The Dynamic Evolution of China's Pension System: Reforms and Future Prospects

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33rd Colloquium on Pensions and Retirement Research

Introduction

- Two major challenges of the Chinese public pension system
  - Ageing and fiscal sustainability: 60+ in pop. 20% (2025) $\rightarrow$ 30% (2036) $\rightarrow$ 40% (2050)
  - Large formality based inequality: informal receive 5% pension/45% wage of formal peers

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- Policy reforms underway
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- Policy reforms underway
  - 11th Session of the Standing Committee of the 14th National People's Congress gradually increase men's retirement age from 60 to 63, women from 50/55 to 55/58
- What we do:
  1. How would the 2024 reform affect fiscal budget, household behavior, and welfare?
  2. Any policy to deepen the reform?
  3. How sensitive are the results to model assumptions?

Outline

The Chinese Public Pension System: Transformation and Challenges

Challenge 1: Rapid Ageing

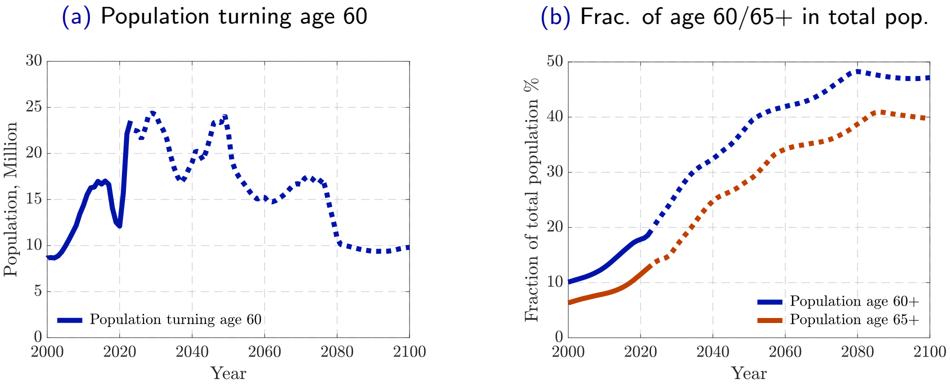


Figure: Old Age Population over Time

Note: Data after 2023 are projected by World Population Prospects 2023 under the medium fertility scenario published by the United Nations.

Challenge 2: Rural-Urban Disparity

		Formal/EBPS	Informal/RURPS
Population, million		521.21	545.22
Contributors	Population, million	379.25	372.54
	Total contribution, billion CNY	70,506	6,185
	Annual ave. contribution, CNY	18,590	1,660
Recipients	Population, million	141.96	172.68
	Total benefits, billion CNY	63,757	4,613
	Annual ave. benefits, CNY	44,912	2,671
Incomes/Cons.	Annual disposable incomes, CNY	51,821	21,691
	Annual consumption, CNY	32,994	18,175

Notes: (i) Data source: 2023 Statistical Bulletin on the Development of Human Resources and Social Security. (ii) Monetary variables are denominated in 2023 CNY. (iii) The average contribution is calculated per contributer, and the average benefit is calcuated per benefit recipient.

The 2024 Reform

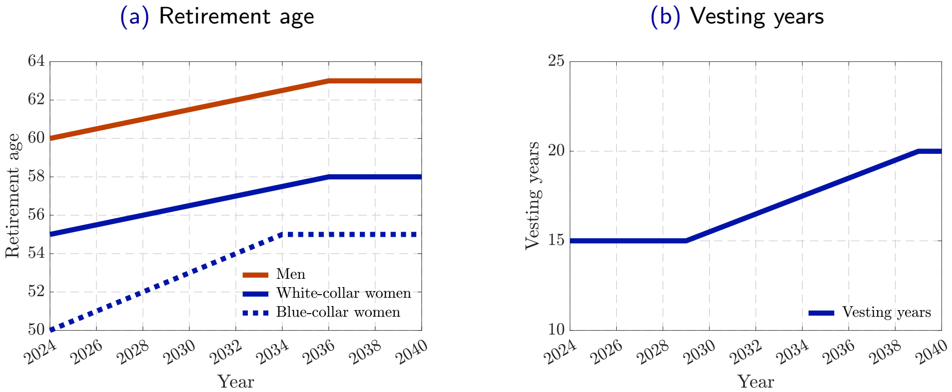


Figure: Retirement Age and Vesting Years under the New Policy Announced in 2024

Framework: Quantitative Model for Long-run Projection

Environment

Overlapping generations of households

1. life cycle of agents that are heterogeneous in formality
   - stochastic mortality between $j \in \{1, ..., J\}$ representing ages 20 to 100
   - income and policies contingent on formality status, fixed for an individual
   - intergenerational transfer: 12% of income transferred to parent generation
   - endogenous labor supply, consumption and savings decisions
2. long run dynamics of
   - cohort-specific formality share
   - demographics: lower fertility rate and ageing
   - macro prices of labor and capital

Input Series

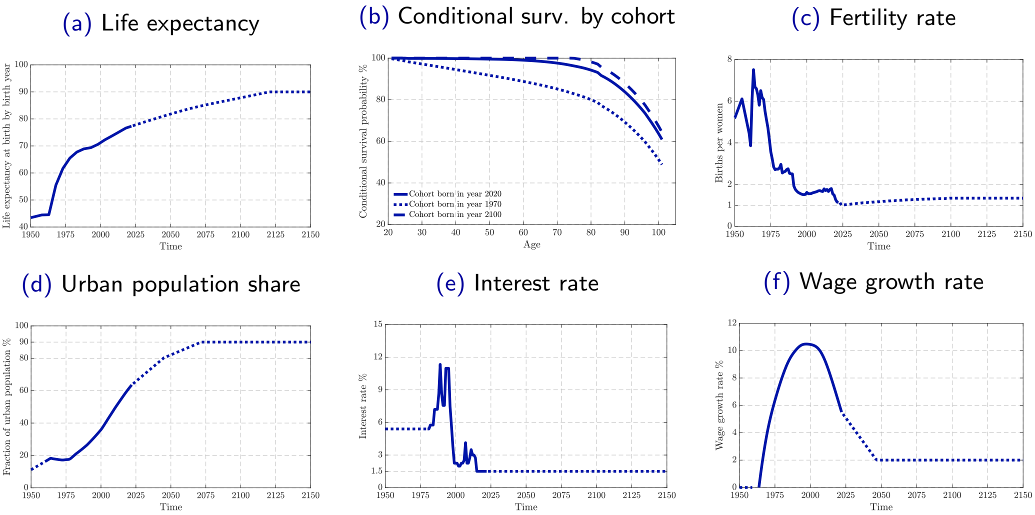


Figure: Model Inputs for Projection

States, Endowments, Preferences & Choices

- **States** age (j), formality status (s), private assets (a), pension contribution (b)
- **Choices**: labor supply (l), consumption (c), private savings (a')
- **Preferences** agents maximize expected utility

$$\mathbb{E}\{\sum_{j=1}^{J}\beta^{j-1}(\prod_{a=0}^{j-1}(1-\psi_a))[(1-\psi_j)u\,(c_j,l_j)+\psi_j\mathcal{V}(a_j)]\}, \qquad u(c,l)=\frac{(c^{\nu}l^{1-\nu})^{1-\sigma}}{1-\sigma}$$

- **Endowments** – the working ages allocate 1 unit of time between working (h) and leisure (l), receive wage incomes wh where

$$\log w = \underbrace{\omega}_{\texttt{macro trend}} + \underbrace{\theta}_{\texttt{age}} + \underbrace{\eta}_{\texttt{sector}} + \underbrace{\epsilon}_{\texttt{shocks}}$$

– the retired receive pension incomes and enjoy leisure $= 1$

▸ Individual problem

Benchmark Pension Policy

Formal workers: representing basic old age insurance (BOAI)

- Eligible age: 56 (effective ret. age taking average of men and women)
- Contribution: effective 21% of wage income (policy: 16% social pooling + 8% individual)
- Benefit levels: (i) 50% replacement rate (ii) full indexation to CPI + partial indexation to wages (2% per year)

Informal workers: representing resident pension (RP)

- Eligible age: 60
- Flat contribution rate (2.5% of incomes) and benefits (1700CNY in 2023)

Results: Effects of The 2024 Reform and More Options

Options to Achieve Fiscal Sustainability

- **2024 reform**: increase pension entitlement age
  - the 11th Session of the Standing Committee of the 14th National People's Congress

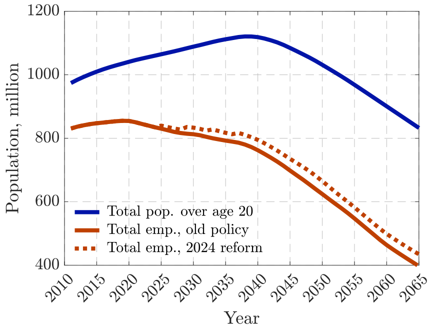
    gradually increase men's retirement age from 60 to 63, women from 50/55 to 55/58
- **More options**
  1. pension benefits indexed to CPI only (currently partial indexation to wage growth)
  2. increase pension benefits for informal workers
  3. consumption-tax based financing
- **Implementation** (i) no accompany reforms ... for evaluating gov't budget

  (ii) other tools to balance gov't budget (SS contribution tax or lump-sum transfers)

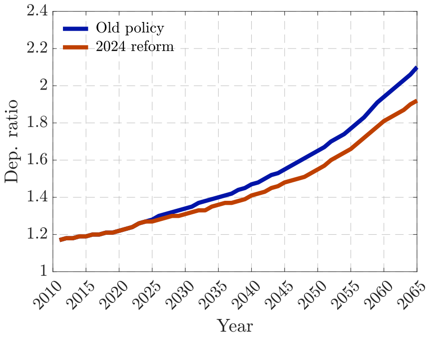
  ... for evaluating welfare

2024 Reform: The Increase in Aggregate Employment

(a) Impact on Employment

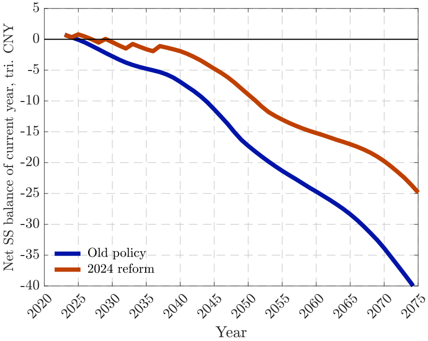


(b) Dependency ratio

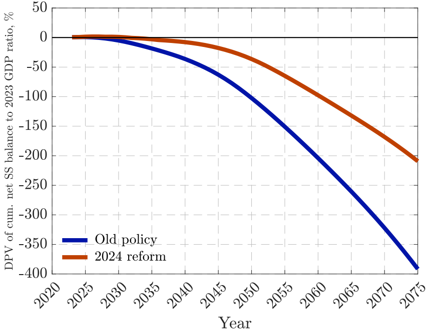


2024 Reform: Impact on Government Budget

(a) Value in 2023 CNY



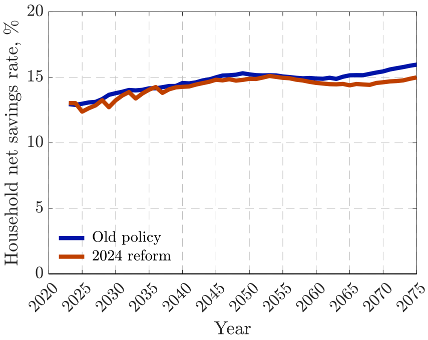
(b) Ratio to 2023 GDP



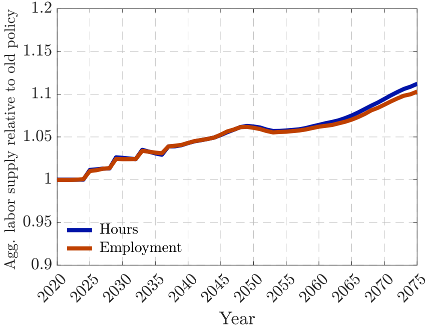
- Discounted using market interest rate

2024 Reform: Impact on Savings and Labor Supply

(a) Household savings rate



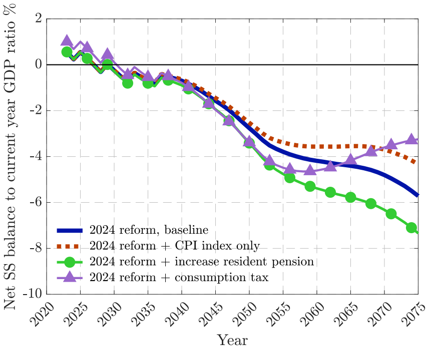
(b) Aggregate labor supply



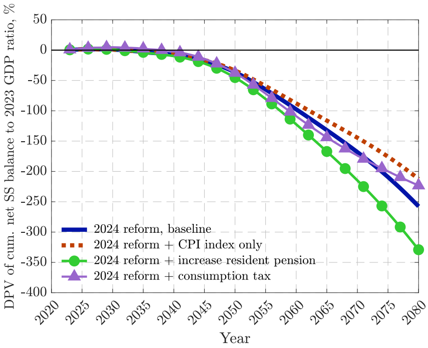
- household net savings rate = 1 - household consumption/household disposable income

Further Reforms: Government Budget in Current Year

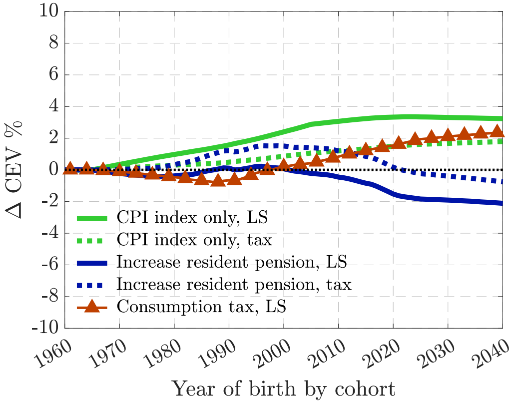
(a) Gov. budget in current year



(b) Cumulative gov. budget



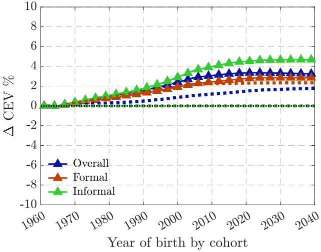
Further Reforms: Overall Welfare



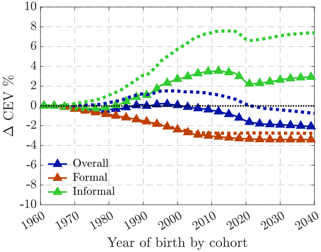
Welfare measured with Consumption Equivalent Variation (CEV): changes in average lifetime utility as the percentage change in consumption needed to make individuals indifferent between a baseline policy and an alternative policy scenario.

Further Reforms: Welfare by Formality

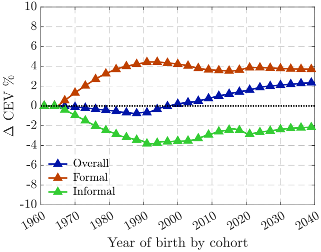
(a) CPI index. only



(b) Increase RP

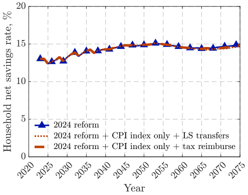


(c) Consumption tax

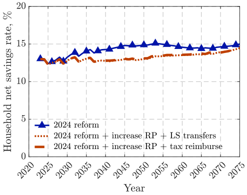


Further Reforms: Household Savings

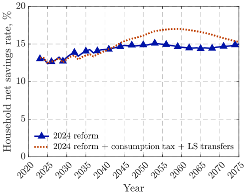
(a) Household Savings Rate



CPI index. only

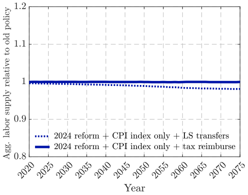


Increase RP

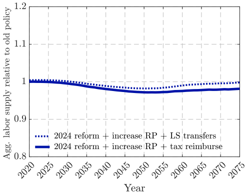


Consumption tax

(b) Total Working Hours Relative to 2024 Reform



CPI index. only



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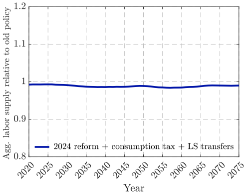


Consumption tax

Sensitivity of Results

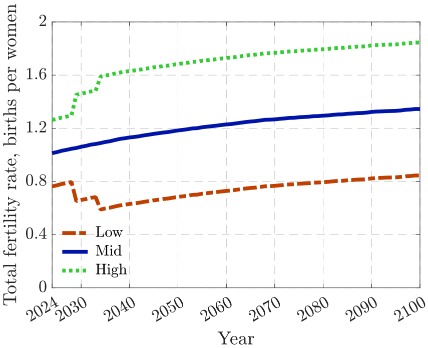
Sensitivity Checks: Overview

1. Demographics: WPP mid fertility variant $\rightarrow$ low fertility variant
2. Intergenerational transfers: 12% $\rightarrow$ 0%
3. Long run wage growth: $1.5\% \rightarrow \{1.0\%, 2.0\%\}$
4. Internal return of individual account (IA) to social-pooling account (SPA):

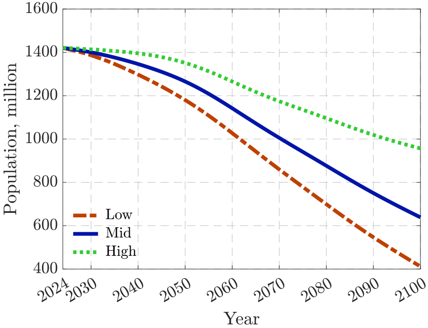
   same rate $\rightarrow$ {IA 20% higher/lower than SPA}
5. Preference parameters: risk aversion $4 \rightarrow \{2, 8\}$, discount factor $.96 \rightarrow \{.92, 1.0\}$

WPP Projection Fertility Variants

(a) Fertility rate

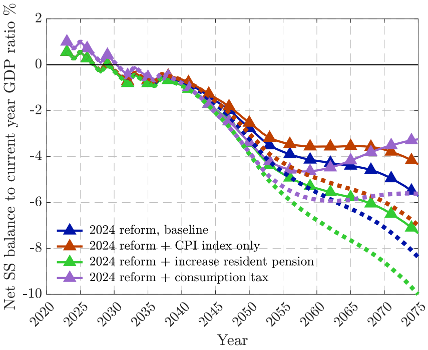


(b) Total population

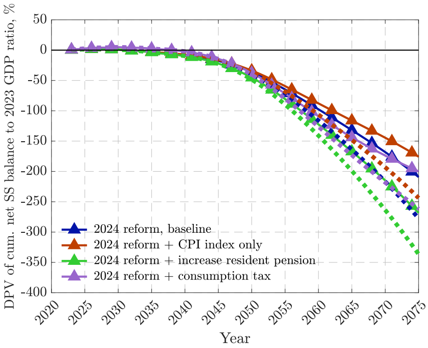


Low Fertility Variant: Government Budget

(a) Gov. budget in current year



(b) Cumulative gov. budget

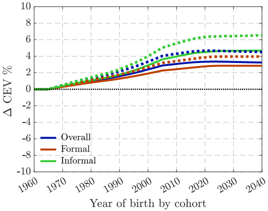


Low Fertility Variant: Welfare

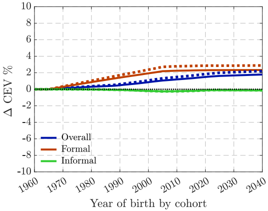
Solid: baseline with mid fertility variant

Dashed: low fertility variant

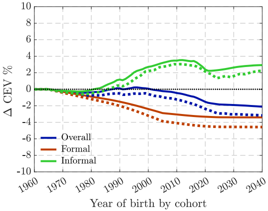
(a) CPI index. only, LS



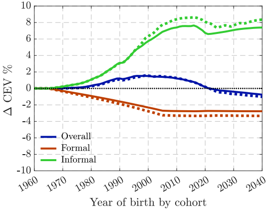
(b) CPI index. only, tax



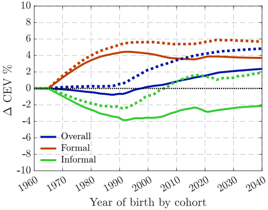
(c) Increase RP, LS



(d) Increase RP, tax

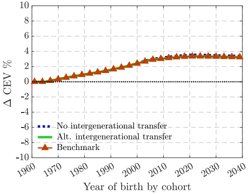


(e) Consumption tax, LS

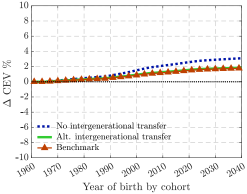


Alternative Assumption on Transfers: Welfare

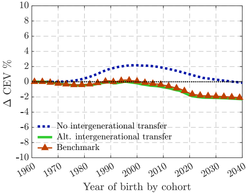
Transfers weaken the insurance effects provided by pension program!



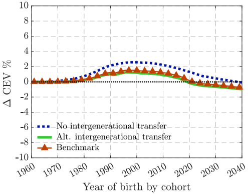
CPI index., LS



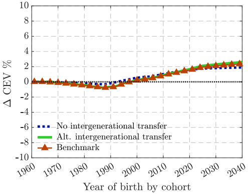
CPI index., tax



Increase RP, LS



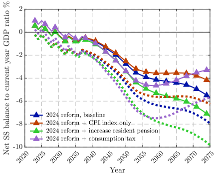
Increase RP, tax



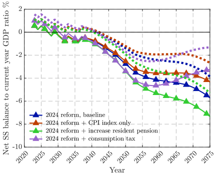
Cons. tax, LS

Wage Growth and Pension Account Returns: Gov. Budget

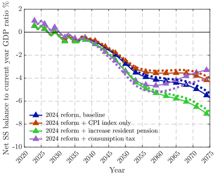
(a) Yearly Government Deficit



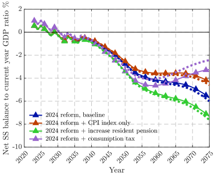
Wage growth 1.5%



Wage growth 2.5%

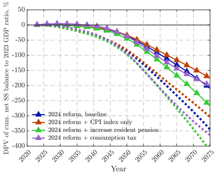


$R_I = 1.2R_S$



$R_I = 0.8R_S$

(b) Cumulative Government Deficit



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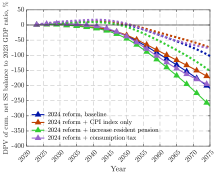

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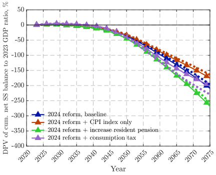

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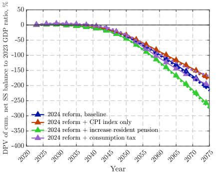
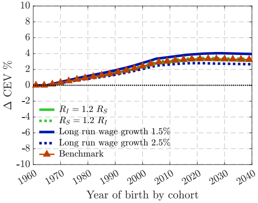
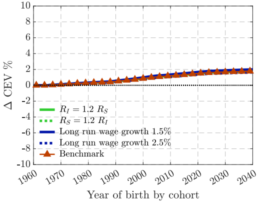


$R_I = 0.8R_S$

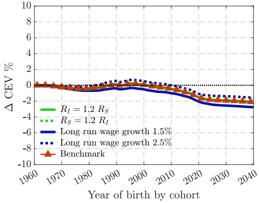
Wage Growth and Pension Account Returns: Welfare



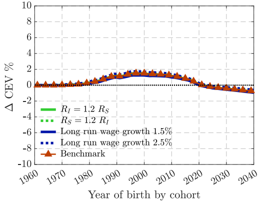
CPI index., LS



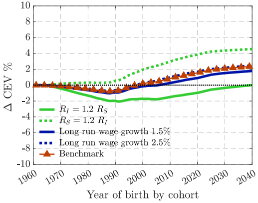
CPI index., tax



Increase RP, LS



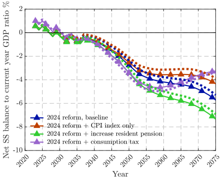
Increase RP, tax



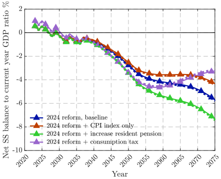
Cons. tax, LS

Preference Parameters: Gov. Budget

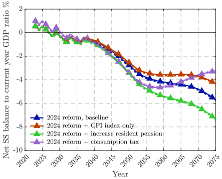
(a) Yearly Government Deficit



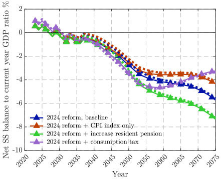
$\sigma = 2$



$\sigma = 8$

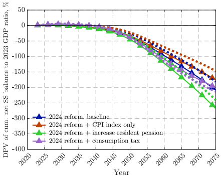


$\beta = 0.92$

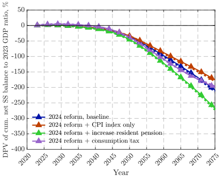


$\beta = 1.0$

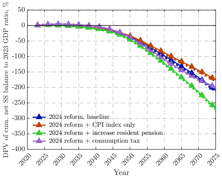
(b) Cumulative Government Deficit



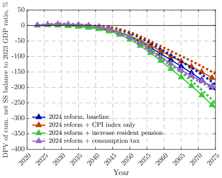
$\sigma = 2$



$\sigma = 8$

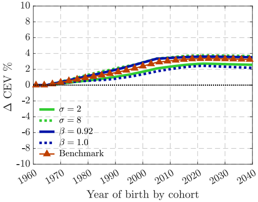


$\beta = 0.92$

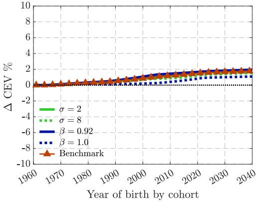


$\beta = 1.0$

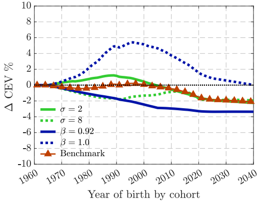
Preference Parameters: Welfare



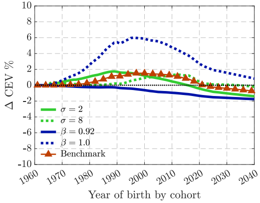
CPI index., LS



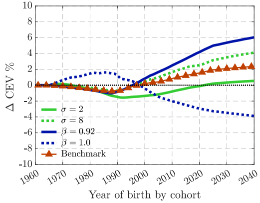
CPI index., tax



Increase RP, LS



Increase RP, tax



Cons. tax, LS

Final Remarks

- In this paper, we
  - provide timely estimates of policy impact of 2024 reform
  - evaluate options that further deepen the reform
  - conduct extensive sensitivity checks to establish the validity of results
- Other challenges
  - gender convergence
  - changing work arrangements, opportunities, and insurance role of pension policy due to technological progress
  - compliance from the firm side

Thank you!!!