CONFERENCE
OF CONSULTING
ACTUARIES

Macroeconomics of Aging

CCA Virtual Annual Meeting • October 19 – 28, 2020

Antitrust Policy

Professional societies, including the Conference of Consulting Actuaries (CCA), are subject to federal and state antitrust laws, and must constantly monitor their activities to ensure continued compliance with all antitrust regulations.

Purpose of Antitrust Laws

The antitrust laws prohibit any concerted activity or combination of competitors from interfering with free competition. In other words, the primary thrust of the law is to control private economic power by protecting competition. Persons and organizations are prohibited from engaging in any action which unreasonably restrains commerce or trade (i.e., competition). Per se violations (practices presumed to be inherently wrong regardless of the motivating factors) include: agreements to fix or stabilize prices, to divide markets, to allocate production, or to impose boycotts. In essence, this means any concerted action that significantly diminishes rivalry among competing firms.

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

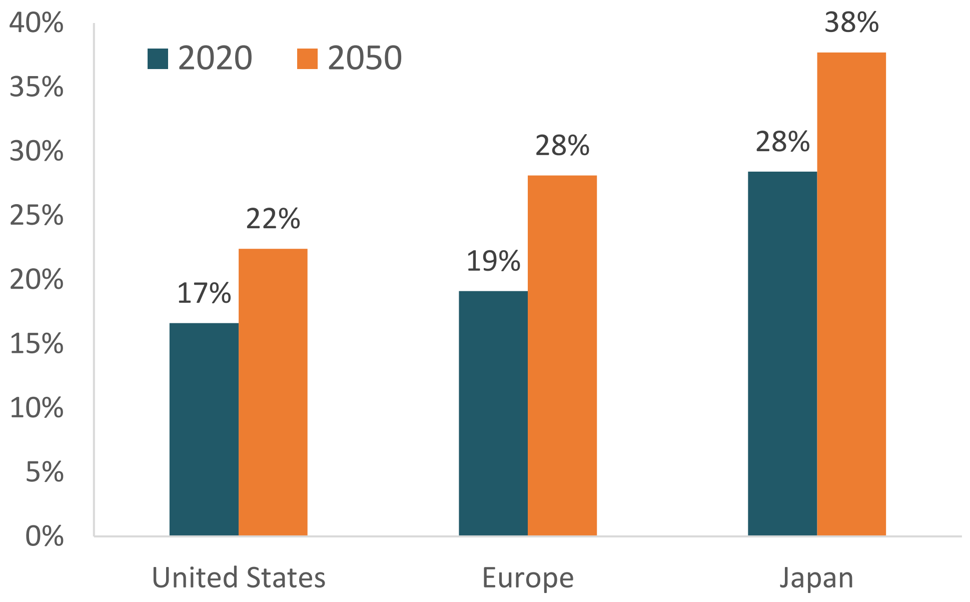
- **The demographic transition, which accompanies development and gives rise to global aging, unfolds in three stages:**
  - Phase 1: Declines in mortality, especially for infants and children, lead to rising youth dependency burdens and rapid population growth. Demographic trends tend to lean against 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.**

	Life Expectancy at Birth				Total Fertility Rate			
	1950-55	1970-75	1990-95	2010-15	1950-55	1970-75	1990-95	2010-15
Developed World	67	72	76	81	2.8	2.1	1.7	1.7
Japan	62	73	79	83	3.0	2.1	1.5	1.4
Western Europe	67	72	76	81	2.5	2.2	1.6	1.6
United States	69	71	76	79	3.3	2.0	2.0	1.9
Emerging East Asia	44	62	70	76	6.0	4.8	2.0	1.5
Eastern Europe	60	69	68	72	2.9	2.2	1.6	1.6
Greater Middle East	42	55	64	70	6.6	6.2	4.6	3.2
Latin America	52	62	69	75	5.9	5.0	3.0	2.2
South Asia	40	52	61	69	5.9	5.5	3.6	2.4
Sub-Saharan Africa	37	45	50	58	6.6	6.8	6.2	5.1

Source: UN Population Division (2015)

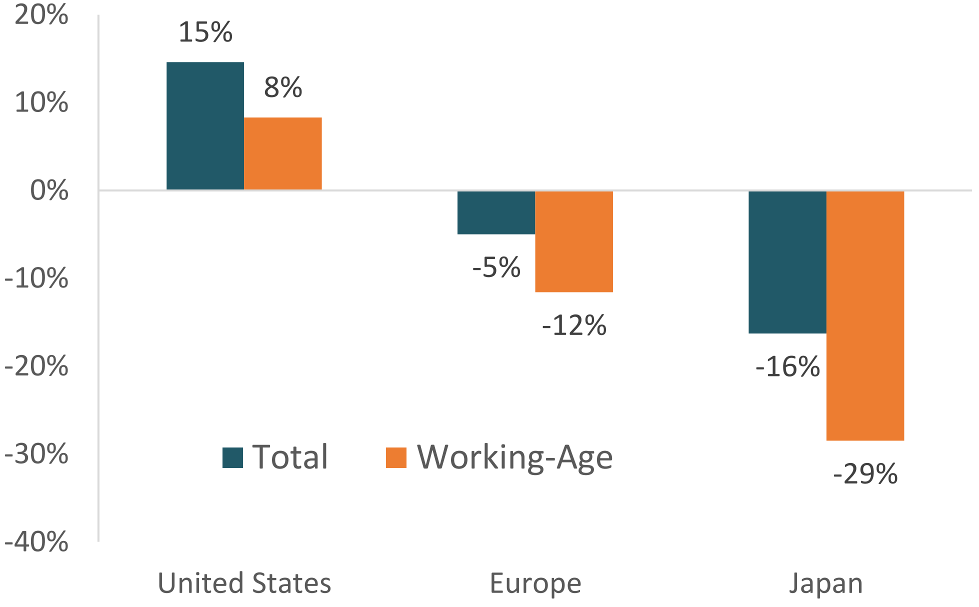
An Aging Developed World

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



Source: UN Population Division (2019)

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



Source: UN Population Division (2019)

A Future of Slower Economic Growth

- ❑ **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

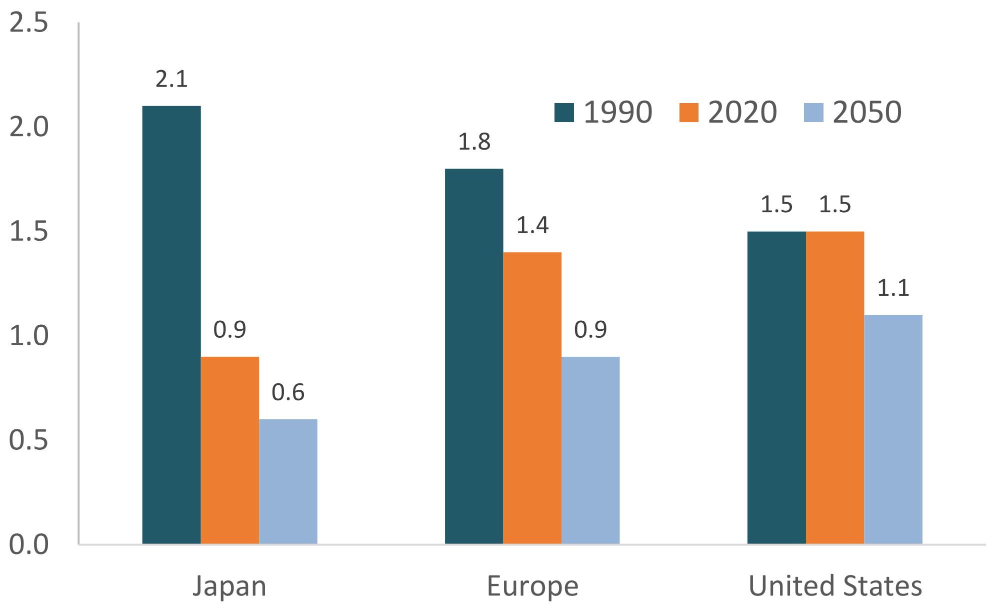
	1980s	1990s	2000s	2010s	2020s	2030s	2040s
Canada	1.7%	1.1%	1.3%	0.5%	-0.1%	0.3%	0.2%
France	1.0%	0.4%	0.6%	-0.2%	0.0%	0.0%	0.1%
Germany	1.1%	0.3%	-0.5%	-0.1%	-1.1%	-0.8%	-0.5%
Italy	0.9%	0.2%	0.2%	-0.4%	-0.7%	-1.2%	-0.6%
Japan	0.7%	0.4%	-0.4%	-1.0%	-0.7%	-1.2%	-1.1%
UK	0.7%	0.4%	0.7%	0.3%	0.0%	0.1%	0.2%
US	1.3%	1.2%	1.1%	0.4%	0.1%	0.3%	0.4%

Source: UN Population Division (2015)

A Closer Look at Savings and Investment

- 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

$$r = \underbrace{\alpha * \frac{n+g+\delta}{s}}_{\text{Marginal Product of Capital Stock}} - (\text{Risk Premium})$$

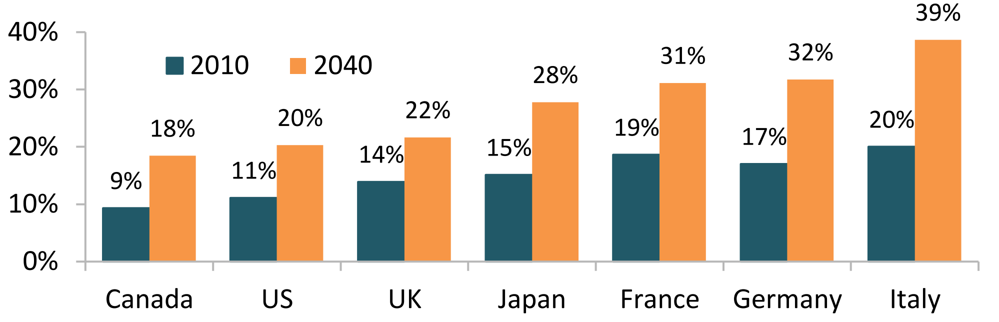
r = Real Rate of Interest
n = Rate of Employment Growth
g = Rate of Productivity Growth
s = Savings Rate

α = Capital Share of National Income
δ = Rate of Depreciation

A Future of Rising Fiscal Burdens

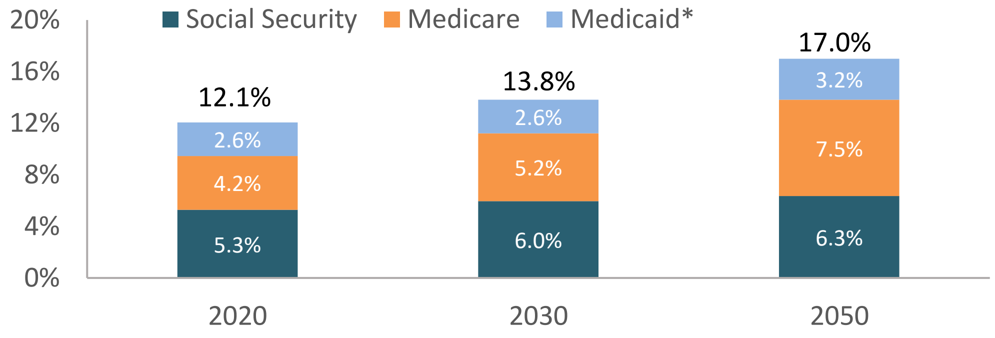
- Graying means paying more for pensions, health care, and long-term care for the elderly.
- Few countries will be able to raise taxes enough to cover more than a fraction of the age wave's total cost.
- Most countries will have to cut old-age benefits, but the required reductions are large and are likely 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.

"Current Deal" Projection: Government Benefits to Persons Aged 60 & Over, as a Percent of GDP, in 2010 and 2040



Note: Includes benefits at all levels of government; assumes no change in retirement ages or replacement rates and a continuation of historical trends in health-care spending.
Source: *The Global Aging Preparedness Index, Second Edition* (CSIS, 2013)

Federal Spending on Major Entitlement Programs, as a Percent of GDP, in 2020, 2030, and 2050



* Includes CHIP and Marketplace Subsidies.
Source: CBO (September 2020)

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*

Real Rate of Return \ Real Wage Growth Rate	2.5%	2.0%	1.5%	1.0%	0.5%
2.0%	21%	23%	26%	28%	31%
2.5%	25%	27%	30%	33%	37%
3.0%	29%	32%	35%	39%	43%
3.5%	34%	37%	41%	46%	51%
4.0%	39%	43%	48%	54%	60%
4.5%	46%	51%	57%	63%	71%
5.0%	53%	60%	67%	75%	84%

Outperforms PAYGO

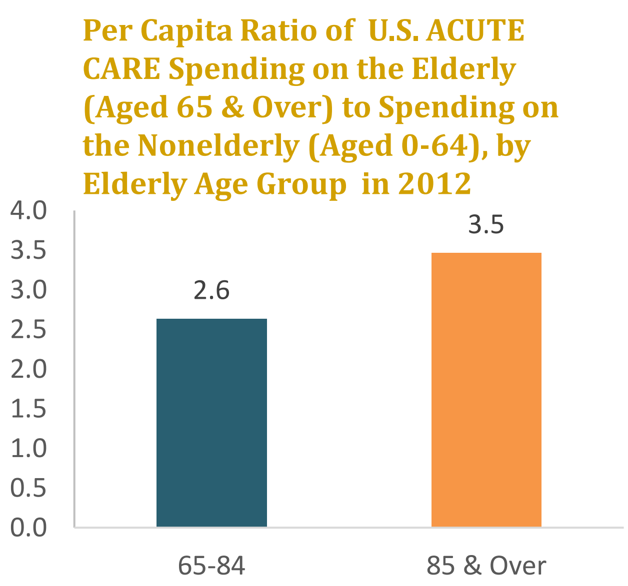
PAYGO

	2.5%	2.0%	1.5%	1.0%	0.5%
	38%	35%	33%	32%	30%

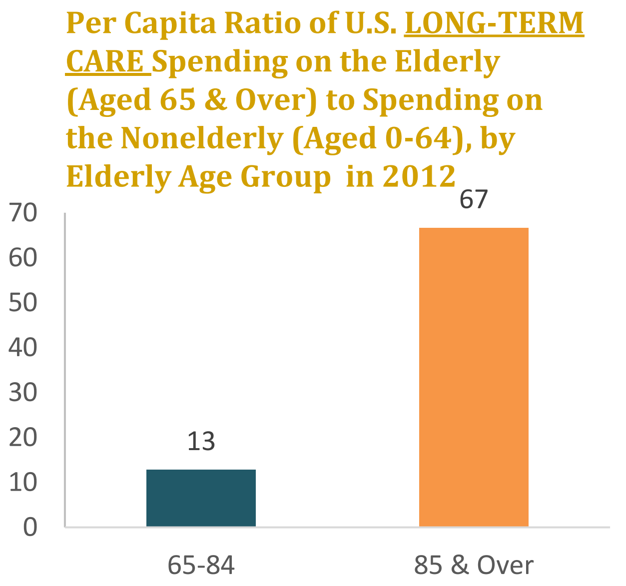
Note: All projections assume U.S. demographics. DC projections assume 40 years of contributions starting at age 25 in 2020, administrative charges equal to 0.5 percent of AUM, retirement at age 65, and phased withdrawals based on projected unisex life expectancy at age 65. PAYGO projections assume retirement 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

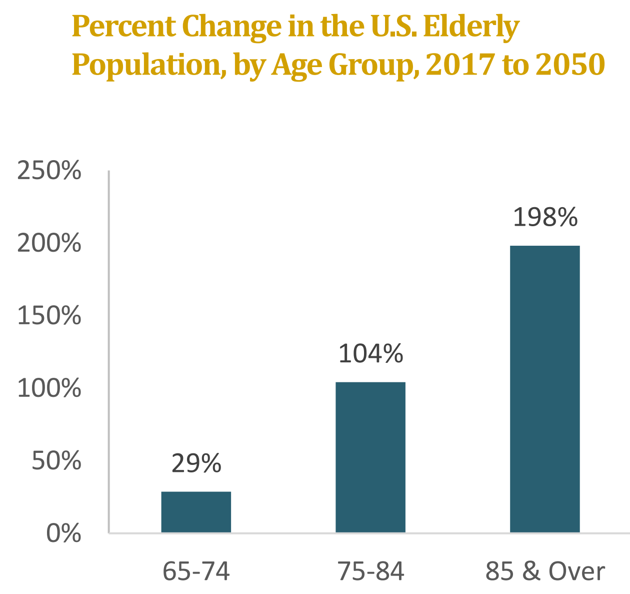
- **Multiplier1:** The elderly consume more per capita in health-care services than the nonelderly.
- **Multiplier 2:** The elderly are the fastest growing segment of the U.S. population.
- **Multiplier3:** The older the elderly are the more health care they consume.
- **Multiplier 4:** The oldest elderly age brackets are the fastest growing of all.



Source: Centers for Medicare and Medicare Services (2018)



Source: Centers for Medicare and Medicare Services (2018)



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:
  - Increase labor-force participation, especially at older ages
  - Increase immigration, especially of skilled workers
  - Increase the birthrate through policies that help workers, and especially women, balance jobs and family
- Solutions that reduce the demographic pressure on government budgets:
  - Reduce unfunded pension liabilities at all levels of government
  - Increase funded retirement savings
  - Impose a global budget constraint on health-care spending
  - 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.