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IZA DP No. 16827

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ABSTRACT

Does High Involvement Management Make You Work Longer? Insights from Linked Survey and Register Data*

The management practices employers deploy may affect the utility workers derive from their jobs, potentially affecting the types of jobs they enter and also their propensity to exit the workforce. Ours is the first paper to assess whether employers' use of high involvement management (HIM) practices may influence workers' retirement intentions. Using linked survey and register data to analyze different combinations of HIM, we find that information sharing and employer-provided training lead to intentions to retire later among those who are close to the official retirement age in Finland.

JEL Classification: J26, J32

Keywords: retirement, high involvement management, information sharing, training

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1. Introduction

As the population continues to age in Europe and in other developed countries, retirement and workforce management become increasingly pressing issues for employers. Good management of retirement and succession planning help to maintain productivity levels and permit the retention of valued staff with firm-specific knowledge. For individual workers, retirement is a significant life transition that can have major impacts on well-being, health status, and financial security, so the timing of retirement decisions is important for both the individual and society.

Employers manage workers using a range of Human Resource Management (HRM) practices which affect workers' likelihood of joining an organization and staying there, as well as how they perform and how they feel about their job whilst they are at the organization. The recent HRM literature has been focused on the potential value to firms of a sub-set of management practices known collectively as high involvement management (HIM). HIM is a popular management approach that emphasizes employee involvement, autonomy, empowerment, information sharing, and continuous development of work-related skills and employer-provided training (Boon et al., 2019). In previous empirical research, it has been linked to a range of positive outcomes for employees, including a higher level of job satisfaction, and consequently lower employee turnover. However, there is no literature to date which links the use of HIM to retirement intentions.

We envisage that HIM practices can significantly influence employees' retirement plans and intentions although the direction of the effect is not entirely clear *a priori.* There is selection into HIM practices, as workers exposed to HIM have either chosen to enter HIM employers in the knowledge that the working environment was characterized by HIM, or else chosen to stay following the adoption of such practices. Either way, HIM can place a substantial amount of responsibility on individual workers which may be welcomed by those who have been at the organization for some time. However, older workers may find it increasingly challenging to fulfill such responsibilities if they struggle either physically or mentally. HIM would then lead to earlier retirement. On the other hand, we hypothesize that employees who feel that they have a voice in decision-making at their workplaces and are supported in their career development also at later

stages of working life are arguably more willing to stay in the workforce longer and delay their retirement plans. If HIM practices promote continuous learning and skill development, older workers may become economically more valuable and attractive to employers. For these reasons, HIM may lead to employees to retire later.

To better understand the potential role of HIM in shaping retirement outcomes, this paper analyzes whether HIM practices have an impact on the expected retirement age of older workers in Finland. We use rich linked survey and register data on Finnish employees and employers for the years 2003, 2008, 2013 and 2018 that allows us to estimate treatment effects. We account for an extensive set of potential confounders such as employee and employer characteristics. Moreover, the linked data contain comprehensive information on working conditions (perceived harms and hazards) at the individual level that are likely to be correlated with intentions to leave the workforce. The linked data we analyze are nationally representative for the working age population in Finland. Our results have implications for organizations and managers seeking to optimize their retirement and workforce management strategies in the context of the growing importance of an aging workforce in Europe and elsewhere.

The paper proceeds as follows. Section 2 provides an overview of the empirical literature. Section 3 describes the institutional background. Section 4 describes linked survey and register data. Section 5 discusses the empirical specifications and presents the results. Section 6 provides a broader discussion of the empirical findings and conclusion.

2. Literature

There is extensive empirical research showing that working conditions and management practices are related to retirement. However, the literature does not consider the potential role of HIM or "bundles" of HIM practices. Topa et al. (2009) conduct a meta-analysis of research on retirement planning and decision-making. Although they discuss the role played by work-related factors, working conditions and job satisfaction, no management variables are included in the meta-analysis. Fisher et al. (2016) survey research on retirement timing and discuss results of the effects of job characteristics and HR policies. For instance, the authors discuss the role of training, but HIM practices are

not explicitly included in their survey. Browne et al. (2019) present a systematic review of the research on retirement intentions and actual retirement, and Knardahl et al. (2017) conduct a systematic review and meta-analysis on disability retirement. Both Browne et al. (2019) and Knardahl et al. (2017) review research that has used the job demands – job control framework or the effort-reward imbalance framework. Although many of the variables discussed are among those practices considered to be HIM practices, the studies covered in these reviews have not explicitly treated them from the perspective of HIM.

Although not focusing on retirement intentions, there is a literature examining the relationship between HIM practices and the job attitudes and job satisfaction of older employees. For example, Kooij et al. (2010) present a meta-analysis of correlations of work-related outcomes, job satisfaction and affective commitment (emotional attachment to the organization), and HIM practices and analyze how their connection changes with age. Their hypothesis is that the correlation of the outcomes and practices increases with age for maintenance practices that help maintain current level of functioning and decreases with age for development practices that aim at achieving higher level of functioning. The results are, however, inconclusive. Of the twelve different practices examined, information sharing, performance management, teamwork, flexible schedules, and internal promotion have a stronger positive correlation with job satisfaction for older employees, and the correlation of rewards and job satisfaction is U-shaped with age. Of these practices, all except internal promotion are classified by Kooij et al. (2010) as maintenance practices. The correlations of affective commitment and HIM practices do not change with age.

Haile (2022) examines the association of HIM bundles and age-specific well-being, measured by low job anxiety and job satisfaction. He finds that practices aimed at improving employees' ability (employee development) increase job anxiety for older workers (aged 50+), whereas motivation-improving practices (appraisal schemes, flexible work, incentive pay) decrease their job anxiety, and opportunity-improving practices (autonomy, teamwork, top-down communication, employee engagement) do not have age-moderated effects. None of the practices have a significant age-moderated association on job satisfaction. Martin et al. (2021) study the relationship between perceived employability and turnover intentions and how this is affected by HIM

bundles and age. They find that the bundle of motivation-enhancing practices (training, participation, voice, teamwork) has a stronger turnover-reducing effect for the younger (under 30) and mid-aged (30-49) employees and the bundle consisting of flexibility-enhancing practices (flexible working time, teleworking, work-life balance) a stronger effect on the turnover intentions of the mid-aged and older (50+) employees. Retirement has not been analyzed in these studies. However, if the HIM practices improve job satisfaction or other work-related outcomes, or reduce turnover, they can be expected to diminish also early retirement intentions.

Our research is related to earlier Finnish studies that used the same Quality of Work Life Surveys, linked to register data, to study retirement. Böckerman and Ilmakunnas (2020) study retirement intentions and actual retirement using the 2003 and 2008 surveys. They include dummy variables for unfavorable working conditions (indicators for at least one clear harm and hazard) and a simple HIM indicator (for at least two HIM practices) to explain job satisfaction, which in turn explains retirement intentions and the intentions explain retirement timing. They find that exposure to HIM practices is related to fewer retirement thoughts and later retirement, and job-related harms and hazards have the opposite effect. Retirement thoughts were measured by using an ordered variable with three possible values, intentions to retire before, at, or after the statutory retirement age. A corresponding ordered variable was used for actual retirement. Nivalainen (2022) uses the 2008 survey to examine expected and actual retirement ages. She discusses several work-related factors and finds, e.g., that job autonomy and flexibility are related to later retirement, and physically demanding job with earlier retirement. However, she does not examine HIM practices. Ilmakunnas and Ilmakunnas (2018) use the 2003 and 2008 surveys to compare intended and actual retirement ages, focusing on the effect of health, but do not discuss work-related factors. Nivalainen (2023) uses the 2008 and 2018 surveys to examine expected retirement ages, concentrating on policy changes between the surveys. She finds that expected retirement ages have followed changes in the statutory retirement age.

Although there is no direct empirical evidence on the issue we are examining, we hypothesize, based on theory, that exposure to HIM may have countervailing effects on older workers' propensity to retire early. On the one hand, if HIM is used by an employer for work enrichment, and increases workers' control over their working

environment, one might expect improvements in job attitudes and job satisfaction, consistent with HIM proxying higher job quality (Karasek, 1979). One might expect this to be the case regardless of age but, in the case of older workers, at the margin, this may lead employees to postpone retirement if HIM increases their utility from work relative to leisure time.

The alternative proposition, often propounded by labour process theorists (Boon et al., 2019), is that HIM is a form of labour intensification since the devolution of job-related responsibilities to workers may not be welcomed, unless compensated for via additional wages in recognition of the additional effort workers must put forth in the presence of HIM (Huselid and Becker, 2011). Again, this may be true regardless of one's age but in the case of older workers close to retirement the intensification of labour via HIM may increase workers' desire to retire early if HIM reduces the utility of work relative to leisure time.

There are ways in which HIM impacts the utility of work relative to leisure which are age-related. For instance, if HIM practices are relatively new, and require learning on-the-job, it is conceivable that they may appeal less to older workers due to the relative costs of investing in these new practices.[1]

Alternatively, older workers may be more adept at absorbing the new information required to successfully operate HIM practices, in part due to seniority giving them tacit knowledge about the workplace and firm-specific skills making HIM usage less costly for them relative to newer workers. If so, it is possible that HIM may raise older workers' satisfaction relative to younger workers', increasing their desire to remain in post more than their junior counterparts.

There is a study for Britain examining the partial correlation between changes in age shares among workers in the workplace, changes in HIM, and workplace labour productivity. It finds no robust association between changes in age shares and changes in workplace productivity, and results do not change with the introduction of a control

[1] The old English adage is that one can't teach an old dog new tricks.

for changes in HIM practices (Bryson et al., 2020). One might speculate, based on such findings, that worker preferences for or against HIM do not vary greatly by age.

Finally, it may be that HIM practices are heterogeneous with respect to their impact on older workers' retirement intentions. Previous research for Finland has already established that the impact of HIM on workers' job satisfaction varies across 'bundles' of practices (Böckerman et al., 2012). If this is so for older workers, it is possible that different bundles of HIM may impact retirement intentions differently. Following on from earlier theoretical research, it may be, for example, that at least some HIM practices are treated as labour intensification by older workers, which might increase the desire for early retirement, but that this effect may be offset in the presence of incentive payments rewarding workers for the additional effort those HIM practices require, resulting in a benign effect on retirement intentions.

3. The Finnish pension system

In this section we briefly describe the Finnish pension system and its major reforms during the period our data covers. The statutory pension system is based on first pillar pensions: employment-based earnings-related pension and residence-based national and guarantee pensions. The role of second and third pillar pensions (employer-specific, voluntary pensions, and pensions based on labour market agreements) is minor. The earnings-related pension is accrued by nearly all employment, and all employees, self-employed and farmers are covered by the scheme. Earnings-related pensions related to private sector employment are provided by pension insurance companies. The public sector has its own pension provider. There is no pension ceiling or upper limit for the earnings-related pension. Most retired individuals above the statutory retirement age receive only earnings-related pension.

The national pension can be received if the earnings-related pension is very small or does not exist. The guarantee pension (from 2011 onwards) provides the minimum level of pension since it is paid only if the total pension income is below a certain minimum level. National and guarantee pensions are administered by the Social Insurance Institution of Finland.

The pension system has undergone major reforms during the period under study. We focus on the changes influencing the retirement age(s) since these are the most relevant regarding our research question. The most important reforms occurred in 2005 and 2017. Before the year 2005, statutory retirement age was 65 years. In 2005, Finland introduced flexible retirement age. After the reform, it was possible to flexibly retire between the ages 63 and 68, i.e., an individual can decide whether to retire at 63 or to continue working. The 2005 reform was agreed in 2002 and, thus, was public information at the time of the first survey used in this study (2003). An important point is that a flexible retirement age gives the employee leeway in terms of the retirement timing, and the employer cannot similarly let go of the employees after the minimum retirement age as they might in some other systems.

While the reform aimed at postponing the average retirement age through changes in financial incentives, this goal was not fulfilled. The lowest retirement age became a new social norm (Gruber et al. 2022).[2] After the 2017 reform (decided in 2014), the statutory retirement age has increased by three months per birth cohort beginning from those born in 1955. The rise will continue until the retirement age is 65 for the birth cohorts 1962-1964. Starting from the year 2030 (the cohort 1965), retirement age will follow the development of life expectancy and it will increase (or decrease) by a maximum of two months per birth cohort. The retirement age will be confirmed for the year in which the age cohort turns 62. Thus, the 2018 survey includes some individuals who do not know their exact statutory retirement age.

Public sector employees have some differences related to retirement age compared to private sector workers. Some public sector employees have a fixed occupational or personal retirement age that differs from the statutory retirement age. Our data set does not include these personal retirement ages but has information on whether an individual is covered by the public sector pension law.

Early old-age pension was possible for individuals close to the statutory retirement age during some of the years under study. The take-up of early old-age pension reduced the

[2] Retirement at certain ages is commonly found in many countries. Possible explanations include social norms, default options, and reference-dependent utility (van Erp et al., 2014).

old-age pension permanently (0.4 % by each month that early old-age pension was received). In 2003, early old-age pension was possible to draw at the age of 60. In the 2005 reform, this age was increased by two years. Early old-age pension scheme was abolished in 2013. Regarding the respondents of the survey in 2013, it was only possible for those turning 62 during the same year to take the early old-age pension.

There have also been changes in partial pension schemes over the past 20 years. Part-time pension was in use from the late 1980s until 2016. The precondition for receiving part-time pension was a transition from full-time employment to part-time employment. In 2003, the age limit for part-time pension was 58 years. In 2010, the age limit was increased to 60 and to 61 years in 2013. In 2017, partial old-age pension replaced part-time pension. There are no employment-related requirements related to the partial old-age pension. Either 25 or 50 per cent of the accrued earnings-related pension can be drawn as partial pension. The partial old-age pension, however, permanently reduces the full old-age pension by 0.4 per cent of the accrued pension for each month the pension is taken early. The partial old-age pension can be withdrawn at the age of 61. For those born in 1964 or later, the age limit is 62 years. In line with the statutory old-age pension, the age limit for partial old-age pension will follow the development of life expectancy.

4. Data

Our empirical analysis is based on the use of nationally representative linked survey and register data for employees in Finland. Information on expected retirement age, high involvement management practices, and perceived working conditions is based on the Quality of Working Life Surveys (QWLS) of Statistics Finland (Lehto and Sutela, 2005, 2009; Sutela and Lehto, 2014; Sutela et al., 2019). These cross-sectional data are available for the years 2003, 2008, 2013 and 2018.

The initial sample for QWLS is the Labor Force Survey which randomly samples the working age population for a telephone interview. The respondents are wage and salary earners between 15 and 64 years old with a normal working week of at least 5 hours. These QWLS respondents' data are linked to their comprehensive longitudinal register data. These included the FOLK data from Statistics Finland. The data set contains rich

background information on employees. The data are linked using unique personal identifiers.

Our dependent variable is the difference between the expected retirement age and the statutory retirement age, both measured in months. The QWLS contains information on expected retirement age for all those who are at least 50 years old at the time of the QWLS. Therefore, our empirical analysis is restricted to this age group. The wording of the question is: "At what age do you reckon you will retire on a full-time pension?" The expected retirement age has been asked in full years, but in the 2018 survey this was asked in years and months, in line with the statutory retirement age increasing three months per birth cohort starting from the year 2018. Although the survey question does not distinguish between retirement with a full old-age pension or an early old-age pension – an option abolished in 2013 – the question directly refers to a "full-time pension"; thus, the partial retirement schemes are not considered.

Low expected retirement ages may be explained by some occupations having relatively low retirement ages during the earlier surveys. At the other extreme, very high expected retirement ages mean that the individuals continue working full time even when they are above the upper limit of the flexible retirement age. We leave out those who were already above the statutory retirement age during the survey since they are not relevant for our research question (these cases exist mainly in the period when statutory retirement age was 63). This leaves 5 989 observations in the four surveys combined. Out of these, expected retirement age is available for 5 693. To remove outliers and possibly wrongly coded answers, we leave out observations where the expected retirement age is below 55 years (5 observations) or above 70 years (10 observations). Taking out those with missing values for some of the explanatory variables the sample size used in the estimations is 5 117.

In 2003, the statutory age was still 65, but the forthcoming 2005 reform was known at that time and the 2003 survey respondents were actually reminded of the reform. As the statutory retirement age, we use 65 (cohorts born before 1942) or 63 (cohorts born in 1942 or later) for the 2003 survey, and 63 for the 2008 and 2013 surveys. For the 2018 survey we take into account the gradual increase in the statutory age, based on the 2017 reform. For those born in 1965 or later we assume that the statutory age is 65. In the

robustness analysis we investigate alternative assumptions about the statutory retirement age. There are personal retirement ages in the public sector for the older age cohorts in Finland, but we control for this by including an indicator variable for those covered by the public sector pension system and indicators for occupations.

Figures 1 and 2 show the distributions of the expected retirement age and the difference between expected and statutory retirement age, respectively, in full years. In Figure 1 the expected retirements in 2003 peak at 63 and 65 years. These are the two statutory ages based on the birth year. The peak at 60 may be due to lower retirement ages in some public sector occupations but may also reflect the prevailing (before the pension reform) attitude to favor early withdrawal from working life as well as the previous possibility of withdrawing an early old-age pension. The 2005 pension reform led to a shift in the mode of expected retirement ages to 63 in the 2008 and 2013 surveys. The 2017 reform, in turn, shifted the mode to 65. There is also a general shift over time from expected early retirement to retirement at the statutory age or even later which is illustrated in Figure 2 with the shift rightwards over time in the distribution of the difference of expected and statutory retirement ages.

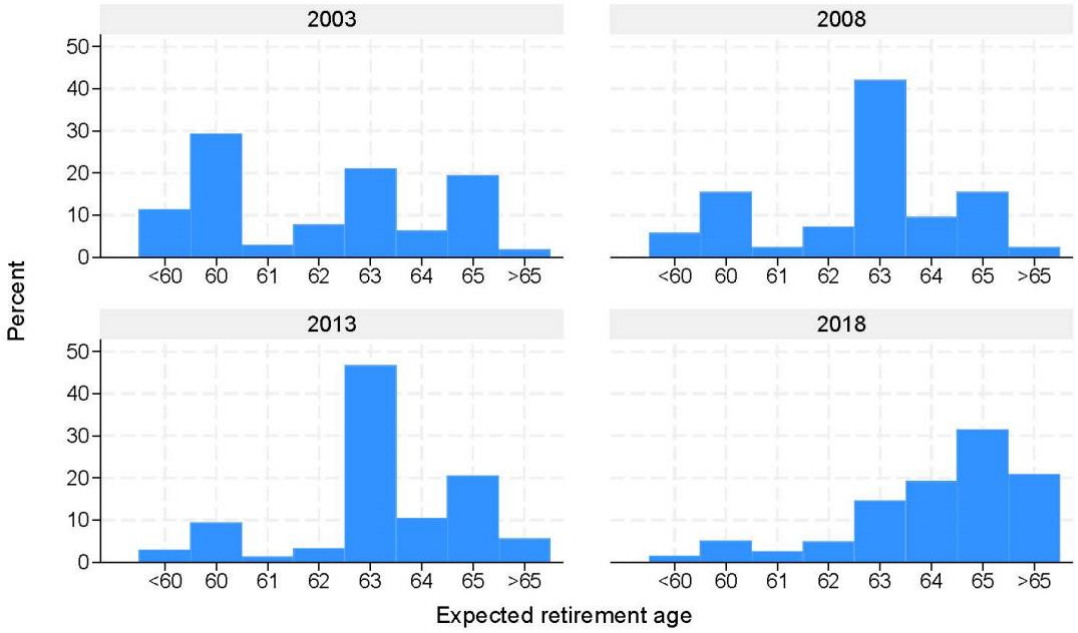

Figure 1. Distribution of expected retirement ages

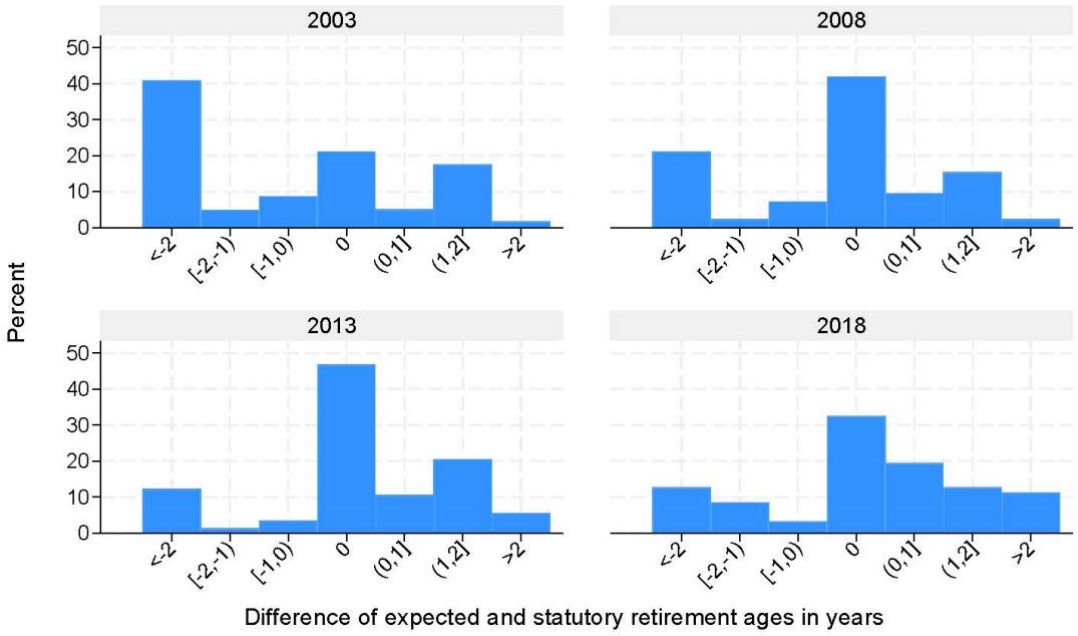

Figure 2. Distribution of the difference between expected and statutory retirement ages in months

We follow our earlier work using the QWLS to characterize HIM practices (Böckerman et al., 2012, 2013). We are able to identify those exposed to incentive pay, employer-provided training, team working, and information-sharing by the employer. Incentive pay is an indicator for those who are subject to performance-related pay; training is relevant for employees who have participated in employer-provided training during the past 12 months; team working indicates those who work mostly in teams; and information sharing involves employees who are informed about changes at work at the planning stage rather than shortly before the change or at the time of its implementation. These measures correspond to the primary elements of a high-performance workplace from the perspective of employees, as highlighted in Appelbaum et al. (2000).

The survey also contains information permitting us to control for several potential confounders which may influence retirement behavior. These include working conditions such as perceived harms and hazards. For perceived harms, the highest category corresponds to the perception by a worker that a certain feature of working conditions is 'very much' (on a five-point scale) an adverse workplace factor. The harms included 19 factors such as heat, cold and dust, among other things. For perceived hazards, the highest category among three possibilities was the one in which the respondent considered a certain feature at the workplace to be 'a distinct hazard' (on a three-point scale). The hazards included 10 factors, such as accident risk, risk of strain injuries and risk of grave work exhaustion, among other things. We aggregated the responses to the questions about adverse working conditions by constructing an indicator variable that equals one if there is at least one clearly adverse factor (the variable 'harms') and a dummy that equals one if there is at least one distinct hazard (the variable 'hazards'). As good health is likely to be related to later retirement, we use a dummy variable for indicating good self-assessed working condition (working condition above seven in the scale from zero to ten).

We use individual characteristics from the QWLS and FOLK, measured during the survey year, as the standard control variables to explain retirement intentions. These included age (in months), gender (an indicator for females), marital status (an indicator for being married or cohabiting), education (indicators for secondary and tertiary education, with basic education as the reference group), and indicators for occupations at the 1-digit level as indicators of a person's socioeconomic status. Year indicators

account for changes in the pension system, but also for general trends in the management practices.

Using longitudinal linkages of the combined data, we utilize FOLK to obtain information on work and employment histories to those exposed to low/high HIM. The idea is to mitigate the problem related to non-random exposure to HIM. We condition on employees' work and earnings histories (average log income; average unemployment months over past six years; and an indicator for over ten years' tenure), which are plausibly highly correlated with unobserved worker traits such as personality, motivation, and job attitudes related to sorting into HIM practices. We also condition on workplace size with indicators for size classes in terms of the number of employees (10-49, and 50-, with below 10 as the reference category), indicators for multi-plant and public employers, indicators for occupations, and past (in the previous survey) average count of HIM practices in the occupation, to account for work and occupation related factors that may explain sorting into HIM. These variables are similar to those we have used in our earlier work (Böckerman et al., 2012).

5. Results

5.1. Descriptive evidence

The descriptive evidence from the pooled cross-sectional data indicates that teamwork and employer-provided training are the most prevalent high involvement practices in Finnish workplaces (Tables 1–2). Table 1 shows the use of different practices irrespective of whether other practices are employed at the same time, whereas Table 2 shows all possible combinations of the practices. In Table 1 we also report two summary measures, i.e., an indicator for having at least two HIM practices (this measure is similar to Böckerman and Ilmakunnas, 2020) and the count of practices used. This count refers to the number of HIM practices an employee is subjected to, which can range from 0 to 4. On average, the number of high involvement practices utilized is close to two. 11 percent of older employees had all four HIM practices in their workplace while 16 percent had a bundle of three practices. The pairwise correlations between different high involvement management practices are documented in Table A1. We find that there are statistically significant, but generally weak, positive correlations

between different high involvement management practices. The use of HIM practices has increased over time (Table A2), although there is no monotonous trend. The share of employees exposed to performance-related pay, teamwork, and training was higher in 2018 than in 2003, but information sharing has not increased. The average number of HIM practices has increased from 1.70 in 2003 to 1.97 in 2018.

5.2. Baseline estimates

We first examine the difference between the expected and statutory retirement age (measured in months) and HIM using the indicator for at least two HIM practices (Panel A of Table 3) and the count of high involvement practices as the explanatory variable (Panel B of Table 3). At this stage we are simply interested in the conditional correlation of the variables and therefore included a minimum number of control variables in the model, namely age (in months), gender, an indicator for being under the public sector pension law, and year indicators. This specification yielded a statistically insignificant coefficient for the HIM indicator, but a statistically significant and positive coefficient for the HIM count suggesting that the higher the number of HIM practices in Finnish workplaces, the more likely it is that older employees continue working above the statutory retirement age. However, including more variables (occupation indicators or survey-based variables harms, hazards and good working condition) in the model rendered the coefficient on the HIM count insignificant (an auxiliary analysis, not included in the table).

Given the previous literature's focus on specific bundles of HIM practices and how they differentially impact worker wellbeing we incorporated all possible combinations of high involvement management practices in the same regression, along with the same limited set of control variables as previously (Panel C of Table 3). In this model, two combinations were statistically significant: one involving information sharing and employer-provided training, and the other combining information sharing, employer-provided training, and teamwork. These combinations are significantly related to delayed retirement intentions.

Estimating the causal effects of HIM practices on retirement intentions is challenging. Since we have cross-sectional data, fixed effects models cannot be used for eliminating time-invariant unobserved characteristics that are potentially correlated with the HIM variables. Moreover, there are no clear exogenous factors or policy changes that would have affected the use of management practices. Consequently, we utilize an empirical approach based on selection on observables.

We conducted Inverse Probability Weighting with Regression Adjustment (IPWRA) estimation for various combinations of high involvement management practices. The aim is to balance the treatment and control groups in a way that they resemble as closely as possible a randomized experiment. In the Inverse Probability Weighting (IPW) part the probability of being exposed to the treatment – which in our application is the exposure to a specific bundle of high involvement management practices – is modeled. In the regression adjustment (RA) stage we run a weighted model for the outcome variable – which is the difference between the expected and statutory retirement ages – separately for the treatment and control groups. The weight of each unit (employees in our application) in the treatment group is based on the inverse probability of receiving the treatment, given the covariates. In the control group, the weights are inverse probabilities of not receiving the treatment. Finally, the predicted outcomes are calculated for each unit using the parameters estimates from the treatment group estimations and averaged over the total sample, and the same is done using the parameters from the control group estimation. The comparison of the predicted means gives the average treatment effect (ATE). When the predicted means are calculated using the treated units only, we get the average treatment effect on the treated (ATT). That is, the counterfactual for the treatment group is formed using the estimates of the model for the control group. IPWRA has the advantage that it has a double robust property, i.e., it is sufficient that either the model for the conditional mean of the outcome or the model for the propensity score of the treatment is correctly specified, but correct specification is not required for both (Wooldridge, 2010; Słoczyński and Wooldridge, 2018).[3]

[3] We used the *teffects ipwra* routine implemented in Stata 17 (StataCorp, 2021). We used a linear model for the outcome and a logit model for the treatment.

The treatment and outcome models can include different variables. The IPW part incorporates variables that have been in the earlier literature utilized to explain selection or sorting into the use of high involvement management practices. These variables include past income, past unemployment, long tenure, the average number of high involvement management practices at the 1-digit occupational level from the previous QWLS survey[4], indicators for plant size, a multi-plant firm, the public sector, and gender, as well as occupational and year indicators. In the inverse probability weighting part of the model, we can also evaluate whether the explanatory variables are sufficiently similar between the treatment and control groups, using an overidentification test (Imai and Ratkovic, 2014).

The regression adjustment (RA) part that explains the outcome of interest includes variables presumed to influence the retirement decision. There are both objective variables, based on register data (age in months, gender, marital status, public sector pension law, occupation) and subjective ones, based on the surveys (harms and hazards at the workplace, and good working condition). Since education and occupation are correlated, we left the former out of the model. Changes in retirement regulations are to a large extent taken into account by our dependent variable (the difference between expected and statutory retirement ages). However, as expectations do not necessarily move in line with changes in the statutory age, we include year indicators in the model. We proceeded by first estimating the model with the objective variables (and the year indicators) and then with the subjective measures as additional variables.

Table 4 shows the estimated average treatment effects on the treated (ATT) for different combinations of management practices from the IPWRA estimation with only the objective variables included in the RA part. In each case, the treatment group consists of those exposed to the HIM combination in question, the control group of individuals who are not exposed to any HIM practices, and all other HIM combinations are excluded. Therefore, the sample size varies in the estimations. ATT measures the effect of an HIM practice on the retirement intentions among those who have been exposed to the practice, i.e., their outcome is compared to the outcome in the hypothetical situation

[4] For the 2003 survey, we used information on HIM practices from the 1997 survey which was not otherwise used in the estimations.

where they had not been exposed to HIM. In all estimations the hypothesis of covariate balance was accepted in the overidentification test (not reported in the table).

Our findings reveal significant average treatment effects for the treated for the combinations of information sharing with employer-provided training, as well as information sharing, training, and teamwork. Being exposed to the former combination leads to intentions to retire five and a half months later than those not exposed to any HIM practice, and the latter combination to intentions to retire six months later. These are economically meaningful effects. For the other combinations, the treatment effects are not significant. The ATTs are two to three months for some HIM bundles, but possibly because of the relatively small number of observations the effects are not precisely estimated. These combinations involve information sharing (other than the two bundles mentioned above). Some bundles that include performance related pay have a negative point estimate, which is relatively large in absolute value, but insignificant.

From these results, our conclusion is that for older workers to effectively cope at work, especially information sharing is crucial for employees to delay their retirement. Also, training is important but needs to be combined with information sharing. However, practices that tend to increase workplace stress, such as teamwork and performance-based pay *per se,* do not appear to be beneficial in terms of postponing retirement decisions.

5.3. Robustness of baseline estimates

To examine the robustness of the results, we used alternative estimators to investigate the treatment effects of the two practices that we found to be significant (combination of information sharing with employer-provided training and combination of information sharing, training, and teamwork). Table 5 shows the results from RA, IPW, and IPWRA estimations, with two alternative variable sets in the RA part (i.e., the subjective measures as additional variables). The table shows both average treatment effects (ATE) and average treatment effects on the treated (ATT). ATE measures the average difference in the outcomes among those exposed to a HIM practice and those not exposed to it. These results show that the IPW estimates of ATT are significant for both

combinations of HIM practices (row 1). For RA and IPWRA, the ATEs are more likely to be statistically significant than the ATTs. Inclusion of the subjective measures renders the ATTs insignificant. A possible explanation is that these variables are such strong predictors of retirement intentions that controlling for them eliminates the difference in outcome between those under an HIM practice and the control group. The connection between the subjective variables and retirement intentions may be due to justification bias: employees who would like to retire early can be inclined to report that their working condition is low and physical work environment poor. An alternative explanation might be that the subjective estimates of harms and hazards at the workplace by employees captures an otherwise unobserved component of the workplace which is negatively correlated with HIM practices. In doing so, it may account for the otherwise unobserved 'good workplace' or 'good management' driving both HIM presence and the preparedness of employees to remain in post beyond statutory retirement age.

As an additional robustness check, we examined two modifications to the definition of the statutory retirement age. First, we used 65 as the statutory age for all 2003 survey participants, instead of the age defined in the forthcoming 2005 pension reform. Second, for the youngest cohorts (born 1965 or later) in the 2018 survey we assumed that due to the development of life expectancy the retirement age increases by two months per year, instead of staying at 65. Both modifications had only a very minor influence on the results and are therefore not reported in tables.

6. Conclusions

Using high-quality Finnish linked survey and register data, our study examines how different workplace practices, collectively called high involvement management practices, affect when people choose to retire. These nowadays popular management practices include employer-provided training, information sharing, performance-related pay, and teamwork. Our empirical analysis placed particular emphasis on analyzing the effects of distinct combinations of these practices. We aimed to understand not only the individual influence of each practice but also how their interplay contributes to shaping

employees' decisions regarding when to exit the workforce. Our study offers insights into how management practices can influence the transition to retirement.

We show that effects of HIM on retirement intentions differ depending on the nature and combination of practices. While certain practices such as information sharing and employer-provided training encourage employees to prolong their careers, others, such as performance-related pay (e.g., bonuses), do not show a significant impact on the decision to retire and even the point estimate is negative. Our findings imply that job enrichment, achieved through high involvement practices, can be a powerful tool for motivating older workers to remain in the workforce longer. This insight is particularly valuable for organizations looking to retain their experienced and skilled staff. Our empirical findings further suggest that workplaces that invest in enriching the job experience can expect a more prolonged engagement from their senior employees.

Our results show that older workers can significantly enhance their ability to thrive in the workplace when they have access to employer-provided training and effective information sharing mechanisms. These two fundamental practices not only contribute to potentially improved job performance but also play a pivotal role in extending the retirement age of employees. The importance of employer-provided training cannot be overstated. By offering specialized training programs tailored to the evolving needs of older workers, companies can empower their employees with the skills and knowledge necessary to adapt to changing work environments. This ensures that older workers remain competitive in an ever-evolving job market. As a result, older workers are more likely to feel valued and engaged in their roles, which in turn encourages them to continue working beyond their statutory retirement age.

Moreover, effective information sharing within the workplace fosters a collaborative and supportive work environment. When employers facilitate the exchange of knowledge and expertise among their employees, older workers can harness the collective wisdom of their colleagues, helping them stay current with industry trends and best practices. This also strengthens their sense of belonging within the organization, making the prospect of retirement less appealing. Companies that prioritize these practices not only empower their aging workforce but also stand to

benefit from the continued contributions of experienced employees, ultimately promoting a more productive and inclusive workplace.

Our findings provide crucial insights for organizational strategies and policy making. Companies aiming to optimize their workforce composition, especially in terms of retaining skilled older workers, might benefit from focusing on high involvement practices that enhance job satisfaction and engagement. Moreover, the results could inform broader policy discussions on workforce management in the context of aging populations in Europe and elsewhere. While the study offers significant insights, it also opens avenues for further research. Investigating how these findings apply in different cultural or institutional contexts or exploring the long-term effects of such practices on workforce composition and productivity, could provide additional valuable information for policy purposes.

References

Appelbaum, E., Bailey, T., Berg, P., Kalleberg, A.L. (2000). Manufacturing Advantage: Why High-performance Work Systems Pay Off. Cornell University Press.

Boon, C., Den Hartog, D. N., Lepak, D. P. (2019). A systematic review of human resource management systems and their measurement. Journal of Management, 45(6), 2498–2537.

Böckerman, P., Ilmakunnas, P. (2020). Do good working conditions make you work longer? Evidence on retirement decisions using linked survey and register data. Journal of the Economics of Ageing, 17, article 100192.

Böckerman, P., Bryson, A., Ilmakunnas, P. (2012). Does high involvement management improve worker wellbeing? Journal of Economic Behavior and Organization, 84, 660–680.

Böckerman, P., Bryson, A., Ilmakunnas, P. (2013). Does high involvement management lead to higher pay? Journal of the Royal Statistical Society, A: Statistics in Society, 176(4), 861–885.

Browne, P., Carr, E., Fleischmann, M., Xue, B., Stansfeld, S.A. (2019). The relationship between workplace psychosocial environment and retirement intentions and actual retirement: a systematic review. European Journal of Ageing, 16, 73–82.

Bryson, A., Forth, J., Gray, H. and Stokes, L. (2020). Does employing older workers affect workplace performance? Industrial Relations: A Journal of Economy and Society, 59(4), 532–562.

Fisher, G.G., Chaffee, D.S., Sonnega, A. (2016). Retirement timing: A review and recommendations for future research. Work, Aging and Retirement, 2(2), 230–261.

Haile, G. (2022). Are high performance work systems compatible with the extending working life agenda? Personnel Review, 51(1), 176–193.

Huselid, M. A., Becker, B. E. (2011). Bridging micro and macro domains: Workforce differentiation and strategic human resource management. Journal of Management, 37(2), 421–428.

Ilmakunnas, P., Ilmakunnas, S. (2018). Health and retirement age: Comparison of expectations and actual retirement. Scandinavian Journal of Public Health, 46(Suppl 19), 18–31.

Imai, K., Ratkovic, M. (2014). Covariate balancing propensity score. Journal of the Royal Statistical Society, B: Statistical Methodology, 76(1), 243–263.

Karasek, Robert A. (1979). Job demands, job decision latitude, and mental strain: Implications for job design. Administrative Science Quarterly, 24(2), 285–308.

Knardahl, S., Johannessen, H.A., Sterud, T., Härmä, M., Rugulies, R., Seitsamo, J., Borg, V. (2017). The contribution from psychological, social, and organizational work factors to risk of disability retirement: a systematic review with meta-analyses. BMC Public Health, 17:176.

Kooij, T.A.M., Jansen, P.G.W., Dikkers, J.S.E., de Lange, A.H. (2010). The influence of age on the associations between HR practices and both affective commitment and job satisfaction: A meta-analysis. Journal of Organizational Behavior, 31(8), 1111–1136.

Lehto, A.-M. and Sutela, H. (2005). Threats and Opportunities. Findings of Finnish Quality of Work Life Surveys 1977-2003. Statistics Finland.

Lehto, A.-M., Sutela, H. (2009). Three decades of Working Conditions. Findings of Finnish Quality of Work Life Surveys 1977-2008. Statistics Finland.

Martin, L., Nguyen-Thi, U.T., Mothe, C. (2021). Human resource practices, perceived employability and turnover intention: does age matter? Applied Economics, 53:28, 3306–3320.

Nivalainen, S. (2022). From plans to action? Retirement thoughts, intentions and actual retirement: an eight-year follow-up in Finland. Ageing & Society, 42, 112–142.

Nivalainen, S. (2023). Retirement intentions and increase in statutory retirement age: 2017 pension reform and intended retirement age in Finland. Journal of Aging & Social Policy, published online April 1, 2023.

Słoczyński, T, Wooldridge, J.M. (2018). A general double robustness result for estimating average treatment effects. Econometric Theory, 34, 112–133.

StataCorp (2021). Stata Statistical Software: Release 17. StataCorp LLC.

Sutela, H., Lehto, A.M. (2014). Työolojen muutokset 1977−2013. Statistics Finland.

Sutela, H., Pärnänen, A., Keyriläinen, M. (2019). Digiajan työelämä. Työolotutkimuksen tuloksia 1977—2018. Statistics Finland.

Topa, G., Moriano, J.A., Depolo, M., Alcover, C.-M., Morales, J.F. (2009). Antecedents and consequences of retirement planning and decision-making: A meta-analysis and model. Journal of Vocational Behavior, 75, 38–55.

van Erp, F., Vermeer, N., van Vuuren, D. (2014). Non-financial determinants of retirement: A literature review. De Economist, 162, 167–191.

Wooldridge, J.M. (2010). Econometric Analysis of Cross Section and Panel Data. 2nd ed. MIT Press.

Table 1. Descriptive evidence on high involvement management practices.

	Mean	Std.dev.
Performance-related pay	0.246	0.431
Team working	0.659	0.474
Training	0.589	0.492
Information sharing	0.350	0.477
HIM indicator (at least 2 practices)	0.627	0.484
HIM count (0—4)	1.844	1.062

Notes: N=5117.

Table 2. Descriptive evidence on the combinations of high involvement management practices.

	Mean	Std.dev.
No HIM practices	0.114	0.318
Performance-related pay only	0.022	0.148
Performance-rel. pay and team working	0.039	0.194
Performance-rel. pay and training	0.026	0.160
Performance-rel. pay and information sharing	0.009	0.095
Performance-rel. pay, team working, and information sharing	0.018	0.134
Performance-rel. pay, team working, and training	0.066	0.249
Performance-rel. pay, information sharing, and training	0.013	0.112
Team working only	0.118	0.322
Team working and training	0.180	0.385
Team working and information sharing	0.054	0.226
Team working, information sharing, and training	0.131	0.337
Information sharing only	0.036	0.187
Information sharing and training	0.038	0.190
Training only	0.083	0.276
All four HIM practices	0.052	0.222

Notes: N=5117.

Table 3. HIM Practices and Their Relationship to the difference between the expected and statutory retirement ages.

	HIM practice	Coefficient
Panel A	HIM indicator	0.833
		(0.772)
Panel B	HIM count (0—4)	0.760**
		(0.354)
Panel C	Performance-related pay only	-1.002
		(2.627)
	Performance-rel. pay and team working	-2.724
		(1.976)
	Performance-rel. pay and training	-2.624
		(2.522)
	Performance-rel. pay and information sharing	1.331
		(3.250)
	Performance-rel. pay, team working, and information sharing	2.730
		(3.070)
	Performance-rel. pay, team working, and training	-0.237
		(1.887)
	Performance-rel. pay, information sharing, and training	3.818
		(3.600)
	Team working only	-0.359
		(1.538)
	Team working and training	-1.533
		(1.412)
	Team working and information sharing	2.669
		(1.935)
	Team working, information sharing, and training	3.518**
		(1.533)
	Information sharing only	2.928
		(2.196)
	Information sharing and training	4.235**
		(2.005)
	Training only	-0.507
		(1.776)
	All four HIM practices	2.140
		(1.981)

Notes: N=5117. The outcome is difference in months. In Panel A the explanatory variable of interest is a dummy variable for having at least two HIM practices, in Panel B the high involvement management count (ranging from 0 to 4), while Panel C reports the results based on the different combinations of high involvement management practices. In Panel C the reference group is no HIM practices. In all Panels the (unreported) control variables include age in months, female indicator, whether under the public sector pension law, and year indicators. Robust standard errors in parenthesis. Significance level: ** 5%, * 10%.

Table 4. The average treatment effect on the treated (ATT) of all possible combinations of high involvement management practices on the difference between the expected and statutory retirement ages

HIM practices	ATT	N
Performance-related pay only	0.158	699
	(2.795)	
Performance-rel. pay and team working	-2.483	785
	(2.369)	
Performance-rel. pay and training	-2.169	705
	(2.971)	
Performance-rel. pay and information sharing	-0.230	631
	(3.331)	
Performance-rel. pay, team working, and information sharing	2.348	678
	(3.380)	
Performance-rel. pay, team working, and training	0.179	923
	(2.593)	
Performance-rel. pay, information sharing, and training	2.837	591
	(4.448)	
Team working only	0.837	1187
	(1.748)	
Team working and training	0.965	1507
	(2.390)	
Team working and information sharing	2.777	859
	(2.170)	
Team working, information sharing, and training	6.238**	1254
	(3.112)	
Information sharing only	1.841	769
	(2.300)	
Information sharing and training	5.591**	776
	(2.793)	
Training only	1.282	1008
	(2.081)	
All four HIM practices	3.357	830
	(3.255)	

Notes: The outcome is difference in months. The table reports average treatment effects on the treated (ATT). The reference group is no HIM practices. The estimates are based on inverse probability weighted regression adjustment IPWRA. The specification is described in the main text. Robust standard errors in parenthesis. Significance level: ** 5%, * 10%.

Table 5. The treatment effects of selected combinations of high involvement management practices on the difference between the expected and statutory retirement ages

	Information and training		Information, training and teams	
	ATT	ATE	ATT	ATE
RA	4.747*	5.189***	4.920*	2.835
	(2.507)	(2.369)	(2.683)	(2.065)
RA, additional variables	3.149	4.554*	3.025	1.527
	(2.451)	(3.377)	(2.527)	(2.002)
IPW	5.075*	5.348***	6.013*	5.949**
	(2.681)	(2.526)	(3.540)	(2.750)
IPWRA	5.591**	6.912***	6.238**	5.641**
	(2.793)	(2.344)	(3.112)	(2.426)
IPWRA, additional variables	3.139	6.127***	2.010	3.281
	(2.572)	(2.239)	(2.541)	(2.118)
Overidentification test	14.669		16.701	
N	776		1254	

Notes: The outcome is difference in months between expected and statutory retirement ages. The table reports average treatment effects (ATE) and average treatment effects on the treated (ATT). The reference group is no HIM practices. RA is regression adjustment, IPW inverse probability weighting, and IPWRA inverse probability weighted regression adjustment. The specification is described in the main text. The overidentification test statistic is chi-squared distributed with 21 degrees of freedom. The additional variables refer to the subjective variables for harms and hazards at the workplace, and good working condition. Robust standard errors in parenthesis. Significance level: *** 1%, ** 5%, * 10%.

SUPPLEMENTARY ONLINE APPENDIX (NOT FOR PRINT)

Appendix Table A1. The pairwise correlations between different high involvement management practices

	Performance-related pay	Team working	Training	Information sharing
Performance-related pay	1			
Team working	0.066***	1		
Training	0.057***	0.179***	1	
Information sharing	0.028**	0.106***	0.113***	1

Notes: N=5 117. Significance level: *** 1%, ** 5%.

Appendix Table A2. High involvement management practices over time

	2003	2008	2013	2018
Performance-related pay	0.218	0.262	0.242	0.262
Team working	0.594	0.672	0.631	0.734
Training	0.522	0.596	0.601	0.626
Information sharing	0.371	0.366	0.322	0.351
HIM indicator (at least 2 practices)	0.563	0.657	0.608	0.674
HIM count (0-4)	1.704	1.896	1.796	1.973
Number of observations	1120	1227	1477	1293

Appendix Table A3. Descriptive statistics

Variable	Mean	Std.dev.
Expected retirement age in months	757.733	28.901
Statutory retirement age in months	761.153	9.163
Expected retirement age minus statutory age in months	-3.420	27.165
Age in months	673.994	43.156
Female	0.567	0.496
Married	0.752	0.432
Public pension law	0.408	0.492
Managers (reference)	0.057	0.233
Professionals	0.223	0.417
Technicians and associate professionals	0.199	0.399
Clerical support workers	0.093	0.291
Service and sales workers	0.164	0.370
Skilled agricultural, forestry and fishery workers	0.012	0.109
Craft and related trades workers	0.103	0.304
Plant and machine operators, and assemblers	0.075	0.264
Elementary occupations	0.073	0.260
Harm	0.247	0.431
Hazard	0.387	0.487
Good working condition	0.806	0.396
Past six years' average log income	5.063	1.224
Past six years' average unemployment months	0.319	1.072
Over ten years' tenure	0.654	0.476
Past HIM count in occupation	1.768	0.364
Plant size -9 (reference)	0.243	0.429
Plant size 10-49	0.391	0.488
Plant size 50-	0.366	0.482
Year 2003 (reference)	0.219	0.414
Year 2008	0.240	0.427
Year 2013	0.289	0.453
Year 2018	0.253	0.435

Notes: N=5 117.