Tove Midtsundstad, Ingrid Sivesind Mehlum and
Anne Inga Hilsen

The impact of the working environment on work retention of older workers

National report – Norway

Fafo

Tove Midtsundstad, Ingrid Sivesind Mehlum and
Anne Inga Hilsen

The impact of the working environment on work retention of older workers

National report – Norway

Fafo-paper 2017:09

ISSN 0804-5135

Contents

Preface

In Autumn 2015, the Working Environment Committee ("Arbejdsmiljøudvalget") under the Nordic Council of Ministers granted funds for the current collaborative Nordic project: "The impact of the working environment on work retention of older workers" ("Arbejdsmiljøets betydning for fastholdelse af ældre arbejdstagere").[1]

The aim of this project is to prepare a comparative overview of the current knowledge regarding determinants of work participation in the Nordic countries, with particular emphasis on the impact of the working environment, and to disseminate this gathered knowledge in the Nordic countries.

The Working Environment Committee under the Nordic Council of Ministers has requested a critical review of the current knowledge. We have aimed to meet this request, but it needs to be emphasised that the standardised methods for critical reviews of scientific literature are not applicable for the comprehensive grey literature that contains a substantial part of the total knowledge base in this field in the Nordic countries. Consequently, we have not rated the degree of scientific evidence. Instead, we have considered the type and size of the existing studies, and conclusions are considered more definitive if supported by several studies.

The Nordic project group consisted of the following participants from four Nordic countries. Denmark: Chief consultant Otto Melchior Poulsen, M.Sc., Dr.Vet.Sci. (project leader), the National Research Centre for the Working Environment. Iceland: Medical director Kristinn Tómasson, Dr.Med., and Johann Fridrik Fridriksson, Administration for Occcupational Health & Safety. Norway: Associate professor at University College Southeast Norway, PhD and Senior Scientist Anne Inga Hilsen, PhD and Senior Scientist Tove Midtsundstad, Fafo Institute for Labour and Social Research. Department head of Occupational Medicine Ingrid Sivesind Mehlum, MD PhD, Department of Occupational Medicine and Epidemiology, STAMI. Sweden: Professor and senior consultant, Maria Albin, MD, Dr.Med.Sci., Unit of Occupational Medicine, Institute of Environmental Medicine, Karolinska Institute, Stockholm. Assistant professor Kerstin Nilsson, PhD, Dr.Med.Sci., Department of Occupational and Environmental Medicine, Lund University, Sweden and Department of Work Science, Business Economics and Environmental Phycology, Swedish University of Agricultural Sciences.

[1] The Nordic project was originally planned as a collaboration between Denmark, Finland, Norway and Sweden—each had participated in and prepared national reports for the JPI UEP Fast Track project. However, due to profound financial downsizing and large organisational changes at the Finnish Institute of Occupational Health (FIOH), the Finnish participants in the project declared themselves to be unable to carry out the project. Researchers from Iceland subsequently agreed to participate.

The Nordic report "Report on the impact of the working environment on work retention of older workers" is based on national reports from Denmark, Norway, Sweden and Iceland.

The Norwegian report is a revised version of the national report originally prepared for the JPI UEP project (Midtsundstad & Hilsen 2015).[2] In this revised version of the report, more papers are included, with a particular emphasis on elucidating the impact of the working environment. For the revision of the national reports, additional scientific and grey literature was systematically searched in databases on national reports, and a thorough web search was performed. Furthermore, relevant national research institutions were contacted and asked to provide additional scientific material. National workshops were also arranged in each participating country to exchange knowledge and discuss the practical implications of the current knowledge with labour market parties and other stakeholders. The national workshops in Norway were held in November and December 2016.

Oslo, May 2017

Tove Midtsundstad Ingrid Sivesind Mehlum Anne Inga Hilsen

[2] Increased work participation among older workers was on the strategic research agenda of the Joint Program Initiative "More Years, Better Lives" (JPI MYBL). In 2014, as part of the JPI MYBL Working Group 3 ("Work & Productivity") and during a fast-track (JPI UEP: "Understanding Employment Participation") activity, it was decided that we would create a comprehensive overview of research and current knowledge regarding the main determinants of work participation among older workers. This overview would also target the individual, institutional and societal reasons for early retirement in Europe, and identify major knowledge gaps highlighting needs for future cross-country and interdisciplinary research. The report from the JPI UEP project was published in February 2015 (Hasselhorn & Apt 2015). The participating countries in JPI UEP (Austria, Belgium, Canada, Denmark, Finland, Germany, Netherlands, Norway, Poland, Sweden and UK) prepared national reports on current knowledge covering both scientific literature and grey literature, and major findings across countries were summarised in the joint JPI UEP report.

Executive summary from the Nordic report[3]

The working environment is rarely the sole cause of early retirement. In most cases, the working environment interacts with a multitude of other factors at the micro (individual health, economy etc.), meso (workplace, family and close social network) and macro (the social security system, labour market legislation and regulation) levels in the decision to retire or continue working. This is clearly illustrated in the theoretical framework proposed by Nilsson (2016) (figure 1). Two major perspectives exist on labour market retention of older workers:

The 'vulnerable' older worker perspective focuses on the large group of older workers who, with limited resources due to attrition, health problems and lack of competences, have specific needs for protection and work adaptation if they are to sustainably extend their work life.

The resourceful older worker perspective focuses on the group of older workers who have excellent health and many competences. The workplace considers them a valuable and productive resource, particularly if their high experience can be utilised. In order to extend the work life of this group of workers, the workplace needs to focus on improving their job satisfaction.

Across the four Nordic countries—Denmark, Iceland, Norway and Sweden—significant differences in retirement age exist, and these differences may, to some extent, be attributable to historical as well as current differences in exit culture, pension systems, labour market regulations and policies. One major difference is that Denmark has had an early exit culture, in which early retirement has been used to reduce the labour force in periods of high unemployment. Consequently, early retirement is widely expected and socially accepted in Denmark. In contrast, the three other countries have a late exit culture in which unemployment has been combated in all age groups. Job security is high in the other countries, but low in Denmark—hence, unemployment rates of older workers are high in Denmark. Exit via disability pension is rare in Denmark and Iceland, but frequent in Norway and Sweden; in Denmark and Iceland, therefore, older workers with health problems may not have the option of a disability pension and may instead be forced to take voluntary early retirement. With recent decreased access to disability pensions, however, voluntary early retirement has also increased in Sweden.

The impact of the working environment on retirement

Estimation of the fraction of retirement attributable to working environment has only been made for transition to disability pension and sickness absence, but not for transition to voluntary early retirement. The estimates are highly health-related, and

[3] This summary is written by Otto Melchior Poulsen.

knowledge is lacking on the relative impact of other work-related predictors of voluntary early retirement (e.g. job satisfaction and motivation). In Denmark, a large fraction of disability retirement is attributable to high physical work demands (21% for men and 34% for women), and two psychosocial work factors (decision authority and variation) could each explain 10-15 % of the risk of disability retirement. Similar results were obtained in Norway, where five psychosocial and eight mechanical (ergonomic) risk factors at work could explain 45 % of disability retirement. Finally, 30 % of long-term sickness absence is attributable to the psychosocial working environment in Denmark, and between 31 % to 54 % of the social gradient in long-term sickness absence is attributable to the working environment in Norway.

Working environment predictors of retirement

The association between labour market exit and several working environment factors has been studied in detail in all Nordic countries, with comparable results. We therefore suggest that evidence from one country may be considered valid in the other Nordic countries as well.

We conclude that the following working environment predictors of early labour market exit are well-documented: occupational accidents, whole-body vibration, physical work demands (e.g. strenuous work, heavy lifting and prolonged standing), quantitative work demands (e.g. work speed and time pressure), job control/autonomy/influence at work, leadership support, conflicts at work and bullying/harassment, job satisfaction and age discrimination. In addition, less strong but still moderate documentation exists for possibility for competence development. Finally, limited Nordic research has been made on the impact of chemical work factors, noise, shift work, colleague/fellowship support, organisational commitment, and fear of reorganisation on early labour market exit.

In all Nordic countries, there is a strong social class gradient in early exit to retirement, and social class, health and working environment are closely linked. The effects of recently more-restrictive welfare systems (e.g. regarding the accessibility of disability pensions), with respect to health inequalities between men and women and between socioeconomic groups, have not been studied in detail.

Comparison of the working environment of older workers in the Nordic countries

National surveys on working environment and health are carried out in Denmark, Iceland, Norway and Sweden. Comparison of data from the four countries reveals similarities, but also distinct differences.

Older, blue-collar Danish women report far more exposure than men to work with monotonous movements, whereas blue-collar women and men in Norway and Sweden report approximately the same exposure to monotonous movements. Moreover, in Norway and Sweden, older blue-collar women tend to report less exposure than older blue-collar men to strenuous physical work (particularly in Sweden), heavy lifting (particularly in Norway) and work with hands lifted above the shoulder, whereas the opposite is the case in Denmark. In general, the physical working environment of older Dan-

ish blue-collar women appears to be more demanding than that of older Norwegian and Swedish blue-collar women.

Older Danish and Swedish workers report approximately the same high exposure to work that requires an awkward physical position, and/or one's hands to be lifted above the shoulder. Exposure in Denmark and Sweden to these two physical factors in the work environment far exceeds that of older Norwegian workers. Older Danish and Swedish men are also more exposed to vibrations and loud noise in the work environment than Norwegian older men.

In Denmark, older workers report far more occupational accidents than older workers in Norway and Iceland. In Sweden, occupational accidents and injuries are generally higher among the older workers than for other age groups. However, there is also a difference in occupational injuries between different sectors. This is probably due to the fact that retirement age differs between sectors. The proportion of occupational injuries with a fatal outcome is highest among farmers and forestry workers.

Bullying/harassment is experienced by a far larger fraction of older workers in Denmark than Sweden (moderate), and Norway (very low). Older Norwegian workers experience more support and help from nearest leader than older workers in Sweden and Denmark. On the other hand, older Swedish and Danish workers more often experience control over how work is done than older Norwegian workers.

Altogether, the physical and psychosocial working environment of older Norwegian workers generally appears to be better than that of older workers in Sweden and Denmark.

Effects of workplace interventions to increase retention of older workers

In Denmark and Norway, less than half of all workplaces take practical actions to promote retention of older workers. Most often, workplace policies and activities aim to provide possibilities for stepping down and gradually exiting the labour market. The activities consist mainly of flexible work-time, work-time reduction, more days on leave/holiday, and bonuses. More rarely, the activities include reduced workload, improved ergonomics, or competence development. The effects of companies' interventions to increase retention of older workers have only been systematically evaluated in Norway. In general, these studies find that interventions offered by Norwegian companies have limited effect on early retirement and sickness-related absences. However, they find that those interventions targeted at workers with health problems and reduced working capacity reduce the probability of disability pensioning, and that offering extra days off and bonuses postpones voluntary early retirement. In Sweden, most workplaces have zero policies for retaining older employees. Only 5 % of managers in Swedish municipal organisations reported that there organisations had measures in place to retain older employees—these measures were described as health and fitness activities, intergenerational skills transfer projects, specific mentoring/tutoring projects and reduced working hours for older employees.

Failure to demonstrate general effects does not rule out that positive effects may occur for some groups of workers, in some companies and in some industries. In all Nor-

dic countries, several case stories exist in which workplaces have retained older workers successfully due to specific interventions.

Even though a good working environment may be of paramount importance for the retention of older workers, there is a dearth of information regarding the effects of interventions to improve work environments on retirement behaviour. Current knowledge indicates that there is great potential in developing workplace interventions which combine the prevention of working environment risk factors (e.g. risk factors for accidents, strenuous work/high physical work demands, insufficient recovery between work shifts, quantitative work demands, conflicts at work and bullying/harassment, and age discrimination) with increments of job satisfaction through increased control/influence, possibilities for development and recognition from management.

Research needs

The project has identified research needs linked to the following themes:

Achievement of a sustainable work life balance for all. More research is needed on effective workplace policies and interventions to increase the sustainable retention of older workers. In particular, knowledge is needed regarding older, lower-educated female workers who hold jobs with high physical demands (e.g. health care, service and cleaning). In addition, physically demanding work is also high among immigrant workers—more so than might be expected given their level of education. Finally, the proportion of older workers with debilitating chronic diseases is expected to increase in the future; as such, research is needed on work adaptations that can accommodate these older workers. There is also a need for new workplace interventions that combine the prevention of work environment risk factors and age discrimination with increasing employee job satisfaction. In addition, there is an urgent need for more 'from research to practice' knowledge, targeting how to disseminate information about efficient interventions to the workplace.

Long-term consequences of an extended work life. More knowledge is needed about the potential negative consequences of longer and cumulative exposure to occupational hazards, particularly for low-educated older workers with lengthy exposure to physically demanding work. Hence, evaluation of workplace policies and interventions targeting older workers should not only focus on work retention (i.e. expected and actual retirement age) but also on workers' health and well-being both during and after an extended work life. One significant shortcoming in our current knowledge-base is the lack of information about the effects of transitioning between different social benefit schemes (e.g. unemployment, sickness absence, social security aids and disability schemes). In theory, pension system regulations that restrict access to early retirement may not necessarily increase the proportion of older people who are gainfully employed. Increased transfer between different social benefit schemes may instead occur, particularly for older people with low labour market mobility due to lack of education and/or chronic health conditions.

The dynamics of the retirement process. So far, most studies have considered retirement as a sole, singular event, not taking into account that the decision to retire—and

the retirement process itself—may extend over several years. A longer (life-course) perspective is needed on work-related ability and attitudes and how these change over time, as well as how older workers gradually adapt to their future lives as pensioners. More knowledge is needed regarding how health, well-being and quality of life may change during the retirement process, in addition to the possible positive effects of combining voluntary part-time employment with partial retirement.

The workplace perspective. Less than half of Danish and Norwegian workplaces take practical actions to promote the retention of older workers, and while some information exists about workplace motives and perspectives in Norway, more knowledge is urgently needed in all Nordic countries—particularly in Denmark, Iceland and Sweden, where knowledge on this topic is seriously lacking. The following questions need to be explored: Why do some workplaces—but not all—decide to recruit and/or retain older workers? Which types of older workers are offered the senior retention interventions and why? Additionally, information is lacking on the actual needs of small- and medium-sized enterprises (SMEs), in particular, and how these needs can be met. Potentially important case stories exist in workplaces (e.g. in the wholesale and building markets) where senior employees have been actively recruited to utilise their experience, but the cases have not been systematically described and the current knowledge on effects of this type of senior-targeted policy is sparse. Finally, the practical use of research-based knowledge at the workplace level is very limited. It may well be that many workplaces do not have the necessary resources to gather knowledge to inform and support their workplace policies and practical activities, and this lack of information may be an important barrier to sustainable extended work life, particularly at SMEs. Therefore, there is also a strong need for more efficient knowledge dissemination and application—from research to practice—in the workplace.

Combating age discrimination. Age discrimination occurs in all Nordic countries. The most prominent effect of age discrimination on older workers is that, because they face very limited opportunities for new employment, they are more likely to stay in a job whose demands exceed their work capacity, or are forced to take early retirement. In addition, older workers are often not offered competence development. Effective ways to combat age discrimination therefore need to be developed, including how to change negative attitudes and behaviours in the workplace, and cultural perceptions of older workers at the societal level. However, workplaces may have objective reasons—for example, due to seniority-based salary systems—for their reluctance to hire older workers. As such, there is also a need to look more closely at the workplace perspective, and to answer the following questions: What are the objective reasons for workplace reluctance regarding hiring older workers? And how can the needs of these workplaces be met?

Combating stigmatization. If labour market policies and workplace senior policies and activities focus on older workers as potentially 'vulnerable', and if older workers are selectively entitled to a better working environment and better work conditions than their younger counterparts, there are risks of stigmatization. Stigmatization may have severe negative consequences, including tension between age groups that results in reduced social support and coherence, reduced workplace commitment, and reduced job

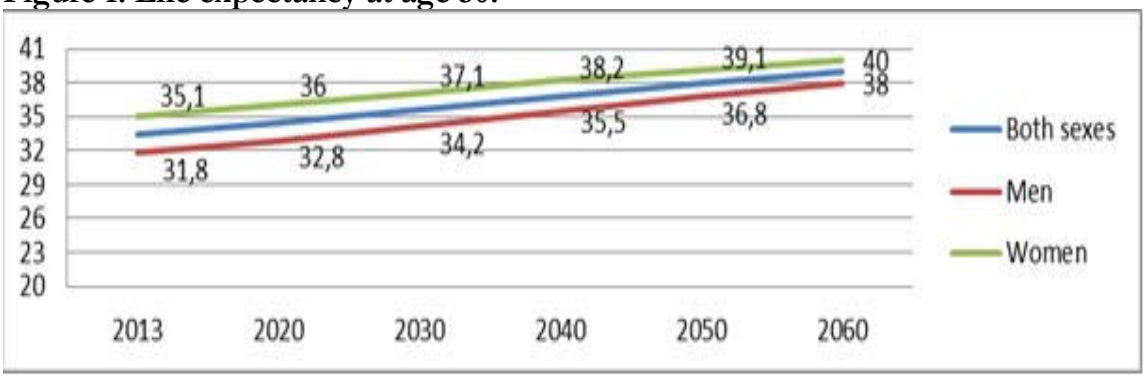
satisfaction. Little is known about why and when stigmatization occurs and what its actual consequences are, but increased knowledge about how to make efficient use of the different capabilities of younger versus older workers in the workplace (e.g. mentorship, composition of working teams, etc.), may be an important component in combating it.

A brief introduction

Demographic factors[4] and employment figures

The Norwegian population will continue to grow throughout this century, from 5.1 million inhabitants today to 6 million in 2030 and 7 million in 2065, according to the medium alternative in the population projections estimated by Statistic Norway.[5] Due to increased life expectancy (figure 1), the population will continue to age. The number of adults and elderly will increase sharply over the coming decade, particularly among those aged 70 and over: from 11 % of the population today to around 19 % in 2060. The proportion of people aged 50 to 70 is expected to be stable, however, at around 23–24 % of the population from 2014 to 2040. As a result, the number of people aged 66 and above per 10 people aged 20 to 66 (i.e. working age) is expected to increase from 2.2 in 2012 to 4.0 in 2060 (Haga 2014).[6]

Figure 1. Life expectancy at age 50.[7]



Source: Statistic Norway.

From an international perspective, the employment rate among Norwegian older workers is high. While economic activity in general has declined slightly, this decline does not apply to older workers (age 50 and above), for whom the expected duration of economic activity (i.e. full-time employment) has increased from 9.6 years in 2001 to 11.6 years in 2015; from 7.9 years to 9.9 years (in 2014) for women and from 11.3 years to 13.2 years (in 2014) for men (figure 2) (Haga 2016).

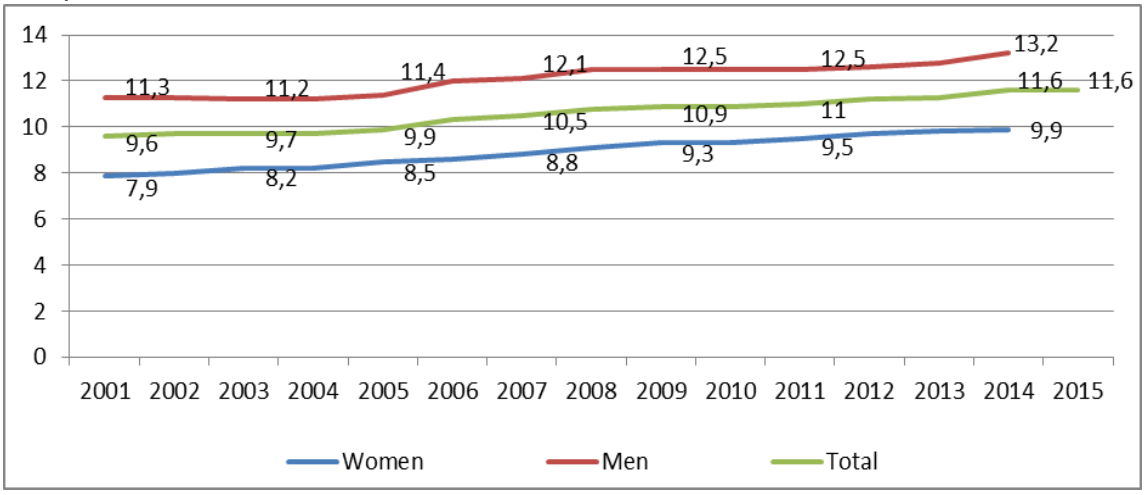
[4] http://www.ssb.no/en/befolkning/statistikker/folkfram

[5] The medium alternative MMMM is Statistic Norway's main alternative, and in this alternative they assume a medium development in fertility, life expectancy, domestic migration and immigration.

[6] Meld. St. 12 (2012–2013) Report to the Storting (White Paper) Long-term Perspectives on the Norwegian Economy 2013.

[7] Statistic Norway https://www.ssb.no/statistikkbanken

Figure 2. Expected years of economic activity at age 50 by gender, 2001–2014/2015.

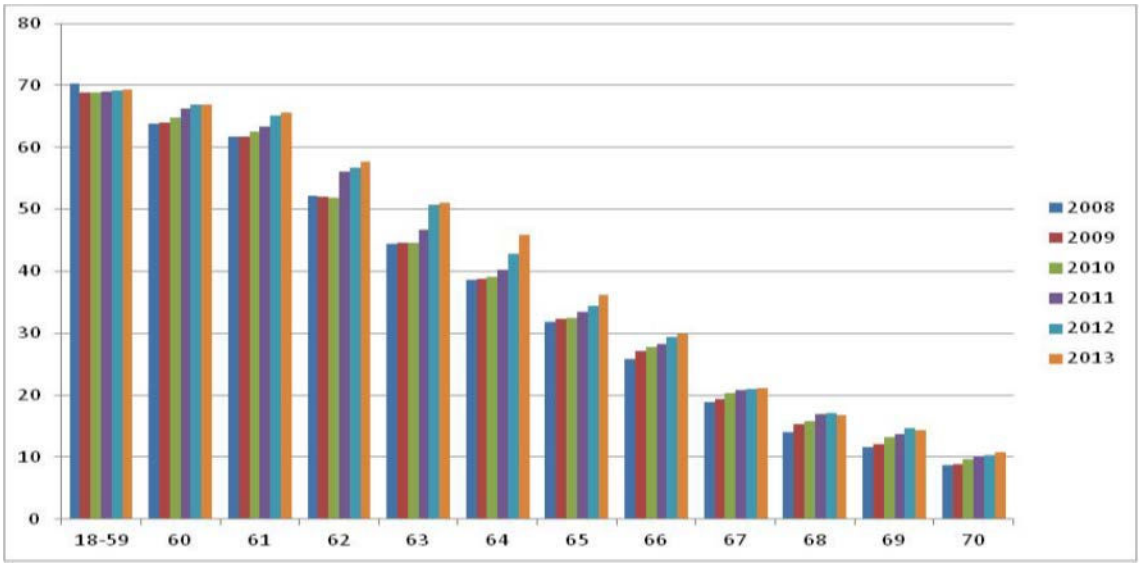


Source: Haga 2016, NAV.

Labour market participation for those over 50 years of age has increased even in periods with growing unemployment (for example, 2002–2003 and 2009–2010). Average weekly working hours have also increased by 10 % for employees age 67 to 70 from 2008 to 2013; the increase from 2010 to 2013 may be an effect of the pension reform.

A significant growth in employment is also noticeable among older workers aged 62–64 years, after 2011 (figure 3), and this applies to both women and men. The growth in these age groups has been particularly strong for those with secondary education as their highest level of education. Further, from 2011 to 2012, the growth in the share of those employees who were still working one year later was stronger in the private sector than in the public sector (Claus, Nordby et al. 2014).

Figure 3. Share of persons aged 60–70 years, employed per 31.12.2007–31.12.2013. Percent.



Source: Claus, Nordby et al. 2014, Statistics Norway.

Institutional framework

In recent years, there has been a good deal of focus on increasing the actual retirement age among older employees. In Norway, this goal has been facilitated by means of the 2011 pension reform, the inclusive working life agreement (IA Agreement) between the government and the primary employer and employee organisations (2001-), and by raising the age limit from 70 to 72 years in the Working Environment Act (WEA) of 2015.

Employment policies and their changes

The aim of the Norwegian employment policy is to promote high labour force participation, low unemployment and efficient labour force utilisation. Tripartite cooperation between the government and social partners is vital. In Norway, trade union membership is high, wage formation is relatively coordinated at the national level and working life is well-regulated.[8] This allows business and labour organisations to share responsibility for social progress, not least by helping to limit unemployment. Cooperation between the government and social partners has contributed to greater wage equality, and has fostered social cohesion.[9]

The authorities may use various strategies and instruments to increase employment among older workers, including *legislation, financial incentives targeting employers or employees, the initiation or funding of various information and awareness campaigns*, and the offer or funding for various forms of employment-related counselling and guidance for the social partners, employers, managers and older workers (Midtsundstad 2015).

In their efforts to increase employment among older workers, the Norwegian authorities have reformed the total Norwegian pension system to increase the attractiveness of working after having reached the statutory retirement age. Moreover, through the initiation and signature of the agreement on a more inclusive working life (the IA Agreement), social partners have been assigned a more active role in the efforts to prevent early retirement and to increase the recruitment and retention of older workers.

While pension reform emphasises the attractiveness of the pension system as a main cause for early retirement and seeks to counteract early exit by strengthening the financial incentives targeting employees, the basic principle of the IA Agreement is that early retirement is an effect of workplace conditions and therefore needs to be counteracted by policies and initiatives targeting older workers in individual enterprises (ibid.).

The pensions system and social security system

Norway has a late-exit culture founded on a longstanding tradition of promoting high labour force participation and low unemployment, a policy that is reflected in the high labour force participation of older workers. Of primary significance is the high statutory pension age that Norway has long had (67 years for both men and women up to 2011,

[8] EIRO: Norway: Industrial relations profile - http://www.eurofound.europa.eu/eiro/country/norway.htm
[9] Meld. St. 12 (2012–2013) Report to the Storting (White Paper) Long-term Perspectives on the Norwegian Economy 2013.

and currently 62 to 75 years), Norway's relatively high age limit for termination of job contracts (70 years up to 2015, currently 72 years), and a voluntary early retirement scheme (AFP) introduced in 1988, which gave employees the opportunity to retire at age 62 from 1 March 1998 (Midtsundstad 2011).

In other words, before 2011 it was only possible for Norwegian employees to retire before the age of 62 on a disability pension (except for employees in occupations with a legislated lower age limit, such as military officers and police officers, who had the opportunity to retire at age 57 if they have been in their occupation for 28 years) (see table 1).

Table 1. The Norwegian pension system before the pension reform (–2011).

Old age pension	Private sector with AFP	Private sector without AFP	Public sector
National Insurance scheme (NIS) Disability pension	Partial pension (50-100%) Benefit - Calculation equals OAP from NIS (Income last 3 years before disability + Some have supp. from OP) Work – earning test		Partial pension (20-100%) Benefit - 66 % Work – earning test
National Insurance scheme (NIS) Old age pension (OAP)	67 years 40 years (full) 20 best income years (supplement) up to 6G 54 % of earlier income on average		
Contractual early retirement scheme (AFP)	62-66 years (benefit equals oap from NIS)		62-64 years: benefit equals oap from NIS 65-66 years: equals occ.pens.
Occupational pension (OP) schemes	67- years Only DB before 2001: 60-70% Mandatory from 2006 (OTP) - mostly DC (2%)		67- years Defined benefit (DB): 66%
Special age limits	Only a few occupations (pilots, divers etc.)		30-40% 60- (57), 63- (60), 65- (62) (police and military officers, nurses etc.)
Termination of the employee contract	70 years (67)		70 years (mandatory)

NIS = National Insurance Scheme, OAP = old-age pension, AFP = contractual early retirement scheme, OP = occupational pension scheme, DB = defined benefit schemes, DC = defined contribution schemes, WEA = Work Environment Act.

The pension system has, however, been reformed and a new public old-age pension scheme came into force in 2011 (table 2). From then on, those between the ages of 62 and 66 were given the opportunity to retire on an old-age pension from the National Insurance System (NIS), and a new AFP scheme was introduced in the private sector, replacing the old one. While strict deduction rules had previously been applied if labour incomes exceeded NOK 15 000 per year in combination with payments from the AFP scheme, people were now free to combine the new private sector AFP scheme with unlimited income from work. However, this did not apply to recipients of AFP pensions in the public sector. The reform also enabled 67-year-olds from 2008 on to combine work and retirement, with no deductions from their pension payments. In 2009

and 2010, this rule was also expanded to include 68- and 69-year-olds. Old-age retirees over 70 already had this opportunity. These regulatory amendments have made the combination of work and retirement increasingly common among the oldest age groups (Bråthen & Grambo 2009).

Table 2. The Norwegian pension system after the pension reform (2011–).

Old age pension	Private sector with AFP	Private sector without AFP	Public sector
National Insurance scheme (NIS) Disability pension	Partial pension (20-100%) 66% (taxable) Work – earning test		
National Insurance scheme (NIS) Old age pension (OAP)	Withdrawal - 62-75, actuarial neutral Accrual – all years in work counts (13-75)		Withdrawal - 62-75, actuarial neutral (cannot be combined with AFP) Accrual – 13-75
Contractual early retirement scheme (AFP)	62-70 years, supplementary, lifelong (actuarial neutral)		62-64 years: benefit equals oap from NIS 65-66 years: equals occ. pens.
Occupational pension scheme (OP)	67 years DB (23 %) - lifelong DC (67%) – often 10 years		67- years DB, 66%, lifelong
Special age limits (OP)	Only a few occupations (pilots, divers etc.)		30-40 % 60- (57), 63- (60), 65- (62) (police and military officers, nurses etc.)
Termination of employee contract (WEA, §13-15a)	72 years (70) – from 2015		70 years (mandatory)

NIS = National Insurance Scheme, OAP = old-age pension, AFP = contractual early retirement scheme, OP = occupational pension scheme, DB = defined benefit schemes, DC = defined contribution schemes, WEA = Work Environment Act

In other words, the pension reform allows employees to draw a pension at any time they want after reaching the age of 62, irrespective of whether they continue working or not. The precondition is that the accumulated pension entitlements (old-age pension from the NIS, AFP and occupational pension schemes) must exceed the minimum pension level (from the age of 67), when adjustments based on changes in life expectancy are taken into account. The new rules imply that retirement and resignation from work are turned into two independent decisions, and no longer need to be taken at the same time. If retirement is delayed, the annual pension disbursements will also increase. In addition, continued employment after the age of 62 will accumulate increased pension entitlements (up to age 75 for old-age pensions from NIS and up to age 72 for AFP) and thus a higher annual pension when it is finally claimed. Many will therefore have a financial incentive to delay their retirement and to continue working. However, the level of future pension benefits and the opportunity to retire early depends considerably on whether the person in question is entitled to an AFP pension, which covers all public employees but only about half of all private sector employees (Hippe & Midtsundstad 2016), and a beneficial occupational pension.

The pension reform also involved the introduction of a *compulsory occupational pension* for all wage earners. From 1 January 2007, all companies must offer such schemes (**NO0404101N**, **NO0507102F**. Before 2006, only 50 % of private sector employees were covered by such schemes.

Sickness benefit can be received for a maximum of one year, while *work assessment allowance* ("arbeidsavklaringspenger", AAP) can be received for up to four years. If treatment and other measures do not lead to return-to-work, and the work capacity is deemed permanently impaired, the person may apply for disability benefit. This can be done before the end of the maximum period if further rehabilitation is not considered useful, either because the person is approaching normal retirement age, or because the illness is serious and return-to-work is considered unlikely.

In addition, a new *disability pension system* came into force 1 January 2015. The disability benefit from NIS now equals 66 % of yearly income up to 6 G (the basic amount in NIS; NOK 92 576 as of 1 May 2016). Calculation of income is based on the three years with the highest income in the five years before illness/injury. Those with low or no income are entitled to a basic benefit (1 G). The disability benefit is taxed the same as earned income. It is possible to combine work and disability pension, but there is a limit to how much income one may earn before the disability benefit is reduced.

The Working Environment Act and other regulations

In July 2008, all Norwegian employees were also given a statutory right to reduced working hours from the age of 62 to make it easier for older workers to combine work with a pension (The Working Environment Act § 13). The changes aim to enable these employees to remain in employment, even if they do not want to work full-time. This is in line with the new National Insurance Scheme, as well as the revised early retirement scheme AFP, both of which contain strong financial incentives to remain employed—including working part-time—beyond the age of 62 (**NO0611019I**, **NO0804039I**).

Further arrangements exist in Norwegian working life to encourage continued employment among older employees: employees aged 60 years and over are entitled to an extra holiday week, according to the Holiday Act. In the state sector, employees over the age of 62 are also offered 8 to 14 additional paid days off to encourage them to stay longer in employment. These extra days off are part of the collective agreement for state sector employees (Midtsundstad et al. 2017).

The IA agreement

The IA agreement, which is a tripartite agreement between the Government and the social partners, was signed on 3 October 2001. The declaration of intent was initially signed for a period of four years from 3 October 2001 to 31 December 2005, and later extended from 2006 to 2013 and, most recently, from 2014 to 2018. On the basis of this IA agreement, the Government and the social partners have committed themselves to seeking to establish a more inclusive labour market for the benefit of the individual employee, the workplaces and society as a whole. Through the agreement, focus has been

placed on reducing sickness absence and the use of disability pensions, increasing the retirement age and ensuring the recruitment of people with impaired functioning capacity and other vulnerable groups into the employment market. The goal of the last agreement is to increase the years in employment for 50-year-olds by 12 months from 2009 to 2018.

As a result of the IW-agreement an increasing share of Norwegian companies has incorporated old age policy measures into their personnel policy (Midtsundstad 2014, Midtsundstad 2015b, Hermansen & Midtsundstad 2015). The majority of Norwegian employers report that they take – and indeed insist on taking – social responsibility for keeping people in employment. However, that responsibility is largely limited to their own employees (Midtsundstad 2008). In 2013 (Midtsundstad 2014), 73 % of all Norwegian establishments with 10 or more employees had introduced measures to enable persons with a reduced working capacity to continue in employment. 54 % reported to have programs preventing health problems and improving work ability, whereas 30 % of the establishments promoted training, life-long learning, and career development for older employees past the age of 55. Similarly, 37 % reported to have pro-retention programs for older employees above the age of 62. The most common initiatives offered to retain older workers in Norway are less strenuous work, rearrangement of work tasks, extra days off, shorter working hours without a proportionate wage reduction, and provision of additional bonuses to older employees who choose to continue working rather than retire. This was found to be the case in both 2005 and in 2013 (Midtsundstad 2007, 2014).

Studies show that companies in which work is allocated to teams, making employees mutually dependent on each other to perform their work tasks, are less inclined to offer older employees flexible working time arrangements (Midtsundstad & Bogen, 2011). However, the possibility of offering retention measures facilitating more flexibility, such as additional leave and phased retirement, do presumably increase with the size of the company, even if work is allocated to teams. Compared to a small staff, which might provide less flexibility for adjusting staff plans, a larger staff may provide more leeway for adjusting production. Offering retention measures may also be correlated with cyclical changes. Studies of Norwegian employers show that companies increase their retention efforts when faced with labour shortages (Midtsundstad 2005c, 2011). Furthermore, when experiencing economic hardship and the need for retrenchment, such as in the aftermath of a financial crisis, companies seem to be less inclined to retain their older workers (Solem 2012). However, during a period of downsizing it may also be important to retain core employees, while looking for possibilities to reduce the overall staff size in order to cut costs. In other words, some older workers may be regarded as more valuable for the company than other workers, especially those holding what may be described as a "key competence" (Midtsundstad, 2011). Being committed to the goals of the IW-Agreement also increases the likelihood of offering retention measures (Midtsundstad 2011). Studies have also found that time associated with training new staff is correlated with efforts to retain older workers in Norway (Midtsundstad 2005c, 2011). Thus, for companies where the training of new staff requires substantial time, retaining experienced workers will presumably be desirable.

The Government's main instruments to reduce exclusion and attrition from the labour market have also included information and counselling services. These have been provided under the auspices of NLWA labour centres, as well as in the form of support for the Centre for Senior Policy (CSP). As part of the follow-up of the IA agreement, the Government also reduced the payroll tax for workers over 62 in 2004. The purpose was to make it more attractive for employers to recruit and retain a greater number of older workers (Midtsundstad 2007). As the effect of this measure appeared to be quite negligible (Ellingsen and Røed 2006), it was discontinued from 1 January 2007.

The labour market for older workers

In 2004, the Norwegian economy experienced an unprecedented boom, generating strong economic growth and a tight labour market with low unemployment. However, the international financial and economic crisis prompted a sharp deterioration in the Norwegian economy in 2008 and 2009. In early 2009, the Norwegian parliament (Stortinget) approved the spending of significant funds to alleviate the effects of the economic crisis, including increased spending on roads, railways and other public facilities, as well as helping financial institutions deal with their liquidity challenges. Over the course of 2010, there was an upward swing in the economic cycle, the rise in unemployment stalled, and the employment rate started to grow again. However, due to decreasing oil prices from 2014 on, the unemployment rates in Norway have increased over the last two years, especially in the southern and western parts of Norway.

The unemployment rate, as measured in the Labour Force Survey, was 4.6 % in 2016 (among workers aged 15 to 64 years), compared to 3.6 % in 2010. However, the unemployment rates among people aged 55 to 74 are low, although these rates—especially long-term unemployment rates for older workers—are increasing.

The labour market mobility of people above 50 in Norway is also low, with only 5–6 % changing their employer during a 12-month period (Lien 2014; Nielsen & Norberg-Schulz 2016). This share has been stable during the last 10 years (ibid.). Studies also show that Norwegian employers hesitate to recruit workers above the age of 57 (Dalen 2016). According to Dalen (2016), 97 % of managers prefer to recruit experienced workers, but only 60–70 % prefer to hire older workers.

Retirement figures and trends

Since 2011, a growing number of people have chosen to combine employment and retirement; as such, there is no longer a correlation between the time someone draws a pension (i.e. retires) and the time when he or she stops being employed. The Norwegian Labour and Welfare Administration (NAV) has therefore established separate indicators for employment behaviour and retirement behaviour among older people, in the form of expected employment age (see figure 2) and expected retirement age, respectively (Haga & Lien 2016).

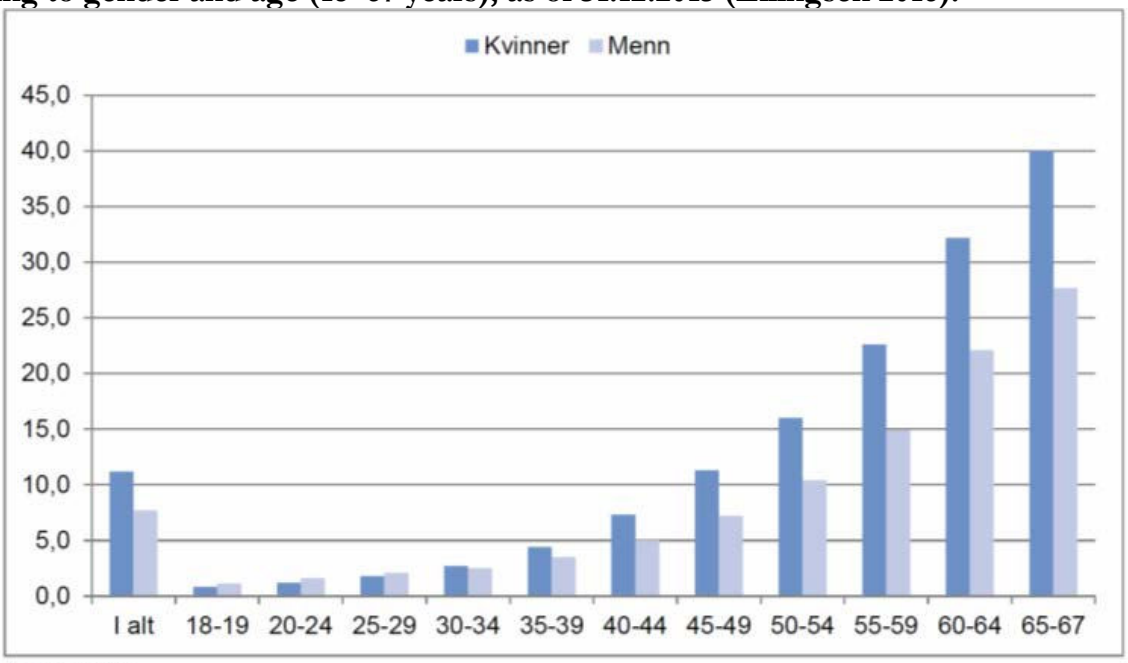
The expected retirement age reflects retirement behaviour and comprises retirement pensions, permanent disability pensions and contractual pensions (AFP). In 2010, the

expected retirement age for a 50 years old was 63.7, which is 0.3 years lower than in 2005 but approximately equal to what it was in 2001 (63.5).

In Norway, the primary reasons people aged 50–64 are outside the labour force included illness or disability (60.9 %) and early retirement (22.0 %) (European Commission 2012). A European survey conducted in 2006 among people aged 50–69 (who had been employed at least until the age of 50), found that among those who were retired in the EU-27, a total of 61.3 % had retired because they had reached the statutory retirement age or because they wanted to stop working, compared to 48.9 % in Norway. In the EU-27, close to one in every six persons had retired after having been made redundant or after having encountered difficulties in performing their job. Health issues also appear to be a major cause of retirement in the EU-27, particularly in Norway, where 32.8 % had retired because of health-related or financial reasons.

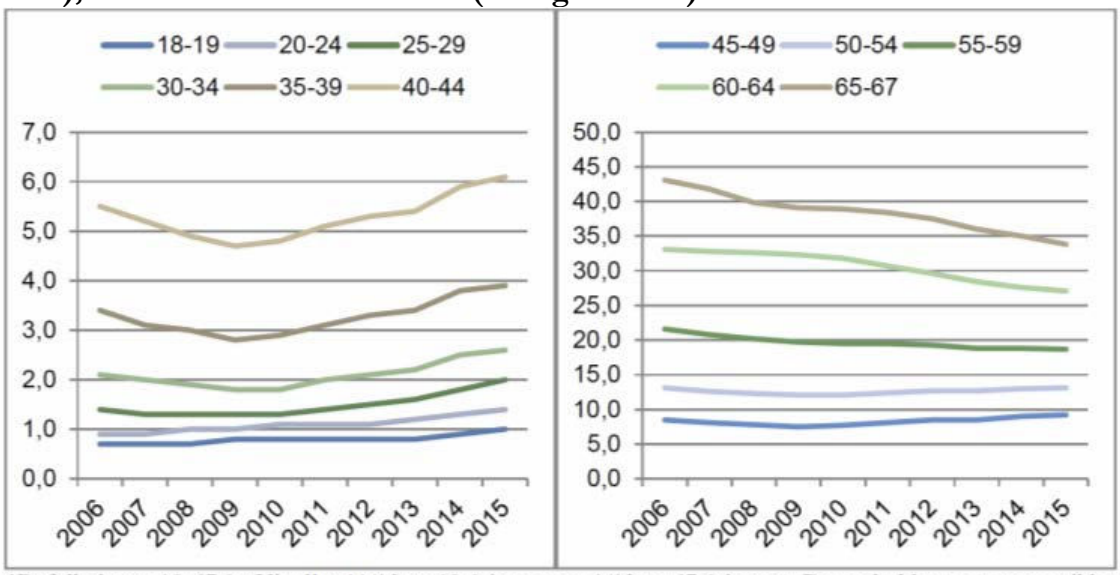
The proportion of the population with disability benefits naturally increases with age, and is generally higher among women than among men, except in the youngest age groups (< 30 years) (figure 4). While the number of people with disability benefits has increased somewhat during the past 10 years, from 297 485 in 2006 to 314 748 in 2015, the proportion of the population with disability benefits has decreased, from 10.0 % to 9.4 %. The proportion in the oldest groups (> 54 years) has decreased the most (figure 5).

Figure 4. Proportion (percent) of the population with disability pension, according to gender and age (18–67 years), as of 31.12.2015 (Ellingsen 2016).



Kilde: NAV

Figure 5. Proportion (percent*) of the population with disability pension (18–67 years), as of 31.12.2006 –31.12.2015 (Ellingsen 2016).



*Befolkningen 18-67 år: Vi teller 11/12 av 18-åringene og 1/12 av 67-åringene. Dette skyldes at en person ikke kan bli uføretrygdet før måneden etter fylte 18 år, og blir alderspensjonist senest måneden etter fylte 67 år.Kilde: NAV

The trends in disability retirement is related to the development in other health-related benefits, particularly sickness benefit and work assessment allowance ("arbeidsavklaringspenger", AAP) (NAV 2016). In 2015, 81 % were AAP receivers for a period before getting a disability pension, while 5.4 % came directly from a sickness benefit. However, the proportion coming from AAP was reduced with age (59 % among 65- to 66-year-olds), while the proportion coming directly from sickness benefit increased (by 12.5 %) (table 3).

Table 3. Status prior to disability pensioning among new receivers (18–67 years) 1–4 quarter 2015. Percent. (Ellingsen 2016).

	I alt	18-24	25-29	30-39	40-49	50-59	60-64	65-66
Sykepenger	5,4	0,2	1,2	1,5	2,7	5,8	10,6	12,5
AAP	81,1	48,7	87,1	88,5	86,6	84,0	78,9	59,3
Arbeidssøker/ Nedsatt arbeidsevne	4,4	8,2	7,8	5,8	4,6	3,5	3,0	3,5
Uoppgitt	9,2	42,8	3,9	4,2	6,0	6,6	7,5	24,7

Kilde: NAV

Analysis of research by domain

There has been extensive research in Norway on the effect of policy measures on extending working age, particularly since 2001 with the signing of the first IA Agreement, in which one of the objectives was increased labour market participation for the 50+ population. There are analyses of both large-scale datasets from surveys (cross-sectional and cohort studies) and register data, as well as some longitudinal studies. These studies focus for the most part on possible factors that can predict early retirement or extended work careers, and there are few studies that focus solely on only one of the aspects.

The Norwegian Life-Course, Ageing and Generation Study (NorLAG) is the first national and longitudinal ageing survey to be completed in Norway. The first wave of data collection was carried out in 2002–2003 among respondents aged 40 to 84 (however, the sample of persons aged 50 and above was limited). The second wave was carried out five years later (2007–2008) and included the whole adult life-course (respondents aged 18 to 84); it was integrated with the UN-based Generation and Gender Survey (GGS), thus allowing comparative analyses. A third wave was carried out in 2017 (completed in June 2017). NorLAG has produced a range of publications, from scientific articles to (grey literature) reports, but few of these focus on factors that may affect workers' retirement decisions.

There are also relevant analyses based on The Nord-Trøndelag Health Study (the HUNT Study), a longitudinal population health study in Norway. The HUNT Study is one of the largest health studies ever conducted. It is a unique database of personal and family medical histories collected during three intensive studies (1984–86, 1995–97 and 2006–08). The HUNT Study is reinforced and supplemented by linkage to registries at the regional and national level (e.g. The Cancer Registry of Norway, The Medical Birth Registry of Norway and The National Health Insurance Register). Norway (represented by The National Institute of Occupational Health—STAMI) also participates in the European Working Conditions Survey (EWCS), which monitors the status and trends of working conditions, identifies groups with specific work challenges and analyses various aspects of the work environment, every 5 years.

In addition, Norway has the FD-Trygd database. FD-Trygd is a historical event database covering demography, social conditions, social security, employment, job seeking, state employees, income and wealth. The statistical unit is the person, and information in the database consists of registrations of events in each individual's life span. These registrations can be combined to build event histories for a group of people or an entire population. FD-Trygd contains information for the entire population of Norway, from 1992 onwards. It is therefore possible, with FD-Trygd, to connect all individuals belonging to the same family.

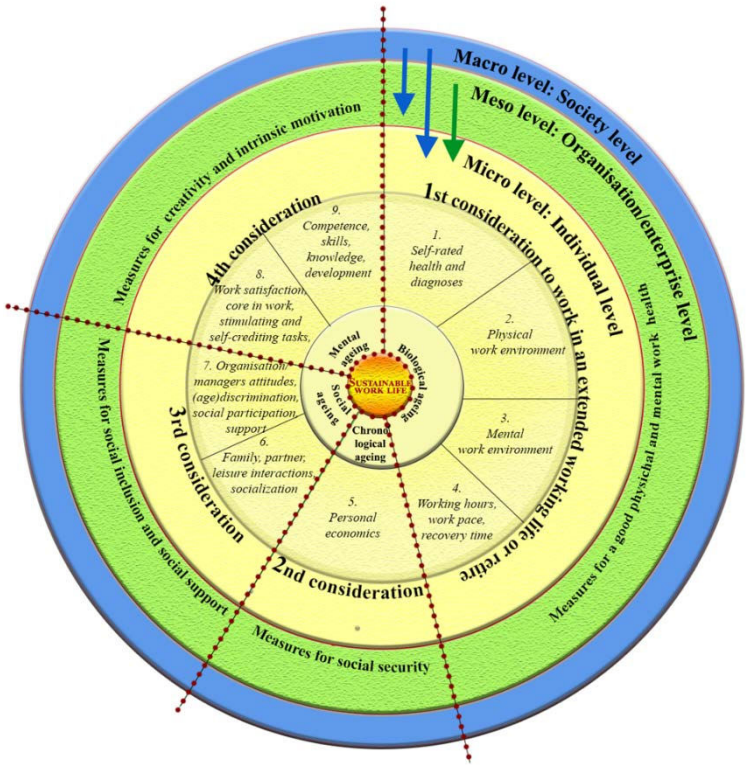
Since 2003 there has also been an annual survey among a representative sample of managers (N=750) and employees (N=1 000) (SSPs "seniorpolitiske" barometer) on attitudes towards older workers and self-reported experiences of discrimination (Dalen 2016a-b). The results are presented in annual reports and one (grey literature) report analyses the development from 2003 to 2008 (Solem & Mykletun 2009). However, the studies do not analyse how these attitudes actually influence older workers' retirement behaviour and labour market participation.

The complexity in causes and processes of retirement

Even though the focus of the Nordic report is on the impact of the working environment on the retention of older workers, it is important to recognize that the working environment is rarely the sole cause of early retirement. In most cases, the working environment interacts with a multitude of other factors at the micro, meso, and macro levels in the process of deciding whether to retire or continue working (Wang & Schulz; Hasselhorn & Apt 2015; Nilsson 2016; Midtsundstad 2002b; Midtsundstad 2015).

Nilsson (2016) has developed a comprehensive theoretical framework for analysing and understanding the complexity of work life participation of older workers (see figure 6).

Figure 6. Theoretical framework for analysing older workers' work life participation.



According to Nilsson, older workers' ability to work is affected by factors at three levels: the macro (societal) level, the meso (organisational/enterprise) level and the micro (individual) level.

At the *micro (individual) level*, nine areas affect whether employees can and/or want to work:

- Self-rated health and diagnoses
- Physical work environment, accidents, physical demands
- Psychosocial work environment, stress, effort/reward, threat, violence
- Working hours, work pace, recovery time
- Personal economy
- Family, life partner, leisure interactions, socialisation
- Organisation's and managers' attitudes, (age) discrimination, social participation, social support
- Work satisfaction, stimulating and self-rewarding tasks, core in work
- Competence, skills, knowledge, development possibilities

These nine areas are included in the following four considerations in the decision whether to extend one's work life or retire:

1. Is self-rated health and illness in relation to physical and mental work environment and working hours, work pace and recovery time best/sufficient when employed or when retired?
2. Is personal economy best/sufficient when employed or when retired?
3. Is the possibility of experiencing contextual participation and social inclusion with others best/sufficient when employed or when retired?
4. Is the possibility of having meaningful and self-rewarding activities best/sufficient when employed or when retired?

The nine areas and four considerations regarding work life participation are also related to the four different conceptualisations of ageing: biological ageing, chronological ageing, social ageing, and mental ageing.

At the *meso (organisational/enterprise) level*, the older person's decision to extend his/her work life participation or to retire is affected by the attitudes and activities of organisations/enterprises—specifically, creating a good physical and psychosocial (mental) working environment for employees, creating social security for employees, ensuring social inclusion and social support for employees (including combating age discrimination) and stimulating creative possibilities and intrinsic motivation to work for employees.

The *macro (societal) level* affects both organisations/enterprises and individuals. Age-related policy, communicated through legalisations, regulations, and economic incentives, may create possibilities and barriers for organisations/enterprises and individuals with respect to all nine areas included in the four considerations in figure 7. However, it is seldom considered that, in addition to chronological age, biological, social and mental ageing are also important factors in the decision to extend work life.

Working conditions play a central role among factors that influence labour market participation at a higher working age (Pohrt & Hasselhorn 2015). Work factors—such as physical and chemical work environments, physical and ergonomic job demands and psychological job demands—autonomy and other psychosocial factors may act as "push factors" (Shultz, Morton et al. 1998), if they are adverse or experienced as too demanding and thus induce people to leave working life early, or as "pull factors" if they are positive and help older workers find it attractive to keep working.

When acting as push factors, working conditions may have an impact, whether through work-related negative health effects or the demands of the work, or through a combination of the two (Mehlum 2011). Reduced health may create a discrepancy between job requirements and working capabilities, which, in turn, may lead to early retirement (usually in form of a disability pension) (Blekesaune & Solem 2005). Health is also one of the most important factors when it comes to deciding when to take AFP (Midtsundstad 2002b; Midtsundstad 2005b; ECON 2009; ECON 2008; Midtsundstad &

Nielsen 2013). The need to retire will, however, depend on the interaction between the individual's health and job demands (Westin 1994). Consequently, due to dissimilar job demands, the same illness or impairment may result in different rates of work incapacity (Stattin 2005).

In order to put the current understanding regarding the connection between working environment and retirement into a broader perspective, we therefore first summarise a selection of current knowledge in Norway about the importance of factors at the macro level: the labour market, legislation and its implementation and financial factors (pension and social security system), and factors related to the micro level, including social position (income and educational level), domestic factors (civic status and caring responsibilities), health and health behaviour, work ability and motivation.

The macro level (societal)

The labour market

Unemployment and mobility rates are low among older workers in Norway (OECD 2013). However, the retention rate—the rate at which firms retain older employees in their workforce—is especially high after the age of 60, and has increased since 2005: in 2010, it was at 65.2 %, 11 percentage points higher than in 2005. The other side of the coin is the low aggregate share of new hires of older workers: 4.9 % for people aged 55-64 years in 2011 (ibid.). However, 48.3 % of older unemployed persons were rehired in 2011, a figure very close to the rehiring rate for the prime-age unemployed.

Analysis by Lien (2014) shows that the labour market mobility of people above 50 in Norway is low. Only 5–6 % change their employer during a period of 12 months, a number that has been stable over the last 10 years. Studies also show that Norwegian employers hesitate to recruit workers above the age of 57. While 97 % prefer to recruit experienced workers, only 60–70 % prefer to hire older workers (Dalen 2016a).

Using survey data from 2010–2011, Furåker, Nergaard et al. (2014) examine patterns of lock-in (i.e. difficulty finding an equally good job with another employer) among employees in Finland, Norway and Sweden. They find that the number of those locked-in is lower in Norway than in Finland and Sweden; probably due to higher demand for labour and lower levels of unemployment. Furthermore, they find that older workers are more pessimistic about their job prospects than younger workers, and that the likelihood of being locked-in increases with increased age and health problems.

According to OECD (2011) and Halvorsen & Tägtström (2013), unemployment benefits are used as a pathway to early retirement only to a very limited extent in Norway (which may affect the composition of unemployment among older people). Conversely, once registered as inactive, few older workers go back to work. Bratsberg et al. (2010) have studied the connection between unemployment and disability rates in light of the fact that permanent disability insurance rolls in Norway outnumber registered unemployment by four to one. Based on administrative register data, matched with

firms' financial statements and closure data collected from bankruptcy proceedings, the authors show that a large fraction of Norwegian disability insurance claims can be directly attributed to job displacement and other adverse shocks to employment opportunities. They estimate that, for men, job loss more than doubles the risk of entry to permanent disability rolls and that displacements account for fully 28 % of all new disability insurance claims. They conclude that unemployment and disability insurance are close substitutes.

Andreassen and Kornstad (2010) use a discrete choice model to quantify the desire to draw a rehabilitation or disability benefit among fully employed married women in Norway. Important findings include the fact that decreasing unemployment has played a significant role in increasing the number on disability and rehabilitation, while changes in disability benefits have not played a significant role.

Investigating the paths to a disability pension among individuals aged 30 to 55 years, Fevang & Røed (2006) find huge variation in disability risk between different groups. Women are more at risk than men, and the lower-educated are more at risk than the higher-educated. Unsurprisingly, the risk also increases with age: for example, the likelihood of being a disability pensioner in 2003 among those aged 51 to 55 years in 1992 was 30 %. They also find that the labour market situation affects disability risk: about 5 % of all new disability pensions between 1993 and 2000 are related to downsizing.

Furthermore, Myklebø (2011) analyses work re-entry among recipients of social benefits. She finds that 66 % of the unemployed and 36 % of those registered as having reduced work ability were employed six months after their last registration at the NLWA. Re-entry to work is highest among those who had been registered as unemployed. The probability of restarting work was 74 % for the 45- to 59-year-old age group, declining to 57 % for people above the age of 60. The likelihood of exiting the labour market again because of health problems is highest for the 60- to 66-year-old age group. Among those previously registered as having reduced work ability, 45 % of those aged 60 to 66 were receiving a disability benefit six months later.

Based on survey data, Andersen (2007) studies the possibility of reactivation of disability pensioners. He finds that the number of disability pensioners wanting to increase their labour market participation decreases with age: 50 % of those 45 years and younger stated that they wanted to work for more hours or re-enter the labour market, compared to only 15 % of those 60 years and above. The main reason given, especially among the oldest, is lack of suitable work. However, many in the age group 55 years and above also stated that work adjustment in and of itself would not have helped them return to work. This is in line with earlier studies which find that few early retirees retire because of unsatisfactory work adjustments (Midtsundstad 2002; Midtsundstad 2005a).

Solem (2012) analyses the relationship between employers' attitudes to older workers and the economic crisis (2008–2009), based on data from CSP's Senior Policy Barometer from 2003 to 2009. He finds that the quick shifts in business cycles in 2008 and 2009 produced immediate reactions among managers. In particular, the protection of older workers during downsizing (i.e. the seniority principle) gained less support within the first half year of the crisis; however, there was a return to the former level of support within the next half year. This pattern of change was observed in the private sector,

while managers in the public sector changed attitudes on a smaller scale and in the direction of increased support for the seniority principle. The cognitive component of attitudes was less affected by the financial crisis than the behavioural disposition mentioned above. The tendency was toward more positive conceptions of older workers among managers in the public sector; in the private sector, the views of managers changed even less, but in a negative direction. The impact of steadier business cycles is seen in the affective component of attitudes, yet older workers are among the least popular categories to recruit in both rising and falling cycles. The finding that managers in the private sector are more affected than managers in the less market-exposed public sector supports the potential effects of the financial crisis on attitudes toward older workers. However, for senior policy (the active aging policy at the workplace), it is important to keep in mind long-term trends and not be beset by short-term shifts in the need for older workers. Lasting effects of falling business cycles on the employment of older workers may be prevented by reinforcing a solid basis of realistic conceptions about older workers and by openness concerning the affective aspects of ageing and older workers.

Legislation and its implementation

Norwegian studies in this area are connected to labour market regulations and welfare arrangements, and to changes in these laws and regulations over the last 10 years—for example, the tripartite IA Agreement, signed in 2001, the pension reform (see C), changes in the WEA (the Working Environment Act), and the disability benefit scheme.

As part of the IA Agreement, the Norwegian payroll tax was reduced by 4 percentage points (from 14% to 10%) in July 2002 for employees aged 62 and older. Ellingsen & Røed (2006) analyse the effect of this tax reduction on the employment patterns and unemployment of older workers. They find that a reduction in payroll taxes has no effect on older workers' ability to secure new jobs, but they also find a reduction in the exit rates of workers 62 years and older, compared to younger employees. However, this is mainly due to reduced disability rates, which was probably an effect of changed disability regulations during the same period.

Finseraas & Jacobsen (2014) present the results of a survey experiment where the treatment group was provided with an information brochure regarding recently implemented changes in the Norwegian pension system and a control group was not. They find that those who received the information were more likely to respond correctly to questions regarding the new pension system. "This information effect" was larger for those with higher levels of education, but only for the most complex aspect of the reform. Despite greater knowledge about the reform in the treatment group, Finseraas & Jacobsen find no differences between the treatment and control group in terms of preferences regarding when to retire, or whether to combine work and a pension.

There is little information thus far on the effect of the WEA's increase in age limit from 70 to 72 years. However, a study by Svalund and Veland (2016) using survey data indicate that the increased age limit will have limited impact on the employers hiring and retain policy.

On 1 January 2015, new legislation concerning disability benefits was introduced. The primary aim of this "disability reform" was to facilitate increased participation in the labour market among recipients of disability benefits. Bråthen & Nielsen (2016) investigated whether the reform caused any change in employment in the first six months of 2015 by means of a series of fixed-effects regression analyses. They find that among partially disabled women, who make up about 10 % of the population of disability benefit recipients, the reform had a negative effect on employment rates. However, the reform did not change the employment rates of the fully disabled, nor of partially disabled men. Thus, their main conclusion is that the reform did not affect the employment rate among disability pensioners during the first six months after its introduction.

Financial factors/the pension system

The Norwegian Research Council (NRC) has, through a special research programme (EVAPEN), funded several projects analysing the effects of Norway's ongoing pension reform. However, only a few results have been published thus far. Important features of this reform (which has been in effect since 2011) are the adjustment of pensions for changes in life expectancy, flexible retirement starting at age 62 based on actuarial principles and new rules for the indexation of pensions. Another part of the reform is a new model for accumulating pension entitlements that will be introduced gradually for cohorts born after 1954 and fully for cohorts born after 1962.

Most analyses of the effects of the reform so far are based on dynamic micro-simulation models (for example MOSART).[10] The pension reform implemented from 2011 will imply a shift to a quasi-actuarial system, seeking to neutralise the expenditure effect of further increases in life expectancy and strengthen ties between former earnings and pension benefits. Labour supply will be stimulated by lowering implicit tax rates and by aligning the social and private costs of early retirement. Using a large, dynamic micro-simulation model, Stensnes and Stølen (2007) find that the reform will stimulate labour supply and reduce the future tax burden but also increase inequality in the benefits received by old-age pensioners.

The calculations presented by Christensen et al. (2012) also indicate that Norway's pension reform will lead to a strong improvement in economic incentives to continue working and to delay retirement, in comparison with the old system: postponing retirement by one year will typically increase the annual old-age pension by about 7.5 %. About two thirds of this effect is attributable to the actuarial adjustment and about one third to the accumulation of additional pension entitlements in the new system. These incentives, however, only apply to part of the population; about 40 % of Norwegians

[10] From a representative sample of the population in a base year, the MOSART model simulates the future life course for each person in this initial population. The life course is simulated by possible transitions from one state to another, as determined by transition probabilities that depend on each person's characteristics. These transition probabilities are estimated from observed transitions in a recent period. Events included are migration, deaths, births, marriages, divorces, educational activities, retirement and labour force participation. Public pension benefits are calculated from labour market earnings and other characteristics included in the simulation. Old-age pensions, disability pensions, surviving spouse pensions and early retirement pensions are included in the model (Christensen et al 2012).

retire on a disability pension before the age of 67, and this group is mainly unaffected by the economic incentives of the reform. Public sector employees are also not fully affected by the incentives because of the AFP early retirement plan for the 62- to 66-year-old age group. The public sector AFP scheme, which has poor work incentives, will remain largely unchanged in the near future.

Using a difference-in-differences approach, Hernæs et al. (2016) and Midtsundstad & Nielsen (2014) compare changes in employment at ages 62 and 63 from 2008 to 2012 in private sector companies with the new, flexible AFP scheme and public sector companies with the old AFP scheme. Both found that the probability of being employed has increased more in private sector companies with AFP than in public sector companies with AFP, when sex, cohort, educational level and industry/sector is controlled for. Hernæs et al. (2016) also found that the probability of being employed for those in private sector companies without AFP decreases over the period. The reason seems to be that they now have the possibility of drawing a flexible old-age pension from the National Insurance Scheme from the age of 62. Previously (prior to 2011), they had to wait until the age of 67.

Earlier analyses by Bråthen & Bakken (2013), based on register data on retirement behaviour and employment from 2001–2012, support these findings. For a reference person (Norwegian-born, male, 64 years old, no children under the age of 12, no parents alive, having worked for 30 years or more, working in the private sector, spouse is still working etc.), the probability of still being employed after one year increases if he works in a company with an AFP scheme.

Furthermore, Dahl & Lien (2013) have found that almost 45 % of those with the opportunity to draw an old-age pension before the age of 67 did so. However, two out of three of these pensioners continued working. As a result, the proportion of older people (aged 62 to 66) in employment increased from 39% in 2010 to 42% in 2012. The increase was especially high in private sector companies with an AFP scheme, and among blue-collar workers and those with primary school as their highest educational level. The proportion of retirees from companies with an AFP scheme has decreased from 24% in 2009–2010 to 15% in 2011–2012, among 62- to 66-year-old workers. Furthermore, old-age pensioners aged between 62 and 66 continue working almost as much as they did prior to taking up their pension benefits. Of those combining work and the old-age pension, over 80% work at least 30 hours per week.

Norway's National Insurance System provided benefits from the age of 67 (until 2011), but with an earnings test for those aged 67 to 69. Up to 1 January 2008, 40% of earnings exceeding a threshold were deducted from the public pension. The threshold was around one sixth of the average full-time earnings up to 1 January 2002, when it was doubled. Part of the ongoing pension reform is the complete elimination of the earnings test; it was abolished for those aged 67 from 2008, for those aged 68 from 2009 and for those aged 69 from 2010. In the current system, there is no deferral, so the earnings test can be viewed as a "real" tax. Hernæs & Jia (2009) analyse the changes in earnings following the reform implemented in 2002, which doubled the wage threshold for the earnings test. They used administrative registers, spanning the years 1999–2003, covering many socioeconomic dimensions of the entire population, and containing ex-

tensive information on employment and income. In broad terms, their analysis indicates a positive labour supply response to the earnings test reform. The impact of the earnings test was also confirmed by a difference-in-difference analysis of the reform. However, they find no clear evidence that the reform has increased labour market participation.

Brinch et al. (2012) have also studied two recent changes in incentives to work facing 67- to 69-year-old workers in Norway: an earnings test reform (which increases current earnings from work) and a pension system maturation (which increases pension accrual from work). Within a difference-in-differences framework, they exploit these changes to investigate the effects of economic incentives and find that the earnings test reform has significant effects, while the pension system maturation has no significant effects. The findings confirm that 67- to 69-year-olds do adjust their work efforts when there are economic incentives but are only motivated to do so by incentives affecting their current income and not those affecting their future pension.

The positive effect of changes to the old-age pension on employment rates among those aged 67 and above are also documented by Bråthen & Grambo (2009). They find that the changes had an effect on older workers' labour market participation: the probability of a person aged 66 working at the age of 67 increased by 4%. However, the effect varied with individual characteristics and industry.

Vestad (2013) has estimated the labour supply effects of the early retirement programme AFP in the 1990s. He uses detailed administrative data to characterise full paths towards retirement and account for substitution from other exit routes, such as unemployment and disability insurance. By exploiting a reduction in the lower age limit for early retirement during the 1990s as a source of exogenous variation in individual eligibility, he obtains robust difference-in-differences and triple-differences estimates indicating that more than two out of three pensioners would still be working at the age of 63 had the age limit been 64 rather than 62. Hence, although successful in creating a more dignified exit route for early leavers, the programme also generated substantial costs in terms of inducing others to retire earlier.

There are also studies of the connection between retirement behaviour and labour market participation among employees aged 62+ entitled to a labour market-based pension (i.e. occupational pension) or employees being offered bonuses for opting out of employment. In a study based on survey data from 1 474 employees and pensioners born in 1933, 1934 and 1935, Midtsundstad (2002b) finds that entitlement to an occupational pension (defined as "benefit") increases the probability of early retirement, when other important factors like sex, education level, occupational group (i.e. class), income, health and working capacity, seniority and working conditions are controlled for. Furthermore, being offered a bonus for opting out of employment also increases the probability of early retirement at age 62 (Midtsundstad 2002b).

Furthermore, a study by Kostøl & Mogstad (2013) shows that there is significant potential among younger disabled people to work if financial incentives are increased. They do not, however, find any effects of economic incentives among disabled people in the 50-61 age group. This research is supported by Bråthen (2011). Based on data from the Norwegian labour force survey, he estimates that nearly 32 000 people receiv-

ing disability benefits would like to start working. But while 22 % of the recipients in the age group 35 to 49 report a willingness to work, the proportion among people above the age of 50 who report the same is only 9 %.

The micro level (individual)

Social position

Many of the Norwegian studies in the field control for gender, income, education level and occupation, or display separate analysis for the different groups; we therefore know how these factors affect the retirement decision and labour market participation of older workers.[11]

In a study of early voluntary retirement among private sector employees, using data from a retrospective cohort study among private sector employees (N=1 500), Midtsundstad (2002) found that retirement patterns vary between different occupational and educational groups: blue-collar workers retire earlier than white-collar workers, and those with higher education retire later than those with upper secondary school or less. This was true even after gender, income, occupational group, sector, self-reported health and work capacity, seniority, and civic status was controlled for. Furthermore, different occupational and educational groups give different reasons for retiring early. Although the main reason expressed by both groups was that they wanted more leisure time, many blue-collar workers who had retired early emphasise the importance of long working careers, heavy workloads, health problems and reduced working capacity, while the white-collar workers claimed that work was no longer as interesting or rewarding, or that they wanted to retire because their spouse had retired (Midtsundstad 2002b; Midtsundstad 2005a). The same differences in retirement patterns between different occupational and educational groups were found in a retrospective cohort study of retirement behaviour among government sector employees, based on survey data from 2002–2003 (Midtsundstad 2005a; Midtsundstad 2005b) and a retrospective cohort study of early retirement behaviour among local government employees in 2012–2013 (Midtsundstad and Nielsen 2013; Midtsundstad & Nielsen 2014a). Hauge & Årethun (2008) and Bråthen & Bakken (2013) also found the same socioeconomic differences in retirement patterns, when analysing early retirement with AFP in 2007 and 2012. There are also several other register-based studies who shows the same differences in retirement patterns after 50, taking into account withdrawal of disability pension, AFP-pension, occupational pension and old-age pension from NIS (Midtsundstad 1999; Midtsundstad

[11] If the effects are different for women and men or for people of high and low social position (effect measure modification), the results should rather be displayed separately for the different groups, rather than adjusting for gender and indicators of social position (education, occupational class, income). Also, if the research aim is to study the effect of an indicator of social position, adjusting for other indicators of social position may lead to over-adjustment if they are mediators of the effect of the social indicator being studied (Schisterman et al. 2009).

2002; Midtsundstad 2002; Midtsundstad 2006; Hyggen 2007; Hermansen 2011; Nielsen 2013; Nielsen 2017).

Furthermore, Solem et al. (2014), who analysed the possible associations between retirement intentions and behaviour, using five-year quantitative panel data on Norwegian senior workers, found significant correlations between retirement intentions and retirement behaviour within a five-year period. They also found that labour market resources (i.e. health and education) not only influenced timing of retirement, but even the connection between intentions to retire and retirement behaviour: older workers with poor health, and workers with low education, often retire earlier than they prefer, and blue-collar workers often retire earlier than they had decided. Even for white-collar workers and those in good health, constraints seem to apply when they wish to retire late.

In Norway, disability pension is also strongly associated with decreasing years of education (Gravseth et al. 2007; Gravseth et al. 2008), particularly in cases of musculoskeletal diagnoses (Bruusgaard et al. 2010) and mental disorders (Kristensen et al. 2010). Only few Norwegian studies have, however, examined the impact of different working conditions on social inequalities in disability pensioning among older workers. Most of the studies referred to also include younger employees (aged 20–50), and hence do not speak to which working conditions affect older workers' retirement behaviour/disability in contrast to workers in general.

Bruusgaard, Smeby et al. (2010) found a dramatic increase in the prevalence of people granted a disability pension with decreasing years of education across all levels of education. The disparities were much stronger than those seen for other health-related parameters and were especially strong for those with musculoskeletal diagnoses. The disability pension seems, however, to be more a consequence of health problems than a proxy for health status. The demonstrated relationship between education and disability pension may be partly explained by exclusion from the workforce because of health-related work problems. The study was based on data on all ethnic Norwegians aged 18 to 66 years and alive on 31 December 2003. Age, sex, the receipt of a disability pension on 31 December 2003, and the diagnosis on the medical certificate were taken from a national social security file. The file also included six levels of education: primary school, low-level secondary school, secondary school, low-level university, and university and research level.

Hagen et al. (2002; 2006) studied the importance of working conditions (e.g. physical job demands, concentration requirements, workload, autonomy and job satisfaction) and lifestyle (e.g. smoking, physical activity, BMI and alcohol), health conditions and psychosocial aspects for disability retirement due to back pain among approximately 35 000 employed men and women (between the ages of 25 and 59 in 1985) who attended the Nord-Trøndelag Health Study (HUNT 1, 1984–86) and were followed for seven years (from 1987 to 1993) in the national disability register. They found that physically demanding work and poor general health had the largest impact, while lifestyle factors had less of an impact (Hagen 2002). They also studied the importance of occupational social class (using three categories), working conditions and lifestyle on the relationship between education and disability due to back pain and found that the relationship was partially mediated through working conditions (Hagen 2006). Working conditions con-

tributed the most toward explaining the relationship for men, while occupational class, working conditions and lifestyle factors had similar impact for women.

Haukenes et al. (2011) studied the relationship between occupational social class and later disability retirement (until the end of 2004) among 7 031 middle-aged participants of The Hordaland Health Study (HUSK) 1997–1999 (who were between 40 and 45 years of age at the time of the study) and whether work-related factors (such as working hours, years in current work, physical job demands, psychological job demands and job control) could explain this relationship. They found a strong social gradient in disability retirement by occupational class. The work-related factors mediated to some extent the effect of occupational class on disability retirement and explained about 25% of the difference between skilled/unskilled workers and the highest occupational class (i.e. higher-grade professionals), especially physical job demands and job control.

Hansen & Ingebrigtsen (2008) studied social class differences in self-reported sickness absence for at least 14 days in the previous 12 months, in three of Statistics Norway's surveys on living conditions focusing on working environment (1996, 2000 and 2003) and found that education level and physical and ergonomic working environment were the most important factors. Although psychosocial factors (demands, control, organisational climate) in themselves were important for sickness absence, they could not explain social inequalities in sickness absence in this cross-sectional study. This demonstrates the fact that some factors might have an impact on health, without influencing social inequalities in health.

Lund & Bjerkedal (2001) studied 7 241 new disability pensioners due to accidents, in the Disability Register of the National Insurance Administration in Norway for 1992–1997. Of these, 33 % had been injured in occupational accidents. The rates of disability pensioning due to occupational accidents were 3 to 4 times higher among blue-collar workers than among white-collar workers, and highest in mining (100.0 per 100 000 people) and industry (41.3), compared with 16.5 in the total population and 3.4 among people with office work. The relationship between disability pensioning and mortality in the 15–64 age group was found to be approximately 2:1 for all accidents, but 5:1 for occupational accidents.

A study by Sterud & Johannessen (2014) is also worth mentioning, although the outcome is long-term sick leave, not disability retirement. They examined to what extent the social gradient in long-term sick leave may be explained by mechanical and psychosocial work environment factors among 6 758 eligible respondents to the 2009 "Survey of living conditions on work environment" by Statistics Norway. Eight work-related psychosocial factors and 10 mechanical exposures were measured and the subjects were followed up in national registries. In total, 9.4% had medically-confirmed long-term sick leave ≥ 40 working days during 2010, with strong social gradients across the five educational levels, ranging from 12.4% (elementary school) to 3.3% (university/college ≥ 4 years) among men and 15.4 % to 4.6 % among women. Adjusting for work-related mechanical and psychosocial factors explained 41–44% of the social gradient in men and 31–54% in women. The work-related factors that accounted for this gradient were rather similar for men and women. The most important mechanical factors were standing (among women), squatting/kneeling, heavy physical work and awkward lifting, while for

psychosocial factors, the most important were monotonous work, limited possibilities for development, low job control and low levels of leadership support.

Domestic factors

There is increasing agreement that peoples' aspirations for extending working life or entering retirement and the trajectories they try to follow also are rooted in households and immediate social networks (Vickerstaff 2015).

Jia (2005a) uses a binary choice panel data model to analyse married individuals' retirement behaviour in Norway when a new option, AFP, becomes available, and finds that the directions of spousal effects are quite symmetric, although women seem to have a much stronger response to their spouses' characteristics than men. In another paper, Jia (2005b) analyses the labour market participation behaviour of retiring couples. To account for the unobserved heterogeneity in decision-making structures within the households, he formulates a mixed model with two types of households, the cooperative type and the non-cooperative type. The estimation results show that more than half of the households were of the non-cooperative type. Furthermore, Jia (2005c) provides an empirical analysis of the joint retirement behaviour of working couples using a dynamic programming model, estimated on micro data. The estimation results show that a model which uses only measures of economic incentives (wage and pension benefits) gives a satisfactory fit with the observed retirement pattern. The results also indicate that husbands have higher bargaining power within the household. A hypothetical policy simulation shows that by taxing pension benefits as wage income, the labour market participation of both husbands and wives will increase by around 4 percentage points at age 65.

Studying early retirement on AFP among private sector employees born in 1933, 1934 and 1935, Midtsundstad (2002) found that having an unemployed or retired spouse increases the probability of early retirement. She also found that being single and male increased the probability of early retirement, while being single and female increased the probability of postponed retirement, compared with having an employed husband/partner. The study was a retrospective cohort study among 1 500 older worker and pensioners in private sector. All participants were employed at age 60 and interviewed in 2000-2001, when they were between 64–68 years old.

Bråthen & Bakken (2013) also found in their analysis, based on register data from the period 2001–2012, that spouses coordinate their retirement. The probability for a male employee retiring early increases by 10 percentage points if his spouse has left the labour market the same year. The importance of spouse retirement behaviour for own retirement behaviour also increases with age.

A few studies have also analysed how caring responsibilities (for elderly parents or other family members) may affect the retirement decision. Midtsundstad (2009) found in her study of older workers' retirement behaviour among private and governmental sector employees that care responsibilities for relatives are of little or no importance; the main reason for this is that few older workers had older relatives alive. However, even though very few older workers have caring responsibilities, multivariate analyses showed

that having a sick partner or relative increased the probability of early retirement (Midtsundstad 2002; Midtsundstad 2005b). The same studies found that one out of four women over the age of 55 worked part-time due to caring responsibilities.

A study based on Norwegian register data by Fevang, Kverndokk et al. (2008) found that having a lone parent in the terminal phase of life significantly affects the offspring's labour market activity. Employment propensity declines by around one percentage point among sons and two percentage points among daughters during the years just prior to the parent's death, ceteris paribus. Long-term sickness absence also increases sharply. The probability of being a long-term social security claimant (defined as being a claimant for at least three months during a year) rises by as much as four percentage points for sons and two percentage points for daughters. After the parent's death, earnings tend to rise for those still in employment, while employment propensity continues to decline. The higher rate of social security dependency persists for several years.

Gautun & Hagen (2010) also investigated how common it is for elderly employees to experience difficulties associated with combining work and care obligations for their parents, and to what extent this affects their behaviour in working life. To illuminate these questions, they present findings from a representative survey conducted in Norway in 2007. One finding is that 7 out of 10 respondents (with one or both parents alive) were both employed and caring for their elderly parents. Of these, 57 % had experienced difficult situations in coping with both. The most preferable arrangement was flexible working hours. Employees preferred the possibility of reducing or staggering working hours, or the option to work from home if necessary.

Kotsadam (2011) found that care for elderly parents has an effect on women's labour force participation in European countries, but that this effect is small in Norway and cannot explain the higher incidence of disability among older women.

Furthermore, in a newly published study based on NorLAG data, gender differences are identified in couples, where "common problems" (health symmetry) seem to be a comfort for men, but not so for women, who will have to shoulder the majority of the caring responsibilities regardless (Syse, Solem et al. 2014).

Health and health related behaviour

Health is of course strongly related to retirement behaviour, and is often seen as the primary factor that decides which opportunities are open to older workers.

A systematic review (Bjørngaard, Krokstad et al. 2009) of the epidemiological research on disability benefits in the Nordic countries identified 118 articles of relevance. The majority of the articles were cohort studies using disability benefits as an end point, with 67 population-based studies and 29 based on patient populations. Six of the cohort studies use disability benefit as an exposure. There were seven case-control studies and nine studies describing different interventions. Connections between different health issues and work disability are well documented, as is the importance of socioeconomic and work-related factors. The review revealed an emphasis on individual risk factors and concluded that, although important, individual factors alone cannot explain the growth seen in the last decade in the number of employees receiving disability benefits.

The NorLAG (Norwegian Life-Course, Ageing and Generation) Study is an ambitious longitudinal study. There has been a wide range of publications based on NorLAG (Slagsvold and Solem 2005; Slagsvold and Daatland 2006; Veenstra, Lima et al. 2009; Furunes, Mykletun et al. 2012; Slagsvold , Veenstra et al. 2012; Daatland and Slagsvold 2013). NorLAG results confirm that the early retirement scheme (AFP) to some extent reflects health-related causes for early labour market exits. Among men, the effect is strongest for subjective health status, whereas among women, symptoms of depression have the strongest impact on subsequent early retirement. Although poor health represents a limitation for work, there is no clear-cut point where work becomes impossible. Even in the lowest health decile a fair proportion is employed. However, age adds to the effect of health on early retirement. Persons with poor health aged 55 to 61 are less inclined to work, compared to those below 55 with a similar health status. This age effect may reflect negative stereotyping of older workers and indicate a potential for increased employment rates in middle-aged and older age groups. Compared to any other type of retirement, disability pensioning tends to weaken self-esteem among retirees. This finding indicates that the disability pension is not an appealing exit path. Most likely, it constitutes a risk to self-esteem and quality of life (Slagsvold et al. 2012).

There are also several other studies which look at the correlation between self-reported health and work ability and early retirement (Midtsundstad 2002b; Midtsundstad 2005a; Midtsundstad 2005b; Midtsundstad & Nielsen 2013; Midtsundstad & Nielsen 2014a), and correlations between sick leave history and retirement behaviour (Midtsundstad & Nielsen 2013), when other relevant factors are controlled for. Most of these analyses find that health problems and (self-reported) reduced work capacity increase the probability of early retirement (AFP). However, one study on the relationship between expected retirement age and expected health development, based on survey data among employed women aged 50 to 70 (Gamperiene et al. 2010), found that neither work ability, nor actual health, has the same effect as expected health development on expected retirement age. In other words, beliefs may predict expected retirement age better than actual health. However, without follow-up studies, it is impossible to determine what the actual retirement pattern will turn out to be. However, in a study by Haukenes et al. (2012), which examined whether self-perceived health, family situation and work factors could explain women's higher risk of disability pension among participants of the HUSK study, they also found a moderate impact of self-perceived health.

In another study, Haukenes et al. (2014) examined the relative importance of physical and mental health-related quality of life as predictors of disability pension due to musculoskeletal diseases among 18 581 participants (1953–1957) in the HUSK Study (1997–1999), followed through 2004. Baseline measures of health-related quality of life were estimated using the Physical (PCS) and Mental Component Summary (MCS) of the Short Form-12 (SF-12). Participants reporting poor physical health (quartile 1) had a marked increased risk for disability pension due to musculoskeletal diseases compared with those reporting good/somewhat good physical health (quartiles 4 and 3 combined). Adjustment for socioeconomic status and lifestyle factors slightly attenuated the association, and adding the number of reported pain sites weakened the association even more. Participants reporting poor mental health also had a higher risk for disability pension

due to musculoskeletal diseases; this, however, was not statistically significant in the final model.

Syse et al. (2015) used survey data from gainfully employed individuals aged 57 to 66 in 2002, to assess changes in health status and behaviours associated with retirement 5 years later (N=546). They found that, compared with workers, retirees were more likely to report improvements in mental health, and less likely to report mental health deteriorations. Retirees were more likely to both increase and reduce their alcohol intake, and to increase physical activity and lose weight.

Work ability

Workers who perceive their work to be physically demanding frequently retire early or seek a disability pension. It has been assumed that the workload may become too strenuous for senior workers doing physically demanding work; however, there has been little evidence to support this assumption. To examine this, Jebens et al. (2015) tested work ability, measured as aerobic power (VO_2max) and muscle strength, among forty male construction workers, 20 young workers (< 33 years) and 20 senior workers (> 44 years). They found that senior workers used a greater portion of their maximal aerobic power during work than the young ones did, although the maximal oxygen uptake was higher for the young workers, who also performed better on most muscle strength tests. The authors concluded that elderly construction workers showed a decline in physical fitness compared with their younger peers, but the energetic requirements of the work tasks were equal. Senior workers are thus more exposed to overload when performing heavy manual work than their younger peers.

In a questionnaire-based study by the same group of authors (Jebens et al. 2014) among 87 male construction workers, the level of musculoskeletal pain was higher among middle-aged men (30–50 years) and seniors (> 50 years) than among the youngest workers (< 30 years). All workers reported that good health was important for continued working. A reduction in the physical demands of future work was rated as being important for continuing working, particularly among those experiencing high levels of mechanical exposure and reduced work ability.

In a third study by some of the same authors (Lunde et al. 2016), cardiovascular loads were measured by relative heart rate (RHR), in 42 construction workers during work and leisure over 3 to 4 days. RHR generally decreased with age, as well as with higher levels of VO_2max. There were large differences in mean RHR during the workday between professions, with highest values among carpenters, henchmen and bricklayers (at approximately 20 % of the individuals' maximum capacity), while only a few minutes were spent in high-load intensities, which are needed to achieve training effect. Four participants had a mean RHR above the recommended threshold of 33 %, which might have been a negative effect, rather than a training effect, of the physical activity at work. There was a trend towards lower reported work ability (single item: "current work ability compared with lifetime best") with higher RHR during work. The cardiovascular load was generally low in leisure time, confirming the results from a large, international

meta-analysis, which found that occupations with manual work might have low levels of leisure time physical activity (Fransson et al. 2012).

Although these Norwegian studies are small and cross-sectional, and may not be representative for all workers with heavy physical work, the results indicate that an imbalance between workload and physical work ability may explain why workers with physically demanding work retire early or seek a disability pension. These publications are part of an ongoing project at STAMI, aimed at elucidating factors that determine work ability and participation in occupations with physically demanding tasks, with an emphasis on seniors. The project includes the health care sector in addition to the construction sector; both sectors are physically demanding, with mechanical risk factors for musculoskeletal disorders, but have different gender composition, with female and male dominance, respectively.

Emberland & Knardahl (2015) studied the contribution of specific psychological, social and mechanical work exposures to self-reported low levels of work ability among 3 779 employees from 48 organisations over a 2-year period. They considered changes in 16 work exposures and 3 work ability measures (the work ability index score, as well as perceived current and future work ability) and found that several psychological and social work factors contributed to self-reported work ability. Role conflict (conflicting role expectations), human resource primacy (organisational focus on human resources), and positive challenge (usefulness of skills and meaningfulness of work) were the most consistent contributors and showed both temporal and longitudinal associations with the level of work ability across test designs. Role clarity and fair leadership were also prominent predictors, but were less consistent, while mechanical exposures were not predictive in this study. The participants represented a wide range of occupational sectors; however, women were overrepresented in the sample. Therefore, caution should be taken when inferring the current results to the total working population.

Motivation

There are several studies that analyse the relationship between (self-reported) motivation and expected and actual retirement outcome.

Midtsundstad (2003) studied early retirement behaviour among government sector employees, based on survey data from 2002 to 2003 (N=1 800), and found that one of the main reasons for retiring early, according to the retirees themselves (especially among managers and higher educated employees), is loss of job motivation. For those who continued working after the age of 62, the opposite was true. Their main reasons for staying were that the job was still interesting and rewarding, that they did not have health problems and that their manager wanted them to stay longer. The same pattern was found in a study of retirement behaviour in the private sector, based on survey data from 2000–2001 (Midtsundstad 2002), and in analyses of the retirement behaviour among municipal sector employees (Midtsundstad & Nielsen 2013), also based on survey data. All three studies mentioned above are retrospective cohort studies. Furthermore, Midtsundstad & Bogen (2011) found in their qualitative study of retirement processes in eight different industries in 2009–2010 (based on interviews with a small,

selected number of older employees) that older workers often stress the importance of well-being at work in their retirement decision. However, well-being at work seems to have different meanings depending on the workers' level of education: while care workers and industrial workers stressed that they enjoyed being *at work* (i.e. the social aspect), engineers and executive officers enjoyed the *work itself*, their work tasks and other aspects of their work (i.e. personal development).

Motivation to work has also been linked to positive psychology and healthy workplaces (Torp et al. 2013; Vinje & Ausland 2013; Vinje & Ausland 2012a-d). In an explorative, qualitative study, Vinje & Ausland (2013) found that a salutogenic work environment has four characteristics: sense of usefulness, wanting the best for each other, mastery and zest for work. They found that experiencing and exploring qualities of presence in the workplace stimulates salutogenesis, which builds health-promoting work lives for older workers.

Torp and colleagues (2013) found that work engagement counteracted some of the negative effects of low control at work, and concluded that "promoting engagement may have more positive organisational effects than a more traditional disease prevention focus, because engagement is (…) closely related to good work performance and motivation" (2013: 387).

Motivation to work is also covered in two literature reviews published since 2012 (Midtsundstad 2012; Solem 2012). Solem (2012) found that older workers participate less in training and see less opportunity for learning new things at work. As opportunities for learning may contribute to maintained work ability, measures to include older workers in training and learning may contribute to improved work ability. Other studies also show that participation in learning activities declines with age (Becken 2015; Hilsen & Tønder 2012, Tikkanen, Guðmundsson et al. 2012), although less so than in the EU. In 2008, EU27 had a participation rate for older workers aged 50 to 64 of 9.5, while Norway had a rate of 19.3 (Tikkanen, Guðmundsson et al. 2012: 205). Whether lack of participation is caused by lack of motivation or lack of opportunity, it is difficult to say, but there seems to be a mix of both (Hilsen & Salomon 2010).

According to Tikkanen and Nyhan (2008), the following are the main barriers to lifelong learning for older workers:

> "(A) Learning cultures in workplaces have rarely been supportive to older workers. Older workers tend to have reached the top of their career possibilities, and in small companies and flat organisations more generally, 'the glass ceiling' tends to be low; (B) older workers' image of themselves as learners tends to be poor, giving rise to a self-fulfilling prophecy. As several chapters in this book show, while older workers have expertise in work, they are often novices when it comes to learning; (C) traditionally, 'the competence order' in workplaces (the degree to which one manages one's job tasks) has followed 'the social order', which is a result of one's years of experience in a company. More experienced employees are often considered to be more competent employees. Traditionally, older workers are considered as teachers and mentors of younger employees, rather than having learning needs themselves (Cedefop, Tikkanen et al. 2006). Thus, when the workplace does not require them to change their job tasks, this gives rise to a feeling of why bother to engage in training; (D) related to the above, the relevance of the training on offer is often an issue for older workers. Older workers have broader perspectives, greater understanding and sounder judgements than their less experienced counterparts. Thus, they tend to be more critical

> consumers of training products. The balancing and contemplation often takes place between what is their current situation and what could it be after taking more training" (Tikkanen and Nyhan 2008: 6).

It is impossible to determine whether discriminatory processes are more or less important than motivational factors, but the combination of the two serves to exclude older workers from much-needed participation.

The meso level (organisational/enterprise)

Working conditions among older workers

In a review of the literature, Solem (2010) found that physical and ergonomic work environments are often better among older workers than among younger workers. This may be due partly to selection (i.e. the "healthy worker effect", as a result of earlier retirement among workers with poor work environments leading to poor health) and partly an effect of adaptions and shifts to less demanding jobs with age, often with foreman or leadership responsibilities. The review finds that older workers seem to encounter fewer demands at work, but also receive less support and feedback from their supervisors.

The National Surveillance System for Work Environment and Occupational Health (NOA) at STAMI regularly presents results from Statistics Norway's Surveys on living conditions and working environment. The latest "Fact Book on Working Environment and Health" demonstrates that the proportion of older workers (between 55 to 66 years of age) is 20 % among all employed persons, but varies between occupations, from 7 % (for shop workers and police/guards) to 30 % (for top leaders, teachers and administration staff) (NOA 2015). Older employees tend to have more part-time work and less night work, compared to other employees (NOA 2011). Moreover, as many as 20 % of male workers between 55 and 66 lack a written employment contract, which is even higher than in the youngest age group (16- to 24-year-olds), at 15 %, and among all men, at 14 %. Psychological job demands are generally somewhat reduced with age, and low job control is somewhat more frequent among the older employees, compared to the middle-aged (NOA 2011). Mechanical exposures tend to be lower in the oldest group, but not consistently among women; having to stand (for three quarters of the workday) and heavy lifting (20 kg or more) at work is more common among 55- to 67-year-old women than among the 35–44 and 45–54 age groups.

The NOA Fact Book also presents data from other sources, such as the registers of The Norwegian Labour Inspection Authority. These show that workers above the age of 55 have increased risk of occupational injury mortality, particularly farmers (35 % of injury deaths occur among farmers above 65 years) (NOA 2015). Although young workers often have higher risk of occupational accidents (UiB 2013) due to lack of experience and training, the consequences of accidents are often more serious for older workers.

Work factors and early retirement

A number of Norwegian studies have examined the relation between work factors and retirement behaviour. Most of these have focused on either disability retirement or non-disability retirement, but Blekesaune & Solem (2005) studied both types, in combination and separately. They investigated the impact of working conditions on individual retirement for 270 occupations. Survey data (Statistics Norway's "Level of Living" Surveys from 1987, 1991 and 1995) were used to create Job Exposure Matrixes (JEMs) for all occupations, for three types of job strain (physical job strains, psychological job stress and job autonomy), each based on indexes with two or three items. Employees and their occupations were identified in the 1990 census. Income and social insurance/security data were used to identify the transition from work to retirement between 1991 and 1999 for 19 114 Norwegian employees between the ages of 60 and 67. Retirement was identified by a drop in work-related income and was studied both jointly and separately for disability and non-disability retirement. Disability retirement was also categorised in four diagnostic subgroups (mental, cardiovascular, musculoskeletal, and others). Data were analysed using logistic regression (competing risk) "duration" models.

Findings indicated that disability retirement was related to physical job strains, particularly musculoskeletal and cardiovascular disability, which might indicate a mismatch between the physical capabilities of older workers and physical job demands. Among men, both pathways to early retirement were related to low autonomy in job tasks and cardiovascular disability. Furthermore, psychological job stress was associated with lower non-disability retirement. However, the number of work factors was limited to three dimensions. If other work factors had been included, more associations between working conditions and early retirement could probably have been identified.

In this study, one third of early retirements among 60- to 67-year-olds were disability retirements and two thirds non-disability retirements. However, the AFP system covered only 80 % of employees in these age groups (50 % in the private sector and all public employees) and was also changed during the study period. Only employees were included in the study and occupations with earlier-than-normal retirement age were excluded. Furthermore, the Norwegian retirement system was reformed in 2011. Thus, although the study population was fairly representative of employees at the time, the results may not be totally generalizable to today's retirement situation and for all employed persons, both employees and self-employed. Moreover, non-disability early retirement is not available for most employees under the age of 62 years, thus, early retirement below this age will be predominantly disability retirement.

The authors states that covariates for age, education, income and health have been examined, as these variables may explain why job characteristics are correlated with retirement behaviour (i.e. they could be confounding the results). In a sub-analysis, they controlled for health (earlier sick leaves) to examine whether health selection could explain unexpected results, but did not find that it could. Some of the previous studies, referred in this article, did control for health, including Solem & Mykletun (1997) and Holte, Krokstad et al. (2000). However, if the health condition is work-related, and caused by the studied working conditions, health would represent a mediator, not a confounder, and should not be adjusted for when examining the relationship between

working conditions and early retirement. Thus, adjusting for health in studies of early retirement might lead to over-adjustment (Schisterman et al. 2009).

Midtsundstad's (2002b) analyses of survey data (a retrospective cohort study), covering 1 500 private sector employees and early retirees (all employed at age 60), showed that having a heavy workload (self-reported) increased the probability of drawing an AFP pension early, when other relevant factors were controlled for. She also found that many retirees themselves, especially blue-collar workers, related their early retirement to heavy workloads, long working careers and, among other factors, to the companies' retirement culture—i.e. that it was common at the workplace to retire at a certain age/as soon as possible (at age 62).

Furthermore, in a survey data (retrospective cohort) study of early retirement among government sector employees and early retirees (N=1 800), Midtsundstad (2005b) finds that (self-reported) age discrimination in the workplace increases the probability of early retirement. Analysing the retirement behaviour of municipal employees, Midtsundstad and Nielsen (2013) also find that lack of job autonomy and a poor relationship with middle management increases the probability of drawing an AFP pension as early as possible (at age 62), ceteris paribus.

Work environment and disability retirement

Numerous studies have examined the relationship between working conditions and disability retirement. Some have focused on physical work factors, others on psychosocial ones and some on different types of work factors. Few, however, have studied how these factors influence older workers' retirement behaviour.

Holte et al. (2000) studied the impact of five self-reported work characteristics on disability retirement during an 11-year observation period, based on 47 000 participants in The Nord-Trøndelag Health Study, HUNT1 (1984–86) and HUNT2 (1995–97). Disability retirement was significantly associated with physically demanding work (physically tired after work), low job autonomy, and job satisfaction, adjusted for age; however, associations were weaker for job stress and psychological demanding work, requiring concentration and attention (mentally tired after work). The associations persisted, although somewhat weakened, after adjustment for all other variables in the table (table 27 in Holte et al. 2000), including occupation (9 categories) and a binominal measure of health (long-standing physical or psychological illness or injury); however, adjusting for health and occupation may have led to some over-adjustment.

Another prospective study, by Holte et al. (2000), was based on registry and census data from all new disability pensioners with osteoarthritis in Norway during 1971–1980 and 1981–1990, registered as being between 50 and 56 years old and employed in either the 1970 or the 1980 census. Occupations were coded according to the Nordic Classification of Occupations and categorised in three groups, with very different work environments: manual workers (skilled and non-skilled), routine non-manual workers and professionals. The authors found that manual workers had nearly twice the probability of becoming a disability pensioner with osteoarthritis compared to professionals, after adjusting for part-time work, income, level of education, marital status and gender. The probability of becoming a disability pensioner with osteoarthritis was three times higher

in the 1980s compared to the 1970s. They concluded that the relatively strong association between manual work and disability pensioning with osteoarthritis suggested difficulties in adjusting manual work patterns for a person with osteoarthritis, which might have increased during the study period, as implied by the higher probabilities of disability pensioning in the 1980s.

The same authors (Holte et al. 2001) found, using the same three job categories, that manual work was a predictor of becoming a disability pensioner with rheumatoid arthritis among men, but less so among women. Moreover, they also found (Holte et al. 2002) that manual work was a predictor for becoming a disability pensioner with soft tissue rheumatism (which included fibromyalgia), for both men and women aged 30 to 39 years and followed-up with for 10 years, while being a parent was neither a risk factor nor a protective factor. They concluded that physically demanding employment, but not a physically demanding private life, predicted disability pensioning in this group, which might reflect that factors concerning a patient's private life are not taken into account when evaluating whether or not a disability pension should be granted, at least not for patients with uncertain medical conditions.

The studies by Holte et al. were prospective and included the total population in Norway, or in a Norwegian county (Nord-Trøndelag) considered to be fairly representative of the Norwegian population, although with somewhat greater proportions in primary production and manual work than in the country as a whole (Krokstad & Westin 2004). The registry- and census-based studies are considered to have complete data, and the HUNT studies had high participation rates (nearly 90 % and 70 %, respectively, for HUNT1 and HUNT2) (Krokstad et al. 2013).

Krokstad et al. (2002) also used questionnaire data from HUNT1 (1984–86) to identify determinants of disability pension in a 10-year follow-up study of the general working population of the county of Nord-Trøndelag (N=62 369). They found low levels of education, low self-perceived health, occupation-related factors and any long-standing health problem to be the strongest independent determinants, and stronger among younger people compared to those over 50 years. Four occupational risk factors were included. Work with high physical demands was found to increase the risk between 40 % and 55 % in the four groups (women/men, +/- 50 years of age), adjusted for a number of other factors (including age, educational level, employment status, health status, health behaviour and non-work psychosocial risk factors). Low job control increased the disability risk between 29 % and 40 % in all groups. Psychological demands (such as concentration and attention) only increased the risk significantly among women 50 to 66 years of age, by 33 %.

Emberland et al. (2017) used questionnaire data from 12 438 employees (18–62 years, with a mean age of 41.8 years; 55.5 % women) in 96 companies, representing a wide range of occupations, linked with disability registry data. During follow-up through 2014 (median 5.8 years), 6.4 % of the women and 2.0 % of the men were granted disability pension. The authors found that high physical workload nearly doubled the risk of disability pension, compared to low physical workload (hazard ratio, HR 1.93), and that high control over work intensity reduced the risk by nearly 40 %, compared to low control (HR 0.62). Moreover, fair leadership and positive challenge in work were also shown to reduce the risk of disability pension, both by more than 40 % (both HRs 0.56), while

role conflict increased the risk by more than 50 % (HR 1.55). Thus, they found that several specific psychological and social work factors were independent contributors to risk of disability retirement.

Foss et al. (2010, 2011) studied long-term sickness absence (> 8 weeks), based on data from 8 333 participants (aged 30 to 45 years) in the Oslo Health Study 2000–01 (HUBRO). During the 5-year follow-up (2001–2005), nearly 13 % of the women and 9 % of the men experienced at least one musculoskeletal sickness absence episode (Foss et al. 2011), while nearly 8 % and 4 %, respectively, had at least one psychiatric sickness absence episode (Foss et al. 2010). The authors found that heavy physical work increased the risk of long-term musculoskeletal sickness absence in both genders, while low job control or having shift/night work increased the risk among men only, and poor support from a superior increased the risk among women (Foss et al. 2011). Although women exhibited a higher risk of musculoskeletal sickness absence, the associations with job exposures were stronger for men. Moreover, Foss et al. (2010) found that poor support from a superior had an independent and moderate adverse effect on long-term psychiatric sickness absence, and appeared to be mediated through mental distress. These analyses indicate that poor work environment can make people mentally distressed, rather than that poor mental health leads to taking jobs with poor work environments.

Alfonso et al. (2016) performed a representative cohort study on self-reported occupational skin exposure in 2009 (5 items), based on data from Statistics Norway's Surveys of living conditions on working environment, linked with physician-certified sick leave (≥ 16 days in 2010). After adjustment for psychosocial and mechanical occupational exposures and education, sick leave was predicted by occupational skin exposure to cleaning products and waste among men, and occupational skin exposure to water among women. The estimated population risk attributable to occupational skin exposure was 14.5 %, which means that physician-certified sick leave (≥ 16 days) could, hypothetically, be reduced by 14.5 %, if the population were entirely unexposed for these skin exposure factors.

Claussen & Dalgaard (2009) tested the hypothesis that the gender divide in disability pensioning is attributable to differences in health, mental distress, occupation and income among 9 195 participants from the general working population (aged 40, 45, 59, and 60 years) in the Oslo Health Study (2000–2001), who were eligible for a disability pension. Survey data were linked to data from the National Insurance Administration. They found that 5 % of the eligible sample received a disability pension during the four years following the health survey. The age-adjusted odds of receiving a disability pension for women was greater (odds ratio, OR 1.41) than for men. Self-reported health significantly contributed to the risk of receiving a pension, and seemed to reduce the imbalance in disability rates between the genders, as did adjusting for level of mental distress. Further adjustment for occupation and working conditions reduced the gender divide to an insignificant level, and the inclusion of income level (income three years prior to pensioning) completely eliminated any gender difference in the risk of receiving a pension (OR 1.03 not significant, ns). The included work factors were job control (OR 2.07, after adjustment for gender, health, mental distress, occupation (8 categories), income and other work factors), shift work (OR 1.07 ns) and physically demanding work (OR 1.17 ns). They concluded that gender differences in disability pensioning in Oslo

were attributable to women's poorer self-reported health, greater levels of mental distress, lower wages and more unfavourable working conditions.

Similarly, they tested the hypothesis that differences in disability pensioning among different ethnic groups in the same population were attributable to differences in occupation, income, health and mental distress (Claussen et al. 2009). The authors found that an age- and gender-adjusted odds ratio of 2.27 among immigrants from developing countries and Eastern Europe, as compared to ethnic Norwegians, was reduced to 0.88 after adjusting for occupation, working conditions and income. This was further reduced to 0.63 when self-reported health and mental distress was included. In this study, job control (OR 1.82) was a somewhat weaker predictor than in the other study, but was adjusted for place of origin (i.e. Western, Non-Western), in addition to the other factors. They concluded that the higher risk of receiving a disability pension among immigrants from developing countries and Eastern Europe than among ethnic Norwegians was largely explained by work factors and level of income.

Haukenes et al. (2012) examined the extent to which self-perceived health, family situation and work factors could explain women's higher risk of disability pension across educational strata, based on the population-based Hordaland Health Study (HUSK), conducted in 1997–99 among inhabitants born in 1953–57. They included 5 959 men and 6 306 women in paid work, with valid information on education and self-perceived health. During the follow-up period (5–7 years), 99 (1.7 %) men and 230 (3.6 %) women were awarded disability pension. Except for a moderate impact of Self-perceived health, adjustment only for family situation and work factors only (occupational class and working hours per week) did not influence the gender difference in risk in the total population; however, among the highly educated, the gender difference in risk of disability pension was fully explained by self-perceived health and work factors.

Brage et al. (2007) studied predictors for low back disability in a prospective 12-year study of a random sample of occupationally active residents in (urban) Oslo and (rural) Lofoten in Norway (N=1 152, 20–55 years old in 1990). Emotional distress was the primary predictor studied, but they also included some work-related factors and found that physical job stress (from an index based on 6 items: physically demanding work, noise, air pollution, bad working postures, drafts and high work speed) was associated with low back disability, adjusted for low back pain (current or previous), emotional distress, sociodemographic factors, life style and non-work psychosocial factors. Organisational job stress and psychosocial job stress (both 4-item indexes) were non-significant, as was being unsatisfied with work.

Sterud (2013) examined the impact of five work-related psychosocial and eight mechanical risk factors for work disability, in a randomly drawn cohort from the general population, aged 18 to 66 (6 745 eligible respondents), based on the Surveys of living conditions on work environment, 2006 and 2009, by Statistics Norway. In total, 2.6 % (176 individuals) reported work disability in 2009, at 3-year follow-up. Disability rates were higher among women, older workers, and those with shorter education, as well as among people reporting higher levels of psychological distress and musculoskeletal complaints. After adjusting for these factors, work-related psychosocial predictors of disability were low levels of supportive leadership and monotonous work, while psycho-

logical job demands, job control and bullying/harassment did not show significant associations with disability in this study. Statistically significant mechanical factors were neck flexion, prolonged standing, whole-body vibration, and heavy physical work. The estimated population risk attributable to these factors was about 45 %, largest for standing (21 %) and monotonous work (19 %), for those exposed for three quarters of the workday. The author concluded that monotonous work, prolonged standing, neck flexion and whole-body vibration appeared to be the most consistent and important predictors of work disability.

Støver et al. (2013) investigated the associations between work environment factors (11 psychosocial and 13 physical) and disability pension, using data from a health survey (1988–89) of 5 749 working 40- to 42-year-old Norwegians from Nordland County, linked to a national register for disability pensions during a follow-up of over 18 years. They found that both cumulative physical and psychosocial work environmental exposures were associated with an increased risk of disability pension, although this association was attenuated for most variables after adjusting for baseline health, smoking, alcohol and education. A five-point increase on the cumulative index for poor psychosocial work environmental exposures (11 factors) was associated with a 22 % increased risk of disability after adjustments, whereas a similar increase on the cumulative index for poor physical work environmental exposures was associated with a 29 % increased risk. The individual factors showing the strongest associations were poor colleague fellowship, fear of reorganisation, low job satisfaction, vibrations, exhaust fumes and heavy lifting. The authors concluded that people who report a poor work environment are at a higher risk for subsequent work disability. This finding suggests that improving working conditions may be an area of intervention in order to reduce the number of people who leave the labour market with a disability pension.

New technology, restructuring and downsizing

Several studies have found that organisational change, new technology, restructuring and downsizing increases the probability of sickness absence, early retirement and welfare dependency (Midtsundstad 2002b; Midtsundstad 2005b; Lorentzen et al. 2006; Røed & Fevang 2007; Rege et al. 2009; Bratsberg et al. 2010).

Schøne (2009) analysed whether introduction of new technology and new work practices reduces the demand for older workers and increases the demand for younger workers in the hiring process, and found that technology is age-biased towards young, low-skilled workers. However, after sweeping away time-invariant unobserved firm effects by using a fixed-effects approach, most of the significant relationships disappear. Hence, the results seem to be driven by unobserved heterogeneity between firms and are not causal effects of technology and new work practices on the demand for workers in different age groups.

Becken (2012), on the other hand, found that the introduction of new technology influenced the choice of early retirement when time of introduction coincided with access to early retirement pension. This is also confirmed in a small qualitative study by Lotherington & Obstfelder (2014). This also supports the finding from an earlier case

study by Hilsen and Salomon (2010), where organisational change of every kind led to a "should I stay or is this the time to leave" decision for older workers with access to early retirement pension.

Midtsundstad also found in two retrospective cohort studies among 1 500 older workers and pensioners in the private sector (Midtsundstad 2002), and 1 800 older workers and pensioners in the governmental sector (Midtsundstad 2005), that a large part of those retiring on AFP at age 62 related their retirement to the introduction of new technology and/or employer demand for further workplace training, which they did not want to take part in. About 30 % of the early private sector retirees and about 20 % in the governmental sector related their retirement to either the introduction of new technology or demand for further training.

Human resource management (HRM)

Human resource management (HRM) and interventions can be defined as the role of organisations and the employer (human resource management includes recruitment and selection, enterprise policies, organisational health promotion, interventions and attitudes towards older workers in the organisation—e.g. discrimination) with respect to work participation. HRM and interventions cover initiatives and measures introduced by the employer (or the HR department) to strengthen the choice of work over early retirement ("stay" factors) or to counteract "push" factors.

There are a lot of Norwegian publications that relate discussions of HRM to older workers (cf. Midtsundstad 2003; Midtsundstad 2005a-c; Midtsundstad 2007; Bogen & Midtsundstad 2006; Midtsundstad & Bogen 2011; Midtsundstad 2011; Midtsundstad & Bogen 2011; Bogen & Hilsen 2013; Midtsundstad & Bogen 2014; Midtsundstad & Nielsen 2014; Midtsundstad 2014; Hilsen & Midtsundstad 2014; Midtsundstad 2015a-b; Hermansen & Midtsundstad 2015; Hilsen 2009; Terjesen et al. 2015; Terjesen & Salomon 2015; Terjesen, Lau et al. 2012).

Measures or programmes aimed at reducing early retirement and increasing employment of older workers can be categorised in different ways. Midtsundstad (2005, 2011) distinguishes between strategies for prevention, retention and integration. *Prevention* encompasses long-term efforts to ensure that employees do not end up in a vulnerable position in relation to the labour market. These initiatives are meant to prevent health problems and the loss of working capacity, competence and/or motivation, and are often aimed at all the company's employees rather than restricted to a particular group of employees such as, for example, those over 50. *Retention* initiatives target individuals who are already in a vulnerable position. They may have been threatened with exclusion, or have access to an early retirement scheme they wish to use. Retention initiatives will not have the same scope and long-term impact as prevention initiatives; they are for defined target groups and particular situations. For example, initiatives for the retention of older workers in Norway are often focused on employees around the age of 62 years who can retire on the AFP scheme. *Integration* includes policy initiatives targeting individuals outside the company (e.g. recruiting people who have typically had difficulty finding jobs

and/or permanent employment). As part of an old-age policy, different personnel policy interventions may be used to recruit or re-employ older workers.

Furthermore, Midtsundstad (2007) has distinguished between measures directed at the work itself in order to reduce work demands (e.g. reduction of workload or work hours, change of work tasks, restructuring, new technology etc.), and measures that are directed at the individual employee in order to strength their health and working capacity, and their competence or motivation, such as different health promotion programmes and lifelong learning. Measures that aim to encourage older workers to shift their priority from leisure time to work, or make it easier to combine work and family life, may also be used.

Salomon and Hilsen (2011) have therefore suggested that the various prevention and retention measures gain relevance during different stages of the working career, and propose a three-phase working career model. *Phase 1* starts from the first day on the job and continues as long as a person is active in working life. From day one, job content and job demands, work environment and competence management will influence the future career of the employee. The employees are exposed to their employer's HR policy and competence management systems. In *phase 2*, as employees get older, HR policy is still crucial for motivation and work performance. Still, at a certain stage, some employees experience a need for more specific support in order to perform their work to a satisfactory level. At the age of 50+ an increasing number of employees face some kind of health problem. Interventions during the second phase therefore focus on support directed at specific groups. *Phase 3* starts when employees come close to the time when they must decide whether to use existing early retirement schemes or continue working. At this stage, the aim of HR policies for prolonging working careers is to make the job so attractive that it can compete with a pension. Support measures will also be in use, but the main focus will change from the support perspective to the use of extra economic and social incentives to keep people working.

In other words, prevention, by definition, starts early, and thus does not only encompass older workers. A holistic approach must also start early, while special provision for older workers may be necessary later in their careers. Employers often use a combination of measures and initiatives, usually as part of an overall strategic plan (cf. Midtsundstad 2005a; Midtsundstad 2007; Steinum 2008; Midtsundstad 2011; Midtsundstad & Bogen 2011; Midtsundstad 2015a). Demands from older workers, or from unions on behalf of older workers, may also influence the types of measures selected (e.g. focusing on reduced working hours and economic incentives to retain those eligible for early retirement) (Midtsundstad & Bogen 2011; Midtsundstad & Bogen 2014).

Research on HRM and interventions concentrates on a range of issues and covers (at least) the following two main issues: attitudes to older workers and interventions.

Attitudes Towards Older Workers

Attitudes of employers, colleagues and older workers themselves influence actions and may have consequences for perceived work ability and retirement behaviour. Anti-

discrimination in recruitment/selection and promotion is a consequence of negative attitudes towards older workers and negative stereotypes (i.e. ageism). It is also an issue by itself, one that is covered in the literature. Solem (2010) and Solem and Mykletun (2009) find that managers show a less positive attitude towards "older" or "senior" applicants to jobs than to "young" and "experienced" applicants, and they hesitate to call in for interview applicants in their late 50s. This is based on analyses of the Norwegian Senior Policy Barometer, which has collected data yearly from national representative samples, starting in 2003. One sample consists of 750 managers and the other includes 1 000 employed persons aged 15 to 74. Managers in the public sector are more positive towards older workers than managers in the private sector. Age discrimination is one type of negative behaviour towards older workers, but its prevalence is hard to determine. Age discrimination has been illegal in Norway since 2004, but many workers are of the opinion that it still takes place. About four to five percent of workers indicate that they have been exposed to age discrimination in working life.

Other studies fail to find age barriers in recruitment, although they demonstrate that few managers planned to actively recruit older workers. Also, no overt negative attitudes towards seniors were expressed, and older managers seemed to be more positive towards older workers (Furunes and Mykletun 2005). However, through analysing managers' use of metaphorical images, another study based on the same data reveals negative stereotyping of a senior hospitality workforce (Furunes and Mykletun 2007; Furunes, Mykletun et al. 2011). In-depth analyses indicate that age discrimination towards seniors does exist, as managers seem to be biased. Some have positive experiences with a senior workforce, but when it comes to recruiting new employees, younger people are the first choice. In a 2010 survey among 800 Norwegian personnel managers/employers in companies with 10 or more employees, only 30 % stated that they felt a responsibility to recruit older workers (Midtsundstad & Bogen 2011). Nearly identical results were found in a similar company survey conducted in 2005. Furthermore, only six out of four managers had called an older worker (over 50) in for an interview in their latest recruitment process (Midtsundstad 2007). In a survey data (retrospective cohort) study of early retirement among government sector employees and early retirees, Midtsundstad (2005b) also found that (self-reported) age discrimination in the workplace increases the probability of early retirement. Analysing the retirement behaviour of municipal employees, Midtsundstad and Nielsen (2013) also found that lack of job autonomy and a poor relationship with middle management increased the probability of drawing an AFP pension as early as possible (at age 62), ceteris paribus.

Managers' attitudes towards older workers may be dependent on many factors. A study of data from 1 138 managers who were asked to rate their perceptions of 30 capabilities related to human development and working life (Furunes, Mykletun et al. 2011) finds that managers perceive ageing as contributing to increased managerial and interpersonal skills, creative problem-solving capacities and work ethic. On the negative side, age contributes to impaired learning capacities and basic functions. The researchers suggest that it is likely that managers working with older workers will develop conceptualisations of this part of the workforce that are closer to the characteristics demonstrated

by research on actual behaviour, hence prevailing stereotypes of these workers may not be so general and persistent as argued in the existing research.

Over the last few years there has been an increasing interest in the legal understanding of age discrimination in Norwegian working life. There have been some high-profile court cases where employees contested the termination of their contracts when retirement age was reached. The results are varied—in some cases, the employer won and some cases were won by the employee. Even if there are limited scientific reports or articles covering this theme, there are a few discussing the implication of the EU's directive on age discrimination in Norwegian law (Tollefsen 2013; Evju 2007; Evju 2006; Sigurdsen 2008). In addition, there is a wide range of master theses at the Faculty of Law at both the Universities of Oslo and Bergen (e.g. Aniksdal 2012; Beck 2011; Grændsen 2012; Gulbrandsen 2013; Lossius 2013; Lunke 2012; Sannerhaugen 2014; Volle 2014). A focus on the different measures and initiatives (mentioned above) may help prevent early retirement and promote longer working careers. The literature in this field underlines the importance of a holistic approach that covers the range of different measures as well as the entirety of working life, not one that is focused solely on older workers (Midtsundstad 2007; Hilsen and Salomon 2010; Salomon and Hilsen 2011), and underscores the argument that what happens at the end of the career is often informed by what has happened earlier. A holistic approach entails the consideration of the importance of motivation and workplace health promotion measures, such as protection, adaptation of the workplace, work tasks or working hours and other health promotion interventions.

Interventions

There is extensive research on HRM and interventions for prolonging working life among older workers in Norway. The types of interventions and the experiences of the older workers have been extensively studied through surveys and case studies. Most HR policies and different types of interventions are related to well-being at work, health, work ability and attitudes to retirement and expected (self-reported) retirement behaviour. The measurable "effect" is mostly defined as the older workers' wishes for a late exit.

Different qualitative studies of the relationship between work time reductions, extra days off, bonuses etc. on expected and actual retirement age fail to find any clear indications of the effect of such interventions, although all these interventions are highly appreciated by the older workers receiving them (Bogen & Midtsundstad 2007; Econ 2009; Hilsen 2009; Hilsen et al. 2009; Econ 2010; Hilsen & Salomon 2010; Becken 2011; Midtsundstad & Bogen 2011; Reichborn-Kjennerud et al. 2011; Becken 2012; Hilsen 2012; Bogen & Hilsen 2013).

A retrospective cohort study among governmental sector employees and retirees, using logistic regression, however, found that access to a retention program (active ageing measures) reduced the probability of drawing an AFP pension early (age 62), controlled for other relevant factors (Midtsundstad 2005b). The same was found in a similar survey

study from 2012 among municipality sector employees and retirees (Midtsundstad & Nielsen 2013).

I addition, several studies, based on combined survey and register data (2001–2007/2010) have analysed whether work place interventions actually offered by Norwegian companies have any effect on sickness absence, disability pensioning and/or voluntary early retirement behaviour, using either a difference-in-differences approach or a fixed-effect approach (natural experiment) (Midtsundstad, Hermansen et al. 2012; Midtsundstad, Nielsen et al. 2012; Midtsundstad et al. 2013; Hermansen 2014; Hermansen 2015; Hermansen & Midtsundstad 2015; Midtsundstad & Nielsen 2014; Midtsndstad & Nielsen 2016; Nielsen & Midtsundstad 2016).

The study by Midtsundstad, Hermansen et al (2012) did not find any effect on older workers' retirement behaviour when they were offered a retention programme in the period 2001–2007, neither did separate analyses of the effect of such retention programmes on retirement behaviour and sickness absence in the municipality sector find any statistical significant effects (Midtsundstad, Nielsen et al. 2012). However, Hermansen (2014), who studied the separate effect of individual retention measures based on data from 2000–2010, found that older workers who were offered extra days off had a reduced probability of drawing an AFP pension early (at age 62 and 63)—although being offered reduced working hours with some wage compensation did not (Hermansen 2015). Furthermore, Hermansen & Midtsundstad (2015) found that being offered a retention bonus reduced the probability of drawing an AFP pension at age 62 and 63. In other words, although being offered a retention measure per se did not seem to have any effect on the retirement behaviour, some of the retention measures offered seem to have an impact on the retirement behaviour, if not for all groups of employees, then at least for some. The studies thus far have, however, only looked at the effect on retirement at age 62 and 63, and not whether such measures could increase the total years in employment after the age of 62 and 63 or the productivity among those above 62 years of age.

Furthermore, in three different studies, investigating the effect of being offered different work place interventions to reduce sickness absence and disability, Midtsundstad & Nielsen found that work-related measures offered by Norwegian companies to prevent further injury and exhaustion among employees with reduced working capacity did not reduce sickness absence probability or sickness absence duration per year among older workers (Midtsundstad & Nielsen 2014; Nielsen & Midtsundstad 2016), although they did reduce the likelihood of disability pensioning among workers over 50 (Midtsundstad & Nielsen 2016; Nielsen and Midtsundstad 2016). One reason for this may be that adjustments of working conditions make it easier for people with health problems to continue working, which reduces disability rates. At the same time, people with health problems will have higher probability of sickness absence, so the sickness absence rates will increase.

However, research has shown that the causes of early retirement are complex and are generated by a number of different factors within, as well as, outside the workplace. One would therefore assume that in order to be effective, the initiatives and instruments launched to prevent early retirement need to vary between professions, industries, and

sectors. In Norway today, however, they do not. The options and the allocation criteria are surprisingly similar across industries and enterprises, despite the heterogeneity of needs, problems, and challenges (Bogen & Midtsundstad 2007, Midtsundstad & Bogen 2011, 2012, 2014, Bogen & Hilsen 2013). This may be one reason why active aging policies and the measures chosen by Norwegian companies are not necessarily effective in reducing early retirement. In addition, the costs of the measures offered may exceed the intended gains, as those who would continue working anyway also are entitled to the retention measures (Midtsundstad & Bogen 2011).

Summary

There has been an extensive research on ageing and retirement in Norway over the last 20 to 25 years, with some studies focusing on single aspects and others on a range of factors that can potentially predict early retirement and/or extended work careers. These studies are based on large-scale datasets from surveys (both cross-sectional and retrospective cohort studies), register data, longitudinal studies and qualitative studies.

The current Norwegian research literature shows that Norwegian labour market participation and retirement behaviour among older workers are affected by a multitude of factors at the macro, meso and micro level.

It is well documented that the labour market situation, including the business cycle, downsizing and unemployment, affects older workers labour market participation and retirement. Several studies have also documented that financial incentives and other features of the pension system and social insurance system influence how and when older workers retire, and whether they choose to work or not after drawing a pension. Furthermore, social position (sex, educational level and occupational position) influence the retirement pattern: blue collar workers retire earlier than white-collar workers. Demographic factors also affect retirement decisions. Older Norwegian workers' retirement behaviour are affected by gender, civic status, spouse's labour market situation and retirement, but to a lesser degree by caring responsibilities.

However, health, work ability and work environment seem to be among the most important factors. Table 4 below summarises the main conclusions regarding the effect of different work environment factors on labour market participation and early retirement among older workers (50+).

Work environment factors and association with retirement

Work factor	Number of Norwegian studies	Strength of documentation[1]
Occupational accidents	3	The association between occupational accidents and disability retirement is well-documented.
Chemical work factors		
Air pollutants, Exhaust fumes	2	We consider one study to be of high quality, showing strong association between disability pension and exhaust fumes. Due to the low number of studies we consider the association to be uncertain.
Cleaning agents and disinfectants	1	One study finds associations between sick leave and occupational skin exposure to cleaning products and waste among men, and water among women. Due to the low number of studies we consider the association to be uncertain.
Physical work factors		
Whole-body vibration	2	Both studies are of good quality and show a strong association with exit to disability pension. We consider the association to be well-documented.
Noise	1	Uncertain. Only one inconclusive study.
Strenuous work – high physical work demands	A multitude of studies	In general, the studies show a strong association between high physical work demands and retirement (both disability retirement and voluntary early retirement), and the association is well-documented. The most frequently reported work factors are: • Strenuous work • Heavy/awkward lifting • Repetitive work • Work with hands lifted • Prolonged standing

Continued. Work environment factors and association with retirement

Work factor	Number of Norwegian studies	Strength of documentation[1]
Psychosocial work factors	A multitude of studies	For some psychosocial work factors, the studies show conflicting results.
Job control/autonomy/ influence at work	5	Low job control/autonomy is strongly associated with disability retirement and voluntary early retirement in several studies. We consider the association to be well-documented.
Job satisfaction	1	Low job satisfaction is associated with disability retirement and voluntary early retirement. The studies are of high quality and we consider the association to be well-documented.
Shift work	1	Shift work does not contribute to gender difference in disability retirement. Due to the low number of studies we consider the association to be uncertain.
Psychological work demands (work speed, time pressure, emotional demands)	2	Psychological work demands are risk factors for early voluntary retirement. We consider the association to be well-documented.
Leadership support/quality	2	Low leadership support is associated with disability retirement and early voluntary retirement. We consider the association to be well-documented.
Poor colleague fellowship/ support	1	Poor colleague fellowship/support is a risk factor for disability retirement. Due to the low number of studies, and conflicting results with other Nordic countries, we consider the association to be uncertain.
Possibility for competence development	1	One study finds that high possibility for competence development predicts low transition to disability pension. We consider the association to be moderately documented.
Fear of reorganisation	1	Fear of reorganisation is a risk factor for disability retirement. Due to the low number of studies we consider the association to be uncertain.
Conflicts at work/ bullying/harassment	1	A study found bullying/harassment to be a non-significant risk factor for disability retirement. We consider the association to be well-documented, due to other Nordic studies.

Continued. Work environment factors and association with retirement

Work factor	Number of Norwegian studies	Strength of documentation[1]
Age discrimination	Several reports	Several reports document the existence of age discrimination. It seems well-documented that the most prominent effect of age discrimination is that older workers have very limited possibilities to get a new job if they become unemployed, and therefore often are forced to take early retirement.

[1] *The authors of the Nordic report have considered the level of documentation using a few simple and pragmatic criteria: If several studies have been performed in several Nordic countries, and the majority (all) of the studies point in the same direction, we consider it to be well-documented. If only one or two studies have been made, we consider the documentation to be uncertain. Only the results of the Norwegian studies are shown in the table.*

Although there has been an extensive research on ageing and retirement in Norway there is a need for more studies of:

- labour market mobility among older workers, to better understand how rehiring and recruiting processes affect older workers' labour market participation, and

- how different age management strategies and programmes, as well as workplace interventions, affect retirement behaviour and labour market participation.

There are also needs for mixed-methods projects (i.e. interdisciplinary studies combining register and survey studies with case studies and other forms of qualitative data). Although advanced econometric or epidemiologic analyses based on register (panel) data are the best way to document causal evidence, they often fail to explain the "how" and "why". In addition, a lot of important—and, especially, new and forthcoming—factors are not registered in administrative registers. It is therefore important to prioritize qualitative and survey-based studies, in order to understand the complexity of older workers' retirement decisions and labour market participation.

References

Andersen, R. K. (2007). *Reaktivisering av uførepensjonister*. Fafo rapport 2007:10. Oslo, Fafo Institutt for arbeidslivs- og velferdsforskning.

Aniksdal, J. (2012). *Vern mot alderdiskriminering ved opphør av arbeidsforhold: Herunder utvelgelseskriterier, sluttpakkeordninger*. Master thesis. Det juridiske fakultet, Universitetet i Oslo.

Andreassen, L. and T. Kornstad (2010). *Transitions to disability and rehabilitation*. Discussion paper no. 641. Oslo, Statistics Norway, Research Department.

Bass, B.M. & Riggio, R.E. (2006). *Transformational Leadership* (2nd ed.). Erlbaum.

Beck, N. (2011). *Aldersgrenser i arbeidsforhold: Om adgangen til å bringe arbeidsforhold til opphør i henhold til aml. § 15-13a*. Master thesis. Det juridiske fakultet, Universitetet i Oslo.

Becken, L-E. (2015). *Livslang læring og ansettbarhet for arbeidstakere over 55 år. Utarbeidet for Senter for seniorpolitikk*. Proba-rapport nr. 2015-11. Oslo: Proba.

Becken, L-E. (2012). Seniortiltak og pensjoneringsatferd for seniorer med rett til AFP i statlig sektor. *Søkelys på arbeidslivet*, 2012, Vol.29(04), pp.349-367

Becken, L. E. (2011). "Redusert arbeidstid med full lønnskompensasjon blant seniorer med rett til AFP i fire statlige etater." *Søkelys på arbeidslivet* , vol. 28(4): 374 - 393.

Becken, L. E. (2012). "Seniortiltak og pensjonerings-adferd for seniorer med rett til AFP I statlig sector." *Søkelys på arbeidslivet*, vol. 29(4): 349-367.

Bjørngaard, J., Krokstad, S., Johnsen, R., Oxaas Karlsen, A., Pape, K., Støver, M., Sund, E. R. and Westin, S. (2009). "Epidemiological research on disability benefits in the Nordic countries." *Norsk Epidemiologi*, vol. 19(2): 103-114.

Blekesaune, M. (2012). Gender roles and disability retirement. *Tidsskrift for samfunnsforskning* 53(1):33-48 · January 2012.

Blekesaune, M. (2015). Can Self-Enhancement Values Predict Retirement Behavior? An Analysis Combining Survey and Register Data From Norway. *The International Journal of Aging and Human Development* 80(2):101-14.

Blekesaune, M. Skirbekk, V. (2012). Can personality predict retirement behaviour? A longitudinal analysis combining survey and register data from Norway. *European Journal of ageing*. September 2012. DOI: 10.1007/s10433-011-0212-6

Blekesaune, M. and P. E. Solem (2005). "Working conditions and early retirement a prospective study of retirement behavior." *Research on Aging*, vol. 27(1): 3-30.

Bogen, H. and A. I. Hilsen (2013). *Seniorpolitikk under skiftende forhold. Gjenbesøk i seks kommuner.* Fafo-rapport 2013:07. Oslo, Fafo Institute for Labour and Social Research.

Bogen, H. and T. Midtsundstad (2007). *Noen år til. Erfaringer med seniorpolitikk i seks kommuner,* Fafo-rapport 2007:28. Oslo, Fafo Institute for Labour and Social Research.

Brage S, Sandanger I, Nygård JF. 2007. Emotional distress as a predictor for low back disability: a prospective 12-year population-based study. *Spin*e, vol. 32(2):269-274.

Bratsberg, B., Fevang, E. and Røed, K. (2010). *Disability in the welfare state: An unemployment problem in disguise?* Discussion paper series // Forschungsinstitut zur Zukunft der Arbeit, No. 4897. Der Open-Access-Publikationsserver der ZBW – Leibniz-Informationszentrum Wirtschaft www.econstor.eu, Institute for the Study of Labor (IZA).

Brinch, C. N., Hernæs, E. and Jia, Z. (2012). *Labor supply on the eve of retirement. Disparate effects of immediate and postponed rewards to working.* Discussion papers no. 698. Oslo, Statistics Norway. Research department.

Bruusgaard, D., Smeby, L. and Claussen, B. (2010). "Education and disability pension: a stronger association than previously found." *Scandinavian Journal of Public Health*, vol. 38(7): 686-690.

Bråthen, M. (2011). *Uførepensjonisters tilknytning til arbeidslivet.* NAV-rapport. Oslo, Arbeids- og velferdsdirektoratet, Stab for analyse og strategi / Seksjon for utredning.

Bråthen, M. and F. Bakken (2013). *Arbeid eller pensjon? En studie av hvilke faktorer som påvirker seniorenes beslutning om å fortsette i jobb?* NAV-rapport 2013:1. Oslo, Arbeids- og velferdsdirektoratet (NAV).

Bråthen, M. and A.-C. Grambo (2009). "Sysselsettingseffekten av endrede regler for alderspensjon for 67-åringer." *Arbeid & Velferd*, 2009(2).

Bråthen, M. & Nielsen, R.A. (2016). *Uførereformen. Konsekvenser for yrkesaktiviteten.* Fafo-report 2016: 27. Oslo, Fafo Institute for Labour and Social research.

Cedefop, et al. (2006). *"Promoting Lifelong Learning for Older Workers." An International Overview,* Luxemburg.

Christensen, A. M., Fredriksen, D., Lien, O. Ch. and Stølen, N. M. (2012). Pension reform in Norway: combining an NDC approach and distributional goals. Robert Holzmann, Edward Palmer and D. Robalino (eds.), *Nonfinancial Defined Contribution Pension Schemes in a Changing Pension World 2010 2075*. PublicProgress, Lessons, and Implementation. Washington DC, The World Bank: 129-158.

Claus, G., Nordby, P. and Næsheim, H. (2014). *Yrkesaktivitet blant eldre før og etter pensjonsreformen.* Rapport 2014/19. Oslo, Statistic Norway.

Claussen B, Dalgard OS, Bruusgaard D. 2009. Disability pensioning: can ethnic divides be explained by occupation, income, mental distress, or health? *Scandinavian Journal of Public Health*, vol. 37(4):395-400.

Claussen B, Dalgard OS. 2009. Disability pensioning: the gender divide can be explained by occupation, income, mental distress and health. *Scandinavian Journal of Public Health*, vol. 37(6):590-597.

Commission, E. (2012). *Active ageing and solidarity between generations: A statistical portrait of the European Union 2012,* Luxembourg: Publications Office. Eurostat statistical books.

Daatland, S. O. and B. R. Slagsvold (2013). *Vital aldring og samhold mellom generasjoner. Resultater fra Den norske studien av livsløp, aldring og generasjon (NorLAG) – runde 1 og 2.* . NOVA Rapport 15/2013. Oslo, Norsk institutt for forskning om oppvekst, velferd og aldring - NOVA.

Dahl, E. H. and O. C. Lien (2013). "Pensjonsreformen - flere eldre i arbeid." *Arbeid & Velferd*, 2013(1): 58-70.

Dalen, E. (2013). *Norsk Seniorpolitisk Barometer 2013. Kommentarrapport LEDERE I ARBEIDSLIVET.* Oslo, Ipsos MMI AS.

Dalen, E. (2016a). *Norsk Seniorpolitisk Barometer 2016. Kommentarrapport LEDERE I ARBEIDSLIVET.* Oslo, Ipsos MMI AS.

Dalen, E. (2016b). *Norsk Seniorpolitisk Barometer 2016. Kommentarrapport* ARBEIDTAKERE *I ARBEIDSLIVET.* Oslo, Ipsos MMI AS.

Econ Pöyry (2009). *Redusert arbeidstid for seniorer med rett til AFP. Utarbeidet for Senter for seniorpolitikk.* ECON-rapport nr. 2009-084. Oslo, Econ Pöyry.

Econ Pöyry (2010). *Evaluering av forsøk med redusert arbeidstid for seniorer.* Sluttrapport. Econ-rapport nr. 2010-044. Oslo, Econ Pöyry.

Ellingsen, G. and K. Røed (2006). *Analyse av aldersdifferensiert arbeidsgiveravgift.* Frisch rapport 2006/5. Oslo, Stiftelsen Frischsenteret for samfunnsøkonomisk forskning (Ragnar Frisch Centre for Economic Research).

Ellingsen, J. (2016). *Utviklingen i uføretrygd per 31. desember 2015.* Notat fra Arbeids- og velferdsdirektoratet/ Statistikkseksjonen.

Emberland, J.S. and Knardahl, S. (2015). Contribution of psychological, social, and mechanical work exposures to low work ability: a prospective study. *Journal of Occupational and Environmental Medicine*, vol. 57(3):300-314.

Emberland JS, Nielsen MB, Knardahl S. Psychological, social, and mechanical work exposures and disability retirement: a prospective registry study. *BMC Public Health*. 2017; 17(1): 56.

Evju, S. (2007). Aldersdiskriminering, pensjonsalder og aldersgrense ; EF-domstolens dom 16. oktober 2007, sal C-411/05 Palacios de la Villa - Cortefiel Servicios SA. *Nytt i privatretten*, 2007, Årg. 9, nr. 4, pp.2-3.

Evju, S. (2006). Aldersdiskriminering, likebehandling og pensjonsalder; om Mangold, Chacón Navas - og arbeidsmiljølovens kap. 13. *Arbeidsrett,* 2006, Vol. 3, nr 3, pp.137-161.

Fevang, E., Kverndokk, S. and Røed, K. (2008). *Informal care and labor supply*. IZA discussion papers, No. 3717. Bonn, Institute for the Study of Labor (IZA).

Fevang, E. and K. Røed (2006). *Veien til uføretrygd i Norge*. Rapport 10/2006. Oslo, Ragnar Frisch Centre for Economic Research.

Foss L, Gravseth HM, Kristensen P, Claussen B, Mehlum IS, Skyberg K. Risk factors for long-term absence due to psychiatric sickness: a register-based 5-year follow-up from the Oslo health study. J Occup Environ Med. 2010; 52(7): 698-705.

Foss L, Gravseth HM, Kristensen P, Claussen B, Mehlum IS, Knardahl S, Skyberg K. The impact of workplace risk factors on long-term musculoskeletal sickness absence: a registry-based 5-year follow-up from the Oslo health study. J Occup Environ Med. 2011; 53(12): 1478-82.

Fransson E.I., Heikkilä K., Nyberg S.T., Zins M., Westerlund H., Westerholm P., Väänänen A., Virtanen M., Vahtera J., Theorell T., et al. (2012). Job Strain as a Risk Factor for Leisure-Time Physical Inactivity: An Individual-Participant Meta-Analysis of Up to 170,000 Men and Women: The IPD-Work Consortium. *American Journal of Epidemiology*, vol. 176:1078–1089.

Furunes, T. and R. J. Mykletun (2005). "Managers' perceptions of older workers in the hotel and restaurant industry." *International Congress Series* 1280: 275-280.

Furunes, T. and R. J. Mykletun (2007). "Why diversity management fails: Metaphor analyses unveil manager attitudes." *International Journal of Hospitality Management* , vol. 26(4): 974-990.

Furunes, T., Mykletun, R. J. and Solem, P. E. (2011). "Age management in the public sector in Norway: exploring managers' decision latitude." *The International Journal of Human Resource Managemen*t, vol. 22(6): 1232-1247.

Furunes, T., Mykletun,R.J. and Solem, P.E. (2012). How do different exit routes from work affect older workers' self-esteem? *Handbook on Psychology of Self-Esteem*. D. W. Meszaros, Nova Science Publishers, Inc.: 325-337.

Furåker, B., Nergaard, K. and Salonieni, A. (2014). "Lock-in Patterns among Employees: A Nordic Comparison." *The International Journal of Comparative labour Law and Industrial relations*, vol. 30(4): 453-458.

Galaasen, A. M. and Sørbø, J. (2013). Pensjonsreformen og arbeidsledige over 60 år. *Arbeid og velferd*, nr. 1 2013.

Gamperiene, M., Hilsen, A.I. and Skarpaas, I. (2010). *Hvis bare helsa holder... - En kartleggingsstudie av kvinners helse, arbeidsevne og holdninger til pensjonering.* AFI-paper 2010/8. Oslo, Work Research Institute.

Gautun, H. and K. Hagen (2010). "How do middle-aged employees combine work with caring for elderly parents?" *Community, Work & Family*, vol. 13(4): 393-409.

Gravseth HM, Bjerkedal T, Irgens LM, Aalen OO, Selmer R, Kristensen P. Life course determinants for early disability pension: a follow-up of Norwegian men and women born 1967-1976. Eur J Epidemiol. 2007; 22(8): 533-43.

Gravseth HM, Bjerkedal T, Irgens LM, Aalen OO, Selmer R, Kristensen P. Influence of physical, mental and intellectual development on disability in young Norwegian men. Eur J Public Health. 2008; 18(6): 650-5.

Grændsen, I. C. (2012). *Rekkevidden av vernet mot aldersdiskriminering ved pliktig avgangsalder*. Master thesis. Det juridiske fakultet, Universitetet i Oslo.

Gulbrandsen, S. (2013). *Aldersdiskriminering og aldersgrenser i arbeidslivet-Bedriftsfastsatte aldersgrensers lovlighet, vilkår og hensiktsmessighet*. Master thesis. Det juridiske fakultet, Universitetet i Oslo.

Haga, O. & Lien, O. C. (2016). "Forventa pensjoneringsalder og yrkesaktivitet." *Arbeid & Velferd*, 2016(2): 105-115.

Hagen, K.B., Tambs, K. and Bjerkedal, T. (2002). A prospective cohort study of risk factors for disability retirement because of back pain in the general working population. *Spine*, vol. 27(16): 1790-1796.

Hagen, K.B., Tambs, K. and Bjerkedal, T. (2006). What mediates the inverse association between education and occupational disability from back pain? - A prospective cohort study from the Nord-Trøndelag health study in Norway. *Social Science and Medicine*, vol. 63(5): 1267-1275.

Halvorsen, B. and J. Tägtström (2013). *A matter of health and job satisfaction Seniors, work and retirement in the Nordic region*. Copenhagen, Nordic Council of Ministers.

Hansen, H.T. and Ingebrigtsen, T. (2008). Social Class and Sickness Absence in Norway. Acta Sociologica, vol. 51(4): 309-327.

Hauge, L. and T. Årethun (2008). *Kven går av med AFP?* NAV-rapport 2008/3. Oslo, Arbeids- og velferdsdirektoratet (NAV).

Haukenes, I., Mykletun, A., Knudsen, A., Hansen, H.-T. and Mæland, J. (2011). Disability pension by occupational class – the impact of work-related factors: The Hordaland Health Study Cohort. *BMC Public Health*, vol. 11: 406.

Haukenes, I., Gjesdal, S., Rortveit, G., Riise, T., Mæland, J.G. (2012). Women's higher likelihood of disability pension: the role of health, family and work. A 5-7 years follow-up of the Hordaland Health Study. *BMC Public Health,* vol. 12: 720.

Haukenes, I., Farbu, E.H., Riise, T., Tell, G.S. (2014). Physical health-related quality of life predicts disability pension due to musculoskeletal disorders: seven years follow-up of the Hordaland Health Study Cohort. *BMC Public Health*, vol. 14: 167.

Hedström, P. (2005). *Dissecting the social: On the principles of analytical sociology*, Cambridge University Press Cambridge.

Hermansen, Å. (2011). *Pensjonering før fylte 67 år. Tidligpensjonering og bruk av AFP innen KS' tariffområde 2002–2009*. Fafo-report 2011: 23. Oslo, Fafo Institute for Labour and Social Research.

Hermansen, Å. (2015). Retaining older workers: The effect of phased retirement on delaying early retirement. *Nordic Journal of Social Research.* Vol. 6 2015.

Hermansen, Å. (2014). Additional leave as the determinant of retirement timing—retaining older workers in Norway. *Nordic Journal of Working Life Studies.* Vol. 4(4):89-108.

Hermansen, Å. & Midtsundstad, T. (2015). Retaining older workers - analysis of company surveys from 2005 and 2010. *International Journal of Manpower*, vol. 36(8):1227-1247. DOI 10.1108/IJM-07-2014-0150.

Hermansen, Å. & Midtsundstad, T. (2015). "The effect of retaining bonuses on early retirement - retaining older Norwegian workers." Paper presented at The 12th ESA e *Conference - Differences, Inequalities and Social Imagination,* Praha, 25.-28. August 2015.

Hyggen, C. (2007). *Tidligpensjonering og AFP. Pensjonering før fylte 67 år innen KS' tariffområde 2002–2006*. Fafo-report 2007:39. Oslo, fafo Institute for labour and Social Research.

Hernæs, E., Markussen, S., Piggott, J. and Røed, K. (2016). Pension reform and labor supply. *Journal of Public Economics*, *142*, pp.39-55.

Hernæs, E. and Z. Jia (2009). *Labour supply response of a retirement earnings test reform,* Memorandum//Department of Economics, University of Oslo.

Hilsen, A. I. (2009). *"Go for a senior": From work ability to senior resources, changing perceptions of seniors in working life*, PhD-thesis, NTNU, Tapir Uttrykk.

Hilsen, A. I. (2012). *Seniorpolitikk i store virksomheter - følgeevaluering ved St. Olavs Hospital.* AFI-rapport 2012:15. Oslo, Work research Institute.

Hilsen, A. I., Olsvik, V.M. and Steinum, T. (2009). *På seniorvis. Seniorpolitikk i kvinnedominerte bransjer, tiltak for å hindre tidligavgang i hotell og helsevesen.* AFI-rapport 2009:4. Oslo, Work Research institute.

Hilsen, A. & Salomon, R. (2010). *Seniorpolitikk—virker virkemidlene.* AFI-rapport 4: 2010. Oslo, Work Research Institute.

Hilsen, A.I. & Tønder, A.H.(2012) *Hvordan beholde, utvikle og overføre kompetanse?* Fagartikkel for Senter for seniorpolitikk.

Hippe, J.M. and Vøien, H. G. (2014). *An analysis of future benefits from public and private pension schemes. The Norwegian country study to the OECD pension adequacy project.* Fafo-report 2014:21. Oslo, Fafo Institute for Labour and Social Research.

Hult, C. and Edlund, J. (2008). Age and Labour Market Commitment in Germany, Denmark, Norway and Sweden. *Work Employment & Society* 22(1):109-128 · March 2008.

Holte, H. H., Krokstad S. and Magnus P. 2000. *Årsaker til uførepensjonering [Causes of disability retirement.] Oslo: Norwegian Institute of Public Health*, Report no 5. https://www.fhi.no/globalassets/migrering/dokumenter/pdf/arsaker-til-uforepensjonering-pdf.pdf

Holte, H.H., Tambs, K. and Bjerkedal, T. 2000. Manual work as predictor for disability pensioning with osteoarthritis among the employed in Norway 1971-1990. *International Journal of Epidemiology*, vol. 29(3):487-94.

Holte, H.H., Tambs, K. and Bjerkedal, T. 2001. Becoming a disability pensioner with rheumatoid arthritis in Norway 1971-1990. *Journal of Rheumatology*, vol. 28(1):54-61.

Holte, H.H., Tambs, K. and Bjerkedal, T. 2002. Physically demanding situations as predictors of disability pensioning with soft tissue rheumatism among persons 30-39 years old in Norway, 1981-90. *Journal of Rheumatology*, vol. 29(8):1760-1766.

Jia, Z. (2005). "Labor supply of retiring couples and heterogeneity in household decision-making structure." *Review of Economics of the Household*, vol. 3(2): 215-233.

Jia, Z. (2005). *Retirement behavior of working couples in Norway. a dynamic programming approach.* Discussion Papers No. 405, Feburary 2004. Oslo, Statistics Norway, Research Department.

Jebens, E., Mamen, A., Medbø, J.I., Knudsen, O. and Veiersted, K.B. (2015). Are elderly construction workers sufficiently fit for heavy manual labour? *Ergonomics*, vol. 58(3):450-462.

Jebens, E., Medbø, J.I., Knudsen, O., Mamen, A. and Veiersted, K.B. (2014). Association between perceived present working conditions and demands versus attitude to early retirement among construction workers. *Work*, vol. 48(2):217-228.

Kostøl, A. R. and M. Mogstad (2013). *How financial incentives induce disability insurance recipients to return to work.* Discussion papers no. 685. Oslo, National Bureau of Economic Research.

Kotsadam, A. (2011). "Does informal eldercare impede women's employment? The case of European welfare states." *Feminist Economics*, vol. 17(2): 121-144.

Kristensen P, Gravseth HM, Bjerkedal T. Influence of early life factors on social inequalities in psychiatric outcomes among young adult Norwegian men. Eur J Public Health. 2010; 20(5): 517-23.

Krokstad S, Johnsen R, Westin S. 2002. Social determinants of disability pension: a 10-year follow-up of 62 000 people in a Norwegian county population. *International Journal of Epidemiology*, vol. 31(6):1183-1191.

Krokstad S, Westin S. 2004. Disability in society-medical and non-medical determinants for disability pension in a Norwegian total county population study. *Social Science and Medicine*, vol. 58(10):1837-1848.

Krokstad, S., Langhammer, A., Hveem, K., Holmen, T.L., Midthjell, K., Stene T.R., Bratberg, G., Heggland, J. and Holmen, J. 2013. Cohort Profile: the HUNT Study, Norway. *International Journal of Epidemiology*, vol. 42(4):968-977.

Lien, O. C. (2014). "Få bytter jobb etter fylte 50 år." *Arbeid & Velferd*, 2014(1): 37-50.

Lie, A. (2008)."Inclusive Working Life" in Norway - Experience from "Models of Good Practice" enterprises. *Croatian Medical Journal* 49(4):553-60 . September 2008. DOI: 10.3325/cmj.2008.4.553.

Lorentzen, T., Løken, E. and Trygstad, S. (2006). "Den nye staten: Omstillingens effekter på ansattes fravær og trygdemottak." *Søkelys på arbeidsmarkedet*, vol. 23(2): 249-258.

Lossius, C. J. (2013). *Eldre arbeidstakeres menneskerettslige vern til å fortsette i arbeid. En nærmere vurdering av samspillet mellom norsk internrett og menneskeretten i et arbeidsrettslig perspektiv.* Master thesis. Det juridiske fakultet, Universitetet i Bergen.

Lotherington, A.T. & Obstfelder, A. (2014). «Du må være ung for å henge med i dag!» - Inkluderings- og ekskluderingsmekanismer på det høyteknologiske sykehuset. *Søkelys på arbeidslivet*, 2014, Vol.(01-02), pp.118-135

Lund J, Bjerkedal T. 2001. Permanent impairments, disabilities and disability pensions related to accidents in Norway. *Accident Analysis & Prevention*, vol. 33(1): 19-30.

Lunde, L.K., Koch, M., Veiersted, K.B., Moen, G.H., Wærsted, M. and Knardahl, S. (2016). Heavy Physical Work: Cardiovascular Load in Male Construction Workers. International Journal of Environmental Research and Public Health, vol. 13(4):356.

Lunke, C. (2012). *Vektlegging av alder ved nedbemanning: Interesseavveining og utvelgelse etter arbeidsmiljøloven § 15-7, med særlig vekt på alder som utvelgelseskriterium og forholdet til reglene om aldersdiskriminering.* Master thesis. Det juridiske fakultet, Universitetet i Oslo.

Madsen, P. K., Rasmussen, S., Virjo; I., Dølvik, j. E., Nergård, K., Svalund, J., Furuåker, B., Berglund, T. and Lovén, K. (2010). *Labour Market Mobility in nordic Welfare States*. TemaNord 2010:5151. Københvan: Nordisk Ministerråd.

Mehlum, I.S. (2011). Hvor mye av sykefraværet er arbeidsrelatert? *Tidsskrift for Den norske legeforening*, vol. 131(2):122–125.

Meld. St. 12 (2012–2013) Report to the Storting (White Paper) *Long-term Perspectives on the Norwegian Economy 2013*.

Midtsundstad, T. (1999). *Forventet pensjoneringsalder og pensjoneringsmønstre blant kommunalt ansatte seniorer.* Fafo-notat (working paper) 1999:04. Oslo, Forskningsstiftelsen Fafo.

Midtsundstad, T. (2001). *Pensjonering i stat og skoleverk. Analyse av registerdata fra Statens Pensjonskasse 1996 og 1999*. Fafo-notat 2001:01. Oslo, Forskningsstiftelsen Fafo.

Midtsundstad, T. (2002a*). Tidlig pensjonering i stat og skoleverk. En analyse av registerdata fra Statens pensjonskasse for 2000*. Fafo-notat 2002:12. Oslo, Forskningsstiftelsen Fafo.

Midtsundstad, T. (2002b). *AFP-pensjonisten: sliten–eller frisk og arbeidsfør? En analyse av tidlig pensjonering og bruk av AFP i privat sektor*. Fafo-rapport 385. Oslo, Fafo Institute for Labour and Social Research.

Midtsundstad, T. (2003). "Yrke bestemmer avgangen: En beskrivelse av tidlig pensjonering blant statsansatte." *Søkelys på arbeidsmarkedet*, vol. 20 (1): 101-112.

Midtsundstad, T. (2005a). *Ikke nødvendigvis sliten - en analyse av tidligpensjonering og seniorpolitikk i staten*. Fafo-rapport 482. Oslo, Fafo Institute for Labour and Social Research.

Midtsundstad, T. (2005b). "Ikke nødvendigvis sliten... En analyse av AFP-pensjonering i staten." *Søkelys på arbeidsmarkedet,* vol. 22(2): 217-232.

Midtsundstad, T. (2005c). "Virksomhetenes sosiale ansvar." I Torp, H.(red.), *Nytt arbeidsliv. Medvirkning, inkludering og belønning*. Oslo: Gyldendal Akademisk.

Midtsundstad, T. (2007a). *Fra utstøting til inkludering? : en kartlegging av norske virksomheters arbeidskraftstrategier overfor eldre arbeidstakere*. Fafo-report 2007: 37. Oslo, Fafo Institute for Labour and Social Research.

Midtsundstad, T. (2007b). *Pensjonering før fylte 67 år. Tidligpensjonering og bruk av AFP innen KS' tariffområde 2002–2004*. Fafo-rapport 509. Oslo, Fafo Institute for Labour and Social Research.

Midtsundstad, T. (2009). "Går vi av tidlig for å pleie mor." *Søkelys på arbeidslivet*, vol. 26(2): 137-252.

Midtsundstad, T. I. (2011). "Inclusive workplaces and older employees: an analysis of companies' investment in retaining senior workers." *The International Journal of Human Resource Management*, vol. 22(06): 1277-1293.

Midtsundstad, T. (2012). «Pengene eller livet?» Eldres arbeidsmotivasjon og yrkesdeltakelse». S. In Stjernø, S. and E. Øverbye (eds.), *Arbeidslinja. Arbeidsmotivasjonen og velferdsstaten*. Oslo, Universitetsforlaget.

Midtsundstad, T. (2014). *Voksende seniorengasjement i norsk arbeidsliv. En virksomhetsundersøkelse fra 2013*. Fafo-rapport 2014:30. Oslo, Fafo Institute for Labour and Social Research.

Midtsundstad, T. (2015). *IA som strategi for lengre yrkeskarrierer. En analyse av virksomhetenes seniorpolitikk og dens effekt på tidligpensjoneringen.* Avhandling for graden Phd. Nr. 537. Oslo: Institutt for sosiologi og samfunnsgeografi, Universitetet i Oslo.

Midtsundstad, T. and H. Bogen (2011a). How the Worker Collective may Moderate Active Ageing Policy and its Outcomes', In R. Ennals and R. Salomon (eds.) *Older Worker in a sustainable society, Labour, Education & Society*,.Vol 21. Peter Lang.

Midtsundstad, T. and H. Bogen (2011b). "Seniorpolitikk – behov for justering? Analyse av praksis i seks foregangskommuner." *Søkelys på arbeidslivet* , vol. 28(1-2): 89-106.

Midtsundstad, T. and H. Bogen (2011c*). Ulikt arbeid - ulike behov : seniorpolitisk praksis i norsk arbeidsliv*. Fafo-rapport 2011: 10. Oslo, Fafo Institute for Labour and Social Research.

Midtsundstad, T. and H. Bogen (2014). "Active Aging Policies between Individual Needs and Collective Goods. A Study of Active Aging Policies and Practices in Norway." *Nordic Journal of Working Life Studies*, vol. 4(2): 139-158.

Midtsundstad, T., Hermansen, Å. and Nielsen, R. A. (2012). "Effects of companies' initiatives to reduce early retirement among older workers." *Nordic Journal of Working Life Studies*, vol. 2(3): pp. 89-108.

Midtsundstad, T. and Nielsen, R. A. (2013). *Arbeid, pensjon eller begge deler? En analyse av kommunalt ansattes pensjoneringsadferd.* Fafo-rapport 2013:12. Oslo, Fafo Institute for Labour and Social Research.

Midtsundstad, T. and Nielsen, R. A. (2014a). *Arbeid og pensjon i kommunal sektor. Analyse av survey- og registerdata fra før og etter pensjonsreformen.* Fafo-rapport 2014: 45. Oslo, Fafo Institute for Labour and Social Research.

Midtsundstad, T. and Nielsen, R. A. (2014b). Do work-place initiated measures reduce sickness absence? Preventive measures and sickness absence among older workers in Norway. *Scandinavian Journal of Public Health*, vol. 42 (2): 207–214.

Midtsundstad, T. and Nielsen, R. A. (2016). Do workplace interventions reduce disability rates? *Occupational Medicine*, vol. 66(9):691-697.

Midtsundstad, T., Nielsen, R. A. and Hermansen, Å. (2012). "Tilrettelegging og seniortitak – påvirker det kommuneansattes sykefravær og tidligpensjonering?" *Søkelys på arbeidslivet*, vol. 29(1): 130-150.

Midtsundstad, T., Nielsen, R.A. and Hermansen, Å. (2013). *Virksomhetenes seniortiltak. Har de effekt på seniorenes sykefravær og tidligpensjonering?* Fafo-notat 2013:01. Oslo, Fafo Institutt for arbeidslivs- og velferdsstudier.

Moen, B.E., Bråtveit, M., Møllerløkken, O.J., Koldal, G. and Tjalvin, G. (2013). *Elbok i arbeidsmedisin.* Universitetet i Bergen, Institutt for global helse og samfunnsmedisin, Arbeids- og miljømedisin, Bergen, 2013. ISBN 978-82-9123283-6.

Myklebø, S. (2011). *Overgang til arbeid og aktivitet blant tidligere NAV-brukere.* Report No. 3/2011. Oslo, Norwegian Labour and Welfare Administration (NAV).

Nielsen MB, Knardahl S. Does human resource primacy moderate the impact of psychological distress on subsequent risk for disability retirement? Scand J Work Environ Health. 2017; 43(2): 187-190.

Nielsen, R. A. og Midtsundstad, T. (2016). *Virker tiltakene? Effektanalyser av virksomhetsinitierte tiltak på ansattes sykefravær og uførepensjonering.* Fafo-notat 2016:12. Oslo, Fafo Institute for Labour and Social Research.

NOA 2011. *Faktabok om arbeidsmiljø og helse 2011. Status og utviklingstrekk.* Oslo: Statens arbeidsmiljøinstitutt.

NOA 2015. *Faktabok om arbeidsmiljø og helse 2015. Status og utviklingstrekk.* STAMI-rapport 2015, årgang 16, nr. 3. Oslo: Statens arbeidsmiljøinstitutt.

OECD (2011). *Pension at a Glance - retirement income systems in OECD and G20 countries.* Paris, OECD Oublishing.

OECD (2013). *Ageing and Employment Policies: Norway 2013 Working Better with Age.* Paris, OECD.

Overland S, Glozier N, Henderson M, Mæland JG, Hotopf M, Mykletun A. Health status before, during and after disability pension award: the Hordaland Health Study (HUSK). *Occup Environ Med.* 2008 Nov;65(11):769-73. doi: 10.1136/oem.2007.037861.

Pensjonspolitisk arbeidsgruppe (2016). *Arbeid, pensjon og inntekt i den eldre befolkningen.* Rapport fra pensjonspolitisk arbeidsgruppe 31. Mai 2016. (Pensjonspolitisk arbeidsgruppe er underlagt Arbeids- og pensjonspolitisk råd som ble opprettet i forbindelse med tariffoppgjøret i Norge i 2008).

Pohrt, A. and Hasselhorn, H. M. (2015). Domain: Work factors. In: Hasselhorn, H.M. and Apt, W. (2015). *Understanding employment participation of older workers: Creating a knowledge base for future labour market challeng*es. Research Report. Federal Ministry of Labour and Social Affairs (BMAS) and Federal Institute for Occupational Safety and Health (BAuA). BMAS/ BAuA,

Berlin, 120 pages. Online available at: http://www.jp-demographic.eu/about/fast-track-projects/understanding-employment

Rege, M., Telle, K. and Votruba, M. (2009). "The effect of plant downsizing on disability pension utilization." *Journal of the European Economic Association*, vol. 7(4): 754-785.

Reichborn-Kjennerud, K., Gamperiene, M. and Hilsen, A. I. (2011). "Make me an offer I Can't Refuse" - Do Extra Days off Contribute to Seniors Staying at Work longer?" In R. Ennals and R. Salomon (eds.*) Older Worker in a sustainable society, Labour, Education & Society*,.Vol 21. Peter Lang Publishing Group.

Røed, K. and E. Fevang (2007). "Organizational change, absenteeism, and welfare dependency." *Journal of Human Resources*, vol. 42(1): 156-193.

Salomon, R. and A. I. Hilsen (2011). A Three Phase Perspective on Senior Policies. In R. Ennals and R. Salomon (eds.) *Older Worker in a sustainable society, Labour, Education & Society*, vol. 21. Peter Lang Publishing Group.

Sannerhaugen, S. K. (2014). *Aldersdiskrimineringsvernet i forbindelse med nedbemanning. Høy alder som utvalgskriterium.* Master thesis. Det juridiske fakultet, Universitetet i Oslo.

Schøne, P. (2009). "New technologies, new work practices and the age structure of the workers", *Journal of Population Economics*, vol. 22(3): 803.

Schisterman, E.F., Cole, S.R., Platt, R.W. (2009). Overadjustment bias and unnecessary adjustment in epidemiologic studies. *Epidemiology* vol. 20(4):488-495.

Shultz, K.S., Morton, K.R. and Weckerle, J.R. (1998). The influence of push and pull factors on voluntary and involuntary early retirees' retirement decision and adjustment. *Journal of Vocational Behavior*, 53(1): p. 45-57.

Sigurdsen, S. (2008). Forbud mot aldersdiskriminering i arbeidslivet. *Bibliotekaren*, 2008, Nr. 2, pp.32-32.

Slagsvold, B. and Daatland, S. O. (2006). *Eldre år, lokale variasjoner. Resultater fra Den Norske studien av Livsløp, Aldring og Generasjon (NorLAG). Runde 1.* NOVA-rapport 15/06. Oslo, NOVA.

Slagsvold, B. and P. E. Solem (2005). *Morgendagens eldre. En sammenlikning av verdier, holdninger og atferd blant dagens middelaldrende og eldre.* NOVA-rapport 11-2005. Oslo, NOVA.

Slagsvold, B., Veenstra, M., Daatland, S.O., Hagestad, G., Hansen, T., Herlofson, K., Kolᾳen, K. and Solem, P. E. (2012). "Life-course, ageing and generations in Norway: the NorLAG study." *Norsk Epidemiologi*, vol. 22(2): 95-102.

Solem, P. E. (2015). Ageism and age discrimination in working life. *Nordic Psychology*. November 2015. DOI: 10.1080/19012276.2015.1095650

Solem, P. E. (2012). *Ny kunnskap om aldring og arbeid.* NOVA-rapport 6/12. Oslo, NOVA.

Solem, P. E. (2012). "Possible Effects of the Financial Crisis on Managers' Attitudes to Older Workers." *Nordic Journal of Working Life Studies*, vol. 2(3): pp. 129-142.

Solem, P. E. (2010). *Eldres posisjon i arbeidslivet ved konjunkturomslag.* NOVA-rapport 5/10. Oslo, NOVA.

Solem, P.E. and Mykletun, R.J. (1997). Work environment and early exit from work. Arbete och Hälsa, 29, (285-292).

Solem, P. E. and R. J. Mykletun (2009). *Endringer for seniorer i arbeidslivet fra 2003 til 2008*. NOVA-rapport 20/09. Oslo, NOVA.

Solem, P. E., Syse, A., Furunes, T. Mykletun, R. J., De Lange, A. H., Schaufeli, W. and Ilmarinen, J. (2014). "To leave or not to leave: retirement intentions and retirement behaviour." *Ageing & Society*, vol. 2014(12 (in press)).

Stattin M. Retirement on grounds of ill health. (2005). *Occupational and Environmental Medicine*, vol. 62(2):135–140.

Steinum, T. (2008). *Hva kan vi lære av gode eksempler på seniorpolitikk?* AFI-publikasjon. Oslo, Work Research Institute (WRI).

Stensnes, K. and N. M. Stølen (2007). *Pension reform in Norway: microsimulating effects on government expenditures, labour supply incentives and benefit distribution.* Discussion paper no. 524. Oslo, Statistics Norway, Research Department.

Sterud T, Johannessen HA. 2014. Do work-related mechanical and psychosocial factors contribute to the social gradient in long-term sick leave: a prospective study of the general working population in Norway. *Scandinavian Journal of Public Health*, vol. 42(3):329-334.

Sterud T. 2013. Work-related psychosocial and mechanical risk factors for work disability: a 3-year follow-up study of the general working population in Norway. *Scandinavian Journal of Work, Environment and Health*, vol. 39(5):468-476.

Støver M, Pape K, Johnsen R, Fleten N, Sund ER, Ose SO, Bjørngaard JH. 2013. Work environment and disability pension – an 18-year follow-up study in a Norwegian working population. *Scandinavian Journal of Public Health*, vol. 41(6):587-596.

Svalund, J. & Veland, G. (2016). *Aldersgrenser for oppsigelse og særordninger for eldre i arbeidslivet.* Fafo-report 2016:22. Oslo. Fafo Institute for labour and Social Research.

Syse A, Veenstra M, Furunes T, Mykletun RJ, Solem PE. (2015). Changes in Health and Health Behavior Associated With Retirement. *Journal of Aging and Health*. Dec 31. pii: 0898264315624906. [Epub ahead of print]

Syse, A., Solem, P. E., Ugreninov, E., Mykletun, R. and Furunes, T. (2014). "Do Spouses Coordinate Their Work Exits? A Combined Survey and Register Analysis From Norway." *Research on Aging*, published online 20 January 2014. DOI: 10.1177/0164027513516151.

Terjesen, H.C.Aa., Salomon, R. & Bernstrøm, V.H. (2015). *HR-funksjonens rolle i seniorpolitikken*. AFI-rapport 13/2015. Oslo: Arbeidsforskningsinstituttet.

Terjesen, H.C.Aa. & Salomon, R. (2015). *Langsiktig ledelse. Om bærekraftig aldring i arbeidslivet.* Oslo: Cappelen Damm AS.

Terjesen, H.C.Aa., Lau, B. & Salomon, R. (2012). "*Er du her, så regner jeg med deg!"* AFI Rapport 2012:19. Oslo: Arbeidsforskningsinstituttet.

Tikkanen, T. I., Guðmundsson, B., Hansen, L. E., Paloniemi, S., Isopahkala-Bouret, U., Randle, H. and Sandvik, J.et al. (2012). "Social partners: out with early exit, in with learning and career development for senior employees?", *Sociologia del Lavoro*, 1529(125): 99-117.

Tikkanen, T. I. and B. Nyhan (2008). *Innovative learning measures for older workers. Luxembourg,* Office for official publications of the European Communities.

Tollefsen, N. (2013). Aldersdiskriminering av kvinner i forhold til pensjonsrettigheter. Avdeling for kvinderett, barnerett, likestillings-og diskrimeneringsrett (KVIBALD). *Kvinnerettslig skriftserie* nr. 89, Institutt for offentlig rett. Universitetet i Oslo

Torp, S., Grimsmo, A., Hagen, S., Duran, A. & Gudbergsson, S.B. (2013). Work engagement: a practical measure for workplace health promotion? *Health Promotion International.* Vol. 28 (3): pp. 387-396.

Veenstra, M., Lima, I.A. and Daatland, S.O. (2009). *Helse, helseatferd og livsløp. Resultater fra LOGG og NorLag. Norsk institutt for forskning om oppvekst, velferd og aldring.* NOVA Rapport 3/2009. Oslo, NOVA.

Vestad, O. L. (2013). "Labour supply effects of early retirement provision." *Labour Economics,* vol. 25: 98-109.

Vickerstaff, S. (2015). Domain: Domestic and Houshold Factors. In: Hasselhorn, H.M. and Apt, W. (2015). *Understanding employment participation of older workers: Creating a knowledge base for future labour market challeng*es. Research Report. Federal Ministry of Labour and Social Affairs (BMAS) and Federal Institute for Occupational Safety and Health (BAuA). BMAS/ BAuA, Berlin, 120 pages

Vinje, H.F., Ausland, L.H. (2013). Salutogent nærvær bygger helsefremmende arbeidsliv. *Socialmedicinsk tidskrift.* Vol 90, Nr 6 (2013): pp. 810-820.

Vinje, H.F. & Ausland, L.H. (2012a). *Nærvær i seniorers arbeidsliv: Presentasjon av en kvalitativ studie.* Artikkel for senter for seniorpolitikk. www.seniorpolitikk.no

Vinje, H.F. & Ausland, L.H. (2012b). *Eldre ledere har funnet balansen og ønsker å fremme nærvær.* Artikkel for senter for seniorpolitikk. www.seniorpolitikk.no

Vinje, H.F. & Ausland, L.H. (2012c). *Kollegafellesskap fremmer nærvær og velvære i seniorers arbeidsliv.* Artikkel for senter for seniorpolitikk. www.seniorpolitikk.no

Vinje, H.F. & Ausland, L.H. (2012d). *Helsens dynamikk på arbeidsplassen: Betraktninger fra en studie om seniorers nærvær og velvære i arbeidslivet.* Artikkel for senter for seniorpolitikk. www.seniorpolitikk.no

Volle, E. (2014). *Aldersgrenser og aldersdiskriminering-Særlig om bedriftsinterne aldersgrenser.* Master thesis. Det juridiske fakultet, Universitetet i Oslo.

Westin, S., Schlesselman, J.J., Korper, M. (1989). Long-term effects of a factory closure: unemployment and disability during ten years' follow-up. *Journal of Clinical Epidemiology*, vol. 42(5):435-441.

Westin S. (1994). Ervervsmessig uførhet – et forhold mellom individets ressurser og arbeidslivets krav. In: Bruusgaard D, Hatland A, Syse A (eds.), *Et nødvendig gode. Folketrygdens plass i velferdssamfunnet.* Oslo: AdNotam Gyldendal, pp. 133-146.

Winge, S., Mostue, B.A., Gravseth, H.M. (2015). Skader i bygg og anlegg: Utvikling og problemområder. KOMPASS Tema nr. 4. Trondheim: Direktoratet for arbeidstilsynet 2015.

Østby KA, Ørstavik RE, Knudsen AK, Reichborn-Kjennerud T, Mykletun A. (2011). Health problems account for a small part of the association between socioeconomic status and disability pension award. Results from the Hordaland Health Study. *BMC Public Health.* 2011 Jan 6;11:12.

The impact of the working environment on work retention of older workers

STAMI
NATIONAL INSTITUTE OF OCCUPATIONAL HEALTH

Fafo
P.O.Box 2947 Tøyen
N-0608 Oslo
www.fafo.no

Fafo-paper 2017:09
ISSN 0804-5135
Order no. 10259