Macroeconomic Consequences of Population Aging

Barry Bosworth
The Brookings Institution
Main Themes

- Impact of Aging on Aggregate Saving
- Impact of Aging on Investment
- Importance of Global Capital Market
- Relationship to Current Economic Situation
A. Demographic Effects on Saving

- Microeconomic analysis
  - Weak life-cycle influences
  - Many people have no significant retirement saving
  - Lack of panel surveys and information on pensions
  - Highly disparate patterns of wealth accumulation complicates aggregation.
  - Average dollar much different than average person.
Saving measured as change in wealth minus estimated capital gains (SCF)

<table>
<thead>
<tr>
<th>Age group</th>
<th>Percent of after-tax income</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-34</td>
<td>13.6</td>
</tr>
<tr>
<td>35-44</td>
<td>10.1</td>
</tr>
<tr>
<td>45-54</td>
<td>10.3</td>
</tr>
<tr>
<td>55-64</td>
<td>10.6</td>
</tr>
<tr>
<td>65 and older</td>
<td>2.5</td>
</tr>
<tr>
<td>Total sample</td>
<td>9.5</td>
</tr>
</tbody>
</table>
Macroeconomic Evidence

  - Most pronounced for Asia
  - Weak evidence for industrial economies
- Multi-country panel data sets
  - Cross-national differences are correlated with other determinants.
  - Within-country demographic changes are small compared to changes in saving
Dataset

- 85 Countries (95% of World GDP) Covering 1960-2004
- 40 Countries (91% of World GDP) with Public and Private Saving
- Sources: OECD, World Bank, IMF, and country statistical offices
- United Nations, *World Population Prospects*
- All data converted to 5 year averages
The Fixed Effects Model

\[ S_{it} = F_{1}(X_{it}, C_{i}, P_{it}) + u_{it} \]

Where \( S_{it} \) is saving in country \( i \) at time \( t \);
\( X_{it} \) are a set of country-specific economic factors that change over time;
\( C_{i} \) are factors that are largely time-invariant but vary across countries;
\( P_{it} \) capture the age structure of the population;
And \( u_{it} \) is an uncorrelated error term.
Coefficients on National Saving

![Graph showing coefficients by age group across different regions.](image)
Coefficients on Private Saving

-3 -2 -1 0 1 2
0-14 20-24 30-34 40-44 50-54 60-64 70up
age group

coefficient

40 Countries
Industrial Countries
Emerging Markets
Coefficients on Government Saving

Graph showing the coefficients on government saving for different age groups across 40 countries, Industrial Countries, Emerging Markets, and Asia.
Expected Saving, United States, Various Specifications, 1960-2050

Share of GNI


85 country polynomial
OECD polynomial
OECD categorical
B. Demographic Effect on Investment

- Slower labor force growth should reduce growth of capital stock.
- Limited research on link between labor force growth and technical change.
- There are only a few studies of impact of aging on investment demand.
- Use formulation that parallels that of saving.
Higgins (1998) concludes that the decline in investment will exceed that of saving for high-income economies out to 2025.

Bosworth and Keys (2004) also obtained strong demographic effects, but
- decline in saving projected to exceed that of investment by 2050
- high-income countries would have CA deficits.
Coefficients on Saving and Investment, 85 Countries

Age Distribution Coefficients

-3 -2 -1 0 1 2

Age0-14 age20-24 age30-34 age40-44 age50-54 age60-64 age70up

Saving
Investment
C. Global Perspective

- Aging traditionally modeled in a closed-economy context (Cutler et al., 1990)
  - Lack of investment opportunities reinforces the life-cycle decline in saving.
  - Optimal response to aging is to reduce saving.
- Open-economy perspective
  - Large global capital market with disparate demographic trends among nations.
  - Shifts in S-I balances spill over to current account.
Coefficients on Current Account

Age Distribution Coefficients

-3 -2 -1 0 1 2

age0-14 age20-24 age30-34 age40-44 age50-54 age60-64 age70up

All Industrial Asia
Projections

- Demographic effects are already negative for saving within industrial countries.
- Estimates of demographic impact from all country sample implies large current account deficits for industrial countries by 2025 and later.
- Industrial country sub-sample implies smaller changes that could easily be overwhelmed by other factors.
  - Japanese current account change of 6% of GNI by 2025
  - United States only about 2%. 
D. Current Relevance

- Bernanke - “global saving glut”
- U.S saving shortfall offset by excess saving in other countries
  - Linked to demographic change in major industrial countries.
  - Falling real interest rates.
## Current Account by Region

(Percent of World GDP)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.</td>
<td>-0.45</td>
<td>-0.22</td>
<td>-0.51</td>
<td>-1.37</td>
<td>-1.81</td>
</tr>
<tr>
<td>Japan</td>
<td>0.26</td>
<td>0.40</td>
<td>0.34</td>
<td>0.35</td>
<td>0.39</td>
</tr>
<tr>
<td>Europe</td>
<td>-0.04</td>
<td>-0.13</td>
<td>0.28</td>
<td>0.17</td>
<td>0.16</td>
</tr>
<tr>
<td>Emerging Asia</td>
<td>0.02</td>
<td>0.01</td>
<td>0.14</td>
<td>0.38</td>
<td>0.55</td>
</tr>
<tr>
<td>Emerging Latin America</td>
<td>-0.11</td>
<td>-0.11</td>
<td>-0.17</td>
<td>-0.04</td>
<td>0.08</td>
</tr>
<tr>
<td>Middle East</td>
<td>0.08</td>
<td>-0.09</td>
<td>0.01</td>
<td>0.17</td>
<td>0.44</td>
</tr>
</tbody>
</table>
Recent Trends

- Offset to US deficit is in Asia and OPEC
- Global change is concentrated on investment side
  - Declining saving and investment in other industrial countries
  - No investment decline in US
  - Sharp drop in investment in Asia
United States

Percent of GNI

Investment

Saving
Industrial Countries Excluding U.S.
Emerging Asia

Percent of GNI

Saving

Investment

Asia financial crisis

Summary

- Substantial uncertainty about effect of demographics on aggregate saving
  - Effects appear small in industrial countries
  - Very substantial correlation in Asia
  - Concentrated in private saving
- Significant offsetting effect on investment requirements.
- Need to evaluate in context of global capital flows.
Summary (2)

- Demographic changes are not a significant source of current excess global saving
  - Decline in investment outside United States
  - High saving of oil-producing states
  - Demographic factors are already exerting a negative influence on saving in industrial countries.