Changing Age Structures and their Implications for Development

Andrew Mason
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An Asian Economy's Economic Lifecycle

- Labor Income: Surplus at working ages
- Consumption: Large deficits at young and old ages.

Per Capita Values

Age

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The Last Demographic Transition
Age Distribution of Niger's Population, 1950-2200

- Children (0-19)
- Working ages (20-64)
- Elderly (65+)

Source: UN Pop Division.
Two Demographic Dividends

• The interaction between the economic lifecycle and population age structure produces two dividends.
  • The first dividend results from an increase in the share of the population at ages with a production surplus.
  • The second dividend results from an increase in the share of the population at the old ages – with a production deficit.
First Dividend

- Increase in population share in the highly productive ages
- Increase in per capita income
  - Increase in per capita consumption and current living standards
  - Increase in per capita saving and future living standards
First Dividend: Additional Growth in Per Capita Income, 1970-2000 (percent)

<table>
<thead>
<tr>
<th>Region</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Asia &amp; Southeast Asia</td>
<td>0.59</td>
</tr>
<tr>
<td>South Asia</td>
<td>0.10</td>
</tr>
<tr>
<td>Latin America</td>
<td>0.62</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>-0.09</td>
</tr>
<tr>
<td>Middle East and North Africa</td>
<td>0.51</td>
</tr>
<tr>
<td>Transitional Economies</td>
<td>0.24</td>
</tr>
<tr>
<td>Pacific Islands</td>
<td>0.58</td>
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</tbody>
</table>

Source: Mason 2005.
1\textsuperscript{st} Dividend Summary

- The 1\textsuperscript{st} Dividend led to a significant increase in per capita income in the developing world and a more moderate increase in industrial countries.
- Per capita income increased by roughly 40\% in E/SE Asia, LA, Pacific Islands.
- 1\textsuperscript{st} Dividend period delayed in S Asia and SSA.
- The 1\textsuperscript{st} Dividend is ultimately transitory.

Source: Mason 2005.
Second Dividend

Increase in population share in the old, low-productive ages → Increase in demand for old-age resources → Expansion of old-age transfer programs

Increase in demand for old-age resources → Increase in capital, economic growth: 2nd dividend
• If reallocations to old age are accomplished via expansion of transfer programs, no second dividend.
• If reallocations to old-age are accomplished via increased saving and investment, economy grows more rapidly yielding a second dividend.

Note: Taiwan 1998 LC profiles.
## Second Dividend: Additional Growth in Per Capita Income, 1970-2000 (percent)

<table>
<thead>
<tr>
<th>Region</th>
<th>Growth (percent)</th>
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<tbody>
<tr>
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<tr>
<td>South Asia</td>
<td>0.69</td>
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<tr>
<td>Latin America</td>
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<td>Sub-Saharan Africa</td>
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<td>Middle East and North Africa</td>
<td>0.70</td>
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<td>Transitional Economies</td>
<td>0.57</td>
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<tr>
<td>Pacific Islands</td>
<td>1.15</td>
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</tbody>
</table>

Source: Mason 2005.
Second Dividend Summary

- Effects are substantial in many developing countries.
- Not yet realized in Sub-Saharan Africa and South Asia.
- Positive growth effect is transitory, but level of income is permanently higher.
- Potential effect that will not be realized if countries rely excessively on transfer systems.
Implications for Population Aging

• Trade-off between first dividend and second dividend.
• Population aging leads to decline in productive share of population but may also lead to a rise in capital.
• The net effect of aging depends on features of:  
  – the economic lifecycle  
  – the old-age support system.
National Transfer Account Project

• Objective is to develop and apply a comprehensive system of accounts that measures the economic lifecycle and the associated economic support systems.
• Core project is led by the East-West Center and UC-Berkeley with funding from the National Institute on Aging.
• International effort that involves many outstanding scholars.
Two Important Questions about the Economic Lifecycle

• Can the age profile of production be modified to extend the productive ages and to raise productivity at older ages?
• Can the age-profile of consumption be affected to reduce the lifecycle deficit at old ages? Is this a policy that should be pursued?
## Lifecycle Deficit and Surplus Ages

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>Early Age</th>
<th>Later Age</th>
<th>Duration</th>
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<tbody>
<tr>
<td>Indonesia</td>
<td>1996</td>
<td>29</td>
<td>58</td>
<td>29</td>
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<tr>
<td>Thailand</td>
<td>1996</td>
<td>26</td>
<td>61</td>
<td>35</td>
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<td>Taiwan</td>
<td>1998</td>
<td>24</td>
<td>56</td>
<td>32</td>
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<tr>
<td>Japan</td>
<td>1999</td>
<td>29</td>
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<td>United States</td>
<td>2000</td>
<td>27</td>
<td>59</td>
<td>32</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>2004</td>
<td>24</td>
<td>57</td>
<td>33</td>
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</tbody>
</table>

- Short duration of productive span.
- Old-age deficit begins at a relatively young age.

Source: www.ntaccounts.org
Increased concentration of labor income at prime working ages.

Source: Mason et al.
Labor Income

• In Japan, labor income at young and old ages also declined relative to labor income at prime ages between 1989 and 2004 (Ogawa et al.)

• In the US, however, labor income has increased at old ages relative to labor income at other ages since the early 1980s. This is a promising development. (Lee et al.)
Huge increase in education spending with adoption of NHI.
Amazing stability and intergenerational equity over a 26 year period of rapid economic growth.

No apparent relationship between consumption and economic circumstances of cohort.

Source: Mason et al.
Figure 1A. Per Capita Labor Income and Consumption, US (2000)

Source: See Lee, Lee and Mason (2005) for methods and data sources for these estimates.
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Old-Age Reallocation Systems

• Transfers
  – Public transfers
    • PAYGO pension programs
    • Public health care and long-term disability programs
  – Familial transfers

• Asset-based reallocations
  – Funded public programs
  – Funded employment based programs
  – Personal saving
Old-Age Reallocation Systems

Capital-based transformation

Social welfare transformation

Traditional society

Familial Transfers

Public Transfers

Saving

Old-Age Reallocation Systems
Old-Age Reallocation Systems

Mixed Strategies

50-50 familial and saving

50-50 familial and public

50-50 saving and public

Familial Transfers

Public Transfers

Saving

US is mixture of saving and public transfers.
Old-Age Reallocations, US & Thailand.

Thailand is a mix of saving and familial transfers.
Old-age Reallocation System, Selected Countries.

- **Asset-based (%):**
  - Thailand
  - Mixed public and familial transfers
  - Taiwan
  - Large public, less asset-based, no familial.

- **Public transfers (%):**
  - US
  - Costa Rica

- **Family Transfers (%):**
  - Japan
  - Taiwan
Cautions

• Important changes in economic lifecycle but links to policy have not yet been made.

• Large variation in the old-age reallocation system. Understanding this better is clearly a priority.

• Important to test robustness of private reallocation estimates to alternative assumptions.
Core Project
East-West Center, Honolulu
and
Center for the Economics and
Demography of Aging,
University of California - Berkeley

<table>
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<th>Lee, Ronald, Co-Director</th>
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Asia Sub-Project
Nihon University Population Research Institute

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<th>Hirofumi Ando, Co-Director</th>
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<tr>
<td>Rikiya Matsukura</td>
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<td>Maliki</td>
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Core Support:
National Institutes of Health

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To CEDA: NIA, R01-AG025247

Asia Project:
United Nations Population Fund

For more information:  www.ntaccounts.org