Pension Indicators

Reliable statistics to improve pension policy-making

Carolina Romero-Robayo
Edward Whitehouse
The need for reliable and up-to-date data

- Valuable lessons to be learned from other countries
- More countries address pressures of population ageing and maturing of pension systems
- Rapid change and widespread pension reform
- Need for timely information about increasingly diverse retirement-income provision
- Move away from narrow focus on financial sustainability
- Greater emphasis on a ‘results–based’ policy-making
- Impact of policy changes needs to be identified, measured and assessed
Data sources

- Primary sources: national
  - administrative: published or databases
  - household surveys
  - labour-force surveys

- Secondary sources: international organisations
  - World Bank
  - OECD (Organisation for Economic Co-operation and Development)
  - Regional development banks
  - ILO (International Labour Office/Organisation)
  - United Nations
  - ISSA (International Social Security Organisation)
Database: Constraints and challenges

- Capacity and resources on the national level
- Co-ordination between national agencies
- Missing or wrong information of individual records
- Corruption, evasion and abuse of systems
- Comparability in secondary sources
- Applicability of key concepts
Organising the indicators

Environment → System design → Performance
Environment Indicators

Demographic, economic and social context
Demographic, economic and social context

- Well known phenomenon of population ageing
  - Lower fertility
  - Longer life expectancy
- Patterns of labour-force participation by age
- Public finances: a constraint on pension-reform options
- Financial-sector development: a constraint on the direction of pension reform?
Demographic change: Fertility
Demographic change: Life expectancy at birth
Demographic change: Population ageing, projections
Economic context: labour-market participation of over 65s

Source: ILO
Other environment indicators

- Fiscal situation: a constraint on reform choices?
  - budget deficit
  - government debt

- Financial-market development
  - to be developed using World Bank indicators

- Institutions
  - to be developed using World Bank governance indicators


Design Indicators

Structure of the pension system, key parameters and rules
World-Bank multi-pillar framework: simplified version

Retirement-income system: national schemes

- Zero pillar: mandatory, public, adequacy
  - Basic
  - Resource-tested
- First pillar: mandatory, public, mainly income replacement
  - DB
  - Points
  - NDC
  - Public DC
  - Minimum pensions
- Second pillar: mandatory, private, income replacement
  - Private DC
  - Private DB
- Third pillar: voluntary, private
Overall structure: First and second pillars

- Zero pillar only: 5 countries (e.g., Botswana, Ireland, Namibia, New Zealand, South Africa)
- NDC: 10 countries (Azerbaijan, Egypt, Italy, Kyrgyz R., Latvia, Mongolia, Norway, Poland, Russia, Sweden)
- Private DC: 32 countries (Latin America, Eastern Europe/Central Asia, Australia, Denmark, Egypt, Ghana, Nigeria, Norway, Sweden)
- Public DC/provident funds: 25 countries (South Asia, Pacific, East Africa)
- DB schemes: 123 countries
- Points schemes: 10 countries (e.g., France, Germany, Senegal, Slovak R.)
### Parameters: accrual rate

<table>
<thead>
<tr>
<th>Region</th>
<th>Regional average accrual rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Asia/Pacific</td>
<td>1.8%</td>
</tr>
<tr>
<td>Eastern Europe/Central Asia</td>
<td>1.7%</td>
</tr>
<tr>
<td>Latin America/Caribbean</td>
<td>1.2%</td>
</tr>
<tr>
<td>Middle East/North Africa</td>
<td>1.6%</td>
</tr>
<tr>
<td>South Asia</td>
<td>2.0%</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>1.6%</td>
</tr>
<tr>
<td>High-income OECD</td>
<td>1.6%</td>
</tr>
<tr>
<td><strong>World</strong></td>
<td><strong>1.7%</strong></td>
</tr>
</tbody>
</table>
## Parameters: earnings measure

<table>
<thead>
<tr>
<th>Region</th>
<th>Lifetime average earnings</th>
<th>Best/final earnings</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Asia/Pacific</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Eastern Europe/ Central Asia</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Latin America/Caribbean</td>
<td>-</td>
<td>17</td>
</tr>
<tr>
<td>Middle East/North Africa</td>
<td>-</td>
<td>10</td>
</tr>
<tr>
<td>South Asia</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>-</td>
<td>18</td>
</tr>
<tr>
<td>High-income OECD</td>
<td>16</td>
<td>3</td>
</tr>
<tr>
<td><strong>World</strong></td>
<td><strong>24</strong></td>
<td><strong>54</strong></td>
</tr>
</tbody>
</table>
Parameters: earnings measure

Number of years of earnings in pension calculation

Pre-reform | Post-reform
---|---
Iceland | Germany
United States | Hungary
Canada |

Iceland, Germany, Hungary
Japan, Korea, Luxembourg, Switzerland
United States
Canada

Pre-reform | Post-reform
---|---
Austria, Portugal | Czech Republic
Finland, Poland, Portugal | France
Sweden, Spain |

Sweden, Spain
Czech Republic
France
Austria, Finland, Portugal, Poland, Portugal

Pre-reform | Post-reform
---|---
Norway, United Kingdom |
Norway, United Kingdom |
Norway, United Kingdom |
## Indexation

<table>
<thead>
<tr>
<th>Region</th>
<th>Prices</th>
<th>Wages</th>
<th>Mixed</th>
<th>Ad hoc/discretionary</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Asia Pacific</td>
<td>2</td>
<td>2</td>
<td></td>
<td>1</td>
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<tr>
<td>Eastern Europe Central Asia</td>
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<td>3</td>
</tr>
<tr>
<td>Latin America Caribbean</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>Middle East North Africa</td>
<td>2</td>
<td>1</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>8</td>
<td>2</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>High-income OECD</td>
<td>11</td>
<td>2</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td><strong>World</strong></td>
<td><strong>39</strong></td>
<td><strong>10</strong></td>
<td><strong>15</strong></td>
<td><strong>37</strong></td>
</tr>
</tbody>
</table>
Contribution rate:
Defined-contribution schemes

![Bar chart showing the distribution of contribution rates to mandatory DC/provident fund (% of earnings) across 20 countries. The chart indicates that the majority of countries contribute 10% of earnings to the fund.](chart_image)
Performance Indicators

Assessing pension systems against key objectives and principles
Six principles and objectives

- **Coverage** of the pension system, by both mandatory and voluntary schemes
- **Adequacy** of retirement benefits
- **Financial sustainability** and affordability of pensions to taxpayers and contributors
- **Economic efficiency**: minimising distortions on economic behaviour, such as labour supply and saving
- **Administrative efficiency**: keeping costs low (collecting contributions, paying benefits, managing investments)
- **Security** of benefits in the face of different risks and uncertainties
Coverage

How much of the labour force is covered by the pension system?
Coverage

- Low coverage of formal pension systems may lead to widespread old-age poverty
- Retirement-income systems can affect people at all stages of their adult lives (as contributors or beneficiaries)
- Focus here in people of working age
- Measuring coverage: affiliates or members?
  - but risk of double-counting people in multiple schemes or with multiple accounts/records
  - also, dormant accounts/records of people no longer actively contributing
  - people registered for social security but not covered by pension component
Defining coverage: The active member concept

- Someone who contributed to or accrued rights in a formal pension scheme
- Concept clearest when pensions are contributory, but active members of non-contributory schemes are also ‘covered’
- Also, people who receive credits for periods of unemployment, caring for children, full-time education, military service etc. can be covered
- Note: active member concept only applies to mandatory income-replacement pensions (first and second pillars) and rarely to zero pillar schemes (universal basic, means-tested)

Comparators:
- Working-age population
- Labour force
Coverage and national income

Coverage
% of labour force

Gross national income per head
USD, 2009, log scale
Coverage: different measures

Pension system coverage (% of labor force)

Pension system coverage (% of working age population)

0 25 50 75 100
0
25
50
75
100

Pension system coverage (% of labor force)
Adequacy

Pension entitlements, replacement rates and pension wealth
Three approaches to assessing adequacy

- Empirical information on pension entitlements of recent retirees
- Evidence from household survey data on income and poverty of older people
- Models of future pension entitlements of today’s workers
Modelling pension entitlements

- Uses ‘Apex’ model (Analysis of Pension Entitlements across Countries)
- Results published in OECD *Pensions at a Glance* and World Bank *Pensions Panorama*
- Baseline assumptions:
  - worker entering the labour market today
  - full career from age 20 to national, normal pensionable age
  - standard assumptions of inflation, average-earnings growth, investment returns (for DC), discount rate
  - country-specific information on mortality rates
- Important to note this is an *indicator* not a *forecast*
Apex results from *Pensions Panorama* and *PaG Asia/Pacific*

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**Eastern Europe/Central Asia**
- Turkey
- Hungary
- Poland
- Bulgaria
- Latvia
- Slovak Republic
- Czech Republic
- Estonia
- Lithuania
- Croatia

**South Asia**
- Pakistan
- Sri Lanka
- India

**East Asia/Pacific**
- Taiwan
- Vietnam
- China
- Philippines
- Thailand
- Hong Kong
- Malaysia
- Indonesia
- Singapore

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**Middle East/North Africa**
- Iran
- Yemen
- Egypt
- Libya
- Algeria
- Bahrain
- Morocco
- Jordan
- Tunisia
- Djibouti
- Egypt
- Yemen
- Iran

**Latin America/Caribbean**
- Uruguay
- Costa Rica
- Argentina
- Dominican Republic
- Colombia
- Chile
- Peru
- El Salvador
- Mexico
Extending the analysis

- Net replacement rates
- Pension wealth
  - present value (‘stock’) of the ‘flow’ of pension benefits
  - pension eligibility age
  - indexation of pensions in payment
  - national life expectancy
Pension wealth

Lifetime value of pension flow

- OECD-30
- Latin America/Caribbean, East Asia/Pacific
- Middle East/North Africa
- South Asia

Age of retirement
## Pension wealth: sample results

<table>
<thead>
<tr>
<th>Country</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>16.4</td>
<td>20.1</td>
</tr>
<tr>
<td>India</td>
<td>6.2</td>
<td>6.6</td>
</tr>
<tr>
<td>Indonesia</td>
<td>2.6</td>
<td>2.6</td>
</tr>
<tr>
<td>Malaysia</td>
<td>6.4</td>
<td>6.4</td>
</tr>
<tr>
<td>Pakistan</td>
<td>10.7</td>
<td>12.5</td>
</tr>
<tr>
<td>Philippines</td>
<td>8.3</td>
<td>9.5</td>
</tr>
<tr>
<td>Thailand</td>
<td>8.7</td>
<td>10.2</td>
</tr>
<tr>
<td>Vietnam</td>
<td>15.1</td>
<td>16.9</td>
</tr>
<tr>
<td>Canada</td>
<td>6.6</td>
<td>7.7</td>
</tr>
<tr>
<td>France</td>
<td>8.8</td>
<td>10.2</td>
</tr>
<tr>
<td>Germany</td>
<td>7.2</td>
<td>8.5</td>
</tr>
<tr>
<td>Italy</td>
<td>10.0</td>
<td>10.7</td>
</tr>
<tr>
<td>Japan</td>
<td>5.7</td>
<td>6.4</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>4.2</td>
<td>4.8</td>
</tr>
<tr>
<td>United States</td>
<td>5.9</td>
<td>6.8</td>
</tr>
<tr>
<td>OECD-30 average</td>
<td>9.3</td>
<td>10.8</td>
</tr>
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Pension entitlements of current retirees

- **Current** rather than **expected** entitlements
- These depend on
  - past parameters and rules of the pensions system
  - past social and economic circumstances
- **Average benefit levels: whose benefits?**

<table>
<thead>
<tr>
<th>Category</th>
<th>Lithuania</th>
<th>Brazil</th>
</tr>
</thead>
<tbody>
<tr>
<td>All beneficiaries</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Old-age</td>
<td>128</td>
<td>131</td>
</tr>
<tr>
<td>Male old-age</td>
<td>145</td>
<td>144</td>
</tr>
<tr>
<td>New male old-age</td>
<td>170</td>
<td>154</td>
</tr>
<tr>
<td>Survivors</td>
<td>27</td>
<td>99</td>
</tr>
<tr>
<td>Disabled</td>
<td>122</td>
<td>–</td>
</tr>
<tr>
<td>Disabled below pension age</td>
<td>96</td>
<td>–</td>
</tr>
<tr>
<td>Civil servants</td>
<td>–</td>
<td>357</td>
</tr>
<tr>
<td>Farmers</td>
<td>–</td>
<td>75</td>
</tr>
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<td>357</td>
</tr>
<tr>
<td>Farmers</td>
<td>–</td>
<td>75</td>
</tr>
</tbody>
</table>
Old-age poverty: OECD countries

Old more likely to be poor

Old less likely to be poor
Financial sustainability

Assessing the finances of pension systems over the long term
Expenditures

Public pension spending (% of GDP)

- Brazil
- Fiji
- Syria
Contribution revenues

Pension-contribution revenues (% of GDP)

Brazil

Fiji

Syria

2005 2010 2015 2020 2025 2030 2035 2040 2045 2050 2055
‘Current balance’: Expenditures minus revenues

Current balance of pension system (% of GDP)

-7
-6
-5
-4
-3
-2
-1
0
1
2005 2010 2015 2020 2025 2030 2035 2040 2045 2050 2055

Brazil
Fiji
Syria

Current balance of pension system (% of GDP)
‘Current balance’: Expenditures minus revenues

Current balance of pension system (% of GDP)

Brazil
Fiji
Syria
## ‘Stock’ indicators

<table>
<thead>
<tr>
<th>% of GDP</th>
<th>Brazil</th>
<th>Fiji</th>
<th>Syria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present value pension spending (2007-2056)</td>
<td>489.7</td>
<td>233.3</td>
<td>152.2</td>
</tr>
<tr>
<td>Present value contributions (2007-2056)</td>
<td>271.9</td>
<td>189.0</td>
<td>97.7</td>
</tr>
<tr>
<td>Financing gap (2007-2056)</td>
<td>217.7</td>
<td>44.3</td>
<td>54.5</td>
</tr>
</tbody>
</table>

| Implicit pension debt (2007)             | 148.6  | 73.9  | 72.5  |
| Pension-reserve assets (2007)            | 0.0    | 63.8  | 1.1   |
| Solvency gap (2007)                      | 148.6  | 10.1  | 71.5  |

| Implicit pension debt (2055)             | 241.0  | 124.9 | 240.4 |
| Pension-reserve assets (2055)            | 0.0    | 50.5  | 0.0   |
| Solvency gap (2055)                      | 241.0  | 74.4  | 240.4 |
Implicit pension debt

Implicit pension debt (% of GDP)

Brazil
Syria
Fiji

2005 2010 2015 2020 2025 2030 2035 2040 2045 2050 2055
Solvency gaps

Implicit pension debt, assets in pension reserves and solvency gap (% of GDP)

Brazil
(IPD=solvency gap)

Fiji
Syria

Assets in pension reserves

IPD
Solvency gap
IPD
Solvency gap

Fiji

2010 2015 2020 2025 2030 2035 2040 2045 2050 2055
Economic efficiency

Minimising the pension system’s distortions of individual choices
Retirement incentives: simple approach, Canada
## Retirement incentives: measurement

<table>
<thead>
<tr>
<th>Long term in the workplace</th>
<th>Defined benefit</th>
<th>Defined contribution</th>
<th>Points</th>
<th>Notional accounts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Extra year's entitlement</td>
<td>Extra year's contributions</td>
<td>Extra year's entitlement</td>
<td>Extra year's entitlement</td>
</tr>
<tr>
<td></td>
<td>Extra year towards qualifying conditions</td>
<td>—</td>
<td>Extra year towards qualifying conditions</td>
<td>Extra year towards qualifying conditions</td>
</tr>
<tr>
<td>Valorisation of earlier years’ earnings</td>
<td>Investment returns on accumulated balance</td>
<td>Uprating of pension-point value</td>
<td>Notional interest on accumulated notional capital</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Higher earnings replace earlier, perhaps lower, earnings in benefit formula</td>
<td>—</td>
<td>Higher earnings replace earlier, perhaps lower, earnings in benefit formula</td>
<td>—</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Shorter retirement duration</th>
<th>Defined benefit</th>
<th>Defined contribution</th>
<th>Points</th>
<th>Notional accounts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Forgo a year’s benefits</td>
<td>Forgo a year’s benefits</td>
<td>Forgo a year’s benefits</td>
<td>Forgo a year’s benefits</td>
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<tr>
<td></td>
<td>“Actuarial” adjustment</td>
<td>Lower annuity factor</td>
<td>“Actuarial” adjustment</td>
<td>Lower annuity factor</td>
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<table>
<thead>
<tr>
<th>Delay in claiming</th>
<th>Defined benefit</th>
<th>Defined contribution</th>
<th>Points</th>
<th>Notional accounts</th>
</tr>
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<tbody>
<tr>
<td>Probability of dying</td>
<td>Probability of dying</td>
<td>Probability of dying</td>
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<tr>
<td>Discounting</td>
<td>Discounting</td>
<td>Discounting</td>
<td>Discounting</td>
<td>Discounting</td>
</tr>
</tbody>
</table>
Retirement incentives: complete picture, Canada

Change in pension wealth from working an extra year (% of annual earnings)

- Total
- Targeted
- Earnings-related

Age of labor-market exit

55  60  65
Retirement incentives matter: Effect on behaviour
Administrative efficiency

Assessing the cost of running public pension systems
Security

Risk and uncertainty in retirement-income systems