Macroeconomics of Aging

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Speakers

Tom Terry, FSA, MAAA, FCA, EA
The Terry Group

Richard Jackson, Ph.D.
Global Aging Institute
How Global Aging Will Reshape the Economy of the United States and Other Developed Countries

Richard Jackson
President
Global Aging Institute
The Demographic Transition

- The demographic transition, which accompanies development and gives rise to global aging, unfolds in three stages:
  - **Phase 1:** Declines in mortality, especially for infants and children, lead to rising youth dependency burdens and rapid population growth. Demographic trends tend to lean against economic and living standard growth.
  - **Phase 2:** Fertility rates fall with a lag. Declining youth dependency burdens and rising median ages open up a window of opportunity for economic and social development known as the “demographic dividend.”
  - **Phase 3:** The relative growth in the number of elderly overtakes the relative decline in the number of children. Old-age dependency burdens rise and populations stagnate or contract. Demographic trends once again tend to lean against economic and living standard growth.

- While much of the emerging world now finds itself in phase 2, all of the developed world has entered phase 3.

<table>
<thead>
<tr>
<th></th>
<th>Life Expectancy at Birth</th>
<th>Total Fertility Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developed World</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Japan</td>
<td>67</td>
<td>72</td>
</tr>
<tr>
<td>Western Europe</td>
<td>67</td>
<td>72</td>
</tr>
<tr>
<td>United States</td>
<td>69</td>
<td>71</td>
</tr>
<tr>
<td>Emerging East Asia</td>
<td>44</td>
<td>62</td>
</tr>
<tr>
<td>Eastern Europe</td>
<td>60</td>
<td>69</td>
</tr>
<tr>
<td>Greater Middle East</td>
<td>42</td>
<td>55</td>
</tr>
<tr>
<td>Latin America</td>
<td>52</td>
<td>62</td>
</tr>
<tr>
<td>South Asia</td>
<td>40</td>
<td>52</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>37</td>
<td>45</td>
</tr>
</tbody>
</table>

An Aging Developed World

Elderly (Aged 65 & Over), as a Percent of the Population in 2020 and 2050

<table>
<thead>
<tr>
<th>Region</th>
<th>2020</th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>17%</td>
<td>22%</td>
</tr>
<tr>
<td>Europe</td>
<td>19%</td>
<td>28%</td>
</tr>
<tr>
<td>Japan</td>
<td>28%</td>
<td>38%</td>
</tr>
</tbody>
</table>

Source: UN Population Division (2019)

Percent Change in the Total and Working-Age Population (Aged 20-64), 2020 to 2050

<table>
<thead>
<tr>
<th>Region</th>
<th>Total</th>
<th>Working-Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>15%</td>
<td>8%</td>
</tr>
<tr>
<td>Europe</td>
<td>-5%</td>
<td>-12%</td>
</tr>
<tr>
<td>Japan</td>
<td>-16%</td>
<td>-29%</td>
</tr>
</tbody>
</table>

Source: UN Population Division (2019)
More slowly growing or contracting working-age populations will translate into slower growth in employment and GDP.

Productivity growth may also fall in aging societies, further dragging down economic and living standard growth:

- Aging workforces may be less flexible, less mobile, and less entrepreneurial.
- Rates of savings and investment may decline as age structures shift upwards and employment growth slows.
- The economy will be increasingly dominated by service industries resistant to productivity improvements ("Baumol’s Cost Disease").
- As domestic markets stagnate, the danger of “beggar-thy-neighbor” protectionism will grow.
- Unless productivity rises at least as fast as employment falls, Japan and some European countries may face “secular stagnation”—that is, zero growth in real GDP across the business cycle.

### Average Annual Growth Rate in the Working-Age Population (Aged 20-64), by Decade

<table>
<thead>
<tr>
<th>Country</th>
<th>1980s</th>
<th>1990s</th>
<th>2000s</th>
<th>2010s</th>
<th>2020s</th>
<th>2030s</th>
<th>2040s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>1.7%</td>
<td>1.1%</td>
<td>1.3%</td>
<td>0.5%</td>
<td>-0.1%</td>
<td>0.3%</td>
<td>0.2%</td>
</tr>
<tr>
<td>France</td>
<td>1.0%</td>
<td>0.4%</td>
<td>0.6%</td>
<td>-0.2%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Germany</td>
<td>1.1%</td>
<td>0.3%</td>
<td>-0.5%</td>
<td>-0.1%</td>
<td>-1.1%</td>
<td>-0.8%</td>
<td>-0.5%</td>
</tr>
<tr>
<td>Italy</td>
<td>0.9%</td>
<td>0.2%</td>
<td>0.2%</td>
<td>-0.4%</td>
<td>-0.7%</td>
<td>-1.2%</td>
<td>-0.6%</td>
</tr>
<tr>
<td>Japan</td>
<td>0.7%</td>
<td>0.4%</td>
<td>-0.4%</td>
<td>-1.0%</td>
<td>-0.7%</td>
<td>-1.2%</td>
<td>-1.1%</td>
</tr>
<tr>
<td>UK</td>
<td>0.7%</td>
<td>0.4%</td>
<td>0.7%</td>
<td>0.3%</td>
<td>0.0%</td>
<td>0.1%</td>
<td>0.2%</td>
</tr>
<tr>
<td>US</td>
<td>1.3%</td>
<td>1.2%</td>
<td>1.1%</td>
<td>0.4%</td>
<td>0.1%</td>
<td>0.3%</td>
<td>0.4%</td>
</tr>
</tbody>
</table>

According to Modigliani’s “Lifecycle Consumption Hypothesis,” savings rates will fall as a larger share of the population enters the retirement years.

Investment rates will fall because, with workforces growing more slowly or contracting, less capital-broadening will be required to maintain a constant rate of growth in the per-worker capital stock.

In a neoclassical framework, so long as the per-worker capital stock continues to grow at a constant rate, less investment would not lower productivity and living standard growth. In an endogenous growth model, where productivity depends on “learning by doing,” it would.

Which falls more—savings or investment—will determine whether we are heading toward a future of capital surpluses or capital shortages.

Ratio of Middle-Aged Adults Aged 45-64 to Elderly Adults Aged 65 & Over, in 1990, 2020, and 2050

Source: UN Population Division (2019)
What Happens to Interest Rates?

- According to the neoclassical growth model, lower GDP growth will reduce real interest rates, while a lower savings rate will increase them.

- Since population aging potentially lowers both GDP growth and the savings rate, it could in theory push real interest rates either up or down.

- To date, population aging has worked to lower real interest rates. The demographically led slowdown in GDP growth is already well under way, while as yet there is little evidence of lifecycle declines in savings.

- In developed economies, delayed retirement and rising life expectancy may be buoying up savings.

- In emerging markets, especially in Asia, income may be outpacing consumption aspirations, also buoying up savings (the “Duesenberry Relative Income Hypothesis”).

- However, this could change in the future as large postwar boom generations fully enter retirement.

**SOLOW-SWAN GROWTH MODEL**

Formula for the Equilibrium Real Rate of Return in a Growing Economy

\[ r^* = \alpha \cdot \frac{n + g + \delta}{s} - (\text{Risk Premium}) \]

- \( r^* \) = Real Rate of Interest
- \( n \) = Rate of Employment Growth
- \( g \) = Rate of Productivity Growth
- \( s \) = Savings Rate
- \( \alpha \) = Capital Share of National Income
- \( \delta \) = Rate of Depreciation

**Marginal Product of Capital Stock**

\[ r = \frac{n + g + \delta}{s} - (\text{Risk Premium}) \]
A Future of Rising Fiscal Burdens

- Graying means paying more for pensions, health care, and long-term care for the elderly.
- Few countries will be able to raise taxes enough to cover more than a fraction of the age wave’s total cost.
- Most countries will have to cut old-age benefits, but the required reductions are large and are likely to meet with resistance from aging electorates.
- The alternatives: Let old-age benefits crowd out other government spending and/or run widening budget deficits, undermining national savings.
The Demographics and Economics of Retirement Policy

- As societies age, funded retirement systems are likely to enjoy a widening rate of return advantage over pay-as-you-go retirement systems.

- When societies are young and growing, the implicit rate of return on pay-as-you-go systems, which is equal to the growth rate in taxable payroll, may well exceed the rate of return to capital. As employment and wage growth slow, however, the advantage shifts to funded systems.

- It is true that the rate of return to capital can also be expected to decline in aging societies. But it is doubtful that it will decline as far as the growth rate in taxable payroll, which in real terms may be close to zero in faster-aging developed countries and is unlikely to average more than 1.0 to 1.5 percent in the United States.

Stylized Replacement Rate Projections

Replacement Rates for Workers Retiring in 2060: Funded DC System with a 12.5 Percent Contribution Rate under Different Wage Growth and Rate of Return Assumptions, Compared with PAYGO Replacement Rates at the Same Contribution Rate*

<table>
<thead>
<tr>
<th>Real Wage Growth Rate</th>
<th>2.5%</th>
<th>2.0%</th>
<th>1.5%</th>
<th>1.0%</th>
<th>0.5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0%</td>
<td>21%</td>
<td>23%</td>
<td>26%</td>
<td>28%</td>
<td>31%</td>
</tr>
<tr>
<td>2.5%</td>
<td>25%</td>
<td>27%</td>
<td>30%</td>
<td>33%</td>
<td>37%</td>
</tr>
<tr>
<td>3.0%</td>
<td>29%</td>
<td>32%</td>
<td>35%</td>
<td>39%</td>
<td>43%</td>
</tr>
<tr>
<td>3.5%</td>
<td>34%</td>
<td>37%</td>
<td>41%</td>
<td>46%</td>
<td>51%</td>
</tr>
<tr>
<td>4.0%</td>
<td>39%</td>
<td>43%</td>
<td>48%</td>
<td>54%</td>
<td>60%</td>
</tr>
<tr>
<td>4.5%</td>
<td>46%</td>
<td>51%</td>
<td>57%</td>
<td>63%</td>
<td>71%</td>
</tr>
<tr>
<td>5.0%</td>
<td>53%</td>
<td>60%</td>
<td>67%</td>
<td>75%</td>
<td>84%</td>
</tr>
</tbody>
</table>

PAYGO

|                  | 38%  | 35%  | 33%  | 32%  | 30%  |

Note: All projections assume U.S. demographics. DC projections assume 40 years of contributions starting at age 25 in 2020, administrative charges equal to 0.5 percent of AUM, retirement at age 65, and phased withdrawals based on projected unisex life expectancy at age 65. PAYGO projections assume retirement at age 65, a benefit period equal to projected unisex life expectancy at age 65, and price indexation of benefits in current payment status.
The Four Age-Related Health-Care Multipliers

- **Multiplier 1:** The elderly consume more per capita in health-care services than the nonelderly.
- **Multiplier 2:** The elderly are the fastest growing segment of the U.S. population.
- **Multiplier 3:** The older the elderly are the more health care they consume.
- **Multiplier 4:** The oldest elderly age brackets are the fastest growing of all.

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### Per Capita Ratio of U.S. ACUTE CARE Spending on the Elderly (Aged 65 & Over) to Spending on the Nonelderly (Aged 0-64), by Elderly Age Group in 2012

- 65-84: 2.6
- 85 & Over: 3.5

**Source:** Centers for Medicare and Medicare Services (2018)

### Per Capita Ratio of U.S. LONG-TERM CARE Spending on the Elderly (Aged 65 & Over) to Spending on the Nonelderly (Aged 0-64), by Elderly Age Group in 2012

- 65-84: 13
- 85 & Over: 67

**Source:** Centers for Medicare and Medicare Services (2018)

### Percent Change in the U.S. Elderly Population, by Age Group, 2017 to 2050

- 65-74: 29%
- 75-84: 104%
- 85 & Over: 198%

**Source:** UN Population Division (2017)
Maintaining Economic and Living Standard Growth in an Aging World

National Solutions

• Solutions that offset the demographic drag on economic growth:
  o Increase labor-force participation, especially at older ages
  o Increase immigration, especially of skilled workers
  o Increase the birthrate through policies that help workers, and especially women, balance jobs and family

• Solutions that reduce the demographic pressure on government budgets:
  o Reduce unfunded pension liabilities at all levels of government
  o Increase funded retirement savings
  o Impose a global budget constraint on health-care spending
  o Increase investments in the health of the elderly, both current and future

Global Solutions

• The differential pace and timing of global aging across the countries and regions of the world creates important economic opportunities.

• Open global capital markets can allow savings in older and more slowing growing developed countries to flow to investment opportunities in younger and faster growing emerging markets.

• Open global labor markets can allow workers in countries where labor is abundant and capital is scarce to be matched with jobs in countries where just the opposite is true.

• As the world ages, globalization will become ever more critical to maintaining growth and prosperity. The danger is that protectionist pressures in aging slow-growth economies will push them the other way.