Work-related mental health problems increase with rising aggregate unemployment

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Abstract

This paper analyzes the relationship between work-related mental health of the German working population and unemployment on the occupation-region level measured one year before the outcome. Rising unemployment is significantly associated with a higher risk for emotional strain, emotional exhaustion, absenteeism, and presenteeism among employed individuals. Occupation specific unemployment drives this relationship, while the regional dimension is less important. The relationship is driven by individuals with own past unemployment experience.

Keywords: work-related mental health; unemployment; emotional exhaustion; emotional strain

JEL Classification: I10, J64

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1 Introduction

Economic downturns impact all economic players: individuals, firms, and the state. Individuals are most commonly affected by unemployment or worse employment prospects. Apart from economic consequences, there is an extensive literature showing that the unemployed are less well off in terms of life satisfaction and mental health Clark and Oswald (1994); Weich and Lewis (1998); Murphy and Athanasou (1999); Paul and Moser (2009); Marcus (2013). Job loss is not necessary to experience these well-being losses. Job insecurity is enough to make people worse off Green (2011); Reichert and Tauchmann (2011); Jiang and Probst (2017). The threat of job loss does not even need to be close. Aggregate unemployment also reduces happiness among employed people Di Tella et al. (2003). There are several mechanisms explaining the latter finding: first, aggregate unemployment could increase individually perceived job insecurity, second, individuals who remain employed while others are laid off could feel guilty, and third, individuals could stay in stressful jobs they would otherwise have quit Clark et al. (2010). Most of the literature focuses on life satisfaction or general mental health measures.

This paper contributes by analyzing the relationship between work-related mental health and unemployment changes at the occupation-region level. While individual and organizational factors of work-related mental health problems are fairly well understood, less is known about aggregate factors such as unemployment changes. The second contribution of this paper lies in the measurement level of unemployment. Most of the literature uses regional unemployment information. I extend this to the occupation level as this is the unit where individuals assess their outside options. A consultant for example would be unconcerned by rising unemployment for plumbers and vice versa.

Health problems and a rich set of job demands and resources, sociodemographic and

job characteristics come from a survey which is representative of the German working population. Unemployment data are matched on occupation and federal state level generating variation in around 600 occupation-federal state cells. I run OLS regressions of work-related mental health problems on unemployment changes from two to one periods earlier to allow for a sufficient time difference. The key findings are, first, rising occupation- and federal state-specific unemployment is significantly associated with higher work-related mental health problems among employed individuals. The relationship is stronger for milder problems. Second, occupation specific unemployment drives this relationship while the spatial dimension of unemployment (region) is less important. Third, the relationship hinges on individual past unemployment experience: rising unemployment is not associated with mental health problems for individuals without any own unemployment experience. The duration of the past unemployment spell seems to partly play a role.

The remainder of this paper is structured as follows: Section 2 introduces the framework for analyzing work-related mental health outcomes and reviews literature on unemployment and mental health. Data, descriptives, and estimation method are presented in section 3. Section 4 shows the estimation results and section 5 identifies potential mechanisms. The last section concludes.

2 Related literature

2.1 Aggregate unemployment and mental health

There is ample evidence on a link between aggregate unemployment and individual mental well-being. This comprises life satisfaction, absenteeism, mental health problems and

anti-depressant medication. Using European and American data, DiTella et al. for example show that macroeconomic conditions, in particular recessions, have an influence on happiness (life satisfaction) Di Tella et al. (2003). They measure recessions with GDP loss and estimate that both unemployed and employed Europeans and U.S. Americans would have to be paid $200 to be compensated for their loss in well-being. Clark et al. confirm that aggregate unemployment reduces well-being even for the employed but differentiate by job prospect: how employed and unemployed people's life satisfaction changes depends on their job prospect Clark et al. (2010). There are at least three reasons why employed people are affected by others' unemployment. First, rising unemployment can be perceived as an increase in job insecurity. When many people lose their jobs, economic prospects are bad and one might lose the own job in the future. Second, while employed people keep their employment, others become unemployed. This can make them feel guilty. Third, rising unemployment means that outside options are worse. Employees who are unsatisfied with their current job might want to leave for a better job but worse outside options discourage them from doing so. They stay in their job and dissatisfaction increases.

There is also evidence on absenteeism, e.g. Shoss and Penney find and association between unemployment rates and sickness as well as violence absences in the U.S. Shoss and Penney (2012). The evidence on economic recessions and mental health is summarized in Frasquilho et al. Frasquilho et al. (2015). They conclude that prevalence of mental health problems is higher during recessions. There is evidence that these mental health problems can be quite severe and thus require medical treatment. Bradford and Lastrapes analyze the relationship between unemployment and prescriptions for anti-depressants and anti-anxiety medication Bradford and Lastrapes (2014). For a fall in

employment of 1%, prescriptions rise about 10% primarily in the Northeast of the U.S. According to Urbanos-Garrido and Lopez-Valcarcel, economic recessions can increase the adverse health effects of unemploymentUrbanos-Garrido and Lopez-Valcarcel (2015). They document that unemployment, especially long-term unemployment, is related to reduced health status and worse mental health in Spain. This reduction is larger after compared to before the economic crisis.

2.2 Hypotheses

A common framework to model work-related mental health is the Job Demands-Resources model (JD-R, Demerouti et al. Demerouti et al. (2001)), where an imbalance between job demands and job resources leads to detrimental health outcomes. In this model, burnout arises from an imbalance between job demands and job resources. High job demands such as a high workload or a narrow time frame put strain on the individual. If this strain persists for a long time, more and more energy is depleted which may lead to exhaustion and physical health problems because it affects the immune system which is then less strong against diseases. Job resources, on the other hand, act as a moderator between job demands and the individual. Resources can reduce the consequences of job demands directly (help from colleagues) or indirectly (motivation and engagement due to working climate). When resources are depleted, job demands unfold their unbuffered damaging consequences. The JD-R comes from burnout research [1] where nearly all

[1]Burnout consists of three dimensions: emotional exhaustion, cynicism, and personal inefficacy. An imbalance in demands and resources can lead to exhaustion. The individual tries to cope with her exhaustion and the overwhelmingly impossible situation by adopting withdrawal behavior. Disengagement from work, a detached attitude towards customers or cynicism towards the organization, oneself, and the system are common self-protection mechanisms. Altogether, both exhaustion and cynicism lead to less professional efficacy. The higher the workload and the more cynical the individual, the less she is able to fulfill her work tasks in a concentrated and efficient manner. Perceiving a loss in own efficiency can result in higher effort and even more exhaustion or higher cynicism. The JD-R has been criticized because it does not include factors outside from work (family problems as non-job-related demands, or yoga and mediation as buffers, Singh et al.,Singh et al. (2012)). Other models exist but they focus

burnout studies collect their own data and measure burnout with a validated measure (e.g. Maslach Burnout Inventory, Oldenburg Burnout Inventory or the Burnout Clinical Subtype questionnaire). The study population is usually very narrow (specific occupation or geographic area). Exceptions are Hasselhorn and Nübling and Lohmann-Haislah who use a representative sample from the whole German working population in 1999 and 2012, respectively Hasselhorn and Nübling (2004); Lohmann-Haislah (2012). These data are also used here since they include a broad range of job characteristics and self-rated health (see section 3).

In the JD-R framework, two mechanisms can account for a relationship between mental health problems and aggregate unemployment. First, rising unemployment deters employees in imbalanced jobs which they might leave if it was not for worse outside options due to rising unemployment. Upon realizing the imbalance between job demands and resources, the rational employee assesses her outside options before leaving her current job to find a more balanced one. If unemployment is high, her probability of finding new employment is lower. This deters the employee in her job where continued exposure to the imbalance can result in work-related mental health problems. Second, rising unemployment means higher perceived job insecurity which acts as a job demand Basińska and Wilczek-Rużyczka (2013). Both mechanisms work in the same direction and suggest a positive relationship between work-related mental health problems and rising aggregate unemployment changes. Given that employees are becoming more and more mobile with regards to their work location, the regional dimension of the unemployment measure is probably less important.[2] Occupational mobility is likely lower so that the occupational

on work factors, too. In comparing four common models (strain and stress model, job demand-control model, transactional stress model, effort-reward-imbalance-model), Lohmann-Haislah (2012) underlines that the imbalance between demands and resources is the common theme across all models. She points out that an individual's subjective (aside from an objective) assessment of the situation is determinant for the reaction (stress or no stress).

[2]Even though mobility is lower than in the U.S., in particular younger Germans are becoming more

dimension is expected to matter more. Based on the scarring effect of unemployment for life satisfaction, own unemployment experiences in the past could make employees more vulnerable to aggregate unemployment.

3 Data and Methods

3.1 Data

The data stem from the 2012 BIBB/BAuA-Survey on the Working Population on Qualification and Working Conditions (QaC) which is a representative cross section of the German working population. About 20,000 participants are surveyed on a broad range of sociodemographic variables, job and company characteristics including job demands and resources. A health section includes emotional exhaustion, a component of burnout, and staying at home sick (absenteeism) and going to work sick (presenteeism). A milder version of emotional exhaustion is the degree of emotional strain. Since satisfaction as an outcome dominates the literature on unemployment and mental health, I consider it as an additional outcome. Job satisfaction is rated on a four point scale from very dissatisfied to very satisfied. All dependent variables except absenteeism and presenteeism are standardized for the analysis. Unemployment data come from the Institute for Employment Research (*Institut für Arbeitsmarkt- und Berufsforschung*, IAB: *Berufe im Spiegel der Statistik*)[3] and are merged to the QaC on 2-digit occupation codes and federal states resulting in 609 occupation-federal state combinations. The final sample consists of 14,873 observations and comprises German employees between 18 and 65 years.

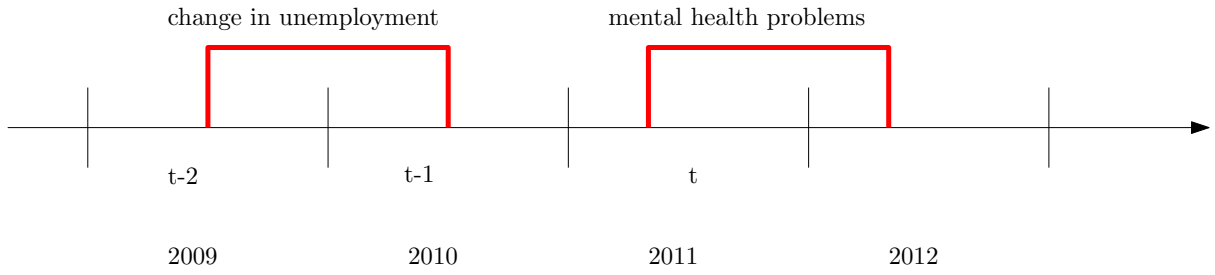
In analyzing the relationship between work-related mental health problems and rising unemployment, timing is crucial for two reasons. First, duration plays an important

mobile.

[3]Available at: http://bisds.infosys.iab.de/, last accessed on August 15, 2017.

role for work-related mental health problems. They do not arise from a single or short stressful situation but when exposure is longer (this is especially true for burnout, see Schaufeli and Enzmann, 1998). Second, individuals need time to observe changes in unemployment, especially when these changes are so small that they are unnoticed in the beginning. The interviews for the surveys were conducted around the turn of the year 2011/12 and the health questions explicitly refer to the last 12 months. To allow enough time for unemployment changes to be noticed and mental health problems to develop, the analysis considers unemployment changes from 2009 to 2010 (figure 1).

Figure 1: Lag between measurement of work-related mental health problems and unemployment



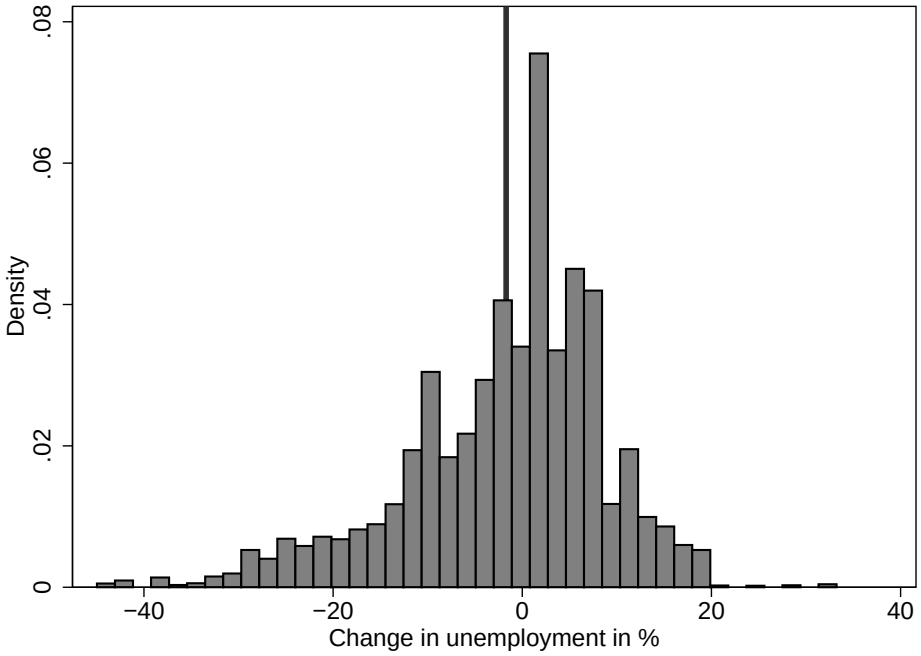
3.2 Descriptives

Work-related mental health problems are not uncommon to the German working population in 2012. 25% of the employees report being exhausted. 12% frequently feel emotionally strained, 33% sometimes and 28% rarely. One fourth never experiences emotional strain. About 16% stay at home sick (absenteeism), while 19% come to work despite being sick and knowing that they should better have stayed home (presenteeism).

Unemployment increased in 169 occupation–federal state combinations (28%). Figure 2 displays a histogram of relative unemployment changes across 5%-groups. 52% of the

individuals faced increasing unemployment, around 25% experienced sharp increases in unemployment of more than 10% (37 occupation-federal state cells). 7% of the sample experienced sharp declines in unemployment of more than 20%. For around 40%, changes were below +/-5%. To facilitate the overview, changes in unemployment are grouped into nine categories, five in which occupation specific unemployment on the federal state level decreased or remained constant and four in which unemployment increased.

Figure 2: Histogram of unemployment changes

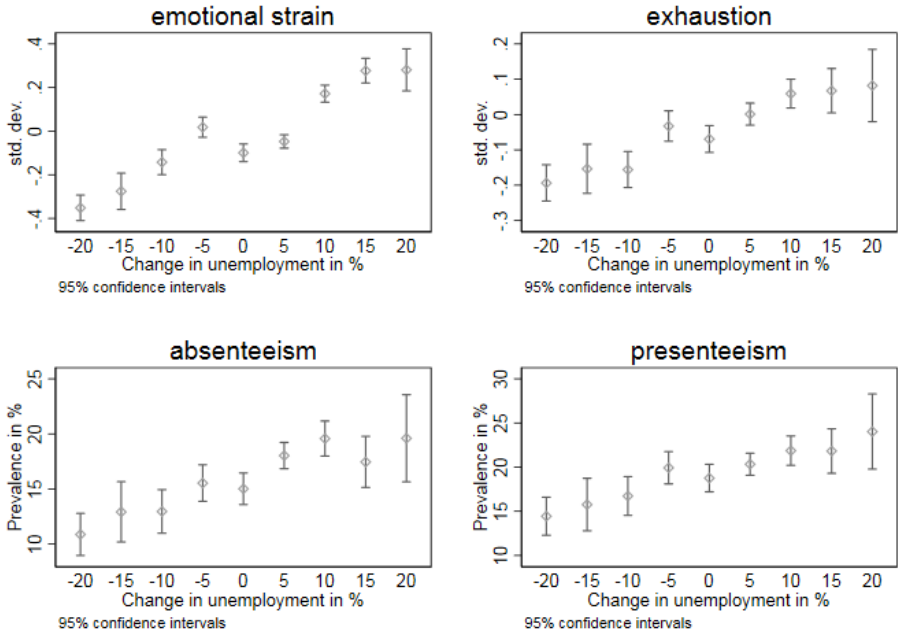


The x-axis shows one period lagged changes in occupation specific unemployment on federal state level. Mean: -1.7% change. Data sources: BIBB/BAuA, IAB. Own figure.

The prevalence of work-related mental health problems increases with unemployment (figure 3). Emotional strain, exhaustion, absenteeism, and presenteeism are lowest among individuals whose occupation and federal state specific unemployment decreased markedly (by 10% to 20%). Prevalence increases with unemployment but is comparatively high in the group facing 5% decreases in unemployment. The higher the increases in unem-

ployment, the higher the mean prevalence of mental health problems. Larger confidence intervals suggest that the differences for the groups with unemployment increases of 10% to 20% are not significant. The difference across unemployment is largest for emotional strain as the range comprises 0.7 standard deviations. The range for exhaustion is 0.3 standard deviations. Absenteeism and presenteeism vary in an order of 10 and 8 percentage points.

Figure 3: Work-related mental health outcomes by changes in unemployment



The x-axis shows one period lagged changes in occupation specific unemployment on federal state level. 95% confidence intervals. Data sources: BIBB/BAuA, IAB. Own figure.

3.3 Estimation procedure

The relationship between unemployment changes and work-related health outcomes is formalized in equation 1. Individual work-related health outcomes Y_i are regressed on occupation o and federal state f specific changes in unemployment $\Delta Unem_{of}$ and a

vector of individual control variables $\mathbf{X}_i$. α is a constant, u_i is the error term. To ease interpretation, $\Delta Unem_{of}$ is a dummy variable taking the value 1 for increasing and 0 for constant or decreasing unemployment.[4]

$$Y_i = \alpha + \beta \Delta Unem_{of} + \mathbf{X}_i' \delta + u_i \tag{1}$$

$\mathbf{X}_i$ contains relevant predictors of work-related mental health as identified by the literature: job demands and resources, sociodemographic and job characteristics according to table A.1.

Equation 1 is estimated with OLS. For the binary outcomes absenteeism and presenteeism, it is a linear probability model.[5] Standard errors are clustered on the occupation-federal state level to account for potential interdependence of error terms.[6] As a point of reference, I regress health complaints on the change in unemployment before adding variables capturing job demands, job resources, sociodemographic and job characteristics as in table A.1.[7]

4 Results

4.1 Main results

Rising unemployment is significantly associated with work-related mental health problems (columns one to four of table 1). The table reports unemployment coefficients and the constant from the base model (no covariates) and the full model (all covariates from table

[4]Otherwise, the changes in unemployment being associated with a certain change in the dependent variables are measured as changes in the change in unemployment, e.g. a ten percentage point increase in the change in unemployment. The results hold with this continuous measure.

[5]Marginal effects after logit estimation are of similar size.

[6]Moulton shows that OLS standard errors are downward biased when the data has a grouped structure Moulton (1990). Downward biased standard errors in turn inflate test statistics. Data structure is usually grouped when merging micro data (individual survey data) and macro data (occupation-federal state unemployment information). The results are similar when estimating non-clustered robust standard errors.

[7]Variance inflation factors are larger than 10 for age, hours, and tenure. Excluding these variables does not affect the coefficient of interest substantially. The results reported include them.

A.1). Sample sizes differ across the dependent variables due to missing information on the outcome. In general, raw coefficients for unemployment changes in the base model are roughly 1.5 times larger than coefficients in the full model with all covariates. All unemployment coefficients are significant at the 1% level. The full models perform better in terms of the model selection criteria AIC and BIC (not reported) and explain a larger share of the variation in the outcome.

Increasing occupation-federal state unemployment is associated with an increase in emotional strain by 0.074 standard deviations in the full model. The estimate for emotional exhaustion is larger (0.099). Absenteeism and presenteeism increase by 3.7 and 3.3 percentage points. This corresponds to relative increases of 23% and 17% respectively, as absenteeism averages 16% and presenteeism 19%. Unemployment is not associated with lower job satisfaction (last column). In the base model without any covariates, increasing unemployment is associated with an increase in overall satisfaction of 0.117 standard deviations. The point estimate is about one tenth in size and insignificant in the full mode.

Table 1: OLS estimates for work-related mental health outcomes

	strain	exhaustion	absenteeism	presenteeism	satisfaction
base model					
unemployment	0.196***	0.134***	0.048***	0.035***	0.117***
	(0.059)	(0.032)	(0.012)	(0.013)	(0.026)
constant	-0.153***	-0.104***	0.144***	0.175***	-0.071***
	(0.036)	(0.018)	(0.007)	(0.007)	(0.020)
full model					
unemployment	0.074*	0.099***	0.037***	0.033***	0.014
	(0.041)	(0.025)	(0.010)	(0.010)	(0.022)
constant	-0.608***	-0.651***	0.081	0.062	-0.007
	(0.188)	(0.166)	(0.070)	(0.072)	(0.204)
N	11325	11311	11308	11304	11324
R^2 adj. base	0.009	0.005	0.004	0.002	0.003
R^2 adj. full	0.261	0.159	0.122	0.157	0.245

Standardized dependent variable given in column header (absenteeism and presenteeism: binaries). Full model contains job demands and resources, sociodemographic and job covariates according to table A.1. Standard errors clustered on federal state and occupation in parentheses. Significance levels * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Data sources: BIBB/BAuA. Own calculations.

The positive relationship between work-related mental health problems and rising unemployment could be driven by certain individual or job characteristics. Due to space constraints, I summarize the subsample findings here: the relationship is stronger for full-time employees, where job insecurity is higher and where there are fewer safety nets. For the rest of the paper, I continue to use the full sample as the results are robust to using full-time employees only. Additional robustness checks find that level or level changes in unemployment are not significant for health. Choosing longer, closer or more remote periods of unemployment changes yields largely insignificant results. The strictly work-related nature of mental health is important as general mental health (sleeping disorders, tiredness, the blues and overall presenteeism) is not affected to the same degree by rising unemployment (exceptions: headaches and nervousness). Excluding city states or federal states with potential underreporting in the number of unemployed people does not affect results substantially.

5 Mechanism

This section aims at shedding more light on the mechanism of the relationship between unemployment and work-related mental health. The first subsection asks whether occupational or regional unemployment is the driving force. The second subsection analyses whether own unemployment experiences in the past play a role.

5.1 Level of aggregation of unemployment

While prior studies focus on regional variation in unemployment, the measure employed here consists of occupational and regional variation. The findings from the previous section could be driven by region or occupation or both. To analyze this, table 2 shows the results for different measures of unemployment changes. Panels one and two use rising occupation specific unemployment on the federal level and in West/East Germany separately.[8] The point estimates for occupation but not state specific unemployment changes ("specific Germany") are highly significant and slightly larger for all outcomes but strain (large standard error). The coefficients for occupation specific unemployment changes in East or West Germany ("specific East/West") are smaller and less significant due to larger standard errors.

Commuting to other federal states could bias the results. Panel three uses the federal state of the company location instead of the individual state of residence. Merging occupation and federal state specific unemployment data based on this definition yields 612 occupation-federal state combinations. The points estimates are smaller than the original ones except for emotional strain (larger).[9]

[8]Different sample sizes arise because unemployment information is available for more occupations on a higher level of aggregation.

[9]Another possibility to address commuting would be to include the unemployment in federal states which are attractive to commuters, e.g. due to proximity. One could for example include adjacent federal states and calculate the mean of residential and surrounding federal states unemployment changes. There

The last panel displays coefficients for federal state specific but occupation unspecific unemployment changes on the federal state level. Unemployment decreased for all federal states except Bremen. Schleswig-Holstein's decrease from 2009 to 2010 was largest (29%), Mecklenburg Vorpommern's smallest (2.8%). Using the binary unemployment measure finds significant coefficients but this is not robust to the continuous measure as displayed in the table. A 10 percentage points increase in the relative change in unemployment is significantly associated with higher absenteeism (4.6 percentage points). Point estimates are insignificant for all other outcomes and virtually zero for strain and presenteeism. This suggests that occupation is more important than region for the relationship between unemployment and work-related mental health.

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are two problems with this approach. First, while proximity is clearly given for all city states residents, this is different for larger federal states. For example, Saxony is close for East Lower Saxons but not for West Lower Saxons. Second, Hesse and Thuringia have five to six neighbors which would cover half of Germany's area. A more narrow measurement unit than federal states would be required for this analysis.

Table 2: OLS estimates for work-related mental health outcomes, level of aggregation prior unemployment

	strain	exhaustion	absenteeism	presenteeism
specific Germany				
unemployment	0.125	0.101***	0.033**	0.039***
	(0.112)	(0.037)	(0.014)	(0.014)
constant	-0.620***	-0.630***	0.060	0.078
	(0.205)	(0.134)	(0.059)	(0.055)
specific East/West				
unemployment	0.059	0.080**	0.025*	0.030**
	(0.089)	(0.036)	(0.013)	(0.014)
constant	-0.611***	-0.650***	0.055	0.071
	(0.214)	(0.153)	(0.066)	(0.072)
specific company				
unemployment	0.086**	0.076***	0.022**	0.026***
	(0.039)	(0.024)	(0.010)	(0.010)
constant	-0.617***	-0.636***	0.091	0.068
	(0.190)	(0.166)	(0.069)	(0.072)
unspecific federal state				
unemployment, cte.	0.007	0.073	0.046***	0.008
	(0.033)	(0.048)	(0.015)	(0.016)
constant	-0.544***	-0.519**	0.144*	0.094
	(0.142)	(0.243)	(0.075)	(0.096)
N Germany, East/West, company	12433	12413	12415	12411
N unspecific	11325	11311	11308	11304

Standardized dependent variable given in column header (absenteeism and presenteeism: binaries). Full model contains job demands and resources, sociodemographic and job covariates according to table A.1. Specific: occupation and federal state of residence specific unemployment. Germany: occupation specific unemployment. East/West: occupation and East/West German specific unemployment. Company: occupation and federal state of company specific unemployment. Unspecific: federal state of residence unemployment. Unemployment: binary. Unemployment, cte.: continuous measure. See text for details. Standard errors clustered on federal state and occupation in parentheses. Significance levels * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Data sources: BIBB/BAuA. Own calculations.

5.2 Own unemployment experience in the past

Individuals who have been unemployed in the past might react differently to increasing unemployment compared to individuals who have no own experience with unemployment. Unemployment experience could a) scar people and make them more vulnerable to worse outside options or b) toughen them (habituation) and make them less vulnerable as in

Clark et al. Clark et al. (2001). Information on prior unemployment experience is not available for all individuals. Sample sizes reduce to around 3,000 people who have never been unemployed and about 5,000 people who have been unemployed at some point in their work life. There are 411 occupation-federal state combinations in the sample with no past unemployment experience and 546 in the sample with past unemployment experience.

Estimating equation 1 separately for both samples shows that the relationship between rising unemployment and higher work-related mental health problems is driven by individuals with past unemployment experience. For individuals without own unemployment experience, there is no relationship between rising unemployment and work-related mental health (upper panel in table 3). Standard errors are larger than in the full sample and point estimates are often less than half or more the original size. All unemployment estimates are insignificant. This is different in the sample with past unemployment experience: point estimates are highly significant (except for emotional strain) and slightly larger than for the whole sample (lower panel in table 3). Increasing unemployment is associated with an increase in emotional exhaustion of 0.132 standard deviations. Absenteeism and presenteeism increase 5.0 and 4.4 percentage points which equals 29% at a 17% absenteeism rate and 21% at a presenteeism rate of 21%. All in all, unemployment scars in the sense that it makes individuals more vulnerable to later unemployment threats.[10]

[10]One could argue that people with weaker mental health selected into the group of people with unemployment experience and that this is driving the above relationship. In this case, weak mental health made people lose their job in the first place and could result in a more violent reaction to rising unemployment. Prevalence of emotional exhaustion and strain should then also be higher among people with unemployment experience. Emotional exhaustion is indeed significantly higher among people with unemployment experience (0.05 standard deviations, 5% level), while emotional strain is lower (0.12 standard deviations). Some selection can thus not be ruled out entirely. However, selection would also occur out of unemployment, i.e. individuals with better mental health select back into employment and thus into the sample.

Table 3: OLS estimates by unemployment experience

	strain	exhaustion	absenteeism	presenteeism
without				
unemployment	0.030	0.018	0.014	0.012
	(0.062)	(0.040)	(0.016)	(0.018)
constant	-0.527	-0.758**	0.110	0.006
	(0.419)	(0.356)	(0.149)	(0.165)
with				
unemployment	0.085	0.132***	0.050***	0.044***
	(0.054)	(0.038)	(0.015)	(0.017)
constant	-1.085***	-0.676*	0.044	0.119
	(0.330)	(0.362)	(0.129)	(0.155)
N without	2387	2387	2383	2384
N with	3947	3943	3944	3937

Standardized dependent variable given in column header (absenteeism and presenteeism: binaries). Combined: emotional exhaustion and/or emotional strain. Full model contains job demands and resources, sociodemographic and job covariates according to table A.1. Standard errors clustered on federal state and occupation in parentheses. Significance levels * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Data sources: BIBB/BAuA. Own calculations.

The duration of the unemployment spell could matter. The direction of this effect is not a priori clear. Again, longer past unemployment could make individuals even more vulnerable due to continued exposure to unemployment or make them less vulnerable due to habituation. Mean past unemployment is 1.6 years with a standard deviation of 1.9 years. Most individuals needed up to a year to leave unemployment (1,800). For 1,600 people, unemployment lasted not longer than half a year. 700 became re-employed after up to two years and 800 needed three years or longer. The coefficient of duration is statistically significant only in the base model for emotional strain (appendix table **??**). The point estimate is negative but decreases in the full model and becomes insignificant. The effect of unemployment on emotional strain and absenteeism seems to increase by 0.034 and 0.011 standard deviations per year of prior unemployment (significant at the 5% level). There is no such effect for exhaustion and presenteeism. This suggest that there might be an accumulative effect, i.e. that scarring becomes stronger over unemployment

duration at least for milder symptoms and absenteeism. For exhaustion and presenteeism scarring and habituation effects might occur but seem to cancel out.[11]

6 Conclusion

This paper contributes to the literature on the relationship between unemployment, job insecurity, and aggregate unemployment on individual well-being in a twofold way: first, it focuses on clearly work-related mental health problems, second, it uses occupation- and region-specific unemployment.

Aggregate unemployment changes can affect employed individuals mental health through three channels: increases job insecurity, feelings of guilt (others lost their job), and worse outside options. Worse outside option discourage employees from leaving stressful job due to fear of unemployment. If an employee is unsatisfied with her job, e.g. because she faces high job demands but has few job resources, she might consider leaving this job for a more balanced one. Before leaving, she assesses her outside options taking the economic situation into account. Rising aggregate (occupation-specific) unemployment worsens her outside options because her probability of finding a new job is lower. Unemployment is more likely. This discourages the employee to quit. She continues to work in the imbalanced job and her work-related mental health suffers.

The findings are, first, a significant relationship between rising unemployment and work-related mental health problems. The relationship is stronger for mild problems such as emotional strain. Second, occupation specific unemployment drives this relationship. The spatial dimension (region) of unemployment is less relevant. Third, the relationship is driven by past unemployment experience. This suggests a scarring effect of unemployment

[11] A factor which could bias this finding is how long ago the unemployment spell occurred. The importance of events from the remote past might fade out over time and result in the insignificant estimates. Unfortunately, the data does not contain information on the time of the unemployment spell.

similar to the one for life satisfaction in Clark et al. Clark et al. (2001). There could be a continued exposure effect for milder symptoms and absenteeism.

The analysis is subject to three limitations. First, the paper remains descriptive in the sense that it does not identify a causal effect of aggregate unemployment on work-related mental health. Individuals select into occupations and federal states. This could be correlated with mental health vulnerability. Experience could also induce more healthy individuals to leave for occupations or federal states with better conditions. Less healthy individuals might be left behind and "stuck" in unfavorable occupation-federal state cells. Second, the analysis does not explicitly account for geographic and occupational mobility. Individuals might have broader employment prospects than their current federal state and occupation. The first is not problematic as the spatial dimension is less important. Occupational mobility might arise from similarities between occupations or earlier employment in a different occupation. Data on individual occupational mobility is not recorded. Third, while worse outside options are one suggested underlying driver of the found relationship, there is no final proof of this due to lacking data on the time of exposure to high job demands and low job resources. The data is cross-sectional and collected every sixth year only. A yearly panel would be necessary to infer exposure time. This limitation does not substantially decrease the findings' relevance. Even being agnostic about the exact channel, the important take away is that there exists a link between rising unemployment and worse work-related mental health.

Despite these limitations, the findings are relevant when assessing the costs of economic downturns. These calculations are often limited to monetary losses because non-monetary losses, e.g. reductions in well-being, are harder to measure. The same is true for work-related mental health decreases. Data is sparse. One of the main reasons for this

is the problematic measurement of for example burnout, the only work-related mental health problem for which there is some consensus and some, albeit inaccurate data. Even less is known for milder work-related mental health problems such as emotional strain and exhaustion.

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Tables

Table A.1: Covariates

job demands and resources	sociodemographics	job characteristics
job demands	gender	hours, squared hours
reach limits of own capacity	having a partner	tenure
interrupted during work	having children	atypical work (short/temporary)
deadline/performance pressure	education	night work
work fast	(base: medium)	shift work
minimum performance	age, age square	work on weekends
overstrained		standby duty
risk of financial loss		feel work is important
no timely information		successful work life balance
do not receive all information		
details predetermined		
repetition		
job resources		
plan/schedule own work		
influence own workload		
decide when to break		
perform tasks independently		
good collaboration		
ambiguous factors		
supervisor for somebody		
get familiar with tasks		
improve methods		
demanded unknown things		

Own table.