DIW GRADUATE CENTER

The effect of pension reforms on old-age income inequality.

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Motivation

- The shift of the normal retirement age (NRA) ↑ is meant to incentivize individuals to work longer (in GER, UK, ITA, ...)
- However, incentives come to nothing if there's no choice (lay-offs, expiring contracts, plant closures and suspensions)
- Poor people usually face a higher risk of involuntary job loss

Labor market frictions are relevant in GER

Every year 5% of W-German men aged 60+ involuntarily lose jobs (SOEP): Primarily low-paid and low educated workers, migrants and those on temporary contracts.

At age 60+, becoming unemployed ≈ end of working life (less than 10% ever find a job again)

The German statutory pension scheme

- Little redistributive elements; pension benefits are linked proportionally to life time labor income
- Early retirement implies actuarial deductions
- Pension benefits are the most important income source of the elderly

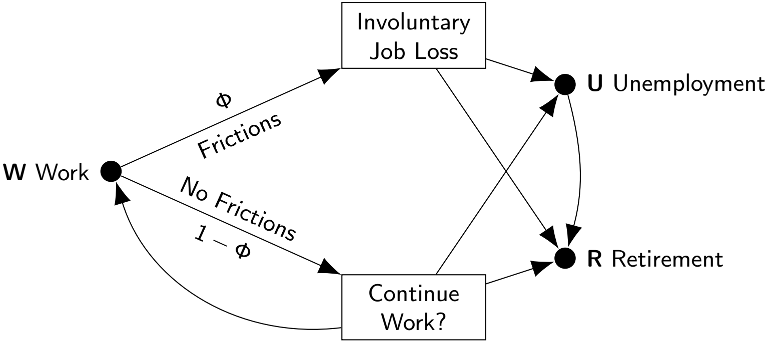
⇒ Early career endings are costly

Research questions

→ Accounting for labor market frictions, how will upward-shifting the NRA from 65 to 67 affect retirement timing and benefit levels?

→ Will already poverty-vulnerable groups be affected differently?

A Dynamic Discrete Choice Model of Retirement – Structure

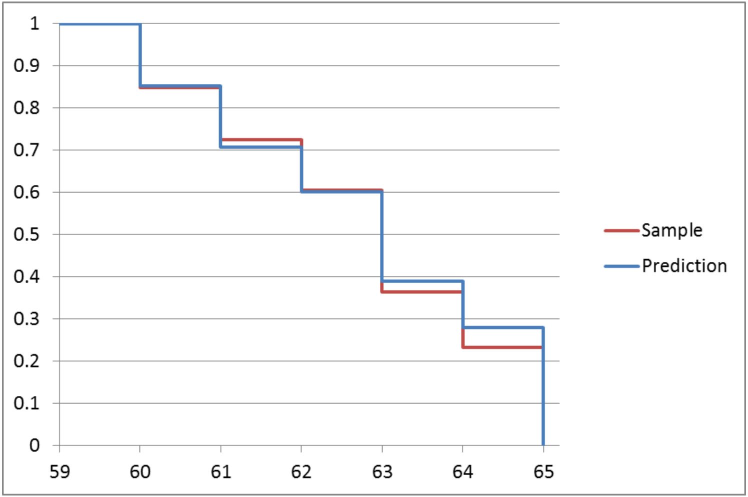


Flow Utilities | Value Functions | Intuition

Data

- Precise administrative panel data set of Federal Employment Agency and Pension Scheme
- All in all, 6621 person-year observations from ages 60-65 of 2439 W-German men of cohorts 1940-44 who still worked when aged 60 $\rightarrow$ positively selected sample
- Probability of labor market frictions, Φ, imputed using SOEP-survey data
- Likewise, wealth and homeownership imputed using the SOEP

Model Fit: Survival Function — Share of People Employed



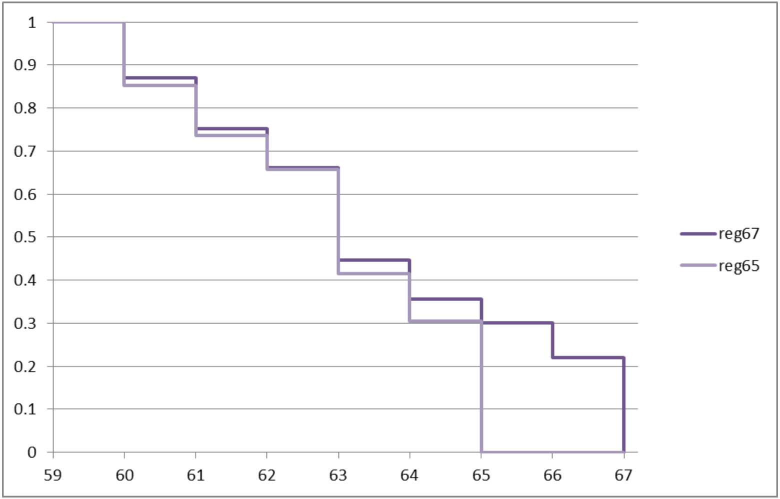
Simulating a shift of the NRA from 65→67:

How are retirement age and benefits goin to be affected?

Procedure: Take estimated model parameters and apply to changed incentive context.

Hazard Rates | Parameter Estimates | Importance of Frictions | Model Fit

Survival Function, NRA65 → NRA67, Simulation



Simulation: retirement age and pension benefits, averages

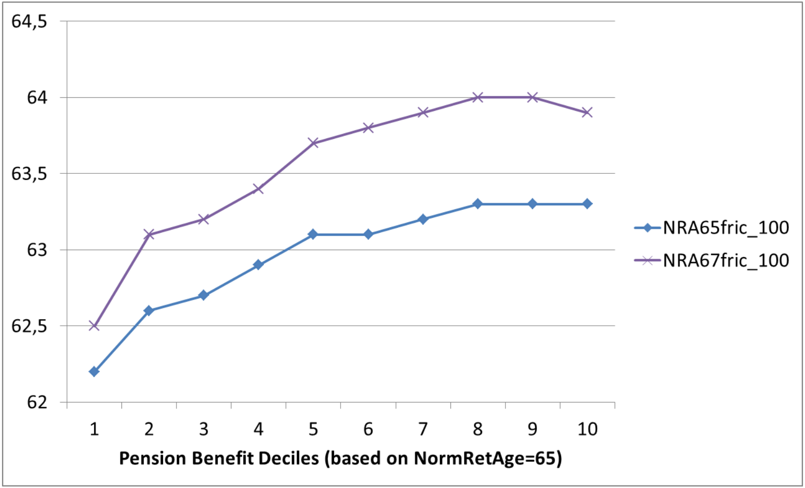
Simulation (100k draws, cohorts 43-44)	NRA65	NRA67
Age at exit from employment	62.96	63.56
Age at legal retirement	63.63	64.26
Pension benefits [EUR]	1327	1296

Are effects heterogeneous?

Procedure: Splitting the sample in 10%-blocks along projected pension benefits (NRA65); Thus, there's deciles running from *1* (around 700EUR) to *10* (around 1800EUR)

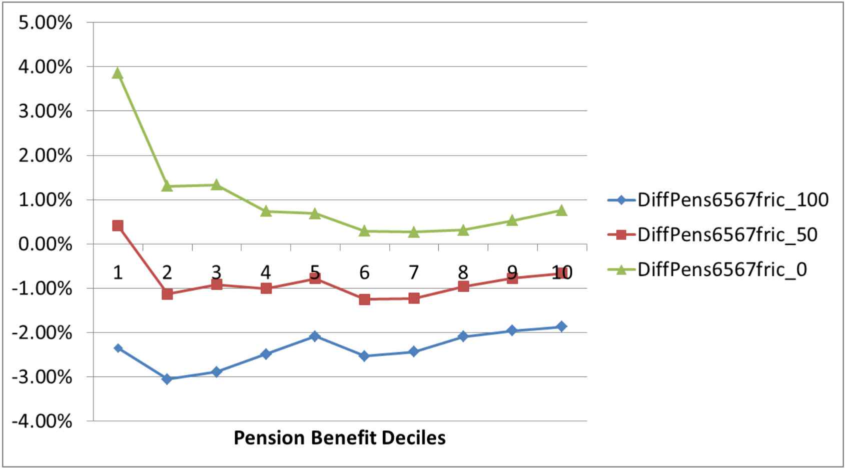
▸ Characteristics along benefit deciles

Age at employment exit: NRA65→NRA67



▸ Share of winners qua benefit level

Projected pension benefits — Reducing frictions



▸ benefits – disutility of work

Consequences for Inequality

Table : Inequality of Monthly Pension Benefits

	NRA65	NRA67	$NRA67_{\nu\downarrow}$	NRA67	$NRA67_{\nu\downarrow}$
	Baseline			*level of frictions=0.5*	
90/10 ratio	1.984	2.028	2.039	1.994	1.996
90/50 ratio	1.309	1.321	1.325	1.315	1.315

Note: 100,000 draws. Measured at age 67 (after everybody retired).

Conclusion

- Labor market frictions hamper the behavioral reaction to an increase of the NRA – in a heterogeneous way.
- Already poverty-vulnerable workers suffer the highest relative losses to their pension benefits.
- The 90/10 ratio of pension benefits is increased – and an homogeneous decrease of the disutility of work will not alter this trend.

Thank you for your attention!

APPENDIX

Model Intuition

- Individuals are making decisions trying to maximize their discounted life time utility.
- Each period, individuals involuntarily lose jobs with probability Φ. The probability Φ is derived by regressing involuntary job losses on various socio-demographics and varies from 3-28%.
- Not losing jobs allows for quiting nevertheless, but it also allows for continuing employment.
- Employment reduces deductions and implies labor income, contributions and *working disutility*.
- Working disutility linearly rises with age.

Model Intuition II

- Both voluntary and involuntary job losses allow for a transition to both unemployment and retirement.
- UI benefit receipt is *stigmatizing*. The eventual transition into retirement is deterministic (eligibility varies from 12-32 month).
- Retirement is an *absorbing state*.
- Thus, practically I model the exit from employment and the following first choice whether to retire or take up UI benefits — the rest is deterministic.

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Flow Utilities

$$u_W = \frac{(Y_w + H + I)^{1-\gamma} - 1}{1-\gamma} + \nu_k + \epsilon_W \qquad (1)$$

$$\text{with } \nu_k = c_{1,k} + \alpha \cdot (a - 60) + \beta_1 X_1$$

$$u_U = \frac{(Y_{ui} + H + I)^{1-\gamma} - 1}{1-\gamma} + \tau_{stigma} + \epsilon_U \qquad (2)$$

$$\text{with } \tau_{stigma} = c_2 + \beta_2 x_2$$

$$u_R = \frac{(Y_r + H + I)^{1-\gamma} - 1}{1-\gamma} + \epsilon_R \qquad (3)$$

with primary income Y, interest income I, rent imputation for owner-occupied houses H. Disutility of work ν_k, $k = \{Type1, Type2\}$, age a and $X_1 = Unskilled, SkilledBlueColl, WhiteColl, German$. τ_{stigma} with $x_2 =$(in Firm$>$ 5yrs); $\epsilon_R, \epsilon_U, \epsilon_W \sim$ EV1. back

Value functions of work, unemployment and retirement

$$V_a^W = u_W + \delta \cdot \pi_{a+1|a} \cdot [\Phi_{a+1} \cdot E \max\{V_{a+1}^U, V_{a+1}^R\} + (1-\Phi_{a+1}) \cdot E \max\{E \max\{V_{a+1}^U, V_{a+1}^R\}, V_{a+1}^W\}] \quad (4)$$

$$V_a^U = u_U + \underbrace{\sum_{t=a+1}^{t_u} \delta^{t-a} \cdot \pi_{t|a} \cdot E[u_U]}_{\text{Unemployment until } t_u} + \underbrace{\sum_{t=t_u+1}^{T} \delta^{t-a} \cdot \pi_{t|a} \cdot E[u_R]}_{\text{Pension from } t_u+1 \text{ on}} \quad (5)$$

$$V_a^R = u_R + \sum_{t=a+1}^{T} \delta^{t-a} \cdot \pi_{t|a} \cdot E[u_R] \quad (6)$$

with discount factor: $\delta = 0.94$, Survival Prob $a \rightarrow t$: $\pi_{t|a}$, Prob of involunt. job loss: Φ

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Likelihood

Individual and type-specific choice probabilities

$$P_k^W = (1-\Phi)\cdot Pr(\bar{V}^{-W} < V^W) \tag{7}$$

$$P_k^U = \langle \Phi + (1-\Phi)\cdot Pr(\bar{V}^{-W} > V^W)\rangle \cdot Pr(V^U > V^R) \tag{8}$$

$$P_k^R = \langle \Phi + (1-\Phi)\cdot Pr(\bar{V}^{-W} > V^W)\rangle \cdot Pr(V^U < V^R). \tag{9}$$

that are summed up individual-wise over types and age

$$l_i = \sum_{k=1}^{2} p_k \prod_{age} P_{i,k}^C \tag{10}$$

$$\Rightarrow LL = \sum_{i=1}^{N} log\ l_i \tag{11}$$

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Estimation

- Recursive calculation of value functions
- Assumptions on error terms allow for closed form solutions
- Identification of parameters eased through both cross-sectional and policy variation (Phase-in of early retirement deductions)
- Maximum Likelihood Estimation

Parameter Estimates

Parameter	Value	Std.Dev.	
γ	2.46	0.27	Risk aversion
p_1	0.46	0.18	Pr(Type1)
$\alpha(Alter)$	0.64	0.08	disutility ν
$c_{1,Typ1}$	-5.07	0.37	disutility ν
$c_{1,Typ2}$	-.66	0.25	disutility ν
$\beta_{\nu,0}$ (*White Coll*)		Base cat.	disutility ν
$\beta_{\nu,1}$ (*Unskilled*)	1.40	0.16	disutility ν
$\beta_{\nu,2}$ (*Skilled Blue Coll*)	0.17	0.18	disutility ν
$\tau : c_2 + \beta_\tau X_2$	0.62	0.26	UI stigma

$\delta = 0.94$, N=6,000

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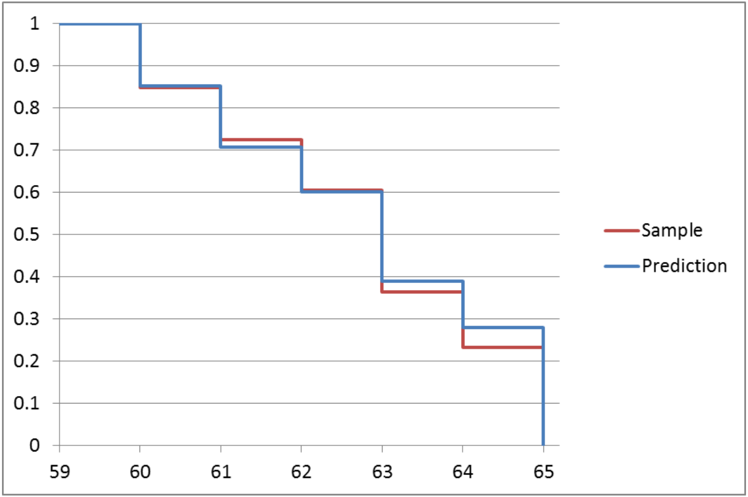
Model Fit: Survival Function — Share of People Employed



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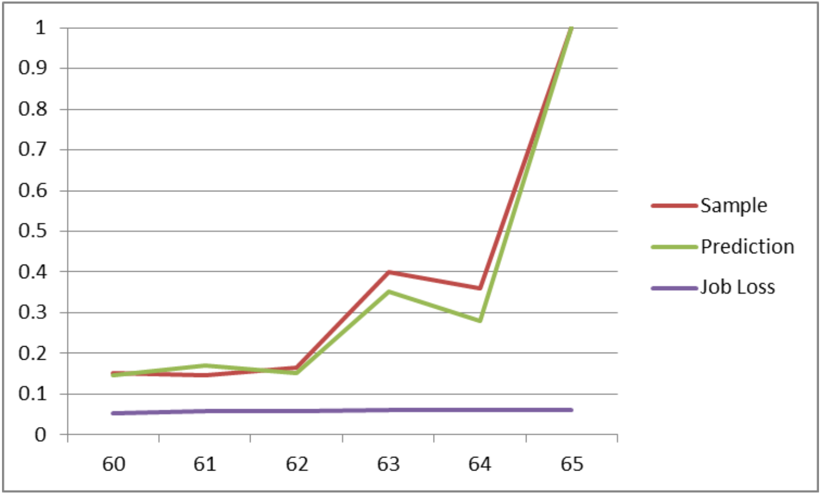
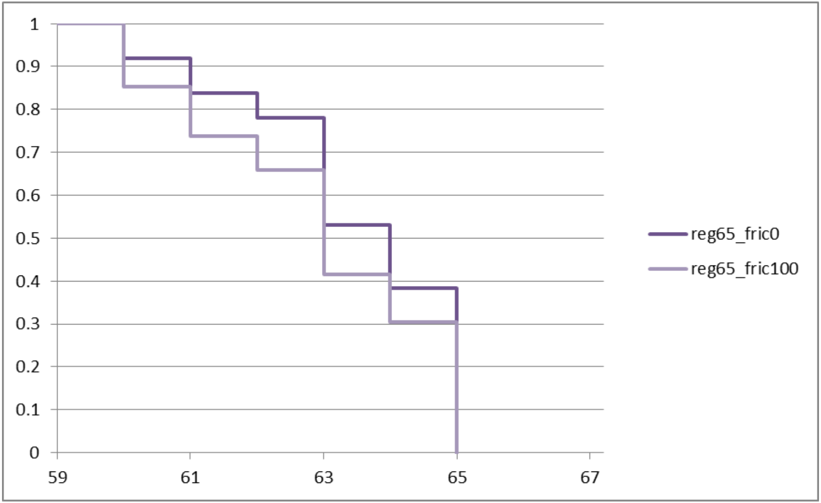
Hazard Rate, Sample and Prediction



Pathways R1 & R2 summed up; Pr of Job Loss for comparison back

Survival Function: Influence of Frictions



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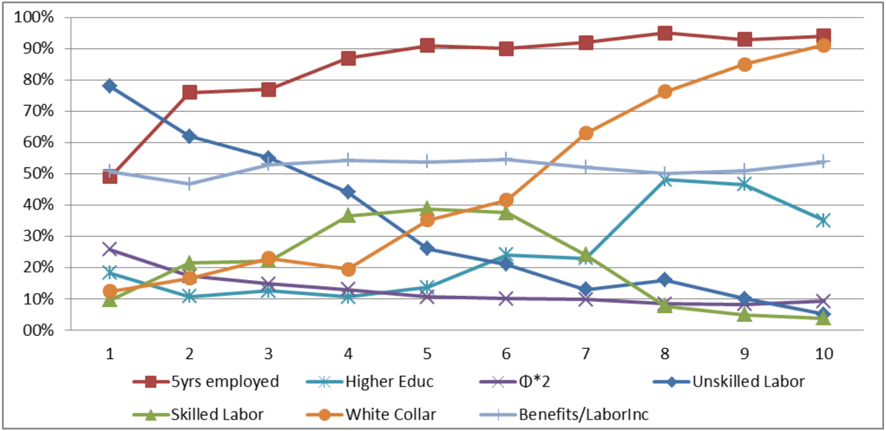
Central characteristics along benefit deciles, Age 60



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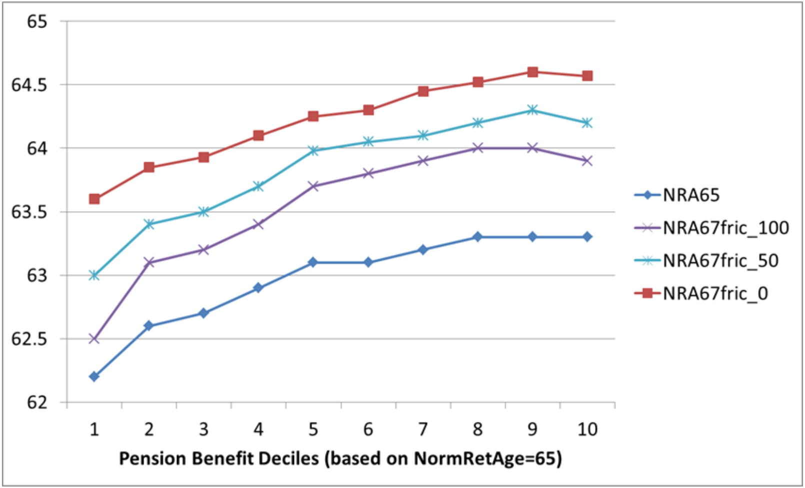
Employment Exit along Deciles, Varying Frictions



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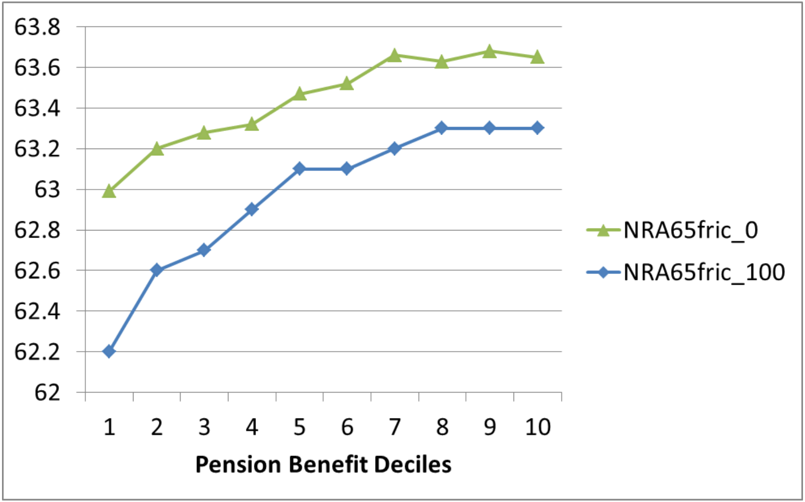
Untimely Career Endings — The Role of Frictions, NRA65



▸ Variation of Frictions, NRA67

Share of Winners in Terms of Benefit Levels, NRA65→67

Table : Winners along Deciles [in %]

Decile	1	2	3	4	5	6	7	8	9	10
Change>0EUR	28	29	30	32	34	31	31	35	35	35
Change>50EUR	16	21	22	25	27	26	28	29	29	30

Table : Winners along Socio-Demographics [in %]

	White Coll.	Skill. Lab	Unsk. Lab	Type1	Type2
Change>0	36	31	29	9	54

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Projected pension benefits — Reducing the disutility of work by the equivalence of 2 years of age