

# **Title: Disability retirement and public sector reorganization: Hospital mergers in Norway**

## **Abstract**

This paper analyses the effect of hospital mergers on the probability of employee disability retirement, focussing on whether the effect on disability retirement differs with employee educational attainment. I use register data for all employees of Norwegian public hospitals from 2000 to 2006. The analyses employ a difference-in-differences approach using hospital fixed effects. The results show that the probability of entering disability retirement only increases in the second year after the merger compared with non-merger years, indicating that the effect is short-term. Predicted probabilities indicate that the effect is only significant for employees with lower education. Possible explanations are that increased strain in association with the merger leads to disability amongst employees or that managers use disability retirement as a way of achieving staff reductions without formally laying off staff.

## **Keywords**

Disability, education, hospital, merger, public sector, register data, reorganization,  
retirement

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## **Introduction**

Early retirement due to disability is a great burden to the individual and a major cost for society (OECD, 2003). The proportion of the working-age population receiving a disability pension in Norway was 10% in 2008, the OECD average being 6% (OECD, 2010, 59). The loss of working ability, including the ability to take part in the monetary and social benefits of paid work (Jahoda, 1982), adds to the disadvantage of disability. Disability retirement is however also unequally distributed, the risk of entering disability retirement being shown to be greater for the lowest educated even in studies controlled for longstanding illness, health behaviour, psychosocial and working conditions (Nilsen et al., 2012).

Health-related exclusion not only results in negative consequences for the individual but is also a challenge for the welfare state. The ageing workforce across the industrialized world is forcing governments to intensify their efforts to extend workers' labour force participation (Auer and Fortuny, 2000). Massive public sector reorganization is at the same time being carried out to increase efficiency and cut the costs of public services, the public sector having also been increasingly marketized and privatized in the last 30 years (Hebdon and Kirkpatrick, 2005). An increasing rate of mergers in the public sector begs research on how the employees are affected.

The quality of work, in terms of higher skill levels and wages, has improved in the past half-century. There has, however, also been an intensification of work, workplace technological and organizational changes accounting for much of the intensification of work seen in recent decades (Green, 2006). Adverse working conditions such as work that has to be carried out standing, low job security, low social support (Albertsen et al., 2007), low job control (Baumberg, 2014) and increased demands at work (Westin, 1990) are associated with disability retirement. Previous research found that different types of reorganization such as downsizing (Rege et al., 2009; Vahtera et al., 2005), organizational change (Røed and Fevang, 2007) and privatization (Virtanen et al., 2010) increased the risk of employee disability retirement. Studies have also shown that mergers are associated with increases in general anxiety disorders (Wang et al., 2012), exhaustion, functional incapacity (Vaananen et al., 2004), psychiatric events (Vaananen et al., 2011) and increased risk of long-term sickness absence (Kjekshus et al., 2014). The potential effect of mergers on disability retirement however remains an area that has not been investigated.

The literature on health based exclusion from the labour market suggests that mergers may have the most adverse effect on the lowest educated employees, the lower educated having poorer health (Bartley, 2004; Marmot and Wilkinson, 2006) and a weaker labour market attachment (McIntosh, 2004; OECD, 2013). The lowest educated

also work less often whilst ill (Bartley and Owen, 1996; Van der Wel et al., 2010).

Scholars have also not investigated whether major organizational changes such as mergers have a differentiated effect on employees with different levels of education, despite a research tradition that focuses on the social gradient in working conditions (Hämmig and Bauer, 2013; Marmot et al., 2006; Schrijvers et al., 1998; Siegrist and Theorell, 2006).

The hospital sector in Norway is, as in many western countries, undergoing extensive reorganization. Hospital mergers have become increasingly frequent in Norway despite no evidence of efficiency gains in the short and medium term (Kjekshus and Hagen, 2007). Around 20% of Norwegian hospitals were involved in mergers between 1992 and 2000 (Kjekshus and Hagen, 2007) whereas more than 90% of public hospitals were involved in mergers from 2000 to 2010 (Kjekshus et al., 2014). The objective of this study is to analyse the effect of hospital mergers on the disability retirement rate of employees and to investigate whether the effect is contingent on educational attainment. The study applies a difference-in-differences approach using hospital fixed effects, to analyse these effects for Norwegian public hospital employees in the years 2000 to 2006. The study analyses at what point in time in the merger process the probability of disability retirement is highest and interaction terms for education and merger years capture differences in effects between education levels. Descriptive

statistics on the degree of disability and time from first sickness to disability retirement provide input on the circumstances surrounding disability retirement for the higher and lower educated.

### *The Norwegian disability pension*

All residents of Norway are members of the National Insurance Scheme. Residents aged 18 to 66 who have been a member of the National Insurance Scheme for at least three consecutive years prior to the onset of disease, illness or injury are eligible for the disability pension program. A disability pension is only granted to those with a physician-certified minimum reduction in the ability to work of 50%. A disability pension is, in practice, a lasting benefit. The recipient receives the pension until he or she dies or is transferred to retirement pension at the age of 67 (NOU 2007:4). The process of entering disability retirement is usually long, involving one year of physician-certified sickness absence followed by a Norwegian Labour and Welfare Administration (NAV) investigation of the possibility of work rehabilitation.

The replacement rate for the sickness benefits paid in the first year of sickness is 100% of wages. The replacement rate for the Norwegian disability benefit is within the 60% to 70% range found in many countries (OECD, 2003). The disability pension consists of a flat rate and an earnings-related component, plus means-tested supplements for

disability pensioners with a dependent spouse or children. Employees with below average wages generally have a higher replacement rate than employees with above average wages (NOSOSKO, 2013, p. 159). Employers pay benefits for the first 16 days of sickness absence, the National Insurance covering the remainder of the sickness absence period of up to one year. At the end of this one year period, the employee must resume work, enter self-supported non-employment or transfer to other temporary, social or disability pension benefits. Those granted disability pensions in 2005 had received temporary benefits such as enrolment in a work rehabilitation program, unemployment benefits or social assistance for an average of 2.5 years (with large deviations) from the onset of the medical condition until a disability pension was granted (NOU 2007:4). The average time from the onset of disease until the granting of a disability pension was 23 months (st.d. 21.9) for the disability retirement cases analysed in this paper. The proportion of the Norwegian population receiving a disability pension in 2008 was one of the highest in the OECD countries, other countries with high rates including Hungary, Sweden, Finland, Estonia and The Netherlands (OECD, 2010, 60).

## **Theoretical background and research questions**

Previous research on the health effects of mergers and other reorganizational strategies have been based on theories that describe how characteristics of the psychosocial work environment and job insecurity lead to unhealthy stress. Karasek and Theorell's (1990) demand-control (DC) model, which views the psychosocial work environment as a potential source of unhealthy stress, is the most frequently used model. The DC model identifies high-demand, low-control working environments as causing unhealthy stress in employees which in turn leads to disease. Other theories, such as the theory that describes the health consequences of job insecurity (Ferrie et al., 2008), describe a pathway from job insecurity to disease through unhealthy stress.

Disability retirement requires certification by a physician. Disability is, however, not purely a medical condition as it develops in relation to a job. Disability retirement can be understood as sickness, sickness being referred to by Twaddle (1993) as being the social consequences of ill health. Sickness, disease and illness are three aspects of health. Disease is health defined by medical diagnoses, illness is the individual's subjective experience of health and sickness constitutes the social consequences of health (Twaddle, 1993). Westin's (1990) study of disability retirement after the closure of a factory, found that becoming disabled was not solely a result of changes in an



individual's health or functioning. Increased job demands can also render an individual's health resources inadequate, even where health does not deteriorate.

Organizational changes such as mergers can be a stressful experience for employees. Earlier research has found that organizational change can amplify or exacerbate work-stressors that are not confined to organizational change. Stressors such as increased workload, uncertainty, interpersonal conflict, perceived unfairness and perceived loss have been found to increase during organizational change (Robinson and Griffiths, 2005). Emotional costs due to anxiety, uncertainty and stress and higher workloads in the pre-merger and post-merger period were also reported by both clinical and managerial staff of merging NHS health trusts (Fulop et al., 2005). Hospital mergers in Norway in the time-period studied were not characterised by downsizing, even though some merging hospitals experienced personnel reductions (Kjekshus et al., 2014). These reductions were not due to layoffs as employment protection is high in Norwegian working life. A merger process can nonetheless involve uncertainty for the employees, lower levels of control and higher demands.

Stress theories indicate that organizational changes such as mergers may alter the psychosocial working environment through increasing demands or reducing an employee's control over his or her work. These changes cause stress and, ultimately,

disease and disability retirement. This paper, extrapolating from Westin's (1990) theory, furthermore argues that changes in the working environment during a merger process may alter job requirements in such a way that employees find their health to not be sufficient to continue working.

There is a lack of studies of the effect of mergers on disability retirement. Scholars have, however, studied the effect of other types of major organizational change. Vahtera et al. (2005) found a significantly higher risk of disability retirement among municipal employees in four towns in Finland who kept their jobs after a major downsizing. The authors suggest that the stress of downsizing had a detrimental effect upon health. Rege et al. (2009) found that the downsizing of plants in Norway increased the risk of disability retirement amongst workers at the downsized plants and suggested that this was driven by the effect of the downsizing on economic opportunity (unemployment) or on the health of the workers. Østhus (2011), however, found that the association in Norway between downsizing and disability retirement was driven by the effect of exiting workers. This challenges the hypothesis that downsizing leads to harmful stress for the workers remaining in the downsized organization.

Virtanen et al. (2010) found an increased risk of work disability among employees who had been transferred from public sector work to private agencies in the British Whitehall II cohort, even when controlling for baseline health status and unemployment experiences during the follow-up period. Privatization was however accompanied by staff reductions. No negative health effects were found in a study of privatization upon Finnish radiology and laboratory employees where there were no staff reductions (Vahtera and Virtanen, 2013). Finally Røed and Fevang (2007) in Norway found that organizational change, operationalized as personnel reductions, caused a significant increase in the risk of disability retirement among nurses who continued working at the hospital.

The inconsistency in the literature encourages further research into the relationship between workplace reorganization, health and health-related exclusion from work. The longitudinal register data made available to this study allows the temporal aspect of disability retirement and mergers to be investigated. If mergers are associated with an increase in disability retirement, then investigating when in the merger process the effect appears is also of interest. Different explanations lead to different expectations of when disability retirement would be affected.

Increased work demands and job insecurity may be enduring characteristics of a post-merger organization. Restructuring has been found to often be a consequence of mergers, as mergers are often executed to strengthen financial position, increase operating efficiencies and consolidate services (Bazzoli et al., 2002). Mergers have been shown to increase employee sickness absence in the merger year and two to four years after the merger (Kjekshus et al., 2014). High levels of reorganization in post-merger organizations may be a contributing factor to increased sickness absence in these years. A merger may also result in lasting negative consequences for individual employees. Employees who reported a decline in their status at work following the merger of a Finnish industrial company with an equally sized Swedish company, had a higher risk of reporting exhaustion and functional incapacity two years after the merger (Vaananen et al., 2004). The risk of a psychiatric event (hospitalization, psychotropic drug prescription or suicide) was 60 % higher in the five years following the merger for employees who experienced a negative change in their work situation after this merger (Vaananen et al., 2011). Mergers are expected to have a long-term effect on disability retirement rates where employees experience lasting negative consequences, increased demands or job insecurity in post-merger organizations.

Hypothesis 1a: The probability of disability retirement increases during a merger and remains high in post-merger organizations.

The consequences of mergers upon disability retirement rates may be short-term. Stressors associated with a merger process include participation in work groups that plan and implement the merger (which are in addition to normal workloads) and the uncertainty associated with employees not knowing what their role will be in the new organization (Robinson and Griffiths, 2005). These stressors are likely to increase prior to the merger, but decrease when the merger has been completed. The main arguments for merging are increased efficiency through economies of scale effects, reduced function duplication and a belief that higher activity volumes lead to higher quality (Kjekshus and Hagen, 2007). Hospital mergers in Norway have not involved downsizing. The merger goal of higher efficiency may therefore provide a further explanation of the effect of mergers on disability retirement. The least efficient employees can, in mergers that include workforce restructuring, be pressurised to apply for disability retirement as a form of 'grey' early retirement (Buchholtz et al., 2006). The expectation that arises from these explanations is that mergers have a short-term effect on disability retirement.

Hypothesis 1b: The probability of disability retirement increases during a merger and falls to pre-merger levels after the merger has been completed.

### *Educational differences in the consequences of mergers*

There is a social gradient in working conditions, health and attachment to the labour market, the lower educated having poorer health (Bartley, 2004; Marmot and Wilkinson, 2006) and a weaker attachment to the labour market (OECD, 2013).

Previous research has found a social gradient in the psychosocial working environment, the lowest grade employees having the lowest level of control at work (Marmot et al., 2006). A post-merger working environment characterized by increased demands is therefore likely to contribute more to a stressful working environment for the lowest educated than for their higher educated colleagues. The lowest educated are also likely to have less influence on a merger process, further diminishing their control. The lowest educated are, however, less likely to take part in work groups planning the merger and will therefore not experience the increased demands of planning the merger whilst at the same time having to carry out regular work tasks. The shift towards a demand for higher qualified labour has furthermore resulted in the lower educated becoming less attractive in the labour market (McIntosh, 2004). This may render those with less education more prone to a perceived job insecurity during an upcoming merger. The lowest educated are therefore likely to be more susceptible to negative health effects of mergers due to stress.

The disability retirement rate for the lowest educated is likely to be more affected by factors other than health than the rate for the higher educated. Several studies have revealed social inequality in sickness: the interaction effect between health and education on employment (Bartley and Owen, 1996; Van der Wel et al., 2010). The lowest educated who have disabilities are less likely to work than the higher educated with disabilities. This may be due to the harder or more physically challenging work of the lowest educated, but does not fully account for the differences. The lowest educated have been found to have the highest risk of entering disability retirement, even when longstanding illness, health behaviour, psychosocial and working conditions are controlled for (Nilsen et al., 2012).

Lower skilled employees are more likely to be encouraged to apply for a disability pension where an organization is looking to reduce or reorganize the workforce and where a disability pension is perceived to be an unofficial form of early retirement (Buchholtz et al., 2006). Employees with lower education who carry out routine work that modern hospitals can resolve using new technology, are more replaceable than highly skilled employees. Where an employee becomes ill, an employer may see workplace adaption as being less economically attractive where the sick employee can be easily replaced by another employee without extensive training. Physicians furthermore judge a patients' physical capacity in the light of their personality, social

circumstances and the assumed consequences of the physician's disability certification decision (Meershoek et al., 2007). The demand for higher qualified labour means that the lower educated are generally less attractive in the labour market (McIntosh, 2004). This may make it more difficult for the lower educated to use job change as a strategy for vocational rehabilitation, thereby increasing the likelihood of disability retirement. Relatively generous disability pensions can also be seen as a factor 'pulling' employees out of the labour market, placing a tax on work and increasing the motivation to retire (Schils, 2008). The replacement rate for the disability pension is higher for the lowest educated (Rege et al., 2009) who have the lowest wages. The financial incentive to apply for a disability pension is therefore higher for the lowest educated.

Hypothesis 2: The probability of disability retirement during mergers is greater for the lowest educated.

## **Data and methods**

The study population consists of all employees of Norwegian public hospitals in the third week of November each year from 2000 to 2006. Although there has been an increase in the number of private hospitals from 6 in 2001 to 28 in 2004, the absolute majority of patients are treated at public hospitals. Private hospitals are small and



primarily provide elective surgery and outpatient care (Martinussen and Magnussen, 2009).

Of the original 59 hospitals in the study, 52 were included in the analyses. Among the included hospitals, 30 underwent a merger in 2001, 9 in 2002, 3 in 2004 and 1 in 2005. There were no mergers in 2000, 2003 or 2006 and 9 of the hospitals did not merge in the study period. The many mergers in 2001 are most likely due to the hospital enterprise reform which saw the state take-over ownership of the hospitals from the counties on 1 January 2002 (Møller Pedersen, 2002).

The hospitals studied had data for only one merger in the study period, had data for at least one non-merger year before the merger and up to four years after the merger. In cases where hospitals merged before 2000, two years following this merger was excluded from the data. In cases where hospitals merged again after the merger included in the study, two years before the second merger were excluded from the study. Four hospitals merged twice in the period 2000-2003 and two hospitals (which merged in 2001 and 2002) had no registered data for the non-merger years. These six hospitals were excluded from the study. One hospital had no disability retirements and was automatically dropped from the analyses because there was no variation to analyse. This hospital did not merge, so its exclusion is unlikely to affect the results.

Register data collected and prepared by Statistics Norway provides information on employee demographics, highest attained education, place of employment and benefits received since 1992. Individual level data was made available to this study for the years up to and including 2008. Data on hospital mergers were derived from the National Patient Register (NPR). The data was matched to employees based on their place of employment in each year. The final data contains 374,362 person-years distributed amongst 100,418 employees clustered within 52 hospitals over 7 years. Employees included in the study work at one of the hospitals and are included until they are granted disability pension, die or turn 67 years and are no longer eligible for a disability pension. Those who were granted any form of disability pension before 2000 or before they started working at a hospital in the study, were excluded.

### *Disability pension*

This study analyses the risk of disability retirement for hospital staff in each year of the merger process. In the analyses, disability retirement is recorded for employees who enter disability retirement in a year in which they were employed at one of the hospitals and for employees who leave the labour market and enter disability retirement within two calendar years after having stopped working. 2190 employees are registered as entering disability retirement during the study period.

Degree of disability is the reduction in working capacity specified as a percentage of the employee's normal working hours before the onset of disease. The register data includes a variable that indicates the date of onset of disability, which is set retrospectively after a disability pension is granted. In most cases this is the first day of the registered long-term sickness absence due to the disease that causes the permanent reduction in working capacity<sup>1</sup>. The variable is not an objective measure, as there is room for judgement in the few cases where an individual was non-employed at the time of the onset of disease or if there was no marked deterioration or onset of the disease. It is, however, the best measure available for the onset of disability. I computed the time from the onset of disability until a disability pension was granted or the employee stopped working prior to subsequent disability retirement (whichever came first). Onset of disability is the dependent variable in the regression model in table 4 which is used to further investigate the timing of retirement in relation to mergers.

### *Mergers*

After the merger, the hospitals which had previously reported individually, reported as a single unit to the NPR. Hospitals report on 1 January each year. A merger is included in this analysis as a dummy set of five variables for each year of the merger process and a reference category for the years before the merger. Variables include year of the

merger (the year prior to joint reporting) and the first, second, third and fourth year after the merger was registered. The length of time it takes for a disability pension to be granted after the onset of disease means that a merger anticipation effect is unlikely to cause disability retirement in the pre-merger years.

### *Education*

The Norwegian Standard Classification of Education includes the highest level of education attained by employees. I divided the employees into two categories, higher educated employees who had completed tertiary education and lower educated employees. An interaction term for education and merger year is included to test hypothesis 2: that the probability of disability retirement due to mergers is greatest for the lowest educated.

### *Control variables*

The analyses are controlled for employee age, gender, earnings, marital status and children, all of which have been linked to disability retirement (NOU 2007:4). They are also controlled for variables that indicate whether the employee is an immigrant and for the study year. Age squared is included to allow a curvilinear relationship to disability pension receipt, increasing with age, then decreasing as the normal pension age approaches. Marriage and number of children under the age of 18 form a dummy

set that indicate the employee's family status via the following categories; non-married with no children, non-married with children, married without children and married with children. The data does not include information on cohabitation. The non-married categories therefore include both those living alone and cohabitants.

Foreign-born employees with two foreign-born parents and those born in Norway by two foreign-born parents are categorised as immigrants. Earnings are included as a logarithm of annual salary retrieved from the tax register. Earnings are closely associated with health. Lower earnings are however also likely to be a result of entering disability retirement. Earnings are therefore lagged one year. The analyses include a dummy for each calendar year of the study period, to account for differences in legislation and economic fluctuations.

### *Method*

This paper analyses the association between mergers and disability retirement using difference-in-differences (DiD) logistic regression. Logistic regression is preferred because the dependent variable is dichotomous. DiD is a quasi-experimental approach in which a merger is seen as a treatment received by some hospital employees and not by others (Angrist and Pischke, 2009; 233). The merger dummy set allows the point in time at which disability retirement is most prominent in a merger process, to be

investigated. An additional regression analysis, with the onset of disability as the dependent variable, was conducted to further investigate the timing of the onset of disability in relation to the merger process.

Unlike a classical experiment, researchers do not randomly assign mergers to the hospitals in the study. If hospital mergers are more common between hospitals where the risk of disability retirement is high, then the results of a simple pooled regression will overestimate the effect of mergers on disability retirement. Hospital fixed effects are therefore applied by including hospital dummy variables (not shown) in the analyses to account for some of the systematic differences between hospitals that merge and hospitals that do not merge. The hospital dummy set controls for any time-invariant difference in the risk of disability retirement between hospitals. This in effect means that each hospital is its own control group. Individual level variables control for any variation in a hospital's staff between the years. The analyses use the Stata 13 logit command with cluster robust standard errors on hospital level (Cameron and Trivedi, 2009; 335).

The degree of unobserved heterogeneity in logistic models affects the estimate of the coefficients. The effect of one covariate is therefore affected by the value of the other covariates in the model (Allison, 1999; Mood, 2010). This is also true for the magnitude

of the interaction term (Ai and Norton, 2003). I therefore present the results from the estimated logistic regression models as average marginal effects (AME). AME expresses the average change in the likelihood of entering disability retirement given the distribution of other independent variables in the sample (Mood, 2010). I estimated AMEs with Stata's margins command. Since Stata only reports AMEs for main effects of the variables, I also report the AME of each merger year conditional on education. To illustrate the differential effect of mergers on the educational categories, I graph the estimated probabilities for disability retirement conditional on education and merger year, all other variables at sample values. Tables reporting log odds ratio estimates from the models are available from the author upon request.

## **Results**

### *Descriptive analysis*

Table 1 shows the characteristics of the sample. The majority (80%) of the sample are women and the mean age is 41.2 years (st.d. 11.3). Employees with tertiary education are the largest educational category at 68%. First and second generation immigrants comprise 8% of the sample. Around one third of the sample are non-married and have no children under the age of 18 (32%) and a further third are married and have children under 18 years of age (31%). The remainder are married without children

under 18 (22%) or non-married but have children (16%). The lowest educated are on average 5.4 years older than the highest educated. They are more often women, less often immigrants, more often married without children under 18 and have lower earnings. The proportion of employees in each educational category is identical in merger and non-merger years. The percentage entering disability retirement is, as expected, much larger for the lowest educated.

*Table 1 here*

The average time from first registered disability until disability retirement or work exclusion was 21.1 months for the disability retirement cases analysed in this paper. Deviations were however large. The average was 22.2 months for those with tertiary education and 20.5 months for the lowest educated (t-test of difference:  $p=.092$ ). The lowest educated are more likely to be granted a full disability pension, 57% compared to 51% for those with tertiary education ( $\text{Chi}^2=6.096$ ,  $p=.014$ ).

### *Risk of disability retirement during mergers*

Table 2 shows that, for the sample as a whole, the probability of entering disability pension is higher in the first and second year after the merger than in the non-merger years, but only significantly so for the second year after merger. The probability of entering disability retirement then decreases and in the third and fourth year after the



merger it is no different from pre-merger years. The results support hypothesis 1b, which assumes that mergers increase the risk of disability retirement, but is only a short-term effect.

*Table 2 here*

Model 2 in table 2 includes the interaction term for education and merger year on the likelihood of entering disability retirement. However, Stata only reports the AME of main effects. I therefore computed and compared the AME for employees with low and high education, to investigate any differences.

*Table 3 here*

Table 3 shows the AME of mergers conditional on education, based on the estimates from model 2 of table 2. AME indicates the change in the likelihood of entering disability retirement in each merger year compared with the years before the merger, for each hospital, given low and high education and sample values of all other variables. The results indicate an increased likelihood of .28 percentage points of entering disability retirement in the second year after merger compared to non-merger years for employees with low education. This increase is significant. The AME are small and not significant for employees with high education. A test of the difference in the second year after merger between the AME for high and low

education is significant at  $p < .05$ . However a test of the difference between the AME in all years for high and low education is not significant. The results are therefore interpreted with some caution.

*Figure 1 here*

Figure 1, which is also based on model 2, illustrates the estimated conditional probabilities of entering disability retirement at various stages of the merger process given high and low education and sample values for all other variables. Non-overlapping confidence intervals in the pre-merger years illustrates that employees with lower education have a higher risk of entering disability retirement than those with higher education, both when mergers are taking place and when they are not. The widening gap between the two educational categories from the first to the second year after the merger illustrates that mergers have an effect on employees with lower education. There is however no indication of an effect on the higher educated. For the lowest educated, the confidence interval of the predicted probability in the second year after the merger (.75% - 1.12%) does not overlap the confidence interval of the predicted probability before merger (.57% - .74%). The results support hypothesis 2, which assumes that the effect of mergers on disability retirement is greatest for the lowest educated.

*Table 4 here*

Table 4 shows the AME based on a logistic regression where the onset of disability is the dependent variable. The probability of onset is significantly greater in the merger year than in the years before the merger, but not in the other years of the merger process. These results support the results of model 1, which indicate that mergers affect disability retirement only in the short term. This supports hypothesis 1b, which presumes a short-term effect of mergers on disability retirement rates.

All the models show that the likelihood of entering retirement increases with age, but decreases as the age of retirement approaches. Women are more prone to entering disability retirement than men and there is a strong educational component, as the likelihood of entering disability retirement is higher for employees with lower education. Income is negatively associated with disability retirement. Those who are married or who have children under the age of 18 are less likely to enter disability retirement than the reference category who are non-married and have no children. Those who are married with children are even less likely to enter disability retirement.

## **Discussion**

In this paper, I have analysed the likelihood of the disability retirement of hospital employees during hospital mergers. I have also analysed whether the likelihood is contingent on educational attainment. The results show that the likelihood of entering disability retirement is higher in the second year after a merger than in non-merger years, but not in subsequent years. This finding is in accordance with earlier research that found restructuring has a negative effect upon disability retirement (Rege et al., 2009; Røed and Fevang, 2007; Vahtera et al., 2005) and that mergers have a negative effect upon health (Kjekshus et al., 2014; Vaananen et al., 2011; Vaananen et al., 2004; Wang et al., 2012). Comparing the effect of mergers on disability retirement within subcategories shows that the increased risk of disability retirement during a merger process mainly affects employees with lower education and that there is no significant impact on the risk of disability among employees with higher education.

Both the peak effect of mergers on disability retirement in the second year after merger and the corresponding significant effect on the onset of disability in the merger year suggest that mergers only have a short-term effect on disability retirement rates. The two measures are complimentary, as the onset of disability is set as being the start of the last long-term sickness absence spell before disability retirement. The heightened likelihood of the onset of disability in the merger year can be explained by

increased demands in the merger year causing stress-related diseases and increased demands leaving some employees with inadequate health resources. Other plausible explanations are that the goal of increased efficiency in the new organization incentivizes managers to encourage weak or superfluous employees to apply for a disability pension or that the employees themselves apply in response to the upcoming merger. The lack of any long-term effects of mergers can also be explained by adaptation. Individuals tend to adapt to major life changes, reducing their impact on health and well-being over time (Diener et al., 2006). Employees of post-merger organizations that are characterized by increased demands and unhealthy stress can adapt to the new situation after a while, reducing the health effects of the merger in the long term. Kjekshus et al. (2014) find that the odds of sickness absence is higher in the merger year and in the second to fourth year of a merger than in non-merger years. They attribute the lack of significance in the first merger year to employees' quick adaptation. They explain the subsequent increase as an effect of the internal changes undertaken after a merger. The second increase in sickness absence can be indicative of a second wave of disability retirement five to six years after a merger. Unfortunately, restricted follow-up time in the data prohibits an analysis of this.

The analyses indicate that the effect of mergers on disability retirement rates is only significant among the lowest educated. It is unlikely that the lowest educated

employees are the most involved in the planning of a merger. It is therefore unlikely that the increased demands associated with the planning of mergers would affect the lowest educated employees more than the highest educated. Being included in the planning of a merger can be beneficial if it gives a greater sense of control and decreases insecurity. However, being involved in the planning does not necessarily contribute in this way. Increased workloads as a result of involvement in project groups that implement new systems that are in addition to normal workloads have been identified as being a major source of stress (Robinson and Griffiths, 2005). The stress of increased demands is not therefore likely to solely affect the lowest educated.

There are several reasons to believe that some degree of restructuring of the workforce to achieve greater efficiency, contributes to the effect of mergers on disability retirement. There are also several reasons why this would have the greatest effect on the disability retirement of the lowest educated. Research on social inequality in sickness (Bartley and Owen, 1996; Van der Wel et al., 2010) finds that employees with low education have a higher risk of workforce exclusion following illness than the highest educated. Likewise, the likelihood of being pressurised to apply for a disability pension by employers is higher among the lowest educated, as these employees are more replaceable than the higher educated and more skilled employees.

The lowest educated also have greater incentives to opt out during a burdensome merger process. Applying for a disability pension as a response to an adverse working environment may be a more viable option for the lowest educated than the highest educated, as the replacement rate of the disability pension is higher for the lowest educated employees with the lowest incomes. The 100% replacement rate of sickness absence benefits during the first year might also be an initial pulling factor. Certifying physicians are likely to be aware of the different labour market situations of the higher and lower educated. The chance of successful vocational rehabilitation is also slimmer for lower educated employees. Physicians might therefore agree to disability retirement earlier, thereby reducing the likelihood of continued work. The descriptive analyses in this paper also show that the highest educated are granted partial disability more often than the lowest educated. This suggests that it is easier for the highest educated to remain employed with an illness.

Selection might lead to biased estimates. Hospital fixed effects control for any time constant differences between the hospitals. However, personnel may leave the hospitals during the study period and it is possible that the healthiest employees leave during a merger. If this is the case, then this will lead to biased results. However, the analyses also include employees who start employment at the hospitals in the years

after the merger and who therefore have not experienced the mergers. This is likely to bias the results downwards.

Register data on welfare receipt is both objective and detailed. It unfortunately does not include variables on the individual employees' working conditions or their perceived health. It is therefore only possible to hypothesise about the causes of the higher risk of disability retirement among employees at merging hospitals and about the causes of the influence of education. Further research that includes data on employees' working conditions and subjective health is needed.

This study is of employees of Norwegian public hospitals. Unemployment is low in Norway and the disability pension has a wide coverage and is relatively generous compared with many other countries. One should therefore be careful when attempting to apply the results to other countries. Researchers must take the large proportion of women in the sample into account when applying the results to other sectors.

To conclude, this paper's results indicate that mergers increase the risk of employees entering disability retirement in the short-term. Analyses suggest that the increase mainly applies to the lowest educated employees. Future research should concentrate on further revealing the mechanisms behind these relationships. Even so, governments



need to acknowledge the dilemma that strategies to increase the efficiency of services supplied by the welfare state might lead to workforce exclusion, ultimately reducing the welfare of the employees with the weakest attachment to the work force.

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### **Notes**

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<sup>1</sup> <https://www.nav.no/rettskildene/%C2%A7+12->

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## Tables

**Table 1.** Descriptive statistics. Percentages based on observations (person-years).

	<b>Whole sample</b>	<b>Lower education</b>	<b>High education</b>
	% or mean (SD)	% or mean (SD)	% or mean (SD)
N (observations)	374,362	118,070	256,292
N (people)	101,410	31,633	69,777
Merger years:			
Before or non-merger	49%	49%	49%
Merger year	12%	12%	12%
1st year	13%	13%	13%
2nd year	10%	10%	10%
3rd year	9%	9%	9%
4th year	8%	8%	8%
Age	41.2 (11.3)	44.9 (11.4)	39.5 (10.9)
Man	20%	18%	20%
Immigrant	8%	6%	9%
Higher education	68%	0%	100%
Family:			
Non-married, no children	32%	30%	32%
Non-married, with children	16%	16%	15%
Married, no children	22%	30%	18%
Married with children	31%	24%	34%
Missing	0.01%	0.01%	0.01%
Log earnings, 1 year lag	12.4 (0.72)	12.2 (0.6)	12.4 (0.76)

Disability retirement entries	0.6%	1.2%	0.3%
<hr/>			
N (disability retirement entries)	2190	1442	748
% full disability (at entry)	55%	57%	51%
Time from onset of disability to dp/work exclusion, months	21.1 (23.9)	20.5 (24.8)	22.2 (22.1)
<hr/>			

**Table 2.** Average marginal effects (AME) from logit models of entering disability retirement for the whole sample and with education-merger interaction terms.

Variable	Model 1 Full sample		Model 2 Interaction terms	
	AME	SE	AME	SE
Merger year (ref. years before merger)				
Merger year	0.000	0.0006	0.000	0.0006
1st year	0.001	0.0006	0.001	0.0006
2nd year	0.002*	0.0008	0.002*	0.0008
3rd year	0.000	0.0008	0.000	0.0008
4th year	0.000	0.0010	0.000	0.0010
Tertiary education (ref. lower)	-0.003***	0.0004	-0.003***	0.0004
Age	0.001***	0.0001	0.001***	0.0001
Age squared/100	-0.001***	0.0001	-0.001***	0.0001
Immigrant	0.000	0.0006	0.000	0.0006
Man	-0.003***	0.0005	-0.002***	0.0003
Log earnings (lagged one year)	-0.004***	0.0001	-0.004***	0.0001
Family (Ref. Non-married, no children)				
Non-married, with children	-0.002***	0.0005	-0.002***	0.0005
Married, no children	-0.001*	0.0003	-0.001*	0.0003
Married with children	-0.003***	0.0003	-0.003***	0.0003
Missing	0.023	0.0261	0.023	0.0258
Merger year*tertiary education	No		Yes	
LL	-10697.031		-10695.136	

Pseudo R2	0.2043	0.2044
N observations	374,362	374,362
N individuals	100,418	100,418

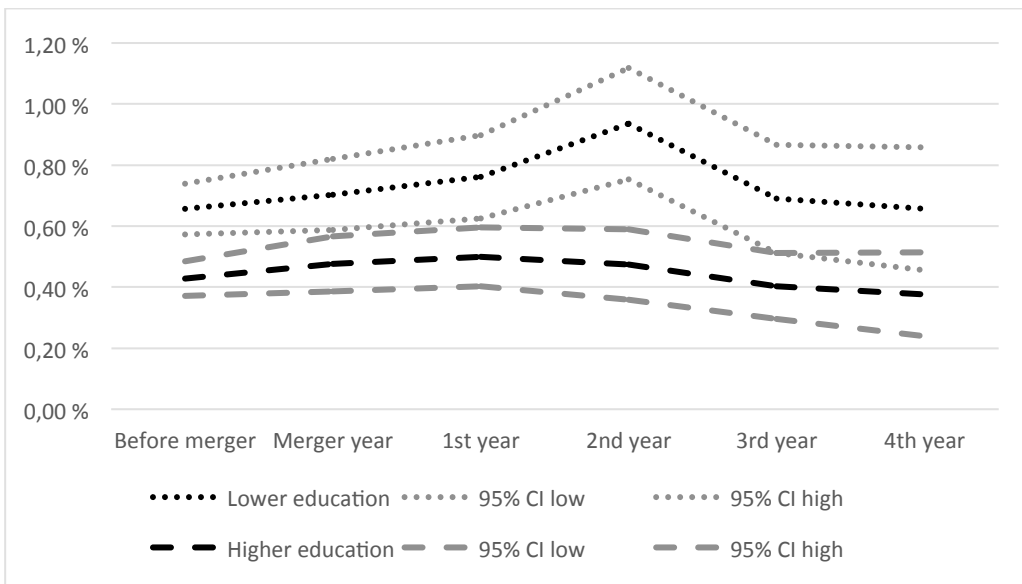
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Note: Standard errors clustered at hospital level. Significance probabilities (\*\*\*) $p < .001$ , \* $p < .05$ ). Control variables not shown: Year dummy variables, Hospital fixed effects.

**Table 3.** Average Marginal Effects (AME) of mergers conditional on education, all other variables at sample values. Based on estimates from model 2 in table 2.

<b>Model 2</b>		
Variable	AME	SE
Low education		
Merger year	0.0005	0.0009
1st year	0.0011	0.0009
2nd year	0.0028*	0.0011
3rd year	0.0003	0.0012
4th year	0.0000	0.0014
High education		
Merger year	0.0005	0.0006
1st year	0.0007	0.0006
2nd year	0.0005	0.0007
3rd year	-0.0002	0.0007
4th year	-0.0005	0.0008

Note: Significance probabilities (\*p<.05).



**Figure 1.** Conditional predicted probabilities of entering disability retirement.

Conditional on educational level, mergers and interactions between these, sample values for all other independent variables in model 2.

**Table 4.** Average marginal effects (AME) from the logit model of onset of disability for the whole sample.

<b>Model 3</b>		
Variable	AME	SE
Merger year (ref. years before merger)		
Merger year	0.002*	0.0008
1st year	0.000	0.0007
2nd year	0.001	0.0008
3rd year	0.001	0.0012
4th year	0.002	0.0014
Tertiary education (ref. lower)	-0.005***	0.0005
Age	0.002***	0.0001
Age squared/100	-0.001***	0.0002
Immigrant	0.001	0.0008
Man	-0.003***	0.0006
Log earnings (lagged one year)	-0.005***	0.0002
Family (Ref. Non-married, no children)		
Non-married, with children	-0.003***	0.0005
Married, no children	-0.001**	0.0003
Married with children	-0.005***	0.0004
LL	-14681.138	
Pseudo R2	0.1928	
N observations	372,276	
N individuals	101,385	



Note: Standard errors clustered at hospital level. Significance probabilities (\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ ). Control variables not shown: Year dummy variables, Hospital fixed effects.