Addressing Social Security Solvency While Sustaining High Labor Force Participation*

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7–29–2018

*This work was supported by SSA grant RRC08098401UM18-10. The opinions and conclusions are solely those of the author and should not be considered as representing the opinions or policy of any agency of the Federal Government.
Background

• Social Security Trustees Report: trust fund depleted early 2030s

• Need new revenues or cost reductions — see, for example, SSA Office of Chief Actuary website

• Or, need to find efficiency gains
Idea This Project

• Check implications for labor force participation of various policies

• Ask if there are efficiency gains that could be captured
Framework

• Life-cycle model of household behavior

• Household utility maximization subject to lifetime budget constraint
  • Utility flow depends upon consumption and leisure
  • Resources consist of male and female earnings, less taxes, plus Social Security benefits
Framework (cont.)

• Leisure choices occur on extensive margin

• Focus on male retirement ages here

• Details:
  
  • Take account of changing family composition with “equivalent adult” consumption indices

  • Use “earnings dynamics” profiles of earning amounts at different experience levels, by education group
Analysis

• Key FOC for optimal retirement age $R$:

$$\frac{B'(R) + y(R)}{X(R)} = \text{constant}$$

• $B'(R)$ is effect on present value of Social Security benefits from change in $R$

• $y(R)$ is net-of-tax earnings just prior to retirement

• $X(R)$ is household consumption

• Larger left-hand side numerator implies later optimal retirement age
Data and Estimation

- Male and female Social Security lifetime earnings histories
- Consumer Expenditure Survey pseudo panel for equivalent adult scales
- HRS for demographics, retirement ages, and net worth at retirement
<table>
<thead>
<tr>
<th>Variable</th>
<th>Stage 1</th>
<th>Stage 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\beta_1 = \frac{r-\ell}{1-\gamma}$</td>
<td>0.0264*** (0.0008/34.5727)</td>
<td>0.0272*** (0.0006/41.9929)</td>
</tr>
<tr>
<td>$\beta_2 = \xi^S$</td>
<td>0.3351*** (0.0523/6.4108)</td>
<td>0.3351*** (0.0491/6.8244)</td>
</tr>
<tr>
<td>$\beta_3 = \xi^K$</td>
<td>0.3372*** (0.0181/18.6690)</td>
<td>0.3373*** (0.0165/20.4231)</td>
</tr>
<tr>
<td>$\beta_4 = \frac{\gamma}{1-\gamma} \cdot \ln(\omega)$</td>
<td>-0.0831** (0.0370/-2.2482)</td>
<td>-0.0830*** (0.0218/-3.8153)</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>NA</td>
<td>-0.2171*** (0.0245/-8.8703)</td>
</tr>
<tr>
<td>$\gamma^R$</td>
<td>-0.2179* (0.1150/-1.8940)</td>
<td></td>
</tr>
<tr>
<td>$\gamma^A$</td>
<td>-0.0906** (0.0449/-2.0179)</td>
<td>NA</td>
</tr>
<tr>
<td># Obs</td>
<td>4033</td>
<td>4033</td>
</tr>
<tr>
<td>Criterion $S(\theta, \hat{V})$</td>
<td>0.0000</td>
<td>11.6044</td>
</tr>
</tbody>
</table>
Policy 1: Payroll Tax Increase

• Trustee Report 2017: 24% ↑ needed [i.e., OASI payroll tax increase of about 250 basis points total]

• Economics of tax change:
  • Substitution effect: $R \downarrow$ [i.e., $y \downarrow$]
  • Income effect: $R \uparrow$ [i.e., $X \downarrow$]
  • Balance: expect “wash”
Policy 1 (cont.)

• Simulation results: see Table 2

• As expected above, negligible change in labor force participation
## Table 2. Simulated Change in Average Retirement Age with Payroll Tax Increase

<table>
<thead>
<tr>
<th>Percent Payroll Tax Change</th>
<th>Change Retirement Age</th>
<th>Change Per Capita Consumption</th>
<th>Change Utility</th>
<th>Change OASI Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gross-of-Tax Real Interest Rate=5%/yr</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.0000</td>
<td>-0.0312</td>
<td>-0.0051</td>
<td>-0.0011</td>
<td>-0.0001</td>
</tr>
<tr>
<td>12.0000</td>
<td>-0.0681</td>
<td>-0.0102</td>
<td>-0.0022</td>
<td>-0.0002</td>
</tr>
<tr>
<td>18.0000</td>
<td>-0.0983</td>
<td>-0.0153</td>
<td>-0.0033</td>
<td>-0.0003</td>
</tr>
<tr>
<td>24.0000</td>
<td>-0.1347</td>
<td>-0.0204</td>
<td>-0.0044</td>
<td>-0.0005</td>
</tr>
<tr>
<td><strong>Gross-of-Tax Real Interest Rate=2%/yr</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.0000</td>
<td>-0.0297</td>
<td>-0.0051</td>
<td>-0.0011</td>
<td>-0.0001</td>
</tr>
<tr>
<td>12.0000</td>
<td>-0.0605</td>
<td>-0.0102</td>
<td>-0.0022</td>
<td>-0.0001</td>
</tr>
<tr>
<td>18.0000</td>
<td>-0.0887</td>
<td>-0.0153</td>
<td>-0.0032</td>
<td>-0.0002</td>
</tr>
<tr>
<td>24.0000</td>
<td>-0.1185</td>
<td>-0.0204</td>
<td>-0.0043</td>
<td>-0.0002</td>
</tr>
</tbody>
</table>

Source: see text.
Policy 2: Benefit Decrease

• Trustee Report 2017: 18% ↓ needed

• Economics of benefit change:
  • Substitution effect: $R \downarrow$ [i.e., $B'(R) \downarrow$]
  • Income effect: $R \uparrow$ [i.e., $X \downarrow$]
  • Balance: expect $R \uparrow$
Policy 2 (cont.)

• Simulation results: See Table 3

• Effects are small:
  
  • High interest rate specification \( (r = 0.05) \):
    \[ R \uparrow 0.75 \text{ months} \]
  
  • Low interest rate specification \( (r = 0.02) \):
    \[ R \uparrow 2.4 \text{ months} \]
### Table 3. Simulated Change in Average Retirement Age with OASI Benefit Decrease

<table>
<thead>
<tr>
<th>Percent OASI Benefit Change</th>
<th>Change Retirement Age</th>
<th>Change Per Capita Consumption</th>
<th>Change Utility</th>
<th>Change OASI Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross-of-Tax Real Interest Rate $r = 5% / yr$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.0000</td>
<td>0.0215</td>
<td>-0.0034</td>
<td>-0.0008</td>
<td>-0.0600</td>
</tr>
<tr>
<td>12.0000</td>
<td>0.0425</td>
<td>-0.0068</td>
<td>-0.0015</td>
<td>-0.1200</td>
</tr>
<tr>
<td>18.0000</td>
<td>0.0673</td>
<td>-0.0102</td>
<td>-0.0023</td>
<td>-0.1800</td>
</tr>
<tr>
<td>Gross-of-Tax Real Interest Rate $r = 2% / yr$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.0000</td>
<td>0.0655</td>
<td>-0.0075</td>
<td>-0.0017</td>
<td>-0.0600</td>
</tr>
<tr>
<td>12.0000</td>
<td>0.1330</td>
<td>-0.0151</td>
<td>-0.0035</td>
<td>-0.1199</td>
</tr>
<tr>
<td>18.0000</td>
<td>0.2039</td>
<td>-0.0226</td>
<td>-0.0053</td>
<td>-0.1799</td>
</tr>
</tbody>
</table>

Source: see text.
Policy 3: Seek Greater Efficiency

• Idea: Existing payroll and income taxes create a wedge between gross and net earnings in our key condition for the optimal retirement age

• Although the income and substitution effects of existing taxes tend to cancel, the efficiency cost of the wedge can be quite large
Policy 3 (cont.)

• One possible approach: Use age-specific payroll tax reductions — e.g., Laitner/Silverman [2012]

• Approach examined here: Enhance the sensitivity of Social Security benefits to the retirement age
Status Quo

- “Indexing year”: Year individual reaches age 60

- Vector of earnings:
  
  - Age $s$ below 60: element for vector is $y(s) \cdot (\overline{y}(60) / \overline{y}(s))$
  
  - Age $s$ at or above 60: element for vector is $y(s)$

- Select highest 35 elements from vector. Their average, divided by 12, is the AIME

- Apply the benefit formula to the AIME
Policy 3: Remove Earnings Indexation

- Select an individual’s highest 35 nominal earnings amounts
- Divide the average by 12 for the new AIME
- Rescale everyone’s AIME by the common proportional factor that restores the average AIME to its prereform level
- Apply the existing benefit formula
Policy 3 (cont.)

- The indexation adjustments are very large — reflecting inflation and TFP growth

- The sensitivity of one’s Social Security benefits to one’s retirement age is greatly enhanced

- See Diagram 1
Diagram 1

- **Net earnings**
- **Age**
- **Current dollar**
- **De-trended**

Axes:
- Y-axis: Net earnings
- X-axis: Age

Key points:
- Age 22, 26, 62 (R)
- Curves indicating net earnings and de-trended current dollar.
Simulation 3: Outcomes

• See Table 4

• We also consider allowing an agent to count each annual earnings amount past age 60 double

• Gains in labor force participation are 1.23 to 1.85 years
<table>
<thead>
<tr>
<th>Indexing Formula Change</th>
<th>Change Retirement Age</th>
<th>Change Per Capita Consumption</th>
<th>Change Utility</th>
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</tr>
</thead>
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<tr>
<td><strong>Gross-of-Tax Real Interest Rate ( r=5%/yr )</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stop Indexing Earnings Before 60</td>
<td>1.2311</td>
<td>0.0011</td>
<td>-0.0008</td>
<td>-0.0203</td>
</tr>
<tr>
<td>Stop Indexing &amp; Double Count Earnings after 60</td>
<td>1.5251</td>
<td>0.0009</td>
<td>-0.0011</td>
<td>-0.0263</td>
</tr>
<tr>
<td><strong>Gross-of-Tax Real Interest Rate ( r=2%/yr )</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stop Indexing Earnings Before 60</td>
<td>1.4880</td>
<td>-0.0002</td>
<td>-0.0020</td>
<td>-0.0208</td>
</tr>
<tr>
<td>Stop Indexing &amp; Double Count Earnings after 60</td>
<td>1.8470</td>
<td>-0.0012</td>
<td>-0.0028</td>
<td>-0.0278</td>
</tr>
</tbody>
</table>

Source: see text.
Contribution to Solvency

• Rough calculation: OASI and federal income tax revenues from 1 more year of work, across the board, equal about 3.3% of current Social Security Benefits if \( r = 0.05 \), and 3.0% if \( r = 0.02 \)

• Thus, Table 4 changes in \( R \) could amount to 4-5.5% of Social Security benefits, or about 20-30% of the 2017 shortfall