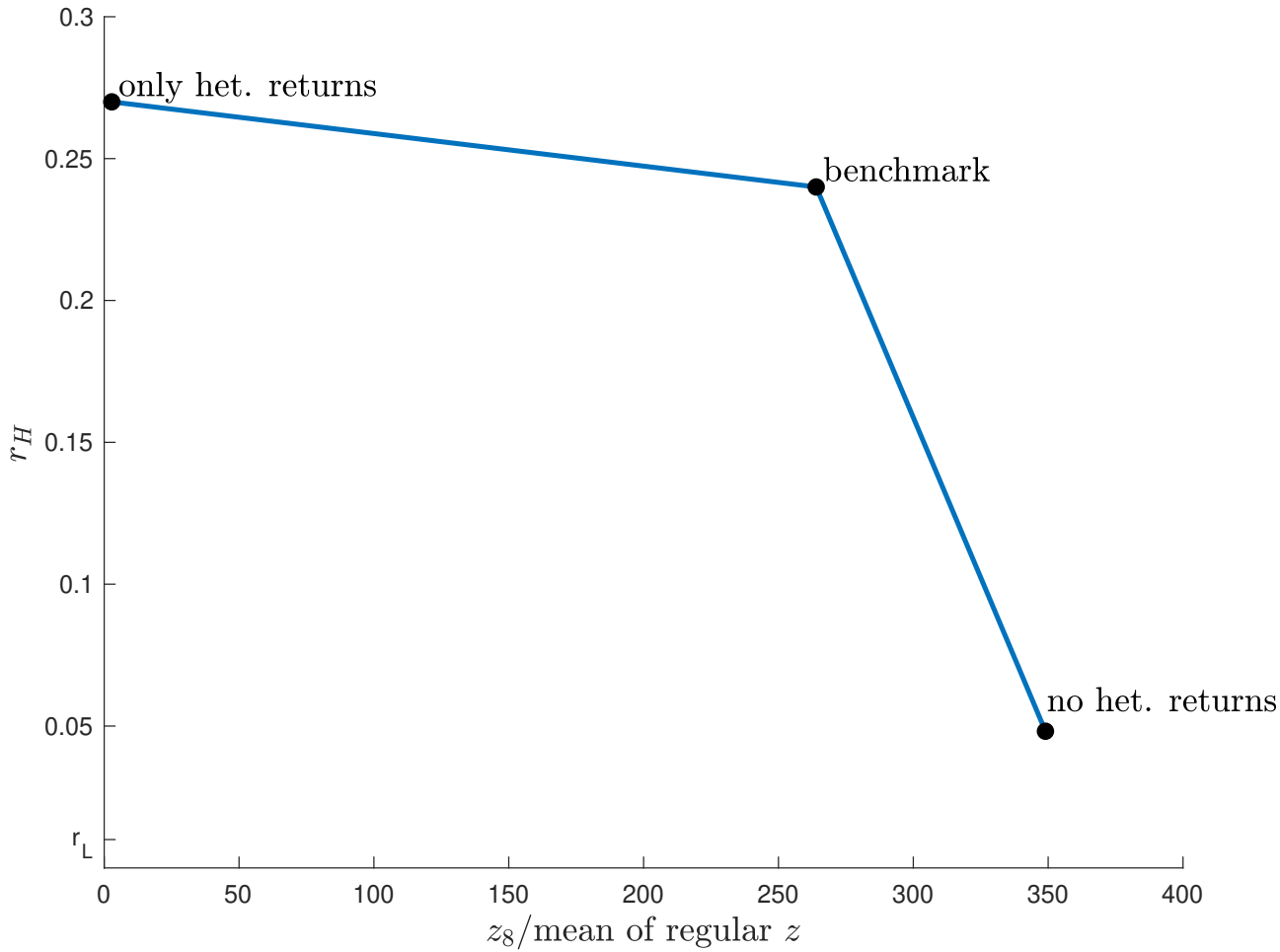


Figure: Path of assets for fixed return, large bequest when young or always top z

Alternative calibrations generating top 0.1% wealth share of 14%



Alternative calibrations: implications for the joint distribution

	Top 1% earnings	labor income share of top 1% by		correlation of wealth with	
		income	wealth	earnings (21-64)	income
data	0.19	0.64	0.55	0.35	0.52
benchmark	0.18	0.63	0.48	0.20	0.65
only het. returns	0.04	0.31	0.07	0.01	0.67

Conclusion

- Model can replicate US income and wealth distribution very well, including
  - joint distribution of income and wealth
  - top income composition

  and life cycle dynamics of earnings, income and wealth
  - levels and
  - inequality.
- Realistically high level of earnings concentration main driver of high wealth concentration in US.
- Rate of return heterogeneity makes a limited contribution over the finite horizon of one human life.
- Models that only rely on rate of return heterogeneity cannot match the high levels of earnings at the top of the income and wealth distributions.

Thank you !

Appendix

Data and Definitions

- Survey of Consumer Finances 2010 - 2016
- Market Income
  - + wage and salary income (L)
  - + business and farm income (K+L)
  - + interest and dividend income (K)
  - + private pension withdrawals (K)
  - ± capital gains (K)
  - − e.g. social security income, transfer income etc.
- Business Income: K or L?
  - solution: If no wage is reported for active business, we impute it.
- Capital gains
  - solution: Report both with and without capital gains and calibrate the average.

go back

Cross-Sectional Distributions of Income, Earnings and Wealth

	Top Percentile							
	0.1%	0.5%	1%	5%	10%	20%	40%	Gini
Wealth share	0.14	0.28	0.37	0.63	0.76	0.88	0.97	0.85
Income share	0.08	0.18	0.23	0.41	0.53	0.68	0.86	0.67
Earnings share	0.06	0.14	0.19	0.36	0.49	0.66	0.86	0.66†

Source.– Survey of Consumer Finances, 2010 and 2016. All households. Cumulative shares. Income includes capital gains. Patterns are similar when excluding capital gains.
†The earnings gini for working age households is 0.58.

back to correlation
capital gains

The Joint Distribution of Wealth, Income and Earnings

Shares of Net Worth by Income and Earnings:

	Top Percentile					
sorted by...	0.5%	1%	5%	10%	20%	40%
... net worth	0.28	0.37	0.63	0.76	0.88	0.97
... income	0.20	0.27	0.51	0.61	0.71	0.81
... earnings	0.13	0.19	0.38	0.47	0.57	0.67

Source.– Survey of Consumer Finances, 2010 and 2016. All households. Income includes capital gains. Figures excluding capital gains are similar.

Cross-Sectional Distributions of Income, Earnings and Wealth

	Top Percentile							
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Wealth share	0.14	0.28	0.37	0.63	0.76	0.88	0.97	0.85
Income share (w KG)	0.08	0.18	0.23	0.41	0.53	0.68	0.86	0.67
Income share (w/o KG)	0.07	0.16	0.21	0.39	0.51	0.67	0.86	0.66
Earnings share	0.06	0.14	0.19	0.36	0.49	0.66	0.86	0.66†

Source.– Survey of Consumer Finances, 2010 and 2016. All households. Cumulative shares.
† The earnings gini for working age households is 0.58.

back

The share of income from labor

$$\text{Income} = \underbrace{\text{Wage income} + \text{Business}}_{\text{Labor income}} \underbrace{\text{income} + \text{Interest, dividends}(+\text{capital gains})}_{\text{Capital income}}$$

Percentile	All 0-100	Top Income Groups 90-95	95-99	99-100
Wage income				
with capital gains	74	83	69	49
without capital gains	78	84	73	56
Labor Income				
with capital gains	80	87	76	59
without capital gains	84	89	80	68

- Labor income is the major income source for the top 1% in the SCF.
- It accounts for 55% of income even in the top 1% of wealth.

back

The share of income from labor – top fractiles from IRS data

	Income Percentile Category				
	99-100	99-99.5	99.5-99.9	99.9-99.99	99.99-100
w/o capital gains:					
Wage	56	73	61	47	34
Business	30	20	29	37	37
Int. + Div.	14	7	10	15	29
w/ capital gains:					
Wage	49	68	54	40	27
Business	27	19	26	32	30
Int., Div., KG	24	13	19	28	42

Source.– 2015 update to Piketty and Saez (2007), averages for 2010-2015.

- Labor income is the major income source for the top 1% in the SCF.
- IRS agrees: wage income is the main source except for the top 0.1%.

Stationary Equilibrium

Let $s = \{j, k, z, \kappa\} \in S$ be the state vector.

1. Functions $V(s)$, $c(s)$, $k'(s)$ and $h(s)$ solve the households' problem.
2. Firms maximize profits.
3. Factor markets clear:

$$K = \int k'(s)\mathrm{d}\Gamma(s) \quad \text{and} \quad N = \int_{j<J_r} z\varepsilon_j h(s)\mathrm{d}\Gamma(s)$$

4. The government's budget is balanced:

$$G + Tr + \int b(s)\mathrm{d}\Gamma(s) = \tau_s \int c(s)\mathrm{d}\Gamma(s) + \int [y(s) - y^d(s)]\mathrm{d}\Gamma(s)$$

5. $\Gamma(s)$ is consistent with the policy functions, and is stationary.

back

Tax System and Disposable Income y^d

$$\begin{aligned} y^d &= \lambda \min\{y_f, y_b\}^{1-\tau_l} + (1-\tau_{max}) \max\{0, y_f - y_b\} \\ &\quad + (1-\tau_c) \max(r\kappa k - d_c, 0) \end{aligned}$$

- Taxable household income: $y_f = wz\varepsilon_j h + \min(r\kappa k, d_c) + b(j,z)$
- Taxation of household income: progressive up to y_b, constant MTR above

$$\lambda \min\{y_f, y_b\}^{1-\tau_l} + (1-\tau_{max}) \max\{0, y_f - y_b\}$$

  - $0 \leq \tau_l \leq 1$ measures the degree of progressivity of the tax system.
  - Permits net transfers (e.g. Welfare-to-work (Workfare) and EITC)
- Taxation of Corporate Income:

$$(1-\tau_c) \max(r\kappa k - d_c, 0)$$

- Social Security: piecewise linear as in the law

back

Calibration of the Model: Preset Parameters

Parameter	Description	Value
	Demographics	
J	Maximum life span	16
j_R	Mandatory retirement age	10
s_0, s_1, s_2	Survival probability by age	Halliday (2015)
	Production	
α	Share of capital	0.27
δ	Depreciation	4.5%
	Preferences	
σ_c	Risk aversion	1.5
σ_l	Inverse frisch elasticity	1.22 (Blundell et al. 2016)

back

Calibration of the Model: Preset Parameters

Parameter	Description	Value	Source
	Labor Productivity		
$\{\varepsilon_j\}_{j=1}^{j_R-1}$	Age-efficiency profile		own estimate
$\{z_1, \ldots, z_6\}$	Ordinary productivity states		own estimate
A_{ij}	Transition rates of ordinary productivity		own estimate
	Taxes and Transfers		
τ_c	Marginal corporate tax rate	0.236	Gravelle (2014)
τ_s	Consumption tax rate	0.05	Kindermann and Krueger (2016)
Tr	Government transfers / GDP	0.027	NIPA
G/Y	Expenditures / GDP	0.155	NIPA

Calibration of the Model: Jointly Calibrated Parameters

Parameter	Description	Value
β	Discount rate	0.979
θ	Labor disutility	5.5
$\lambda_{in}, \lambda_{ll}, \lambda_{lh}, \lambda_{hh}$	Transition rates	...
z_7, z_8	Top productivity states	...
$R_{LL}, R_{HH}, R_{\text{top,top}}$	Return transition rates	...
$\kappa_L, \kappa_H, \kappa_{\text{top}}$	Rate of return multipliers	...
ϕ_1, ϕ_2	Bequest utility	-0.42, 0.19
τ_l	Tax progressivity	18%
d_c	Corporate asset threshold/mean assets	0.79

Calibration of the Model: Preset Parameters

Parameter	Description	Value	Source
	Demographics		
J	Maximum life span	16	
j_R	Mandatory retirement age	10	
s_0, s_1, s_2	Survival probability by age	-5.49, 0.15, 0.016	Halliday (2015)
	Production		
α	Share of capital	0.27	NIPA
δ	Depreciation	4.5%	NIPA
	Preferences		
σ_c	Risk aversion	1.5	
σ_l	Inverse frisch elasticity	1.22	Blundell et al. (2016)

go back

Calibration of the Model: Preset Parameters

Parameter	Description	Value	Source
	Labor Productivity		
$\{\varepsilon_j\}_{j=1}^{j_R-1}$	Age-efficiency profile		own estimate
$\{z_1, ..., z_6\}$	Ordinary productivity states		own estimate
A_{ij}	Transition rates of ordinary productivity		own estimate
	Taxes and Transfers		
τ_c	Marginal corporate tax rate	0.236	Gravelle (2014)
τ_s	Consumption tax rate	0.05	Kindermann and Krueger (2016)
Tr	Government transfers / GDP	0.027	NIPA
G/Y	Expenditures / GDP	15.5%	NIPA

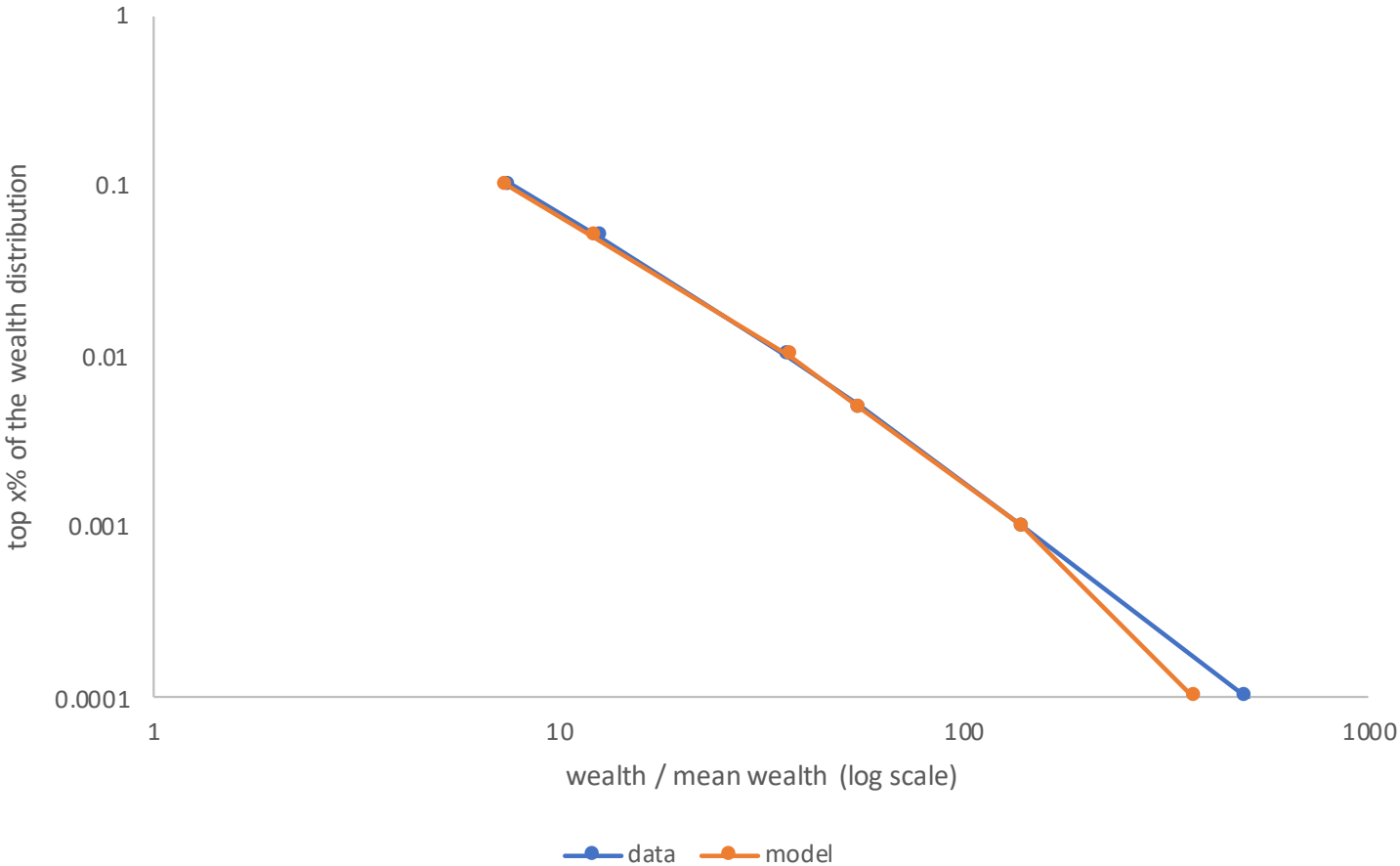
Calibration of the Model: Jointly Calibrated Parameters

Parameter	Description	Value
β	Discount rate	0.979
θ	Labor disutility	5.5
$\lambda_{in}, \lambda_{ll}, \lambda_{lh}, \lambda_{hh}$	Transition rates	...
z_7, z_8	Top productivity states	...
$R_{LL}, R_{HH}, R_{\text{top,top}}$	Return transition rates	...
$\kappa_L, \kappa_H, \kappa_{\text{top}}$	Rate of return multipliers	...
ϕ_1, ϕ_2	Bequest utility	-0.42, 0.19
τ_l	Tax progressivity	18%
d_c	Corporate asset threshold	0.8

Taxes and bequests

moment	source	data	model
Corporate income tax revenue/GDP	NIPA	2.5%	2.6%
Top 1% ATY - Bottom 99% ATY	Piketty and Saez (2007)	6.8%	6.5%
Bequest/Wealth	Guvenen et al.(2017)	1-2%	1.7%
90th pct bequest dist.	De Nardi et al. (2014)	4.53	7.5
Top 2% bequest share	Sabelhaus (2017)	40%	47%

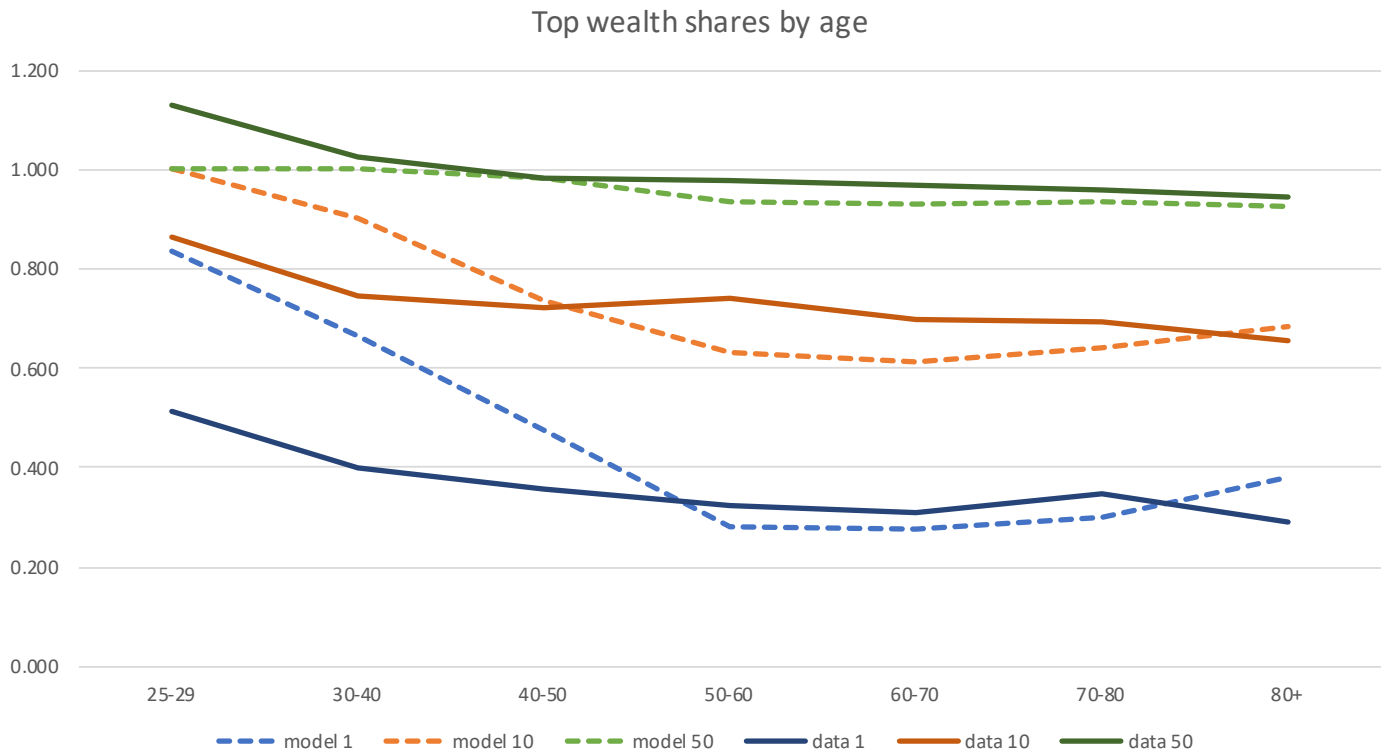
Pareto plot of the wealth distribution



- Precise fit up to top 0.1%
- Top 0.001% share falls slightly short: 3.7% in model vs 5% in data

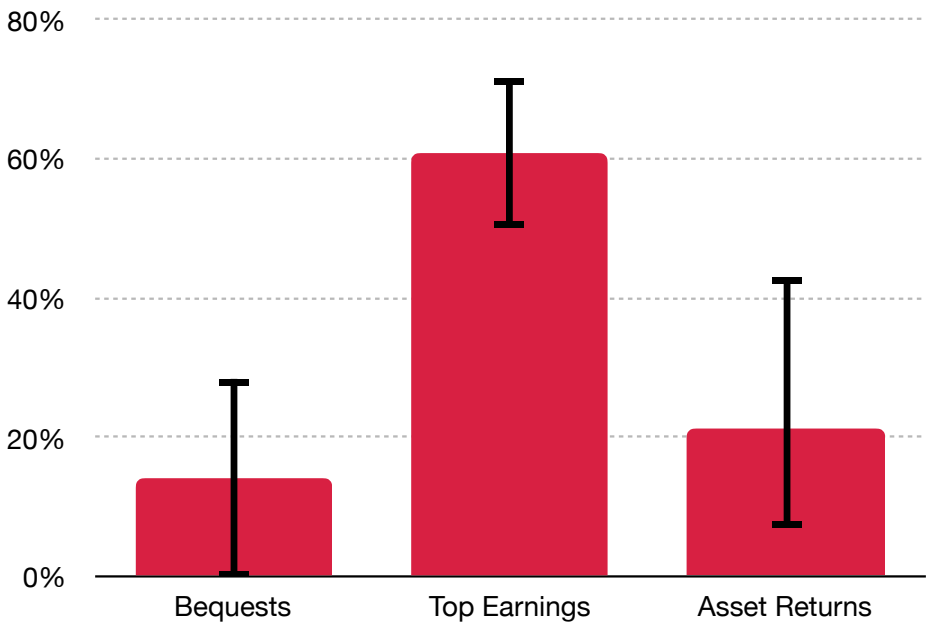
back

Additional moments: Top wealth shares by age group

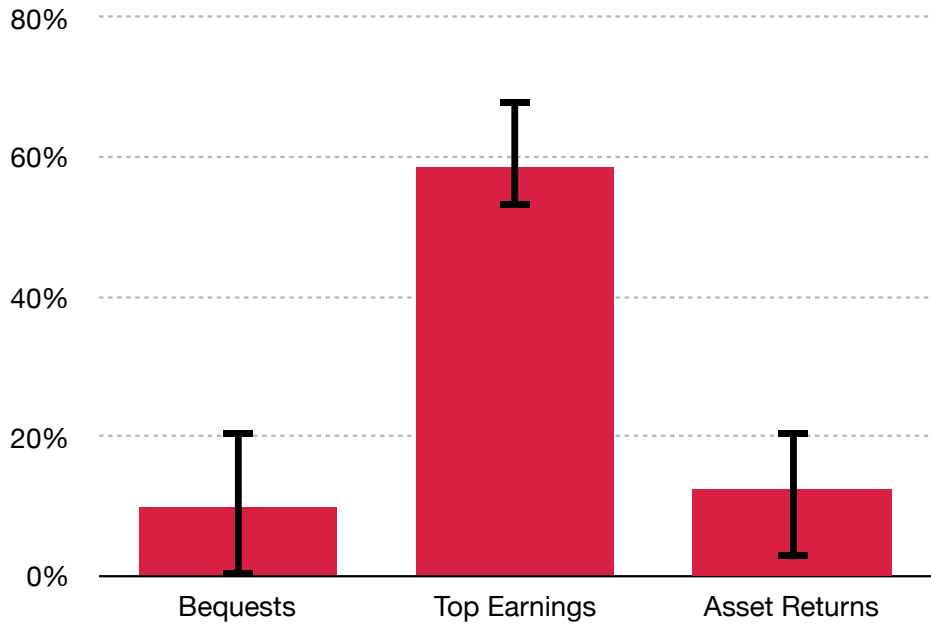


back

Counterfactuals: Eliminating individual channels



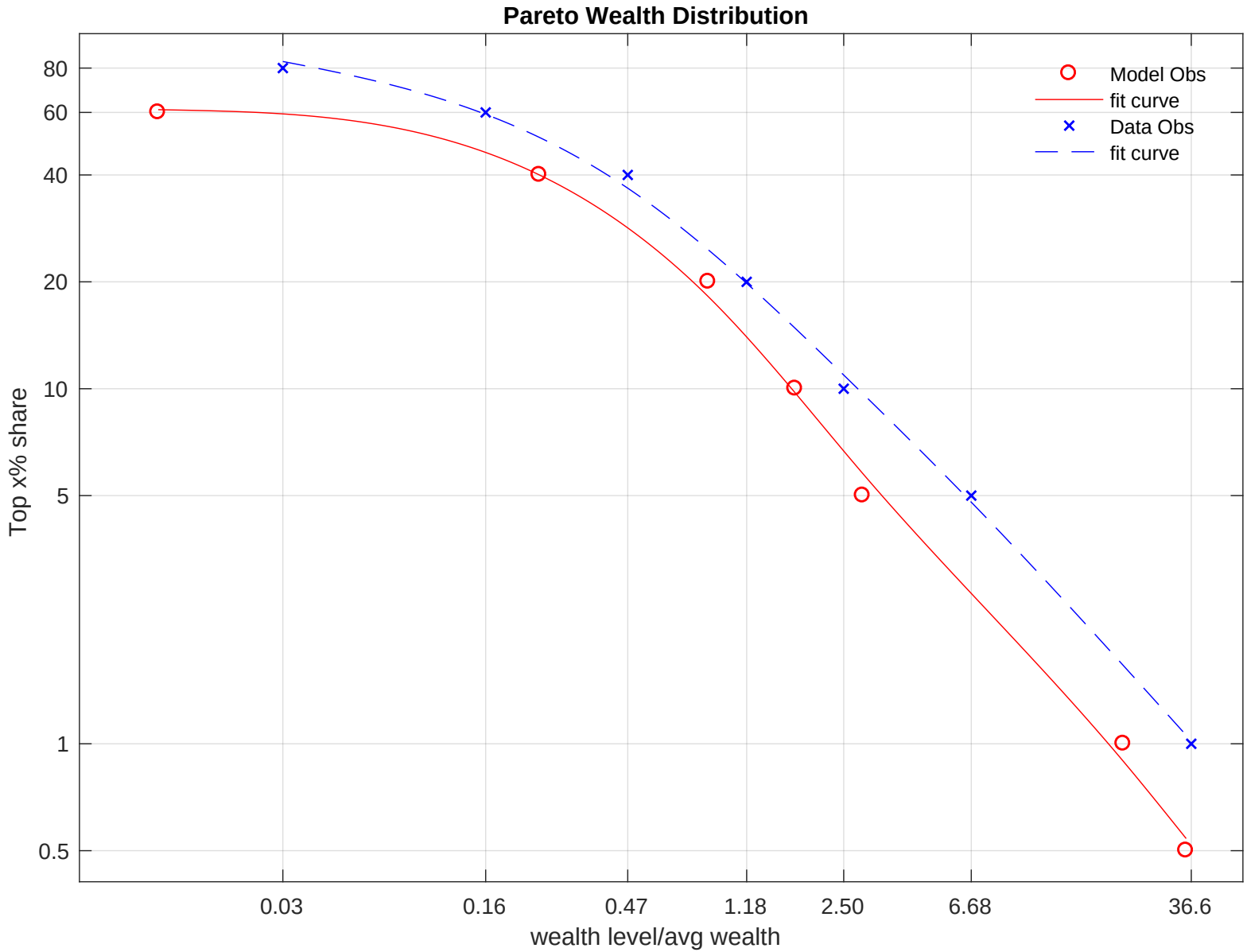
Reduction in top 0.1% wealth share



Reduction in top 1% wealth share

back

Pareto plot for wealth



Top earnings levels and transitions – detail

	low F			high F			top states	
	z_1	z_2	z_3	z_4	z_5	z_6	z_7	z_8
z level	1	1.97	3.89	3.24	6.39	12.6	170	1207
fraction	0.09	0.32	0.09	0.09	0.32	0.09	0.006	0.0002

Transition probabilites:

enter z_7	0.002	$z_7 \to z_8$	0.026	Prob. stay in top 1%	
stay in z_7	0.85	stay in z_8	0.76	data	0.62
leave z_7	0.13	$z_8 \to z_7$	0.24	model	0.60

back

Distribution of Earnings Growth for the Top 1% of Earners

Moment	std. dev.	skewness	kurtosis
SSA Data	1.7	-1.3	8.3
Model	2	-2.9	10.4

Note.– Data moments come from Guvenen, Karahan, Ozkan & Song (2015) and are based on Social Security Administration data.

back

Counterfactual wealth distributions

	Top percentile					
	0.1%	0.5%	1%	5%	10%	Gini
Data	0.14	0.28	0.37	0.63	0.76	0.85
Benchmark model	0.07	0.26	0.39	0.65	0.76	0.86
No top earnings	0.01	0.04	0.08	0.30	0.48	0.69
Common return	0.06	0.24	0.37	0.62	0.73	0.85
Homothetic bequests	0.07	0.24	0.37	0.58	0.68	0.79

go back

Alternative calibrations – detail on marginal distributions

awesome factor	r_H		Top wealth shares 0.1%	1%	10%	Top earnings shares 0.1%	1%	10%
		data:	0.14	0.37	0.76	0.06	0.19	0.49
1.27	r_L		0.06	0.37	0.72	0.06	0.25	0.44
1.00	0.06		0.06	0.37	0.74	0.05	0.20	0.40
0.75	0.11		0.07	0.37	0.75	0.03	0.16	0.36
0.50	0.15		0.09	0.37	0.78	0.02	0.11	0.32
0.25	0.20		0.14	0.37	0.79	0.014	0.07	0.28
z_6	0.22		0.19	0.37	0.77	0.004	0.03	0.25

Notes: "awesome factor": counterfactual z_7 and z_8 relative to benchmark z_7 and z_8.
Last line: $z_7 = z_8 = z_6$.

back

Alternative calibrations: implications for joint distributions

Labor income shares:

awesome factor	r_H		99-100	95-99	90-95	99-100	95-99	90-95
			by income			by wealth		
		data:	0.64	0.78	0.88	0.5	0.71	0.80
1.00	0.06		0.70	0.80	0.79	0.53	0.45	0.64
z_6	0.22		0.02	0.58	0.72	0.01	0.14	0.35

Correlations:

awesome factor	r_H		Correlation of wealth with earnings (21-64)	income
		data:	0.35	0.52
1.00	0.06		0.38	0.52
z_6	0.22		-0.01	0.85

back

Alternative calibrations: implications for wealth by age

Top 1% of wealth:

awesome factor	r_H		mean age	fraction 21-30	31-45	46-65	over 65
		data:	61.6	0.01	0.10	0.50	0.39
1.27	r_L	61.2		**FILL IN**			
1.00	0.06	62.7		**FILL IN**			
z_6	0.22	68.9		**FILL IN**			

back

Returns by wealth

Expected returns by wealth group (in %)

	top 0.1%	P90-95	bottom 20%
model	5.8	5.0	3.6
Bach et al. 2018	9.3	5.8	2.8

back

Counterfactual Share of Income from Labor

	All 0-100	Top Percentiles 99-100
Data	0.79	0.58
Benchmark model	0.79	0.65
Common returns	0.79	0.68
No top earnings	0.77	0.63