Pension Systems and the Financial Crisis

Richard Hinz – The World Bank

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Objectives of the Exercise

- Illustrate the magnitude and dynamics of a financial crisis and associated macroeconomic impact on the financing and benefit outcomes of a representative pension systems
- “Stress Test” pension systems to assess impact of severe shocks from financial crisis
- Evaluate the impact of several types of policy interventions to assist policy makers in considering their likely effect
Method of Analysis

- Design several representative pension systems to illustrate potential differences in outcomes resulting from varying designs and underlying conditions
- Formulate several crisis scenarios that bound the range of forecasts for the crisis and path of recovery
- Simulate outcomes for various pension systems relative to baseline (non-crisis) expectations
- Estimate the impact of potential policy interventions in relation to baseline and crisis scenarios
Representative Pension Systems
Three Prototype Systems

- Mature high coverage system that has been partially reformed to address short term fiscal pressures through reduction of benefit generosity and addition of funded second pillar and representative of Europe and Central Asia (CE)
- Less mature system with lower coverage and more generous benefits representative of composite of Latin American systems (LAC)
- Immature system with generous benefit promises but young population that is building up reserves representative of Middle East or North Africa (MENA)
Demographics

Central Europe

Latin America

Middle East and North Africa
Coverage of Pension System as Share of Population

Central Europe

Latin America

Middle East and North Africa

- Total male coverage
- Total female coverage
- Male contributors
- Female contributors
Dependency ratio: Old age and disabled as proportion of contributors

CE
LAC
MENA
## Main System Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>CE</th>
<th>LAC</th>
<th>MENA</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP per capita (US$)</td>
<td>11135</td>
<td>7487</td>
<td>6282</td>
</tr>
<tr>
<td>Average old age pension as proportion of average wage</td>
<td>47%</td>
<td>81%</td>
<td>60%</td>
</tr>
<tr>
<td>Average survivors pension as proportion of average wage</td>
<td>21%</td>
<td>50%</td>
<td>34%</td>
</tr>
<tr>
<td>Pension contribution rate</td>
<td>28%</td>
<td>18%</td>
<td>19%</td>
</tr>
<tr>
<td>Averaging period for wage base calculation</td>
<td>20</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>Average length of service at retirement (male/female)</td>
<td>35/30</td>
<td>26/25</td>
<td>26/25</td>
</tr>
<tr>
<td>Effective retirement age (male/female)</td>
<td>57/55</td>
<td>56/55</td>
<td>57/54</td>
</tr>
<tr>
<td>Life expectancy at retirement</td>
<td>19/25</td>
<td>20/24</td>
<td>19/24</td>
</tr>
<tr>
<td>Effective accrual rate</td>
<td>1.4%</td>
<td>2.4%</td>
<td>1.9%</td>
</tr>
<tr>
<td>Contributions as % of GDP</td>
<td>5.9%</td>
<td>3.0%</td>
<td>3.5%</td>
</tr>
<tr>
<td>Expenditures as % of GDP</td>
<td>7.2%</td>
<td>2.8%</td>
<td>1.3%</td>
</tr>
</tbody>
</table>
Participation in Funded Pillar by Age
Baseline and Three Crisis Scenarios

- **Baseline (non-crisis) Scenario**
  - Real GDP growth rate of 5.2% per year that gradually decelerates over 20 years to steady state of real growth of 2.5% per year.

- **Moderate Shock - Rapid Recovery**
  - A 2% decline in the 2009 followed by a relatively rapid return to positive growth of 2% and 4% for the following two years after which growth settles gradually to the long term level of 2.5%.

- **Severe Shock – Rapid Recovery**
  - GDP declines by 6% in 2009 but then returns to the 2.5% path within four years.

- **Severe Shock – Slow Recovery**
  - Same severe shock through 2012 with gradual return to 2% growth by 2026.
Illustration of Macro Scenarios

GDP growth

- Baseline
- Moderate
- Severe/Rapid Recovery
- Severe/Slow Recovery

Year: 2007, 2017, 2027

GDP growth percentages:
- -8%
- -6%
- -4%
- -2%
- 0%
- 2%
- 4%
- 6%
Cumulative Impact in Relation to the Baseline

Cumulative difference in GDP growth

- Moderate
- Severe/Rapid Recovery
- Severe/Slow Recovery
Other Important Assumptions

- **Employment and Wages**
  - Wage bill is assumed to remain constant proportion of output when growth is positive
  - When growth is negative aggregate wage bill is assumed to decline at twice the change in GDP
  - 2/3rds of decline due to changes in wage levels, 1/3 due to employment levels

- **Asset values for Funded Pillar**
  - 20% decline in 2008 followed by 10% decline in 2009
  - Return to positive value in line with GDP recovery for individual scenarios
Cumulative Difference in Wage and GDP levels

2007  2017  2027

Cumulative Difference in Wage and GDP levels

<table>
<thead>
<tr>
<th>Year</th>
<th>GDP</th>
<th>Wagebill</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>2017</td>
<td>Severe/ Rapid Recovery</td>
<td>Severe/ Slow Recovery</td>
</tr>
<tr>
<td>2027</td>
<td>Severe/ Slow Recovery</td>
<td>Severe/ Slow Recovery</td>
</tr>
</tbody>
</table>

GDP-Moderate  Wagebill-Moderate  GDP-Severe/ Rapid Recovery
Wagebill-Severe/ Rapid Recovery  GDP-Severe/ Slow Recovery  Wagebill-Severe/ Slow Recovery
Annual Changes in Asset Returns

Asset price growth rate (real)
Impact of Three crisis scenarios on representative systems
Baseline Fiscal Status of Systems
Projected Non-Crisis Benefit Levels
Share of Average Wage

<table>
<thead>
<tr>
<th>Year</th>
<th>CE, total</th>
<th>LAC, total</th>
<th>MENA, total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2026</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2036</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2046</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2056</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2066</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
Dynamics of the Fiscal Impact of the Financial Crisis

- Shock to wages and earnings causes large decline in covered wage base
- This causes revenues to decline rapidly in the period of the shock
- Revenues then begin to grow slowly when recovery occurs but from lower base
- Benefit expenditures change much more slowly – Increasing as a share of GDP in short run and then declining in later period. This because benefit formulas utilize a long earnings base and there is a lag in incorporating changes in wage levels in the formula.
- A fiscal gap emerges in the short to medium term due to the differential timing of the revenue and expenditure impacts
- Over the long term benefits adjust to lower reference wages
Most immediate impact of shock to wage base is decline in revenues – Measured as Share of GDP

<table>
<thead>
<tr>
<th>Year</th>
<th>CE</th>
<th>LAC</th>
<th>MENA</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>-0.9%</td>
<td>-0.9%</td>
<td>-1.0%</td>
</tr>
<tr>
<td>2017</td>
<td>-0.7%</td>
<td>-0.7%</td>
<td>-0.8%</td>
</tr>
<tr>
<td>2027</td>
<td>-0.5%</td>
<td>-0.5%</td>
<td>-0.6%</td>
</tr>
<tr>
<td>2037</td>
<td>-0.3%</td>
<td>-0.3%</td>
<td>-0.4%</td>
</tr>
<tr>
<td>2047</td>
<td>-0.1%</td>
<td>-0.1%</td>
<td>-0.2%</td>
</tr>
</tbody>
</table>

CE = CE
LAC = Moderate
MENA = Severe/ Rapid Recovery

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Social Protection & Labor
THE WORLD BANK
Expenditures Impact is More Complex in Timing and Direction

CE

LAC

MENA

Moderate

Severe/ Rapid Recovery

Severe/ Slow Recovery
Key Issues in Interpretation

- Part of the impact when measured as a share of GDP is that the denominator is changing at the same time as the numerator.
- Expenditures may be constant but because GDP declines they show an increase - revenue losses seem smaller than if measured in absolute terms.
- Estimates are likely low because they do not assume “dynamic effects” - greater benefit claims due to losses in employment.
Annual Net Changes in Relation to the Baseline - In % of GDP

CE

LAC

MENA

Moderate

Severe/ Rapid Recovery

Severe/ Slow Recovery
## Cumulative Fiscal Impact
### Percent of GDP

<table>
<thead>
<tr>
<th>Region – Crisis Type – Recovery Type</th>
<th>2018</th>
<th>2025</th>
<th>2050</th>
<th>2075</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE – Severe Shock – Slow Recovery</td>
<td>-13.4%</td>
<td>-16.6%</td>
<td>-11.3%</td>
<td>-4.7%</td>
</tr>
<tr>
<td>CE – Severe Shock – Fast Recovery</td>
<td>-10.3%</td>
<td>-12.5%</td>
<td>-11.2%</td>
<td>-7.5%</td>
</tr>
<tr>
<td>CE – Moderate Crisis</td>
<td>-1.7%</td>
<td>-1.4%</td>
<td>-0.3%</td>
<td>0.1%</td>
</tr>
<tr>
<td>LAC – Severe Shock – Slow Recovery</td>
<td>-2.8%</td>
<td>0.1%</td>
<td>22.7%</td>
<td>42.5%</td>
</tr>
<tr>
<td>LAC – Severe Shock – Fast Recovery</td>
<td>-1.7%</td>
<td>0.4%</td>
<td>15.0%</td>
<td>25.6%</td>
</tr>
<tr>
<td>LAC – Moderate Crisis</td>
<td>-0.1%</td>
<td>0.6%</td>
<td>5.8%</td>
<td>7.5%</td>
</tr>
<tr>
<td>MENA – Severe Shock – Slow Recovery</td>
<td>-5.2%</td>
<td>-6.5%</td>
<td>-2.9%</td>
<td>2.4%</td>
</tr>
<tr>
<td>MENA – Severe Shock – Fast Recovery</td>
<td>-3.6%</td>
<td>-4.1%</td>
<td>-2.7%</td>
<td>0.8%</td>
</tr>
<tr>
<td>MENA – Moderate Crisis</td>
<td>-0.7%</td>
<td>-0.8%</td>
<td>-0.2%</td>
<td>0.4%</td>
</tr>
</tbody>
</table>
Change in Average Benefit as Share of Average Economy Wide Earnings

CE

LAC

MENA
Observations on Impacts Relative to Non-Crisis Baseline

- Crisis can be expected to result in a short term liquidity crisis for more mature systems – Revenues decline rapidly with loss in covered wage base while benefits do not change but become larger share of diminished GDP.
- The size of this fiscal gap can be as large as 2% of GDP per year in the early years if crisis is severe.
- Impact is most severe when coverage and dependency rates are high (CE) – less severe with younger population and lower coverage (LAC)
- Less mature systems that have low current beneficiary populations face loss in funding ratios but not liquidity challenges.
Observations - Continued

- Over the longer term as lower wage histories are incorporated into the benefit formulas expenditures begin to decline in relation to baseline levels. Depending on benefit generosity and maturity of the system the crisis could improve fiscal balance of some systems.

- The more generous the current benefit promises and the younger the population the stronger are these effects relative to pre-crisis expectations.

- Benefits levels measured as share of the average economy wide earnings are not affected very much – increase in short term but return to baseline levels within decade as both benefits and wages decline relative to expectations.
Alternative Perspective: Absolute Rather than Relative Effect on Long Term Solvency

CE

LAC

MENA

Baseline
Moderate
Severe/ Rapid Recovery
Severe/ Slow Recovery
Overall Observations on Fiscal Impacts

- Impact of the crisis depends on both design, path of the crisis and underlying demographics.
- Most pronounced effects will be short term liquidity crisis – Can have substantial impact that is motivating changes during the past year in some countries.
- Benefit levels as share of wages will increase in short term as long as they are not indexed downward with loss in wages but over longer term will adjust to new earnings levels if wage indexation is maintained – New retirees in individual accounts systems may have the largest impact.
- Effects of crisis does not have a large impact on long term fiscal path of systems. These are determined by more fundamental factors such as demographics, benefit formulas and indexation policy.
- Wage indexed will face same long term sustainability challenges that are not much worse as result of crisis – and in some cases may be marginally better.
Policy Alternatives to address crisis
Raise Retirement Age
Compared to Crisis Instead of Baseline

CE

LAC

MENA

Severe/ Rapid Recovery

Severe/ Rapid Recovery with 1-year increase of ret.age by 2015
Switch to Price Indexation

CE

LAC

MENA

Severe/ Rapid Recovery

Price index in 2009
Diverting 2nd Pillar Flows

CE

LAC

Severe/ Rapid Recovery - multipillar

Severe/ Rapid Recovery - return to PAYG

Severe/ Rapid Recovery - multipillar

Severe/ Rapid Recovery - return to PAYG
Some General Conclusions from the Analysis

- The financial crisis will impose significant challenges to public pension systems' ability to maintain short cash flows due to a rapid decline in revenues as employment and wage levels respond to a shock in output – This can be as high as 2-3% of GDP.

- Over the long run expenditures will adjust to the lower earnings levels and a new equilibrium would be reached – Benefits as a share of earnings will increase in the short term but show little change over the long term.

- In some cases the long term impact could improve the fiscal balance.

- The size of the impact will be quite variable depending on the severity of the crisis, the underlying demographic structure, coverage patterns and demographics.

- The crisis will have only a marginal long term effect on the deteriorating fiscal position of most systems – demographics and design remain the primary factors.

- The long term effect is less than a one year improvement in life expectancy which is a very conservative projection of future demographic trends.

- The crisis may provide a chance to switch from wage to price indexation that could have a much larger effect on long term sustainability.

- Diverting Contributions from funded accounts has some short term impact but leads to worsening of long term conditions.