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Has the share of the working life expectancy that is spent receiving a partial or full disability pension changed in Finland over the period 2005–2018? A longitudinal register-based study

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ABSTRACT

Objectives The share of the overall working careers that is spent receiving disability benefits is unclear. We examined trends in full-time equivalent working life expectancy (FTE-WLE) among those with and without receiving a permanent full or partial disability pension in Finland, where certain amounts of work are allowed while receiving these pensions.

Design Longitudinal register-based study.

Setting Finnish population.

Participants Nationally representative 70% samples of the working-age population.

Outcome Using the Sullivan method, we examined annual FTE-WLE at age 45, truncated at age 63, in 2005–2018 by disability pension status. Full-time equivalent work participation was based on combined information on annual employment days and work income.

Results Compared with those with no disability pension, disability pensioners had a larger relative (full and partial pensioners of both genders) and absolute (male partial pensioners) increase in the FTE-WLE between 2005 and 2018. In 2018, the FTE-WLE of both male and female full disability pensioners was around 3.5 months, being 6 months at its highest in musculoskeletal diseases. The FTE-WLE of partial disability pensioners was around 6.5 and 8 years among men and women, respectively, being around half of the corresponding expectancies of non-pensioners. The FTE-WLE of partial disability pensioners was considerable in musculoskeletal diseases and mental disorders and even higher in other diseases. Full disability pensioners spent a disproportionately large time in manual work, increasingly in the private sector, and partial pensioners in the public sector with lower non-manual and manual work, increasingly with the former. At the population level, the share of the FTE-WLE that is spent receiving a disability pension remained relatively small.

Conclusions Increased work participation while receiving a disability pension is likely to have had important implications for prolonging individual working careers but only minor contribution to the length of working lives at the population level.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ We used large nationally representative register data, which do not have the problem of non-response or loss to follow-up.
⇒ The data include detailed annual information on work participation and pension receipt.
⇒ We introduce a novel measure of full-time equivalent working life expectancy (FTE-WLE) to account for the magnitude of actual work contribution.
⇒ Due to lack of information on working hours, FTE-WLE was estimated based on combined information on employment days and work income, which may have been subject to misclassification.
⇒ The working careers of real-birth cohorts may differ from that of a hypothetical cohort reflected by the period life-table approach.

INTRODUCTION

Promoting work participation among people with disabilities has been distinguished as an important societal goal. However, activating receivers of work disability benefits has received less attention than, for example, activating the unemployed.[1 2] Common health problems in working age, such as musculoskeletal diseases and mental disorders, seldom lead to inability to perform any work. Working partially while receiving work disability benefits has the potential to increase the overall level of work participation, if this is an alternative to full work exit rather than to full-time work.

Previous studies have consistently shown that the use of part-time sick leave and graded return to work lead to increased work participation.[3–12] The use of part-time sick leave nevertheless also leads to increased use of partial disability retirement,[9 13] that is, a more permanent withdrawal from full-time

work. It is unclear how this 'partial work disability route' contributes to the overall length of working careers. The availability of this route may keep individuals with health problems at least partially in the labour market. Alternatively, however, this may induce individuals to remain working part-time and eventually even apply for a full disability pension instead of attempting to return to full-time work. Among full disability pensioners, that is, those with the maximum grade of work disability that can be assigned in a country's pension system, some work participation may still be allowed, work incentives provided within the system playing an important role.[14 15]

People with poor self-rated health,[16] depressive symptoms[17] and certain musculoskeletal conditions[18] or related sickness absence[19 20] have been found to have a shorter working life expectancy (WLE) than the general population. How disparities in WLE by health status and work disability have developed over time is nevertheless still unclear. Several studies have examined trends in 'unhealthy' and 'healthy' WLEs, providing information on the number of expected working years with and without chronic diseases, disabilities or poor self-rated health.[21–23] However, the focus of this type of approach is not on the overall differences in WLE between groups with better and poorer health.

In Finland, the overall WLE has increased.[24] Furthermore, the share of partial disability retirement in the expected total time spent in disability retirement has increased. This is expected to have contributed to the increased WLE, as partial disability pensioners often continue partially at work.[25] Promoting work participation among people with partial work ability—enhancing the possibilities to combine work and disability pension receipt being one way of doing so—has been an important societal goal in Finland.[26] Currently, partial disability pensioners are allowed to earn up to 60% and full disability pensioners up to 40% of their past earnings, and among the former, work participation is very common.[15] However, it remains unclear how developments in the length of working careers of full and partial disability pensioners retired due to different diseases and working in different segments of the labour market compare to those of the general population. Moreover, the share of the overall working careers at the population level that is spent receiving a disability pension is yet to be established.

Using nationally representative Finnish register data and the Sullivan method, we introduce a novel measure of full-time equivalent working life expectancy (FTE-WLE). The measure combines information on the number of days employed and the magnitude of work contribution based on work income, to be able to address the partial nature of work contribution among disability pensioners. The research questions are listed as follows:

1. What has been the FTE-WLE at age 45 among men and women receiving and not receiving a partial or full disability pension in the period 2005–2018?
2. Has the FTE-WLE differed by diagnosis group of the pension?
3. Has the distribution of FTE-WLE into work in particular occupational classes and employment sectors differed by disability pension status?
4. What is the share of the FTE-WLE at the population level that has been spent receiving a partial or full disability pension?
5. How have the aforementioned patterns in FTE-WLE changed between 2005 and 2018?

METHODS

Study population

We used the FOLK data of Statistics Finland including longitudinal register-based information on sociodemographic factors and employment for the population living permanently in Finland. For this study, we included a subpopulation based on 70% nationally representative random samples of the working-age population, for which we had derived additional information on death dates and national pension episodes from the Social Insurance Institution of Finland and earnings-related pension episodes from the Finnish Centre for Pensions, linked to the FOLK data using personal identification numbers.

The sample cohorts were derived from five cross sections, that is, the last days of the years 2004 (sample used for calculations of the periods 2005, 2006 and 2007), 2007 (periods 2008, 2009 and 2010), 2010 (periods 2011, 2012 and 2013), 2013 (periods 2014, 2015 and 2016) and 2016 (periods 2017 and 2018). Data selection and calculations were performed separately for each study year between 2005 and 2018. We included individuals who turned 45–62 years during the study year and had lived in Finland at the end of each of the three preceding years.

In Finland, individuals may be granted a national and/or earnings-related full disability pension if their work ability is reduced by at least 60%. In the earnings-related scheme, the disability pension may be granted as partial, that is, 50% of the full pension, with work ability reduced by 40%–60%.[15] A person can apply for a preliminary decision on a partial disability pension while they are still performing their normal work duties.[27]

Both full and partial disability pensions may be granted as permanent or for a fixed period. For this study, we considered only permanent pensions as we were interested in the remaining working careers of individuals according to their long-term disability pension status. We used information on whether a study person received a permanent disability pension at the turn of a study year to form the categories (1) full disability pension, (2) partial disability pension and (3) no disability pension (everyone who did not receive a disability pension, eg, employed, unemployed, early retired or otherwise outside the labour force at the turn of the study year). Permanent disability pensioners are retirees who are unlikely to transition back to a non-retired state. In the cause-specific analyses, we examined musculoskeletal diseases

(International Classification of Diseases (ICD), 9th Revision, codes 710–739 and ICD, 10th Revision, codes M00–M99), mental disorders (290–319 and F00–F99) and all other causes.

Working life expectancy

We used the Sullivan[28] method to calculate FTE-WLE in single-year periods between 2005 and 2018. The method combines standard period life tables with information on work participation. It reflects the outcome of a hypothetical cohort, providing information on the average remaining time spent in work at a specified age, if the age-specific mortality and work participation rates remained the same as they were in the calendar period in question. We derived mortality and full-time equivalent (FTE) work participation rates between age x and x+1 based on calculations on individuals who turned 45–62 during the examined calendar year. The FTE-WLE was thereby calculated for age 45, with truncation at age 63.

Mortality rates

We calculated annual mortality rates by gender and 1-year age group, separately for those receiving a full disability and no disability pension. For the cause-specific calculations with smaller numbers, we used the age groups 45–49, 50–54, 55–59 and 60–62. For disability pensioners due to musculoskeletal diseases who had few deaths below age 60, we further combined the first three groups.

Age-specific mortality rates could not be calculated for partial disability pensioners due to a small number of deaths. The crude mortality rates among partial disability pensioners (5.9 and 8.5 deaths among men and 2.4 and 2.7 among women per 1000 person years in 2005 and 2018, respectively) were much lower than among full disability pensioners (27.5 and 23.7 among men and 16.3 and 17.4 among women), somewhat higher than among those with no disability pension (5.0 and 3.5 among men and 1.9 and 1.5 among women), and relatively close to those among the total study population (7.7 and 5.1 among men and 3.3 and 2.6 among women). We therefore used the age-specific mortality rates of the total male and female study populations for partial disability pensioners.

Work participation

Partial work participation has often been addressed based on working hours, which were recently used also to adjust employment to an FTE rate when calculating WLE.[29] As our data did not include information on working hours, we introduce a novel measure to assess the magnitude of work contribution during employment based on earned income. More precisely, we estimated FTE proportion of time spent in work by combining annual information on the number of days employed and the total taxable work income, including wage and entrepreneurial income.

We first calculated work income per employed day among the study subjects in relation to the corresponding median value in the overall population within strata based on combinations of categories of occupation, gender, age group and employment sector. For this, we used age strata 45–54 and 55–62 years. Information on occupation and employment sector was derived from the end of the study year, and, if this was not available, from the end of the previous year. The employment sector was divided into private and public, and in unknown cases of sector it was defined as private. For occupation, we used a classification by Statistics Finland, based on the International Standard Classification of Occupations. The occupational titles included up to five digits and could be determined for most of those with any annual employment (95.4% in 2005 and 95.2% in 2018). For individuals with missing occupation, we used educational level instead of occupation to form the strata. For strata with less than 30 individuals (including 1.3% of the population), we combined the employment sectors, genders and age groups, and finally, used occupational titles at a less specific digit-level until the stratum size reached at least 30. We considered a study person to have full work contribution receiving the value 1 if their income per employed day was over 60% of the population group's median value. If less, we used that proportion as the value for work contribution. We then calculated FTE annual proportion of time spent in work as {work contribution}×{number of days employed}/365. For a person who was employed with a 50% work contribution for 6 months, FTE annual proportion of time spent in work would thus be calculated as 0.5×180/365=0.25. Those with no work contribution received the value 0.

The threshold of 0.6 for partial work contribution was chosen considering that the contribution of disability pensioners is generally partial, with partial pensioners being allowed to earn up to 60% and full pensioners up to 40% of their established past mean earnings without losing the pension. Earnings among disability pensioners may also exceed these limits, as it has been possible to put the pension on hold when attempting to return to work and, since 2010, to earn up to a specified absolute limit that corresponds with the size of the minimum pension.[15] Our measure appears to realistically reflect the level of work participation among the employed full and partial disability pensioners, for whom the mean FTE proportions of time spent in work were 0.22 and 0.52 in year 2005 and 0.24 and 0.54 in year 2018, respectively. For those with no disability pension, the corresponding proportion was 0.86 in 2005 and 0.88 in 2018.

We calculated annual mean FTE proportion of time spent in work by gender and 1-year age group. The calculations were performed for the total study population and separately for those receiving a full, partial and no disability pension. When distributing this time into work in particular occupational classes and employment sectors, the following statuses were examined: (1) upper non-manual, private; (2) lower non-manual, private; (3) manual, private; (4) upper non-manual, public; (5) lower non-manual, public; and (6) manual, public. Occupational class was based on a classification by Statistics Finland. Among disability pensioners, these calculations by work participation status as well as the cause-specific

calculations were performed in the age groups 45–49, 50–54, 55–59 and 60–62 due to smaller numbers.

Period life tables

The mortality rates and the values of mean FTE proportion of time spent in work were inserted to period life tables to calculate gender-specific FTE-WLE for the total study population and by all-cause and cause-specific disability pension status. We calculated 95% CIs for the FTE-WLE by taking the variance in both mortality rates and work participation into account.[30]

To examine how FTE-WLE was distributed to work in the six statuses based on occupational class and employment sector, we included these as separate work participation statuses in the life tables, the calculations only including wage employment. The distribution of FTE-WLE to time working in the six statuses was calculated separately among men and women by disability pension status. For examining the share of the overall FTE-WLE that was spent receiving a disability pension, work while receiving a partial, full or no disability pension were included as separate work participation statuses in the life tables of the total male and female study populations.

Patient and public involvement

Patients or the public were not involved in the design, conduct, reporting or dissemination plans of our research.

RESULTS

Between 2005 and 2018, the share of full disability pensioners decreased from 12.1% to 8.1% among men and from 9.9% to 6.7% among women (table 1). The share of partial disability pensioners increased from 0.6% to 0.8% among men and from 1.0% to 1.5% among women.

In the total male and female study populations, the FTE-WLE at age 45, truncated at age 63, increased from 10.56 and 11.22 years in 2005 to 11.98 and 12.92 years in 2018, respectively (table 2). The FTE-WLE increased over the study period in all groups by disability pension status. Among men irrespective of disability pension status and among female full disability pensioners, however, the FTE-WLE temporarily decreased in the years following the financial crisis in 2008. Between 2005 and 2018, the proportional increase in the FTE-WLE was larger among full and partial disability pensioners than among those with no disability pension, being as large as 60% among female full disability pensioners. In 2018, the FTE-WLE was, nevertheless, still relatively low among both male and female full disability pensioners, that is, 0.29 and 0.30 years, respectively. Among partial disability pensioners, the increase in FTE-WLE between 2005 and 2018 was notable even in absolute terms, being in men larger (1.45 vs 1.06 years) and in women similar (1.40 vs 1.48 years) compared with those with no disability pension. By 2018, the FTE-WLE had in men reached 6.42 and 13.07 years and in women 7.80 and 13.91 years among partial disability pensioners and those with no disability pension, respectively.

In both the first and last study year among both men and women, the most prevalent diagnostic cause was consistently mental disorders among full disability pensioners and musculoskeletal diseases among partial disability pensioners (table 3). Among full disability pensioners, the FTE-WLE was higher in musculoskeletal diseases and lower in mental disorders than in other causes. However, the relative increase in FTE-WLE between 2005 and 2018 was largest in mental disorders. Among partial disability pensioners, the FTE-WLE was considerable in both musculoskeletal diseases and mental disorders, and even higher in other causes. The increase over time in the FTE-WLE was largest among those with other causes and relatively small among women with mental disorders.

Among both genders and both in 2005 and 2018, those with no disability pension had a larger share of their FTE-WLE spent in upper non-manual work in the private sector than disability pensioners (table 4). Both full and partial disability pensioners had a larger share spent in manual work in the public sector than those with no disability pension. However, this share decreased over the study period in all groups, but particularly among full disability pensioners. Full disability pensioners had a disproportionally large and increasing share spent in private sector manual work. Among female full disability pensioners, the share of private sector work altogether increased. Both male and female partial disability pensioners further had a disproportionally large and increasing share spent in lower non-manual work in the public sector.

The share of the total FTE-WLE that was spent receiving a full disability pension was 0.03 and 0.02 years among men and women, respectively (table 5). These figures were the same in 2005 and 2018; even though FTE-WLE increased among full disability pensioners, this effect was cancelled out by the decreasing share of this group in the population. The share of the total FTE-WLE that was spent receiving a partial disability pension increased over the study period, being in 2018 0.5 years among men and 0.12 years among women.

DISCUSSION

Using extensive Finnish register data, we examined the expected length of working lives by introducing a novel measure of FTE-WLE. This allowed us to account not only for the time spent employed but also for the magnitude of work contribution during this employment. We found that between 2005 and 2018, the relative increase in FTE-WLE at age 45, examined until age 63, was larger among permanent full and partial disability pensioners than among those without a disability pension. Furthermore, among partial disability pensioners even the absolute increase was in men larger and in women similar compared with those with no disability pension.

In 2018, the FTE-WLE of full disability pensioners was among both genders around 3.5 months overall,

Table 1 Proportion (%) of men and women receiving and without receiving a permanent full or partial disability pension at the turn of the years 2005–2018

Year	Full disability pension (%)	Partial disability pension (%)	No disability pension (%)	Total (%)	N
Men					
2005	12.1	0.6	87.3	100.0	483 567
2006	12.1	0.6	87.3	100.0	487 892
2007	12.1	0.7	87.3	100.0	491 241
2008	11.8	0.7	87.5	100.0	489 914
2009	11.7	0.8	87.6	100.0	485 843
2010	10.7	0.7	88.7	100.0	480 959
2011	11.0	0.8	88.3	100.0	476 959
2012	10.6	0.8	88.6	100.0	472 556
2013	10.0	0.8	89.1	100.0	468 525
2014	9.6	0.8	89.5	100.0	464 791
2015	9.2	0.9	90.0	100.0	459 493
2016	8.8	0.9	90.3	100.0	454 567
2017	8.4	0.8	90.7	100.0	449 230
2018	8.1	0.8	91.1	100.0	442 960
Women					
2005	9.9	1.0	89.1	100.0	481 832
2006	9.8	1.1	89.1	100.0	486 676
2007	9.8	1.1	89.0	100.0	490 664
2008	9.7	1.2	89.1	100.0	490 749
2009	9.5	1.3	89.1	100.0	487 014
2010	8.9	1.2	89.9	100.0	482 471
2011	8.9	1.5	89.6	100.0	477 689
2012	8.6	1.5	89.9	100.0	473 481
2013	8.2	1.6	90.3	100.0	469 553
2014	7.9	1.6	90.5	100.0	464 290
2015	7.5	1.6	90.9	100.0	459 126
2016	7.2	1.6	91.2	100.0	454 262
2017	6.9	1.6	91.5	100.0	448 581
2018	6.7	1.5	91.8	100.0	441 204

being highest when the pension was due to musculoskeletal diseases, that is, around 6 months. Full disability pensioners spent an excess amount of time in manual work, increasingly in the private sector. At the population level, the share of the FTE-WLE that was spent receiving a full disability pension was small.

By 2018, the FTE-WLE of partial disability pensioners had increased to around 6.5 years among men and almost 8 years among women, being around half of the corresponding expectancies of those without a disability pension. The FTE-WLE of partial disability pensioners was considerable in both large disease groups, that is, musculoskeletal diseases and mental disorders, and even higher in other diseases. Partial disability pensioners spent an excess amount of time in lower non-manual and manual work in the public sector, increasingly in the former occupational class. The share of the overall FTE-WLE at the population level that was spent receiving a partial disability pension increased over the study period, being in 2018 around 0.5 and 1.5 months among men and women, respectively.

Overall, the larger relative increases in the length of the expected working career among disability pensioners than among the more general population give a positive message of the opportunities of people with permanently reduced work ability to partially take part in the labour market. Furthermore, the recession in the late 2000s did not appear to result in a disproportionately large reduction in the FTE-WLE of disability pensioners. This effect was restricted to men overall and to female

Table 2 Full-time equivalent working life expectancy (years, with 95% CI for the first and last years) at age 45, truncated at age 63, stratified analyses for men and women receiving and without receiving a permanent full or partial disability pension in the years 2005–2018

Year	Full disability pension (years)	Partial disability pension (years)	No disability pension (years)	All (years)
Men				
2005	0.24	4.97	12.01	10.56
	(0.22–0.25)	(4.71–5.22)	(11.98–12.04)	(10.53–10.59)
2006	0.26	5.54	12.26	10.79
2007	0.29	6.21	12.52	11.04
2008	0.23	6.18	12.70	11.22
2009	0.21	6.18	12.40	10.96
2010	0.20	6.07	12.26	10.98
2011	0.24	6.38	12.58	11.21
2012	0.25	6.30	12.68	11.34
2013	0.25	6.37	12.60	11.31
2014	0.26	6.19	12.50	11.28
2015	0.26	6.21	12.49	11.31
2016	0.27	6.27	12.58	11.44
2017	0.28	6.29	12.81	11.71
2018	0.29	6.42	13.07	11.98
	(0.27–0.31)	(6.05–6.78)	(13.04–13.09)	(11.95–12.01)
Change 2005–2018				
Years	0.05	1.45	1.06	1.42
%	21.9	29.2	8.8	13.5
Women				
2005	0.19	6.40	12.43	11.22
	(0.17–0.20)	(6.18–6.61)	(12.41–12.46)	(11.19–11.24)
2006	0.20	6.64	12.30	11.47
2007	0.22	7.02	12.95	11.72
2008	0.18	7.34	13.20	11.94
2009	0.18	7.47	13.28	12.02
2010	0.16	7.32	13.27	12.11
2011	0.21	7.56	13.53	12.30
2012	0.22	7.72	13.64	12.43
2013	0.23	7.58	13.62	12.45
2014	0.26	7.71	13.56	12.44
2015	0.24	7.66	13.54	12.47
2016	0.26	7.60	13.56	12.52
2017	0.28	7.52	13.70	12.69
2018	0.30	7.80	13.91	12.92
	(0.27–0.32)	(7.56–8.04)	(13.88–13.93)	(12.89–12.95)
Change 2005–2018				
Years	0.11	1.40	1.48	1.70
%	60.1	22.0	11.9	15.2

Table 3 Distribution (% and n) and FTE-WLE at age 45, truncated at age 63, stratified analyses for men and women receiving a permanent full or partial disability pension by disease group in years 2005 and 2018

	2005			2018		
Year	%	n	FTE-WLE (years)	%	n	FTE-WLE (years)
Men						
Full disability pension						
Musculoskeletal	21.1	12 290	0.46	15.8	5662	0.47
Mental	40.1	23 369	0.12	49.0	17 511	0.21
Other	38.9	22 694	0.31	35.2	12 565	0.37
Total	100.0	58 353	0.24	100.0	35 738	0.29
Partial disability pension						
Musculoskeletal	50.1	1446	4.95	54.0	1985	5.88
Mental	11.1	321	4.72	9.9	364	6.14
Other	38.8	1119	5.07	36.2	1330	6.88
Total	100.0	2886	4.97	100.0	3679	6.42
Women						
Full disability pension						
Musculoskeletal	25.1	11 943	0.38	16.7	4932	0.54
Mental	47.0	22 430	0.12	54.7	16 128	0.22
Other	27.9	13 312	0.24	28.5	8404	0.38
Total	100.0	47 685	0.19	100.0	29 464	0.30
Partial disability pension						
Musculoskeletal	55.1	2558	6.18	53.2	3604	7.47
Mental	17.5	814	6.54	16.1	1091	6.92
Other	27.3	1269	6.60	30.7	2084	8.48
Total	100.0	4641	6.40	100.0	6779	7.80

FTE-WLE, full-time equivalent working life expectancy.

full disability pensioners, that is, groups that are excessively working in manual occupations and in the private sector. These segments of the labour market are known to have been particularly affected by the recession influencing outcomes of labour market participation and work disability in Finland.[31 32]

Even towards the end of the study period, however, the length of the expected working career was relatively modest among full disability pensioners, considering that they could earn up to 40% of their past earnings. Furthermore, previous findings from Finland indicate that while 5% of full disability pensioners were working in 2008, an additional 21% would have wanted to work, mainly occasionally.[33] The positive trend in the length of working careers among full disability pensioners may suggest that the opportunities to participate in the labour market have been improving for this group. In line with our results, a previous study found that full disability pensioners due to musculoskeletal diseases had the highest and those due to mental disorders the lowest level of work participation.[34] Our study nevertheless further indicates that the relative increase in the length of working careers has been largest in mental disorders.

The expected working career of partial disability pensioners can be regarded long, considering that they were not allowed to earn more than 60% of their past earnings. In Finland, people typically transition to partial disability retirement directly from working life. Most of those who continue to work remain in the same occupation and with the same employer.[33] The people concerned are thus likely to have a good labour market attachment. Our findings suggest that combining partial work participation with receiving partial disability benefits is likely to add an increasing number of years to one's working career, given that this is an option to full work exit rather than to full-time work. Moreover, the working careers of partial disability pensioners are expected to be long in all large disease groups. Based on previous studies, within the group including other causes than musculoskeletal diseases and mental disorders, those with cardiovascular and nervous diseases have particularly high levels of work participation.[33 34] Despite the extensive work participation of partial disability pensioners at the individual level, we found that the contribution of their work to the aggregate length of working careers was relatively modest due to the small share of partial disability pensioners in the population.

Table 4 FTE-WLE at age 45, truncated at age 63, distributed to time working in particular occupational classes and employment sectors (%), stratified analyses for men and women with or without receiving a permanent full or partial disability pension in years 2005 and 2018, calculations restricted to those in wage employment with an identified occupational class

	Full disability pension		Partial disability pension		No disability pension	
Year	2005 (%)	2018 (%)	2005 (%)	2018 (%)	2005 (%)	2018 (%)
Men						
Upper non-manual, private	8.7	9.1	5.2	7.2	15.5	19.3
Lower non-manual, private	16.4	18.5	16.4	13.0	15.6	16.7
Manual, private	50.3	57.7	36.2	41.6	37.3	37.8
Upper non-manual, public	5.8	3.7	8.7	8.3	12.6	11.8
Lower non-manual, public	4.3	3.9	10.2	13.1	7.7	7.5
Manual, public	14.5	7.1	23.4	16.9	11.3	7.0
Total	100.0	100.0	100.0	100.0	100.0	100.0
FTE-WLE in wage employment (years)	0.15	0.19	3.87	4.86	9.84	10.57
n	58 353	35 738	2886	3679	422 328	403 543
Women						
Upper non-manual, private	3.5	8.6	1.6	2.7	6.0	9.3
Lower non-manual, private	26.5	32.8	17.6	18.2	24.9	24.8
Manual, private	21.5	28.1	13.7	10.3	13.1	10.3
Upper non-manual, public	7.9	8.0	9.1	10.0	15.2	18.3
Lower non-manual, public	23.3	15.4	41.0	45.5	30.6	30.8
Manual, public	17.4	7.1	17.0	13.3	10.2	6.6
Total	100.0	100.0	100.0	100.0	100.0	100.0
FTE-WLE in wage employment (years)	0.13	0.21	5.78	7.22	11.29	12.52
n	47 685	29 464	4641	6779	429 506	404 961

FTE-WLE, full-time equivalent working life expectancy.

In line with our findings, previous ones indicate that partial disability retirement has been used more in the public than in the private sector[35] and also the likelihood of working while receiving the pension is higher in the former.[33] Although we examined the occupational class and employment sector of work performed while receiving a disability pension, these work circumstances are likely to be strongly correlated with those occurring before retirement. There may be potential to increase the length of individual working careers if partial disability retirement instead of full retirement would be made more feasible in segments of the labour market where it has so far been used less, such as in private sector occupations. This could be achieved, for example, by companies providing better opportunities for partial work arrangements and other work modifications. In the private

Table 5 Share of the total FTE-WLE at age 45, truncated at age 63, that was spent with or without receiving a permanent full or partial disability pension among men and women in the years 2005 and 2018

	Total FTE-WLE that was spent receiving:								
	Full disability pension		Partial disability pension		No disability pension		Total		
	Years	%	Years	%	Years	%	Years	%	N
Men									
2005	0.03	0.3	0.03	0.3	10.50	99.5	10.56	100.0	483 567
2018	0.03	0.2	0.05	0.4	11.90	99.3	11.98	100.0	442 960
Women									
2005	0.02	0.1	0.06	0.5	11.14	99.3	11.22	100.0	481 832
2018	0.02	0.1	0.12	0.9	12.78	98.9	12.92	100.0	441 204

FTE-WLE, full-time equivalent working life expectancy.

sector, variation between companies has been found to be much larger for the risk of partial compared with full disability retirement, suggesting that companies may have an important role in promoting work participation of those with partial work disability.[36] All people with partial work disability may not, however, be able to continue in their previous occupations, which may prevent them from applying for a partial disability pension or hinder employment among those already receiving it. This highlights the importance of also promoting employment opportunities and retraining of people with partial work disability more generally in the labour market.

The strengths of this study include the use of large population-based register data with detailed information on work participation and pension receipt over a long study period. The register data do not have problems of non-response or loss to follow-up, ensuring national representativeness of the study population. Our novel measure of FTE-WLE combined information on employment days and work income in relation to the median value of one's peer population group. The approach has a particular advantage when investigating work participation of disability pensioners, who due to pension regulations are allowed to have only partial work participation. Compared with measures that are solely based on information on being employed, a measure considering FTE work participation can more accurately address the differences in actual work contribution between those with and without a disability pension.

The use of the FTE-WLE measure, nevertheless, also has limitations. We may have misclassified work participation in cases where work income was not closely tied to the time spent at work. Such misclassification is, however, unlikely to have largely influenced the conclusions of our study that focused on large groups at the population level. More bias might be expected if the focus were on the comparison of work participation between, for example, specific occupations or industries.

Using our FTE-WLE measure, we could not distinguish whether partial work contribution was attributable to part-time work in terms of reduced regular working hours or non-participation in work for a certain period of time despite having an ongoing employment period (eg, irregular or seasonal work, zero-hour contracts or not drawing income as an entrepreneur). During the months that the men and women of the total study population were employed, 15.1% and 12.3% in year 2005 and 14.4% and 12.2% in year 2018, respectively, were defined to have partial work contribution. Data from Statistics Finland,[37] based on a labour force survey, indicate that among men and women aged 45–64, the proportion of those working part-time, as perceived so by the respondents, was 8.6% and 14.5% in 2005 and 8.1% and 14.9% in 2018, respectively. The opposite direction of the gender difference compared with our data may be a result of men more often having zero-income employment periods, which may contribute to the annual work participation being partial using our measure but may in surveys be reported as non-employment instead of part-time work. Our measure may also underestimate the work contribution more for men than for women, if for example, men more often have disproportionately low income compared with their peers.

The used Sullivan method was suitable for our analyses focusing on changes in WLE by calendar year with annual-level information on work participation available. It should, however, be noted that the findings stratified by disability pension status reflect the remaining working career of a hypothetical 45-year-old cohort who will experience the same age-specific work participation and mortality rates that occurred for this group in the period in question and whose disability pension status at each year of age will remain the same until turning 63. Such a hypothetical working career would not have been realistic for temporary disability pensioners. The analyses were therefore restricted to permanent disability pensioners, the conclusions only applying to this group. Furthermore, the experiences of real birth cohorts may differ from the hypothetical one. Among both full and partial disability pensioners in Finland, the likelihood of work participation has been found to be larger among those who were granted the pension more recently.[34] It is possible that work participation jointly depends on age and time since being granted the pension in a complex way. Furthermore, a previous study shows that over a third of permanent partial disability pensioners transitioned into full disability retirement during a 4-year follow-up.[38] Future studies examining the actual labour market trajectories of people who are granted a disability pension at different ages would provide additional important information on the length of their working careers.

CONCLUSIONS

In Finland, the FTE-WLE, that is, the expected length of working careers accounting for the magnitude of actual work contribution, has at least in relative terms increased faster among disability pensioners than among the general population. Still, the expected length of working careers remained modest among full disability pensioners. While the expected working careers were considerably long among partial disability pensioners, this had a relatively minor influence on the average expected length of the working career in the total population, as partial disability pensioners are still a relatively small group. All in all, combining work and disability pension receipt may have had important implications for prolonging individual working careers.

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