

Linking pension ages to occupational life expectancies

Dorly Deeg

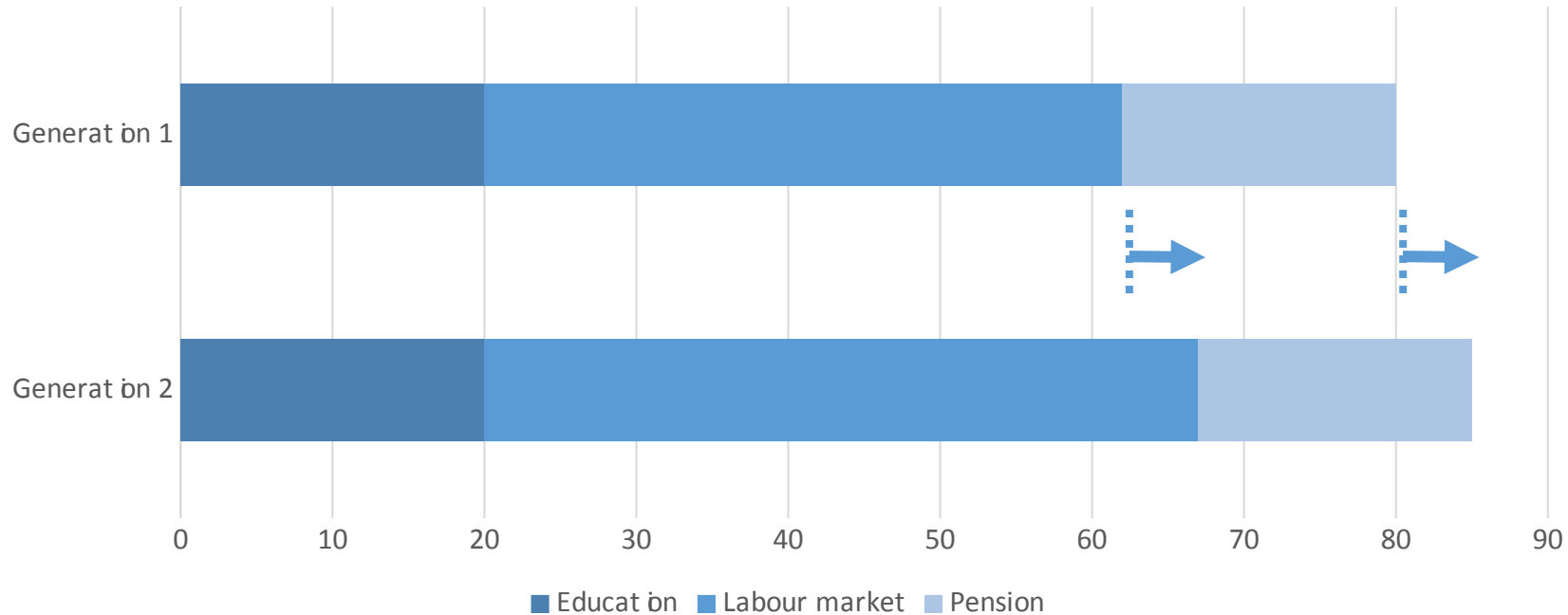
Wouter De Tavernier

Sascha de Breij

Actuarial fairness

“Equal treatment for equal risks” —Landes, 2015, p. 521

- Generation
- Education
- Occupation
- ...



‘Demanding’ occupations?

- Arbitrary criteria
- Life expectancy?
 - Actuarial fairness as more objective ground than demandingness
 - More objective metric
 - Derivable from register data

Occupational pension age?

Occupational changes

- Increasingly unstable careers
- Occupational 'weights' of years worked

RQ1: occupational differences in survival time?

Occupations change

- Mortality of 1970s builder \approx life expectancy of builder today?
- Relative occupational medical consumption as intermediary?

RQ2: medical consumption mediates relation occupation-survival?

Longitudinal Aging Study Amsterdam (LASA)

3 regions

- Secularized
- Protestant
- Roman Catholic
- Representative for NL

Sample

- Random
- $N_{\text{baseline}} = 3.107$
- Baseline ages 55-85
- Start 1992-93
- Mortality follow-up until 2017

Realized probability of dying

= individual's survival compared to peers (same age & sex)

RPD = 0,9: died when 90% of cohort still alive

RPD = 0: died as last survivor of cohort

22,1% still alive at end follow-up

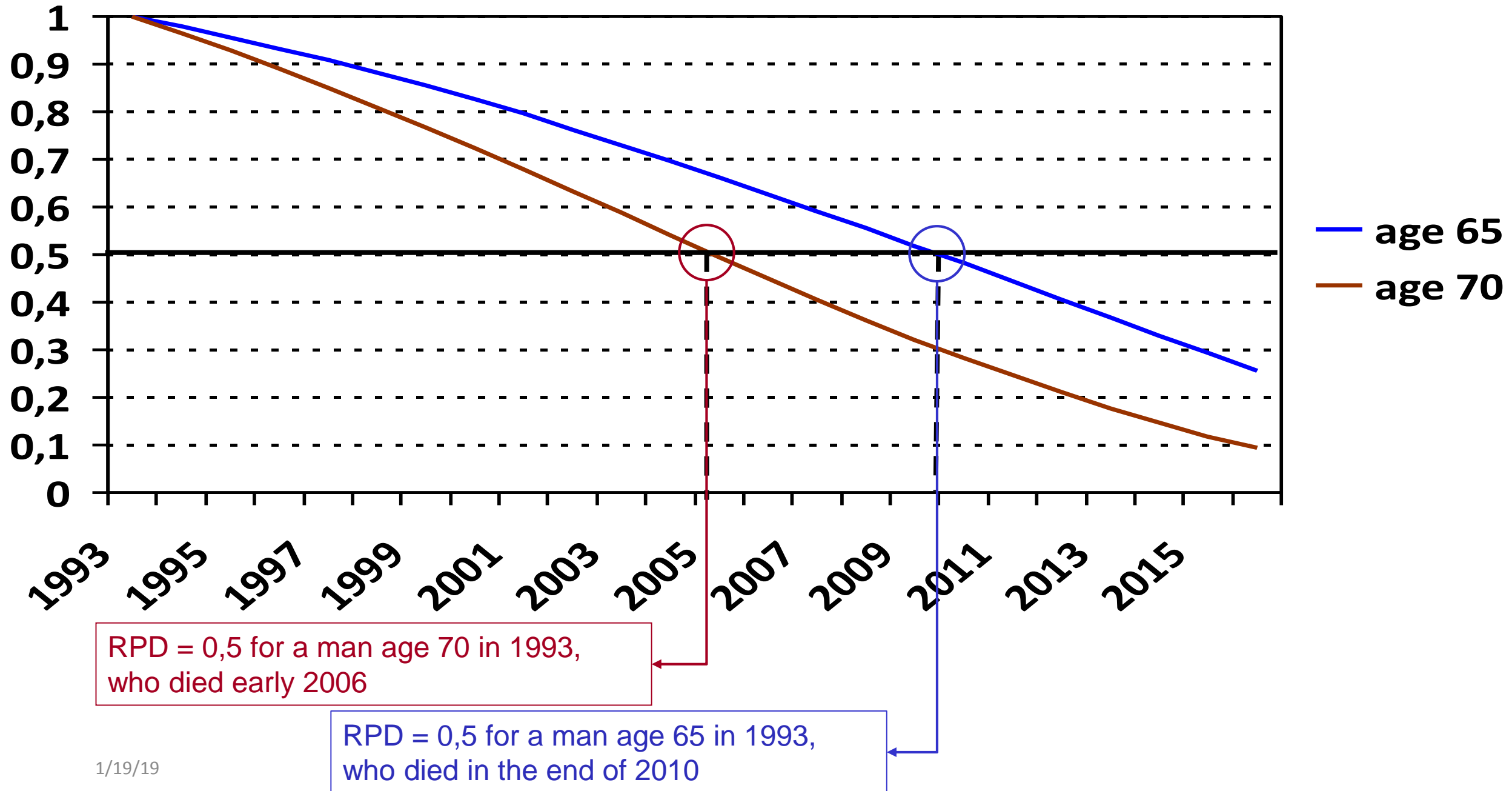
→ $\text{RPD} = \% \text{ cohort still alive} * 0,5$

(= avg. RPD for survivors)

Logit RPD = LRPD = $\ln(\text{RPD}/(1-\text{RPD}))$ = normally distributed

→ Dependent variable in linear regression

RPD for men aged 65 (blue) and men aged 70 (brown) in 1993



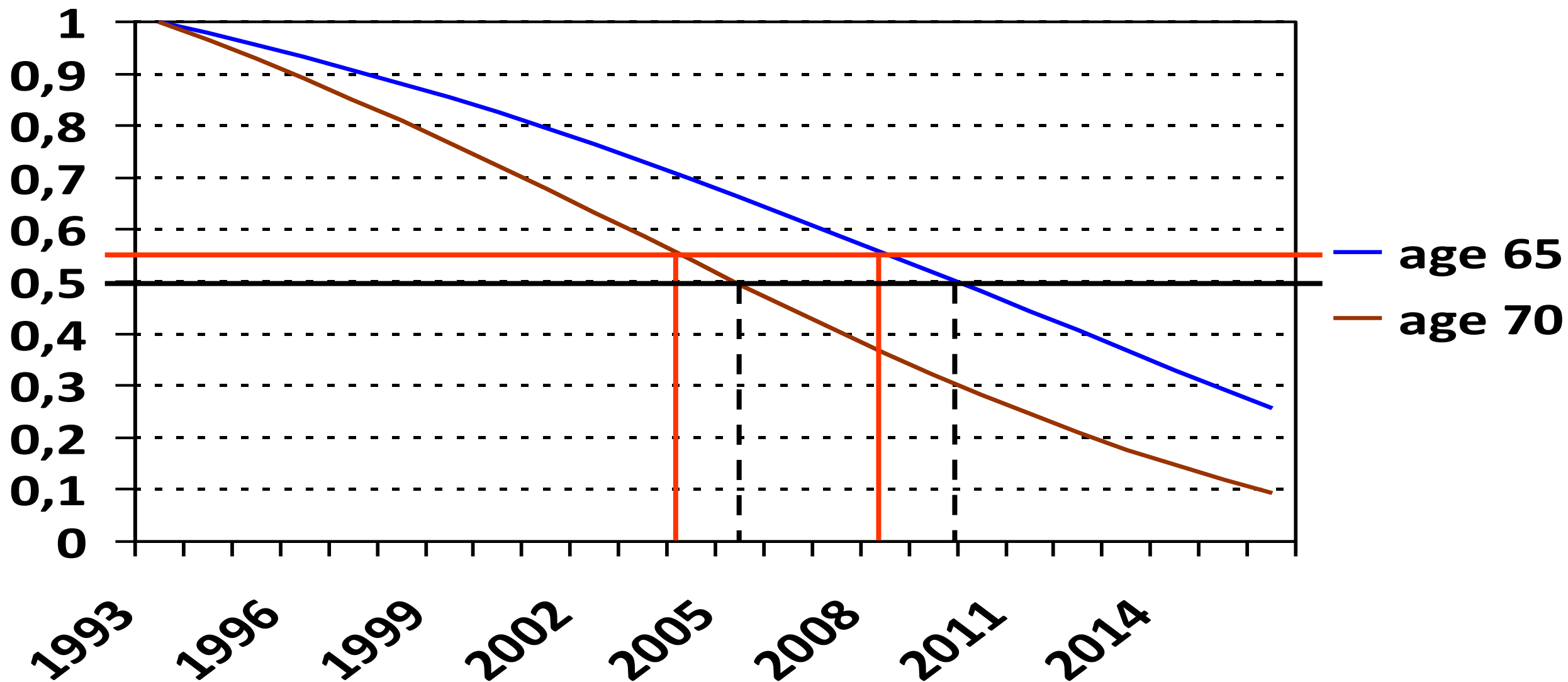
Socio-demographic characteristics and survival (LRPD) of the selected sectors (N=2,529)

		Gender ¹ (%)			
	N (%)	Male	Female	Education in years ² : M (sd)	LRPD ³ : M (sd)
Technical	679 (26.8)	77.5	22.5	8.6 (2.8)	+0.15 (1.63)
Transport	99 (3.9)	92.9	7.1	7.4 (2.3)	+0.28 (1.65)
Administrative	618 (24.4)	43.6	56.4	9.4 (2.8)	+0.06 (1.58)
Care	397 (15.7)	12.5	87.5	8.2 (3.5)	-0.02 (1.56)
Agriculture	194 (7.7)	79.4	20.6	8.1 (2.3)	-0.18 (1.61)
Teaching	107 (4.2)	46.8	53.2	13.7 (3.1)	-0.28 (1.67)
Others	435 (17.2)	52.3	47.7	9.5 (4.1)	-0.06 (1.64)

¹ The gender differences between the sectors are significant at $p < 0.001$

² The educational differences between the sectors are significant at $p < 0.001$

³ The survival differences between the sectors are significant at $p = 0.023$



Realised probability of dying for men aged 65 (blue) and men aged 70 (brown) in 1993.

LRPD = 0.28 → RPD = 0.57 →

Loss of 21 months (age 65 in 1993); Loss of 17 months (age 70 in 1993)

Linear regression models of LRPD on sector¹

Education explains...

	Model 1		Model 2		
	Regression coeff. B (SE)	Sign.ce (p-value)	Regression coefficient B (SE)	Sign.ce (p-value)	
Technical	0.203 (0.099)	0.041	0.155 (0.099)	0.117	1/4 th
Transport	0.340 (0.179)	0.058	0.230 (0.180)	0.200	1/3 rd
Administrative	0.112 (0.101)	0.267	0.082 (0.101)	0.417	
Care	0.040 (0.112)	0.720	-0.032 (0.112)	0.773	
Agriculture	-0.119 (0.139)	0.394	-0.169 (0.139)	0.225	
Teaching	-0.220 (0.174)	0.205	-0.044 (0.178)	0.805	4/5 th
Education (yrs)			-0.045 (0.010)	<0.001	

¹ Each sector is compared to the non-defined sectors

Model 1: adjusted for age; Model 2: adjusted for age and education

Potential mediators: health and medical consumption

Number of days sick in bed

Number of medications

Hospital admission past 6 mo.

Outpatient visits “

General practice contact “

Linear regression models of LRPD on sector¹

	Model 1		Model 2		Sick days explain...
	Regression coeff. B (SE)	Sign.ce (p-value)	Regression coefficient B (SE)	Sign.ce (p-value)	
<i>Sick days* (n=2,519)</i>					
Technical	0.208 (0.099)	0.036	0.187 (0.099)	0.059	10%
Transport	0.334 (0.179)	0.062	0.317 (0.178)	0.076	5%
Administrative	0.094 (0.101)	0.351	0.082 (0.101)	0.414	
Care	0.028 (0.112)	0.801	0.035 (0.111)	0.752	
Agriculture	-0.101 (0.139)	0.469	-0.084 (0.138)	0.543	
Teaching	-0.221 (0.173)	0.203	-0.205 (0.173)	0.236	7%
Sick days			0.265	<0.001	

¹ Each sector is compared to the non-defined sectors

Model 1: adjusted for age; Model 2: adjusted for age and health

* Quadratic term

Conclusion:

Proof of principle

- Survival
 - Shorter in technical and transport sectors
 - Longer in education
- Partly explained by
 - Education
 - Health
- Future
 - Replication using Danish registers?
 - More detailed distinctions
 - Career trajectories

Wouter.detavernier@kuleuven.be
@WDeTavernier

