Session 128 L - China Social Health Insurance Programs @ 2030

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DAVOUT YEAN
Session 128, China Social Health Insurance @ 2030
Oct. 17, 2017
Summary

Utilized past experience of the most vibrant social health insurance program, “Urban Employee-Based Basic Medical Insurance Scheme” to formulate a 15 years projection model for China social health insurance programs. The results of this projection will be used to explore the possible future directions for China’s social health insurance programs.
Contents

• **Social welfare Programs**

• Health Insurance Framework
  - Framework
  - Health Care Delivery System & Commercial Health Insurance Market
  - Social Health Insurance Programs
    - New Rural Cooperative Medical Care System
    - Urban Employee-Based Basic Medical Insurance Scheme
    - Urban Resident-based Basic Medical Insurance Scheme

• Framework, assumptions, and the structure of the 15 years projection model

• @2030

• Possible future directions for China social health insurance programs

• China Profile
  - Geographic
  - Demographic
  - Economic
Social Welfare Programs

**Fund Income and expenditure for Pension**

- **Income**
  - 2012: $338 b
  - 2013: $383 b
  - 2014: $485 b
  - 2015: $433 b
  - 2016: $527 b

- **Expenditure**
  - 2012: $259 b
  - 2013: $307 b
  - 2014: $428 b
  - 2015: $499 b
  - 2016: $589 b

- **Year-End Balance**
  - 2012: $530 b
  - 2013: $475 b
  - 2014: $399 b
  - 2015: $450 b
  - 2016: $411 b

**Growth rates**

- Expenditure: 5% in 2014, 15% in 2015, 25% in 2016

**Fund Income and expenditure for unemployment+ Worker’s Compensation+ Maternity Insurance**

- **Income**
  - 2012: $31 b
  - 2013: $63 b
  - 2014: $81 b
  - 2015: $96 b
  - 2016: $109 b

- **Expenditure**
  - 2012: $17 b
  - 2013: $20 b
  - 2014: $24 b
  - 2015: $27 b
  - 2016: $33 b

- **Year-End Balance**
  - 2012: $15 b
  - 2013: $43 b
  - 2014: $65 b
  - 2015: $79 b
  - 2016: $86 b

**Growth rates**

- Income: 10% in 2013, 0% in 2014, 0% in 2015, 10% in 2016
- Expenditure: -10% in 2013, 0% in 2014, 0% in 2015, 10% in 2016

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**Enrollee**

- **2012**
  - Pension: 788 m
  - Urban & New rural cooperative medical: 1,341 m

- **2013**
  - Pension: 820 m
  - Urban & New rural cooperative medical: 1,373 m

- **2014**
  - Pension: 842 m
  - Urban & New rural cooperative medical: 1,333 m

- **2015**
  - Pension: 858 m
  - Urban & New rural cooperative medical: 1,336 m

- **2016**
  - Pension: 888 m
  - Urban & New rural cooperative medical: 1,336 m

**Social Welfare Programs**

- Pension
- Urban & New rural cooperative medical
- Unemployment
- Worker's compensation
- Maternity

**Enrollee**

- 2012: 788 m
- 2013: 820 m
- 2014: 842 m
- 2015: 858 m
- 2016: 888 m

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**Enrollee**

- 2012: 1,341 m
- 2013: 1,373 m
- 2014: 1,333 m
- 2015: 1,336 m
- 2016: 1,336 m

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**Enrollee**

- 2012: 1,341 m
- 2013: 1,373 m
- 2014: 1,333 m
- 2015: 1,336 m
- 2016: 1,336 m
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Framework of China Health Insurance Systems

- Healthcare System
  - Commercial Insurance
    - Supplement Health, Critical Illness, Long-term Care, Disability Income
      - Self-Paid Individual and Group
      - Public Servants, Military, etc.
      - Employed Individual
      - Non-employed individual and/or family member
    - Medical specific stop loss insurance
    - Government Employee Health Plan
      - Employed Individual
    - Basic Medical Insurance for Urban Employees
      - Non-employed individual and/or family member
    - Basic Medical Insurance for Urban Residents
      - Low Income individual and family
    - New Rural Cooperative
    - Maternity Insurance
      - Low Income individual and family
  - Social Program
    - Urban Medical Aid
    - Rural Medical Aid
  - Welfare Program
    - Low Income individual and family
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Health Care Delivery System

- 29,140 Hospitals
- 5,689 k beds, 78.3% belong to public hospital
- 5.37 bed per 1,000
- 926 k Community Medical Centers, 54 k are public
- 1,442 k beds

Basic Structure

Hospital: Inpatient, Outpatient, ER, Rad/Path, Rx, Clinic, Dental

Community Medical Center (Clinic): Small Hospital → Doctor Office

Rx

Private Dental & Eye clinic
Health Care Delivery System

Health Personnel in China

- Hospitals: 5,415 Health Professionals, 1,127 Other Staffs
- Community Medical Institutions: 3,354 Health Professionals, 1,329 Other Staffs
- Other Health Institutions: 265 Other Staffs

Health Professionals 8,455
Others 2,718

Constitution of Health technician in China

- Graduate: 10.3%
- Undergraduate: 38.8%
- Junior college: 30.6%
- Polytechnic school: 18.3%
- High school and below: 2%

Health resource comparison Between Us and China

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<th>*US</th>
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<td>5.37</td>
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<tr>
<td># Registered Doctor per 1000 people</td>
<td>2.31</td>
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<tr>
<td># Registered Doctor/# Registered Nurse</td>
<td>0.91</td>
<td>0.29</td>
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</table>
Commercial Health Insurance Market

Health Insurance Breakdown 2016

Covering about 1.05 billion persons in CHINA

- Medical: 31%
- Long Term Care: 31%
- Disability: 0%
- CI: 42%
- Medical: 27%
- Life insurance: 17%
- Non-life insurance: 8%
- Auto insurance: 0%
- Health insurance: 75%

Life insurance growth ratio: -10.2% to 67.7%
Non-life insurance growth ratio: 2.4% to 24.7%
Health insurance growth ratio: 16.9% to 31.7%
Auto insurance growth ratio: -100% to 67.7%


$T
0 50 100 150 200 250 300 350 400 450
-100% -80% -60% -40% -20% 0% 20% 40% 60% 80%

Life insurance
non-life insurance
health insurance
auto insurance
Life insurance growth ratio
non-life insurance growth ratio
health insurance growth ratio
auto insurance growth ratio
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Basic Medical Insurance of Urban Employees

- Funding
  Payroll deduction
  Employee 2%, Employer 6-10%

- Fund Distribution
  3% go to Individual Account
  The rest go to a “pool”
Why using Urban Employee-Based Basic Medical Insurance Scheme as the baseline?

- Stronger legal foundation and better support by tax policies
- Most mature program
- Standard and well-structured eligibility roles, reliable source for funding, clearly defined comprehensive coverage
- A matured compulsory Plan, since 2010 the enrollee population almost becomes a closed population
- Available/Reliable experience data
Urban Resident-based Basic Medical Insurance Scheme

### Urban Residents & Growth

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<th>Adults</th>
<th>Minors</th>
<th>College Students</th>
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<td>46%</td>
<td>45%</td>
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<td>58%</td>
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<td>7%</td>
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<td>2015</td>
<td>100%</td>
<td>62%</td>
<td>32%</td>
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<td>2016</td>
<td>100%</td>
<td>66%</td>
<td>29%</td>
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<tr>
<td><strong>CAGR</strong></td>
<td><strong>15.2%</strong></td>
<td><strong>22.3%</strong></td>
<td><strong>6.8%</strong></td>
<td><strong>3.2%</strong></td>
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### Income, Payment & Balance%

<table>
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<th>Payment</th>
<th>Balance%</th>
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<td>4.1%</td>
<td>31.0%</td>
<td>23%</td>
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<tr>
<td>2012</td>
<td>4.4%</td>
<td>23.0%</td>
<td>18%</td>
</tr>
<tr>
<td>2013</td>
<td>5.1%</td>
<td>18.0%</td>
<td>15%</td>
</tr>
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<td>2014</td>
<td>5.6%</td>
<td>25.6%</td>
<td>22%</td>
</tr>
<tr>
<td>2015</td>
<td>6.4%</td>
<td>32.7%</td>
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</tr>
<tr>
<td>2016</td>
<td>9.2%</td>
<td>43.6%</td>
<td>38%</td>
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### per Capita Funding of UR

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<th>Payment</th>
<th>Balance%</th>
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<td>50.0%</td>
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<tr>
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<td>9.6%</td>
<td>28.5%</td>
<td>19%</td>
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<tr>
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<td>10.5%</td>
<td>17.4%</td>
<td>13%</td>
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<td>2013</td>
<td>12.1%</td>
<td>17.4%</td>
<td>13%</td>
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<td>13.2%</td>
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<td>2015</td>
<td>14.0%</td>
<td>68.5%</td>
<td>13%</td>
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<td>2016</td>
<td>15.1%</td>
<td>22.0%</td>
<td>14%</td>
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</table>
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Enrollee Demographic Structure

- Use 2010 nationwide census results as a reference
- Age and education level two dimensional approach
- Assumptions:
  - Average employment age at 18
  - Average retirement age at 58
  - Enrollee age distribution
  - Enrollee education level distribution

Progression
- Active
  - New graduate (enter)
  - Retired active enrollee (enter)
  - New employment (enter)
- Retiree
  - New unemployment (exit)
  - Death (exit)

Financial Positions in 2030

Key Components for Projection Model

- Enrollee Demographic Structure
- Funding/Income/Premium
- Claim Cost

- Enrollee Demographic Structure
  - Use 2010 nationwide census results as a reference
  - Age and education level two dimensional approach
  - Assumptions:
    - Average employment age at 18
    - Average retirement age at 58
    - Enrollee age distribution
    - Enrollee education level distribution

- Funding/Income/Premium
  - Average Wage
  - Premium Contribution Base
  - Contribution Rate

- Claim Cost
  - Analyze Utilization by…..
    - Two major demographic categories: Active, Retiree
    - Three benefit categories: Hospital Inpatient, General & ER Office Visit, Office Visit(Specific Illness)
    - Four different view on utilization: Episode, Admission, Day, Visit.
  - Analyze matching cost per unit
Funding - GDP, Average Wage, Premium Contribution Base

Fiscal Subsidy

<table>
<thead>
<tr>
<th>Year</th>
<th>China GDP ($b)</th>
<th>GDP Per Capita ($)</th>
<th>GDP Per Capita Growth Rate</th>
<th>Premium Contribution Base Growth Rate</th>
<th>Premium Contribution Base /GDP Per Capita</th>
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</thead>
<tbody>
<tr>
<td>2010</td>
<td>6100.6</td>
<td>4561</td>
<td>10.1%</td>
<td>13.0%</td>
<td>79%</td>
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<td>2011</td>
<td>7572.6</td>
<td>5634</td>
<td>9.0%</td>
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<td>76%</td>
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<td>2012</td>
<td>8560.5</td>
<td>6338</td>
<td>7.3%</td>
<td>16.2%</td>
<td>80%</td>
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<tr>
<td>2013</td>
<td>9607.2</td>
<td>7078</td>
<td>7.2%</td>
<td>10.4%</td>
<td>81%</td>
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<tr>
<td>2014</td>
<td>10482.4</td>
<td>7684</td>
<td>6.8%</td>
<td>13.1%</td>
<td>85%</td>
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<td>2015</td>
<td>11064.7</td>
<td>8111</td>
<td>6.4%</td>
<td>11.9%</td>
<td>89%</td>
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<tr>
<td>2016</td>
<td>11199.1</td>
<td>8340</td>
<td>6.1%</td>
<td>9.6%</td>
<td>89%</td>
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</table>
Funding - Premium Contribution Base Projection

GDP per Capita & Growth Rate

Premium Contribution Base/GDP per Capita - Actual & Assumption

Funding - Income Projection

- Fiscal Subsidy = 0.8%
- Interest = 3.4%
Claim Cost - Overall Trend

- 1) Enrollee
- 2) Active/Retired
- 3) Medical Cost Inflation
- 4) Utilization Rate

Yearly trends from 2010 to 2016:
- 2010: 24%
- 2011: 23%
- 2012: 21%
- 2013: 20%
- 2014: 15%
- 2015: 12%
- 2016: 10%
Claim Cost - Utilization Assumption
Hospital Inpatient Admission Rate; General & ER Office Visit Rate; Specific Illness Office Visit Rate
## Claim Cost - Unit Cost Assumption

Hospital Inpatient Cost Per Admission; General & ER; Specific Illness Cost Per Visit

### Inpatient Cost per Admission
(4%)

<table>
<thead>
<tr>
<th>Year</th>
<th>Active Staff</th>
<th>Retiree</th>
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<tr>
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<td>1,000</td>
<td>500</td>
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<td>6,130</td>
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<tr>
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<td>7,669</td>
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<td>2027</td>
<td>9,721</td>
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<td>11,260</td>
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</table>

### General & ER Cost per Visit
(5%)

<table>
<thead>
<tr>
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<th>Active Staff</th>
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<tr>
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<td>2013</td>
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<tr>
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<td>30,520</td>
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### Specific Illness Cost per Visit
(5%)

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<td>20,000</td>
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<tr>
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<tr>
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<td>107,260</td>
<td>107,260</td>
</tr>
<tr>
<td>2028</td>
<td>112,410</td>
<td>112,410</td>
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<td>2029</td>
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<tr>
<td>2030</td>
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Contents

• Social welfare Programs

• Health Insurance Framework
  - Framework
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  - Social Health Insurance Programs
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    Urban Employee-Based Basic Medical Insurance Scheme
    Urban Resident-based Basic Medical Insurance Scheme

• Framework, assumptions, and the structure of the 15 years projection model

• @2030

• Possible future directions for China social health insurance programs

• China Profile
  - Geographic
  - Demographic
  - Economic
Income and Expenditure Projection

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
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<td>Reserve ($ b)</td>
<td>170.5</td>
<td>173.1</td>
<td>176.8</td>
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<td>184.7</td>
<td>188.5</td>
<td>192.2</td>
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<td>199.0</td>
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<td>212.4</td>
<td>215.3</td>
<td>218.0</td>
<td>220.6</td>
</tr>
</tbody>
</table>
“Pay as You Go” model holds if strong GDP growth continue, health care cost inflation and services utilization are under control.

For many “poor performer” individual fund/plan, break even year & 0 reserve year will arrive before 2030.

Determine what should be the core coverage (or set priority), i.e. wellness, preventive, basic, chronic, severe illness.

Need further realignment on deductible, co-insurance, benefit max, Out of pocket max, specific stop loss protection.

Management/control on Individual Account needs more attention.

Premium increase shouldn’t be/will not be the life saver.
@2030 - Social Health Insurance Programs Expenditure

Urban Employee-based medical Insurance Scheme
urban Resident-based medical Insurance Scheme
New Rural Cooperative Medical Care System

Total $214.0 b
$102.5 b
$61.0 b
$50.5 b
### Overall Health Expenditure

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<thead>
<tr>
<th></th>
<th>$ b</th>
<th>2030</th>
<th>2016</th>
<th>2015</th>
<th>2014</th>
<th>2013</th>
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<tr>
<td><strong>Total Health Expenditure</strong></td>
<td></td>
<td>...</td>
<td>718.5</td>
<td>629.3</td>
<td>548.5</td>
<td>490.9</td>
</tr>
<tr>
<td><strong>Government</strong></td>
<td></td>
<td>...</td>
<td>215.7</td>
<td>194.3</td>
<td>164.2</td>
<td>147.6</td>
</tr>
<tr>
<td><strong>Social</strong></td>
<td></td>
<td>...</td>
<td>296.1</td>
<td>246.4</td>
<td>202.2</td>
<td>176.9</td>
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<tr>
<td><strong>Three Social Health Insurance Programs Expenditure</strong></td>
<td></td>
<td>...</td>
<td>214.0/72.3%</td>
<td>198.2 / 80.4%</td>
<td>170.9 / 84.5%</td>
<td>145.0 / 81.2%</td>
</tr>
<tr>
<td><strong>Personal</strong></td>
<td></td>
<td>...</td>
<td>206.8</td>
<td>188.6</td>
<td>182.1</td>
<td>166.3</td>
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</table>
Contents

• Social welfare Programs
• Health Insurance Framework
  - Framework
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    - Urban Employee-Based Basic Medical Insurance Scheme
    - Urban Resident-based Basic Medical Insurance Scheme
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Possible future directions for China social health insurance programs

中共中央总书记、国家主席、中央军委主席、中央全面深化改革领导小组组长习近平2015年12月9日主持中央全面深化改革领导小组第十九次会议重要讲话

The Key Words.....

Mission: Promote healthcare reform, social equality and people’s welfare

Goal: Build a multi-layered medical security system

Next Step: Integration of Urban Residents Basic Medical Insurance and New Rural Cooperative System

Key Focus: Unified coverage, funding, benefits, medicine catalogues, site management and fund management.

The Take Away....

• Integrate Urban Residents Basic Medical Insurance and New Rural Cooperative System to promote social equality and people’s welfare.

• 3 key ingredients for the integration: **Unified coverage, funding**, administration support
## @2030 Further Integration Scenarios

### Stay the Same
Project both 2 programs to 2030, based on current coverage level.

Cost per capita at 2030

<table>
<thead>
<tr>
<th>Scheme</th>
<th>Cost per Capita</th>
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</thead>
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<tr>
<td>Urban Employee-Based Basic Medical Insurance Scheme</td>
<td>$1,062</td>
</tr>
<tr>
<td>Urban &amp; Rural Resident-based Basic Medical Insurance Scheme</td>
<td>$114</td>
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</table>

### Unified Coverage
Project both 2 programs to 2030, based on the same coverage level with Urban Employee-based Basic Medical Insurance Scheme

Cost per capita at 2030

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<thead>
<tr>
<th>Scheme</th>
<th>Cost per Capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban Employee-Based Basic Medical Insurance Scheme</td>
<td>$1,062</td>
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<tr>
<td>Urban &amp; Rural Resident-based Basic Medical Insurance Scheme</td>
<td>$1,062</td>
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</table>
### Social Health Insurance Programs Expenditure at 2030 (USD billion)

<table>
<thead>
<tr>
<th></th>
<th>Urban Employee-Based</th>
<th>Urban &amp; Rural Resident-Based</th>
<th>Total</th>
<th>Total Expenditure/GDP at 2030</th>
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<tr>
<td><strong>Stay the same</strong></td>
<td>399</td>
<td>117</td>
<td>516</td>
<td>1.92%</td>
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<td></td>
<td>77.29%</td>
<td>22.71%</td>
<td>100.00%</td>
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<tr>
<td><strong>Unified Coverage</strong></td>
<td>399</td>
<td>1,035</td>
<td>1,434</td>
<td>5.34%</td>
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<td></td>
<td>27.80%</td>
<td>72.20%</td>
<td>100.00%</td>
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### @2030 Further Integration Scenarios

<table>
<thead>
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<th>2016</th>
<th>2015</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GDP</strong></td>
<td>26,862 (CAGR=6.4%)</td>
<td>11,199</td>
<td>11,065</td>
<td>10,482</td>
<td>9,607</td>
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<tr>
<td><strong>Total Health Expenditure</strong></td>
<td>2,686 (10% of GDP assumption)</td>
<td>718.5 (6.4% of GDP)</td>
<td>629.3 (5.7% of GDP)</td>
<td>548.5 (5.2% of GDP)</td>
<td>490.9 (5.1% of GDP)</td>
</tr>
<tr>
<td><strong>Government</strong></td>
<td>807 (30% of Total)</td>
<td>215.7</td>
<td>194.3</td>
<td>164.2</td>
<td>147.6</td>
</tr>
<tr>
<td><strong>Social</strong></td>
<td>1,793</td>
<td>296.1</td>
<td>246.4</td>
<td>202.2</td>
<td>176.9</td>
</tr>
<tr>
<td><strong>Social Health Insurance Programs Expenditure</strong></td>
<td>1,434/80%</td>
<td>214.0/72.3%</td>
<td>198.2 / 80.4%</td>
<td>170.9 / 84.5%</td>
<td>145.0 / 81.2%</td>
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<tr>
<td><strong>Personal</strong></td>
<td>86 ?</td>
<td>206.8</td>
<td>188.6</td>
<td>182.1</td>
<td>166.3</td>
</tr>
</tbody>
</table>
@2030 Further Integration Scenarios

Social Programs

Funding
- Tax revenue
- Surplus reserve
- Individual account

Coverage
- Definition of “Basic Coverage”
- Cost sharing

Pooling
- Eligibility policy
- Geographical & economical barrier

Full Integration of Social Programs

Health Care Service Delivery System

Structure Realignment
- Hospital & Community Medical Center
- General hospital, specialty hospital, clinic

Privatization
- Right or commodity
- Escalate medical inflation
- Qualify for social program

Clinical & Logical separation
- 3 separation: health care service personnel, clinic, Rx
- Qualification and education

Accessible, Good Quality, Affordable

Commercial Health Insurance

Function & Role
- 2 tracks approach or supplemental
- Incentive

Integrated with Social Programs

Corporation with health care service industry/system

Key role in “multi-layer security system”
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• China Profile
  - Geographic
  - Demographic
  - Economic
Geographic - Location

- Size: 3.71 Million Mi²
- One Coast Line: 9,010 Miles Long
- Neighboring Countries: Too Many
- Land Policy

Kazakhstan
Kyrgyzstan
Tajikistan
Afghanistan
Pakistan
India
Nepal
Bhutan
Myanmar (Burma)
Laos
Russia
Mongolia
North Korea
Vietnam
Geographic - Great Divide

Population Distribution

Precipitation Distribution

Spring Festival Rush

Smog Days
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  - Demographic
Demographic - Population Profile

**Growth Rate**
- Year-End Population
- Growth Rate

**Ageing**
- 65+
- 15-64
- 0-14

**Unit: 10 thousand**

- 1958 – 1960: Severe famine
- 2013: If one of the parents is single child allow 2 kids
- 2011: If both parents are single child allow 2 kids
- 2016: 2 kids only

**Newborn**

- 1954
- 1964
- 1974
- 1984
- 1994
- 2004
- 2014
- 2024
- 2030E


**Growth Rate**
- 2000
- 2005
- 2010
- 2015

**Population**
- 1954
- 1964
- 1974
- 1984
- 1994
- 2004
- 2014
- 2024
- 2030E

1.0
1.2
1.4
1.0
1.2
1.4
1.0
1.2
1.4
1.0
1.2
1.4

0%
20%
40%
60%
80%
100%
0%
20%
40%
60%
80%
100%

1980: 1 kid only
2011: If both parents are single child allow 2 kids
2016: 2 kids only
Demographic - Population Profile

- **HuKou (户口)**, comprehensive residential registration system
- **Low illiteracy ratio**
  - China: 3.6%
  - US: 0.9%
  - India: 27.8%
- **Value shift for labor force**
- **Urbanization**
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### Economic - Key Index

<table>
<thead>
<tr>
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<th>CHN</th>
<th>USA</th>
<th>EU</th>
<th>JAN</th>
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<td>18,569</td>
<td>16,398</td>
<td>4,939</td>
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<td>M2</td>
<td>24,032</td>
<td>16,815</td>
<td>10,162</td>
<td>8,557</td>
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<td>M2/GDP</td>
<td>215%</td>
<td>91%</td>
<td>62%</td>
<td>173%</td>
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</tbody>
</table>

#### Inflation

![Inflation Graph](image)

#### M2

![M2 Graph](image)
Economic - Capital Market SOE Phenomena

- 3 stock exchanges (Shanghai, Shenzhen and Hong Kong) total market cap is $10 trillion
- (NYSE + NASDAQ) = $27 trillion
- ~50% of total market cap of Shanghai and Shenzhen stock exchange belongs to SOEs

### TOP 10 in FORTUNE 500 - 2017

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Company</th>
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<tbody>
<tr>
<td>1</td>
<td>WAL-MART STORES</td>
</tr>
<tr>
<td>2</td>
<td>CHINA STATE GRID</td>
</tr>
<tr>
<td>3</td>
<td>CHINA SINOPEC GROUP</td>
</tr>
<tr>
<td>4</td>
<td>CHINA NATIONAL PETROLEUM</td>
</tr>
<tr>
<td>5</td>
<td>TOYOTA MOTOR</td>
</tr>
<tr>
<td>6</td>
<td>VOLKSWAGEN</td>
</tr>
<tr>
<td>7</td>
<td>ROYAL DUTCH SHELL</td>
</tr>
<tr>
<td>8</td>
<td>BERKSHIRE HATHAWAY</td>
</tr>
<tr>
<td>9</td>
<td>APPLE</td>
</tr>
<tr>
<td>10</td>
<td>EXXON MOBIL</td>
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### TOP 10 in CHINA - 2017

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<tr>
<td>3</td>
<td>CHINA SINOPEC GROUP</td>
</tr>
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<td>4</td>
<td>CHINA NATIONAL PETROLEUM</td>
</tr>
<tr>
<td>22</td>
<td>INDUSTRIAL &amp; COMMERCIAL BANK OF CHINA</td>
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<tr>
<td>24</td>
<td>CHINA STATE CONSTRUCTION ENGINEERING</td>
</tr>
<tr>
<td>27</td>
<td>HON HAI PRECISION INDUSTRY</td>
</tr>
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<td>28</td>
<td>CHINA CONSTRUCTION BANK</td>
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<td>38</td>
<td>AGRICULTURAL BANK OF CHINA</td>
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<td>39</td>
<td>CHINA PING AN INSURANCE</td>
</tr>
<tr>
<td>41</td>
<td>CHINA SAIC MOTOR</td>
</tr>
</tbody>
</table>
Global Ranking: 1.US; 2.Japan; 3.China
Substantial Municipal bond rollover in 2015, 2016
Economic - Property Market

- Key factor for GDP growth, counted for 15% of the GDP
- "Land Economic"
- Property Tax
Economic - Infrastructure Development

High Speed Railroad

- Operation length
- New line invested

 Commercial Airport in China

- Number of commercial airport
- Growth rate

Highway and Expressway

- Total mileage of highway in China
- Total mileage of expressway in China
- Density of highway in China

For total length of “Express Way”, China exceed US in 2014, rank #1 in the world.
China: 123,000 km  US:100,000km
Economic - Infrastructure Development

Source of Electricity Production of China in 2015

- Hydropower: 19.6%
- Wind power: 3.2%
- Nuclear power: 3.0%
- Thermal power: 74.2%

Electricity Consumption in China

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual electricity consumption (twh)</th>
<th>Growth rate (%)</th>
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<tr>
<td>2000</td>
<td>1600</td>
<td>0</td>
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<tr>
<td>2005</td>
<td>3200</td>
<td>8</td>
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<td>2010</td>
<td>4800</td>
<td>16</td>
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<td>2015</td>
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Electricity Consumption in China

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<th>Annual electricity consumption (twh)</th>
<th>Growth rate (%)</th>
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<td>1600</td>
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<td>2005</td>
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<td>2010</td>
<td>4800</td>
<td>16</td>
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<td>2015</td>
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Source of Electricity Production in 2011

<table>
<thead>
<tr>
<th>Country</th>
<th>Electric Production (TWH)</th>
<th>Coal</th>
<th>Natgas</th>
<th>Petroleum</th>
<th>Hydropower</th>
<th>Renewable Energy</th>
<th>Nuclear Power</th>
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<td>World</td>
<td>22,158.5</td>
<td>41.2</td>
<td>21.9</td>
<td>3.9</td>
<td>15.6</td>
<td>4.2</td>
<td>11.7</td>
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<td>China</td>
<td>4,715.7</td>
<td>79.0</td>
<td>1.8</td>
<td>0.2</td>
<td>14.8</td>
<td>2.2</td>
<td>1.8</td>
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<td>US</td>
<td>4,326.6</td>
<td>43.3</td>
<td>24.2</td>
<td>0.9</td>
<td>7.4</td>
<td>4.8</td>
<td>19.0</td>
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<tr>
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<td>1,053.0</td>
<td>67.9</td>
<td>10.3</td>
<td>1.2</td>
<td>12.4</td>
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<td>0.1</td>
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<td>1.0</td>
<td>59.0</td>
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<td>Germany</td>
<td>602.4</td>
<td>45.1</td>
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<td>2.9</td>
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<td>17.9</td>
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<td>8.0</td>
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<td>30.0</td>
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<td>1.0</td>
<td>1.6</td>
<td>7.9</td>
<td>18.9</td>
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<td>Italia</td>
<td>300.6</td>
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<td>48.1</td>
<td>6.6</td>
<td>15.2</td>
<td>12.4</td>
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</table>
Economic - Infrastructure Development

**Ranking of 2016 Crude steel production (thousand tons)**

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Country</th>
<th>Crude steel production (thousand tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>China</td>
<td>808,366</td>
</tr>
<tr>
<td>2</td>
<td>Japan</td>
<td>104,774</td>
</tr>
<tr>
<td>3</td>
<td>India</td>
<td>95,618</td>
</tr>
<tr>
<td>4</td>
<td>US</td>
<td>78,475</td>
</tr>
<tr>
<td>5</td>
<td>Russia</td>
<td>70,808</td>
</tr>
<tr>
<td>6</td>
<td>Korea</td>
<td>68,576</td>
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<tr>
<td>7</td>
<td>Germany</td>
<td>42,080</td>
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<tr>
<td>8</td>
<td>Turkey</td>
<td>33,163</td>
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<tr>
<td>9</td>
<td>Brazil</td>
<td>31,275</td>
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<tr>
<td>10</td>
<td>Ukraine</td>
<td>24,218</td>
</tr>
</tbody>
</table>

**Ranking of cities’2016 Crude steel production in China (thousand tons)**

<table>
<thead>
<tr>
<th>Ranking</th>
<th>City</th>
<th>Crude steel production in China (thousand tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tangshan</td>
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<tr>
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<tr>
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