Does raising the retirement age make people work longer?
Evidence from pension age reform in Estonia in the 2000s

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Background and motivation

• Demographic ageing is raising the pressure on the fiscal sustainability of public pension systems

• A widely used measure for relieving this pressure is to raise the age which pensions can be drawn
  • Nearly all EU member states have raised their statutory pension age or are in the process of doing so; nine EU countries have linked further rises of in the pension age automatically to advances in life expectancy

• The purpose of the pension age reforms is twofold:
  • To reduce current and future pension expenditures
  • To increase the labour supply of older persons and generate additional tax revenue

• Although pension age reforms are common, there are only a few studies into their actual LM outcomes
Why should the change in pension age have an effect on labour market decisions?

- There is a variety of mechanisms at work:
  - Lifetime social security wealth is reduced
    - work longer to make it up
  - Current incomes are reduced
    - replacement income from work (if there are no large assets to draw down)
  - Anchoring of LM decisions
    - change in statutory pension age may serve as a signal
  - Age-specific tax incentives change

- There are many other factors at work (economy, cohort flow, other social security schemes, etc.)

- Context matters (explanations for variation in LM outcomes)
The effect of policy change is usually estimated by means of difference-in-differences (DD) approach:

- Focus on age bracket affected by pension age reform
- Does the LM behaviour of individuals in that age bracket differ depending on whether they were below or above pension age?
- Technically dummy treatment variable „below retirement“ age, essentially comparison of pre- and post-reform cohorts

<table>
<thead>
<tr>
<th>Study</th>
<th>Change in pension age</th>
<th>Gender and age bracket Analysed</th>
<th>Crude change in empl rate</th>
<th>Policy-related DD change in empl rate</th>
<th>% change attributed to policy reform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staubli &amp; Zweimüller (2013): Austria</td>
<td>M 60&gt;62, F 55&gt;58.5</td>
<td>M 57-64, F 52-59</td>
<td>+19%, +25.4%</td>
<td>+9.75%, +11%</td>
<td>51%, 43%</td>
</tr>
<tr>
<td>Cribb et al. (2016): UK</td>
<td>F 60&gt;62</td>
<td>F 60</td>
<td>+10%</td>
<td>+6.3%</td>
<td>63%</td>
</tr>
<tr>
<td>Vestad (2013): Norway</td>
<td>MF64&gt;62</td>
<td>MF63</td>
<td>-34.1%</td>
<td>-27.1%</td>
<td>79%</td>
</tr>
<tr>
<td>Rabaté &amp; Rochut (2019): France</td>
<td>MF60&gt;61</td>
<td>MF60-61</td>
<td>...</td>
<td>+21%</td>
<td>...</td>
</tr>
</tbody>
</table>
Our study: research questions

- How did persons, whose entitlement to an old-age pension was postponed because of pension age reform, responded to the change?
  
  To what extent did they stay in *employment* longer, claimed *unemployment* benefits, or withdraw from the labour market (became *economically inactive*)?

- How did the responses of individuals vary according to socio-demographic characteristics (education, immigrant status, urban-rural residence)?
  
  Did sub-groups with worse labour market performance show greater difficulties in staying longer in employment?
Data and analytical approach

Data sources:
- Pension register => receipt of pensions (different schemes)
- Tax register (social tax payments) => LM status of individuals (employed, unemployed(benefit recipient); inactive)
- Population register => country of residence (Estonia), deaths
- Census => socio-demographic characteristics (education, immigrant status, urban-rural residence, marital status)

Time period: 2001–2011, LM status with monthly accuracy

Study population: women born in 1943–1952 (men were not affected by the reform in the period of study)

Method: difference-in-differences approach; effects of changes in both early and normal old-age pension, linear probability models (main effects and interactions).

Caveat: LM statuses constructed from administrative data
Normal and early pension age, Estonia, women born from 1943 to 1952

<table>
<thead>
<tr>
<th>Birth cohort</th>
<th>Age of normal retirement</th>
<th>Year of reaching normal retirement age</th>
<th>Age of early retirement</th>
<th>Year of reaching early retirement age</th>
</tr>
</thead>
<tbody>
<tr>
<td>1943</td>
<td>58</td>
<td>2001</td>
<td>56</td>
<td>2000</td>
</tr>
<tr>
<td>1944</td>
<td>58.5</td>
<td>2002(II)-2003(I)</td>
<td>56</td>
<td>2000</td>
</tr>
<tr>
<td>1945</td>
<td>59</td>
<td>2004</td>
<td>56</td>
<td>2001</td>
</tr>
<tr>
<td>1946</td>
<td>59.5</td>
<td>2005(II)-2006(I)</td>
<td>56.5</td>
<td>2002(II)-2003(I)</td>
</tr>
<tr>
<td>1947</td>
<td>60</td>
<td>2007</td>
<td>57</td>
<td>2004</td>
</tr>
<tr>
<td>1948</td>
<td>60.5</td>
<td>2008(II)-2009(I)</td>
<td>57.5</td>
<td>2005(II)-2006(I)</td>
</tr>
<tr>
<td>1949</td>
<td>61</td>
<td>2010</td>
<td>58</td>
<td>2007</td>
</tr>
<tr>
<td>1950</td>
<td>61.5</td>
<td>2011(II)-2012(I)</td>
<td>58.5</td>
<td>2008(II)-2009(I)</td>
</tr>
<tr>
<td>1951</td>
<td>62</td>
<td>2013</td>
<td>59</td>
<td>2010</td>
</tr>
<tr>
<td>1952</td>
<td>62.5</td>
<td>2014(II)-2015(I)</td>
<td>59.5</td>
<td>2011(II)-2012(I)</td>
</tr>
</tbody>
</table>
Normal pension age, Estonia, women born from 1943 to 1950
Employment rates: women and men aged 55–64
Estonia, 1989–2018

- Females 55-59
- Males 55-59
- Females 60-64
- Males 60-64
Results
Descriptive results: age-specific activity rates
Estonia, women born from 1944 to 1950

Postponement of exit from the labour force associated with change in early retirement age

Postponement of exit from the labour force associated with change in normal retirement age
### Descriptive results: change in the LM status

**Estonia, women born from 1943 to 1952**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In the labour force</strong></td>
<td>44</td>
<td>64</td>
<td><strong>+20</strong></td>
<td>57</td>
<td>75</td>
<td><strong>+18</strong></td>
</tr>
<tr>
<td><strong>Employed</strong></td>
<td>44</td>
<td>59</td>
<td><strong>+15</strong></td>
<td>56</td>
<td>67</td>
<td><strong>+11</strong></td>
</tr>
<tr>
<td><strong>Unemployed (registered)</strong></td>
<td>0</td>
<td>5</td>
<td><strong>+5</strong></td>
<td>1</td>
<td>8</td>
<td><strong>+7</strong></td>
</tr>
<tr>
<td><strong>Economically inactive</strong></td>
<td>56</td>
<td>36</td>
<td><strong>-20</strong></td>
<td>43</td>
<td>25</td>
<td><strong>-18</strong></td>
</tr>
</tbody>
</table>

Note: These estimates aggregate the influence of all factors, not just the effect the pension age reform.
Model

\[ y_{it} = \alpha BRA_{ict} + \sum_t \delta_t T_t + \sum_a \delta_a A_a + \sum_c \delta_c C_c + \beta X_i + \varepsilon_{ict} \]

- Random effects GLS linear probability model
- Dependent variable \( y_{it} \) -- being in the specified ML state (e.g. employed) in the month of observation
- Independent (treatment) variable \( BRA_{ict} \) -- being below normal [or early] retirement age in the month of observation
- Controls (added in a stepwise fashion):
  - Model M1: quarterly time dummies \( T_t \) for business cycle effects; quarterly age dummies \( A_a \) for age effects
  - Model M2: M1+ cohort dummies \( C_c \) (two-year specification)
The effect of normal retirement age (NRA) increase on employment, unemployment and inactivity
Estonia, women born from 1943 to 1950

<table>
<thead>
<tr>
<th>Effect of being below NRA on employment</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
<th>M5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.042***</td>
<td>0.041***</td>
<td>0.042***</td>
<td>0.041***</td>
<td>0.041***</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
</tr>
<tr>
<td>Effect of being below NRA on unemployment</td>
<td>0.027***</td>
<td>0.027***</td>
<td>0.027***</td>
<td>0.027***</td>
<td>0.027***</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.001)</td>
<td>(0.001)</td>
<td>(0.001)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Effect of being below NRA on inactivity</td>
<td>-0.069***</td>
<td>-0.068***</td>
<td>-0.069***</td>
<td>-0.068***</td>
<td>-0.068***</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
</tr>
<tr>
<td>Random effects</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Fixed effects</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Individual controls</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Monthly observations</td>
<td>2,669,120</td>
<td>2,669,120</td>
<td>2,574,068</td>
<td>2,574,068</td>
<td>2,647,351</td>
</tr>
<tr>
<td>Individuals</td>
<td>57,512</td>
<td>57,512</td>
<td>55,428</td>
<td>55,428</td>
<td>57,033</td>
</tr>
</tbody>
</table>

Note: The working data cover women born between 1943 and 1950, aged 58–61 at the time of observation.
The effect of early retirement age (ERA) increase on employment, unemployment and inactivity, Estonia, women born from 1945 to 1952

<table>
<thead>
<tr>
<th></th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
<th>M5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effect of being below ERA on employment</td>
<td>0.025*** (0.001)</td>
<td>0.023*** (0.001)</td>
<td>0.024*** (0.001)</td>
<td>0.024*** (0.001)</td>
<td>0.023*** (0.001)</td>
</tr>
<tr>
<td>Effect of being below ERA on unemployment</td>
<td>0.015*** (0.001)</td>
<td>0.015*** (0.001)</td>
<td>0.015*** (0.001)</td>
<td>0.015*** (0.001)</td>
<td>0.015*** (0.001)</td>
</tr>
<tr>
<td>Effect of being below ERA on inactivity</td>
<td>-0.040*** (0.001)</td>
<td>-0.038*** (0.001)</td>
<td>-0.039*** (0.001)</td>
<td>-0.038*** (0.001)</td>
<td>-0.038*** (0.001)</td>
</tr>
<tr>
<td>Random effects</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Fixed effects</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Individual controls</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Monthly observations</td>
<td>2,994,975</td>
<td>2,994,975</td>
<td>2,834,231</td>
<td>2,574,068</td>
<td>2,647,351</td>
</tr>
<tr>
<td>Individuals</td>
<td>63,156</td>
<td>63,156</td>
<td>60,747</td>
<td>60,747</td>
<td>62,626</td>
</tr>
</tbody>
</table>

Note: The working data cover women born between 1945 and 1952, aged 55–59 at the time of observation.
The effect of normal retirement age (NRA) increase on employment, interacted with education in Estonia, women born from 1943 to 1950

<table>
<thead>
<tr>
<th>Effect of being below NRA on employment</th>
<th>M5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effect of being below NRA on employment</td>
<td>0.041*** (0.002)</td>
</tr>
</tbody>
</table>

Interaction of being below NRA and education (relative to the treatment effect of primary/basic educ.)

<table>
<thead>
<tr>
<th>Interaction</th>
<th>Coefficient (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary*below NRA</td>
<td>0.004 (0.005)</td>
</tr>
<tr>
<td>Post-secondary non-tertiary*below NRA</td>
<td>-0.004 (0.005)</td>
</tr>
<tr>
<td>Tertiary*below NRA</td>
<td>-0.000 (0.005)</td>
</tr>
</tbody>
</table>

Random effects yes

Fixed effects no

Individual controls yes

Monthly observations 2,574,068

Individuals 55,428

Note: The working data cover women born between 1943 and 1950, aged 58–61 at the time of observation.
The effect of normal retirement age (NRA) increase on employment, interacted with area of residence Estonia, women born from 1943 to 1950

<table>
<thead>
<tr>
<th>Effect of being below NRA on employment</th>
<th>M6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effect of being below NRA on employment</td>
<td>0.042***(0.002)</td>
</tr>
<tr>
<td>Interaction of being below NRA and area of residence (relative to the treatment effect of urban areas)</td>
<td>Rural*below NRA -0.003 (0.003)</td>
</tr>
<tr>
<td>Random effects</td>
<td>yes</td>
</tr>
<tr>
<td>Fixed effects</td>
<td>no</td>
</tr>
<tr>
<td>Individual controls</td>
<td>yes</td>
</tr>
<tr>
<td>Monthly observations</td>
<td>2,574,068</td>
</tr>
<tr>
<td>Individuals</td>
<td>55,428</td>
</tr>
</tbody>
</table>

Note: The working data cover women born between 1943 and 1950, aged 58–61 at the time of observation.
The effect of normal retirement age (NRA) increase on employment, interacted with nativity
Estonia, women born from 1943 to 1950

<table>
<thead>
<tr>
<th>Effect of being below NRA on employment</th>
<th>0.044*** (0.002)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interaction of being below NRA and nativity (relative to the treatment effect of natives)</td>
<td></td>
</tr>
<tr>
<td>First generation immigrants*below NRA</td>
<td>-0.005 (0.004)</td>
</tr>
<tr>
<td>Second generation immigrants*below NRA</td>
<td>-0.017*** (0.006)</td>
</tr>
<tr>
<td>Random effects</td>
<td>Yes</td>
</tr>
<tr>
<td>Fixed effects</td>
<td>no</td>
</tr>
<tr>
<td>Individual controls</td>
<td>yes</td>
</tr>
<tr>
<td>Monthly observations</td>
<td>2,574,068</td>
</tr>
<tr>
<td>Individuals</td>
<td>55,428</td>
</tr>
</tbody>
</table>

Note: The working data cover women born between 1943 and 1950, aged 58–61 at the time of observation.
Summary of the findings

- Increasing the pension age does make people to stay longer in the labour force but the reform accounts for a relatively small part of the overall increase in activity rates in Estonia.
  - 35% of the change in the age groups affected by NRA increase
  - 22% of the change in the age groups affected by ERA increase

- The relative contribution of the reform to the overall increase in activity rates appears smaller than in Western European settings (43%...79%).
  - We ascribe it to contextual features (low pension expenditures, lack of disincentives to working while drawing the pensions, high risks of poverty among older persons, etc.).

- Quite sizeable spill-over effects can be observed.
  - For both NRA and ERA, two fifths (39%) of reform-related increase in activity is driven by increase unemployment in unemployment.

- The effect of pension age reform do not vary much across sub-groups of the population.
Aitäh kuulamast!

Käsikiri retsenseerimisel ajakirjas Journal of Pension Economics and Finance