Mental health benefits from work-related training?

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Objectives   The aim of this study is to offer some first evidence on the effect of work-related training on the mental health of the workforce in the UK.

Methods   The 2011 edition of the Workplace Employment Relations Study (WERS) was used to study the effect of work-related training on mental health for 22,000 employees clustered in 2,700 firms in the UK. An estimation of the effect of work-related training on mental health needs to take account of unobserved factors like ability, individual discount rate or stigmatization. The endogeneity due to these unobserved factors is accounted for by employing a measure of reduced investment into work-related training due to the 2008 financial crisis as a proxy for a reduction in work-related training. The clustering of the employees was accounted for via a random intercept model.

Results   Reductions in training related to the financial crisis worsened mental health more than wage cuts caused by the crisis.

Conclusion   Work-related training seems to be a potential policy lever to affect the mental health of the workforce. The mental health benefits of work-related training should be included when considering investment in work-related training.

Keywords: Mental health, work-related training, Human Capital, Work Employment Relations Study 2011

Introduction

The mental health of the workforce is of international concern as can be seen by a recent multinational OECD project on the relationship between mental health and work. The results are six key policy challenges for governments of which one is the reduction of productivity losses at work due to mental health. The UK is no exception, 110 million working days were lost in the UK in 2000 due to poor mental health (Thomas and Morris, 2003). Additionally, splitting up the present workers in the UK into those with severe, moderate and no mental health disorders, 80% of the ones with a severe disorder and 70% of the ones with a moderate disorder report to have accomplished less than they would have liked to in the past month, compared to 25% for individuals without a disorder (OECD, 2014).

This paper explores whether work-related training is a potential policy angle to improve the mental health of the workforce. Work-related training may affect the mental health of the workforce, since the literature of the effect of education on mental health has shown that increases in human capital are advantageous for mental health (Chevalier and Feinstein, 2006; Currie and Stabile, 2006; Ding et al., 2009; Fletcher and Wolfe, 2008; Jones et al., 2011). An example of the positive effect of education on mental health is Jones et al. (2011) who exploit variation in the implementation of a policy change in the secondary schooling system in the UK finding educational attainment to be negatively associated with mental illness in adulthood. This paper is an extension of the literature on human capital accumulation in terms of schooling, and extends the effect of human capital accumulation beyond schooling to work-related training and its effect on mental health.

Work-related training is an important part of human capital, as was pointed out by Mincer (1962). Post-school human capital investment made up at least half of human capital in terms of expenditure in the US. Even today work-related training is vital with roughly 40.5bn spent in 2011 in the UK and 53% of the British workforce in receipt of training (Davies B., 2012).

The effect of work-related training on mental health could be driven by unobserved factors such as individual ability, discount rate or stigmatization against individuals with mental health problems. In order to account for this issue, a reduction in access to work-related training caused by the financial crisis, available in the sixth edition of the Workplace Employment Relations Study (WERS), is used as a negative training shock.

The results show that the effect of reduced access to training due to the 2008 financial crisis has a larger impact on mental health than any single one of following crisis indicators: reorganized work, frozen or reduced wages,

reduced non-wage benefits, reduction in hours worked, reduction in paid overtime and unpaid leave. This paper presents the first evidence of the protective effect of work-related training on mental health.

Data

The data used in this analysis is the 2011 edition of the Workplace Employment Relations Study (WERS). The 2011 edition is the sixth edition of the WERS and hence is also referred to as WERS 6. The aim of the WERS is to offer a statistically reliable account of British workplace relations covering about 22,000 employees in 2,700 workplaces in both the private and the public sector. A workplace is defined as the activities of one employer at one location.

A workplace qualifies for sampling into WERS if it employs more than 5 employees and is not active in agriculture, forestry, fishing, mining, or quarrying. Workplaces were selected using systematic random sampling and within workplaces up to 25 workers were randomly selected to fill out a self-completion survey either on paper or online. Data was collected between March 2011 and June 2012. Beyond the employee self-completion part, the WERS 6 contains further parts including workplace level information (NatCen, 2013), which is not used in this study.

Mental Health

The WERS 6 does not include a clinically validated measure of mental health. However, the WERS 6 includes a set of questions asking the individual how often over the past few weeks his or her job has made him/her feel any of the following: tense, depressed, worried, gloomy, uneasy and miserable. The individual replies to each of these questions on a scale ranging from 1 to 5 with 1 being "all of the time" to 5 being "never". These items only capture negative aspects of mental health; The measure fails to capture positive aspects of mental health and therefore could be understood as capturing work-related psychological distress or negative affectivity.

The questions have been aggregated to a single measure of mental health, first by simply adding up all the variables and second by principal component analysis (PCA). The measures created by these two methods have a correlation of 99.98%, showing that virtually no information is lost by using the simpler additive measure. The

additive measure was chosen because it captures as much information as the principal component, but is simpler to understand[1].

Key variables

The WERS 6 includes several questions related to work-related training. However, the focus of this work is on the question: "Did any of the following happen to you as a result of the most recent recession, whilst working at this workplace?" One possible reply to this question is "Access to training was restricted". Other possible replies cover: the individual did not work there during the recession, workload increased, work was reorganized, the individual moved to another job, wages were frozen or cut, non-wage benefits were reduced, contracted working hours were reduced, access to paid overtime was restricted, the individual was required to take unpaid leave, nothing changed or the access to training was restricted. The reference category for this question is an option indicating that the individual has not worked in the same workplace since the crisis.

Controls

Control variables include age, gender, relationship status, whether the individual has dependent children, ethnicity, religion, sexual orientation and how long he or she has been working at the workplace. The contract type of the individual is captured as one of the following: permanent, fixed or temporary contract. The Standard Occupational Classification 2010 is used to control for differences between occupations.

Despite being potentially endogenous, the following variables have been included as previous research has found that they are important determinants of mental health. Dummies indicating whether the individual is an informal carer (Cochrane et al., 1997) and whether the individual has health problems limiting his or her day-to-day activities (Michael et al., 2001). Income is controlled for through hourly wage (McInerney et al., 2013). Unfortunately, wage was only available in fourteen categories ranging from less than £60 per week to £1,051 or more per week. However, following Kasteridis and Yen (2012) the mean of each bounded category is taken and for the highest open-ended category a Pareto estimate is used as upper bound (Parker and Fenwick, 1983). These values are then divided by the contracted number of working hours to calculate pay per hour. Education is included as dummies capturing all academic, vocational or professional qualifications that the individual has obtained. Individuals report all secondary education, university education, vocational qualifications and professional qualifications they have achieved (Jones et al., 2011).

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[1] The results of the principal component analysis are available on request from the author.

Methodology

Given the clustered nature of the data, the independence assumption of standard OLS would not hold, because the error term between individuals is likely to be correlated given that they work in the same company. In order to account for this clustering, the effect of the amount of training days is estimated using a random intercept model.

$$y_{ij} = \beta_0 + t_{ij}\beta_1 + x_{ij}\beta_2 + u_j + e_{ij} \tag{1}$$

with $u_j \sim N(0, \sigma_u^2)$ and $e_{ij} \sim N(0, \sigma_e^2)$

y_{ij} represents the composite mental health measure for a given individual i in company j, t_{ij} is the crisis-related reduction in training and x_{ij} are standard controls such as age, gender, etc. The random intercept model splits the overall error term into a company u_j component and an individual component e_{ij}. The company component can be understood as company correction of the overall intercept, with each company having an intercept $\beta_0 + u_j$, hence the name random intercept model (Rabe-Hesketh, 2008).

As outlined, the proxy variable of reduction in training due to the financial crisis is used, as training is likely to be endogenous. Several factors are discussed in the literature which could affect both mental health and human capital at the same time e.g. individual discount rate and ability or stigmatization. The individual's discount rate might affect how much he or she values investments in both mental health and human capital. A crisis-related reduction in training should be unrelated to these factors, but for the coefficient of a crisis caused reduction in training to be relevant, it is necessary to control for all other crisis impacts, since failure to do so implies that the training reduction captures an overall crisis effect.

Therefore equation (4) is extended to:

$$y_{ij} = \beta_0 + t_{ij}\beta_1 + x_{ij}\beta_2 + c_{1ij}\beta_3 + \dots + c_{8ij}\beta_{10} + u_j + e_{ij} \tag{2}$$

with $u_j \sim N(0, \sigma_u^2)$ and $e_{ij} \sim N(0, \sigma_e^2)$ and c_1 to c_8 representing the crisis control indicators.

However, a more detailed discussion of possible biases and their direction is necessary. Assumptions are made about the possible biases, their magnitude and direction. These assumptions are:

Assumption 1: The coefficient of the reduction in training caused by the financial crisis is an overestimate of the effect of a reduction in training on mental health, when not controlling for other crisis impacts, since in those cases the training reduction captures an overall crisis effect.

Assumption 2: The crisis impacts are only measurable for individuals who worked during and after the crisis at the same workplace, implying they weren't the worst affected by the crisis. Therefore their mental health is assumed to be better than the mental health of the individuals who lost their jobs due to the crisis. This implies that the estimates in this paper are underestimates, because the worst affected are not included in the analysis.

Assumption 1 is estimated in the model in two steps (first without further crisis controls and then with) which allows an indirect test of assumption 1. If assumption 1 holds then the coefficient of the training reduction in (4) should be larger than in (5). Assumption 2 is not testable, since it is an assumption about things that are not observed.

If these assumptions hold, then the coefficient for crisis related reduction in training in (4) is biased upwards, whilst the coefficient for the crisis related training reduction in (5) is biased downwards. Therefore the two estimations bracket the true effect of a reduction in training on mental health.

All estimations are weighted using an employee weight available in the WERS 2011 to account for the probability of the employee surveys being distributed in the workplace, employee selection and post-stratification to the population of all employees by gender. Weighting the data is necessary as larger firms and specific industries are oversampled (NatCen, 2013).

Results

The study population consisted of roughly 22,000 workers in 2,700 workplaces with between 1 and 25 workers interviewed per company. Table 2 shows descriptive statistics of key variables for the study population.

The measure of mental health has a mean of 17.83 (SD 5.19); the measure runs from 0 to 24 decreasing in illness. Less than 10% of the sample is in the bottom 10 scores reflecting mental health problems, whereas more than

75% of the sample is in top ten scores. 50% is clustered in the top five scores indicating no mental health problems.

11% of the study population had their access to training restricted due to the crisis. The most commonly occurring consequences of the crisis were frozen or cut wages (33%), increased workload (26%), reorganized work (18%) and access to paid overtime was restricted (16%). The least occurring events were individuals moved to another job (5%), reduced non-wage benefits (5%), contracted hours were reduced (4%), individuals were required to take unpaid leave (2%) and about 11% of the respondents did not work at this workplace during the crisis.

In a simple cross tabulation of being affected by reduced access to training due to the financial crisis versus not being affected, the affected have a 2.4 lower mean mental health score. After accounting for standard controls, the effect of reduced access to training due to crisis on mental health reduces to -1.9 on the mental health score (P=0.00). However, once introducing controls for other channels through which the crisis could affect mental health, the effect of the training shock on mental health reduces further to -0.8 (P=0.00). Due to the opposing biases, the exogenous effect of a reduction in work-related training on mental health lies between these two estimates.

[Insert Table 3 about here]

Discussion

The key finding of this work is that an exogenous reduction in work-related training worsens mental health substantially. The endogeneity of training due to unobserved factors such as individual discount rate, ability or stigmatization was addressed using reductions in work-related training due to the financial crisis, whilst controlling for other dimensions of the financial crisis (reductions in pay, increased workload, reorganized work, moving to another job, reduced non-wage benefits, reductions in contracted hours were reduced, reductions in paid overtime and requirements to take unpaid leave).

The key assumption in the estimation procedure is that the financial crisis control variables account for all non-training related crisis effects on the individual's mental health. This means that after controlling for increases in workload, reorganized work, job changes, frozen or cut wages, reduced non-wage benefits, reduced hours, reduced paid overtime and unpaid leave, the reduction in access to training only represents a reduction in

training and no other crisis effect. However, since the estimation hinges on this assumption, it is necessary to consider what these other crisis effects could be and how to test whether they are relevant.

Qualitative interviews with employers conducted by the UK Commission's Employer Skills led to the insight that training was one of the first expenditures to be cut in the face of the crisis (Felstead et al., 2012). It therefore seems possible that access restrictions to training related to the crisis might capture some general crisis effect. However, the coefficient of the access restrictions to training nearly halved after introduction of the crisis controls, implying that the crisis controls at least partly did their job. The hope is that future research improves on this point by using better (preferably panel) data; it would be ideal if such a dataset included a clinically validated measure of mental health and an exogenous variation in training. Future research should also attempt to disentangle the causal pathway through which work-related training affects mental health. Grossman (1972) or Silles (2009) argue that the two most likely pathways are through allocative efficiency and productive efficiency. Under allocative efficiency, work-related training directly improves the mental health knowledge of the individual leading to better mental health. The argument for productive efficiency is that work-related training improves the ability of the individuals to process information and makes decision leading to a larger mental health output due to a better choice of mental health inputs.

This work has provided a first insight in the direction of the effect of work-related training on mental health. The UK government has pledged to improve mental health with initiatives across departments and has set employment has a key priority area, stating that employment objectives cannot be reached without improvements in mental health (Her Majesty's Government and Department of Health, 2011). Previous research has shown that work-related training improves productivity (Acemoglu, 1997; Acemoglu and Pischke, 1998, 1999; Cahuc and Zylberberg, 2004). This work shows that work-related training has potential to prevent adverse events like sickness absence and transition out of employment into disability benefits or early retirement due to mental health problems. Economic theory recommends government support of training (Acemoglu, 1997; Acemoglu and Pischke, 1998, 1999) as transaction costs between employee and employer will otherwise lead to underinvestment in training. The existence of transaction costs is generally accepted as a reason for policy intervention (Cahuc and Zylberberg, 2004). So far, the labor economic literature has focused on productivity increases for both worker and firm through training and has split up training into general and firm specific (Acemoglu and Pischke, 1998, 1999; Cahuc and Zylberberg, 2004). The UK government has understood that tackling mental health problems can lead to major productivity increases(Her Majesty's Government and

Department of Health, 2011). This research suggests that employers and researchers might also want to consider productivity increases from training arising from improved mental health, as well as policy makers including mental health benefits from training when developing policies related to work-related training. Given the costs of mental health problems to the individual and society, improving the mental health of the workforce via training might present opportunities for policy intervention with potential net gains. A successful policy would pay its own way through reductions in absenteeism and increases in productivity. However, further research is necessary to establish which kind of training is most effective.

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Table 1 – Definitions of variables used

Variable name	Definition
Mental Health	Self-created mental health measure ranging from 0 to 24 decreasing in illness
Age	Age
Wage (£ per hour)	Hourly wage
Tenure with company	Ordinal measure of years spent at current workplace, the scale being less than a year, one to two years, two to five years, five to ten years and more than ten years.
Carer	Ordinal measure of the amount of hours the individual spent caring a week. The scale is: no, 0-4hrs, 5-9hrs, 10-19hrs, 20-34hrs and more than 35hrs.
Limited Health	Ordinal scale of the whether the individual has health problems that limit his or her day-to-day activities. The scale is: No, a little, a lot.
Dependent Child(ren)	=1 if the individual has one or more dependent children
Gender	=1 if female
Crisis related variables	
Access to training restricted due to the crisis	=1 if the individual had his or her access to training restricted due to the crisis
increased workload	=1 if the individual had his or her workload increased
reorganised work	=1 if the individual had his or her work reorganised
moved to another job	=1 if the individual moved to another job
frozen or cut wages	=1 if the individual had his or her wages frozen or cut
reduced non-wage benefits	=1 if the individual had his or her non-wage benefits reduced
contracted hours were reduced	=1 if the individual had his or her contracted hours reduced
access to paid overtime was restricted	=1 if the individual had his or her access to paid overtime restricted
required to take unpaid leave	=1 if the individual was required to take unpaid leave
didn't work at this workplace during crisis	=1 if the individual didn't work at the workplace during the crisis

Table 2 – Descriptive statistics

Variable name	Obs	Mean	S.D.	Min	Median	Max	Non-response rate
Mental Health	21,447	17.83	5.19	0	19	24	2.43%
Access to training restricted due to the crisis	21,340	0.12	0.32	0	0	1	2.92%
Age	21,824	5.78	1.39	1	6	9	0.71%
Gender	21,835	0.56	0.50	0	1	1	0.66%
Wage (£ per hour)	20,316	13.78	10.72	0.40	11	393	7.57%
Tenure with company	21,815	3.53	1.32	1	4	5	0.76%
Carer	21,765	1.43	1.05	1	1	6	0.98%
Limited Health	21,804	1.11	0.35	1	1	3	0.81%
Dependent Child(ren)	20,951	0.81	0.24	0	0	1	4.69%
Crisis related variables							
increased workload	21,340	0.26	0.44	0	0	1	2.92%
reorganised work	21,340	0.18	0.39	0	0	1	2.92%
moved to another job	21,340	0.05	0.23	0	0	1	2.92%
frozen or cut wages	21,340	0.33	0.47	0	0	1	2.92%
reduced non-wage benefits	21,340	0.05	0.22	0	0	1	2.92%
contracted hours were reduced	21,340	0.04	0.19	0	0	1	2.92%
access to paid overtime was restricted	21,340	0.16	0.37	0	0	1	2.92%
required to take unpaid leave	21,340	0.02	0.13	0	0	1	2.92%
didn't work at this workplace during crisis	21,340	0.11	0.13	0	0	1	2.92%

Table 3: The effect of crisis related reductions in training on mental health

	Random Intercept Model	Random Intercept Model with further crisis controls
Obs	17,827	17,827
Groups	1,902	1,902
Training restrictions	**-1.88***	**-0.77***
Wage (£ per hour)	-0.02***	-0.02***
Tenure with company	-0.40***	-0.25***
Carer	-0.20***	-0.16***
Limited Health	-1.77	-1.63***
Dependent Child(ren)	-0.15	-0.16
Didn't work at that workplace during crisis		**-0.38**
Increased workload		**-1.93***
Reorganised work		**-0.82***
Moved to another job		**-1.04***
Frozen or cut wages		**-0.60***
Reduced non-wage benefits		**-0.56**
Contracted hours were reduced		**-0.45**
Access to paid overtime was restricted		**-0.76***
Required to take unpaid leave		**-0.13**
Constant	22.00***	21.89***

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Both estimations control for sexuality, religion, ethnicity, relationship status, contract type and education.