

Health effects of risky lifestyles and adverse working conditions: Are older employees more penalised?

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Abstract

We use Danish matched employer-employee panel data to analyse differences in the health effects of working conditions and lifestyles between older (50 – 65) and younger (25 – 49) employees. Our findings show that ‘good’ lifestyles seem to be more important than ‘good’ working conditions for the ‘good’ health of older employees. In particular, they are penalized by the lack of a right diet and limited physical activity. The age gradient in the effect of working conditions is heterogeneous across health dimensions and job facets. Results hold also once we account for fixed unobserved individual characteristics.

Keywords: health, working conditions, lifestyles, older workers, fixed effects, Oaxaca decomposition.

1. Introduction

Individuals' health is influenced by several risk factors related both to work and non-work activities. Among the former, extrinsic and intrinsic job quality such as adverse physical demands and psychosocial stressors play the biggest role (Green & Mostafa, 2012; Karasek & Theorell, 1990). Among the latter, unhealthy behaviors, such as smoking, heavy drinking, bad food habits, physical inactivity, are key determinants of major preventable diseases with high economic and social costs (Contoyannis & Jones, 2004).

Our paper contributes to the literature that examined how good jobs and good lifestyle practices relate to good health, and analyses the differences in the health consequences of working conditions and lifestyles between older (aged 50 – 65) and younger (25 – 49) employees. We also analyse how much of observed health disparities by age are due to working conditions and lifestyles, and decompose the effect *a la* Oaxaca into the part attributable to characteristics (keeping constant their effect on health) and the part due to the fact that similar lifestyles and workers conditions impact differently on health depending on employees' age.

Knowledge about that is important for policy purposes because the interventions would depend on what matters more between working conditions and lifestyles: promoting more safety at the workplace in one case, investing in more healthy lifestyles in the other one. The designing of practices that best integrate the work environments and the lifestyles is key to improve the well-being of older employees in the context of healthy aging and of expanded working careers often achieved through postponed retirement (see Robroeck et al., 2013; Cai & Kalb, 2006; Henseke, 2017).

While some recent research highlighted that there exists an age gradient in work-related health (e.g. Davies et al., 2016), only few papers analysed differences in health by age also controlling for working conditions (Jones et al., 2013), and none of them examined how much

of the differential can be attributed to specific job quality facets. Similarly, while several studies have investigated the connections between risky lifestyles and health, none of them explored their age gradient.

We use a two-year (2000 and 2005) panel of data on a representative sample of Danish employees obtained the Danish Work Environment Cohort Study (DWECS) with the Integrated Labour Market Database (IDA). We define five indicators for the physical and psychosocial work environment and four indicators for lifestyles, and we study their effect on four health measures: self-assessed health, musculoskeletal health, and mental health and vitality indexes.

From a socioeconomic perspective, Denmark is an interesting country. First, as in many European countries, population ageing is a challenge, calling for policies that promote longer working lives and delayed retirement. In general, older workers in Denmark have better prospects than the EU average and are on average in better health, still about 20% senior workers leave before retirement due to poor working conditions (OCSE, 2015).

Work pressure and physically demanding work are main barriers to remain in the same job until retirement, and high proportions of older workers report that reduced work pressure, less physical workload and recognition from managers and colleagues are key factors to delay retirement (Eurofound, 2013). Lifestyles such as smoking, alcohol abuse, physical inactivity are key determinants of life expectancy in Denmark as in many other European countries.

The remainder of the paper is organised as follows. In the next section we review the relevant literature. After that, we introduce data sources, main variables and the empirical strategy. Next, we present the main empirical results, which are then discussed in the last section, which concludes.

2. Previous research

The effect of working conditions on health has been extensively analysed within several academic fields. The theoretical framework based on the demand-control model of Karasek & Theorell (1990) and the effort-reward model of Siegrist (1996) provide the standard conceptual framework used by empirical studies. According to it, three main dimensions of work-related risks are relevant for health: Demand, which is associated with physical stress (demanding physical working conditions); Control, which refers to the degree of control on performed tasks and the possibility to develop new skills. Reward, which reflects the prospects for personal progress at work and of receiving the deserved attention by peers, and which can be captured, for example, by the support that the worker receives at job by peers and the perceived job security (Bockermann & Illmakunnas, 2008; Cox et al., 2000; Green & Mostafa, 2012; Stock et al., 2005).

In the economics literature, the empirical evidence suggests that adverse working conditions may harm workers' health, especially its mental component. Robone et al. (2011) use UK data and find that being unsatisfied with working hours negatively relates to health. Datta Gupta & Kristensen (2008) use panel data for Denmark, France and Spain and detect a causal relationship between work environment indicators and general versus work-related health. Cottini & Lucifora (2013) using the data for 15 European countries show that job quality have a strong effect on the mental health of workers, and that this results is robust when the endogeneity of job quality is taken into account.

In this literature, age was rarely the main variable of interest. Jones et al. (2013) study whether older workers are significantly different to younger ones over a range of health and job-related risk indicators for the effects of adverse working conditions including physical, ergonomic and psychosocial risk factors. Results from simple least squares regressions show that older and younger workers are similar in terms of the effect of work-related

characteristics on health. However, once controlling for endogeneity and the ‘healthy worker effect’ (positive correlation of health with the probability of being employed, increasing in age), the exposure to adverse working conditions reduces perceived health especially among older workers, by 5 to 11%, depending on the measure considered

Fletcher et al. (2011) use US data and find that individuals who work in jobs characterised by ‘bad’ and risky conditions experience a decrease in health and that this effect is more evident for older workers.

Using data from the UK labour force survey Davies et al. (2016) find that in the working-age population there is a positive association between age and work-related ill-health. However, this relationship is less robust in the sub-sample of employees, suggesting that selection due to the ‘healthy worker’ effect may underestimate true effects. They also find that, among employees, the effects are stronger when considering also health problems from the previous job, suggesting that work risks tend to cumulate over time. The two sources of bias - persistence and the healthy worker effect – are larger for musculoskeletal health than for mental health.

Especially among older employees, the evidence on the ‘healthy worker effect’ as well as on the persistence of work-related shocks on health is rather mixed. For example, Henseke (2017) uses the Survey of Healthy Ageing and Retirement in Europe (SHARE) panel data of older individuals (aged 50 – 65) for fifteen European countries to analyse the relationship between ‘good’ job quality (intrinsic job quality - physical hazards, occupations and psychosocial facets -, job insecurity and earnings) and ‘good’ health. Dynamic panel correlated random effects model estimates also controlling for selection in employment reveal that, at least among older employees, the cross-sectional association between good job quality and good health reflects mostly time-invariant unobserved heterogeneity, while selection induced by the healthy worker effects is not important. Still, health, and in particular mental

health and musculoskeletal problems, is found to respond to job quality. Finally, lagged job quality is not explicative of subsequent health, suggesting transitory effects of job quality on health.

Schmitz (2016) uses a similar empirical strategy and US data for 50 – 65 years old male employees to analyse whether both current working conditions and lifestyles have an impact on health. Results show that only the psychosocial work environment impact on health, while the contribution of physical demands is irrelevant. In particular, the degree of control and influence on job is positively associated with self-reported health at older ages, and its effect is comparable in magnitude to engage in vigorous physical activity. These results are robust to the inclusion/exclusion of controls for time-invariant unobserved heterogeneity, while health-related sample attrition biases downward estimated effects, which are on the conservative side.

Also Debrand & Lengagne (2008) analyse the links between quality of work and health among older European workers. They find that low Demand and high Reward levels are positively associated to a variety of health status; Control influences only the health of women. Both the lack of support by peers and job insecurity negatively affect health, increasing in particular the risk of depression.

The relationship between lifestyles and health outcomes has received considerable attention especially by epidemiologists (see Breslow, 1999; Patja et al. 2005) and in the areas of medicine and occupational health (among the others, Hellerstedt & Jeffery, 1997; Netterstrøm et al., 1991; Otten et al., 1999; Siegrist & Rödel, 2006).

In the economics literature, Kenkel (1995) finds that health is affected by several lifestyle choices such as diet, smoking, exercise, alcohol consumption, sleep, weight (relative to height), and stress. Others have focused on how single behaviours such as smoking are

determined with health (see, e.g., Blaylock & Blisard, 1992; Mully & Portney, 1990) or have examined interactions between lifestyle choices (e.g., Hu et al., 1995).

Contoyannis & Jones (2004) use a UK panel data and find that sleeping well, exercising, and not smoking in 1984 have dramatic positive effects on the probability of reporting excellent or good self-assessed health in 1991. These effects are much larger when controlling for the non-random allocation of lifestyles.

Borg & Kristiansen (2000) analyse the health effects of both lifestyle and work environment using the 1990 and 1995 waves of our data for Denmark. We build up their results by considering a larger set of health indicators and, more importantly, by explicitly addressing the older – younger employees gradient in this context.

3. Data, variables and empirical strategy

We use data from two different sources matched through individual identifiers. First, The Danish Work Environment Cohort Study (DWECS), a panel data collected every 5 years by the Institute for Occupational Health (AMI). The questionnaire covers many dimensions of the Copenhagen Psychosocial Questionnaire and contains detailed work environment information, such as exposure to physical agents (noise, vibration, etc.), chemical agents, physical workload, social environment, together with occupational, health outcomes and lifestyle information. For the purpose of the paper we focus only on 2000 and 2005 since the full set of lifestyle and working conditions is available only in these two waves.

Second, we use Statistics Denmark Integrated Labour Market Database (IDA), which comprises the Danish population of individual and establishment administrative records, and provide information on individual annual earnings as well as demographic and firm characteristics. The match between IDA and DWECS produces about 3,600 observations. The final sample includes employees in the 25 – 65 age interval employed in all the sectors. We

excluded employees older than 65 to mitigate issues of endogenous retirement, i.e. the fact that only the healthier individuals stay at work longer than their retirement age. We also experimented setting the threshold at 60 as well as leaving the employees older than 65 in the sample. Results are pretty much in line with the ones presented here.

According to their age, employees can be in the younger group (25 – 49) or in the older group (50 – 65). Age-group belonging is captured by the ‘50 plus’ dummy. As for the latter, we use the same definition of the SHARE target population, which is broader than that employed by Jones et al. (2013), who identify older employees as people aged 55 years old or more. Results using the ‘55 plus’ definition are however qualitatively very similar.

3.1. Health outcomes, working conditions and lifestyles

The construction of our health and working conditions’ measures follows the approach typically used in the literature (e.g. Kristensen et al., 2002; Poulsen et al., 2013).

We define four health variables. The first is an indicator of self-assessed health, which is ordered from 0 to 4. This is a rough measure of individuals' health and subject to many well-known conceptual problems (see Datta Gupta & Kristensen, 2007). However, it represents the only available information in many data sets and it is also the mostly used indicator in the literature. Next, we define three additional health variables: mental health, vitality and musculoskeletal health. Each variable is a scale obtained by adding up answers to 4 or 5 questions, normalised to vary between 0 (low health: severe health problems or limitations or diseases) and 100 (high health: no health problems or chronic diseases). All questions had six possible responses from 1 (none of the time or conceptually similar) to 6 (all of the time or conceptually similar). In all cases, the questions refer to symptoms experienced by the individual during the last month.

Musculoskeletal health is based on five questions of the Nordic Musculoskeletal Questionnaire, as follows: "Do you feel pain in the neck/knees/shoulder/hand/low back in the

last 12 months?". A slight complication in the definition of this variable is that in 2005 the questions for neck and shoulder were collapsed into a single question, while in 2000 they were kept separated. This means that for 2005 there is less variability in the index. However, the mean of the Musculoskeletal Health scale is very similar for 2000 and 2005, supporting our strategy of pooling the 2000 and 2005 samples together.

The mental health index is based on the five questions of the so-called Mental Health Inventory (MHI-5), subscale of the Short Form Health Status Survey (36 items, SH-36) widely used in the literature, which encompasses major dimensions of mental health: anxiety, depression, psychological well-being. Low values of our index capture general psychological distress (nervosism/depression). The five questions are: "How much of the time during last month you felt: nervous/down/blue/not happy/not calm and peaceful?".

Vitality is based on 3 questions from the SH-36 ("How much of the time during last month you felt: full of pep/worn out/tired"). It is constructed similarly to mental health and intended to capture energy/fatigue. Vitality is an important domain reflecting both the physical and emotional components of health-related quality of life, and captures general and 'positive' health and wellbeing (Ware & Gandek, 1998).

Concerning working conditions, the DWECS questionnaire contains several questions out of which we construct 5 scales related to the job Demand – Control – Reward dimensions. Contrary to health measures, we express working condition scales in 'negative' terms (high values for worse working conditions). Except for one case (see below), each scale is based on questions with six response options and varies in the 0 - 100 range. In our analysis, Demand is captured by a summary indicator for hazardous physical working conditions experienced at the workplace ('Hazard'). It is obtained aggregating scores to 11 questions about work environmental conditions in the last two months. They include physical exposure (loud noise or vibrations from tool hand or vibrations from strike whole body, etc), termical exposure

(temperature fluctuations or coldness or draft), chemical exposure (skin contact with solvents or solvent vapor or passive smoke).

Next we use two indexes related to psychosocial work conditions and the ‘Control’ the worker possesses over its job. The first captures the degree of influence on work, again with reference to the last two months. The variable is called ‘No influence’ and it obtained as the aggregated scale from these items: influence on decisions/on who to work with/on amount of work/on what you do at work. The second if the work involves repetitive tasks in the last two months (‘Repetitive’: do you repeat the same task many times per hour?/learn new things?/work varied?/can take the initiative?).

Also the Reward dimension is proxied by two indexes. The first measures whether the worker receives help from his/her colleagues/supervisor (‘No social support’). The second accounts for the worker’s perception about her job (in)security (‘Job worries’). This takes value 1 if the worker mentions to worry about at least one of the following situations: (i) Losing job?; (ii) Transferred against will?; (iii) Made redundant because of new technology?, (iv) Difficult to find a new job? Otherwise zero. Since these worries are dummy variables, there is little scope in aggregating into a 0-100 index which would take on only four values.

For the definition of lifestyles we follow the literature that takes inspiration from Alameda seven lifestyles conditions (Borg & Kristensen, 2000; Balia & Jones, 2008; Contoyannis & Jones, 2004). We specify four dummy variables. One for being a current smoker (‘Smoking’) and one for heavy alcohol consumption in the week before the interview (‘Drinking’). The third (‘No physical activity’) is for not undertaking any regular physical activity in the last year (almost passive or light physical activity for less than 2 hours a week), and the fourth (‘Not eating fruit and vegetables’) for eating fruit and vegetables less than once a day.

We also control for a number of additional individual and work characteristics which otherwise may act as confounding factors: gender, marital status, presence of children in the household, educational levels; dummies for firm's size, as well as sectoral dummies and occupational dummies. We further control for the natural logarithm of individual income and for a 2005 dummy. In Table 1 we present some descriptive statistics on the distribution of health, lifestyle and working conditions, in the whole sample and separately for younger and older employees. After excluding observations with missing values in key variables, our final sample consists of about 3,000 observations, of which about 700 are older employees and the remaining younger employees.

<Table 1 here>

In the whole sample, the average level of self-assessed health is 3.23, which means a perceived very good/good level of health for almost 80% of employees. With reference to specific health dimensions, all the scales are well above two thirds of the range of variation. Vitality has the lowest mean with 71 out of 100, while the mean of physical health is 78 out of 100. Finally, the average of Mental health is the highest and equal to 84. With respect to working conditions, the highest score (worst condition) is reported for No influence in decisions, followed by Repetitiveness of work, No social support and Hazards. One third of employees report to feel insecure with respect to their job. About 1 out of 3 employees is a current smoker, 1 out of 5 does not eat fruit and vegetables, and 1 out of 10 does not do any physical activity and is a heavy drinker.

Employees in the '50 plus' group are the 24 percent of the sample. They show on average lower levels of self-assessed health. Concerning specific health dimensions, they find, on the one hand, higher scores of mental health and vitality, while, on the other hand, more physical problems as measured by the musculoskeletal scale. With respect to working conditions, they report to be less exposed to hazard conditions, but more to the absence of

‘Rewards’ as measured by social support and job worries. Finally, on the lifestyle side, they are less likely to smoke, but more to drink and also not to eat fruit and vegetables. Table 1 also shows that the differences in observed health, working conditions and lifestyles between older and younger employees are small in absolute values, but often statistically significant. Of course, the differentials shown in Table 1 could reflect many compositional effects, driving the association between lifestyle, working conditions and health. In the next section, we will address these issues by a more appropriate multivariate analysis.

3.2. Empirical strategy

We estimate four health equations – one for each health outcome – first on the overall sample and, second, separately on employees aged 25 – 49 and 50 plus. Given the longitudinal nature of our data, we use panel data methods to account for observing the same individuals over time every five years. We present both random and fixed effects estimates.

As a major advantage, random effects allow to compute health disparities between older and younger employees and to decompose them *a la* Oaxaca into a part ‘explained’ by different observable individual and job characteristics (the ‘endowments’ effect), an ‘unexplained’ part, which reflects the differences in the health effect of such characteristics (the ‘coefficients’ effect), and, finally, a residual part. The latter captures the fact that both returns and characteristics vary across age groups (Jann, 2008; Oaxaca & Ramson, 1994). Random effects are however, they are not consistent when individual unobserved heterogeneity correlates with covariates.

By converse, fixed effects control for time-invariant sources of endogeneity (unobservable fixed individual characteristics correlated with both health and working conditions perceptions) and reverse causality (when, say, health affects eating and physical activity behaviours and not vice-versa) and the so-called ‘healthy worker effect’ (to the extent to which more healthy individuals self-select into occupational cohorts as they get older

because of time invariant traits and preferences, Li & Sung, 1999). If selection is ‘positive’ and due to unobservable time varying characteristics, fixed effects tend to underestimate adverse health effects, thus providing conservative estimates of true effects.

As a major drawback, fixed effects use part of the variability in the data to estimate individual intercepts. This reduces the precision of the estimates of key parameters, especially when variables have little variation over time and when changing status is a rare event (such as our dummies for lifestyles and working conditions), and in the case of small sample sizes, as in our case for older employees.

Another disadvantage is that fixed effects do not allow the computation of health differential by age nor Oaxaca-type decompositions. On the one hand, coefficients of time invariant covariates are not available; on the other hand, estimated fixed effects are inconsistent unless the panel contains a sufficiently high number of observations for each individual (Woodcock, 2008).

4. Results

Table 2 and 3 contain main results from the random effects model, for the overall sample and by age groups.

<Table 2 here>

First, we briefly comment results of Table 2, where we re-estimate the older-younger health differential of Table 1, but now conditioning on a large set of observable characteristics. The results are qualitatively similar. We find that older workers differ significantly from younger workers across all the range of our health indicators. The probability that the self-assessed health of an older employee is high is 7% less than that of a younger peer; older employees have on average about 2.4 point more of mental health and vitality, and 2.7 points less on the musculoskeletal scale. Given the differences in their means,

a 2.4 points effect would be on average relatively stronger for vitality than for mental health, which has a higher mean (84 vs 71). In relative terms, being an older employee is associated with higher mental health by 2.8% ($2.4/84$) and higher vitality by 3.4% ($2.4/71$).

Since we cannot control for sample selection and only workers currently holding a job are used for the estimates, causal inference on the population of potential employees (people in working age) is problematic and potentially misleading. In this respect, the interpretation of our results goes in the direction of simple statistical (conditional) associations.

Focussing on work-related mental health instead of on general mental health and not controlling for working conditions, Davies et al. (2016) find a similar pattern, with the risk of poor mental health declining during the five years prior to retirement age. They also find an attenuated association between health and age in the case of musculoskeletal problems, while for Denmark we find that the correlation is negative. This seems more in line with the aggregate evidence that within the over 40 million workers in Europe affected by musculoskeletal diseases, in general older workers are more affected than younger ones.

As we would expect, ‘bad’ working conditions and health correlate negatively. Interestingly, physical hazards matter not only for musculoskeletal problems and vitality, but also for mental health. As for the interpretation of coefficients, an increase of 10 points (out of 100) in the physical hazard scale (which is a change of magnitude comparable to its standard deviation, equal to 12) is associated with a decrease of 2.5 points in musculoskeletal health. As expected, social support matters more for mental health and vitality, less for musculoskeletal problems while job worries show a more encompassing health effects, being associated with a decrease in all health indicators. The health gradient of ‘bad lifestyles’ is in general negative, but smaller in magnitude than that of working conditions.

<Table 3 here>

Given this preliminary evidence, Table 3 presents random effects by age groups. Firstly, we find that there are not substantial differences in the coefficients of working conditions across older and younger employees. However, a risky job environment – the Demand dimension - affects more the musculoskeletal health of the 50 plus employees, while for younger employees the effect is higher on mental health. Our proxies for the Control dimension of work are negatively associated especially with the mental health of older employees. For example, moving up in the lack of influence scale by 25 points (equal to its standard deviation) results on average in a decrease of 1.2 points in the mental health scale (1/10 of its standard deviation). The marginal effect for repetitiveness is slightly higher (6.6). These effects are quantitatively moderate at the individual level, but may still be substantial at the aggregate level. For example, several studies suggest that there exists a threshold for depression located about at the half of the mental health scale. There is a sharp change in the risk of depression across that threshold, and people falling below that value are much more likely to develop that pathology (Bjorner et al., 1998). If this is the case, even small marginal effects of psychosocial working conditions on mental health may produce severe health consequences for marginal older employees and high social and economic costs. Finally, the magnitude of the effects for lack of social support and job insecurity, which captures low levels of Rewards, is higher but similar across age groups.

Table 3 results also suggest that the main differences between older and younger employees are in the health role of lifestyles. For example, for 50 plus employees the lack of physical activity and of a right diet is associated with significantly lower health levels, irrespectively of the health measure considered. The association is particularly strong in the case of vitality, where not being physically active is associated on average with a reduction of 10 point in the vitality scale. With the exception of musculoskeletal health, also the dummy for not eating fruit and vegetables is negatively associated with the health of older workers

(and not of younger ones), but with smaller coefficients than physical activity (e.g. -2.26 vs -4.35 in the case of mental health). By converse, these effects are never statistically significant in the sample of younger employees.

Our next step is to investigate to what extent the observed age gradients in health that we documented in Table 1 are attributable to lifestyles and working conditions. To this purpose, we perform an Oaxaca decomposition based on the random effects estimates of Table 3. The results are in Table 4.

<Table 4 here>

Panel a) presents the overall decomposition, which highlights the portion of the observed older – younger disparities in health due, respectively, to characteristics, coefficients and interaction terms. Results show, firstly, that coefficients do play the major role in explaining health differences, while the contribution of differences in characteristics (endowments effect) is always insignificant and in general negative. Hence, in Denmark older and younger employees report different health levels mainly because for an hypothetical employee endowed with similar characteristics (education, occupation, gender, working conditions, lifestyles, etc), these characteristics would produce different effects on individual health depending on his or her age. Secondly, this is true either when the differential is positive (Mental health and Vitality) or negative (Self-assessed health, Musculoskeletal problems). When average health disparities are in favour of older workers as for mental health and vitality (1.7 and 2.01, respectively), if it was only for coefficients, the differential would have been even larger (2.45 and 2.47, respectively).

Next, we give a closer look at the decomposition and isolate the contribution of lifestyles and working conditions from that of other covariates. These details are in the Panel b) of Table 4. Finally, in Panel c) we compute the overall contribution of working conditions

and lifestyles to the endowments and coefficients terms of the decomposition (to ease readability, the interaction term is omitted as it was always insignificant).

Our findings suggest that coefficients play the major role, thanks especially to the contributions of lifestyles. There is however a key difference with respect to the overall picture: if was only for lifestyles, disparities in health would always be negative. For example, in the case of mental health, when we consider all covariates, differences in coefficients would imply a 2.45 points higher health for older employees. However, if we consider only lifestyles, the coefficients effect lowers observed health of older employees on average by 1.11 points. By converse, the contribution of working conditions is smaller and lacks statistical significance.

Working conditions seems to matter more for the endowments part, especially for mental health. This means that, by isolating the contribution of working conditions, the mental health of older employees would be lower than that of younger peers.

Results for the fixed effects model are in Table 5. As expected (see Section 3), several key coefficients lose their statistically significance as compared to random effects. However, fixed and random effects provide a quantitatively and qualitatively overall similar picture, suggesting that, in the case of Danish employees and especially for the older ones, the statistical association between health and working conditions/lifestyles does not entirely reflect heterogeneity in fixed unobservable individual characteristics.

More in detail, estimates for 50 plus employees show that the Demand dimension (Job worries) is never statistically insignificant in any health equation. Older employees seem to be more affected by the degree of repetitiveness over work are more important, i.e. the Control and Reward dimensions. This happens especially in the case of mental health and vitality. The estimates for musculoskeletal health are more difficult to interpret since all the variables capturing working conditions and lifestyles are insignificant.

In any respect, our estimates also show that the Control and Reward dimensions matter less for 50 plus than for 25 – 49 employees. This results holds more in general: overall, the association between working conditions and health is more tenuous in the group of older employees.

<Table 5 here>

Interestingly, the working conditions that matter more in the 25 – 49 sample are exactly those that play no role for older employees. Indeed, a bigger role is played by hazard and social support from colleagues, which show a statistically significant effect for all health variables except in the case of self-assessed health.

Surprisingly there is not a statistically significant effect for job insecurity. This is the main difference between random effects and fixed effects estimates. At its face value, this would suggest that there are unobservable time-invariant traits that make individuals who are more likely to be worried about their job also more likely to report low health levels. This can happen if, for example, being worried for the job and feeling health problems are both driven by risk aversion or pessimism. Hence, especially in the case of being worried for the job, the lack of statistical significance in fixed effects estimates imposes particular care in the interpretation of its random effects coefficient, which could overstate true effects.

In general, results in Table 5 suggest that ‘positive selection’ effects may exist not only between health and job worries (higher health correlated with higher job security/lower job worries), but has a more general content. Indeed, the estimated correlation between the fixed effects and the covariates – $\text{corr}(u_i; Xb)$ in Table 5 – is always negative, suggesting the presence of unobservable individual traits that, on the one hand, make people more likely to report better health and, on the other hand, more favourable working conditions and more healthy lifestyles. Moreover, this effect is larger for older employees (e.g. for Vitality, the correlation is -0.151 in the 25 – 49 group and -0.8 in the 50 plus). Hence, controlling for

individual time-invariant unobserved heterogeneity is important especially to obtain more robust correlations especially among older employees.

5. Conclusions

We analyse health disparities between younger (age 25 – 49 years) and older (age 50 years or more) employees in Denmark, and the role that risky working conditions and lifestyles play in this context. We find that, on average, older Danish employees score lower in self-assessed and musculoskeletal health, but higher in mental health and vitality.

Working conditions and lifestyles do play a role for such differences. In particular, risky lifestyles – especially the lack of a right diet and of physical activity – contribute to lowering the health of older employees relatively more than that of their younger peers.

Using the Demand – Control – Reward framework to guide the interpretation of results, we find that physically demanding working conditions are associated with poorer musculoskeletal health in the case of older employees, while for employees aged 25 – 49 the effect is higher on the mental health side. The lack of control tends to reduce the health of both groups of employees, but more that of older ones. Finally, on the Reward side, worries about job-related insecurities affect the health of employees independently on their age, suggesting that, once employed, in the Danish flexicure system the degree of social insurance perceived by workers at different stages of their careers is however similar.

We find that health differences between older and younger Danish employees do not reflect their different endowment of observed characteristics, but, instead, to the fact that similar characteristics would produce different health consequences depending on the age of employees. The ‘bad news’ for older employees is that this ‘coefficients’ effect produces lower self-assessed health and musculoskeletal health (‘tangible’ health) for them. The ‘good

news' is that, at the same time, it tends to be associated with higher mental health and vitality ('intangible' health).

Focussing on the impact of lifestyles and working conditions, unhealthy behaviours – in particular the lack of physical activity and of a right diet - are particularly detrimental for the vitality and the mental health of older employees, although, in absolute, they possesses higher levels of both of them. By converse, the contribution of working conditions is more on the 'endowments' side. For example, lower levels of social support and higher job worries are able to account for a significant portion of the lower levels of mental health among older employees are explained by their.

To summarise our findings, 'good' lifestyles seem to be more important than 'good' working conditions for the 'good' health of older employees and similar working conditions have heterogeneous effects depending on the health dimension and the age of employees. This suggests that in countries characterised by a rich and encompassing welfare state like Denmark, the design of 'good' policies aimed at favouring the well-being of employees at late stages of the career and, maybe, at giving incentives to postpone retirement is rather complex and calls for multidimensional interventions, covering several aspects of life other than job attributes.

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Tables

Table 1 – Variables, sample and descriptive statistics

Variable	<u>Whole sample</u>				<u>Age</u>	<u>Age</u>	<u>Unconditional</u>	
	<u>Mean</u>	<u>Min</u>	<u>Max</u>	<u>St.dv.</u>	<u>50 plus</u>	<u>25 – 49</u>	<u>difference</u>	<u>coef</u>
Age 50 plus	0.24	0	1					
<i>Health variables</i>								
Self-assessed health	3.23	0	4	0.7	3.15	3.25	-0.10***	-3.22
Mental health	84.65	0	100	12.4	85.93	84.23	1.69***	3.2
Vitality	71.52	0	100	17.2	73.04	71.03	2.01**	2.69
Musculoskeletal health	78.58	0	100	19.9	76.18	79.35	-3.18***	-3.7
<i>Working conditions</i>								
Hazard	12.52	0	100	12.4	10.48	13.18	-2.70***	-6.01
No influence	47.48	0	100	25	46.19	47.90	-1.70	-1.57
Repetitivness	28.26	0	100	28.6	29.24	27.95	1.29	1.63
No social support	21.98	0	100	22.3	23.99	21.34	2.65***	3.75
Job worries	0.35	0	1		0.45	0.32	0.13***	6.53
<i>Lifestyles</i>								
Smoking	0.30	0	1		0.25	0.31	-0.06***	-3.17
Drinking	0.10	0	1		0.16	0.08	0.08***	6.12
No physical activity	0.14	0	1		0.13	0.14	-0.01	-0.4
No fruit&vegetab.	0.23	0	1		0.18	0.25	-0.07***	-3.85
N. Observations	2,898				706	2,192		

Notes: The unconditional difference is a t-test of the difference in means between 50 plus and 25 – 49 years old employees. The t-stat measures the statistical significance of that difference. Significance levels: * = 10%; ** = 5%; *** = 1%.

Table 2 – Estimates of health equations – Random Effects model on the overall sample

<u>Variables:</u>	<u>Self-assessed health</u>		<u>Mental health</u>		<u>Vitality</u>		<u>Musculoskeletal health</u>	
	<u>Coef.</u>	<u>z</u>	<u>Coef.</u>	<u>z</u>	<u>Coef.</u>	<u>z</u>	<u>Coef.</u>	<u>z</u>
Age 50 plus	-0.074**	-2.01	2.380***	4.16	2.434***	3	-2.737**	-2.45
<i>Working conditions</i>								
Hazard	-0.004**	-2.4	-0.130***	-4.56	-0.233***	-6.42	-0.239***	-6.13
No influence	0.001	0.77	-0.025**	-2.45	-0.041**	-2.82	-0.005	-0.31
Repetitivness	-0.003***	-3.12	-0.044**	-2.74	-0.078***	-3.69	-0.096***	-3.91
No social support	-0.004***	-4.59	-0.142***	-9.82	-0.152***	-7.65	-0.102***	-4.47
Job worries	-0.132***	-4.61	-3.153***	-6.43	-4.479***	-6.52	-3.726***	-4.98
<i>Lifestyles</i>								
Smoking	-0.079**	-2.41	-0.434	-0.83	-1.385*	-1.93	-1.897**	-2.11
Drinking	-0.070	-1.64	-2.063**	-2.6	-1.153	-1.19	-0.498	-0.44
No physical activity	-0.129***	-3.19	-1.568**	-2.36	-4.774***	-5.05	-0.751	-0.7
No fruit&vegetables	-0.055	-1.63	-0.583	-1.12	-1.356*	-1.87	-0.765	-0.89

Notes: The model is estimated with 2,898 observations. All the regressions include a constant and additional controls for: gender, education, hourly wage, occupation, sector and size number of children, marital status and a dummy for 2005. Statistical significance: * = 10%; ** = 5%; *** = 1%.

Table 3 – Estimates of health equations with random effects. Separate estimates for 50 plus and 25 – 49 years old employees

Variables:	Self-assessed health				Mental health				Vitality				Musculoskeletal health			
	Age 50 plus		Age 25-49		Age 50 plus		Age 25-49		Age 50 plus		Age 25-49		Age 50 plus		Age 25-49	
	Coef.	z	Coef.	z	Coef.	z	Coef.	z	Coef.	z	Coef.	z	Coef.	z	Coef.	z
<i>Working condit.</i>																
Hazard	-0.011***	-3.02	-0.002	-1.12	-0.078	-1.52	-0.138***	-4.18	-0.223**	-2.92	-0.237***	-5.58	-0.327***	-3.14	-0.211***	-5.11
No influence	0.001	0.43	0.001	0.94	-0.045**	-2.23	-0.018	-1.55	-0.092***	-3.12	-0.022	-1.28	-0.009	-0.22	-0.003	-0.14
Repetitivness	-0.001	-0.32	-0.004***	-3.41	-0.066**	-2.23	-0.037**	-1.96	-0.065	-1.46	-0.086***	-3.47	-0.094	-1.6	-0.092***	-3.4
No social support	-0.003**	-2.39	-0.004***	-4.06	-0.134***	-5.76	-0.151***	-8.39	-0.173***	-5.21	-0.150***	-6.32	-0.076*	-1.72	-0.123***	-4.61
Job worries	-0.186***	-3.24	-0.118***	-3.56	-3.402***	-4.14	-3.049***	-5.18	-4.735***	-3.77	-4.392***	-5.57	-3.708**	-2.21	-3.616***	-4.38
<i>Lifestyles</i>																
Smoking	-0.063	-0.8	-0.087**	-2.44	-0.690	-0.61	-0.286	-0.47	-1.805	-1.15	-1.352	-1.62	-3.025	-1.32	-1.484	-1.57
Drinking	-0.079	-1.01	-0.063	-1.23	-2.441*	-1.8	-1.818**	-1.95	-1.584	-0.87	-1.061	-0.95	0.561	0.27	-1.112	-0.84
No physic. activ.	-0.278***	-3.29	-0.082*	-1.84	-4.351**	-2.94	-0.734	-0.96	-10.568***	-4.9	-3.046**	-2.91	-4.821*	-1.78	0.587	0.55
No fruit&veget.	-0.161**	-2.13	-0.028	-0.76	-2.460**	-2.12	-0.059	-0.1	-2.904*	-1.81	-0.930	-1.13	-1.270	-0.56	-0.518	-0.57

Notes: The model for the group of individuals with 50 years of age or more is estimated with 706 observations; that for individuals in the age interval 25 – 49 with 2,192 observation. All the regressions include a constant and additional controls for: gender, education, hourly wage, occupation, sector and size number of children, marital status and a dummy for 2005. Statistical significance: * = 10%; ** = 5%; *** = 1%.

Table 4 – Oaxaca decomposition of health differences: 50 plus vs 25–49 years old employees

	<u>Self-assessed health</u>		<u>Mental health</u>		<u>Vitality</u>		<u>Musculoskeletal health</u>	
Panel a) Overall decomposition								
Raw difference	-0.100**	-2.65	1.693**	2.92	2.012**	2.34	-3.175**	-2.82
- <i>Endowments</i>	-0.014	-0.62	-0.549	-1.39	-0.381	-0.66	0.433	0.67
- <i>Coefficients</i>	-0.073*	-1.91	2.450***	4.19	2.468**	2.95	-2.402**	-2.12
- <i>Interaction</i>	-0.012	-0.52	-0.209	-0.52	-0.075	-0.14	-1.206*	-1.83
Panel b) Detailed decomposition: disaggregated contribution of working conditions and lifestyles								
<i>Endowments:</i>								
Working conditions								
Hazard	0.029**	2.73	0.209	1.48	0.603**	2.66	0.883**	2.82
No influence	-0.001	-0.41	0.076	1.25	0.156	1.36	0.014	0.22
Repetitivness	-0.001	-0.31	-0.085	-1.33	-0.084	-1.09	-0.122	-1.15
No social support	-0.009**	-1.96	-0.356**	-2.94	-0.459**	-2.86	-0.200	-1.54
Job worries	-0.025**	-2.88	-0.455***	-3.46	-0.634***	-3.23	-0.496**	-2.08
Lifestyles								
Smoking	0.004	0.78	0.043	0.6	0.113	1.08	0.190	1.22
Drinking	-0.006	-1	-0.195	-1.7	-0.127	-0.86	0.045	0.27
No physic. activ.	0.002	0.4	0.026	0.4	0.063	0.4	0.029	0.4
No fruit&veget.	0.011*	1.89	0.173*	1.88	0.204*	1.66	0.089	0.55
<i>Coefficients:</i>								
Working conditions								
Hazard	-0.093**	-2.26	0.632	0.99	0.139	0.15	-1.217	-1.04
No influence	-0.004	-0.06	-1.205	-1.12	-3.215**	-2.05	-0.277	-0.14
Repetitivness	0.090	1.29	-0.849	-0.83	0.610	0.41	-0.073	-0.04
No social support	0.018	0.42	0.393	0.56	-0.550	-0.56	1.138	0.92
Job worries	-0.031	-1.03	-0.159	-0.35	-0.155	-0.23	-0.041	-0.05
Lifestyles								
Smoking	0.006	0.28	-0.102	-0.32	-0.114	-0.25	-0.389	-0.62
Drinking	-0.003	-0.17	-0.101	-0.38	-0.085	-0.25	0.272	0.68
No physic. activ.	-0.026**	-2.01	-0.482**	-2.13	-1.001***	-3	-0.720**	-1.83
No fruit&veget.	-0.024	-1.58	-0.429*	-1.82	-0.352	-1.09	-0.134	-0.31
Panel c) Overall contribution of Working conditions and Lifesyles								
<i>Endowments:</i>								
Working condit.	-0.007	-0.47	-0.611**	-2.26	-0.418	-0.98	0.080	0.18
Lifestyles	0.011	0.9	0.047	0.26	0.254	0.92	0.352	1.14
<i>Coefficients:</i>								
Working condit.	-0.021	-0.22	-1.187	-0.85	-3.170	-1.59	-0.471	-0.18
Lifestyles	-0.046*	-1.68	-1.113**	-2.14	-1.553**	-2.35	-0.970	-1.2

Notes: The decomposition uses the random effects estimates of Table 3 and is computed using the ‘oaxaca’ command in Stata. In Panel a), the raw differential is the sum of the endowments, coefficients and interaction terms. Panel b) reports the detailed decomposition for the variables of interest. Panel c) summarises the overall contribution of working conditions and lifestyles, in terms of endowments and coefficients effects. The residual interaction effect is not included in the table. Statistical significance: * = 10%; ** = 5%; *** = 1%.

Table 5 – Estimates of health equations with fixed effects. Separate estimates for 50 plus and 25 – 49 years old employees

Variables:	Self-assessed health				Mental health				Vitality				Musculoskeletal health			
	Age 50 plus		Age 25-49		Age 50 plus		Age 25-49		Age 50 plus		Age 25-49		Age 50 plus		Age 25-49	
	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t
<i>Working condit.</i>																
Hazard	-0,013**	-2,53	0,003	1,29	-0,107	-1,4	-0,142**	-2,63	-0,024	-0,21	-0,283***	-4,45	-0,140	-0,86	-0,132**	-2,46
No influence	0,004*	1,69	0,001	0,63	-0,043	-1,28	-0,020	-1,03	-0,096**	-1,97	-0,017	-0,68	0,077	1,53	-0,006	-0,24
Repetitivness	-0,001	-0,2	-0,004**	-2,76	-0,038	-0,88	-0,042	-1,61	-0,139**	-2,23	-0,052	-1,59	-0,062	-0,78	-0,082**	-2,34
No social support	-0,003	-1,38	-0,003**	-2,17	-0,087**	-2,58	-0,133***	-5,43	-0,143**	-3	-0,131***	-4,1	-0,044	-0,8	-0,118***	-3,79
Job worries	-0,132*	-1,65	-0,033	-0,74	-1,859	-1,59	-0,548	-0,66	-1,473	-0,82	-1,652	-1,5	-2,695	-1,26	-2,455	-2,42
<i>Lifestyles</i>																
Smoking	0,121	0,88	-0,063	-0,91	3,821*	1,9	-0,508	-0,37	2,900	1,28	-3,020*	-1,83	-3,103	-0,89	-1,196	-0,67
Drinking	0,059	0,52	-0,008	-0,12	-1,011	-0,55	-1,011	-0,76	5,644**	2,08	-0,187	-0,12	0,288	0,11	-0,412	-0,21
No physic. activ.	-0,265**	-2,37	-0,045	-0,78	-4,316**	-2,32	-0,586	-0,61	-9,456***	-3,5	-3,075**	-2,42	-4,083	-1,24	-0,622	-0,45
No fruit&veget.	-0,112	-1,02	-0,043	-0,88	-1,541	-1,02	0,611	0,7	-0,473	-0,2	0,055	0,05	0,526	0,18	-0,766	-0,64
corr(u_i, Xb)	-0,102		-0,006		-0,079		-0,032		-0,151		-0,008		-0,185		-0,015	

Notes: see Table 3. Corr(u_i, Xb) is the correlation between the estimated individual fixed effects u_i and the full set of regressors matched with their own coefficients.