“Growing Pains” in China’s Social Security System

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China’s Basic Old Age Insurance System for Urban Workers

- A compulsory scheme with both defined contribution and defined benefit features.

- **Contribution:**
  - Employers pay 20% of employees’ wage bill;
  - Employees contribute 8% of wage to notional individual account.

- **Benefit:**
  - Eligible if 15 years or more contribution history;
  - **Retirement Age:** Female: 50 (blue collar), 55 (white collar); Male 60.
  - **Replacement ratio** (pension benefit as a percentage of pre-retirement wage): depends on the number of years of contribution and the individual’s wage relative to local average social wage.
Some Facts About China’s Social Security System

• Facts #1
  • High Statutory Contribution rate (28%!)
  • Relatively low Pension Benefit Rate
  • Relatively young demographic structure
  • Social Security Fund is in deficit since 2014 for many provinces

• Facts #2
  • Low labor participation rate and early retirement as a developing country
  • Retirement age: male 60; female: 50 or 55

• Facts #3
  • Population Dependency Ratio (1:5.65) vs. Dependency Ratio in pension system (1:2.86)
  • Pension Benefit Replacement Rate Relative to the Social Average Wage (49%) vs. Pre-retirement Replacement Rate (74% and maybe more)

• Fact #4
  • Household save at a very high rate in China: > 40%
Figure 1: Population Dependency Rate in China and OECD Countries
LPR of the Old: China vs. OECD

• Labor Participation Rate (Age 55-64)

<table>
<thead>
<tr>
<th>Year</th>
<th>Country</th>
<th>Gender</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>OECD Male</td>
<td></td>
<td>63.9</td>
</tr>
<tr>
<td>2010</td>
<td>China Male</td>
<td></td>
<td>35.6</td>
</tr>
<tr>
<td>2012</td>
<td>OECD Male</td>
<td></td>
<td>64.5</td>
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<tr>
<td>2007</td>
<td>China Female</td>
<td></td>
<td>43.6</td>
</tr>
<tr>
<td>2012</td>
<td>OECD Female</td>
<td></td>
<td>47.1</td>
</tr>
</tbody>
</table>

Source: OECD “Pension at a glance” and 2010 population census
## LFPR in Different Age Groups in China

Average LFPR decreased from **26.97% → 25.25%**
Life Expectancy increased from **71.4 → 74.83**

<table>
<thead>
<tr>
<th></th>
<th>50-54</th>
<th>55-59</th>
<th>60-64</th>
<th>55-64</th>
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<td><strong>2010</strong> Census</td>
<td></td>
<td></td>
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<tr>
<td>Male</td>
<td>0.753</td>
<td>0.547</td>
<td>0.184</td>
<td>0.398</td>
<td>0.055</td>
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<tr>
<td>Female</td>
<td>0.296</td>
<td>0.15</td>
<td>0.075</td>
<td>0.119</td>
<td>0.02</td>
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<tr>
<td><strong>2000</strong> Census</td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>Male</td>
<td>0.754</td>
<td>0.551</td>
<td>0.239</td>
<td>0.399</td>
<td>0.101</td>
</tr>
<tr>
<td>Female</td>
<td>0.339</td>
<td>0.181</td>
<td>0.096</td>
<td>0.139</td>
<td>0.038</td>
</tr>
</tbody>
</table>

Source: 2000 population census and 2010 population census
## Benefit Replacement Relative to Pre-Retirement Income

<table>
<thead>
<tr>
<th>Pre-Retirement Income</th>
<th>CHARLS2011</th>
<th>CHARLS2013</th>
<th>CFPS2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Income Group</td>
<td>288.3</td>
<td>339.4</td>
<td>176.3</td>
</tr>
<tr>
<td>Medium Income Group</td>
<td>147.0</td>
<td>122.9</td>
<td>102.7</td>
</tr>
<tr>
<td>High Income Group</td>
<td>100.5</td>
<td>97.6</td>
<td>71.3</td>
</tr>
<tr>
<td>Obs.</td>
<td>169</td>
<td>358</td>
<td>67</td>
</tr>
</tbody>
</table>
Key to Our Story

• Productivity Growth Across Chinese Cohorts are Particularly Fast!

1. Much higher multiple of college educated young (25-34 yr olds) to college educated old (55-64 yr olds): the multiple increased from 6.6 to 9.6;

2. The cross sectional Wage-Age Profile peaks in China at much earlier age: 32 (2014 CFPS data); (vs. US, peaked in 47);

3. The peak age in China was moving earlier (documented in another paper, Fang and Qiu, 2018).

Note: Cross-Sectional Wage-Age profile can be used to separately identify cohort to cohort productivity growth and returns to experience.
Multiples of Highly-Educated Among Young (25-34) and Old (55-64): China vs. Other Countries

- China: 9.6 in 2005, 6.6 in 2015
- Australia: 6.6 in 2005, 5.1 in 2015
- Austria: 3.8 in 2005, 1.6 in 2015
- Belgium: 4.0 in 2005, 2.0 in 2015
- Canada: 8.0 in 2005, 4.0 in 2015
- Czech: 6.0 in 2005, 2.0 in 2015
- Denmark: 10.0 in 2005, 6.0 in 2015
- Estonia: 2.0 in 2005, 1.0 in 2015
- Finland: 4.0 in 2005, 2.0 in 2015
- France: 1.6 in 2005, 0.0 in 2015
- Germany: 2.0 in 2005, 1.0 in 2015
- Greece: 3.0 in 2005, 1.0 in 2015
- Hungary: 5.1 in 2005, 3.8 in 2015
- Iceland: 8.0 in 2005, 4.0 in 2015
- Ireland: 2.0 in 2005, 1.0 in 2015
- Israel: 1.0 in 2005, 0.0 in 2015
- Italy: 3.0 in 2005, 1.0 in 2015
- Japan: 5.1 in 2005, 3.8 in 2015
- Korea: 2.0 in 2005, 1.0 in 2015
- Latvia: 6.0 in 2005, 4.0 in 2015
- Luxembourg: 1.6 in 2005, 1.0 in 2015
- Mexico: 8.0 in 2005, 4.0 in 2015
- Netherlands: 2.0 in 2005, 1.0 in 2015
- Norway: 2.0 in 2005, 1.0 in 2015
- Poland: 10.0 in 2005, 6.0 in 2015
- Portugal: 6.0 in 2005, 4.0 in 2015
- Slovakia: 5.1 in 2005, 3.8 in 2015
- Slovenia: 2.0 in 2005, 1.0 in 2015
- Spain: 6.0 in 2005, 4.0 in 2015
- Sweden: 2.0 in 2005, 1.0 in 2015
- Switzerland: 8.0 in 2005, 4.0 in 2015
- Turkey: 6.0 in 2005, 4.0 in 2015
- UK: 2.0 in 2005, 1.0 in 2015
- US: 8.0 in 2005, 4.0 in 2015
- OECD: 6.0 in 2005, 4.0 in 2015
- EU: 6.0 in 2005, 4.0 in 2015
College educated young worker/College educated old worker: Time Trends in China
Wage-Age Profile in CFPS Data

Log. Wage (RMB)
How to Fit All These Facts Together?

• Blaming the Defects of Chinese Social Security System?
  • Low pensionable age;
  • Contribution evasion or avoidance;
  • Insufficient link between contribution and benefits;
  • No strict eligibility scrutiny;
  • Generous pension benefit
  • Population Ageing

• Problems with the These Explanations
  • Fragmented explanation; can’t fit all the facts
  • Eg. Low pensionable age: why not reform? Why early retirement with such a low pensionable age? Why decreasing LPR?
Key Mechanism of the Model

Human Capital Gap between the Young and the Elderly

- Productivity of the Young Rise
  - Wage of the Young Grows
    - Wage Compression
      - Wage Gap Narrower than Productivity Gap
        - Elderly Wage Partially Grows
          - Popu. Depen. Ratio Unchanged
            - Higher Wage than Elderly Labor
              - Market Clearing, Early Retirement and LFPR Decrease

- Productivity of the Elderly Unchanged
  - Wage- Age Profile Hump Early

Governments as Benevolent Social Planner

- Lower Replacement Rate to Average Wage
  - Higher Contribution Rate
    - Higher Replacement Rate to Pre-retirement Wage
      - Dependency Ratio in Social Security Increase
        - Higher Saving Rate
Key Mechanism in Words ...

- Fast productivity progress of the young generation vs. old generation is the key driving force of the model.
  - Thus the word “Growing Pains” in the title.

- Wage compression (e.g., due to fair-wage hypothesis) leads to the wage of the old to be higher than the market clearing wage;

- The old’s employment is rationed as a result – namely, low LFPR for the old results from the labor demand side;

- As a result, the in-system dependency ratio is high even though the population-wide dependency ratio is low;
Key Mechanism in Words ...

• The old saves more because they will spend longer time in retirement.

• Contribution rates of the workers must also be higher as a result.

• Our explanation does not reply on:
  • Population ageing (such as prolong life expectancy and descend TFR)
  • Defects of social security system
An Illustrative Model

- Consider a two-period Overlapping Generations (OLG) model;
- First period: youth, length of the period normalized to 1;
- Second period: old, length of the period $T$;
- Time is indexed by $t$;
- At time $t$, youth population: $N^y_t$
- Old population $N^o_t$
- Population growth: $N^y_t=(1+n)N^o_t$
- Population Dependency Ratio: $\frac{T}{1+n}$
An Illustrative Model

• Period-\( t \) firms solve

\[
\max_{L_t^y, L_t^o} \Pi_t = \left( H_t L_t^y \right)^\gamma + \left( H_{t-1} L_t^o \right)^\gamma - W_t^y L_t^y - W_t^o L_t^o
\]

• Where \( H_t \) is the human capital of youth at time \( t \) and \( H_{t-1} \) is that for the old: \( H_t = (1 + g) H_{t-1} \);
• \( L_t^y \) and \( L_t^o \) are the labor supply of young and old, respectively;
• For simplicity, suppose that wage for the youth \( W_t^y \) is such that the market for youth labor clears, i.e. \( L_t^y = N_t^y \). The youth wage must satisfy:

\[
\ln W_t^y = \ln \gamma + \gamma \ln H_t + (\gamma - 1) \ln L_t^y
\]
An Illustrative Model

• However, suppose for whatever reason (later we will provide a micro-foundation based on fair-wage hypothesis), there is wage compression and the old workers’ labor market does not clear

\[
\ln W_t^O = M \left( W_t^y \right) = \ln \phi + \kappa \ln W_t^y
\]

Where \( \kappa \in (0,1) \).

• This, together with the firms’ labor demand function

\[
\ln W_t^O = \ln \gamma + \gamma \ln H_{t-1} + (\gamma - 1) \ln L_t^0
\]

which implies that the fraction of old that will be employed

\[
\pi_t^O = \frac{L_t^O}{N_t^O} \in (0,1)
\]

and \( \varepsilon(\pi_t^O, 1 + h) < 0 \) where \( 1 + h = (1 + g)^\gamma \).
Summary

• Due to the high intergenerational growth in human capital \( H_t = (1 + g)H_{t-1}; \) high \( g \), any mechanism that may lead to “wage compression” – namely, wage difference is smaller than the productivity difference – will result in low labor demand for the old, i.e. low \( \pi_t^O \);

• Low \( \pi_t^O \) in term implies:
  • A low actual retirement age: \( R^A = 1 + T\pi_t^O \).
  • A high in-system dependency ratio
    \[
    D_t^I = \frac{(1 - \pi_t^O)TN_t^O}{N_t^Y + \pi_t^O TN_t^O}
    \]

Even though the population wide dependency ratio \( \frac{T}{1+n} \) does not change.
Wage Compression via SOE: A Possible Mechanism (NBS Annual Data)

\[ y = -0.6514x + 88.955 \]
\[ R^2 = 0.23448 \]

\[ y = -0.255x + 42.705 \]
\[ R^2 = 0.46435 \]

\[ y = -0.247x + 34.885 \]
\[ R^2 = 0.46522 \]
Key Mechanism of the Model

1. Productivity of the Young Rise
   - Wage Gap Narrow than Productivity Gap
   - Wage Compression
   - Wage-Age Profile Hump Early
   - Elderly Wage Partially Grows
   - Popu. Depen. Ratio Unchanged
   - Higher Wage than Elderly Labor
   - Market Clearing, Early Retirement and LFPR Decrease

2. Wage of the Young Grows
   - Lower Replacement Rate to Average Wage
   - Higher Contribution Rate
   - Higher Replacement Rate to Pre-retirement Wage
   - Dependency Ratio in Social Security Increase
   - Higher Saving Rate

3. Government as Benevolent Social Planner
Now we can examine the third part of the key mechanism: to determine the optimal contribution rate $\theta$.

We follow the model of Feldstein (1985): The Optimal Level of Social Security Benefits (QJE).

Timing:
1. Government sets contribution rate;
2. Firms and workers then decide on labor supply and demand.

Suppose the contribution rate is $\theta$, then the retirees’ benefit level is

$$P_t = \frac{\theta \bar{W}_t}{D_t}$$

where

$$\bar{W}_t = \frac{N_t^y W_t^y + N_t^0 \pi_t^0 W_t^0}{N_t^y + N_t^0 \pi_t^0} = \frac{(1+n)W_t^y + T \pi_t^0 W_t^0}{(1+n) + T \pi_t^0} = \delta_t^y W_t^y + \delta_t^0 W_t^0$$

is the average social wage.
An Illustrative Model (Continued)

• Following Feldstein, assume myopic individuals for now (in the full model, we will consider optimal saving), and suppose that they have log utility function. The social planner’s problem is

\[
\max_\theta SW_t = N_t^y \ln \left( (1 - \theta) W_t^y \right) + N_t^0 T \pi^o \ln \left( (1 - \theta) W_t^o \right) + N_t^0 T \left( 1 - \pi^o \right) \ln (P_t)
\]

• The optimal contribution rate is

\[
\theta^* = \frac{T (1 - \pi^o)}{1 + n + T}
\]

And the optimal benefit replacement rate relative to social average wage is

\[
P^a^* = \frac{\theta^*}{D^I} = \frac{1 + n + T \pi^o}{1 + n + T}
\]
Summary

• Due to the high intergenerational growth in human capital, the optimal contribution rate will be high, and optimal benefit replacement relative to the social average wage will be low;

• However, the benefit replacement relative to pre-retirement wage $W_t^o$, denoted by $P^p$, can increase with $h$. To see this, note

$$P^p = \frac{P_t}{W_t^o} = \frac{P_t}{\bar{W}_t} \frac{W_t}{W_t^o} \approx P^a \frac{W_t^y}{W_t^o}$$

Where the approximation is based on the fact that the fraction of old labor in the economy is relatively small (for example, in CFPS data, workers older than 50 accounts for about 14% of the total labor).
General Model

• Explicitly consider a micro-foundation for the wage compression based on fair-wage hypothesis (Summers, 1988; Akerlof and Yellen, 1990).
  • Old workers decide on effort choice, and the cost of effort is a function of the old wage relative to a reference wage.
  • Consider two specifications of reference wages: (1) a function of the wage of the young; (2) a function of the social average wage.

• Model workers’ saving decisions explicitly.
  • Shows that the earlier retirement of the old also leads them to save more when they are working.
  • Can be a reason for the “high savings rate puzzle” in China.

• All the qualitative predictions of the illustrative model regarding the impact of a higher rate of intergenerational growth of human capital $g$ carries over to the general model.
Calibration for the Two-Period Model

• Yong: 20-49 Yr olds;
• Old: 50-74 Yr olds.
• \( T = \frac{25}{30} = 0.833 \)
• Population dependency ratio from 2015 1% Population Survey: 0.484
• \( \frac{T}{1+n} = 0.484 \rightarrow 1+n = 1.721 \)
• Etc.
## Calibration of the General Model

### Calibration and Simulation Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Description</th>
<th>Calibration</th>
</tr>
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<tbody>
<tr>
<td>$T$</td>
<td>0.833</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$1+n$</td>
<td>1.721</td>
<td></td>
<td></td>
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<tr>
<td>$\lambda$</td>
<td>0.445</td>
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### Targeted Moments

<table>
<thead>
<tr>
<th>Moment</th>
<th>Value</th>
<th>Description</th>
<th>Calibration</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\pi^o$</td>
<td>0.267</td>
<td>$\varphi/(1-\alpha)$</td>
<td>1.332</td>
</tr>
<tr>
<td>$D^I$</td>
<td>0.337</td>
<td>$\pi^Y$</td>
<td>0.924</td>
</tr>
<tr>
<td>$P^a$</td>
<td>0.506</td>
<td>$\phi$</td>
<td>0.626</td>
</tr>
<tr>
<td>$w^Y$</td>
<td>1.000</td>
<td>$A$</td>
<td>2.048</td>
</tr>
<tr>
<td>$w^Y/w^o$</td>
<td>1.400</td>
<td>$(Xe)^Y$</td>
<td>0.777</td>
</tr>
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### Other Endogenous Variable: Non-Targeted

<table>
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<tr>
<th>Variable</th>
<th>Value</th>
<th>Description</th>
<th>Calibration</th>
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<tr>
<td>$1+r$</td>
<td>8.580</td>
<td>$k$</td>
<td>0.169</td>
</tr>
<tr>
<td>$R^A$</td>
<td>54.39</td>
<td>$\theta$</td>
<td>0.171</td>
</tr>
<tr>
<td>$s$</td>
<td>0.163</td>
<td>$P^p$</td>
<td>0.684</td>
</tr>
<tr>
<td>$W$</td>
<td>0.965</td>
<td>$P^n$</td>
<td>0.824</td>
</tr>
<tr>
<td>$\delta^Y$</td>
<td>0.877</td>
<td>$C^Y$</td>
<td>0.909</td>
</tr>
<tr>
<td>$\varepsilon(1+\omega,1+h)$</td>
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<td>$\varepsilon(\theta,1+h)$</td>
<td>0.403</td>
</tr>
<tr>
<td>$\varepsilon(\pi^o,1+h)$</td>
<td>-1.107</td>
<td>$\varepsilon(s,1+h)$</td>
<td>0.403</td>
</tr>
<tr>
<td>$\varepsilon(R^A,1+h)$</td>
<td>-0.215</td>
<td>$\varepsilon(P^a,1+h)$</td>
<td>-0.136</td>
</tr>
<tr>
<td>$\varepsilon(D,1+h)$</td>
<td>0.000</td>
<td>$\varepsilon(P^n,1+h)$</td>
<td>0.402</td>
</tr>
<tr>
<td>$\varepsilon(D^I,1+h)$</td>
<td>0.539</td>
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<td>0.485</td>
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</table>
## Non-Targeted Moments: Model vs. Data

<table>
<thead>
<tr>
<th>Endogenous Variable</th>
<th>Model</th>
<th>Data</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>$R^A$ Actual Retirement Age</td>
<td>54.39</td>
<td>54</td>
<td>Ministry of Human Resources and Social Security</td>
</tr>
<tr>
<td>$\theta$ Contribution Rate</td>
<td>17.1%</td>
<td>16.0%</td>
<td>NBS</td>
</tr>
<tr>
<td>$P^p$ Gross Benefit Retirement Rate Relative to Pre-retirement Wage</td>
<td>68.4%</td>
<td>74.0%</td>
<td>OECD 《Pension at a Glance》</td>
</tr>
<tr>
<td>$P^n$ Net Benefit Retirement Rate Relative to Pre-retirement Wage</td>
<td>82.4%</td>
<td>81.0%</td>
<td>OECD 《Pension at a Glance》</td>
</tr>
<tr>
<td>$\delta^y$ Fraction of Youth Employment</td>
<td>87.7%</td>
<td>83.1%</td>
<td>CFPS, 2014</td>
</tr>
<tr>
<td>$C^y$ Youth Income Share</td>
<td>90.9%</td>
<td>86.2%</td>
<td>CFPS, 2014</td>
</tr>
</tbody>
</table>
Model Simulation with Different g Values: actual g: 6.13% annual
Model Simulation with Different g Values: actual g: 6.13% annual
Delaying the Retirement Age

• One of the most prominent proposal to address the fiscal imbalance of China’s Social Security is to delay the retirement age;

• In this paper, the policy parameter of the social security, namely the contribution rate, is chosen to maximize the social welfare;

• Retirement age is an endogenous equilibrium outcome of the system given the policy parameter;

• Low actual retirement age is the result of high human capital growth in China + “wage compression”;

• Problems facing China’s Social Security System is a “Growing Pain”!
Delaying the Retirement Age

• In this OLG model, the retirement age is given by \( R^A = \pi^y + T\pi^o \)

• Suppose that the government sets a minimum retirement age of

\[ \hat{R}^A = \pi^y + T\hat{\pi}^o \]

where \( \hat{\pi}^o > \pi^o \) is the extent of the mandated delay of retirement.

• If the old does not work between \( \pi^o \) and \( \hat{\pi}^o \), he/she has to rely on personal savings.

• Life cycle savers will be able to undo the effect of the policy change, if the retirement benefits proportionately increase at retirement.

• For myopic workers, such a delay can be welfare decreasing, depending on what social safety net program is introduced to finance the non-workers between \( \pi^o \) and \( \hat{\pi}^o \).
Welfare Loss from Delaying Retirement Age

\( v \): fraction of welfare support when not eligible for SS

\[
p = \left\{ \theta \left[ (1 + n) \pi W^Y_t + T \pi W^o_t \right] - T (\hat{\pi}^o - \pi^o) \tilde{c} \right\} / T (1 - \hat{\pi}^o)
\]
Scenario 2

\[ p = \frac{\theta [(1 + n)\pi^W W_t^Y + T\pi W_t^0] - T(\pi^0 - \pi^0)\tilde{c}}{T(1 - \pi^0)} \]
Scenario 3

\[ p = \{\theta [(1 + n)\pi^y W_t^y + T\pi W_t^o] - T(\hat{\pi}^o - \pi^o)\hat{c}\} \left(\frac{\pi^y + T\hat{\pi}^o}{\pi^y + T\pi^o}\right) \]
## Summary

<table>
<thead>
<tr>
<th>Empirical Facts</th>
<th>Model</th>
<th>Theory</th>
<th>Empirical Facts</th>
<th>Model</th>
<th>Theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human Capital Growth</td>
<td>✓</td>
<td>✓</td>
<td>Increasing TFP</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Intergenerational Education Achievement Difference</td>
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<td>✓</td>
<td>Increasing Intergenerational Education Achievement Difference</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Hump Shaped Cross Sectional Wage-Age Curve</td>
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<td>✓</td>
<td>Earlier Hump in the Cross Sectional Wage-Age Curve</td>
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<td>✓</td>
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<td>Low LFPR of the Old</td>
<td>✓</td>
<td>✓</td>
<td>Decreasing LFPR of the Old</td>
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<tr>
<td>Low Retirement Age</td>
<td>✓</td>
<td>✓</td>
<td>Old LFPR Regional Difference</td>
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<tr>
<td>Early Retirement and Hidden Retirement</td>
<td>✓</td>
<td>✓</td>
<td>Obstacles in the Reform to Delay the Retirement Age</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>High Savings Rate</td>
<td>✓</td>
<td>✓</td>
<td>Obstacles to the Systemic Reform of the Social Security System</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>High Contribution Rate</td>
<td>✓</td>
<td>✓</td>
<td>Social Security Imbalance</td>
<td>✓</td>
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</tr>
<tr>
<td>Low Replacement Rate Relative to Social Average Wage</td>
<td>✓</td>
<td>✓</td>
<td>High Replacement Rate relative to Pre-Retirement Wage</td>
<td>✓</td>
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<tr>
<td>Low Population Wide Dependency Ratio</td>
<td>✓</td>
<td>✓</td>
<td>High In-System Dependency Ratio</td>
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Conclusion

• We present a simple theory to explain many puzzling facts related to China’s Social Security System

• The theory is built on two legs: (1) very high intergenerational human capital growth; (2) mechanisms (e.g. fair wage hypothesis) that may lead to wage compression.

• Most of the problems associated with China’s social security system is “growing pains”: high intergenerational human capital growth!

• Welfare implication: reforms to delay retirement age will hurt welfare because of lack of labor demand.

• Complements other explanations such as: population ageing, and various defects of social security system (e.g., Contribution evasion or avoidance, low contribution-benefit relation, low pensionable age, not strict eligibility scrutiny, empty individual account)
Thank you!