**Online supplementary material**

**Table S1** *Determinants of intended full-time retirement age, multinomial logistic model, coefficients, standard errors (SE) and the respective odds-ratios and their 95% confidence intervals* (CI)

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|  | 55-62 years  vs. 63 years  Coefficient (SE) Odds-ratio (95% CI) | Over 63 years vs. 63 years  Coefficient (SE) Odds-ratio (95% CI) |
| Has thought about retiring before the age of 63 (ref. Never) |  |  |
| Sometimes    Often | 0.41 (0.26)  1.51 (0.90, 2.53)  1.31\*\*\* (0.27)  3.69 (2.19, 6.20) | -0.52\*\* (0.20)  0.59 (0.40, 0.89)  -1.01\*\*\* (0.27)  0.36 (0.22, 0.61) |
| Personal/family characteristics |  |  |
| Age | -0.25\*\*\* (0.05)  0.78 (0.71, 0.85) | 0.06 (0.04)  1.06 (0.98, 1.14) |
| Female | 0.20 (0.25)  1.22 (0.75, 1.97) | -0.22 (0.22)  0.80 (0.52, 1.23) |
| Education (ref. Basic)  Upper secondary    Lower tertiary    Higher tertiary | -0.33 (0.26)  0.72 (0.43, 1.21)  -0.02 (0.33)  0.98 (0.51, 1.88)  -0.18 (0.52)  0.83 (0.30, 2.30) | -0.26 (0.25)  0.77 (0.47, 1.25)  0.06 (0.30)  1.07 (0.59, 1.93)  0.36 (0.43)  1.43 (0.61, 3.35) |
| Socio-economic status (ref. Upper level employee)  Lower level employee    Manual worker | 0.36 (0.33)  1.43 (0.75, 2.72)  0.16 (0.42)  1.18 (0.52, 2.67) | 0.17 (0.29)  1.18 (0.67, 2.08)  -0.14 (0.37)  0.87 (0.42, 1.81) |
| Sector (ref. Private)  Public, no personal retirement age    Public, personal retirement age | 0.99\*\* (0.49)  2.69 (1.03, 7.04)  0.18 (0.23)  1.19 (0.76, 1.89) | -0.59 (0.69)  0.56 (0.14, 2.13)  0.51\*\* (0.20)  1.66 (1.11, 2.48) |
| Good self-rated work ability | 0.08 (0.25)  1.09 (0.67, 1.76) | 0.43\* (0.25)  1.54 (0.94, 2.52) |
| Sickness absences during past 3 years | 0.72\*\*\* (0.25)  2.06 (1.26, 3.37) | -0.08 (0.26)  0.92 (0.56, 1.52) |
| Unemployment experience during past 5 years | 0.70\*\* (0.31)  2.02 (1.09, 3.74) | 0.09 (0.32)  1.09 (0.58, 2.03) |
| Married | 0.36 (0.26)  1.43 (0.86, 2.41) | 0.05 (0.22)  1.05 (0.68, 1.62) |
| Spouse retired | 0.30 (0.30)  1.35 (0.75, 2.41) | -0.01 (0.26)  0.99 (0.59, 1.66) |
| Dependants | 0.86\*\* (0.35)  2.37 (1.20, 4.68) | 0.30 (0.38)  1.34 (0.64, 2.82) |
| Log(income) | 0.27 (0.28)  1.31 (0.76, 2.26) | -0.56\*\* (0.28)  0.57 (0.33, 0.99) |
| Log(debts) | 0.02 (0.02)  1.02 (0.98, 1.07) | 0.01 (0.02)  1.01 (0.97, 1.05) |
| Home-owner | -0.35 (0.28)  0.71 (0.41, 1.21) | -0.21 (0.24)  0.81 (0.51, 1.28) |
| Private pension insurance or pension savings | 0.54\*\*\* (0.21)  1.72 (1.14, 2.59) | -0.19 (0.19)  0.83 (0.57, 1.20) |
| Work very important in life | -0.14 (0.20)  0.87 (0.58, 1.29) | 0.38\*\* (0.19)  1.46 (1.01, 2.12) |
| Work-related characteristics |  |  |
| Part-time pension | -0.21 (0.53)  0.81 (0.29, 2.28) | 0.15 (0.36)  1.17 (0.58, 2.36) |
| Layoffs | 0.47\*\* (0.24)  1.60 (1.00, 2.56) | -0.31 (0.24)  0.73 (0.45, 1.18) |
| Employer’s support for continued employment | 0.08 (0.23)  1.09 (0.69, 1.71) | 0.46\*\* (0.20)  1.59 (1.07, 2.35) |
| Flexibility in scheduling (ref. Low)  Moderate    High | -0.15 (0.27)  0.86 (0.51, 1.45)  0.03 (0.28)  1.03 (0.60, 1.77) | -0.01 (0.25)  1.00 (0.61, 1.63)  0.04 (0.25)  1.05 (0.64, 1.70) |
| Job autonomy | 0.06 (0.16)  1.07 (0.78, 1.46) | 0.38\*\* (0.15)  1.46 (1.09, 1.95) |
| Physically demanding job | 0.05 (0.25)  1.05 (0.64, 1.70) | -0.05 (0.23)  0.95 (0.61, 1.49) |
| Mentally demanding job | 0.17 (0.22)  1.19 (0.77, 1.83) | -0.27 (0.20)  0.76 (0.52, 1.13) |
| Time pressure at work | 0.31 (0.23)  1.36 (0.88, 2.12) | 0.23 (0.21)  1.26 (0.84, 1.91) |
| N=799 |  |  |

Significance levels: \* *p* < 0.1, \*\* *p* ≤ 0.05, \*\*\* *p* ≤ 0.01. See also notes for Table 4.

**Table S2** *Determinants of disability or old-age retirement age, multinomial logistic model, coefficients, standard errors (SE) and the respective odds-ratios and their 95% confidence intervals (CI)*

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|  | 55-62 years  vs. 63 years  Coefficient (SE) Odds-ratio (95% CI) | Over 63 years  vs. 63 years  Coefficient (SE) Odds-ratio (95% CI) |
| Intended retirement age (ref. 63 years) |  |  |
| 55-62 years    Over 63 years | 1.59\*\*\* (0.25)  4.95 (3.03, 8.09)  0.40 (0.32)  1.50 (0.81, 2.78) | -0.12 (0.28)  0.89 (0.51, 1.53)  1.42\*\*\* (0.21)  4.13 (2.74, 6.22) |
| Personal/family characteristics |  |  |
| Age | -0.26\*\*\* (0.05)  0.77 (0.69, 0.86) | 0.15\*\*\* (0.04)  1.17 (1.07, 1.27) |
| Female | 0.03 (0.27)  1.03 (0.60, 1.77) | -0.16 (0.22)  0.85 (0.55, 1.32) |
| Education (ref. Basic)  Upper secondary    Lower tertiary    Higher tertiary | -0.19 (0.28)  0.82 (0.48, 1.42)  -0.32 (0.37)  0.72 (0.35, 1.49)  0.05 (0.58)  1.05 (0.34, 3.27) | 0.35 (0.26)  1.41 (0.85, 2.34)  0.52\* (0.31)  1.69 (0.91, 3.12)  1.14\*\* (0.46)  3.13 (1.27, 7.73) |
| Socio-economic status (ref. Upper level employee)  Lower level employee    Manual worker | -0.69\* (0.37)  0.50 (0.24, 1.03)  -0.79\* (0.46)  0.45 (0.18, 1.12) | -0.17 (0.30)  0.84 (0.47, 1.50)  -0.12 (0.39)  0.89 (0.42, 1.90) |
| Sector (ref. Private)  Public, no personal retirement age    Public, personal retirement age | 0.09 (0.59)  1.09 (0.34, 3.48)  0.14 (0.27)  1.15 (0.68, 1.96) | 0.52 (0.53)  1.68 (0.59, 4.75)  0.76\*\*\* (0.22)  2.13 (1.39, 3.26) |
| Good self-rated work ability | -0.06 (0.26)  0.95 (0.57, 1.57) | 0.81\*\*\* (0.26)  2.26 (1.36, 3.75) |
| Sickness absences during  follow-up period | 0.75\*\*\* (0.24)  2.11 (1.33, 3.36) | -0.18 (0.22)  0.84 (0.54, 1.30) |
| Unemployment experience during follow-up  Period | 0.48\* (0.28)  1.61 (0.93, 2.79) | -0.22 (0.30)  0.80 (0.44, 1.46) |
| Married | -0.56\* (0.31)  0.57 (0.31, 1.05) | 0.14 (0.26)  1.14 (0.69, 1.92) |
| Spouse retired at baseline/retires during follow-up period | 0.31 (0.27)  1.37 (0.81, 2.31) | -0.49\*\* (0.23)  0.62 (0.39, 0.97) |
| Dependants | 0.03 (0.39)  1.03 (0.48, 2.23) | 0.13 (0.38)  1.14 (0.54, 2.41) |
| Log(income) | -0.61\* (0.35)  0.54 (0.28, 1.07) | -0.63\*\* (0.30)  0.54 (0.30, 0.96) |
| Log(debts) | 0.01 (0.02)  1.01 (0.96, 1.06) | -0.02 (0.02)  0.98 (0.95, 1.03) |
| Home-owner | -0.02 (0.30)  0.98 (0.55, 1.75) | -0.20 (0.25)  0.82 (0.50, 1.34) |
| Private pension insurance or pension savings | -0.16 (0.23)  0.85 (0.54, 1.34) | 0.01 (0.19)  1.01 (0.69, 1.48) |
| Work very important in life | -0.30 (0.22)  0.74 (0.48, 1.15) | -0.18 (0.19)  0.84 (0.58, 1.22) |
| Work-related characteristics |  |  |
| Part-time pension | -0.44 (0.50)  0.64 (0.24, 1.71) | -0.41 (0.34)  0.66 (0.34, 1.29) |
| Layoffs | 0.09 (0.27)  1.09 (0.64, 1.85) | -0.13 (0.24)  0.88 (0.55, 1.40) |
| Employer’s support for continued employment | 0.30 (0.25)  1.34 (0.82, 2.19) | 0.38\* (0.21)  1.46 (0.98, 2.19) |
| Flexibility in scheduling (ref. Low)  Moderate    High | -0.72\*\* (0.29)  0.49 (0.27, 0.86)  -0.44 (0.29)  0.64 (0.36, 1.15) | -0.52\*\* (0.25)  0.59 (0.36, 0.97)  -0.32 (0.25)  0.73 (0.44, 1.19) |
| Job autonomy | 0.02 (0.17)  1.02 (0.73, 1.43) | -0.07 (0.15)  0.93 (0.69, 1.25) |
| Physically demanding job | 0.39 (0.26)  1.47 (0.88, 2.47) | -0.24 (0.24)  0.79 (0.50, 1.25) |
| Mentally demanding job | 0.11 (0.24)  1.12 (0.70, 1.81) | 0.28 (0.20)  1.32 (0.89, 1.96) |
| Time pressure at work | -0.15 (0.24)  0.86 (0.53, 1.39) | -0.43\*\* (0.22)  0.65 (0.43, 1.00) |
| N=799 |  |  |

Significance levels: \* *p* < 0.1, \*\* *p* ≤ 0.05, \*\*\* *p* ≤ 0.01. See also notes for Table 5.

**Mediation analysis**

Since layoffs and employer’s support for continued employment were significant predictors of retirement intentions but had no connection (layoffs) or a weaker connection (employer’s support) with actual retirement, it was suspected that these variables might have an indirect effect on actual retirement via retirement intentions. The indirect effect was first tested through mediation analysis (Baron and Kenny 1986). First, actual retirement age was regressed on the variables of interest (and on the restricted set of controls, excluding unemployment and sickness absences). Second, intended retirement age was regressed on the variables of interest (and on the same controls as in the actual retirement age model). Finally, actual retirement age was regressed on the variables of interest and on intended retirement age (and on the controls). If the first two associations are significant and, in the third one, the intended retirement is significant and the variables of interest are or are not, support for the existence of a mediation effect is found (indirect effect; partial/full mediation). In addition, the coefficients of the variables of interest in the first phase must be larger than the respective coefficients in the final phase.

Employer’s support for continued employment met all these conditions instantly. Layoffs did not originally meet the first condition; they only met all the conditions after employment sector was excluded from the controls. However, as this did not change the overall results presented in Table 5[[1]](#footnote-1), the compromise can be accepted. Therefore, the potential indirect effect of layoffs and employer’s support for continued employment on actual retirement age was investigated further. In the case of linear regression models, an estimate and significance test of the indirect effect could be obtained based on the estimates in the above-mentioned different phases (the “product of coefficients” or “difference in coefficient” method, see Sobel 1982; MacKinnon 2000). However, for non-linear probability models, decomposing the total effect into a direct and indirect one is not straightforward due to rescaling: the coefficients of the variables of interest change when the potential mediator which correlates with the outcome is added to the models, regardless of whether the potential mediator is correlated with the variables of interest (e.g., Woolridge 2002).

The KHB method has been developed to solve this problem (see Kohler, Karlson and Holm 2011; Breen, Karlson and Holm 2013). This is a decomposition method that is unaffected by the rescaling and thus allows for unbiased comparison of differently specified non-linear models. It separates the direct and total effect of the variables of interest by estimating a full model including the variables of interest and the mediator, and an unbiased reduced model which omits the mediator. The indirect effect is derived as the difference between the total and the direct effect. Therefore, the presence of indirect effect was verified using the KHB command (in Stata 14.2). At this stage, only the variables that were significant in previous steps were used as control variables in the model of actual retirement age. The results of the mediation analysis concerning actual retirement after age 63 are presented in Table S3.

**Table S3.** *Total, direct and indirect effect of layoffs and employer’s support for continued employment on actual retirement after age 63, marginal effects (ME) and coefficients*

|  |  |  |  |
| --- | --- | --- | --- |
|  | Age of disability or old-age retirement | | |
|  | Over 63 years | | |
|  | Reduced model (Total effect) | Full model (Direct effect) | Difference (Indirect effect) |
|  | ME Coeff. | ME Coeff. | ME# Coeff. |
| Layoffs | -0.079\*\* -0.438\* | -0.052 -0.295 | -0.027\* -0.143\* |
| Employer’s support for continued employment | 0.077\*\* 0.514\*\* | 0.055 0.382\* | 0.022\* 0.132\* |
| Intended retirement age (ref. 63 years) |  |  |  |
| 55-62 years  Over 63 years |  | -0.084\*\* -0.077  0.276\*\*\*1.423\*\*\* |  |

Notes: Significance levels: \* *p* < 0.1, \*\* *p* ≤ 0.05, \*\*\* *p* ≤ 0.01. # standard error of difference not known for marginal effects. The significance of the coefficient is assumed to hold. Controls: age, gender, education, socio-economic status, work ability, married, spouse retired, log(income), flexibility in scheduling, physically demanding job, time pressure at work.

The first column of Table S3 reports the marginal effects and estimated coefficients of layoffs and employer’s support for older workers’ employment from the reduced model (before controlling for intended retirement age). The second column reports the respective results from the full model together with the estimates for intended retirement age. The third column presents estimates for the indirect effect. As can be seen, the total effect of both variables of interest on actual retirement age is significant. The direct effect of layoffs is not significant after controlling for retirement intentions, and the direct effect of the employer’s support for older workers’ employment is only weakly significant and only in the case of the coefficient. This is consistent with the findings in Table 5. The indirect effect of both variables is significant. This leads to the conclusion that the layoffs (negatively) and employer’s support for older workers’ continued employment (positively) impacts actual retirement after the age of 63 to a large degree via the indirect effect through intended retirement age.

# References:

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1. The results are available from the author upon request. [↑](#footnote-ref-1)