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Employment insecurity and employees' health in Denmark

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Abstract

We use register data for Denmark (IDA) merged with the Danish Work Environment Cohort Survey (1995-2000-2005) to estimate the effect of employment insecurity on health for a sample of Danish employees. We consider two health measures from the SF-36 Health Survey Instrument: a vitality scale for general wellbeing and a mental health scale. We use three dimensions of perceived employment insecurity: the fear of job loss (job tenure insecurity), of being transferred against will (job status insecurity) and of not finding another job if the current one is lost (employability insecurity). The nature of the dataset enables us to account for both individual and firm fixed. Results show that, overall, employment insecurity matters for both health measures. All the three insecurity dimensions increase psychological distress of workers, while general wellbeing is negatively affected mostly by employability prospects. We also exploit within country variability in employment protection rules by tenure and between blue and white collars to analyse differences in the health effect of our insecurity measures over these dimensions. We find substantial heterogeneity by tenure (attenuated effects by increasing tenure especially for job tenure insecurity) and occupation (white collars are worse off in their health gradient compared to blue collars).

1. INTRODUCTION

Over the past two decades, higher foreign competition and institutional reforms aimed at reducing employment protection and increasing labour market flexibility induced deep firms' restructuring processes that modified the economic environment of many European countries, often resulting in higher levels of perceived employment insecurity (Cappelli *et al.*, 1997).

Perceived insecurity is an internal feeling and not an actual event like job loss or unemployment, but an individual worried about losing a job or to be not easily re-employed may experience stress, mental strain and uncertainty for the future due to the anticipation of the consequences of an actual job loss. Often, these circumstances can be as stressful as actual working problems or unemployment episodes (e.g. Dickerson and Green, 2012).

'Employment insecurity' – as the OECD (2004) defines all job-related perceived uncertainty - has two main domains. The first is job insecurity, related for example to the fear of losing one's job. The second is employability, i.e. the ability of workers to find new jobs if current ones are lost. In general, higher (lower) insecurity about employability may combine with uncertainty and amplify or mitigate wellbeing effects of job insecurity.

Higher perceived employment insecurity poses key policy challenges as it may affect various dimensions of workers' wellbeing, such as higher stress levels, lower mental health and lower productivity (Cottini and Lucifora, 2013; OECD, 2008).

Several papers analysed the wellbeing consequences of job insecurity, measured by the fear of losing the current job. A robust finding in the literature is that in many countries job insecurity is a source of lower health and wellbeing because it increases stress (Bugard *et al.*, 2009; Burchell, 1994; Cheng *et al.*, 2005; Ferrie *et al.*, 2001; Ferrie *et al.*, 2005; Laszlo *et al.*, 2010; Nolan *et al.*, 2000). The negative effect of job worries spans also to spouses' mental

health (Bunnings *et al.* 2015). Others have found an increase in negative physical health outcomes (Dooley *et al.*, 1987; Kuhnert *et al.*, 1989). Many have found that job insecurity as perceived by the worker is a source of low job satisfaction irrespectively from the type of contract (Origo and Pagani, 2009; Bardasi and Francesconi, 2004, Llena-Nozal, 2009).

The majority of the literature focuses on a single country, only few papers provide cross-countries evidence. Caroli and Godard (2014) estimate the causal effect of job insecurity on health for a big sample of 22 European countries and find that job insecurity negatively affects only a limited subgroup of health outcomes.

Little is known about the impact of employability on the wellbeing among employees. Some evidence that being easily re-employable has positive association with health the fear of job loss might be mediated/reduced by employability (Otterbach and Sousa-Poza, 2016). De Cuyper *et al.* (2008) find a cross-sectional positive association between employability and wellbeing among Belgian workers. Berntson and Marklund (2007) find a positive association between some indirect employability measure and mental wellbeing. Green (2011) finds that employability strongly moderates the effects of unemployment and of job insecurity on life satisfaction and mental health.

In this paper we use register data from Denmark (IDA) merged with the Danish Work Environment Cohort Survey (1995-2000-2005) to analyse the effects of job and employability insecurity on two indicators of perceived health: the first is an energy-vitality scale that measures general wellbeing; the second is a mental health scale that captures psychological distress.

Our paper makes three contributions to the existing literature. First, we use a broader definition of job insecurity. In addition to a variable for the fear of losing the current job ('job tenure insecurity', e.g. Gallie et al., 2016), we also use a variable for the possibility of being

transferred internally to a different position. Because of firm's policies due to e.g. re-organization, outsourcing or takeover decisions, such 'job status insecurity' has been increasing in Europe since at least 2000, but there is little scientific evidence about its effects on health and wellbeing of workers (Gallie *et al.* 2016; Green, 2015; Madsen, 2013).

Second, we contribute to the literature that analysed whether employment protection regimes do play a role for job insecurity and for its wellbeing effects (e.g. Origo and Pagani, 2009; Clark and Postel-Vinay, 2009). However, instead of using a cross-country approach, we investigate these issues exploiting within-country variation in the degree of employment protection received by Danish employees by years of tenure and across blue/white collars.

Third, the availability of register data enables us to account in the estimates for both individual and firm fixed effects, thus producing more accurate estimates of health effects of employment insecurity than the existing literature.

The paper is organised as follows. In Section 2 we review the Danish institutional setting, while the methods (data and empirical strategy) are overviewed in Section 3. In Section 4 we present the main results, which are discussed in Section 5.

2.   INSTITUTIONAL SETTING

Several factors influence the wellbeing cost of employment insecurity. First, subjective components like worker's attitudes (risk aversion, pessimism, etc), ability and ex-ante knowledge of the consequences of a job loss. Second, expected income compensation received from the employer after the decision of dismissal and from the welfare system while searching for another job. The income support associated to the current job is part of job protection policies and typically takes the form of notice periods plus severance/compensation payments. These are likely to influence how perceived job insecurity affects wellbeing.

The second source of protection operates when the worker is in the market through unemployment benefits and active re-employment policies. They are likely to relate with the wellbeing effects of employability insecurity.

Income protection varies according to several observable employees' characteristics. In this context, Denmark is an interesting country[1]. As in many other European Countries, in Denmark both notice periods, severance payments and, especially, compensation pays after an unfair dismissal increase in tenure. From Table 1, such payments are equal on average to 9 months of wage at 20 years of tenure. This is true also for notice periods: with six months of tenure, the notice is one month; with six years is 4 months. *Ceteris paribus* we expect that the longer tenure is, the smaller is the effect of job insecurity on health.

Another interesting feature of the Danish institutional setting is that, as in other European countries such as Greece and Italy, employment protection's terms and conditions differ between white and blue collars. The former are protected by law (Danish Salaried Employees Act), while, for the latter, norms are defined by collective agreements (OECD, 2004, 2013; Bertola et al., 1999; Madsen, 2001). The grounds for fair ('reasonably justified') dismissals include the conduct of the employee and the economic circumstances of the employer. As Table 1 shows, white collars are entitled to longer notice periods and severance pay for long tenures. By converse, for blue collars notice periods are shorter and they do not receive any severance pay for a fair dismissal.

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[1] Overall, Denmark has a low-to-intermediate job protection, high unemployment insurance and active labour market programs. The 1994 LM reform in Denmark introduced the obligation to participate in activation programmes after 12 months of unemployment for adults. The levels of perceived job insecurity are rather low (OECD, 2004). Despite low average insecurity, the wellbeing cost for those who are insecure may still be not negligible.

However, if an employee considers the dismissal unfair, her union can negotiate with the employer. Without an agreement, it is possible to go to court.[2] If the dismissal is unfair, for blue collars the board can define an ex-post compensation that cannot exceed 52 weeks of wage. For white collars, the size of the compensation is in general smaller but directly linked to tenure (and in some cases also to notice periods, which in turn depend on tenure).[3]

From an ex-ante perspective, it is difficult to establish whether white or blue collars receive on average a higher expected compensation from a job loss/dismissal.[4] It is key how much the compensation for an unfair dismissal can be used strategically ex-ante by the employee (or her union) when bargaining with the employer, and transformed into an extra payment under the threat of going to the court. In this circumstance, blue collars are advantaged because on average their ex-post compensation is higher.[5] If the expected value of unfair dismissals matters more than notice periods plus severance pay job insecurity should play a major (negative) role for the wellbeing of white-collars, and vice versa. It is a matter of empirical investigation.

The institutional details also suggest that tenure should have heterogeneous effects by occupation, and mitigate the wellbeing consequences of a dismissal especially for white

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[2] For blue collars, the union is entitled to have the question decided by a special arbitration board - the Tribunal of Arbitrators. Instead, for white collars these cases are handled by ordinary courts.

[3] If the dismissal is 'unfair', an employee is entitled to compensation if he is at least eighteen years old and been employed for an unbroken period of at least one year before when he receives notice of the termination of employment. The size of the compensation is an amount equal to the wage for a period corresponding to half the length of the period of notice to which he is entitled. If the employee has reached the age of thirty, the maximum size of the compensation is an amount equal to the wage for three months. If he has been employed in the enterprise for an unbroken period of at least ten or at least fifteen years, the maximum compensation is respectively an amount equal to the wage of four or six month.

[4] Summing up, data in Table 1 says that, the length of notice periods at twenty years of tenure is 6 months for white collars and 10 weeks for blue collars, while it is around 4 months on average. Compensation pay for unfair dismissal is up to 52 weeks for blue, and up to 6 month for white. Severance pay for a worker with 20 years of tenure is 3 months for white collars and 0 months for blue collars.

[5] This is true under a number of hypothesis: (i) that the probability of both contesting a dismissal as arbitrary and (ii) the probability of winning the eventual arbitrate are the same for white and blue collars, as well as (iii) their respective bargaining power. In general, they are even higher for blue collars, which reinforces the result.

collars, whose notice periods and severance plus compensation payments for an unfair dismissal increase with tenure.

In Denmark the employee is also protected against changes in the content of her job. If the employer decides to change the content of an employee's work or its terms and conditions, and this goes to the detriment of the employee, he or she has the right of receiving the contractual notice period. At the end of the notice, the employee can consider these changes as a constructive dismissal, opting to leave the job.[6] If anything, since notice periods are shorter for blue collars, we expect that they suffer more the negative consequences of job status insecurity on health and wellbeing.

Finally, although in Denmark a dismissed worker receives substantial unemployment benefits and active placement policies for long periods, there is no evidence that tenure plays a role in the perspective of finding another job with similar characteristics, nor that there exist different policies for white and blue collars.[7] If the institutional details matter, we therefore do not expect that the effect of employability insecurity on wellbeing and mental health would vary over these dimensions.

Finally, another relevant feature of the Danish labour market is that, thanks to the high job flexibility and the effectiveness of active labour market policies, the rate of job mobility is high, which is key for identification in the empirical analysis.[8]

3. METHODS

3.1. Data, variables and descriptive statistics

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[6] Moreover, he or she is entitled to compensation if the 'constructive' dismissal that leads to resignation is not reasonably justified (arbitrary or unfair).

[7] Eligibility for unemployment insurance was 12 months of insurance payments and 26 weeks of employment in last 3 years, with a 90% replacement rate in the mid '90s. Of course, tenure affects both eligibility and the replacement rate, but, in the first case, it just represents a threshold which should not be binding in most cases; in the second case, replacement rates are function of the wage, not on tenure (i.e., one may earn a high wage and hence a high replacement rate also with low tenure).

[8] Denmark ranks at the low end of the international scale in terms of average job tenure, along with countries such as the United Kingdom and the United States (OECD, 2004).

The data we use derive from two different sources matched through individual identifiers. First, a panel data collected every 5 years from 1990 to 2005 by the Institute for Occupational Health (AMI) that is the "The Danish Work Environment Cohort Study (DWECS)". The survey contains information on several aspects of the work environment, including workers' subjective evaluation of employments risks and insecurity, as well as on health outcomes, and other firm and personal characteristics. For the purpose of the paper we focus only on 1995, 2000 and 2005 since the full set of variables describing employment insecurity and health is available only for these years.

Second, we use Statistics Denmark Integrated Labour Market Database (IDA), which is the matched employer-employee archive comprising the Danish population of individual and establishment administrative records together with background characteristics. Danish administrative registers record individual annual earnings as well as demographic and firm characteristics. Even though IDA comprises the whole population of Danish firms and workers, when matched to the longitudinal component of DWECS we remain with an unbalanced panel dataset of about 3,600 employees for 8,600 observations.

Our main outcomes are two health-related variables constructed using subscales of the Short Form Health Status Survey (36 items, SF-36) (Kristensen *et al*., 2002; Kristensen *et al.*, 2005; Rugulies *et al*., 2006). SF-36 measures perceived health status and is accepted as a feasible and reliable instrument for evaluating several different dimensions of health. The DWECS contains two subscales of the SF-36. The first is the energy/vitality scale, constructed adding up the score to the following 4 items: "How much of the time during last month: you felt full of pep/with lot of energy/worn out/tired". The answers range from 1 ('All of the time') to 6 ('none of the time'). We inverted the scoring of the first two variables to measure wellbeing in the positive direction. The resulting score has been then normalized to vary between 0 (low health) and 100 (high health). The energy-vitality score correlates well

with objective measures of both physical and mental health problems, and it is then useful to evaluate the overall wellbeing of employees. Low values of our EVI (Energy-Vitality Index) variable measure mental or physical exhaustion and fatigue.

The second is the so-called Mental Health Inventory (MHI-5) subscale, which captures impairment due to mental health problems, and in particular psychological distress. A low rate of our Mental Health index (MHI) is associated with high psychological distress and a high rate with low distress. The MHI-5 contains these five questions: 'How much of the time during last month you felt: nervous/down/blue/not happy/not calm and peaceful?'.

The internal consistency (alpha coefficients) of both EVI and MHI scales is good and produces acceptable Cronbach's alpha values. A number of validation studies for different countries (including Denmark) show that a value below or equal the cut-off point 52 (severe psychological distress) in the MHI is highly correlated with psychological disorders such as anxiety and depression. We will evaluate the robustness of our results to this more specific definition of psychological distress using a below or equal 52 dummy as a dependent variable. For the EVI scale, a similar and widely accepted validation is not available. Nonetheless, we define a dummy for exhaustion that is 1 when EVI scores below or equal 50, which entails an average item score of minimum 3, indicating that a severe lack of energy or vitality happened at least 'a good bit of the time' in the last month.

For what concerns workers' perceived employment insecurity, we consider both job insecurity (lack of continuity in the current job) and insecurity in the labour market (lack of continuity in employment if the current job is lost). We further distinguish between 'job tenure insecurity', which is a dummy that takes value 1 if the worker mentions to 'worry about losing the current job', and the dummy 'job status insecurity', equal to one if the worker worries about the possibility of being 'Transferred to another work against will'.

We capture insecurity in the labour market by the dummy 'employability insecurity', equal to one if the worker declares it would be 'Difficult to find a new job with present qualifications (if the current one was lost)'.

We also account for many physical and psychosocial environment characteristics (Green and Mostafa, 2014). The former capture adverse physical environment (exposure to physical hazards). The latter includes indicators of work repetitiveness and social environment (social support from colleagues and supervisors). They also range 0 to 100 by adding up answers to single items.

Finally, we control for a number of additional individual and firm characteristics: gender, marital status, presence of children in the household, educational levels, a set of age dummies, and for being a current or former smoker, and the body mass index; dummies for firm's size and sector. One advantage of our analysis is that years of tenure and dummies for blue and white collars are from administrative data, free from measurement errors. We further control for the natural logarithm of individual income, regional and time dummies. A description of the main variables is in Table 2.

As suggested by existing evidence, Danish employees experience high levels of mental health: the mean score of MHI is 85, well above critical values (52) for severe psychosocial distress, and evidence for other extra European countries (Green, 2011)[9]. The mean of general wellbeing EVI is 73 out of 100, and more dispersed than MHI. About 15 percent of employees report perceived job insecurity, which are numbers comparable to the European average (Caroli and Godard, 2014) and higher than what has been found for other countries (Green, 2011). Re-employability insecurity occurs for 23% of the whole sample.[10] Table 3 also presents descriptive statistics for blue collars and white collars. The mean scores of both

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[9] Validation studies have shown validity of the Danish SF-36 (Bjorner et al. (1998) among others.
[10] In countries like Australia where unlike Denmark there is not a 'flexicurity' system these numbers are higher (35%, see Green, 2011).

mental health measures are higher for blue collars compared to white collars (86 versus 85 for MHI and 73 versus 72 for EVI respectively) and their difference although small is statistically significant. Also all indicators of perceived employment insecurity show higher prevalence among blue collars compared to white collars and statistically significant differences (18% versus 14% for job tenure insecurity, 15% versus 12% for job status insecurity, 25% versus 20% for employability insecurity). Moreover, our descriptive evidence shows some heterogeneity by tenure: 10 additional years of tenure increase our mental health indexes by nearly 1 point, while decreases Job tenure insecurity by 2 percent and increases re-employability insecurity by 6 percent.

3.2. Empirical analysis

Consider the following linear model of workers' health-related variables *H* for the *i*-th individual at time *t,* which allows for both person and firm determinants of individual health, and also for observed and unobserved factors in both dimensions:

$$H_{it} = \beta x_{it} + \gamma Job\ Ins_{it} + \delta Empl\ Ins_{it} + a_i + \theta_{j(i,t)} + \tau_t + \varepsilon_{it} \qquad (1)$$

H_{it} is explained by observable and possibly time-varying individual and firm characteristics βx_{it}, the job insecurity vector $Job\ Ins_{it}$ (which includes job tenure and job status insecurity), employability insecurity $Empl\ Ins_{it}$, an individual effect a_i, a firm effect $\theta_{j(i,t)}$ for the firm at which worker *i* is employed at time *t*, a time shifter τ_t and a time-varying residual ε_{it}. This is the baseline specification. A first extended specification also includes a vector of two interactions $Job\ Ins_{it} * Empl\ Ins_{it}$, useful to evaluate the extent to which job insecurity and labour market insecurity interplay each other, i.e. if perceived employability perspectives are different according to perceptions of job loss. A second specification includes a vector of interactions between $Job\ Ins_{it}$ and $Empl\ Ins_{it}$, and tenure and tenure squared, which is useful to evaluate if tenure plays any role in the effect of job and employment insecurity.

The fact that both measured and unmeasured individual and firm effect may correlate each other creates a number of empirical problems. First, since outcomes and insecurity are subjective evaluations, unobservable personal traits may simultaneously influence both of them. Second, reverse causality arises if for some unknown reason higher health may secure more stable jobs and better labour market prospects if unemployed. Third, also unobserved firm characteristics may correlate with perceived health and insecurity. For example, a firm with a 'good' climate and nice working conditions may be a workers' high-health firm (with health levels higher than expected given observable characteristics) and, at the same time, reduce the fear of job loss among its employees.

Standard fixed effect models controlling only for time invariant individual heterogeneity neglect the role that firm heterogeneity plays in this context, and are likely to generate inconsistent estimates of the parameters (Abowd *et al*., 2008).

The matched (persons and firm) longitudinal nature of our data allows us to perform a further step in the direction of causality by simultaneously controlling for unobserved effects of workers and of their employing firm. As usual, these 'two-way' fixed effects are consistent if there are not omitted time-varying factors correlated with both health-related variables and insecurity variables. Since for our estimates we use a sample of employees, another potential source of bias is the portion of endogenous selection into employment not due to fixed personal traits. As suggested by Jackle and Himmer (2010), the inclusion of lifestyles may attenuate the bias induced by unobserved individual characteristics that change over time. Similarly, controlling for physical and psychosocial work characteristics mitigates the bias induced by those working conditions that change over time (e.g, organization and job quality changes due to changes in the management of the firm). For example, if insecure jobs are characterized by bad working conditions and high job strain, then omitting the latter two variables might generate an upward bias in the estimates.

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4. RESULTS

We estimate the empirical model of Eq. (1) by random effects (columns 1 and 4 of Table 4), individual fixed effects (columns 2 and 5 of Table 4) and individual plus firm fixed effects (column 3 and 6 of Table 4). The coefficients of the three insecurity dummies measure absolute changes in the dependent variable, which are not easily interpretable and comparable across different outcomes. To ease interpretation, we comment the results transforming the coefficients in percentage point changes.[11]

Baseline random effects suggest that all indicators of employment insecurity are negatively associated with both general wellbeing and positively with psychological distress (Table 4). In particular, the fear of job loss (job tenure insecurity) is significantly associated with lower general wellbeing and, especially, with high psychological distress (-3.0 percentage points for MHI versus -1.9 percentage points for EVI), and it is the insecurity dimension that matters more for psychological distress, as it shows the biggest coefficient. Job status insecurity do matters for both mental health and the general wellbeing of workers as well as employability insecurity. Interestingly, for the latter the effect is double in the EVI equation (-2.6 percentage points versus -6.5 percentage points).[12]

Of course, random effects estimates just provide a general picture and a useful benchmark. Columns (2) and (5) present standard individual fixed effects estimates, robust to unobserved time invariant factors correlated both with the employability and insecurity variables and with MHI and EVI. The point estimates are, in all cases, lower than in the

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[11] For example, suppose that in the MHI equation, the coefficient of job tenure insecurity (JTI) was -3.05. This means that, ceteris paribus (and leaving implicit the dependence on other variables) mean(MHI|JTI = 1) – mean(MHI|JRI = 0) = -3.05. To get percentage changes, we must divide by mean(MHI|JTI = 0), which is roughly equal to: -3.05/0.85 = 0.035 percentage points. Also notice that the mean of general mental wellbeing is lower: for a given coefficient magnitude, the percentage effect is higher.

[12] As to the other control variables included in eq. (1), they show a similar pattern for the MHI and EVI equations: we observe the standard U-shape effect of health in age, and that health is higher for married employees compared to those that are widows or divorced, and decreases for higher body mass indices. Also our scores for physical and psychosocial hazards at the workplace have the expected negative relation with health.

random effects model and some statistical significance is lost, especially in the EVI equation. While the Hausman test rejects the hypothesis of unsystematic differences between random versus fixed effects coefficients, time invariant characteristics other than the individual effects might bias our estimates our preferred strategy to estimate eq. (1) includes also firm fixed effects. Results are in columns (3) and (6) of Table 4. We first notice that movers represent a substantial share of individuals (70%), which is key for the identification of the model and the precision of the estimates. We also notice that firm fixed effects captures an important share of the variance (about 20%) which otherwise would have been in the residual, and which is 1/3 of the variance explained by individual fixed effects (about 60%). Overall, individual and firm fixed traits explain about 80% of the variability in health measures.

For psychological distress, results confirm that all three indicators of employment insecurity do matter, while in the case of general wellbeing only the effect for employability insecurity remains statistically significant with a decrease of 4.4 percentage points.

The comparison of standard fixed effects and 2-way fixed effects also suggests that neglecting the role of firm heterogeneity may overstate the effect of job insecurity especially in the equation for mental health.[13]

In what follows, we focus on our preferred estimation method with individual and firm fixed effects. In Table 5 we present results with the interaction between job tenure and job status insecurity and employability (column 1 and column 3), and between all indicators of insecurity and tenure and tenure squared (column 2 and column 4). In contrast with the existing literature, we find that the interaction between job and employability insecurity are never statistically significant in the case of both MHI and EVI. Our findings do not support

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[13] According to our estimates, this result is spurious and driven by the fact that employees who fear to lose their job are more likely in firms where the average level of mental health is lower, maybe because on average the level of time invariant working characteristics is lower.

the idea that the effect of job insecurity on wellbeing is greater where a worker perceives a lower chance of being re-employed in a job at similar conditions of the previous job. This is what we would expect when income the income support granted by last job once displaced is rather independent to the policies available in the market once searching for a new job. This is the case in Denmark, where unemployment benefits and active re-employment policies are rather universal.

As to tenure, we find that it significantly reduces the mental health impact of expected job losses. For an employee with zero tenure, the effect is 3 percentage points. After 1 year, the effect is 2.7 percentage point, and then it decrease but at a diminishing rate, and it eventually vanishes. As discussed in Section 2, one plausible explanation is that long tenure employees suffer less the cost of losing the job because they are more insured by higher job-related income protection. We do not find any effect by tenure for job status insecurity and employability insecurity.

The results for blue collars and white collars separately are in Table 6, columns (1) to (4) for blue collars and columns (5) to (8) for white collars. We first notice that the number of observations available to estimate the model is now about 7,000 (3,650 for blue and 3,350 for white collars), lower than before. This is because, for each individual, the model cannot account for transitions across occupational groups.[14] Employability insecurity maintains statistically significant effects in both subsamples, while its effect on psychological distress for white collars is bigger compared to blue collars (-4.1 percentage points versus -1.7

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[14] For example, suppose we observe an individual three times (1995, 2000, 2005). In the first two periods he or she is a blue collar, in the last one is a white collar. In the 2 way fixed effects estimates by occupation, this individual contributes for the first two observations, while the third is irrelevant. To the extent that occupation is a choice variable, estimates by occupation may suffer from a selection bias, which is however not easily addressable in the context of 2-way fixed effects models. We have observed that the results obtained by a less flexible specification where we estimated one equation for the overall sample of about 8,700 observations and allowed heterogeneous effects by occupation by interacting the insecurity dummies with a dummy for white collars (and leaving the effects for the other variables not occupation specific) produced very similar results. We conclude that selection bias in occupation may not be of big concern here, and we present results for the more flexible specification with switching regimes by occupation.

percentage points). Job tenure insecurity seem to matter for the psychological distress of white collars (-3.3 percentage points), while job status insecurity for the psychological distress of blue collars (-6.6 percentage points). According to the discussion of Section 2, this may happen when the expected value of compensations ex-ante negotiated under the threat of ex-post unfair dismissals matter more for wellbeing than the income associated with notice periods and severance payments. In the case of our energy/vitality scale, only employment insecurity matters for both white collars and blue collars, and also the magnitude is similar (respectively of -5.4 percentage points and -5.6 percentage points).

In columns (2), (4), (6) and (8) we present results for the model that includes interactions between our employment insecurity indicators and tenure. We find that job status insecurity matters for the psychological distress of blue collars and these effects are reduced for increasing values of tenures. No effect is found with respect to general wellbeing. In the case of white collars job tenure insecurity and employability insecurity matter for MHI and this effect is reduced at increasing tenures only in the case of job tenure insecurity. The only effect of employability insecurity holds statistical significance in the case of EVI. We also find that, when interacted with tenure, also job status insecurity of white collars gains some statistical significance. Interestingly, an instability of this kind (due to e.g. internal mobility) actually has positive effects on mental health and it is perceived as beneficial for the subsequent development of the career, but this effect vanishes once tenure increases.

Robustness Checks

We test the robustness of our results by performing a number of sensitivity checks. All tests use the baseline specification without interactions, estimated with individual and firm fixed effects. Since the unobserved effects that are relevant for both job insecurity are not necessarily at the firm level, we estimate the model also using plant identifiers, which are

available in our dataset. Results in terms of magnitude and statistical significance are substantially unchanged, thus our conclusions are maintained.

Moreover, we use as dependent variable a dummy indicating severe psychological distress and a dummy indicating a severe lack of energy or vitality (threshold below 52 and 50 respectively as suggested in Section 2). Also in this case main results are unchanged.

5.   DISCUSSION

We used three indicators of employment insecurity to analyse their effect on psychological distress and general wellbeing using Danish register data matched with survey data for a period of 15 years. As already found by studies for other countries - characterized by different institutional settings - we confirm that also Danish employees who fear to lose their job experience worse mental health, and that the same occurs for another dimension of job insecurity - the fear of being transferred against will - which has been never considered before. Our results are robust when we account for both unobserved firm and individual heterogeneity. Interestingly, time invariant firm characteristics capture a substantial portion of health variance, and that in some cases this reduces the magnitude or the statistical significance of job insecurity coefficients, as compared to standard individual fixed effects models. As a result, previous studies that ignored firm unobserved heterogeneity might have overestimated the effect of work-related insecurity.

Overall, our results suggest that job insecurity and employability insecurity have a different impact on health: what happens in the current job and the associated instability is important only for mental health and it might create a psychological burden for workers who suffer from it. By converse, the workers' perception of their own future 'value' in the labour market as reflected by employability insecurity matters more than job insecurity, and for both mental health problems and general wellbeing. In general, employability has a more sizeable

and encompassing effect on health, and, for the energy and vitality scale, is the only insecurity dimension that matters.

All the three dimensions of employment insecurity show heterogeneous results by occupation and by years of tenure. The effects of job tenure insecurity are attenuated for increasing years of tenure, reducing especially the mental health costs of job losses. To the extent that institutional arrangements matter for individual wellbeing, this may be due to the fact that in Denmark the amount of income support received from a job dismissal increases with tenure. By converse, no tenure effects are found for the other two dimensions of insecurity, which is consistent with the absence of specific job retain or employability policies by tenure.

Moreover, the analysis by occupations revealed that job status insecurity affects mainly blue collars while job tenure insecurity mostly white collars. Employability insecurity shows no substantial differences by occupation. Again, the institutional details of the Danish employment protection system may help explaining these results. Taking into account that blue collars' receive more generous compensations for unjustified dismissals while white collars have longer notice periods and higher severance payments, the fact that the mental health cost of job tenure insecurity is higher for white collars may suggest that ex-ante agreements that anticipate the possibility of an ex-post unfair dismissal play the major role.

These results are somehow surprising, since in a flexicurity system like the Danish one we would have expected that the high levels of unemployment benefits and the comprehensive system of active labour market policies (training, job search support, etc.) would have limited the expected wellbeing impact of perceiving to be not easily re-employable. Overall, it seems that they feel themselves not insured enough once they lose the actual job.

6.   ACKNOWLEDGEMENTS

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TABLES

Table 1 - Employment Protection terms and conditions in Denmark by type of occupation

	Overall	White collar	Blue collar
Notice period			
9 months	1.8 months	3 months	3 weeks
4 years	3 months	4 months	8 months
20 years	4.25 months	6 months	10 weeks
Severance pay			
9 months	0	0	0
4 years	0	0	0
20 years	1.5 months	3 months(§)	0(*)
Compensation after unjustfied dismissal	9 months at 20 years of tenure. The average is 6.6 months.	Increases with age and seniority: maximum is 6 months for workers older than 30 with tenure higher or equal to 15 years	Maximum is 52 weeks for long services. The average is 10.5 weeks.

Source: OECD Employment Outlook (2004, 2013).

§: 1months for tenure >12years, 2m for tenure >15y, 3m for tenure >18y

*: Since the 2010 round of collective bargaining, the monthly amount of severance pay was introduced and calculated as follows, monthly salary minus 15% minus the monthly unemployment benefit. This amount is payable for a month after 3 years of service; two months after 6 years of employment and three months after 8 years of employment. However, since initial replacement rates are most often above 85%, severance pay is rarely paid.

Table 2 – Main variables and descriptive statistics

Variable	All			
	Mean	S.D.	min	max
Psychological distress(§)	85.68	12.10	0	100
General mental wellbeing	73.02	17.21	0	100
Job tenure insecurity	0.16			
Job status insecurity	0.14			
Employability insecurity	0.23			
Exposure to physical hazards	12.52	11.04	0	97.62
Repetitive tasks	26.93	19.74	0	100
Lack of social support	18.70	16.31	0	100
Currently smoking	0.35			
Used to smoke	0.24			
Never smoked	0.41			
Body mass index (bmi)	24.44	3.69	14.69	67.38
Female	0.49			
Low educ	0.20			
Middle educ	0.55			
High educ	0.26			
Age [18, 30)	0.15			
Age [30, 40)	0.30			
Age [40, 50)	0.31			
Age [50, 65)	0.24			
If has children	0.54			
If married	0.63			
If widow	0.01			
If divorced	0.08			
Hourly wage	209.3	65.38	5.55	570
Tenure	6.77	6.97	1	41
If blue collar	0.51			
If white collar	0.47			
If public employee	0.40			
Year 1995	0.34			
Year 2005	0.29			
Year 2000	0.37			
Resides in CPH region	0.26			
Resides in Central DK	0.40			
Resides in Jutland	0.33			
N. obs	8,675			

Note: To save space, the distribution by firm characteristics (sector and size dummies) is available upon request. Standard Deviation is reported only for non-binary variables. (§)About 3% of the sample reports values of MH below or equal 52 (validated threshold for severe psychological distress).

Table 3 – Health and perceived insecurity differences by occupation and tenure

Panel a.	Blue		White		Differ.
Variable	Mean	S.D.	Mean	S.D.	
Psychological distress	86.33	12.58	85.02	11.54	1.31***
General wellbeing	73.44	17.5	72.58	16.88	0.86**
Job tenure insecurity	0.18		0.14		0.04***
Job status insecurity	0.15		0.12		0.02***
Employability insecurity	0.25		0.20		0.05***
Panel b.	Differential for 10 additional years of tenure§:				
Psychological distress	0.81***				
General wellbeing	0.76***				
Job tenure insecurity	0.02**				
Job status insecurity	0.001				
Employability insecurity	0.06***				

Note. §: the coefficients are from a linear regression of tenure on the variables in the first column.

Table 4 – Psychological distress (MHI) and General Mental Wellbeing (EVI) estimates, whole sample: Random effects (RE), Individual Fixed Effects (FE) and Individual & Firm Fixed Effects (2-FE)

	MHI						EVI					
	RE		FE		2-FE		RE		FE		2-FE	
	(1)		(2)		(3)		(4)		(5)		(6)	
Job tenure insecurity	-2.55	***	-1.81	***	-1.03	*	-1.33	***	-0.78		-0.21	
	0.35		0.43		0.57		0.49		0.59		0.81	
Job status insecurity	-1.38	***	-0.72	*	-1.41	***	-1.79	**	-0.15		-0.29	
	0.36		0.43		0.55		0.52		0.61		0.77	
Employability insecurity	-2.26	***	-1.52	***	-1.73	***	-4.74	***	-3.03	***	-3.19	***
	0.31		0.40		0.50		0.45		0.55		0.70	
N. observations	8,675		8,675		8,675		8,675		8,675		8,675	
N. of individuals	3,640		3,640		3,640		3,640		3,640		3,640	
N. of firms					3,481						3,481	
N. movers					2,560						2,560	
N. groups					792						792	
Hausman (chi2)			137.37	***					138.3	***		
Person & firm eff. = 0 (F stat)					1.78	***					1.81	***
Person effects = 0 (F stat)			1.96	***	1.92	***			2.19	***	1.96	***
Firm effects = 0 (F stat)					1.21	***					1.1	***
Fraction of variance due to person effects	0.28		0.47		0.61		0.32		0.51		0.59	
Fraction of variance due to firm effects					0.18						0.2	

Note: The RE regression includes controls for individual characteristics (gender, education, age, civil status, presence of children, lifestyles, region), job characteristics (white collar, blue collar, manager, tenure, tenure squared, wage), firm characteristics (sector and size dummies) and time dummies. The FE and 2-FE regressions only include time-varying variables plus individual and firm-group effects. 2-FE estimates and statistics are from the 'felsdm' command in Stata. The number of firm effects identified is around 70%. Robust standard errors in parentheses. *** p-value < 0.01; ** p-value < 0.05; * p-value < 0.1.

Table 5 – 2-FE estimates of MHI and EVI: Interacted effects

	MHI				EVI			
	(1)		(2)		(3)		(4)	
Job tenure insecurity	-1.55	**	-2.69	***	-0.68		-1.39	
	0.76		1.12		1.07		1.57	
Job status insecurity	-1.11	*	-1.63		-0.16		0.07	
	0.69		1.05		0.97		1.47	
Employability insecurity	-1.84	***	-1.38		-3.51	***	-3.27	***
	0.57		0.95		0.79		1.33	
Job ret. ins.*Empl. ins.	1.19				1.95			
	1.09				1.53			
Job stat. ins.*Empl. ins	-0.85				-0.48			
	1.07				1.50			
Job ret. ins.*Tenure			0.41	**			0.305	
			0.21				0.300	
Job ret. ins.*Tenure2			-0.017	**			-0.008	
			0.008				0.011	
Job stat. ins.*Tenure			0.026				-0.218	
			0.201				0.284	
Job stat. ins.*Tenure2			0.000				0.007	
			0.007				0.010	
Empl. ins.*Tenure			-0.069				-0.031	
			0.155				0.219	
Empl. ins.*Tenure2			0.002				0.002	
			0.005				0.007	
N. observations	8,675		8,675		8,675		8,675	

Note: See Table 3. The number of individuals, firms, movers and group is the same as in Table 3.

Table 6 – 2-FE estimates of MHI and EVI: Blue & White collars

	BLUE				WHITE			
	MHI		EVI		MHI		EVI	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Job tenure insecurity	-0.332	2.08	0.189	1.79	-2.830 ***	-7.1 ***	-1.598 ***	-2.75
	0.921	1.87	1.292	2.63	1.056	2.01	1.544	2.93
Job status insecurity	-3.231 ***	-5.7 ***	-1.868	-1.35	0.706	2.79 *	0.978	1.81
	0.913	1.84	1.280	2.6	0.934	1.71	1.367	2.48
Employability insecurity	-1.522 *	-0.24	-3.934 ***	-2.93	-3.486 ***	-3.53 **	-4.043 ***	-4.23 *
	0.824	1.6	1.156	2.25	0.899	1.71	1.315	2.49
Job ret. ins.*Tenure		-0.22		-0.23		0.87 **		0.15
		0.32		0.46		0.39		0.56
Job ret. ins.*Tenure2		-0.003		0.004		-0.03 *		0.004
		0.011		0.016		0.01		0.22
Job stat. ins.*Tenure		0.65 *		0.03		-0.52 *		-0.09
		0.35		0.49		0.32		0.47
Job stat. ins.*Tenure2		-0.02 *		-0.002		0.02 *		0.002
		0.013		0.02		0.01		0.016
Empl. ins.*Tenure		-0.33		-0.32		0.1		0.11
		0.26		0.36		0.26		0.38
Empl. ins.*Tenure2		0.013		0.015		-0.005		-0.004
		0.009		0.011		0.008		0.012
N. observations	3,621	3,621	3,621	3,621	3,319	3,319	3,319	3,319
N. of individuals	1,614	1,614	1,614	1,614	1,400	1,400	1,400	1,400
N. of firms	1,902	1,902	1,902	1,902	1,340	1,340	1,340	1,340
N. movers	1,064	1,064	1,064	1,064	1,015	1,015	1,015	1,015
N. groups	544	544	544	544	343	343	343	343
Person & firm eff. = 0 (F stat)	1.79 ***	1.8 ***	1.72 **	1.72 ***	1.66 ***	1.67 ***	1.7 ***	1.69 ***
Person effects = 0 (F stat)	1.87 ***	1.88 ***	1.78 ***	1.77 ***	1.7 ***	1.71 ***	1.76 ***	1.75 **
Firm effects = 0 (F stat)	1.37 ***	1.39 ***	1.16 **	1.16 ***	1.02	1.01	1	0.98

Fraction of variance due to person effects	0.52	0.53	0.56	0.56	0.54	0.53	0.51	0.51
Fraction of variance due to firm effects	0.23	0.23	0.19	0.19	0.2	0.2	0.23	0.23

Notes: See Table 3.

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