

# Lifelong learning and the continued participation of older Norwegian adults in employment

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**Abstract**

The number of people aged 60 and over across the globe is expected to double by 2050, reaching a share of more than 20 percent of the population total. Governments are therefore taking more and more policy actions to encourage ageing workers to extend their working lives and their employers to retain them. According to the OECD lifelong learning opportunities and inclusive labour markets will be essential to ensuring that workers of all educational backgrounds have the possibility of extending their working lives. This article examines the relationship between adult education completed after age 40 and the subsequent active participation of older adults in employment, using individual register data from Statistics Norway.

The results show a substantial effect of upgrading formal education on subsequent labour market participation. Overall effects are quite similar for males and females. Attaining a lower level tertiary degree has the largest impact on labour market participation both for males and females. Completing a secondary education has a strong, long term impact among males. The results suggest that facilitating access to formal education among older workers may be an important contribution to extending working lives.

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## 1 | INTRODUCTION

The share of the world's population aged 60 years or more is predicted to almost double, reaching over 20% by 2050 (United Nations, 2013). This presents an array of economic and social challenges. Governments are therefore taking more and more policy actions to encourage ageing workers to extend their working lives and their employers to retain them (Raemdonck, Beusaert, Fröhlich, Kochoian, & Meurant, 2015).

According to the OECD (2017), lifelong learning opportunities and inclusive labour markets will be essential to ensure that workers of all educational backgrounds have the possibility of extending their working lives. Although there is evidence that attaining adult education late in life may increase older workers' employability and their motivation to postpone retirement (Fourage & Schils, 2008; Groot & van den Brink, 2000; Hagen & Nadim, 2009; Hällsten, 2012; Jacobson, LaLonde, & Sullivan, 2005a, 2005b; Jepsen, Troske, & Coomes, 2014; Nordlund, Stehlik, & Strandh, 2013; Picchio & Ours, 2011; Stenberg, 2012; Stenberg & Westerlund, 2013, 2016; Wiborg, Sandven, & Skule, 2011), some studies remain unconvinced (Raemdonck, Tillema, Grip, Valcke, & Segers, 2012; Stenberg, de Luna, & Westerlund, 2012). However, few are based on high quality data, with some exceptions (Stenberg & Westerlund, 2013, 2016). According to Raemdonck et al. (2015), there is a need to study the formal and informal learning of ageing employees in more detail and examine how both forms of learning contribute to employability, defined as the ability to find and maintain employment. Further education can be seen as an investment in human capital (Becker, 1962) or as a signal of abilities (Spence, 1973). Either way, it is expected to increase labour market participation. However, this expectation may be offset by age-ism or age discrimination, i.e., employers' reluctance to hire older workers (Butler, 1969; Neumark, 2009).

The key focus of this article is the relationship between adult education and the active participation of older adults in employment. We investigate changes in labour market participation after the age of 40 amongst those who increased their *formal* educational level late in life. In other words, we investigate whether adult education in Norway may influence and prolong work participation, using individual register data from Statistics Norway.

## 2 | THE NORWEGIAN CONTEXT

Norway has one of the highest employment rates and productivity levels per capita in Europe. Compared to other European countries, it also has high employment rates among older workers (OECD, 2014). According to the OECD's Survey of Adult Skills (PIAAC), Norwegian workers also have solid basic reading, numeracy and ICT skills and a high participation in skills development compared to workers in other OECD countries (Bjørkeng, 2013). As a result, with the share of the world's population aged 60 and more projected to almost double by 2050 (OECD, 2014), Norway is, in many ways, better placed to meet its future demographic challenges than many other OECD countries. At the same time, almost one quarter of those aged over 55 in Norway is registered as disabled, which is nearly double the OECD average. Furthermore, around 20% of its adult population have only attained primary and lower-secondary school as their highest education level and about 400,000 persons have poor reading skills. Adults with low education and/or weak basic skills are also overrepresented amongst those registered as unemployed, disabled or on long term sick leave.

Globalisation, digitalisation and technological developments are leading to new types of jobs and changes in the skills needed for existing jobs. More than 40% of Norwegian workers have reported seeing substantial restructuring or reorganisation in their current work environment in the past three years and almost half of all employees reported the introduction of new processes or technologies (OECD, 2013). In addition, according to forecasts of future skill needs, the demand for individuals with vocational education is set to increase. Many adults therefore need to develop their basic and professional skills or attain upper-secondary or higher education in order to improve their position in the labour market or their chances of obtaining a stable foothold in the labour market.

In Norway, the right to free education for adults, up to and including upper-secondary level, is guaranteed by law. Since August 2002, adults without primary or lower-secondary education have had the statutory right to education at these levels. The same right has applied to upper-secondary education since August 2000. Since January 2001, all employees have had the right to study leave. Adult education is regulated by the Adult Education Act (1976) and the Education Act (1998). Under the Adult Education Act, the provision of courses is the responsibility of the respective public education authorities at the various levels of education. The Education Act regulates primary, lower-secondary and upper-secondary education for all, including adults. In addition, adults who are able to document having practised a profession for a minimum of five years can obtain an experience-based trade certification (*'praksiskandidatordningen'*). Higher education (universities and university colleges) is regulated by a separate law which applies to this level of education in general (regardless of the students' age). Furthermore, a new law on non-formal adult learning was introduced in 2010 to regulate organised learning activities outside the formal sector. Funding for study associations is regulated by this law and is administered by Skills Norway.

The participation rates in adult education in Norway are high, as in all the Nordic countries. According to Statistics Norway, 12% amongst those aged 25-64 and 5% amongst those aged 50-64 participated in formal education at different levels in 2017 (Statistics Norway, 2018). In 2015-2016, around 7,500 adults participated in primary and lower-secondary education, an increase from 4,000 each year over the period 2003-2010, whilst about 27,000 adults participated in upper-secondary education (Meld. St. 16 (2015-2016); Statistics Norway, 2018). The largest share was women aged 40 or under. In addition, about 9,000 Norwegian adults aged 25 or more obtained a craft certificate/journeyman's certificate in 2015-2016; about 18% as apprentices and 82% as candidates for experience-based trade certification.

### 3 | PREVIOUS RESEARCH

Several studies suggest that competence development and upgrading throughout the professional career (lifelong learning) may be important for older people to meet job requirements, especially in workplaces where labour and competence requirements are constantly changing (Ilmarinen, 2003; Jørgensen, Larsen, & Rosenstock, 2005; Yeatts, Folts, & Knapp, 1999). Documentation of the links between training, competence development and reduced early retirement is nonetheless unclear. Although there is much research on which groups participate in different forms of competence development, much less is known about the relationship between participation in further education and employment.

Previous studies have provided information on the effect of participation of older adults in education on literacy skills (van der Kamp & Scheeren, 1996; van der Kamp & Boudard, 2003) and on participation in the labour market (van den Heuvel, Herremans, van der Hallen, Erhel, & Courtioux, 2006). European experiences of lifelong learning and older workers were also studied by Tikkanen and Nyhan (2006) and AGE (2007). Both recommended making lifelong learning accessible to all employees. Gries, Jungblut, Krieger and Meier (2009) studied the actual age at retirement and suggested that lifelong learning could reduce the number of people taking early retirement. Desjardins and Warnke (2012), meanwhile, provided an overview of age-skill profiles and potential factors influencing skill gain and skill loss at both the individual and population level.

Kilpi-Jakonen, Kosyakova, Stenberg, Vono de Vilhena, and Blossfeldt (2012) examined whether adult education contributed to or countered trends of cumulative advantage over the life course in Sweden, the UK, Spain and Russia and concluded that educational upgrading at mature ages had the potential to reduce social inequalities in all the countries analysed. It tended to increase employment opportunities and women tended to benefit more than men in the UK and Sweden. Likewise, a large comparative study (Blossfeld, Kilpi-Jakonen, de Vilhena, & Buchholz, 2014) which examined adult participation and outcomes of adult learning and training in 14 countries concluded that formal education increased employability, although the effect varied considerably between countries regarding the type of learning and education that had an effect on earnings and employment and for whom.

It also seems that women in general benefit more than men from participation in adult learning. In comparison with the other countries in the study, the Nordic countries (Sweden, Denmark and Finland) demonstrate smaller returns from formal adult education than the liberal countries (Triventi & Barone, 2014; de Vilhena et al., 2014 in Blossfeld et al., 2014). The Nordic countries are characterised by negative returns to formal education and positive returns to non-formal training. The reason suggested by Triventi and Barone (2014) is that cross-national differences in wage returns to formal adult education is similar to differences in returns to formal standard education. Another explanation that they underscore is that formal education is more widespread in the Nordic countries and that the prevalence of adult learning may be inversely correlated with its economic returns. However, the data and methodology used in these studies have several shortcomings.

Although several studies support the idea that higher-educated people are more likely to participate in the labour market and less likely to leave the labour market early, relatively few studies have investigated whether participating in lifelong learning (educational upgrading) actually increased older peoples' (50+) participation in the labour market and their probability of postponing retirement (Hasselhorn & Apt, 2015; Aspøy & Tønder, 2012; Vickerstaff, Loretto, & White, 2009; Phillipson & Smith, 2005; Mayhew & Rijkers, 2005).

There are, however, some high quality studies using longitudinal data and quasi-experimental designs from the US and Sweden that have investigated whether adult education had a causal effect on earnings, employment and/or retirement (Jacobson et al., 2005a, 2005b; Jepsen, Troske, & Coomes, 2014; Stenberg & Westerlund, 2013, 2016). As the Swedish educational system, labour market and welfare system are quite similar to the Norwegian system, the results from the Swedish studies are most relevant for our study.

Stenberg and Westerlund (2016) studied average long run earning effects on higher education for 29-55-year-olds who enrolled in 1992-1993 using high quality longitudinal data (1982-2011) and found substantial positive effects. However, these only emerged after approximately ten years. Their calculations also indicate that the benefits for society exceed the cost. As underscored by the authors, the estimated returns are more than double compared with earlier studies of Swedish adults who enrolled in adult education at the upper secondary level (Stenberg, 2011; Stenberg, de Luna, & Westerlund, 2014). Furthermore, Stenberg and Westerlund (2013) analysed the effect of higher education on adults, using longitudinal population register data (1982-2010) which provide extensive controls for selectivity into education and the potential influence of unobserved factors. They followed a large sample of individuals from ages 42-55 (time of enrolment) to ages 60-73 and found that enrolment in higher education delayed retirement and that the effect was relatively strong. This is in contrast to earlier Swedish studies that investigated whether adult education increased the likelihood of postponing retirement (De Luna, Stenberg, & Westerlund, 2008), comparing those who completed adult education aged 42 or above with those of the same age who did not complete such training and found that adult education did not seem to have any effect on the likelihood of postponing retirement. Other Swedish studies, however, found that formal adult education increased older workers' earnings and employability, especially among women (Hällsten, 2012; Kilpi-Jakonen & Stenberg, 2014; Nordlund et al., 2013).

In Norway, no similar studies of outcomes of adult learning using longitudinal data have been undertaken. However, Proba (2011) investigated outcomes in the labour market for individuals attaining more education as adults using cross-sectional data. The survey showed that they had a significantly higher employment rate compared to individuals who did not increase their education. In particular, having a vocational secondary education seemed to have a positive effect. Completing upper-secondary education as an adult also seemed to reduce the risk of receiving disability benefits compared to those who did not. In another Norwegian study, Wiborg et al. (2011) found that further education seemed to have positive effects in terms of increased labour market participation, higher income and occupational status. They also found that further education at university and college level yielded higher returns than continuing education at upper-secondary school level. Both these studies are, however, based on low quality data and cannot verify whether it is a causal effect between adult education and labour market participation.

There will always be challenges associated with the analysis of this type of cross-sectional datasets. The fact that there is a statistical correlation between participation in competence development and different labour

market outcomes does not necessarily mean that higher salaries and the greater likelihood of being employed are an effect of having completed further education or having attended a course. However, there is evidence that participation in lifelong learning is important for employability. At the same time, there is a need for more knowledge of causal relationships and mechanisms behind statistical co-variation, and in order to obtain such information, there is a need for more analyses based on longitudinal data.

## 4 | DATA AND METHODOLOGY

In order to investigate differences in labour market participation between those who upgraded their formal educational level after the age of 40 and those who did not, we need detailed micro-level data. We used administrative register data from Statistics Norway for the period 2003-2013. Most of our data came from the FD-Trygd database compiled by Statistics Norway. This database is continuously updated and contains data on demographics, employment records and sick pay records. In addition, we used data from the National Education Database, with annual updates of attained formal education. We were interested in those who graduated at or beyond age 40. To increase the number of graduates and allow for a long term follow up period, our sample consisted of all Norwegian residents aged 40 to 54 years in each year. The upper age limit kept our sample relatively homogeneous and reduced the impact of deteriorating health and early retirement which increase with age.

Our dependent variable, labour market participation, measured the number of days in active employment per year. The employment records contained detailed information on when employment contracts started and when they were terminated. Rather than using sick days as a control variable in the analyses, we used the sick pay records, which include details on days covered, to measure 'actual' or active participation in the labour market. Thus, a period with a 50% sick leave was treated as a period in which the active participation was only 50% per day.

Our primary independent variable was attaining education at a higher level. Education is measured by the Norwegian Standard Classification of Education which is a 6-digit code which classifies education by level and field. Like in the International Standard Classification of Education (ISCED), the first digit in the Norwegian Standard relates to level. In this study, we measured change in educational attainment as an increase in educational level. We divided the 8 levels of education into 4 separate groups: Basic education, Secondary Education, Short tertiary education and Long tertiary education. Most individuals starting out in basic education complete secondary education when they attain a higher educational level. Among those with secondary education, most complete lower level tertiary education, whereas those who move up from short tertiary education end up with long tertiary education.

The final data set contained 754,736 males and 717,574 females. 24,153 males and 47,667 females attained higher education during our study period. Our data allowed us to deal with possible selection bias influencing our results. We wanted to estimate the effect of attaining more education on labour market participation. However, those who chose to invest in more education after the age of 40 may have very different observed or unobserved characteristics compared to those who did not participate in education at that age. If the different characteristics can be observed and are available in the data, they can be adjusted for in the analyses. If the characteristics cannot be observed or are not available in the data, there is a need to account for that. In an experimental setting, we could assign formal education randomly and the random assignment would make the exposed and unexposed individuals practically identical in all characteristics, observed and unobserved. Thus, random assignment would remove selection bias (Angrist & Pischke, 2009). However, random assignment to formal education among adults aged 40 or more is not feasible. Fortunately, several approaches, sometimes referred to as quasi-experimental (Tugwell, Knottnerus, McGowan, & Tricco, 2017), have been developed to make causal inferences from observational data. A solution that is often suggested is instrumental variable regression. However, it was challenging to find a valid (and available) instrument which influenced the likelihood of attaining more education after the age of 40, but which did not influence the outcome (labour force participation). Another solution was fixed-effects regression where each individual is used as his or her own control (Allison, 2009), in which all time invariant characteristics are accounted

for and is thus often used to measure causal effects. Time invariant characteristics are gender, social class background and ethnic background, but they could also include innate personal traits such as dispositions towards education and work insofar as they are stable characteristics. Fixed-effects regression was the method used in this article. As it is not possible to estimate the effects of gender in a fixed effects framework, we performed separate analyses by gender and initial educational level. Individuals graduating after reaching 40 years of age probably do not participate at the educational institutions to the same extent as ordinary (and younger) students. Thus, the extent to which they take time off from work to complete their education is not clear. However, to avoid overestimating the effect of graduation caused by a drop in employment when graduating we ran the analyses without including the graduation year. We also performed the analyses with controls for employment in the years preceding graduation. All these results (not shown) are very similar to the results in Table 3. In our analyses, we allowed for a delayed effect of increased education by measuring time since graduation (in years). We also included a second order polynomial to allow for a nonlinear trend in the effect, i.e., the effect may increase or decrease over time. To account for changes in the labour market we included year-dummies, which also adjust for age.

Table 1 presents the number of males and females aged 40-54 years attaining higher education during the period 2003-2013. Overall, about a third was males and their share increased from about 30% in 2003 to 35% in 2013. Among males attaining a higher educational level, 47% completed Secondary education, with women at about 42%. More females than men completed a lower level tertiary education, 32% and 24%, respectively. The share completing a higher tertiary degree was about the same, at 20% among males and 19% among females.

Studying the correlation between educational level and labour market position, we found that those with lower levels of education were more likely to be outside the labour force and to be unemployed (Table 2). Those who were not employed had very few days in employment. If those with a more marginal labour market position obtain a degree, the impact on days in employment may be substantial.

## 5 | RESULTS

This article investigated the impact of increased formal education at age 40 or older (up to 54 years). To investigate differences between males and females and between the different educational levels we did a set of regressions

**TABLE 1** Number of individuals aged 40-54 years attaining a higher educational level during the period 2003-2014 and number who did not

	Males	Females
2003	1684	3928
2004	2019	4951
2005	2120	4743
2006	2081	4088
2007	2226	4176
2008	2310	4317
2009	2304	4120
2010	2578	4487
2011	2288	4333
2012	2329	4437
2013	2214	4087
Total N with increased educational level	24153	47667
Total N without further education	754736	717574

**TABLE 2** Labour force participation by educational level (average number of days in employment). By gender. 2003-2013

Educational level	Males				Females			
	Outside labour force	Employees	Self-employees	Un-employed	Outside labour force	Employees	Self-employees	Un-employed
Basic	20,6 (5)	65,8 (283)	11,3 (19)	2,2 (29)	26,1 (5)	68,7 (278)	3,5 (61)	1,7 (32)
Secondary	8,9 (7)	82,1 (295)	7,7 (16)	1,3 (31)	13,3 (6)	81,4 (282)	4,1 (47)	1,2 (30)
Tertiary, low	7,6 (8)	85,8 (298)	5,2 (25)	1,4 (27)	9,4 (7)	86,6 (289)	3,2 (50)	0,8 (24)
Tertiary, high	5,4 (12)	86,1 (302)	7,7 (81)	0,9 (26)	8,2 (9)	83,3 (285)	7,6 (75)	1,0 (24)

Note. Labour force status in a reference week in November, as used by Statistics Norway in their Register based Employment Statistics.

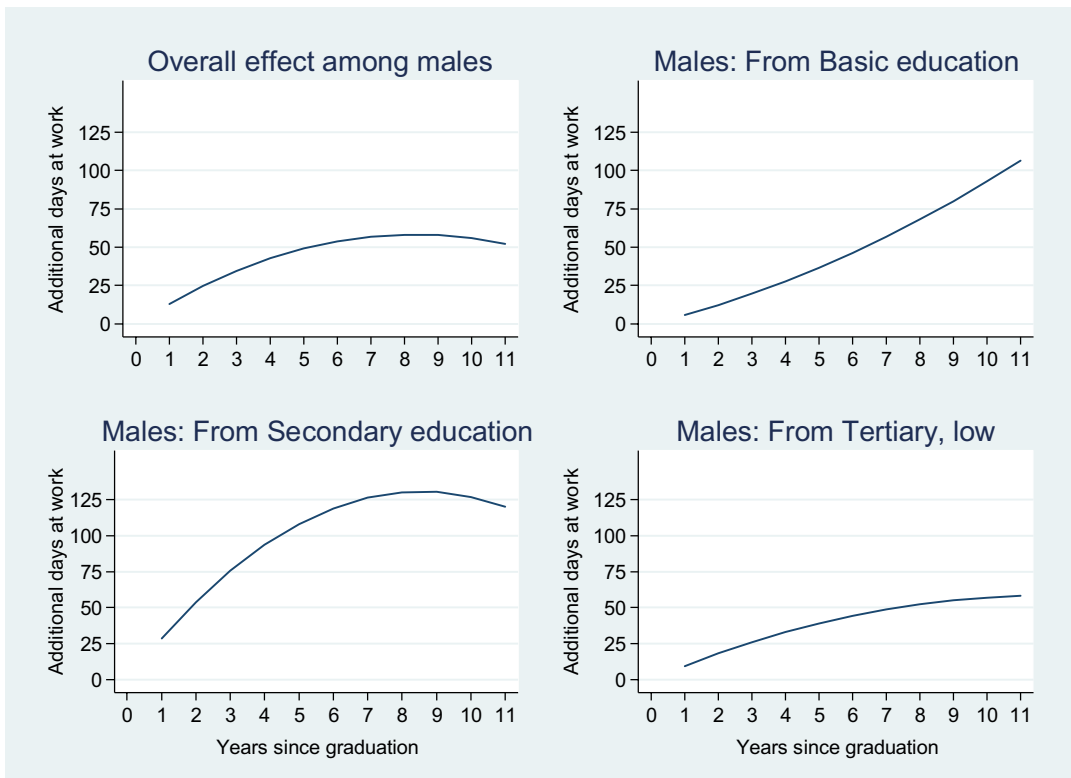
**TABLE 3** Effects of attaining more education on number of days in active employment. By level of education prior to graduation. Fixed effects regression. 2003-2013

	Males		Females	
	Coeff.	Robust S.E.	Coeff.	Robust S.E.
<i>All</i>				
Time since graduation	14,06	0,50	18,38	0,35
Time since graduation <sup>2</sup>	-0,85	0,06	-1,23	0,04
<i>Initially basic education</i>				
Time since graduation	5,35	0,69	13,89	0,50
Time since graduation <sup>2</sup>	-0,39	0,08	-1,12	0,05
<i>Initially secondary education</i>				
Time since graduation	30,51	0,89	26,66	0,59
Time since graduation <sup>2</sup>	-1,78	0,10	-1,51	0,06
<i>Initially lower level tertiary education</i>				
Time since graduation	9,94	1,37	15,40	0,95
Time since graduation <sup>2</sup>	-0,42	0,17	-1,01	0,12

Note. All models adjusted for calendar year. All coefficients are significant,  $P < 0.001$ .

separately for males and females and then among males and females at the different educational levels. The fixed effects regression results are presented in Table 3. For convenience, we illustrated the effect of attaining more education within the different groups in Figures 1 and 2, for males and females, respectively.

All coefficients regarding time since finishing education were positive, but the magnitude varied. The various second order polynomials also varied, making a direct comparison between the different groups cumbersome. However, by looking at Figures 1 and 2 we see that there is an immediate effect of completing more education, but that the effect increases over time and that the time from completion to reaching maximum effect varies between the different groups. The overall effect of attaining more education is very similar between males and females, although the maximum effect is slightly lower among males. We also found that individuals starting out with secondary education, most of whom completed a short tertiary education, had the largest effect on the subsequent



**FIGURE 1** Effects of attaining additional education on number of days in work by years since graduation. Males [Colour figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

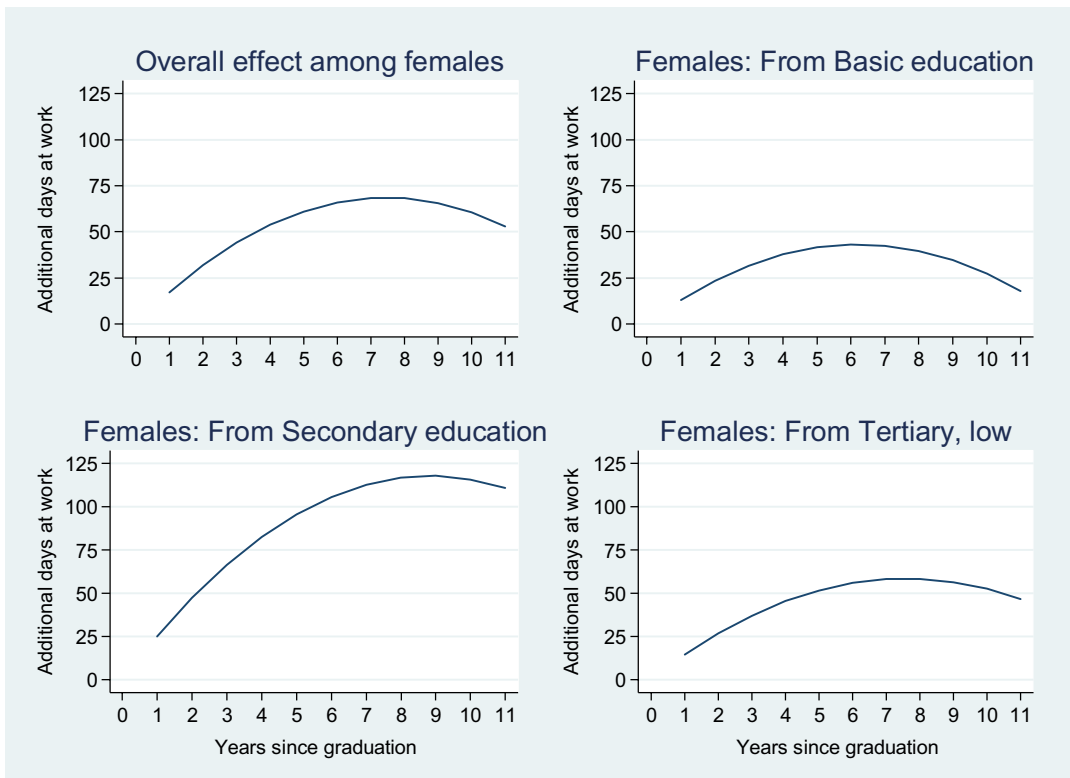
number of days in active employment and that the magnitude was fairly similar between the genders. Obtaining a long university degree had less of an impact on employment, both among males and females. The most striking difference between males and females was among those starting out with some form of Basic education. Among males, the effect on days worked is almost linear, increasing over the whole follow up period and showing no sign of tapering off. Among females, the effects were much weaker, and tapered off again after about 8 years.

## 6 | DISCUSSION AND CONCLUSION

This study found a positive effect of formal educational upgrading, thus contributing to the need for more knowledge on this topic. Our findings are in line with expectations derived from both human capital and signaling theory: more education increases employability measured as an increase in labour market participation, i.e., number of days per year in active employment. Acquiring more transferable skills may facilitate career mobility outside the current work place, but it may also be attractive for the current employer, thus reducing the risk of employment termination.

The overall positive outcomes of upgrading on employment are in line with earlier findings (Blossfeld et al., 2014; Hällsten, 2012; Stenberg & Westerlund, 2013, 2016; Stenberg et al., 2014, Stenberg, 2011). Interestingly, we found that it generally took about eight to ten years before the increase in number of days in employment tapered off, which corroborates studies from Sweden which showed that it took about a decade before returns to adult education fully emerged (Stenberg & Westerlund, 2016). Earlier studies found that women benefited more





**FIGURE 2** Effects of attaining additional education on number of days in work by years since graduation. Females [Colour figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

than men from participation in adult learning (Stenberg & Westerlund, 2016; de Vilhena, Kilpi-Jakonen, Schührer, & Blossfeld, 2014). However, the outcomes of educational upgrading in Norway are positive both for men and women with one exception: men seem to gain much more than women from upgrading their qualifications from basic to upper-secondary level late in life. This is the opposite of some Finnish and Swedish findings (Hällsten, 2012; Nordlund et al., 2013; Kilpi-Jakonen & Stenberg, 2014; Kilpi-Jakonen, Sirno and Martikainen, 2014), but similar to Danish findings (Wahler, Buchholz, Jensen and Unfried, 2014). The data and methodologies used in these studies do, however, vary, and hence are not always comparable.

In Norway, the gender difference in outcome of taking upper-secondary education could be related to the relatively gender segregated labour market. Whilst most women work in the public sector in health, caring or social services, the largest share of men are employed in private sector companies. One possible explanation for the gender differences observed may then be differences in access to adult education, together with differences in job stability (including variation in employment protection legislation) between the private and public sector. Due to labour shortage in the Norwegian health and care sector and the educational sector, most publicly-employed individuals have little risk of being dismissed or losing their job, compared to employees in the private sector where firms may go bankrupt and redundancy and dismissal are more common. Because of differences in job security, the motives for upgrading could differ between men and women, which, in turn, are reflected in the observed outcomes of formal upgrading. The main motive among men in Norway, who mostly work in the private sector, could be to upgrade their qualifications (formalise them) in order to become more attractive on the labour market in case they lose their current job. And our results suggest that their strategy seems to work. Among women, on the other hand, who mostly work in the public sector and therefore have more secure employment, the motives

behind upgrading could be a wish to obtain a more prestigious job or more interesting job task, or simply to obtain a wage increase; all possible positive individual outcomes of educational upgrading that we do not measure in our analysis, but outcomes that may be acquired without increasing the number of days worked.

Attaining more formal education may be positive for the individual, giving access to new knowledge or new skills which may promote work orientation and job satisfaction. However, the results also suggest that an increase in formal education may be a substantial contribution to overall labour supply. The interest in lifelong learning is in part motivated by the anticipated population ageing, which will lead to a need for older employees to extend their working lives. The results show that attaining more formal education has a significant effect on the number of days worked per year. All levels of education attained have a positive impact on employment participation. However, completing a lower level tertiary education has the largest impact both among women and men. In addition, secondary education among males has a strong long term impact on labour supply. Thus, facilitating access to formal education among individuals beyond 40 years of age, particularly secondary education and lower level university education, may be an important means to increase general labour market longevity. Extending working lives through formal education may then reduce some of the challenges associated with the ageing of the population.

## ACKNOWLEDGMENTS

This work was funded by The Research Council of Norway as part of the project "Silver lining – a study of employability and learning trajectories of Late Career Learners" grant 255210.

## REFERENCES

- AGE (2007). *Lifelong learning – a tool for all ages*. Retrieved from [www.age-platform.eu/images/stories/EN/AGE\\_leaflet\\_lifelong\\_learning.pdf](http://www.age-platform.eu/images/stories/EN/AGE_leaflet_lifelong_learning.pdf)
- Allison, P. D. (2009). Fixed effects regression models. In T. F. Liao (Ed.), *Quantitative applications in the social sciences*. Thousand Oakes: SAGE Publications.
- Angrist, J. D., & Pischke, J.-S. (2009). *Mostly harmless econometrics: An empiricist's companion*. Princeton: Princeton University Press.
- Aspøy, T. M., & Tønder, A. H. (2012). *Utredning om forskning på voksnes læring*. Forskningsrådet/ Fafo-notat: En litteraturgjennomgang.
- Becker, G. S. (1962). Investment in human capital: A theoretical analysis. *Journal of Political Economy*, 70, 9–49. <https://doi.org/10.1086/258724>
- Bjørkeng, B. (Ed.) (2013). *Ferdigheter i voksenbefolkningen. Resultater fra den internasjonale undersøkelsen om lese- og tallforståelse (PIAAC). Rapporten 2013/42*. Oslo: Statistics Norway.
- Blossfeld, H. P., E. Kilpi-Jakonen, D. V. de Vilhena, & S. Buchholz (Eds.) (2014). *Adult learning in modern societies: An international comparison from a life-course perspective*. Cheltenham: Edward Elgar Publishing.
- Butler, R. N. (1969). Age-ism: Another form of bigotry. *The Gerontologist*, 9, 243–246. [https://doi.org/10.1093/geront/9.4\\_Part\\_1.243](https://doi.org/10.1093/geront/9.4_Part_1.243)
- De Luna, X., Stenberg, A., & Westerlund, O. (2008). *Can adult education delay retirement from the labour market?* Working paper 6/2008. Stockholm: Institutet för social forskning (SOFI).
- de Vilhena, D. V., Kilpi-Jakonen, E., Schühler, S., & Blossfeld, H. P. (2014). The promise and reality of adult learning in modern societies. In H. P. Blossfeld, E. Kilpi-Jakonen, D. V. de Vilhena, & S. Buchholz (Eds.), *Adult learning in modern societies. An international comparison from a life-course perspective*. Cheltenham: Edward Elgar.
- Desjardins, R., & Warnke, A. J. (2012). *Ageing and skills: A review and analysis of skill gain and skill loss over the lifespan and over time*, OECD Working Paper No. 72. Econ (2009), *Redusert arbeidstid for seniorer med rett til AFP*, rapport 2009–084.
- Fourage, D., & Schils, T. (2008). *Training older workers: Does it help make them work longer?*. Amsterdam: Organistaie voor Strategisch Arbeidsmarktonderzoek.
- Gries, T., Jungblut, S., Krieger, T., & Meier, H. (2009). *Statutory retirement age and lifelong learning*. No 9, Working Papers CIE from University of Paderborn, CIE Center for International Economics.
- Groot, W., & van den Brink, H. M. (2000). Education, training and employability. *Applied Economics*, 32, 573–581.

- Hagen, A., & Nadim, M. (2009). *Hvordan kan kompetanse bidra til å holde folk i arbeid?* Delrapport 3 Liv og arbeid. Fafo-rapport 2009:10. Oslo: Fafo.
- Hällsten, M. (2012). Is it ever too late to study? The economic returns on later tertiary degrees in Sweden. *Economics of Education Review*, 31, 179–194.
- Hasselhorn, H. M., & Apt, W. (2015). *Understanding employment participation of older workers: Creating a knowledge base for future labour market challenges*. Berlin: Federal Ministry of Labour and Social Affairs (BMAS) and Federal Institute for Occupational Safety and Health (BAuA). BMAS/ BAuA.
- van den Heuvel, N., Herremans, W., van derHallén, P., Erhel, C., & Courtioux, P. (Eds.) (2006). *Active ageing: Early retirement and employability*. Leuven-Brussels: Special Issue.
- Ilmarinen, J. (2003). Promotion of work ability during ageing. In I. M. Kumashiro (Ed.), *Ageing and work*. London: Taylor & Francis.
- Jacobson, L. S., LaLonde, R. J., & Sullivan, D. G. (2005a). The impact of community college retraining on older displaced workers: Should we teach old dogs new tricks? *Industrial & Labor Relations Review*, 58, 397–415.
- Jacobson, L. S., LaLonde, R. J., & Sullivan, D. G. (2005b). The returns to community college schooling for displaced workers. *Journal of Econometrics*, 125, 271–304.
- Jepsen, C., Troske, K., & Coomes, P. (2014). The labor market returns to community college degrees, diplomas and certificates. *Journal of Labor Economics*, 32, 95–121.
- Jørgensen, M. S., Larsen, M., & Rosenstock, M. (2005). *Et lengre arbeidsliv. Tilbaketrekningsordninger og arbeidspladsens muligheder*. København: Socialforskningsinstituttet.
- Kilpi-Jakonen, E., Kosyakova, Y., Stenberg, A., Vono de Vilhena, D., & Blossfeldt, H.-B. (2012). *The impact of formal adult education on the likelihood of being employed: A comparative overview*. Retrieved from <http://nbnresolving.de/urn:nbn:de:0168-22oar-363768> Open Access repository [www.ssoar.info](http://www.ssoar.info)
- Kilpi-Jakonen, E., & Stenberg, A. (2014). Adult learning, labour market outcomes, and inequality: The case of Sweden. In H. P. Blossfeldt, E. Kilpi-Jakonen, D. V. de Vilhena, & S. Buchholz (Eds.), *Adult learning in modern societies: An international comparison from a life-course perspective*. Cheltenham: Edward Elgar Publishing.
- Mayhew, K., & Rijkers, B. (2005). How to improve the human capital of older workers. In OECD (Ed.), *Human capital and labour market performance*. Paris: OECD.
- Meld. St. 16 (2015–2016) *Report to the Storting. Social inclusion and a second chance – Coordinated efforts for adult learning*.
- Neumark, D. (2009). The age discrimination in Employment Act and the challenge of population aging. *Research on aging*, 31, 41–68. <https://doi.org/10.1177/0164027508324640>
- Nordlund, M., Stehlik, T., & Strandh, M. (2013). Investment in second-chance education for adults income development in Sweden. *Journal of Education & Work*, 26, 514–538.
- OECD (2013). *Ageing and employment policies: Norway 2013: Working better with age*. Paris: OECD Publishing.
- OECD (2014). *OECD skills strategy diagnostic report: Norway*. Paris: OECD Publishing.
- OECD (2017). *Preventing ageing unequally*. Paris: OECD publishing.
- Phillipson, C., & Smith, A. (2005). *Extending working life: A review of the research literature*: Department for Work and Pensions.
- Picchio, M., & van Ours, J. (2011). *Retaining through training even for older workers*. Ghent: Universiteit Gent.
- Proba (2011). *Utfall på arbeidsmarkedet for personer som fullfører videregående utdanning som voksne*. Oslo: Proba Samfunnsanalyse.
- Raemdonck, I., Beusaert, S., Fröhlich, D., Kochoian, N., & Meurant, C. (2015). Aging workers' learning and employability. In P. Bal, D. Kooij, & D. Rousseau (Ed.), *Aging workers and the employee-employer relationship*. Cham: Springer.
- Raemdonck, I., Tillema, H., Grip, A., Valcke, M., & Segers, M. (2012). Does self-directedness in learning and careers predict the employability of low-qualified employees? *Vocations and Learning*, 5, 137–151.
- Spence, M. (1973). Job market signalling. *The Quarterly Journal of Economics*, 87, 355–374. <https://doi.org/10.2307/1882010>
- Statistics Norway (2018). <https://www.ssb.no/en/utdanning/statistikker/vol>
- Stenberg, A. (2011). Using longitudinal data to evaluate publicly provided formal education for low-skilled. *Economics of Education Review*, 30, 1262–1280.
- Stenberg, A., de Luna, X., & Westerlund, O. (2012). Can adult education delay retirement from the labour market? *Journal of Population Economics*, 25, 677–696.
- Stenberg, A., de Luna, X., & Westerlund, O. (2014). Does formal education for older workers increase earnings? Evidence based on rich data and long-term follow-up. *Labour*, 28, 163–189.
- Stenberg, A., & Westerlund, O. (2013). Education and retirement: Does university education at mid-age extend working life? *IZA Journal of European Labor Studies*, 2, 16. Retrieved from [www.izajournals.com/content/2/1/16](http://www.izajournals.com/content/2/1/16)
- Stenberg, A., & Westerlund, O. (2016). Flexibility at a cost – Should government stimulate tertiary education for adults? *The Journal of the Economics of Ageing*, 7, 69–86.

- Tikkanen, T., & Nyhan, B. (Eds.) (2006). *Promoting lifelong learning for older workers: An international overview*, Cedefop Reference series; 65. Luxembourg: Office for Official Publications of the European Communities.
- Triventi, M., & Barone, C. (2014). Returns to adult learning in comparative perspective. In H. P. Blossfeld, E. Kilpi-Jakonen, D. Vono de Vilhena, & S. Buchhold (Eds.), *Adult learning in modern societies. An international comparison from a life-course perspective*. Cheltenham: Edward Elgar.
- Tugwell, P., Knottnerus, J. A., McGowan, J., & Tricco, A. (2017). Big-5 Quasi-experimental designs. *Journal of Clinical Epidemiology*, 89, 1–3.
- United Nations (2002). *Political Declaration and Madrid International Plan of Action on Ageing*. Second World Assembly on Ageing, Madrid, Spain, 8–12 April 2002, United Nations.
- United Nations (2013a). *Follow-up to the International Year of Older Persons: Second World Assembly on ageing*. Report of the Secretary-General, 19 July 2013, United Nations.
- United Nations (2013). *World Population Ageing 2013*. United Nations, Department of Economic and Social Affairs, Population, Division, ST/ESA/SER.A/348.
- van der Kamp, M., & Scheeren, J. (1996). *Functional literacy of older adults: The case of the Netherlands*. Paper presented at the World Conference on Literacy Philadelphia, PA, March 1996.
- van der Kamp, M., & Boudard, E. (2003). Literacy proficiency of older adults. *International Journal of Educational Research*, 39, 253–263.
- Vickerstaff, S., Loretto, W., & White, P. (2009). The future of older workers: opportunities and constraints. In W. Loretto, S. Vickerstaff, & P. White (Eds.), *The future for older workers. New perspectives*. Bristol: The Policy press, University of Bristol.
- Wiborg, Ø., Sandven, T., & Skule, S. (2011). *Livslang læring og mobilitet i arbeidsmarkedet: En studie av formell og uformell videreutdanning blant norske arbeidstakere basert på Lærevilkårsmonitoren. NIFU rapport 5/2011*. Oslo: NIFU.
- Yeatts, D. E., Folts, W. E., & Knapp, J. (1999). Older workers's adaption to a changing workplace: Employment issues for the 21<sup>st</sup> century. *Educational Gerontology*, 25, 331–347.

**How to cite this article:** Midtsundstad T, Nielsen RA. Lifelong learning and the continued participation of older Norwegian adults in employment. *Eur J Educ*. 2019;54:48–59. <https://doi.org/10.1111/ejed.12322>