

# **Arduous work, labour market exit and mortality: A register study of Finnish late careers**

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## **Topic and theoretical focus**

As populations are ageing, countries have introduced policy reforms to raise retirement ages with the goal of extending working lives. While working longer is possible for many who are in good health and in jobs with adequate working conditions, there are also those who work in physically, cognitively or mentally demanding circumstances that take a toll on their health. Recent studies have confirmed the negative associations between job arduousness and overall and disability-free life expectancy (de Wind et al., 2020; Ebeling, Ahlbom, Gustavsson, & Modig, 2023; Vandenberghe, 2025). Moreover, those performing low-skilled manual work often have entered the labour market at a younger age, especially compared to those who stayed in education longer to complete a higher degree. As workers with long and arduous careers tend to live shorter lives and have fewer years in good health, it could be considered actuarially fair and socially just that they are also allowed to retire earlier (Deeg, De Tavernier, & de Breijl, 2021; Pestieau & Racionero, 2016).

In Finland, the so-called years-of-service pension offers workers with long and arduous careers the possibility to retire early. In 2017 it was decided that the statutory retirement age of 63 will start to gradually rise until age 65, after which it will be tied to life expectancy in 2030. In the same reform, the years-of-service pension was introduced, allowing workers to retire at 63 if they can prove that they a) have reduced ability to work and b) have performed at least 38 years of work that requires great effort. Compared to similar pension schemes in other countries the qualification period of 38 years in arduous work is long and the eligibility age of 63 rather high (OECD, 2023). Workers in arduous jobs may not manage to work until that age, and exit the labour market (e.g., through a disability pension or by becoming long-term unemployed) or die before that. So far, relatively few people have started to receive the years-of-service pension. While earlier studies have described characteristics and careers of those who received the years-of-service pension (Riekhoff & Polvinen, 2025), little is known about how the strict qualification criteria of the scheme reduce the potential target group.

Critics of special pensions for arduous and hazardous work have suggested that policies to address the root causes or compensation structures of such work are more effective and efficient (Mittlaender, 2023; OECD, 2023). One way is to support workers to timely change to a less arduous occupation. However, it is unclear whether changing occupations can extend (working) lives of those in arduous work. On one hand, a change to an occupation with more favourable working conditions might prevent or slow down health problems or allow continuing work with reduced work ability. On the other hand, a “healthy worker survivor effect” may occur (Arrighi & Hertz-Picciotto, 1994): less healthy workers will change to less arduous occupations, while healthier workers will continue in the same occupation. This may be a reason that healthy workers in arduous jobs to continue work and live longer, while less healthy workers will exit or die earlier, despite changing jobs.

The aim of this study is to investigate the relations of job arduousness and job changes with labour market exit and mortality among workers older than 50 in Finland. Our research questions are twofold:

1. To what extent is the arduousness of work related with labour market exit and mortality before age 63?
2. Does changing to a less arduous job in the late career contribute to later or earlier labour market exit and lower or higher mortality?

## Data

The study uses full population register data from the Finnish Centre for Pensions (ETK). We follow the cohorts born between 1955 and 1959 from the year of turning 50 until the year of turning 62 years old. We study those workers who worked for at least 25 years at age 50 (and therefore are able to reach 38 working years by age 63) and for whom information on occupation was available at age 49 or 50 (N = 190,774).

We study two types of outcomes: exit from the labour market or death before reaching the age of 63. Labour market exit is defined as the moment when a person permanently stops receiving earnings from work before and until age 63. Death is based on the date of death. Data are organised into person-years (N = 2,254,598) where a zero means that no event (i.e. labour market exit or death) has taken place and a one means that the event occurred in that year. After the event year, that person is no longer observed. Data is right-censored if someone leaves the data, for example through outmigration or, in the analysis of labour market exit, if a person dies before exiting the labour market.

Our main dependent variable is an indicator of the extent to which the occupation of the individual can be considered physically demanding.<sup>1</sup> This indicator is based on job exposure matrices for physical workload from the Finnish Institute of Occupational Health (Solovieva & Viikari-Juntura, 2019). Collected in 2000 and based on interviews, the data cover about 90 per cent of all occupational groups in Finland. These data at the occupational level are linkable to individuals based on the Finnish version of ISCO-88 occupational classifications. Conversions to ISCO-08 were made for occupations after 2010.

For each occupation (and gender), the data include nine physical load factors: heavy physical work, kneeling or squatting at work, lifting (5 kg), heavy lifting (20 kg), working with a hand above shoulder level, working in a forward bent posture, work demanding high handgrip forces, standing or walking, and sitting. The indicators represent the shares of respondents who said they were exposed to these loads during regular intervals or for a certain minimum amount of time per day. To create a summary indicator of job arduousness for each occupation, we applied principal component analysis to the nine workload factors. Only the predicted scores for the first component are used in the analysis to quantify the physical demandingness of the occupation (eigenvalue = 6.7, explaining 75% of the variance between items). Observations are grouped into occupation arduousness deciles based on the predicted scores, allowing easier interpretation of the results.

In the analysis we control for gender, education, marital status, type of municipality, being an immigrant, year of birth, age and days worked in each year.

## Methods

We analyse the risks of labour market exit and death between ages 50 and 62 separately applying discrete-time survival analysis, using generalized linear models with complementary log-log (Singer & Willett, 2003). For both outcome variables we estimate several models. First, we estimate the association of the deciles of occupation arduousness at age 50 with the risk of exit and death at each of the following ages, with and without control variables. Next, we estimate models separately for each arduousness decile

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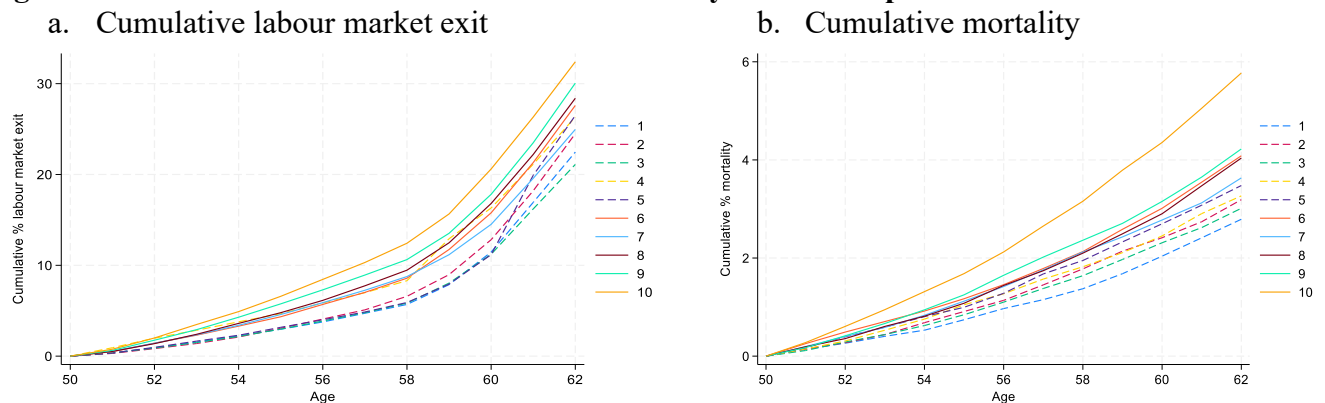
<sup>1</sup> Unfortunately, there is a lack of similar exposure data in Finland on cognitive and mental demandingness in work.

at age 50, using one-year lags for independent variables and allowing them to vary over time. We now use a time-varying cumulative indicator for occupation arduousness that measures the average arduousness of occupations in all preceding years. Similarly, we construct a cumulative indicator of average number of days worked. We interact the cumulative arduousness and working days measures in our models to account for the possibility that working less diminishes the influence of arduousness on exit and mortality.

### Preliminary findings

Figure 1 shows the cumulative shares of persons in our study population who have exited the labour market (panel a) and died (panel b) during the follow-up period between ages 50 and 62 by occupation arduousness deciles. The figure confirms that, overall, the risk of exit and death increases with occupation arduousness: at age 62, in the most arduous decile almost one-third has exited the labour market and six per cent has died, compared with closer to one-fifth exit and three percent mortality in the lowest deciles. These findings are preliminarily confirmed by the discrete-time survival analysis models with initial arduousness deciles as explanatory variable and controlling only for age. The impact of arduousness on exit and death strongly diminishes when sociodemographic factors are controlled for, indicating that selection into arduous occupations plays a significant role in explaining health outcomes (Ravesteijn, Kippersluis, & Doorslaer, 2018), and thereby potentially exit and mortality as well.

**Figure 1. Cumulative labour market exit and death by initial occupational arduousness decile**



Next, we analyse the potential impact of changing occupations on labour market exit and death. Table 1 shows that after age 50, changes between occupations with different levels of arduousness is relatively common. Change is most common in the middle of the distribution, especially deciles 3, 4 and 5, where workers move up and down the distribution. Those in the highest arduousness decile are most likely to remain there and less likely to move to a less arduous occupation. Preliminary results of the discrete-time models suggest that changes in occupational arduousness hold no or even a negative association with labour market exit, once the initial arduousness decile of the job at age 49 or 50 is accounted for. Only in the most arduous jobs (i.e., in the highest initial decile), a drop in arduousness seems to be related with a lower risk of labour market exit. Changes in arduousness in the late career appears to hold no meaningful relation with mortality.

### Discussion and implications

Working in more arduous jobs is related with early labour market exit and mortality. Among those in the most arduous occupations, around one-third exits the labour market (or dies) before reaching the age of

63, meaning that they did not make it to eligibility for the years-of-service pension. Changes to less arduous occupations did not indicate to have a considerable impact on extending (working) lives, except among those in the most arduous occupations. However, from the perspective of eligibility for the years-of-service pension, changing to a less occupation may mean that one no longer qualifies for the pension. Hence, even if changing occupation would be beneficial for the worker, the pension provides a disincentive to do so. Finally, changing occupations in one's late career is more easily said than done. Especially workers who have done physically demanding and often low-skilled manual labour their whole career will have difficulties in getting recruited in other occupations.

**Table 1. Percentage of the time in the labour market spent in occupations in each arduousness decile by initial decile at age 50**

Initial decile	Time spent in decile, %									
	1	2	3	4	5	6	7	8	9	10
1	<b>57.9</b>	12.6	12.3	5.4	4.2	2.8	2.5	0.9	0.7	0.9
2	13.2	<b>56.6</b>	11.8	4.5	4.8	3.7	2.3	1.3	1.1	0.9
3	15.3	8.0	<b>47.7</b>	9.9	8.8	4.2	1.7	1.9	1.6	1.0
4	6.6	6.1	8.5	<b>53.4</b>	7.8	5.0	5.2	2.1	2.1	3.3
5	2.7	3.9	4.5	5.6	<b>55.8</b>	5.6	4.0	4.3	11.4	2.1
6	1.9	2.5	4.4	3.3	5.4	<b>56.8</b>	10.4	6.3	5.8	3.2
7	1.2	1.9	1.9	3.2	2.9	5.1	<b>69.1</b>	4.4	7.1	3.5
8	0.7	1.8	1.5	1.8	3.1	11.4	4.1	<b>65.5</b>	4.6	5.4
9	0.8	1.2	1.2	2.3	2.9	4.5	5.7	9.3	<b>64.3</b>	7.9
10	0.7	1.5	1.4	1.6	3.3	3.4	3.4	5.7	6.0	<b>73.0</b>

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