Retirement Behaviour in Austria: Incentive Effects on Old-Age Labor Supply

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Research Question

▶ To what extent are individual retirement decisions affected by financial incentives?

▶ Irreversible decision: retirement now or continued employment (and later retirement)

▶ **Option value: maximum utility gain from staying in the labor market**; forward-looking variable capturing intertemporal aspects in a simplified framework

▶ Description of individual incentive structure and quantitative evaluation of behavioural responses to counterfactual reforms (Gruber and Wise, 2002)

▶ Two administrative datasets merged on anonymized social insurance identification:
  1. ASSD: Austrian social security database (Zweimueller et al., 2009)
  2. VVP: Pension-relevant info and earnings histories as collected by the pensions insurance office
Retirement and Old-age Labor Supply in Austria

- **Complex intertemporal decision, responsiveness to financial incentives not undisputed** (Duflo and Saez, 2003; Chan and Stevens, 2008; Vonkova and van Soest, 2009)

- Ichino et al. (2007): older displaced workers face reduced re-employment probabilities; employment prospects catch up over the next 2 years

- Schnalzenberger and Winter-Ebmer (2009): employment protection legislation like the layoff tax reduces displacement probability of older workers

- Hofer et al. (2011): subsidisation of old-age part-time employment yields only modest increases in employment probabilities; overall reductions in labor supply

- Winter-Ebmer et al. (2011): job insecurity and dissatisfaction are main driving forces for early retirement

- Staubli and Zweimüller (2011): increase in statutory retirement age has significant effects on employment and out-of-labor-force proportions

- Manoli and Weber (2011): use mandated discontinuous changes in retirement benefits (due to employer-provided severance payments) to estimate labor-supply elasticities
Option Value (Stock and Wise, 1990)

\[
V_S(R) = \sum_{t=S}^{R-1} u \left( YLAB_t^{NET} \right) \cdot \delta^{t-S} + \alpha \cdot \sum_{t=R}^{\infty} u \left( YRET_t^{NET}(R) \right) \cdot \nu_t \cdot \delta^{t-S}
\]

\[OV_S(R) = \max_{T > R} [V_S(T)] - V_S(R)\]

- Instantaneous (isoelastic) utility function in after-tax income \( u(Y) = Y^\gamma \); \( \alpha \) relative utility increase due to leisure (for \( t \geq R \))
- Discount factor \( \delta = 1/(1 + r) \) with \( r = 0.03 \); \( \nu_t \) prob. of survival at \( S \) until \( t \) (standard life tables)
- \( YLAB_t^{NET} \): after-tax labor income at \( t \); \( YRET_t^{NET}(R) \): net retirement benefit at \( t \) for retirement at \( R \)
- \( V_S(R) \): present disc. utility value at age \( S \) obtained from retirement at \( R \); \( OV_S(R) \): maximum increase in \( V_S \) obtainable by retiring at ages \( T > R \)

- Additional: social security wealth (SSW), accrual rate (ACCR), peak value (PEAK)
Microsimulation: Data

- **ASSD**: labor market states, un-/employment and sick leave (days/year), age, gender, migration, industry, retirement (1980-2011)

- **VVP**: Retirement plan and gross benefit, assessment base (Bemessungsgrundlage), insurance carrier (Versicherungsträger), dates (Stichtag/Bescheid)

- Complete insurance records on monthly basis (Beitrags-/Ersatzzeiten), annualised gross income until retirement (Beitragsgrundlage)

- Retirement plans: old-age pension (AP), pre-retirement (VAPL, KOP) and disability pensions (BU, EU, IP); Cohorts from 1936 (males) and 1944 (females) until 1955

- **Entries in 2002-2009**: after reductions 314,805 indiv. with unique retirement date in 2002-09 (ca. 50%)
Microsimulation: Computations

- Calculate individual net pensions for every (relevant) retirement plan and each year in the window period 2002-2014

1. Project annualized gross incomes after observed retirement based on indiv. income time-series
2. Calculate individual assessment bases based on childcare, contribution and substitution periods
3. Calculate gross benefits as defined by assessment base, retirement plan and insurance record
4. Calculate net benefits and net labor income based on income taxes and social insurance contributions of the planning year; validation of simulated/actual benefits
5. Define eligibility for each retirement plan; either deterministically or based on individual probabilities of obtaining health-related disability pensions

- Use actual and counterfactual net pensions to compute (expected) incentive measures for all planning ages $S$ and retirement ages $R$

- Time frame includes $\forall S \in (2002, 2009)$ and $\forall R \in (2002, 2014)$ where $R \geq S$
Incentive Structure: Empirical Patterns

- Incentive structure summarised (for each $S$) through expected incentive measures

- $SSW_S (R = S)$ measures current wealth, $ACCR_S$ considers changes from current to next year; $PEAK_S$ and $OV_S$ have a 5-year planning horizon

- **Empirical patterns are very diverse**: incentive measures strongly dependent on individual characteristics (i.e. eligibility and contributions)

- Structure is *not actuarially fair*, $SSW_S$ is often stagnant (or even declining) once eligible for pre-retirement

- Larger increases in $SSW_S$ typically observed for (i) old-age retirement plan and (ii) in case of jumps from disability to regular retirement
Econometric Specification

- **Binary probit with retirement in the planning year as dependent variable**
- **Independent variables:** age, socio-demographics, $SSW_S$ and one of the additional incentive measures $ACCR_S$, $PEAK_S$ or $OV_S$
- **Age:** either linear (LA) or as indicators (AD); in total 6 different specifications
- **Parameters:** $\delta = 1/(1 + r)$ with $r = 0.03$; $\alpha = 1.92$ and $\gamma = 0.56$ (from grid search)
- **Observations:** 5000 random draws from (left-censored) dataset with 1-4 obs./individual

- Intertemporal effects are (partially) captured through *forward-looking* character of OV (Lumsdaine et al., 1992; Boersch-Suppan, 2001)

- **Extensions:** (a) flexible correlation patterns over time (Boersch-Suppan, 2000) or (b) dynamic programming (Rust and Phelan, 1997; Karlstrom, 2004; Heyma, 2004)
### Option Value and Linear Age: Men

<table>
<thead>
<tr>
<th>#</th>
<th>MEN</th>
<th>coeff. estimate</th>
<th>std. error</th>
<th>t-stat</th>
<th>p-value</th>
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<tbody>
<tr>
<td>1</td>
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<td>0.00002</td>
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<tr>
<td>7</td>
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<td>8</td>
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</table>

**Summary statistics**

- **Number of observations**: 8867
- $\mathcal{L}(\hat{\beta}) = -3632.4976$
- $\text{LR chi2}(36) = 2526.08$
- $\rho^2 = 0.2580$
### Option Value and Linear Age: Women

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<tr>
<th>#</th>
<th>WOMEN</th>
<th>coeff. estimate</th>
<th>std. error</th>
<th>$t$-stat</th>
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<td>8</td>
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**Summary statistics**

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<table>
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<tbody>
<tr>
<td>Number of observations</td>
<td>10405</td>
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<tr>
<td>$\mathcal{L}(\hat{\beta})$</td>
<td>-3877.4475</td>
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<td>LR chi2(35)</td>
<td>3570.01</td>
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<tr>
<td>$\rho^2$</td>
<td>0.3152</td>
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</table>
Discussion: Parameter Estimates

- In all 6 specifications parameter estimates of incentive measures have the expected signs and are highly significant.
- $SSW_S$ increases, while $OV_S$, $ACCR_S$ and $PEAK_S$ decrease prob. to retire at planning age.
- Age, migration and sick leave have positive, unemployment, fragmented employment and income potential negative effects.
- Incentive effects generally stronger in LA-specifications, OV/AD and PEAK/AD show highest log-likelihoods and $\rho^2$; results qualitatively the same for other values of $\alpha$ and $\gamma$.
- Age: hazard rates increase continuously in linear specifications; age indicators reproduce peaks at statutory (pre-)retirement ages.
- Quantitative effects of a given reform determined through changes in both incentive measures and choice of age specification.
- Simulated reforms based on specifications with option value and linear age (OV/LA).
Simulated Reforms

**Strengthening Financial Incentives (CR)**
- Regular retirement age at 65 for males and females at 60% of last income
- 6% bonus p.a. for retirement after 65; 5-year pre-retirement period with 6% reduction p.a.
- Disability option: retirement before 60 still feasible, but with further reductions of 6% p.a.

**Increasing Statutory Retirement Ages (3Y)**
- Statutory retirement age is increased by 3 years for non health-related retirement
- Disability options are affected through changes in future eligibility for regular retirement

Comparison of base/reform scenarios: mean hazard rates by age and gender based on the same time frame
Mean Hazard Rates in Base/Reform: MEN/OV/LA

- **CR**: strong reductions in hazard rates; increases in old-age labor supply above regular retirement age
- **3Y**: decreases out-of-labor-force (OLF) proportion mainly between 59-62; later in line with base
Mean Hazard Rates in Base/Reform: WOMEN/OV/LA

- CR: hazard rates shifted to the right; stronger increases in labor supply for all ages
- 3Y: reduces out-of-labor-force (OLF) proportion mainly between 55-57 and 62-64
Concluding Remarks

- Incentive structure: SSW stagnant/declining as statutory retirement age is reached
- Financial incentives are significant and have potential to increase old-age labor supply
- OLF-Proportion of individuals aged 56-65: decreases by 4.7 / 7.7 pp. for females/males (3Y) and by 11.8 / 7.2 pp. for females/males (CR)
- International comparison difficult due to different starting points; Austrian retirement ages among the lowest in Europe (Gruber and Wise, 2004)
- Robust relationship between incentives and retirement; but overall quantitative effects comparatively low (Staubli and Zweimüller, 2011; Manoli and Weber, 2011)
- Complex and intransparent status-quo; singular changes in the legal code not strong enough to alter incentive structure, universal approach needed
Thank you for your attention!

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