Social Security and Female Labor Supply in China

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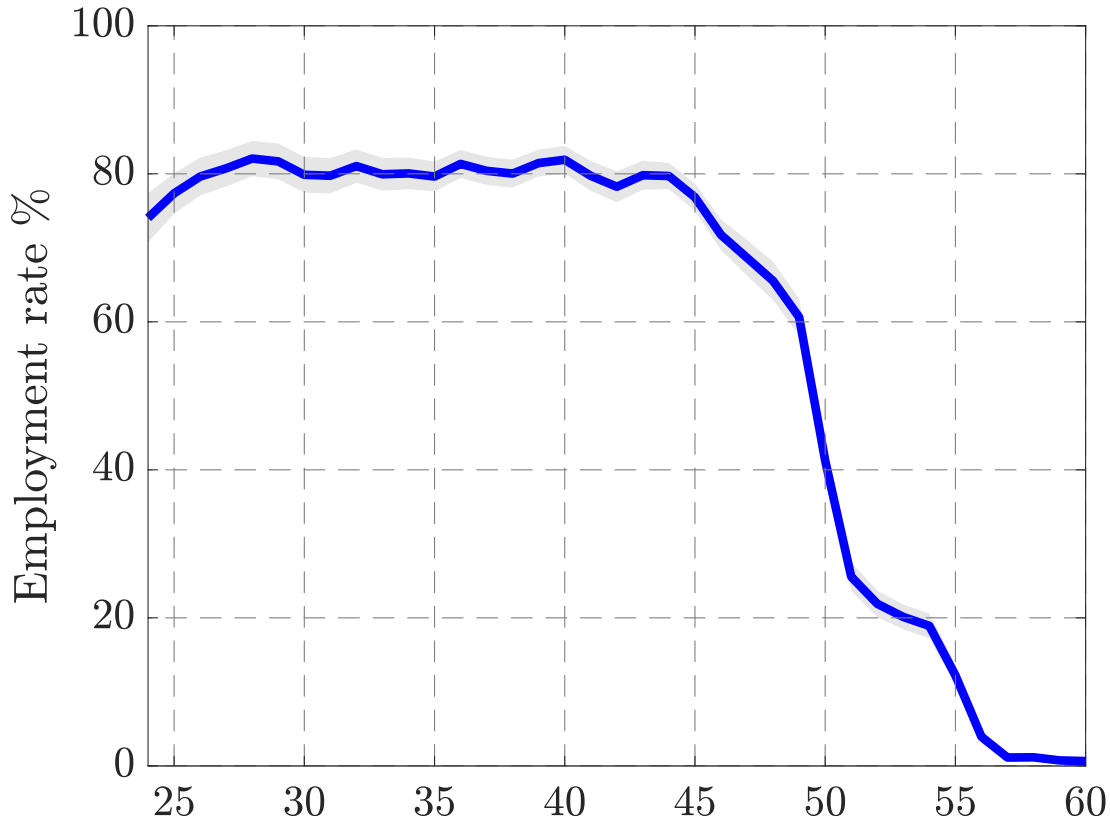
Introduction

- **Motivation**: To maintain fiscal sustainability, the Chinese government plans to raise social security eligibility age
  - current policy: 50 for women and 60 for men
  - proposed: 60 for all
- **Question**: How will increasing women's social security eligibility age from 50 to 60 affect
  - employment of women?
  - women's occupational choice, human capital, and earnings?

Fact 1: current social security policy characterizes employment rate of urban Chinese women



Source: Urban Household Survey of China

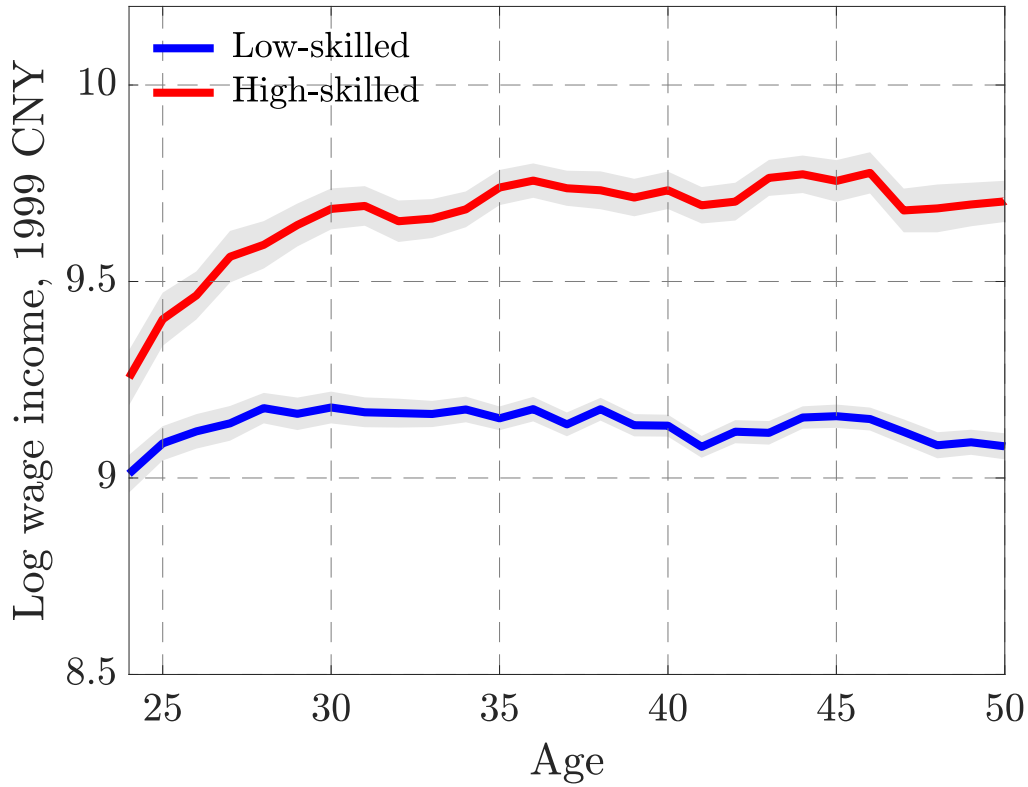
$\Longrightarrow$ Will the reform incentivize women above age 50 to continue working?

Fact 2: sizable grandparental childcare contributes to labor supply of young women

- 80% women have grandchildren by age 60
- 30% grandparents provide childcare, on average 13 hrs/week
- employment rate of women with children under 7 is on average **26** percentage points higher in households with the elderly than those without

$\Longrightarrow$ Will the reform bring unintended effects on young women' labor supply?

Fact 3: wage growth mostly occurs on early career path



Source: Urban Household Survey of China

- High-skilled: abstract task intensive (around 20% of employment)
- Low-skilled: routine or manual task intensive

$\Longrightarrow$ How will the reform affect women's occupational choice, human capital, & earnings?

What we do

This paper: policy effect of delaying retirement on women's employment & human capital over the life cycle

- **Model**: dynamic female labor supply over life cycle, featuring
  - voluntary retirement
  - parental, grandparental and market formal child care
  - occupational choice, human capital and wage dynamics
- **Calibration**: unique features of Chinese data to infer
  - intergenerational time transfer: time allocation on child care for young & old women
  - human capital dynamics: employment & wage growth by occ.

What we find

human capital dynamics & **intergenerational time transfer** are **key** to

- matching benchmark life cycle employment & wage growth
- understanding policy effects of delaying retirement
  1. moderate increase in aggregate labor supply
     - women above age 50 increase labor supply
     - low-skilled young women decrease labor supply
  2. persistent employment/human capital/earnings losses over life

Related literature

- **Social security reform in China** : Song, Storesletten, Wang, & Zilibotti (2015), İmrohoroğlu & Zhao (2018), He, Ning, & Zhu (2019), Deng, Fang, Hanewald, & Wu (2021)

  This paper: focus on **women & human capital**

- **Intergenerational time transfer**: Feng & Zhang (2018), Rupert & Zanella (2018), Frimmel, Halla, Schmidpeter, & Winter-Ebmer (2020)

- **Human capital dynamics (of women)**: Keane and Wolpin (2007,2010), Eckstein, Keane, & Lifshitz (2019), Blundell, Costa Dias, Meghir, & Shaw (2016), Adda, Dustmann, & Stevens (2017)

  This paper: (1) **unified life cycle** framework motivated by **unique data features of China** (2) quantify roles of **human capital dynamics** and **intergenerational time transfer** in policy design

Outline

Quantitative Model

Implications

Policy Experiment

Quantitative Model

Model environment

- **Overlapping generations**:
  - 2 genders $\times$ 2 generations: i individual, j period
  - stochastic arrival of children manifested as time costs
  - pool monetary resources + jointly make decisions
  - unitary preference: consumption, leisure, & childcare

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- **Government**: linear income tax + social security
  - voluntary retirement of women starting from age 50
- **Main features**: intergenerational time transfer + dynamic human capital accumulation

Time allocation

- Time endowment is 1 for each household member every period
- **Individual time constraint**: time on leisure (l), child care (q), and work (n)

$$l^i + q^i + n^i \leq 1, \qquad l^i \geq 0, \qquad q^i \geq 0 \qquad \forall\ i \in \mathcal{I}$$

  - non-retired women choose $\in \{0, \bar{n}\}$
  - $n = \bar{n}$ for men, $n = 0$ for retired

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- **Child care time constraint**: parental, grandparental, and formal child care hours to meet

$$\sum_{i \in \mathcal{I}} q^i + q^n \geq \underbrace{\kappa_\pi}_{\text{time cost}}$$

Occupations, human capital, & wages of women

- **Occupational choice** at the beginning of period 1, household chooses occupation for young women

$$k^{\mathrm{yf}} = \underset{k \in \{1,2\}}{\arg\max} \{V_1(a - \psi_k, \pi, \mathbf{s}) + \varepsilon_k\}$$

  - training cost ψ_k + type I EV unobserved shocks ε_k ▸ Choice probability
  - occupation is **fixed** over the life cycle

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- **Human capital evaluation** $h_{j=1} = 1$

$$h_{j+1} = (1 + \rho(k, n, j))h_j \quad \text{with} \quad \rho(k, n, j) = \begin{cases} e^{\rho_{k,1} + \mathrm{j}\rho_{k,2}} & \text{if } n_j = \bar{n} \\ \rho_{k,0} & \text{otherwise} \end{cases}$$

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- **Wage income** occupation(k) + human capital(h) + shocks(ϵ)

Recursive formulation

- States $\mathbf{x}$: assets (a), children age (π), incomes (s^i)
- Choices $\mathbf{d} = \{k^{\text{yf}}, r^{\text{of}},\ \mathbf{n},\ \mathbf{l},\ \mathbf{q},\ q^n,\ \mathbf{c},\ a'\}$

$$V_j(\mathbf{x}) = \max_{\mathbf{d}} \{u(\mathbf{c}, \mathbf{l}, \mathbf{q}) + \beta \mathbb{E}[\hat{V}_{j+1}(\mathbf{x}')]\}$$

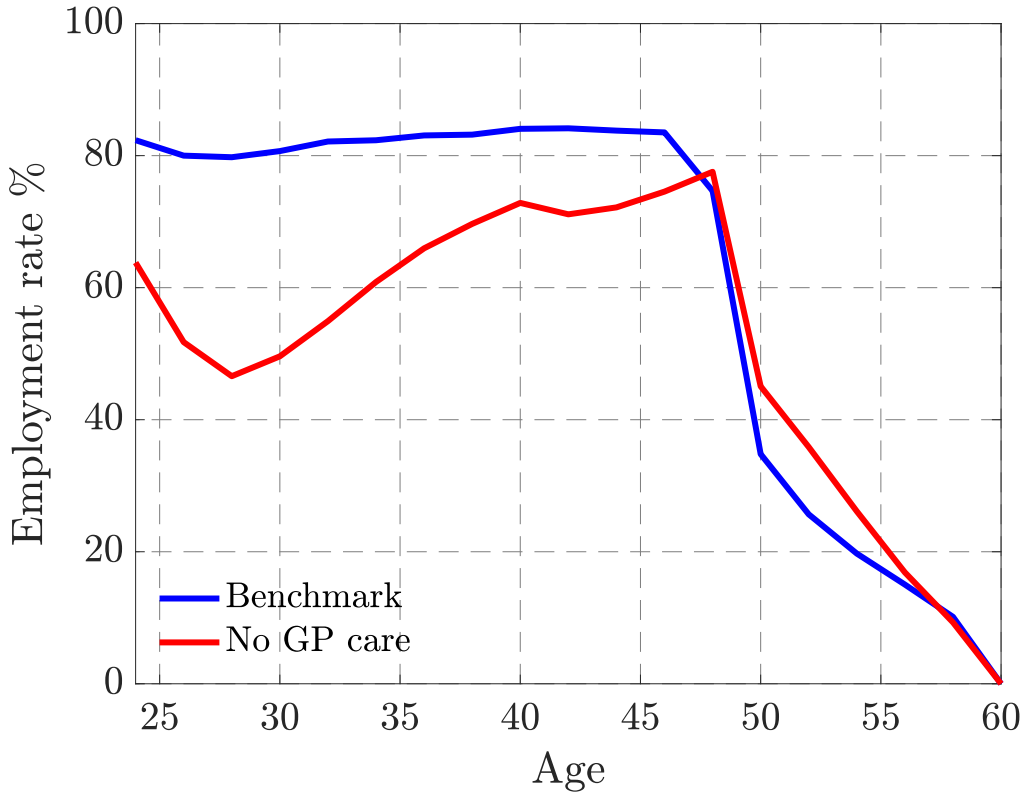
$$\begin{aligned}
s.t. \quad & c^y + c^o + p^n q^n + a' = (1+r)a + y_j(\mathbf{s}, \{n^i\}_{i\in\mathcal{I}}; \mathcal{T}) \\
& l^i + q^i + n^i \leq 1, \quad l^i \geq 0, \quad q^i \geq 0, \quad n^i \in \{0, \bar{n}\} \qquad \forall\ i \in \mathcal{I} \\
& \sum_{i\in\mathcal{I}} q^i + q^n \geq \kappa_\pi \\
& a' > \underline{a}
\end{aligned}$$

with

$$\hat{V}_{j+1}(\mathbf{x}') = \begin{cases} V_{j+1}(\mathbf{x}') & \text{for } j = 1, ..., 11 \\ \max_{k^{\text{yf}}\in\{1,\ldots,K\}} \{V_1(a' - \psi_k, \pi', \mathbf{s}') + \varepsilon_k\} & \text{for } j = 12 \end{cases}$$

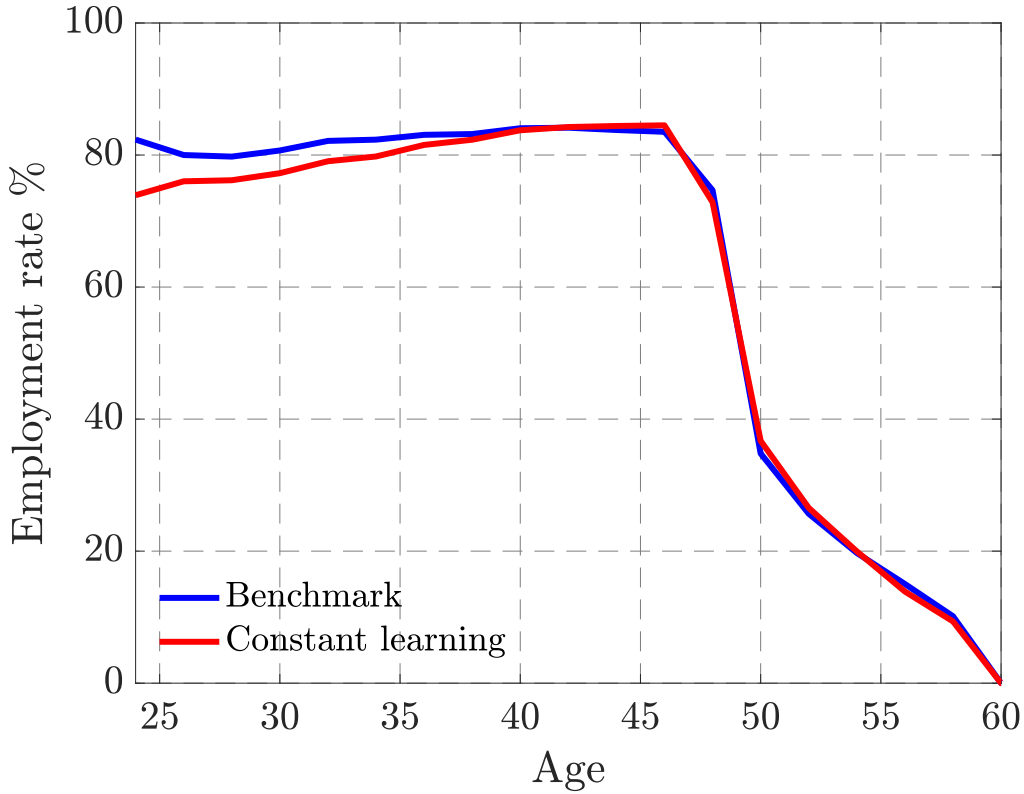
Implications

Role of grandparental child care



- **Blue**: fitness of benchmark model
- **Red**: fix all params to benchmark + shut down grandparental care
  $\Longrightarrow$ size of grandparental care

Role of age-dependent human capital growth



- Constant wage growth reduces opportunity cost of non-employment for young women
  $\Longrightarrow$ employment rate of young $\downarrow$

▸ Occupational emp.& wages ▸ Marginal effect of old

Policy Experiment

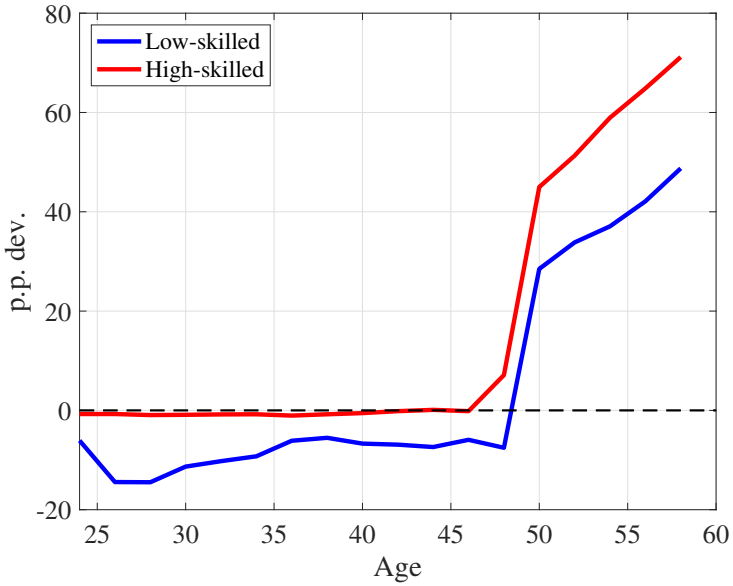
Experiments

Policy counterfactual

- raise social security eligibility age of women from 50 to 60
- adjust income tax to balance the government budget
- compare allocations at steady states

	Baseline	Counterfactual
SS. entitlement age of women	50	60
Income tax rate	0.28	0.23
Share choosing high-skilled occ.	25%	32%

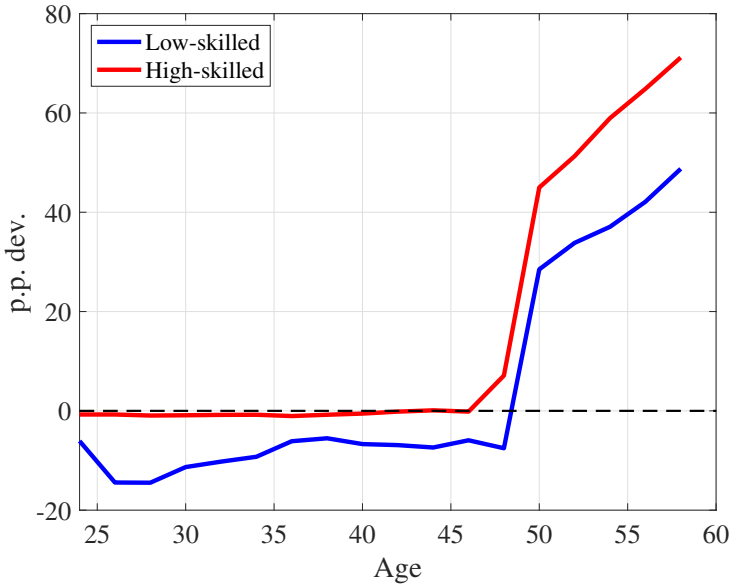
Policy impacts



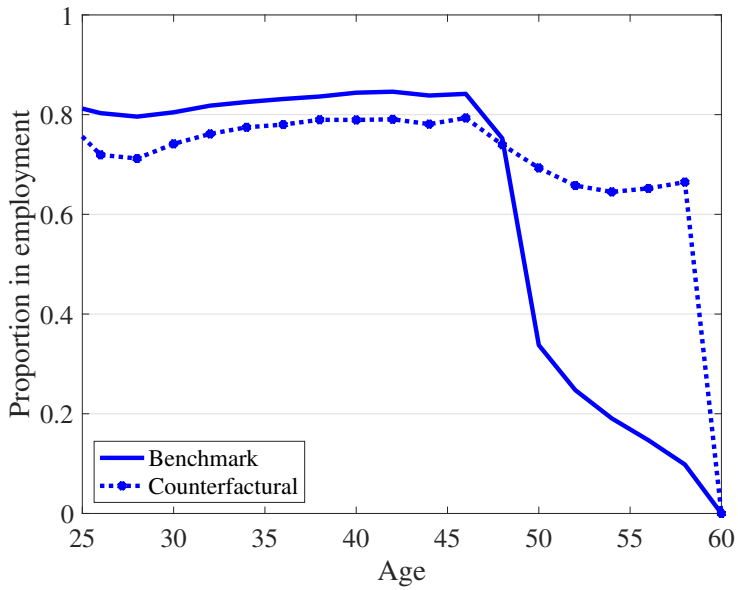
Employment by occupation

- High-skilled
  - barely change before 50
- Low-skilled
  - large and persistent drop before 50
- Both increase after 50

Policy impacts



Employment by occupation



	Lifetime	By age 40
Total working years	+ 3.1	- 1.0

Robustness

- Population aging ▸ Results
- Alternative entitlement ages ▸ Results
- Formal childcare supply ▸ Results

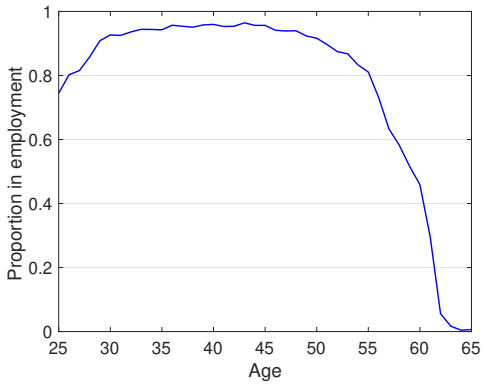
Concluding remarks: implications for SS reform

- **Results**: delaying SS entitlement of women in China
  - increases labor supply of old but reduces labor supply of young
  - persistent employment/human capital loss
- **Key features**
  - intergenerational time transfer
  - dynamic human capital accumulation
- **Potential accompany policy tools**
  - child care subsidies
  - training subsidies

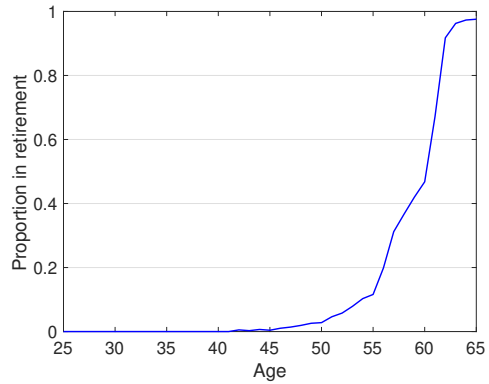
Appendix

Female Labor Supply in China

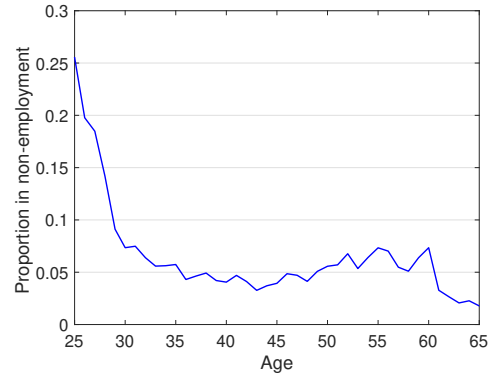
Lifecycle employment status by gender



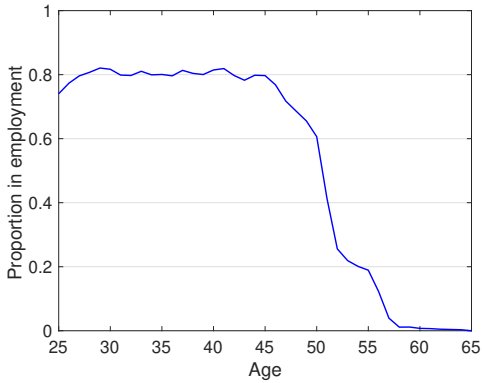
Men-E



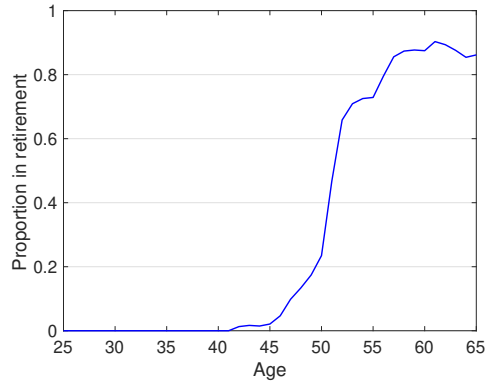
Men-R



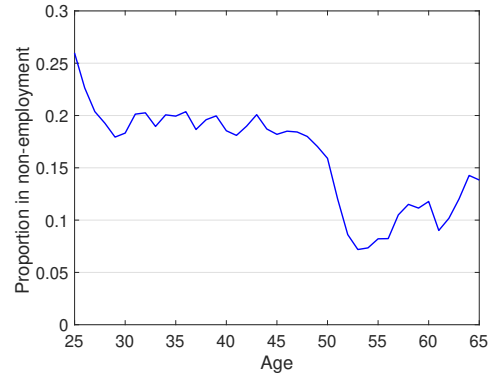
Men-N



Women-E

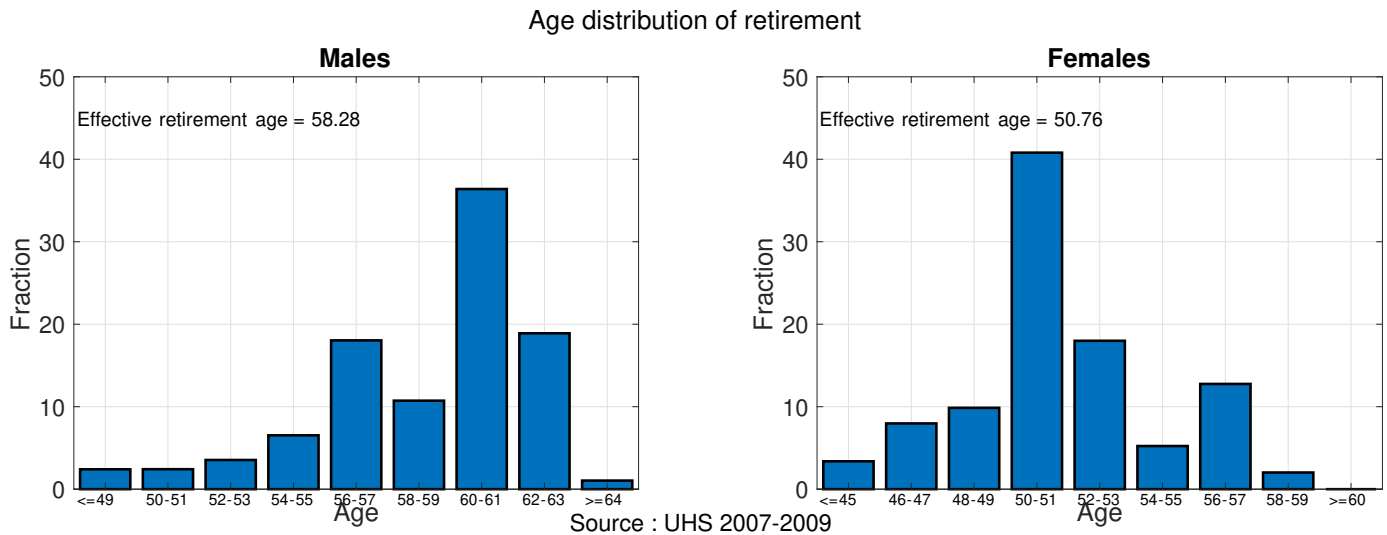


Women-R

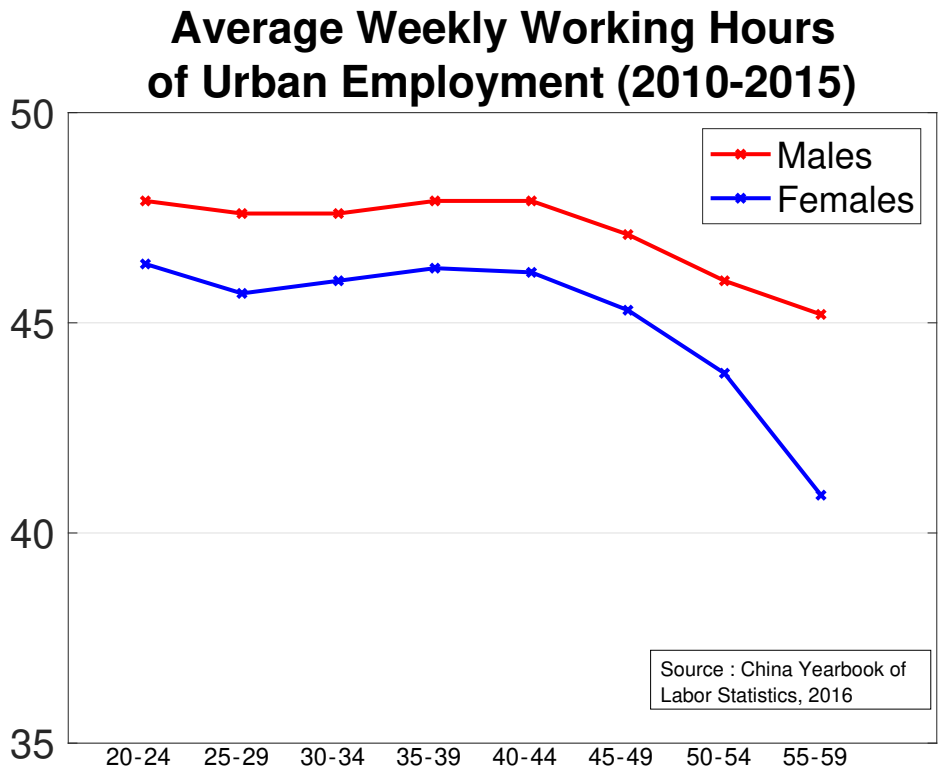


Women-N

Age distribution of retirement in urban China



Weekly Hours of Urban Employment by Gender and Age



Weekly hours distribution for women with children

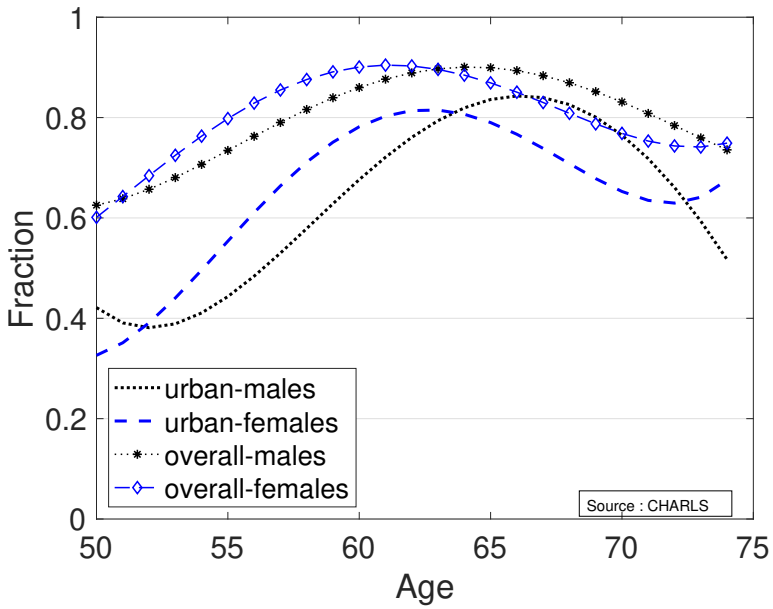
Age	Obs.	emp.	hours	<10h	< 20h	mean	p25	median	p75
25-29	89	80%	94%	3.0%	3.0%	42	39	41	55
30-35	193	86%	100%	0%	0%	43	41	41	55
35-39	311	86%	97%	0%	2.7%	43	41	41	55
40-44	330	84%	98%	0.4%	2.2%	44	41	41	55
45-49	85	78%	100%	1.5%	3.0%	46	41	43	65

Table: Weekly working hours of urban employed mothers, with children under age 18.

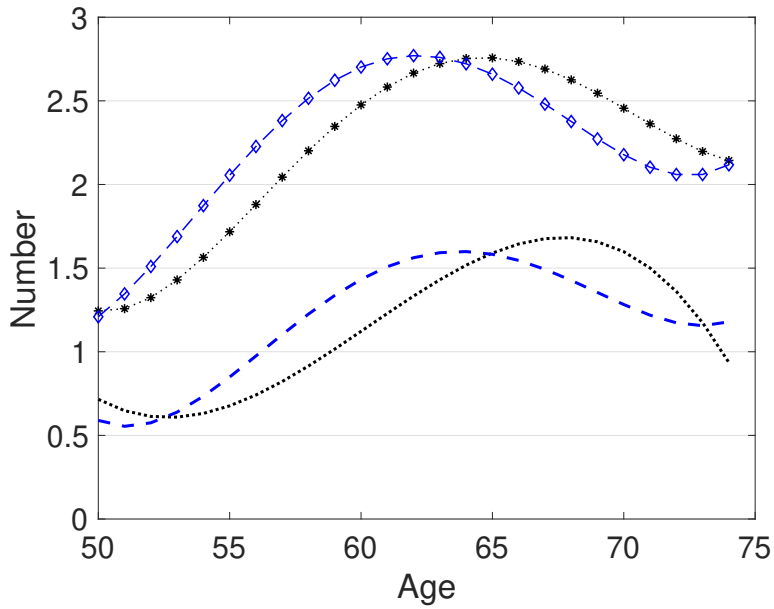
Source : China Household Income Project 2013

Child care Time Allocation

Age profile of grandchildren in overall economy



(a) Fraction



(b) Number

Childcare in the CTUS

- sample size: 19621 individuals from 9049 households, 10 provinces;
- Variables include:
  - primary activity code, secondary activity code, time length of activity, transportation method to conduct activity, other people present when conducting activity
  - age, relationship to the head, marital status, education and employment status
- Assign couples both above age 50 as grandparents

▸ Imputation errors

- Construction of
  - extensive margin: probability of providing positive childcare hours conditional on being grandparents
  - intensive margin: childcare hours conditional on providing positive hours

◂ Back

Childcare activities in CTUS 2008

Code	Activity	Descriprition
611	Physical or daily life care	dressing, feeding, bathing children, medical activities for children
612	Educational care	teaching children, reading for children, chatting or playing with children
613	Looking after children	watching children when children are playing
614	Activities out of household	taking children to public, such as amusement park, hospital, or school

Table: Categories of Childcare Activities

◂ Back

Grandparental childcare in CTUS 2008

	Men		Women	
Age	Employed	Retired	Employed	Retired
Panel A: weekly child care hours				
50 – 54	6.56	–	8.01	17.84
55 – 59	8.29	–	7.67	15.00
60 – 64	–	11.01	–	13.26
65 – 70	–	8.36	–	9.71
Panel B: fraction of child care provision				
50 – 54	0.14	–	0.22	0.39
55 – 59	0.21	–	0.23	0.41
60 – 64	–	0.38	–	0.30
65 – 70	–	0.23	–	0.20

Model

Households

- Overlapping generations
  - Life starts at age 22
  - Individual goes through the young and old stages sequentially
  - Generations overlapped for 24 years (12 model periods)
  - Children are manifested as time cost to the household
- Household structure: two generations $\times$ two genders

$$i \in \mathcal{I} = \{\mathtt{ym}, \mathtt{yf}, \mathtt{om}, \mathtt{of}\}$$

- Household members jointly make decisions

Household decision problem: states

States of the household: $\mathbf{x} = (a, \pi, \mathbf{s})$

- assets: a
- children age: π
- income-related state variables: $\mathbf{s} = \{s^i\}_{i \in \mathcal{I}}$ including
  - k^i: occupation
  - h^i: human capital
  - ϵ^i: income shock
  - r^i: retirement status
  - z^i: average lifetime earnings

Household decision problem: choices & preference

- **Choices**: $\mathbf{d} = \{k^{\text{yf}}, r^{\text{of}}, \ \mathbf{n}, \ \mathbf{l}, \ \mathbf{q}, \ q^n, \ \mathbf{c}, \ a'\}$
  - occupation of young women: $k^{\text{yf}} \in \{1, ..., K\}$
  - retirement of old women: $r^{\text{of}} \in \{0, 1\}$
  - working hours: $\mathbf{n} = \{n^i\}_{i \in \mathcal{I}}$
  - leisure: $\mathbf{l} = \{l^i\}_{i \in \mathcal{I}}$
  - household members' childcare hours: $\mathbf{q} = \{q^i\}_{i \in \mathcal{I}}$
  - market formal childcare hours: q^n
  - consumption of young and old generation: $\mathbf{c} = \{c^y, c^o\}$
  - assets: a'
- **Period utility of household**: $u(\mathbf{c}, \mathbf{l}, \mathbf{q})$

Demographics

Fertility shocks: stochastic arrival of children such that

- all households have children once & before age 40 of the young generation
- take care of children for 16 years

Mortality shocks:

- common to the old generation in the household

Government

Government policy tools $\mathcal{T}$ include:

- Linear wage income tax: τ
- Social security: $b(z)$
  - social security eligibility age is 50 for women and 60 for men
  - all individuals retire by age 60
  - no rehiring after retirement
- Exogenous government spending G
- Government budget balanced

$$\tau \sum_i w^i \mathbb{1}_{\{n^i = \bar{n}\}} - \sum_i b(z^i) \mathbb{1}_{\{r^i = 1\}} - G = 0$$

Occupational choice probability

- Denote value function conditional on the choice of occupation $k^{\text{yf}} = v$

$$\text{EV}_k(\mathbf{x}, \pi, a) = V_1(a - \psi_k, \pi, \mathbf{s})$$

- Unobserved shock ε_k follows type I extreme value distribution
  - mean zero
  - variance σ_e^2
- Probability of choosing occupation v:

$$\mathbb{P}(k^{\text{yf}} = v) = \frac{\exp(\text{EV}_v/\sigma_e)}{\sum_{k=1,\ldots,K} \exp(\text{EV}_k/\sigma_e)}$$

◂ Back

Taking F.O.C (1)

- Consider the problem after employment choices are made $\bar{V}_j$,given expected value functions
- Denote the available time $t^i = 1 - h^i$ as the time endowment net working time

$$\bar{V}_j(\mathbf{x}) = \max_{\mathbf{d}} \{u(\mathbf{c}, \mathbf{l}, \mathbf{q}) + \beta \mathbb{E} V_{j+1}(\mathbf{x}')\}$$

$$s.t. \quad l^i + q^i \leq t^i \qquad \forall\ i \in \mathcal{I} \qquad .....(\lambda_1 - \lambda$$

$$q^{ym} + q^{yf} + q^{om} + q^{of} + q^n \geq \kappa_\pi \qquad .....(\lambda_5)$$

$$c^y + c^o + p^n q^n + a' = (1 + r)a + y_j \qquad .....(\lambda_6)$$

$$a' > \underline{a}$$

$$l^i \geq 0, \quad q^i \geq 0 \qquad \forall\ i \in \mathcal{I}$$

Taking F.O.C (2)

F.O.C's are given as (for the ease of notation, denote $\{yf, ym, of, om\}$ as individuals 1,2,3,4)

$$
\begin{aligned}
&(c^y) && \lambda_6 = U_c^y && \\
&(c^o) && \lambda_6 = U_c^o && \\
&(q^n) && \lambda_6 p^n = \lambda_5 && \\
&(l^i) && \lambda_i = U_l^i && \forall\ i \in \{1,2,3,4\} \\
&(q^i) && \lambda_i = U_q^i + \lambda_5 && \forall\ i \in \{1,2,3,4\}
\end{aligned}
$$

it thus follows

$$U_l^1 = U_q^1 + \lambda_5, \qquad U_l^2 = U_q^2 + \lambda_5$$

note that

$$U_l^1 = (l_1 + \omega q_1)^{\rho-1} \frac{1}{2} H_1^{-\frac{1}{2}} H_2^{\frac{1}{2}} \frac{(c^{1-\nu} H^{\nu})^{-\gamma}(1-\nu)}{H} \quad \text{and} \quad U_q^1 = \omega U_l^1$$

Back

Taking F.O.C (3)

By

$$U_l^1 = U_q^1 + \lambda_5; \qquad U_l^2 = U_q^2 + \lambda_5$$

note that

$$U_l^1 = \frac{1}{2} H_1^{-\frac{1}{2}} H_2^{\frac{1}{2}} \frac{(c^{1-\nu} H^{\nu})^{-\gamma}(1-\nu)}{H}; \qquad U_q^1 = \omega U_l^1$$

$$U_l^2 = \frac{1}{2} H_2^{-\frac{1}{2}} H_1^{\frac{1}{2}} \frac{(c^{1-\nu} H^{\nu})^{-\gamma}(1-\nu)}{H}; \qquad U_q^2 = \omega U_l^2$$

we can get

$$1 = \frac{U_l^2}{U_l^1} = \frac{H_1}{H_2} = \frac{l_1 + \omega q_1}{l_2 + \omega q_2} = \frac{l_1 + \omega(t_1 - l_1)}{l_2 + \omega(t_2 - l_2)}$$

thus

$$t_1 - t_2 = (1-\omega)(q_1 - q_2)$$

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Calibration

Calibration overview

Back

Data:

- Labor market: Urban Household Survey of China 2002-2009
  - two occupations Classification
  - moments on employment and wages by occupation
- Time use: China Time Use Survey – 2008 CTUS-2008
  - moments on childcare hours from the young and the old

Estimation: method of simulated moments

Predetermined parameters

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Parameter	Value	Description
r	0.10	Interest rate
β	0.90	Discounting factor
γ	1.5	Risk aversion
R_1	2	Social security eligibility age of women: 50
τ^b	0.75	Social security replacement ratio
τ	0.28	Income tax rate
$\bar{n}$	0.33	Working time: 8 hr/day
κ_1	0.42	Childcare time for child $<$ 7: 10 hr/day
κ_2	0.08	Childcare time for child $\geq$ 7: 2 hr/day

- Fertility and mortality shocks: Population Census

Children age groups

- Wage process of men: UHS

Internal parameters

Back

14 parameters:

1. Preference parameters: $\{\nu, \omega^y, \omega^o\}$
2. Childcare price: p^n
3. Training cost for high-skilled occupation: ψ_2
4. Standard deviation of unobserved shock: σ_e
5. Occupation-specific human capital evolution:

   $\{\rho_{k,0}, \rho_{k,1}, \rho_{k,2}\}_{k\in\{1,2\}}$
6. Occupational wage premium: $\{\alpha_k\}_{k\in\{1,2\}}$

Internal parameters

Back

Par.	Description	Value	Targeted Moments	Data	Model
Preference & childcare price					
ν	Intensity of leisure	0.42	Employment rate under 50	0.77	0.78
ω^y	Weight on childcare: young	–0.10	Childcare hours: mother	18	18
ω^o	Weight on childcare: old	–0.30	Childcare hours: grandmother	13	12
p^n	Childcare price	4.0	Mean wage of low-skilled		
Occupational choice					
ψ_2	Training cost: high-skilled	1.50	Emp. share of high-skilled	0.33	0.35
σ_e	Std. dev. of shock	0.10	ΔChoice prob. of high-skilled, with child relative to without at age 22	-0.08	-0.08

Human capital: wage growth by age & occupation

Moments and par. values

Estimation: wage growth moments

Functional specification: $h_{j+1} = (1 + \rho(k, n, j))h_j$

$$\rho(k, n, j) = \begin{cases} \rho_{k,1} + j\rho_{k,2} & \text{if } n_j = \bar{n} \\ \rho_{k,0} & \text{if } n_j = 0 \end{cases}$$

by matching moments of women's wage growth:

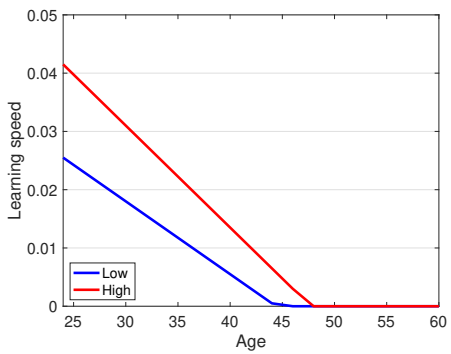
Wage growth per year	High-skilled	Low-skilled
Employed – Age $\in [25, 35]$	5.0%	2.2%
Employed – Age $\in [40, 50]$	0.6%	0.5%
E-N-E workers	-8.3%	-6.6%

◂ Back to all moments

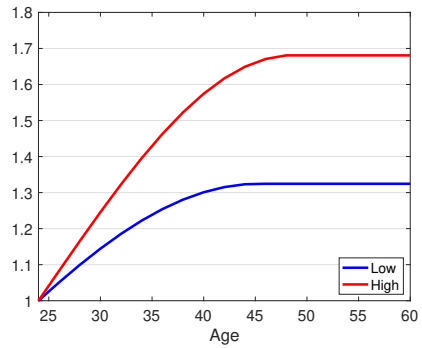
▸ Parameter values

Internal parameters: human capital and occupation

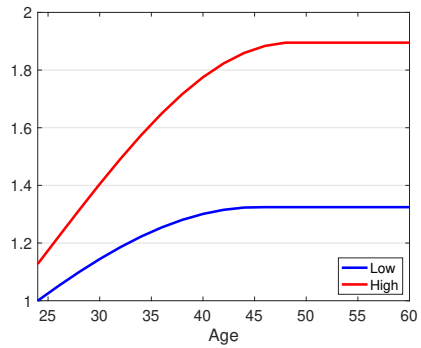
Parameter	Description	Low-skilled	High-skilled
$\rho_{k,1}$	intrinsic learning speed	0.025	0.055
$\rho_{k,2}$	age slope of learning	– 0.002	– 0.004
$\rho_{k,0}$	depreciation in non-employment	– 0.035	– 0.010
α_k	occupational wage premium	– 0.52	– 0.41



Learning speed



Human capital



Wage

◂ Back

Example : transition of child types

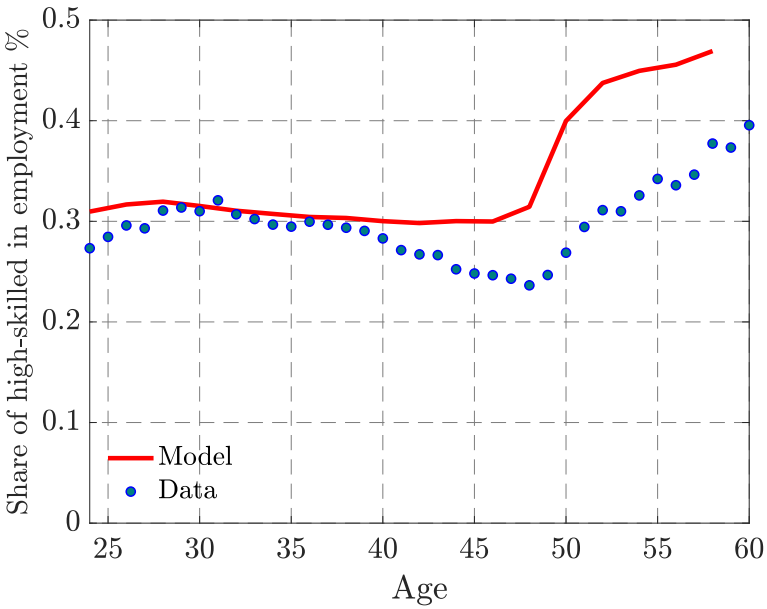
Child transition matrix induced by the fertility process and duration in each bin

$\pi_{nn'}$	$\pi' = 1$	$\pi' = 2$	$\pi' = 3$	$\pi' = 4$	$\pi' = 5$
$\pi = 1$	0.7024	0.2976	0	0	0
$\pi = 2$	0	0.3333	0.6667	0	0
$\pi = 3$	0	0	0.3333	0.6667	0
$\pi = 4$	0	0	0	0.8	0.2
$\pi = 5$	0	0	0	0	1

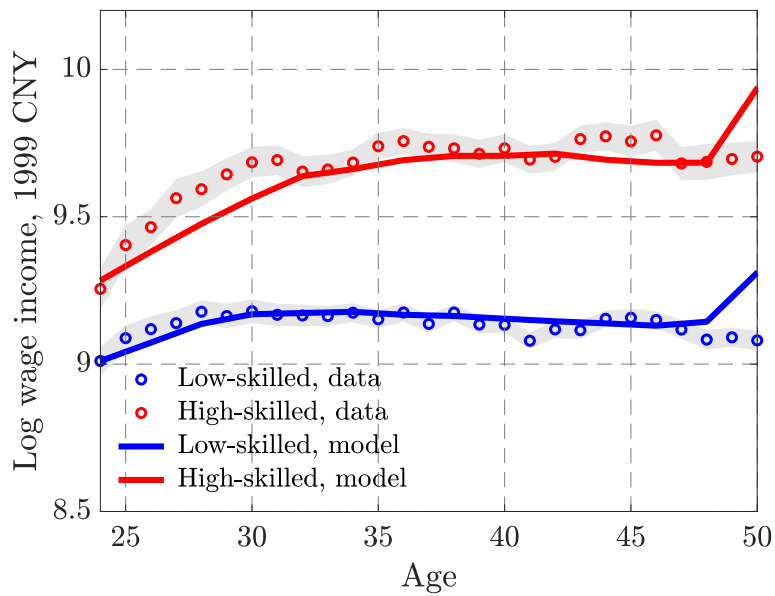
Table: Transition of children number for young generation at age 30

Model fit: occupational emp. & wages

Back



(a) Share of high-skilled in emp.



(b) Mean wages

Validation: determinant of young women's labor supply

Marginal effects of presence of the old generation

Back

$$\text{emp}_i^{\text{yf}} = \mathbb{1}[\alpha_0 + \alpha_1 \text{D}_i + \alpha' \mathbf{X_i} + \epsilon_i > 0]$$

for women between age 24 and 40

- emp^{yf}: indicator of employment status of young women
- D: presence of the old generation
- $\mathbf{X}$: controls of linear, quadratic term of experience, and occupation

	Model	Data
All women	0.040	0.066
Women with child	0.068	–
Women with child under 7	0.225	0.261

Table: Marginal effects of presence of the old generation

Sensitivity to parameters

Marginal effect of old: sensitivity

	ω_y	-0.10 Benchmark	-0.05	-0.15	-0.2
ME of old	All women	0.040	0.042	0.039	0.037
	All mothers	0.068	0.071	0.066	0.064
	With child<7	0.225	0.230	0.221	0.210
	ω_o	-0.30 Benchmark	-0.10	-0.50	-1.0
ME of old	All women	0.040	0.042	0.039	0.033
	All mothers	0.068	0.070	0.067	0.056
	With child<7	0.225	0.229	0.222	0.196

◂ Back

Childcare by employment status

Age	Emp. rate		Hours of employed		Hours of non-employed	
	model	data	model	data	model	data
			Mothers			
$[25, 29]$	0.72	0.76	16.51	15.07	38.90	26.45
$[30, 34]$	0.67	0.82	12.53	13.95	32.50	19.86
$[35, 39]$	0.69	0.83	10.03	9.98	28.13	15.21
			Grandmothers			
$[50, 54]$	0.19	0.22	0.00(0.00)	8.01(0.22)	32.86(0.85)	17.84 (0.39)
$[55, 59]$	0.09	0.10	0.00(0.00)	7.67(0.23)	35.00(0.51)	15.00(0.41)
$[60, 64]$	–	–	–	–	11.64(0.31)	13.26(0.28)
$[65, 69]$	–	–	–	–	15.09(0.29)	9.71(0.18)

Note: () refers to extensive margin

◂ Back

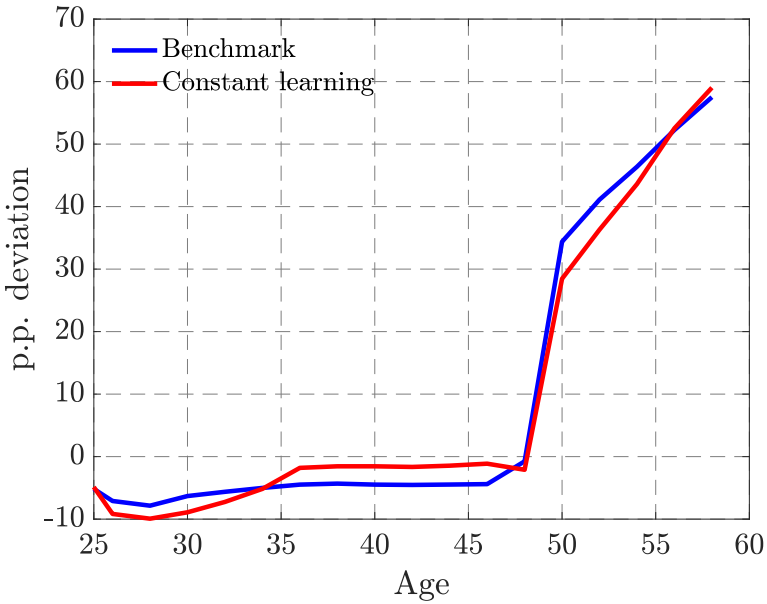
Model fit: childcare hours by children's age

Age group	Parental hours		Non-parental hours			Total
	Mother	Father	Total	Grandparents	Market	
Data						
Overall	9.74	4.93				
$[0, 2]$	15.00	6.11				
$[3, 6]$	11.79	5.47				
$[7, 16]$	8.70	4.35				
Model						
Overall	17.88	9.80	2.29	13.22	3.05	42.00
$[0, 2]$	28.42	13.88	2.44	24.91	8.17	70.00
$[3, 6]$	26.60	13.65	4.29	26.82	4.12	70.00
$[7, 16]$	8.21	5.79	0.00	0.00	0.00	14.00

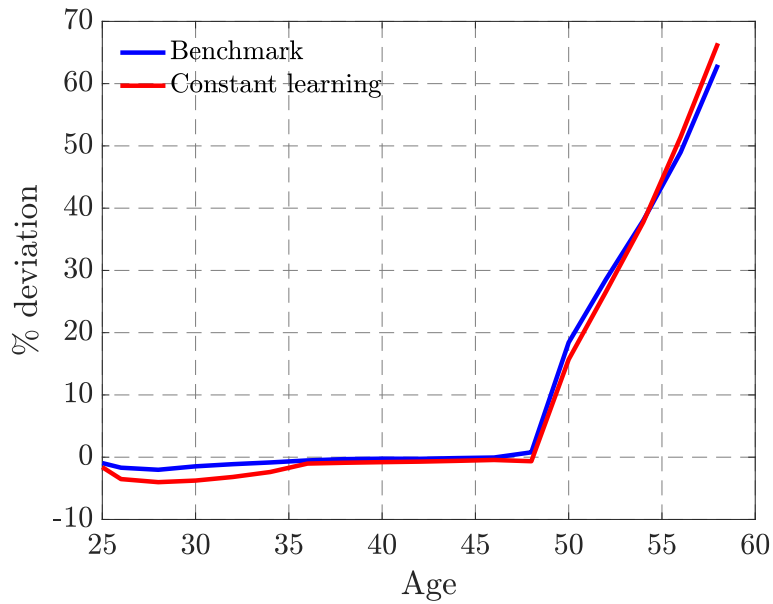
◂ Back

Policy Experiment

Role of age-dependent human capital growth



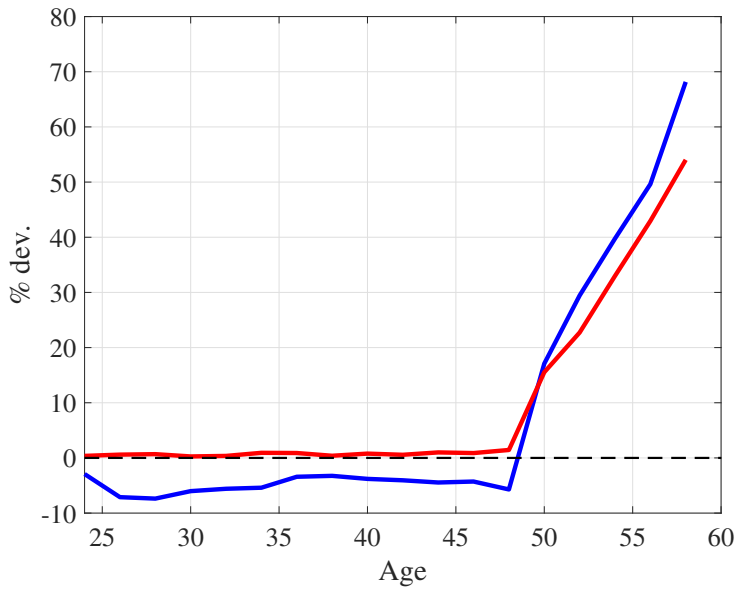
(a) Employment rate



(b) Wages

- lower opportunity cost of non-employment $\rightarrow$ over-predict employment loss at younger ages

Impact on earnings



Pre-tax wage earnings by occupation

		Log change
DPV of	pre-tax wage earnings	+7.5%
	after-tax wage earnings	+12.7%
	labor earnings	+4.6%

Impact on lifetime earnings

◂ Back

Population aging

Reduce death hazard to half of that in the benchmark

$\rightarrow$ increase life expectancy by 2.5 years

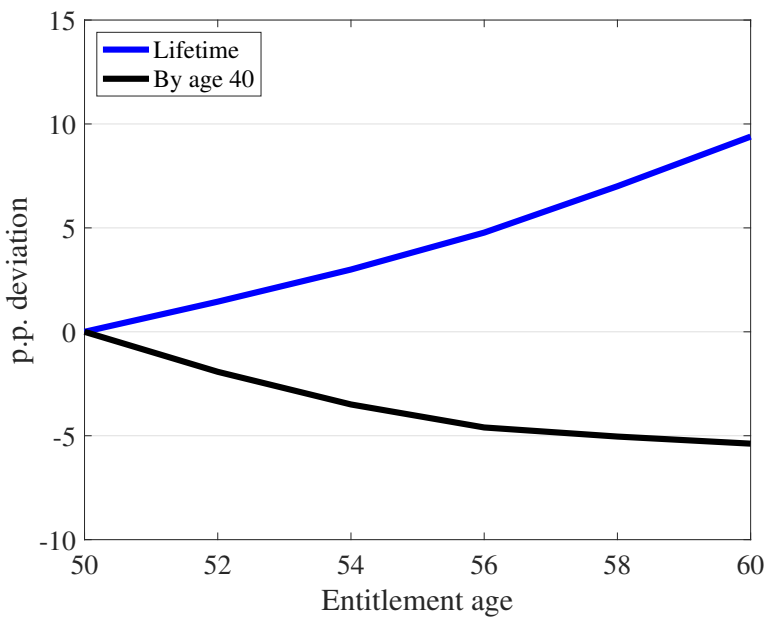
		Lifetime	By age 40
Total working years		+10.0%	-4.9%
Emp. share of high-skilled		+9.2%	+12.5%
DPV of	pre-tax wage earnings	+2.8%	-0.8%
	after-tax wage earnings	+4.6%	+1.0%
	labor earnings	+1.4%	+1.0%
Household savings rate		+ 5.5%	
Household welfare		-0.04%	

Table: Policy effects in the economy of population aging

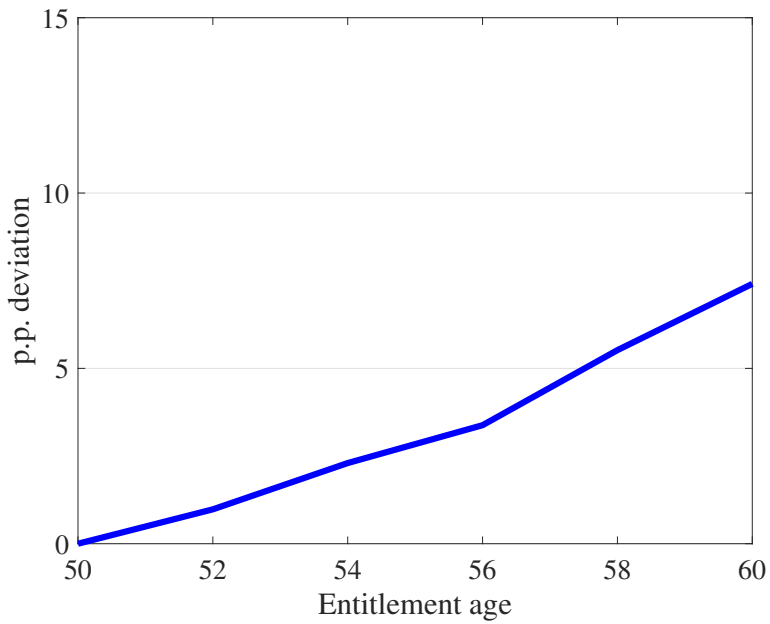
◂ Back

Alternative entitlement age

- Consider a set of policy environment: entitlement age between 50 and 60
- Adjust tax and evaluate at the steady state for each entitlement age



Total working years



Share of high-skilled

◂ Back

Alternative entitlement age

- Consider a set of policy environment: entitlement age between 50 and 60
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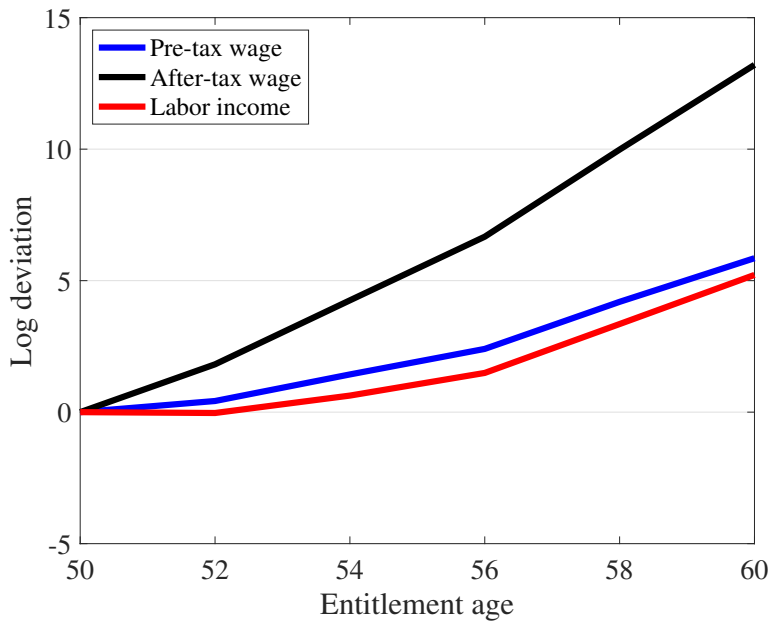
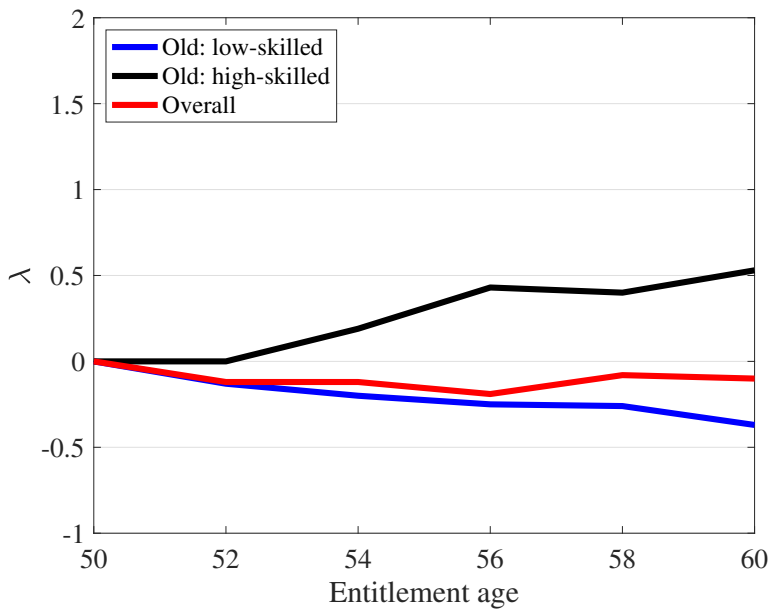


Lifetime incomes



Household welfare

◂ Back

Formal childcare supply

- I specify a reduced-form formal care supply function

$$p^n = \xi_0 + \xi_1 Q^{n,s}$$

  with supply elasticity $\frac{1}{\xi_1}$.
- Equilibrium achieves when

$$Q^{n,s} = Q^{n,d}$$

- Parameter values:
  - Benchmark: $\xi_1 = 0$ perfectly elastic formal childcare supply
  - No good estimate for China
  - United States: ξ_1 between 1.2 and 1.9
- **Conclusion**: robust unless childcare supply is extremely inelastic.

◂ Back

Sensitivity to formal childcare supply elasticity

Supply elasticity $\frac{1}{\xi_1}$		∞ BM	3.0	1.2	0.5	0.1
Childcare price, (log)		0	+0.8%	+1.8%	+3.8%	+11.3%
Frac. using grandparental care, (p.p.)		-15.5%	-15.3%	-15.0%	-14.4%	-12.9%
Frac. using market formal care, (p.p.)		+6.8%	+6.4%	+6.0%	+5.2%	+3.3%
Choice prob. of high-skilled, (p.p.)		+7.5%	+7.0%	+6.7%	+6.0%	+3.1%
Total working years	Lifetime, (p.p.)	+9.4%	+9.2%	+9.0%	+8.5%	+7.3%
	By age 40, (p.p.)	-5.4%	-5.5%	-5.7%	-6.0%	-6.8%
Lifetime DPV of earnings	pre-tax wage, (log)	+2.5%	+2.3%	+2.2%	+1.6%	+0.8%
	after-tax wage, (log)	+5.4%	+5.2%	+5.1%	+4.8%	+3.7%
	labor, (log)	+2.2%	+2.0%	+1.9%	+1.9%	+0.5%
Household savings rate, (p.p.)		+7.1%	+6.9%	+6.8%	+6.7%	+5.7%

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