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Disability retirement and all-cause mortality in ages 65–70: A comparison of Finnish speakers and Swedish speakers in Finland

Julia Klein and Jan Saarela

Swedish speakers in Finland have higher life expectancy and lower disability retirement rates than Finnish speakers. Although disability retirement is an important mortality predictor, no previous study has analysed the ethnolinguistic mortality gradient in light of the difference in disability pension receipt. We study how being a disability pensioner in ages 50–64 relates to mortality in ages 65–70 and whether the two ethnolinguistic groups differ in this respect. We use Cox regressions on longitudinal population-register data covering 1987–2011. Disability pensioners have a mortality hazard that is about twice that of employed persons. We find this pattern to be highly similar for both ethnolinguistic groups. Our results highlight that in order to understand mortality variation across population subgroups, adequate control for previous labour market position is needed. The Finnish welfare system seems to respond appropriately in identifying disability pensioners with equally impaired health in both ethnolinguistic groups.

Keywords: disability pension, mortality, ethnolinguistic groups, population data, Finland

Introduction

One of the corner stones of a social security system is disability pension as a means to protect working-aged people whose health prevents them from participating in the labour market. The rules, requirements, and generosity of disability pension vary widely across Europe, and there are a number of factors predicting disability pension receipt. However, the most important factor is current health status (Börsch-Supan et al., 2017). In Germany, disability pensioners show a high number of hospital days in the two years prior to disability pension receipt (Brockmann et al., 2009), and in Norway and Sweden, sickness allowance is a major risk factor for receiving disability pension (Gjesdal & Bratberg, 2003; Helgadóttir et al., 2011). Also in Finland, sickness allowance most often precedes disability pension receipt (Laaksonen et al., 2016), and the risk for disability pension increases with the number of sick days (Salonen et al., 2018). Disability retirement is most often a permanent state as the return-to-work rates are very low (Saarela & Finnäs, 2002a), both among those with full and partial disability pension (Kausto et al., 2010; Laaksonen & Gould, 2015). Disability pension is therefore regarded as a reliable indicator for poor health.

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While disability pension is usually granted for non-fatal conditions (Polvinen et al., 2015), there is, nevertheless, a strong link to mortality. In Sweden, disability pensioners of all ages have a roughly three times higher mortality risk than those who are not disability retired (Wallmann et al., 2006). Mortality of Danish disability pensioners is much higher than that of any other labour market group from age 59 onwards (Quaade et al., 2002). German disability pensioners have lower rates of survival compared to same-aged old-age retirees (Brockmann et al., 2009). In the Netherlands, every year spent in disability pension past age 58 increases the risk of dying from age 65 by 27 per cent for men and 12 per cent for women (Kalwij et al., 2013). In Finland, persons who have received disability pension before the age of 65 are about two times more likely to die after age 65 compared to those who were working (Klein & Saarela, 2019).

There is a multitude of studies examining the mortality risk around retirement age in different subgroups of the population, such as by labour market category, socioeconomic position, and occupation (Kalwij et al., 2013; Klein & Saarela, 2019; Polvinen et al., 2015; Quaade et al., 2002; Wallmann et al., 2006). However, no study so far has analysed the link between disability pension and mortality for population subgroups other than those identified by socioeconomic or labour market characteristics. The case of Finland provides a good opportunity to do so, as it has two native ethnolinguistic groups with equal constitutional rights. Unlike most minorities, the Swedish-speaking population is not marginalised but equally integrated into society as the Finnish speakers (Saarela & Finnäs, 2002b). There are, nevertheless, distinct health differences between the Finnish-speaking majority and Swedish-speaking minority. Swedish speakers have higher life expectancy and lower disability retirement rates than Finnish speakers. No study so far has explored whether disability pensioners in each ethnolinguistic group are subject to a similarly elevated mortality risk.

The aim with this paper is to study whether Finnish-speaking and Swedish-speaking disability pensioners differ in their mortality risk. We do so by studying whether mortality past the statutory retirement age of 65 is dependent on labour market status in ages 50–64. We distinguish between persons who were disability pensioners, employed, and those who were non-employed for any other reason than disability pension. We run separate analyses for men and women, as there are considerable differences between the sexes both in labour market characteristics as well as in the ethnolinguistic gradient in health.

The Finnish labour market

A high degree of gender equality in the Finnish labour market, which encompasses roughly 2.6 million persons (Statistics Finland, 2019), results in women being strongly represented in the labour market and housewives being rare compared to the situation in many other countries (Elo et al., 2014). Therefore, both sexes have a high degree of labour market attachment (Laitinen-Kuikka & Tuominen, 2003), and the female employment rate is on par with that of men. At present, roughly 80 per cent of the population aged 50 is employed, while this number is around 60 per cent at age 60 and drops sharply thereafter (Statistics Finland, 2019).

The statutory retirement age in Finland has long been 65, and since 2005, it can be freely chosen between ages 63 and 68 (Hietaniemi & Ritola, 2007). Although this theoretically allows people to continue working past age 65, the number of people doing so is small. Practically all persons studied in this paper were retired by age 65. When physical or mental conditions restrict the working capacity for a person aged below 64, he or she is eligible for disability pension. The benefit can be granted for a fixed period of time, or indefinitely until age 65, as full or partial disability pension (Ministry of Social Affairs and Health, 2007). Overall, only about four per cent of all disability pension recipients ever return to the labour market (Saarela & Finnäs, 2002a).

Employed people are generally healthier than those who are not employed (Vinni & Hakama, 1980). Unemployment is predicted by poor health, but unemployment also causes health to deteriorate, which

may translate into higher working age mortality (Martikainen & Valkonen, 1996; Schmitz, 2011; Virtanen et al., 2013). However, the negative association of unemployment and retirement mortality is largely explained by socioeconomic circumstances (Klein & Saarela, 2019). In the late labour market ages, health impaired people may leave the work force early and retire, but international studies show that there is no consistent evidence for a correlation between retirement age and mortality. Only very early retirement, that is, before age 60, shows a negative impact on survival past age 65 (Rogne & Syse, 2018; Kühntopf & Tivig, 2012; Litwin, 2007; Tsai et al., 2005).

Like in other countries (Kalwij et al., 2013; Quaade et al., 2002; Wallmann et al., 2006), the only labour market group in Finland whose retirement mortality is consistently elevated, also when controlling for socioeconomic circumstances, consists of disability pensioners (Klein & Saarela, 2019). Differences in survival by labour market status are less pronounced among women, which might be explained by women's retirement mortality being more related to socioeconomic circumstances than labour market position.

About 90 per cent of the population in Finland is Finnish-speaking, while the Swedish-speaking population amounts to about 5.5 per cent. Both groups are native and have equal constitutional rights. The Swedish-speaking Finns have slightly higher rates of employment (Saarela & Finnäs, 2005a), tend to work in different industries (Saarela & Finnäs, 2006a), and have lower unemployment rates (Saarela & Finnäs, 2005a). Also during the economic crisis of the 1990s, Swedish speakers had markedly lower unemployment rates than Finnish speakers, even when individual characteristics and structural factors were accounted for (Saarela & Finnäs, 2002b; 2003; 2006a).

Health differences between Finnish speakers and Swedish speakers in Finland

Swedish speakers in Finland live longer than Finnish speakers. The difference in life expectancy at birth is approximately three years among men and one year among women (Saarela & Finnäs, 2006b). At age 65, Finnish-speaking men have a 25 per cent higher mortality risk compared to Swedish-speaking men, and among women the difference is slightly less than ten per cent (Saarela & Finnäs, 2006b; 2010). Swedish speakers also fare better in terms of health-related labour market outcomes, such as having a lower probability of receiving sickness allowance (Reini & Saarela, 2017) and shorter sickness spells (Reini & Saarela, 2019). Swedish-speaking men have an approximately 30 per cent lower risk of receiving disability pension than Finnish-speaking men, whereas the difference in women is about 15 per cent (Saarela & Finnäs, 2002a; 2005b). After age 50, this gradient is particularly marked (Reini & Saarela, 2017).

The Swedish-speaking population lives concentrated at the southern and western coastlines of Finland where overall mortality and disability retirements are lower than elsewhere. However, the between-group difference in health cannot be fully explained by differences in geographical distribution or socioeconomic and demographic characteristics (Koskinen & Martelin, 2003; Reini & Saarela, 2017; Saarela & Finnäs, 2005a; 2009; Sipilä & Martikainen, 2009). Previous research has argued that the mortality difference may relate to differences in cultural practices (Reini & Saarela, 2019; Saarela et al., 2016; Saarela & Rostila, 2019). Swedish speakers are believed to attach stronger values and norms to the role of the family as an institution (Saarela & Finnäs, 2018), and the ethnolinguistic mortality gradient is the largest for causes of death associated with behaviours and lifestyles, such as alcohol consumption, suicides, and other external causes (Saarela & Finnäs, 2016).

Potential mechanisms for ethnolinguistic mortality differences among disability pensioners

If disability pensioners in each ethnolinguistic group have different mortality risks, it may be due to three potential mechanisms. One is that people with equally worsened states of health are treated differently according to their ethnolinguistic affiliation. This might arise because of differences in access to healthcare

professionals, medical treatments, or rehabilitation opportunities. It could also be a result of communication problems with the patient or because of bias against one group. The second mechanism involves structural reasons, such as differences in the equipment in clinics in different areas of the country. Lastly, some form of discrimination may cause differences in outcomes among people with equally poor health.

However, considering that both ethnolinguistic groups have equal constitutional rights to access to healthcare, these explanations are not very likely. One additional possibility for observable differences in the mortality risk of disability pensioners is that Swedish speakers and Finnish speakers have pronounced differences in the degree of poor health by the time disability pension is granted. This may be due to stark differences in the proportion of underlying medical conditions, differences in attitudes towards prevention or early screening for progressive disorders, or differences in the trajectory after the onset of a condition.

Thus, at first sight, the overall health advantage of Swedish speakers in comparison to Finnish speakers may seem to suggest a lower mortality risk among disability pensioners, but this may not necessarily be the case. If the healthcare and especially disability pension system works in a similar way for both ethnolinguistic groups – as it should according to the constitution – the assignment to disability pension should be driven by purely health-related reasons, and thus identify people in equally worsened states of health. If that is the case, then we would not observe differences in the association between disability pension and mortality between Finnish speakers and Swedish speakers, and particularly so when socioeconomic and demographic characteristics are accounted for.

Data and methods

The data used are based on Statistics Finland's longitudinal employment statistics files (Työssäkäyntitilaston pitkittäistiedosto, used with permission TK-53-768-12). They contain annual records for 1987-2011, representing 315,887 individuals residing in Finland in any of these years, and allow for individual follow-up during the period. The data constitute a five per cent random sample of Finnish speakers (249,851 persons) and a similarly constructed 20 per cent sample of Swedish speakers (66,036 persons). There is information about year of death of each person and a number of annually available demographic, socioeconomic, and labour market variables, as well as an indicator for ethnolinguistic affiliation. Thus, the data are well suited for analyses of differences in post-retirement mortality according to labour market status in late working life for both ethnolinguistic groups.

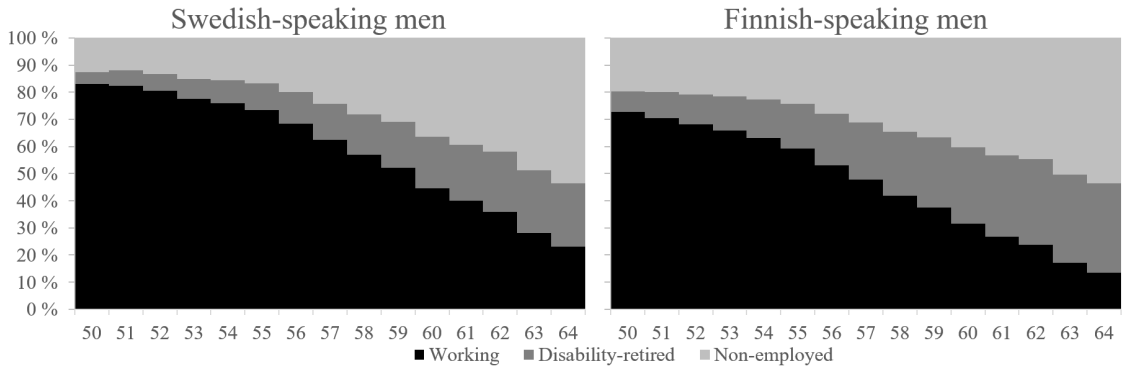

Figure 1. Relative distribution of labour market statuses in ages 50–64, Subsample 50+, men.

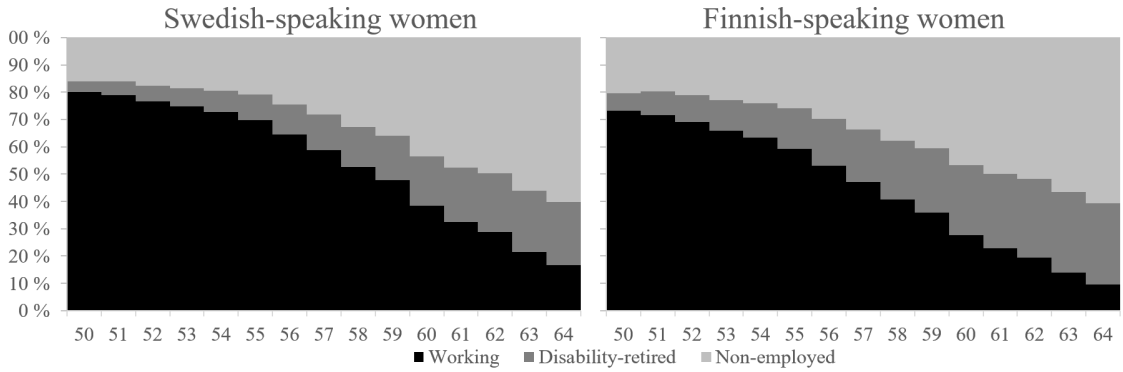

Figure 2. Relative distribution of labour market statuses in ages 50–64, Subsample 50+, women.

In order to assess how being a disability pensioner relates to mortality past age 65, we distinguish between persons who were disability pensioners, employed, and other non-employed persons in ages 50–64. The categorisation is applied for every single age from 50 to 64, as the proportions of the labour market categories changes markedly from one age to the next, and most notably, the number of employed persons decreases (see Figures 1 and 2). The change in proportions may affect the interrelation between disability pension and mortality. Analysing single ages allows us to observe this variation in more detail.

As employed, we count those who were employed or self-employed at the end of a calendar year. Disability pensioners are those who received any amount of disability or individual early pension during a calendar year, irrespective of any other labour market position. Individual early pension was an early retirement scheme that was phased out after 2005. It was open to people born before 1948 who had a long work history. It had less strict criteria than disability pension but was dependent on objective health testing (Hietaniemi & Ritola, 2007). Disability pension is treated as an absorbing state because few disability pensioners ever return to the labour market. Non-employed persons are all others who are not defined by the criteria above. This group includes everyone who was outside the labour market for any other reason than disability retirement, including unemployed people and those who retired before age 65.

Mortality is analysed in ages 65–70. Study persons are those who were alive at the beginning of the calendar year in which they reached the statutory retirement age of 65 and lived in Finland at all ages we observe before that. We analyse three partly overlapping age/cohort intervals, referred to as 'Subsample 50+', 'Subsample 55+', and 'Subsample 60+', respectively. The first consists of persons born 1937–1946, who are observed with regard to labour market status from age 50 until age 64. The second consists of persons born 1932–1946, observed from age 55. The third consists of persons born 1927–1946, observed from age 60. This setup allows us to maximise statistical power by increasing the case numbers in the subsamples with a later starting age, while simultaneously increasing the validity of the subsamples with a lower starting age by comparing how similar the results are in the overlapping ages. The three subsamples contain 33,464, 47,313, and 62,270 individuals, respectively, and 1,817, 2,987, and 4,525 deaths in ages 65-70. Table 1 describes the data by subsample, sex, and ethnolinguistic group.

We estimate joint effects of labour market status and ethnolinguistic group on mortality. In order to do so, we use a variable that combines these two features. Thus, we distinguish six categories: employed Swedish speakers, disability-retired Swedish speakers, non-employed Swedish speakers, employed Finnish speakers, disability-retired Finnish speakers, and non-employed Finnish speakers. We do this for every single age from 50/55/60 to 64. The number of individuals in each state is found in Tables A1 and A2 in the Appendix.

The control variables used are birth cohort, family situation, educational level, homeownership, income, area of residence, and industry of work. They are measured at age 65, when we start to observe mortality, except for industry of work, which is measured at the earliest possible age to capture the situation

Table 1. Data description for each subsample, by sex and ethnolinguistic group.

	Subsample 50+		Subsample 55+		Subsample 60+	
	Swedish speakers	Finnish speakers	Swedish speakers	Swedish speakers	Finnish speakers	Swedish speakers
Men						
Number of persons	3,570	12,664	4,954	17,805	6,536	23,250
Number of person years	14,565	51,584	22,509	80,849	31,462	111,356
Number of deaths	214	1,002	350	1,625	539	2,469
Mortality hazard ratio	0.76	1.00	0.77*	1.00	0.77*	1.00
Women						
Number of persons	3,474	13,756	4,962	19,592	6,664	25,820
Number of person years	14,561	57,753	23,268	91,969	33,184	128,320
Number of deaths	113	488	202	810	297	1,220
Mortality hazard ratio	0.92	1.00	0.99	1.00	0.94	1.00

Source: Authors' calculations based on Statistics Finland (2012). * Hazard ratio is statistically significant at the 5% level.

during working life. Family situation separates people who live alone, those who live with a partner, and all others. Education refers to the highest education attained and is classified into primary, secondary, and tertiary level. Homeownership refers to whether the person lives in a household that owns its accommodation. Finns who live in owned dwellings have lower mortality rates than others (Laaksonen et al., 2008). Income refers to quartiles of taxable income (mainly income from pension and capital). Area of residence distinguishes people who lived in the Helsinki metropolitan region, the rest of Uusimaa, Southwestern Finland, Eastern Finland, Western Finland, and Northern Finland. Only five per cent of the persons in our data moved between ages 50 and 65. Industry of work was measured at age 50, or later if the person was not employed (or not observed) at that age. It distinguishes the categories "Agriculture, hunting, forestry, fishing", "Manufacturing, construction", "Trade, hotels, restaurants", "Transport, communications", "Financial intermediation, insurance, business", "Public and other services", and "Other". The latter category consists predominantly of people with no employment. Tables 2A and 2B provide a summary of the distributions of the control variables by sex and ethnolinguistic group.

Cox regressions are used to estimate the mortality risk from age 65 to 70. Process time is age, which starts at age 65 and ends at death, emigration, or right-censoring at age 70. Normalised weights, that is, the inverse of the inclusion probability, account for the different sampling proportions of the two ethnolinguistic groups. For all three subsamples, we estimate the joint effects of ethnolinguistic affiliation and labour market status on the mortality hazard. We do so for each single one-year age category up to age 64. We summarise the results of three main sets of models. Model 1 contains no control variables and gives the unadjusted estimates for the joint effect between ethnolinguistic affiliation and labour market status. Model 2 adds all socioeconomic and demographic controls variables, except industry of work. Model 3 additionally includes industry of work.

In order to display the different levels of mortality, we summarise the results as hazard ratios (the ratio in the mortality hazard in ages 65–70) with employed Swedish speakers as the reference category (set to 1) in each single one-year age category. However, in order to facilitate the reading of the results, we do not display if an estimate is statistically different from the reference category. In order to focus on ethnolinguistic differences, we indicate instead if an estimate for Finnish speakers is statistically different (at the 5% level) from that of Swedish speakers within one labour market category and apply additional markers in ages where this is the case. This significance testing was done by simply switching the reference category to disability-retired Swedish speakers and non-employed Swedish speakers, respectively. For example, an indicator at age 60 for male disability pensioners indicates that the mortality risk in ages 65–70 for a

Table 2A. Variable's distribution for men, by subsample ethnolinguistic group (%).

	Subsample 50+		Subsample 55+		Subsample 60+	
	Swedish speakers	Finnish speakers	Swedish speakers	Finnish speakers	Swedish speakers	Finnish speakers
Birth cohort						
1927-31					23.6	23.1
1932-36			27.2	28.6	20.7	22.0
1937-41	43.9	46.2	31.9	33.0	24.4	25.3
1942-46	56.1	53.8	40.9	38.4	31.3	29.5
Family situation at age 65						
Living alone	17.5	20.8	16.6	20.1	15.9	19.3
Living with partner	77.3	73.8	77.9	74.0	78.5	74.3
Other	5.2	5.4	5.5	5.9	5.6	6.4
Education						
Primary	43.5	47.5	47.0	52.7	50.7	57.7
Secondary	21.9	27.7	20.7	24.8	19.7	22.2
Tertiary	34.7	24.8	32.3	22.5	29.7	20.2
Homeownership at age 65						
No	16.3	18.7	16.3	18.5	16.2	18.1
Yes	83.7	81.3	83.7	81.5	83.8	81.9
Income at age 65 in quartiles						
1	12.4	16.8	14.0	17.7	13.2	17.4
2	17.2	23.1	15.7	21.7	17.1	21.7
3	25.5	28.1	24.5	28.2	24.0	28.5
4	44.9	32.0	45.8	32.5	45.7	32.3
Region of residence at age 65						
Helsinki metropolitan region	47.3	21.9	47.2	21.1	47.0	20.4
Southern Finland	1.0	15.7	1.0	15.7	1.2	16.0
Southwestern Finland	18.3	14.5	18.1	14.5	18.0	14.4
Eastern Finland	0.5	13.0	0.5	13.3	0.4	13.6
Western Finland	32.4	22.2	32.9	22.3	33.1	22.3
Northern Finland	0.5	12.7	0.4	13.1	0.3	13.3
Industry of work						
Agriculture, hunting, forestry, fishing	11.7	8.9	12.5	10.0	12.9	10.1
Manufacturing, construction	27.3	31.8	26.6	31.2	23.8	27.1
Trade, hotels, restaurants	12.7	8.7	12.3	8.4	11.1	7.3
Transport, communications	11.5	8.0	11.5	8.1	10.6	7.4
Financial intermediation, insurance, business	8.7	7.1	8.8	6.5	7.9	5.7
Public, and other services	13.2	13.3	12.9	12.8	12.0	11.6
Other	14.9	22.2	15.4	23.0	21.8	30.9
Number of persons	3,570	12,664	4,954	17,805	6,536	23,250

Source: Authors' calculations based on Statistics Finland (2012).

Table 2B. Variable's distribution for women, by subsample ethnolinguistic group (%).

	Subsample 50+		Subsample 55+		Subsample 60+	
	Swedish speakers	Finnish speakers	Swedish speakers	Finnish speakers	Swedish speakers	Finnish speakers
Birth cohort						
1927-31					25.0	23.9
1932-36			29.6	29.6	22.1	22.5
1937-41	46.2	47.4	32.6	33.4	24.3	25.4
1942-46	53.8	52.6	37.9	37.0	28.6	28.2
Family situation at age 65						
Living alone	26.3	32.2	26.7	32.1	27.1	32.2
Living with partner	68.0	62.2	67.1	61.5	66.4	60.2
Other	5.8	5.6	6.3	6.3	6.5	7.6
Education						
Primary	46.6	48.2	51.3	53.9	55.9	59.0
Secondary	25.5	29.7	23.3	27.1	21.3	24.4
Tertiary	27.9	22.1	25.4	19.0	22.8	16.6
Homeownership at age 65						
No	17.0	18.9	16.8	18.6	16.8	18.5
Yes	83.0	81.1	83.2	81.4	83.2	81.5
Income at age 65 in quartiles						
1	28.0	33.9	27.9	30.5	29.3	31.2
2	24.9	28.3	25.1	30.1	25.0	29.6
3	24.8	22.5	24.6	23.3	23.7	23.1
4	22.4	15.4	22.4	16.1	22.0	16.1
Region of residence at age 65						
Helsinki metropolitan region	50.6	23.5	50.0	22.6	49.7	21.8
Southern Finland	1.5	15.4	1.3	15.3	1.2	15.6
Southwestern Finland	15.7	14.5	16.4	14.4	16.2	14.5
Eastern Finland	0.2	13.0	0.2	13.2	0.2	13.2
Western Finland	31.7	21.9	31.8	22.4	32.4	22.7
Northern Finland	0.4	11.8	0.3	12.2	0.3	12.2
Industry of work						
Agriculture, hunting, forestry, fishing	8.4	7.1	9.5	7.8	9.4	7.6
Manufacturing, construction	10.8	13.5	10.5	13.8	9.7	11.9
Trade, hotels, restaurants	13.3	12.9	13.7	12.6	12.4	10.9
Transport, communications	4.2	3.2	4.3	3.1	4.0	3.0
Financial intermediation, insurance, business	9.9	9.0	8.9	8.1	7.8	7.1
Public, and other services	37.1	33.5	34.9	31.3	30.8	27.4
Other	16.4	20.8	18.2	23.3	25.9	32.3
Number of persons	3,474	13,756	4,962	19,592	6,664	25,820

Source: Authors' calculations based on Statistics Finland (2012).

Finnish-speaking disability pensioner is statistically different from that of a same-aged Swedish-speaking disability pensioner.

Separate analyses are undertaken for men and women. All analyses are carried out with StataSE 14. We checked whether the proportional-hazards assumption was fulfilled with tests based on Schoenfeld residuals ($p<0.05$). They showed that the assumption was not violated, except for Model 1 for men in Subsamples 55+ and 60+.

Results

The main findings are summarised in Figure 3 for men and Figure 4 for women. For men, the mortality risk in ages 65–70 is highly dependent on previous labour market status (Figure 3). In the first subsample, the unadjusted mortality hazard of disability pensioners in all ages is about 3.3 times that of employed persons, while that of non-employed persons is about 1.6 (Model 1). In the other two subsamples, the size of the estimates is somewhat smaller because of different inclusion criteria (shorter observation window for labour market status and earlier-born cohorts). The overall pattern is nevertheless similar. When all control variables except industry of work are added, the hazard ratios become smaller (Model 2), while the inclusion of industry of work has practically no relevance (Model 3). When we compare the two ethnolinguistic groups within labour market status according to the unadjusted models, Finnish speakers

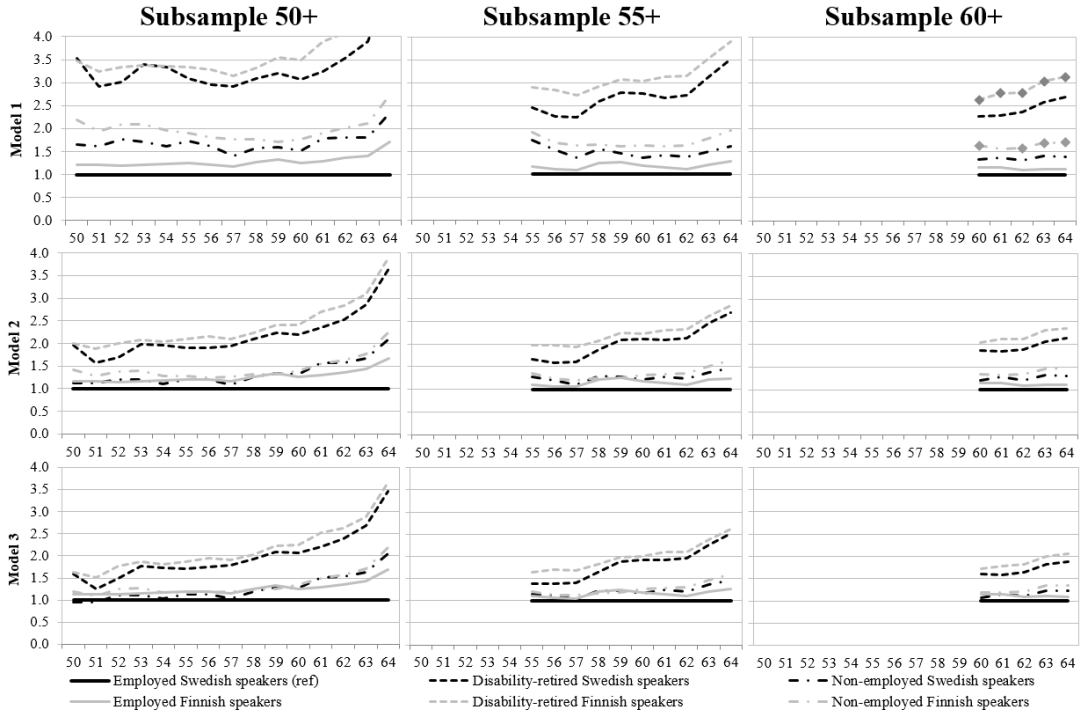

Figure 3. Mortality hazard ratios in ages 65–70 by ethnolinguistic group and labour market status in ages 50–64 for each subsample, men.

Notes: All estimates come from models with joint effects for ethnolinguistic group and labour market status. Model 1 includes no control variables. Model 2 includes all control variables except industry of work. Model 3 includes all control variables. Diamond-shaped indicators refer to estimates that are statistically significant between the ethnolinguistic groups (at the 5% level) within the same labour market status.

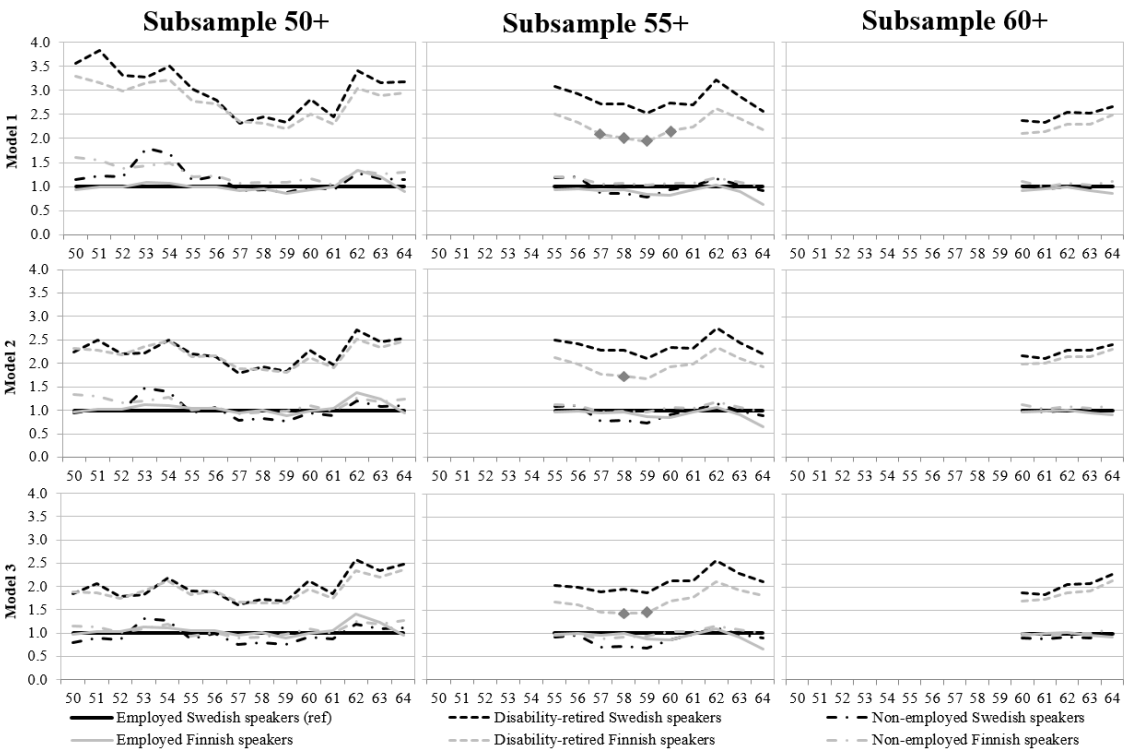

Figure 4. Mortality hazard ratios in ages 65–70 by ethnolinguistic group and labour market status in ages 50–64 for each subsample, women.

Notes: All estimates come from models with joint effects for ethnolinguistic group and labour market status. Model 1 includes no control variables. Model 2 includes all control variables except industry of work. Model 3 includes all control variables. Diamond-shaped indicators refer to estimates that are statistically significant between the ethnolinguistic groups (at the 5% level) within the same labour market status.

have slightly higher mortality risks than Swedish speakers. However, when the control variables are added, the mortality difference between the two ethnolinguistic groups becomes close to zero.

The overall pattern among women (Figure 4) is similar to that among men but, as expected, less emphasised. Disability pensioners have a notably higher mortality risk in ages 65–70 than employed persons. Non-employed women do not differ much in mortality compared to employed women. Since the overall ethnolinguistic mortality gradient among women is small within these ages, the difference within labour market status is also minor. Swedish-speaking women who are disability retired tend to have higher mortality risk than their Finnish-speaking counterparts, but the difference is generally not statistically significant.

A noteworthy pattern, which is particularly pronounced among men, is that being a disability pensioner is associated with an increasing relative mortality risk (in ages 65–70) the closer we get to age 65. The same can be observed for the relative mortality risk of non-employment. The primary reason for this pattern is that mortality hazard ratios give relative mortality differences, and there is positive health selection in terms of who remains employed until age 65. To illustrate the logic behind this argument, we depict mortality hazards, that is, mortality risks in absolute numbers, for Subsample 50+ in Figure 5 for men and in Figure 6 for women. To facilitate reading, confidence intervals of the estimates are not shown. The figures show that persons who were employed just before age 65 have low mortality in ages 65–70, while mortality of persons who were disability pensioners already in their early 50s is highly elevated. Even though mortality in ages 65–70 is decreasing in every labour market status from age 50 to 64, the

difference between labour market statuses increases in relative terms (as was shown by Figures 3 and 4). Results for the other two subsamples look highly similar and are available upon request.

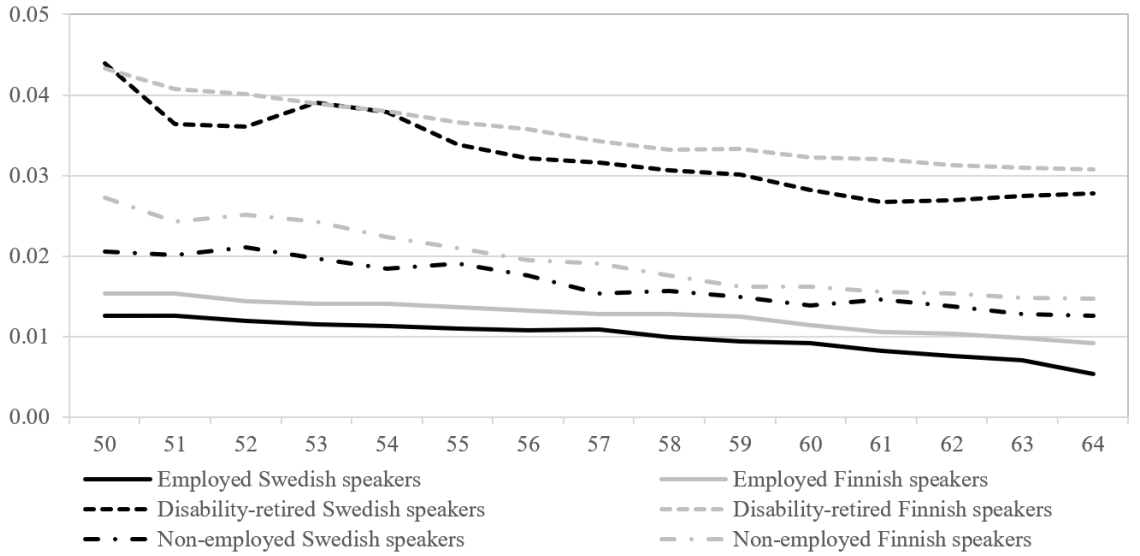

Figure 5. Mortality hazards in ages 65–70 by ethnolinguistic group and labour market status in ages 50–64, Subsample 50+, men.

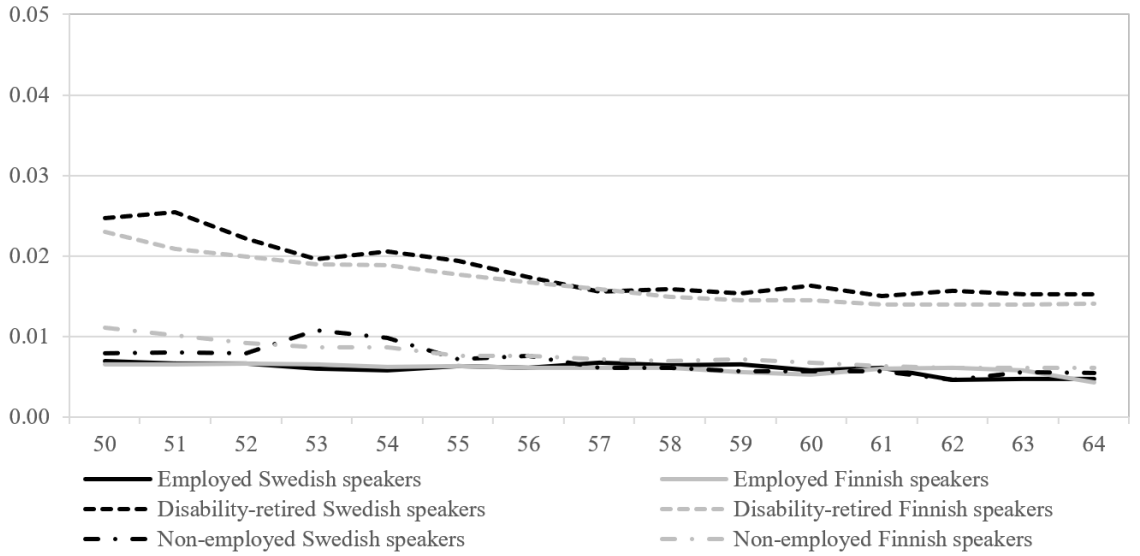

Figure 6. Mortality hazards in ages 65–70 by ethnolinguistic group and labour market status in ages 50–64, Subsample 50+, women.

Discussion

We found that labour market status in the late working ages was linked to mortality after statutory retirement age. Those who were working had the lowest mortality risk, while disability pensioners had the highest. Non-employed persons had a somewhat higher mortality than those who were employed, but the difference was largely due to socioeconomic characteristics. The associations were similar for both sexes but less pronounced among women than among men.

We were particularly interested in whether the mortality risk in ages 65–70 among disability pensioners differed between the two native ethnolinguistic groups in Finland. We found that disability pension receipt was generally associated with a mortality hazard that was approximately twice as high as that of employed persons. Male Finnish-speaking disability pensioners tended to have a slightly higher mortality risk than their Swedish-speaking counterparts, but this difference was generally not statistically significant, and particularly not when socioeconomic and demographic variables were accounted for. Among women, it was instead Swedish-speaking disability pensioners who had the higher mortality risk, but again, these differences were not statistically significant. While this result is not in line with the evidence for more favourable health outcomes among Swedish speakers, it should probably be interpreted with the overall smaller ethnolinguistic differences among women in mind. In complementary analyses (available upon request), we extended the time under risk of dying to age 75 and even up to age 80 where applicable. The results were similar to those presented above, although the influence of previous disability pension receipt on mortality naturally decreased as the time under risk increased.

We can conclude that being a disability pensioner is associated with a similarly raised mortality level in both groups. This means that, although Swedish-speaking Finns have a higher life expectancy and lower disability pension rates, the degree of ill health among disability pensioners appears to be similar in both ethnolinguistic groups. From a policy point of view this is a success, as the findings suggests that the health care and social security system treats both ethnolinguistic groups equally.

As a side note, we want to highlight the rising mortality risk of disability pensioners and non-employed persons after age 60 compared to those who were still employed. One possible explanation would be that employment causes people to be healthier, while leaving the labour market causes health to deteriorate and thus drives mortality upwards. As we have shown with the absolute hazards, this does not seem to be the case. The increased relative mortality of disability pensioners is related to the few persons who were still working and their decreased mortality risk. This means that the least healthy individuals drop out of the labour market, leaving only the healthiest ones to work until statutory retirement age, while the health selectivity of disability pension decreases. This finding is in line with other studies, which find that disability pensioners' mortality is higher the earlier in life disability pension receipt starts (Brockmann et al., 2009; Kalwij et al., 2013; Wallmann et al., 2006).

A main strength of our study design is the use of population-register data, as there is no problem with attrition or self-assessment of health. The lengthy follow-up period enabled us to observe the labour market status in different ages, reasonably long before statutory retirement age, and we could relate it to mortality shortly thereafter. Analyses of overlapping cohorts increased the statistical power and resulted in stable estimates, although they may have introduced some problems with regard to interference of period and cohort effects, which we hope to be able to address by future research using larger data sets. There are some other limitations to point out as well. We disregarded mortality before age 65, meaning that persons who fit our criteria for being observed might be affected by selective mortality before age 65. Furthermore, we did not use information on the causes for disability retirement and mortality. This would have deepened the conclusions, as there is a substantial gradient in the underlying causes for disability pension and mortality between socioeconomic groups (Leinonen et al., 2012; Polvinen et al., 2013; Polvinen et al., 2015), and the two ethnolinguistic groups differ in this respect (Saarela & Finnäs, 2009; 2010). Lastly, we identified persons only on basis of their own unique ethnolinguistic affiliation (mother tongue), as directly available from the population register. No linkage to other generations was utilised, and therefore, we could not

separate people with mixed (exogamous) ethnolinguistic background from those with endogamous background. Issues of this kind could help to deepen the understanding of the underlying mechanisms behind mortality variation subsequent to retirement.

Labour market status in the late working ages showed a clear link with retirement mortality. However, only disability pensioners had a markedly elevated mortality risk net of socioeconomic factors. Associations were nevertheless the same for Finnish speakers and Swedish speakers of both sexes. This finding leads us to conclude that the disability pension system works in a unified way for both native ethnolinguistic groups in Finland.

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Appendix

Table A1. Labour market status in ages 50–64 by subsample and ethnolinguistic group (number of persons), men.

Age	Swedish speakers				Finnish speakers			
	Employed	Disability-retired	Non-employed	Total	Employed	Disability-retired	Non-employed	Total
				Subsample 50+				
50	2,961	159	450	3,570	9,216	940	2,508	12,664
51	2,943	205	422	3,570	8,924	1,210	2,530	12,664
52	2,871	228	471	3,570	8,630	1,386	2,648	12,664
53	2,771	259	540	3,570	8,352	1,582	2,730	12,664
54	2,712	304	554	3,570	8,009	1,774	2,881	12,664
55	2,621	351	598	3,570	7,509	2,079	3,076	12,664
56	2,442	418	710	3,570	6,718	2,396	3,550	12,664
57	2,233	474	863	3,570	6,053	2,674	3,937	12,664
58	2,031	534	1,005	3,570	5,296	2,979	4,389	12,664
59	1,861	603	1,106	3,570	4,738	3,277	4,649	12,664
60	1,592	680	1,298	3,570	4,001	3,554	5,109	12,664
61	1,431	731	1,408	3,570	3,384	3,811	5,469	12,664
62	1,284	793	1,493	3,570	3,008	3,992	5,664	12,664
63	1,007	819	1,744	3,570	2,183	4,115	6,366	12,664
64	822	838	1,910	3,570	1,714	4,161	6,789	12,664
				Subsample 55+				
55	3,734	484	736	4,954	10,990	2,892	3,923	17,805
56	3,460	638	856	4,954	9,756	3,679	4,370	17,805
57	3,162	746	1,046	4,954	8,676	4,203	4,926	17,805
58	2,841	850	1,263	4,954	7,451	4,734	5,620	17,805
59	2,561	967	1,426	4,954	6,481	5,226	6,098	17,805
60	2,149	1,090	1,715	4,954	5,341	5,681	6,783	17,805
61	1,917	1,183	1,854	4,954	4,435	6,070	7,300	17,805
62	1,699	1,268	1,987	4,954	3,889	6,334	7,582	17,805
63	1,315	1,320	2,319	4,954	2,821	6,512	8,472	17,805
64	1,082	1,360	2,512	4,954	2,246	6,609	8,950	17,805
				Subsample 60+				
60	2,961	1,445	2,130	6,536	7,276	7,378	8,596	23,250
61	2,605	1,655	2,276	6,536	5,951	8,277	9,022	23,250
62	2,292	1,785	2,459	6,536	5,114	8,699	9,437	23,250
63	1,772	1,873	2,891	6,536	3,741	8,984	10,525	23,250
64	1,440	1,929	3,167	6,536	2,895	9,162	11,193	23,250

Source: Authors' calculations based on Statistics Finland (2012).

Table A2. Labour market status in ages 50–64 by subsample and ethnolinguistic group (number of persons), women.

	Swedish speakers				Finnish speakers			
Age	Employed	Disability-retired	Non-employed	Total	Employed	Disability-retired	Non-employed	Total
				Subsample 50+				
50	2,782	138	554	3,474	10,067	895	2,794	13,756
51	2,738	177	559	3,474	9,860	1,172	2,724	13,756
52	2,665	200	609	3,474	9,513	1,340	2,903	13,756
53	2,596	237	641	3,474	9,076	1,534	3,146	13,756
54	2,526	271	677	3,474	8,711	1,721	3,324	13,756
55	2,422	325	727	3,474	8,153	2,036	3,567	13,756
56	2,240	384	850	3,474	7,300	2,351	4,105	13,756
57	2,046	451	977	3,474	6,480	2,658	4,618	13,756
58	1,829	509	1,136	3,474	5,613	2,961	5,182	13,756
59	1,661	563	1,250	3,474	4,924	3,254	5,578	13,756
60	1,337	626	1,511	3,474	3,798	3,527	6,431	13,756
61	1,130	692	1,652	3,474	3,156	3,749	6,851	13,756
62	1,003	748	1,723	3,474	2,675	3,952	7,129	13,756
63	745	784	1,945	3,474	1,923	4,058	7,775	13,756
64	583	796	2,095	3,474	1,304	4,109	8,343	13,756
				Subsample 55+				
55	3,534	451	977	4,962	11,862	2,920	4,810	19,592
56	3,271	577	1,114	4,962	10,633	3,756	5,203	19,592
57	2,989	688	1,285	4,962	9,411	4,336	5,845	19,592
58	2,653	797	1,512	4,962	8,012	4,889	6,691	19,592
59	2,374	897	1,691	4,962	6,838	5,370	7,384	19,592
60	1,860	998	2,104	4,962	5,081	5,837	8,674	19,592
61	1,533	1,110	2,319	4,962	4,121	6,185	9,286	19,592
62	1,333	1,195	2,434	4,962	3,458	6,468	9,666	19,592
63	964	1,255	2,743	4,962	2,389	6,628	10,575	19,592
64	757	1,282	2,923	4,962	1,685	6,713	11,194	19,592
				Subsample 60+				
60	2,617	1,308	2,739	6,664	7,079	7,515	11,226	25,820
61	2,134	1,531	2,999	6,664	5,594	8,420	11,806	25,820
62	1,807	1,670	3,187	6,664	4,649	8,849	12,322	25,820
63	1,292	1,760	3,612	6,664	3,147	9,117	13,556	25,820
64	962	1,804	3,898	6,664	2,130	9,244	14,446	25,820

Source: Authors' calculations based on Statistics Finland (2012).