Carrots, sticks and old-age retirement. A review of the literature on the effects of the 2005 and 2017 pension reforms in Finland

Satu Nivalainen
Economist, Finnish Centre for Pensions, Finland
satu.nivalainen@etk.fi

Sanna Tenhunen
Economist, Finnish Centre for Pensions, Finland

Noora Järnefelt
Senior Researcher, Finnish Centre for Pensions, Finland

Abstract
This article reviews the behavioural effects of Finland’s pension reforms in 2005 and 2017. With employment rates in older age groups at relatively low levels, both these reforms aimed to encourage later retirement and introduced a flexible old-age retirement age, initially between ages 63–68 and progressively raised to 65–70 years. However, the two reforms differed notably in terms of the means adopted. The 2005 reform relied heavily on “carrots”, i.e. individual choices and financial incentives. In the 2017 reform, “sticks” had a much bigger role, raising the age of eligibility for old-age pension. We consider how the behavioural effects of these two policies differed from each other. The article reviews the existing literature on pre-reform policy evaluations concerning the effects of the pension reforms and explores actual post-reform retirement behaviour based on studies that use register and survey data. It is shown that the 2005 reform failed to induce later retirement, and that employees in higher socio-economic positions benefited more from financial incentives associated with later retirement. In this regard, the 2017 reform, which will automatically increase retirement age via a higher age of eligibility, treats different socio-economic groups more equally.

Keywords
Pension reform, old-age retirement, socio-economic differences

Introduction
Boasting some of the highest life expectancies in the world, the Nordic countries have worked to encourage later retirement ever since the 1990s (NOSOSCO, 2008). Sweden and Norway have constantly maintained high employment rates in their ageing populations, but Finland has recorded much lower employment figures in the 55+ age groups. Initially the priority in Finnish pension policy was therefore to limit early retirement and other early exit options (Saurama, 2004, pp. 75–77), while raising the retirement age entered the policy toolbox much later on. Employment rates among older people have edged up in Finland since the turn of the millennium, which has made the objective of raising the retirement age a more realistic policy target.
This article reviews the pension reforms carried out in Finland in 2005 and 2017, both of which introduced new old-age retirement rules, with subsequent changes in retirement behaviour. The first reform in 2005 took a “carrot” approach, combining a relatively low age of eligibility with financial incentives to continue working and to postpone retirement beyond the age threshold. The latter reform then adopted a “stick” approach and increased the age of eligibility for each birth cohort, fixing eligibility to increases in life expectancy.

While both programmes allowed for flexibility in the exact timing of retirement for ages above the threshold, they relied on distinctly different means to influence old-age retirement behaviour. The 2005 reform essentially used incentives to “nudge” people to voluntarily choose to retire later, whereas the 2017 reform relied on peremptory provision to increase the age of retirement.

In this article we review the existing literature on the Finnish pension reforms of 2005 and 2017. We describe the pre-reform expectations of the effect of these reforms, which date from the period when the reforms were still under preparation, and the actual post-reform retirement behaviour found in studies using register and survey data. We are particularly interested in evaluating the “carrot” and “stick” policies and how effective they were in terms of increasing retirement age, and to assess their implications for socio-economic differentials in retirement between population subgroups.

**Theoretical background**

Earlier evidence on the effect of financial incentives on retirement

In the economic retirement literature, financial incentives for retiring are typically measured by calculating the future streams of pension benefit as a function of retirement timing (for details, see e.g. Grüber & Wise, 2004). This expected future stream of income, called social security wealth, has both income and substitution effects. Due to the income effect, the level of social security wealth affects retirement decisions; typically, individuals with a higher level of wealth tend to retire earlier (e.g. Berkel & Börsh-Supan, 2004). On the other hand, people typically make decisions based on short-term expectations, even if the decision has longer-term effects. Therefore, a short-term change in social security wealth (substitution effect) explains retirement timing better than longer-term incentive measures (see e.g. Dellis et al., 2004).

However, financial incentives do not necessarily affect retirement. For example, Coile et al. (2002) report that despite the financial benefits of postponing retirement, only few people actually take advantage of this option. In particular, those who are in a weaker position in terms of education or socio-economic status tend to retire earlier regardless of financial incentives (for Norway, see Midtsundstad, 2002; for Denmark, see Poulsen, 2015).

Pension reforms usually involve two separate elements: a change in the statutory retirement age and a change in financial incentives. The effect of financial incentives on retirement is well documented, but less attention has been paid to the effects of age limits on old-age retirement. It has, however, been observed that large numbers retire at the lowest age of eligibility (e.g. Behagel & Blau, 2012).

Furthermore, statutory retirement ages affect behaviour separately from financial incentives. For example, Seibolt (2017) observes that pure financial incentives have only a modest effect on retirement, while statutory age effects are considerable. Manoli & Weber (2016) and Behagel & Blau (2012) reported changes in retirement age even when financial incentives were absent or controlled for. They conclude that due to behavioural responses to statutory retirement ages, framing a reform as a change in the statutory age magnifies the behavioural impact, whereas framing it as a benefit cut dampens the response.
Earlier evidence on the effect of individual factors on retirement
Apart from the effects of financial incentives and age limits, retirement has a clear socio-economic dimension. From the individual point of view, socio-demographic factors such as gender, education, socio-economic status, wealth, and income are reflected in retirement timing.

The findings on the effect of gender are mixed: Some results suggest that women are keener to retire early (Raymo et al., 2011), others that women have a tendency to work longer (Finch, 2014). Higher education and higher socio-economic status are usually related to higher retirement age. The highly educated typically start their working careers at a later age and continue to work longer, and those in higher socio-economic positions typically have less physically demanding jobs, and retire later than those with lower qualifications or those in lower level jobs (for Norway, see Midtsundstad, 2002 and Solem et al., 2014; see also Radl, 2013). Higher wealth has been found to be related to earlier retirement (Aaron & Callan, 2011) and lower expected pension income has been observed to delay retirement (van Solinge & Henkens, 2014). Income prior to retirement, in turn, has a less straightforward impact. There is evidence both to support the conclusion that higher income is related to earlier retirement (Raymo et al., 2011) and that it is related to later retirement (for Norway, see Brinch et al., 2017).

The Finnish context: pension reforms in 2005 and 2017
The Finnish pension system is a defined benefit system where pension level is determined by the length of work history and the amount of past earnings. The earnings-related pension system is mandatory and covers all workers and virtually all earnings, even very small and temporary.

The two pension reforms in 2005 and 2017 brought changes both to the age limits for early and full retirement, and to the financial incentives to retire. The most fundamental changes are described in Table 1.

The 2005 reform introduced a flexible old-age retirement age: instead of the standard eligibility age of 65, people could now retire with a full pension at any point between ages 63 and 68. Important changes were also made to pension accrual rules, first and foremost with a view to encouraging people approaching retirement age to stay on at work. Prior to the reform there were two age-dependent accrual rates. After the reform, a third, accelerated rate was introduced to encourage people to postpone retirement beyond the lowest age of eligibility. In addition to the changes made to the retirement age limits and pension accrual rates, opportunities for early retirement were greatly restricted.1

One key innovation of the 2005 pension reform was the introduction of a life expectancy coefficient which reduces accrued pension benefits. This is an automated mechanism designed to limit the growth of pension expenditure as a result of rising life expectancy. The life expectancy coefficient is determined annually for each cohort at the age of 62. It is applied at the point when the level of pension benefit is determined; no subsequent changes are made once the pension has started. When life expectancy increases, the cuts to pensions will also be increased for future cohorts. The cut in the monthly pension benefit can be offset at least in part by working longer.

1. For example, the unemployment pension and individual early retirement pension were discontinued. Unemployment pension was a system covering long-term unemployed persons aged 60 or over and born before 1950. Individual early retirement pension was a form of disability pension, but with more lenient medical criteria for those aged 58 or over and born before 1944.
In the 2017 reform it was agreed that the lower age limit for old-age pension would be increased by three months for each birth cohort, starting from those born in 1955, until the threshold is 65 years. Starting from 2030, the lowest age limit for old-age pension will be tied to the increase in life expectancy.

The reform also introduced a standard age-independent accrual rate. Instead of higher accrual rate based on earnings, those who continue to work beyond the lowest age limit for old-age pension receive a delayed retirement credit based on accrued pension. The delayed retirement credit is actuarially neutral, i.e. on average, the amount of pension that the individual receives during their entire old-age pension period remains the same regardless of the timing of retirement.

Moreover, the early old-age pension was discontinued. At the same time, to maintain flexibility in retirement, a new type of pension was introduced in the form of a partial old-age pension. Under this scheme, employees can take payment of one-quarter or one-half of their accrued pension benefits, regardless of the number of hours they continue to work. An early retirement deduction or delayed retirement credit is applied depending on whether the partial old-age pension started before or after old-age retirement age. At the same time, the rest of the accrued pension increases in line with delayed retirement credit rules until the person’s full retirement.
Methods and data
Our review makes use of earlier research on either of the two pension reforms, published in Finnish or in English. To ensure the inclusion of all relevant studies, we searched a Finnish database using the search terms “pension reform”, “retirement age” and “old-age pension” (in Finnish) for publications by Finnish research institutes, and Google Scholar using the search term “Finland AND (retirement OR pension)” for academic publications and journal articles in English. We found 51 studies that were published between 2001 and 2019.

However, not all of these studies were relevant for the purpose of evaluating expected or observed behaviour regarding old-age retirement either pre- or post-reform. We therefore selected 27 studies which explicitly addressed expected or observed old-age retirement behaviour following the reforms. In general, studies presenting the expectations concerning the effects of the 2005 and 2017 pension reforms are based on different calculations and projections, while the studies concerning the observed retirement behaviour are based on econometric analyses using individual-level data. These studies use individual-level data from surveys, from administrative register sources, or a mixture of the two. In many cases the data comprise whole age groups or very large samples of the age group studied. The studies consulted and the data used in each study are described in more detail in Nivalainen et al. (2020).

How did carrots and sticks work out in the Finnish pension reforms?
Carrots – the effect of the 2005 reform on financial incentives and retirement
What was expected?
At the time that the 2005 reform was under preparation, Finland had an effective retirement age of 59 years – six years short of the official old-age retirement age. This was mostly due to the relative ease of access to early retirement pathways (unemployment pension, early old-age pension, individual early retirement pension). (Ilmakunnas, 2002.)

Projections concerning the 2005 reform estimated that the pure effect of the reform would increase average retirement age by 0.9 years until 2015 and by 1.4 years in the long run (Finnish Centre for Pensions, 2002). Most of this increase would be due to higher employment among older people. It was projected that the reform would increase the total employment rate by almost 2 percentage points in the long run, and it was expected to have a sizeable effect (about 0.7 percentage points) even during the first five years (Börsch-Supan, 2005).

It was anticipated that the restrictions introduced to early retirement pathways would be the major drivers behind the increase in average retirement age in the short run. In addition, it was expected that flexible retirement age, the accelerated accrual rate and the life expectancy coefficient would have an increasing effect on the average retirement age. (Finnish Centre for Pensions, 2019.)

What really happened? The effect of the 2005 reform on retirement behaviour
Studies assessing the effects of the 2005 reform found that the discontinuation of unemployment pension and individual early retirement pension, as well as the increased age limit for the unemployment pathway to retirement, increased employment rates in all the age groups affected by these changes. Overall, however, the effect was relatively minor and less pronounced than expected (Uusitalo & Nivalainen, 2013).
As for financial incentives, it was observed that the accelerated accrual rate increased the odds of retiring later, as expected (Tuominen et al., 2012). Later assessments of the effect of the 2005 reform based on register data revealed that there were clear age-related differences in the effect of the reform on the incentive to work one more year and to retire. The new rules introduced with the 2005 reform offered a greater incentive for 62-year-olds to postpone retirement by one year. This was due to different early retirement deductions: under the new system, the amount of pension was reduced by 7.2 per cent per year, while under the old rules the respective reduction was just 4.8 per cent. (Uusitalo & Nivalainen, 2013; Grüber et al., 2019.)

The flexible old-age retirement scheme meant that the situation was the opposite for persons aged 63 and 64. For them, the financial incentives to continue working decreased after the reform (substitution effect2) and at the same time, retiring became a financially more attractive option. After the reform both these age groups could retire on a full pension, while before the reform retirement at these ages was penalized in the form of an early retirement deduction. As a result, their social security wealth increased by 9.6 and 4.8 per cent, respectively (wealth effect). In other words, an increased accrual rate of 4.5 per cent after age 63 was not a big enough financial incentive to offset the effect of the discontinuation of the early retirement deduction for those aged 63 and 64. (Uusitalo & Nivalainen, 2013; Grüber et al., 2019.)

People aged 65 or over experienced both negative and positive changes in their incentives for working and retiring, depending on their accrued pension and earnings. For those with high earnings and low accrued pension rights, the new rules increased the incentives to work, while for those with low earnings and a high accrued pension, the old rules offered greater incentives to continue working. (Uusitalo & Nivalainen, 2013; Grüber et al., 2019.)

The results showed a direct correlation between the change in incentives and the risk of retirement. Decreasing incentives to work one more year and increasing incentives to retire in the age groups 63 and 64 raised the odds of retirement at these ages significantly. Among persons aged 62, the likelihood of retiring remained more or less unchanged. It is worth pointing out that with regard to financial incentives and retirement behaviour, those aged 65 constituted a special group. Prior to the reform, practically everyone retired on an old-age pension no later than age 65. After the reform, retirement propensities in this age group dropped noticeably, and some were still unretired at age 65. As a result, the overall risk of retirement at age 65 decreased more than one would have expected based on the change in financial incentives; retirement propensities also fell for those whose financial gains from continuing to work remained about the same or de facto decreased after the reform. This suggests that there were also other than purely financial factors that affected the observed behaviour of people in this age group. (Uusitalo & Nivalainen, 2013; Grüber et al., 2019.)

Due to the varying size of different age groups, increasing retirement propensities at ages 63 and 64 had a larger effect on retirement age than the decreasing number of those retiring at age 65. As a result, and against expectations, the retirement age fell somewhat after the reform. (Uusitalo & Nivalainen, 2013.)

Uusitalo & Nivalainen (2013) and Grüber et al. (2019) showed that in the 2005 reform, both age limits and financial incentives affected retirement behaviour. Grüber et al. (2019) found that defining retirement at the ages of 63 and 64 years as full retirement instead of

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2. For example, for those who were 63 years at the end of 2004, the old system would give an accrual rate of \((1\times 2.5\% \times \text{earnings} + 1\times 4.8\% \times \text{accrued pension})\) in case they decided to continue to work for the next 12 months. In the new system the respective accrual rate would be \((1\times 4.5\% \times \text{earnings})\). Thus, the change in the accrual rate due to the reform was negative. In other words, incentives to continue working decreased.
early retirement had a separate relabelling effect that increased retirement propensities at these ages. Therefore, in contrast to intentions, both components (age limits and financial incentives) of the 2005 reform contributed towards increasing retirement at ages 63 and 64. As a result, the retirement pattern shifted strongly from 65 in 2004 towards 63 in 2005. Over a 10-year period, age 65 was replaced by 63 as the new “normal” of retirement age.

It has been estimated that the life expectancy coefficient decreases the risk of retirement and increases the length of working careers (Uusitalo & Nivalainen, 2013; Määttänen, 2013). However, those with higher education and higher socio-economic status are more responsive to the life expectancy coefficient (Sutela & Lehto, 2014). The same applies to financial incentives in general. Nivalainen (2015) found that the behaviour of individuals with a low educational level, lower socio-economic status and low income is not affected by financial incentives, while highly educated upper non-manual employees with a higher income stay in work longer due to financial incentives.

The socio-economic dimension of retirement

No systematic information is available on socio-economic differences in retirement for the pre-2005 period, as there was only one official retirement age for all: 65 years. After the 2005 reform, which brought increased individual choice, more research emphasis was placed on the socio-economic dimension of retirement.

It was found that both the propensity to continue at work until old-age retirement age as well as the timing of old-age retirement vary by socio-economic group. Manual workers often exit working life before old-age retirement through unemployment or disability, while upper non-manual employees more likely transfer to old-age pension directly from work. Only 40 per cent of manual workers continue to work until old-age retirement, while the respective figure for upper non-manual employees is 70 per cent. (Järnefelt, 2014.) Moreover, manual employees tend to retire at the earliest possible old-age retirement age, while the majority of upper non-manual employees and those with higher education stay on at work longer (Nivalainen, 2014; Nivalainen & Järnefelt, 2017).

Furthermore, it was realised that the age-specific accrual rates do not treat different population groups equally. The timing of working careers varies between socio-economic groups. Manual workers tend to start their careers earlier, and they also stop working earlier compared to upper non-manual workers. (Järnefelt, 2014.) In particular, the accelerated accrual rate was problematic from a socio-economic point of view. It favoured those who are healthy enough and able to remain at work longer, typically those in higher socio-economic positions (Sutela & Lehto, 2014). As a result, it has been estimated that only one in five manual employees had the opportunity to benefit from the accelerated accrual rate, while the respective figure for upper non-manual employees was two in five. Moreover, the accelerated accrual rate was calculated based on earnings, not according to accrued pension or length of working career, and therefore it favoured those with higher income at the end of their working careers.

It was found that retirement patterns do not differ by gender per se, but the factors affecting men’s and women’s retirement differ from each other. It seems that men in higher socio-economic positions had a slightly better chance to benefit from the accelerated accrual rate than women. On the other hand, men with higher wealth and men in higher income quartiles were more likely to retire early. Instead, women with higher income seemed to use the accelerated accrual rate more often than men. (Nivalainen & Järnefelt, 2017; Riekhoff & Järnefelt, 2017.) It is difficult, therefore, to determine the overall effect of the 2005 reform on gender differences.
Sticks – the 2017 reform and the effect of increasing age of eligibility

What was expected?
When the 2017 reform was being prepared, the average effective retirement age in Finland was 60.9 years. It is expected that the 2017 reform will increase the average effective retirement age to 62.4 years by 2027 and to 64.4 years by the mid-2060s. By 2025, the number of employed persons is expected to increase by one per cent and the employment rate by one percentage point. By 2060, the number of employed persons is expected to grow by three per cent. The projected increase in retirement age and employment rates is solely due to the higher age of eligibility for old-age pension. (Reipas & Sankala, 2015.)

What is likely to happen?
In the 2017 reform it was decided that the age of eligibility for old-age pension would be progressively raised until the lowest retirement age is brought back to the pre-2005 limit of 65 years. The lowest age of eligibility for old-age pension will subsequently be tied to changes in life expectancy. The effective retirement age has already increased by 0.3 years from 2017 to 2019 (Finnish Centre for Pensions database). It is estimated that the rising age limit for old-age retirement will drive up the incidence of unemployment and disability pensions (Reipas & Sankala, 2015). Based on earlier evidence, these changes will primarily affect manual workers (Järnefelt, 2014). This may contribute to increasing socio-economic inequalities.

The 2017 reform introduced a target retirement age for each age cohort. Staying on at work until the target retirement age offsets the effect of the life expectancy coefficient. Moreover, replacing the accelerated accrual rate by a delayed retirement credit, which is based on accrued pension rather than earnings, treats people in different socio-economic groups more equally.

It is as yet too early to analyse the behavioural effects of the 2017 reform based on register data. However, a survey on the behavioural effects of the reform (Nivalainen & Tenhunen, 2018) has shown that both the life expectancy coefficient and the delayed retirement credit will increase the likelihood of continuing to work longer. Financial incentives particularly encourage those with higher education and those in higher socio-economic positions to stay on at work. Those in higher socio-economic positions also more often intend to continue to work beyond the earliest old-age retirement age, while manual workers more often intend to retire at the earliest age of eligibility. (Nivalainen & Tenhunen, 2018.)

Since those in higher positions are more responsive to financial incentives and also more often intend to postpone retirement, the life expectancy coefficient and delayed retirement credit may in the future further increase socio-economic differences in working life length and in pension levels. On the other hand, the survey also showed that those who expected to have lower levels of financial well-being in retirement were more responsive to financial incentives and they also intended to continue at work longer (Nivalainen & Tenhunen, 2018). This group more often includes those in lower socio-economic positions, which may to some extent reduce socio-economic differences in pension levels.

The age-independent pension accrual rate will most likely reduce differences in pension levels between socio-economic groups in the long run. The overall effect of the reform on socio-economic differences remains to be seen. Nivalainen & Tenhunen (2018) found no gender differences in the effect of financial incentives or in intended retirement age, so it seems that the gender differences in pensions will largely remain unaffected.

The 2017 reform discontinued the early old-age pension and introduced instead a new pension scheme in the form of the partial old-age pension. It has been discovered that men,
the self-employed and the unemployed are more likely to take payment of an early partial old-age pension. Those receiving an early partial pension were not particularly highly educated or in high positions in the labour market. Instead, those who took payment of a partial old-age pension late were more likely to be women, highly educated and in upper-level socio-economic positions. It seems clear, then, that there is a definite need for flexibility in retirement timing. However, people in different positions need different types of flexibility. Men and those in weaker positions (the unemployed) tend to take advantage of early retirement flexibility, whereas women and those in higher positions are more likely to take advantage of the flexibility available to lengthen their working lives. (Tenhunen et al., 2018.) Position in the labour market thus seems to work in the same way both in partial and full retirement.

Conclusions
Our paper aimed to provide insight into the 2005 and 2017 pension reforms in Finland and their success in terms of postponing old-age retirement. The two reforms applied different measures to try and achieve this goal. The 2005 reform relied on individual choice and financial incentives – the “carrots” – while the 2017 reform relied more heavily on “sticks” and increased the age of eligibility for old-age pension. This article evaluated the impact of the two approaches on the timing of old-age retirement and their implications for socio-economic differentials in retirement.

Our review suggests that the flexible old-age retirement scheme introduced in 2005 did not have the desired effects on old-age retirement age. Even though financial incentives to continue working were sharply increased after age 63, due to the simultaneous decrease in the age limit for old-age retirement, the financial incentives to continue working actually decreased for those aged 63 and 64, and, consequently, retirement at these ages increased. Hence, the reform failed to encourage those reaching the lower flexible age limit to stay on at work. In the longer run, the reform had the effect of shifting the most common old-age retirement age from 65 to 63. (Uusitalo & Nivalainen, 2013; Grüber et al., 2019.)

Uusitalo & Nivalainen (2013) concluded that in order to push up the retirement age in line with pre-reform projections, the age limits and/or the financial incentives would need to be considerably revised. Similarly, and in line with international evidence (e.g. Manoli & Weber, 2016), Grüber et al. (2019) concluded that instead of focusing on changing the accrual rates and other financial incentives, it would have been more cost-effective to nudge people to retire later by changing the age of eligibility for statutory pension. This is exactly what was done in the 2017 reform. This reform will have more success in increasing old-age retirement age, since that age is now rising automatically. The effective retirement age has already gone up.

The results also show that despite the pension policy rules, low-educated manual workers have much less opportunity and are less willing to continue to work than highly educated, upper non-manual workers. This holds irrespective of the pension reforms. The elements of the 2005 reform, i.e. a relatively low flexible retirement age coupled with an accelerated accrual rate based on earnings, contributed to an increase in socio-economic differences. The 2017 reform discontinued this feature and instead introduced a standard accrual rate for all ages. At the same time the decision was made to progressively raise the age of eligibility for old-age pension and to determine the amount of delayed retirement credit based on accrued pension instead of earnings. This should contribute to reducing socio-economic differences, at least to some extent. The ultimate impacts on socio-economic differences will remain to be seen.
The effects of these two reforms in Finland provide lessons for other countries planning to reform their pension systems and so to delay retirement. Based on Finnish evidence, it seems that increasing statutory age limits is far more effective than financial incentives in this regard. Furthermore, the choice of policy approach has the potential to reduce socio-economic differentials in retirement behaviour. Our review of the Finnish pension reforms suggests that it is in fact possible to achieve the two goals at the same time, i.e. improved efficiency and reduced socio-economic differentials.

However, retirement decisions are affected not only by pension policy rules, but also by conditions in the workplace. The results from Finland indicate that favourable working conditions can indeed contribute to later retirement. Nonetheless, the single most important factor in predicting retirement timing is health. This underscores the importance of healthy working environments and high-quality occupational health care at the organisational level. (Tuominen et al., 2012; Nivalainen, 2020; for similar conclusions in Sweden, see Nilsson, 2013; for Norway, see Blekesaune & Solem, 2005.) However, these topics need further research.

It is also possible that increasing life expectancy coupled with improving health, the growing prevalence of employers’ ageing programmes and the slow social acceptance of a higher retirement age can lead to a situation where financial incentives start to assume a greater role than they have had in past decades. Nevertheless, there will always be groups that are unmoved by financial incentives.

References
Aaron, H. J. & Callan, J. M. (2011). *Who retires early?* Center for Retirement Research at Boston College Working Paper 2011–10.
Behagel, L. & Blau, D. M. (2012). Framing Social Security Reform: Behavioral Responses to Changes in the Full retirement Age. *American Economic Journal: Economic Policy*, 4, 41–67. https://doi.org/10.2139/ssrn.1729278
Berkel, B. & Börsch-Supan, A. (2004). Pension reform in Germany: the impact on retirement decisions. *Finanzarchiv*, 60, 393–421. https://doi.org/10.3386/w9913
Blekesaune, M. & Solem, P. E. (2005). Working conditions and early retirement a prospective study of retirement behavior. *Research on Aging*, 27, 1, 3–30. https://doi.org/10.1177/0164027504271438
Brinch, C. N., Fredriksen, D. & Vestad, O. L. (2017). Life Expectancy and Claiming Behavior in a Flexible Pension System. *Scandinavian Journal of Economics*, 120(4), 979–1010. https://doi.org/10.1111/sjoe.12271
Börsch-Supan, A. (2005). *The 2005 Pension Reform in Finland*. Finnish Centre for Pensions Working Papers 2005:1.
Coile, C., Diamond, P., Grüber, J. & Jousten, A. (2002). Delays in claiming social security benefits. *Journal of Public Economics*, 84, 357–385. https://doi.org/10.3386/w7318
Dellis, A., Desmet, R., Jousten, A. & Perelman, S. (2004). Micro-Modeling of Retirement in Belgium. In Grüber, J. & Wise, D. A. (Eds.), *Social security and retirement around the world, micro-estimation*. University of Chicago Press, 41–98.
Finch, N. (2014). Why are women more likely than men to extend paid work? The impact of work-family life history. *European Journal of Aging*, 11, 31–39. https://doi.org/10.1007/s10433-013-0290-8
Finnish Centre for Pensions database. https://tilastot.etk.fi/pxweb/fi/ETK/ETK_130elakkeellesiirtymisika/?tablelist=true (accessed 19.11.2020).
Finnish Centre for Pensions (2002). *Arvioita työmarkkinajärjestöjen sopiman yksityisalojen eläkeuudistuksen vaikutuksista, Eläketurvakeskuksen monisteita 40* (Estimations on the effect of labour organisations’ agreement of private sector pension reform).
Finnish Centre for Pensions (2019). *Vuoden 2005 uudistuksen taustaselvityksiä ja vaikutusarvioita*. https://www.etk.fi/elakejarjestelmat/elakejarjestelma-muutoksessa/ lainmuutosten-taustoi/, visited 24.6.2019. (Investigations and estimations concerning the impact of the 2005 pension reform)
Grüber, J. & Wise, T. (2004). Social Security Programs and Retirement Around the World: Micro-Estimation. NBER. Chicago: The University of Chicago Press.

Grüber, J., Kanninen, O., Nivalainen, S., Ravaska, T. & Uusitalo, R. (2019). The Effect of Relabeling and Incentives on Retirement: Evidence from the Finnish Pension Reform in 2005. Labour Institute for Economic Research Working Papers 3.

Ilmakunnas, S. (2002). Yksityisen sektorin työeläkeuudistus. Kansantaloudellinen aikakauskirja, 98(4), 334–343 (Pension reform in the private sector).

Järnefelt, N. (2014). Vanhusheluakkeelle siirtyneiden työurat. (Working careers among those retiring on old-age pension) In: Järnefelt, N., Nivalainen, S., Salokangas, S. & Uusitalo, H. Sosioekonomiset erot – työurat, eläkkeelle siirtyminen ja eläkejärjestelmä. Eläketurvakeskusen raportteja, 01, 33–59 (Sosioeconomic differences: working lives, retirement and the pension system).

Manoli, D. S. & Weber, A. (2016). The effects of the early retirement age on retirement Decisions. NBER Working Papers No. w22561. National Bureau of Economic Research.

Midtsundstad, T. (2002). AFP-pensjonisten: Sliten – eller frisk og arbeidsfør? Analyse av førtidspensjonering og bruk av AFP i LONHO-området. Fafo-rapport 385. Oslo: Fafo. (AFP-retiree: tired – or healthy and able-bodied?)

Määttänen, N. (2013). Eläkepoliittisten uudistusvaihtoehtojen arviointia stokastisen elinkaarimallin avulla. In Lassila, J., Määttänen, N. & Valkonen, T. (eds.), Eläkeiän sitominen elinaikaan – miten käy työurien ja tulonjaon? Eläketurvakeskusen raportteja, 05, 17–50. (Evaluations of the pension policy reform alternatives based on stochastic life-course models)

Nilsson, K. (2013). To work or not to work in an extended working life? – Factors in working and retirement decisions. (Doctoral Thesis), Swedish University of Agricultural Sciences, Alnarp., Acta Universitatis Agriculturae Sueciae 2013:20

Nivalainen, S. (2014). Kuka jatkaa työssä 63 ikävuoden jälkeen? (Who continues to work after age 63?) In Järnefelt, N., Nivalainen, S., Salokangas, S. & Uusitalo, H. (eds.), Sosioekonomiset erot – työurat, eläkkeelle siirtyminen ja eläkejärjestelmä. Eläketurvakeskusen raportteja, 01, 83–102 (Sosioeconomic differences: working lives, retirement and the pension system).

Nivalainen, S. (2015). Miten elinaikakerroin vaikuttaa eläkkeelle siirtymiseen. Eläketurvakeskuksen keskustelualoitteita 01/2015 (The effect of life expectancy coefficient on old-age retirement).

Nivalainen, S. (2020). From plans to action? Retirement thoughts, intentions and actual retirement: an eight-year follow-up in Finland. Ageing and Society, 1–31. https://doi.org/10.1017/S0144686X20000756

Nivalainen, S. & Järnefelt, N. (2017). Eläkeaikeet ja toteutunut eläkkeelle siirtyminen: Sukupuolen, työskentelysektorin ja muuttuneiden elämäntilanteiden vaikutukset. Eläketurvakeskusen tutkimuksia, 06 (Retirement intentions and actual retirement: the effect of gender, working sector and changed life circumstances).

Nivalainen, S. & Tenhunen, S. (2018). Eläketietous, taloudellisten kannustimien vaikuttavuus ja eläkeaiheet. Eläketurvakeskusen tutkimuksia, 01 (Pension knowledge, effect of economic incentives and retirement intentions).

Nivalainen, S., Tenhunen, S. & Järnefelt, N. (2020). Carrots, sticks and old-age retirement. A review of the literature on the effects of the 2005 and 2017 pension reforms in Finland – an extended version. Available at: www.julkari.fi

NOSOSCO (2008). Old-age pension systems in the Nordic countries. Copenhagen: Nordic Social-Statistical Committee. http://norden.diva-portal.org/smash/get/diva2:968720/FULLTEXT01.pdf

Poulson, O. M. (2015). National report: Denmark. In: Hasselhorn, H. M. & Apt, W. (eds.), Understanding employment participation of older workers: Creating a knowledge base for future labour market challenges. Federal Ministry of Labour and Social Affairs.

Radl, J. (2013). Labour Market Exit and Social Stratification in Western Europe: The Effects of Social Class and Gender on the Timing of Retirement. European Sociological Review, 29(3), 654–668. https://doi.org/10.1093/esr/jcs045

Raymo, J. M., Warren, J. R., Sweeney, M. M., Hauser R. M. & Ho, J.-H. (2011). Precarious Employment, Bad Jobs, Labor Unions, and Early Retirement. The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 66B, 249–259. https://doi.org/10.1093/geronb/gbq106
Reipas, K. & Sankala, M. (2015). Effects of the 2017 earnings-related pension reform – Projections based on the government bill. Finnish Centre for Pensions Reports 08/2015.

Riekhoff, A-J. & Järnefelt, N. (2017). Gender differences in retirement in a welfare state with high female labour market participation and competing exit pathways. European Sociological Review, 33(6), 791–807. https://doi.org/10.1093/esr/jcx077

Saurama, L. (2004). Experience of early exit. A comparative study of the reasons for and consequences of early retirement in Finland and Denmark in 1999–2000. Finnish Centre for Pensions, Studies 2004:2.

Seibold, A. (2017). Reference Dependence in Retirement Behavior: Evidence from German Pension Discontinuities, mimeo.

Solem, P. E., Syse, A., Furunes, T., Mykletum R. J., De Lange, A., Schaufeli, W. & Ilmarinen, J. (2014). To leave or not to leave: retirement intentions and retirement behavior. Ageing and Society, 36(2), 259–81. https://doi.org/10.1017/s0144686x14001135

Sutela, H. & Lehto, A-M. (2014). Työolojen muutokset 1977–2013. Official Statistics of Finland, Statistics Finland (Changes in working conditions in 1977–2013).

Tenhunen, S., Nivalainen, S., Järnefelt, N. & Salonen, J. (2018). Ketkä valitsevat OVEn? Tutkimus osittaiselle varhennetulle vanhuuslääkkeelle siirtymisen taustatekijöistä. Eläketurvakeskuksen tutkimuksia 06/2018 (Who opt for partial old-age pension?).

Tuominen, E., Karisalmi, S., Takala, M. & Kaliva, K. (2012). How Do Intentions Affect Future Retirement? A Case Study of the Finnish Flexible Old-Age Pension Scheme. European Journal of Social Security, 14(2), 111–131. https://doi.org/10.1177/138826271201400203

Uusitalo, R. & Nivalainen, S. (2013). Vuoden 2005 eläkeuudistuksen vaikutus eläkkeellesiirtoihin. (The effect of the pension reform of 2005 on the retirement age). Valtioneuvoston kanslian raporttisarja, 05.

Van Solinge, H. & Henkens, K. (2014). Work-related factors as predictors in the retirement decision-making process of older workers in the Netherlands. Ageing and Society, 34, 1551–74. https://doi.org/10.1017/s0144686x13000330