Retirement Demographics

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These comments do not necessarily represent the views of the Federal Reserve Bank of St. Louis or the Federal Reserve System.
Retirement Demographics

- Economic impacts of the Baby Boomers
  - Economic growth
  - Government finances

- Financial impacts of the Baby Boomers
  - Interest rates and the bond market
  - Stock market
  - Housing market

- Retirement implications
  - What is a reasonable expected return on your assets during retirement?
  - Putting the “human capital” in your portfolio to work
The Baby Boom Was the Largest Demographic Event of the 20th Century

Source: Census Bureau
The Baby Boom Was the Largest Demographic Event of the 20th Century

Source: Census Bureau

The chart shows the estimated number of children under one year old from 1895 to 2015. The Baby Boom is indicated by the period 1946-1964, with a peak in the late 1950s. The Silent Generation is represented by the period around 1900, and Gen Y and Gen X are indicated by the respective periods 1980-2000 and 1965-1980."
Increase in Senior Population Outstrips Under-65 Growth For the First and Only(?) Time in History

Annual Change in Population Aged 65 or Older
Thousands of people

Annual Change in Population Under 65
Thousands of people

Source: Haver Analytics

Source: Census Bureau
Increase in Senior Population Outstrips Under-65 Growth For the First and Only(?) Time in History

Annual Change in Population Aged 65 or Older
Thousands of people

Annual Change in Population Under 65
Thousands of people

First Baby Boomer (b. 1946) reaches age 65 in 2011

Last Baby Boomer (b. 1964) reaches age 65 in 2029

Source: Census Bureau
*Baby Boom + Increasing Longevity + Low Birth Rate = Surging Senior Population*

Share of Resident U.S. Population Aged 65 or Older

Source: Census Bureau

Data
- 2010: 13.1%
- 2020: 16.9%
- 2030: 20.6%

Forecast
- 2010: 13.1%
- 2020: 16.9%
- 2030: 20.6%

Source: Haver Analytics
**Baby Boom + Increasing Longevity + Low Birth Rate = Surging Senior Population**

Share of Resident U.S. Population Aged 65 or Older

Percent

Data Forecast

2010: 13.1% 2060: 23.6%
2020: 16.9% 2050: 22.1%
2030: 20.6% 2040: 21.7%

Source: Census Bureau

Source: Haver Analytics
St. Louis Is Older Than the Nation As A Whole

Share of Population Aged 65 or Older: St. Louis and the U.S.

Percent

St. Louis MSA

Entire U.S.

Sources: Census Bureau; Missouri Office of Administration, Division of Budget and Planning; Data.Illinois.Gov
What About Growth?

OECD Data: 30 Countries, 1960-2013


- Robust findings:
  - Larger elderly population reduces growth of GDP per capita.
  - Larger elderly population reduces investment-to-GDP ratio.
  - Larger elderly population reduces inflation.

<table>
<thead>
<tr>
<th>List of Sample OECD countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
</tr>
<tr>
<td>United Kingdom</td>
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<tr>
<td>Austria</td>
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<td>Belgium</td>
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<tr>
<td>Denmark</td>
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<tr>
<td>France</td>
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<tr>
<td>Germany</td>
</tr>
<tr>
<td>Italy</td>
</tr>
<tr>
<td>Luxembourg</td>
</tr>
<tr>
<td>Netherlands</td>
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</tbody>
</table>
Older Population Reduces Growth: Bivariate Evidence

Sample: 30 countries, 1960-2013

Older Population Reduces Growth: Multivariate Evidence

Table 1. Demographic Impact on Growth of Real GDP per capita (PPP-based)

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<thead>
<tr>
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<tbody>
<tr>
<td></td>
<td>(1)</td>
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<tr>
<td>Population Growth</td>
<td>-0.686</td>
<td>-1.194</td>
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<tr>
<td></td>
<td>[0.270]</td>
<td>[0.018]**</td>
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<tr>
<td>Share of 65 and over</td>
<td>-0.211</td>
<td>-0.261</td>
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<tr>
<td></td>
<td>[0.002]***</td>
<td>[0.000]***</td>
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<tr>
<td>Share of 15-64</td>
<td>-0.132</td>
<td>0.201</td>
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<tr>
<td></td>
<td>[0.159]</td>
<td>[0.037]**</td>
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<tr>
<td>Life expectancy</td>
<td>0.008</td>
<td>0.013</td>
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<tr>
<td></td>
<td>[0.276]</td>
<td>[0.188]</td>
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<tr>
<td>Openness</td>
<td>-0.018</td>
<td>0.005</td>
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<tr>
<td></td>
<td>[0.116]</td>
<td>[0.571]</td>
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<tr>
<td>Secondary school enrollment</td>
<td>0.091</td>
<td>0.083</td>
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<tr>
<td></td>
<td>[0.100]</td>
<td>[0.135]</td>
</tr>
<tr>
<td>Budget Balance/GDP</td>
<td>-0.090</td>
<td>-0.101</td>
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<tr>
<td></td>
<td>[0.000]***</td>
<td>[0.000]***</td>
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<tr>
<td>Inflation</td>
<td>0.272</td>
<td>0.244</td>
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<tr>
<td></td>
<td>[0.000]***</td>
<td>[0.000]***</td>
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<tr>
<td></td>
<td>[0.309]</td>
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<td>Observations</td>
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<tr>
<td>Number of fscodes</td>
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<tr>
<td>R-squared</td>
<td>0.177</td>
<td>0.185</td>
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</table>

**Older Population Reduces Investment: Bivariate Evidence**

**Sample**: 30 countries, 1960-2013

Older Population Reduces Investment: Multivariate Evidence

Table 2. Demographic Impact on Current Account, Savings, and Investment

Older Population Reduces Inflation: Bivariate Evidence

Sample: 30 countries, 1960-2013

Older Population Reduces Inflation: Multivariate Evidence

Table 4. Demographic Impact on Inflation

<table>
<thead>
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<td>Population Growth</td>
<td>0.339</td>
<td>0.524</td>
<td>0.549</td>
<td>0.317</td>
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<td></td>
<td>[0.715]</td>
<td>[0.577]</td>
<td>[0.570]</td>
<td>[0.764]</td>
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<tr>
<td>Share of 65 and over</td>
<td>-0.176</td>
<td>-0.125</td>
<td>-0.137</td>
<td>-0.416</td>
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<td>[0.009]***</td>
<td>[0.013]**</td>
<td>[0.006]***</td>
<td>[0.008]***</td>
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<td>Share of 15-64</td>
<td>-0.101</td>
<td>-0.103</td>
<td>-0.330</td>
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<td></td>
<td>[0.226]</td>
<td>[0.233]</td>
<td>[0.037]**</td>
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<tr>
<td>Life Expectancy</td>
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<tr>
<td></td>
<td>[0.043]**</td>
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<tr>
<td>TOT change</td>
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<td>[0.005]***</td>
<td>[0.005]***</td>
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<td>GDP growth</td>
<td>-0.750</td>
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<tr>
<td>M2 growth</td>
<td>0.192</td>
<td>0.183</td>
<td>0.180</td>
<td>0.180</td>
<td>0.176</td>
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</tr>
<tr>
<td>Budget Balance Chg</td>
<td>0.129</td>
<td>0.153</td>
<td>0.153</td>
<td>0.158</td>
<td>0.150</td>
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<tr>
<td></td>
<td>[0.051]*</td>
<td>[0.022]**</td>
<td>[0.033]**</td>
<td>[0.018]**</td>
<td>[0.022]**</td>
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<td>Constant</td>
<td>-0.053</td>
<td>2.418</td>
<td>8.443</td>
<td>8.739</td>
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<td>[0.910]</td>
<td>[0.060]*</td>
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<tr>
<td>Number of obs</td>
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<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.212</td>
<td>0.216</td>
<td>0.217</td>
<td>0.217</td>
<td>0.222</td>
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<td>RMSE</td>
<td>5.235</td>
<td>5.227</td>
<td>5.223</td>
<td>5.223</td>
<td>5.209</td>
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</tbody>
</table>

Aging U.S. Population Drives CBO Forecast of Rising Federal Debt

Federal Debt Held by the Public Relative to GDP
Percent

CBO 'Alternative Fiscal Scenario': Fed'l Debt Held by Public Relative to GDP
Percent

- World War II
- Reagan-Bush I
- Great Recession
- Aging population and rising health-care costs

Sources: Office of Management and Budget, Congressional Budget Office
Annual data through 2014, projections through 2050
Economic and Financial Impacts of the Baby Boomers

- An older U.S. population will result in
  - Slower growth of per-capita income
  - Less investment
  - Lower inflation
  - Rapidly rising national debt

- The slow-growing labor force (due to our low birth rate) will reduce the overall growth rate of the economy and make our fiscal challenges more serious.

- What does this all this mean for interest rates and other financial markets?
Global Real Interest Rates Have Declined For 30 Years—Does Aging Trump Deficits?

Source: International Monetary Fund, “Perspectives on Global Real Interest Rates,” Chap. 3, World Economic Outlook, April 2014.

Investors Expect Low Interest Rates in the U.S. As Far As the Eye Can See

30-Years Forward 3-Month T-Bill Yield

Source: Federal Reserve Board

Feb. 20, 2015: 3.26% short-term Treasury yield implied in Feb. 2045
Most of the Decline In Rates Has Been in the Real Component

20-Years Forward 3-Month T-Bill Yield
Percent

20-Years Forward Inflation-Adjusted 3-Month T-Bill Yield
Percent

Feb. 20, 2015:
3.20% nominal short-term yield in 2035

Feb. 20, 2015:
1.06% real short-term yield in 2035

Source: Federal Reserve Board
Daily data through Feb. 20 2015
Can Stocks and Bonds Deliver Returns Comparable to Past Performance?

Indexes equal 1 in 1988

Source: Dow Jones, Ryan Labs, Merrill Lynch
Monthly through Jan. 2015
Can Stocks and Bonds Deliver Returns Comparable to Past Performance?

- Returns as high as before? Almost certainly not!
  - Valuations have expanded dramatically.
  - Future economic growth is likely to be significantly slower.
- A “golden age” of high asset returns likely is nearing its end.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Wilshire 5000 stockmarket total return</td>
<td>10.4%</td>
<td>??</td>
</tr>
<tr>
<td>Merrill Lynch corporate-bond total return</td>
<td>7.6%</td>
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<td>Ryan Labs Treasury-market total return</td>
<td>6.5%</td>
<td>??</td>
</tr>
<tr>
<td>Nominal GDP (period is Q4.1987 thru Q4.2014)</td>
<td>4.8%</td>
<td>??</td>
</tr>
<tr>
<td>PCE inflation (period is Q4.1987 thru Q4.2014)</td>
<td>2.2%</td>
<td>??</td>
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</table>
Prospective Returns on U.S. Stocks and Bonds Are Much Lower Now

S&P500 Earnings Yield (inverse of Case-Shiller cyclically adjusted PE ratio)

Real BAA Corporate-Bond Yield (deflated by 5-year moving-avg inflation)

Real 5-Year Treasury Yield (deflated by 5-year moving-avg inflation)

<table>
<thead>
<tr>
<th>Prospective real yield on:</th>
<th>Jan. 1988</th>
<th>Jan. 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>S&amp;P 500 (based on CAPE)</td>
<td>7.2%</td>
<td>3.7%</td>
</tr>
<tr>
<td>BAA corporate bond</td>
<td>7.8%</td>
<td>3.3%</td>
</tr>
<tr>
<td>5-year Treasury</td>
<td>4.9%</td>
<td>0.2%</td>
</tr>
</tbody>
</table>

Source: Dow Jones, Ryan Labs, Merrill Lynch, BEA Monthly through Jan. 2015
Can Stocks and Bonds Deliver Returns Comparable to Past Performance?

- Returns as high as before? Almost certainly not!
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<td>6%</td>
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<tr>
<td>Merrill Lynch corporate-bond total return</td>
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<td>3%</td>
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<tr>
<td>Ryan Labs Treasury-market total return</td>
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<td>2%</td>
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<td>Nominal GDP (period is Q4.1987 thru Q4.2014)</td>
<td>4.8%</td>
<td>3 to 4%</td>
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<tr>
<td>PCE inflation (period is Q4.1987 thru Q4.2014)</td>
<td>2.2%</td>
<td>2%</td>
</tr>
</tbody>
</table>
Why We Should Expect Lower Investment Returns in the Future

1. Slower economic growth

2. High current asset valuations

3. Higher taxes, perhaps focused on investment earnings

4. What about housing as an investment?
The Death of Homeownership Has Been Exaggerated

- Across the entire population, overwhelming majorities of every major demographic group want to be homeowners.
- There is very little association between local housing-market conditions experienced during the recent boom-bust cycle and changes in attitudes toward homeownership.
- Close to 90 percent of people under 45 expect to buy a home at some point in the future.
- Aspirations to own a home are higher among historically disadvantaged minorities than among whites and Asians, despite a 30-percentage-point homeownership-rate gap.

Homeownership Rates Increase With Age

Homeownership Rates by Age of Household Head

Source: Census Bureau
Annual data through 2013
Population Aging Will Be Rapid and Permanent

Age Composition of U.S. Households

Source: Census Bureau
Annual data through 2013; projections through 2060
Population Aging Will Be Rapid and Permanent

---

Age Composition of U.S. Households

- **History**
- **Forecast**

- 75 and over
- 55-74
- 35-54
- Under 35

Source: Census Bureau
Annual data through 2013; projections through 2060
Minority Homeownership Rates Are Lower Than That of Whites

Source: Federal Reserve Board, Survey of Consumer Finances
Racial and Ethnic Composition of the Population is Changing Rapidly

Source: Census Bureau
Annual data through 2013; projections through 2060
The Aging Population Should Lift the Homeownership Rate...

U.S. Homeownership Rate: Projections Based on the Changing Age and Racial and Ethnic Composition of the Population

- Actual
- Aging effect only
- Homeownership rate adjusting for the aging of the population

Source: Census Bureau
Annual data through 2014; projections through 2035
But Faster-Growing Parts of Population Have Low Homeownership Rates

U.S. Homeownership Rate: Projections Based on the Changing Age and Racial and Ethnic Composition of the Population

- Actual
- Aging effect only
- Race and ethnicity effect only
- Homeownership rate adjusting for the aging of the population
- Homeownership rate adjusting for the changing racial and ethnic composition of the population

Source: Census Bureau
Annual data through 2014; projections through 2035
My Best Guess: National Homeownership Rate Won’t Change Much

U.S. Homeownership Rate: Projections Based on the Changing Age and Racial and Ethnic Composition of the Population

- Actual
- Aging effect only
- Both effects
- Race and ethnicity effect only
- Actual homeownership rate
- Homeownership rate adjusting for the aging of the population
- My best guess: Homeownership rate that "splits the difference"
- Homeownership rate adjusting for the changing racial and ethnic composition of the population

Source: Census Bureau
Annual data through 2014; projections through 2035
## Whither House Prices?
### Slow Growth

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>U.S. house prices (FHFA expanded-data HPI)</td>
<td>5.8%</td>
<td>0.3%</td>
<td>3 to 4%</td>
</tr>
<tr>
<td>U.S. per-capita personal income</td>
<td>4.3%</td>
<td>2.9%</td>
<td>2 to 3%</td>
</tr>
<tr>
<td>St. Louis house prices (FHFA expanded-data HPI)</td>
<td>5.2%</td>
<td>-1.0%</td>
<td>1 to 3%</td>
</tr>
<tr>
<td>St. Louis per-capita personal income</td>
<td>4.0%</td>
<td>2.7%</td>
<td>1.5 to 2.5%</td>
</tr>
<tr>
<td>PCE inflation</td>
<td>1.9%</td>
<td>1.9%</td>
<td>2%</td>
</tr>
</tbody>
</table>
U.S. House Prices Have Some Room to Grow

U.S. House-Price Index (FHFA Expanded-Data HPI)
Average level in 1995 equals 100

U.S. Per-Capita Personal Income
Average level in 1995 equals 100

Sources: Federal Housing Finance Agency; Bureau of Economic Analysis
Quarterly thru Q4.2014
St. Louis House Prices Look Cheap—And Likely to Stay That Way

St. Louis MSA House-Price Index (FHFA Expanded-Data HPI)
Average level in 1995 equals 100

St. Louis MSA Per-Capita Personal Income
Average level in 1995 equals 100

“Fair value” of St. Louis house prices

Sources: Federal Housing Finance Agency; Bureau of Economic Analysis
Retirement Implications

- What is a reasonable expected return on your assets during retirement?
  - Stocks  5 to 7%
  - Bonds   2 to 3%
  - Cash    1 to 2%
  - Housing 1 to 3% (St. Louis)
  - Inflation 2%

- Putting the “human capital” in your portfolio to work
  - Save and invest smarter: Plan for low returns.
  - Work longer: Earn more, less need to draw on retirement savings.
In Sum: Retirement Demographics

- The Baby Boomers added to the economy’s growth for decades and now will subtract from growth.

- Our long-term fiscal challenges are manageable if we all pay more taxes (and control outlays, of course).

- Returns on investment are likely to be lower across the board.

- Don’t forget your human capital when planning your long-term financial future.