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How Do Job Conditions Amplify the Impacts of Mental Health Shocks?

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How Do Job Conditions Amplify the Impacts of Mental Health Shocks?

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Abstract

Although there is a large literature on the direct effects of job conditions such as unemployment or job insecurity on mental health, little is known about how the job conditions of individuals may amplify the impact of mental health shocks originated from sources unrelated to the labour market. This paper aims to fill this gap. Using the panel data from the Household, Income and Labour Dynamics in Australia (HILDA) survey, we first establish that negative life events unrelated to the labour market have significant adverse impact on individuals' mental health, and then demonstrate that both job insecurity and job stress exacerbate the impact. We also find gender heterogeneity in the results that job insecurity and job stress affect mostly female workers.

1 Introduction

Everyone experiences negative and positive life events at a certain point of their life. These events, whether experienced first-hand or witnessed (e.g., observing them befalling onto family members or friends), could have a non-negligible impact on individuals' mental health and wellbeing (Dustmann & Fasani, 2016; Kristiansen, 2021; Mahuteau & Zhu, 2016; Mervin & Frijters, 2014), with negative events having a longer-lasting impact than the positive life events. While most of these life events are common to all, the way people react to these life events could be different, depending on whether there are moderating or amplifying factors.

An important moderating factor that may affect the way individual processes these life events are job attributes (or job conditions). The focus on job conditions is well justified. First of all, employment is known to be important to mental health (Cottini & Lucifora, 2013; Cygan-Rehm et al., 2017; Farré et al., 2018). Furthermore, workplace is one of the most important venues where social interaction take places. For instance, for those who have a full time jobs, working typically account for the majority of their activities outside their home. Therefore, job conditions could be important to the mental health of working people and, thus, their resilience to mental health shocks. Historically, most working conditions-related health concerns were associated with workers' physical safety. However, given the decline of the manufacturing sector, the expansion of the service sector, and the use of digital technology, these concerns shifted gradually towards concerns regarding workers' mental health (Cappelli, 1997). Indeed, technological innovations have brought new threats to workers's mental health through their contribution to an increased level of job insecurity and an increased level of job-related stress.

There is a growing body of literature on the impact of job-related stress and job insecurity on mental health and wellbeing (Belloni et al., 2016; Bünnings et al., 2017; Caroli & Godard, 2016; Cottini & Ghinetti, 2018; Cottini & Lucifora, 2013; Dickerson & Green, 2012; Eibich, 2015; Green, 2011; Johnston et al., 2020; Van Aerden et al., 2016). However, there is a scarce literature on the labor market-related factors' moderating effects on workers' mental health and wellbeing. Empirical evidence from Green (2011) suggests that a person's employability has a protective effect on the mental health of those who experience unemployment or job insecurity, whereas Choi et al. (2020) shows that financial wellbeing moderates the impact of job insecurity on financial stress.

To fill in this gap in the literature, we use data from the Household, Income and Labour Dynamics in Australia (HILDA) survey waves 2 to 19 and estimate the moderating (amplifying) effect of job conditions on mental health of individuals who are exposed to major negative life events¹. We focus on five life events that are not directly related to labor force participation: (i) the death of a close relative or family member, (ii) the death of a close friend, (iii) the victim of a property crime, (iv) the victim of physical violence, and (v) the serious injury or illness to a close relative or family member. In doing so, we explore two types of job conditions that can moderate (or amplify) the effect of a shock on mental health namely: job-related stress and job insecurity. As such this paper contributes to the literature on job conditions but providing evidence on their role as amplifiers for negative mental health shocks. We thus highlight a potential pathway through

¹We exclude wave 1 because there is no information about major life events

which mental health deterioration, arising as a result of major life events, can be prevented or attenuated. To the best of our knowledge, this is the first study on this topic.

To investigate if the aforementioned five negative life events have an impact on mental health, we use a difference-in-differences (DiD) approach, where our main treatment variable indicates whether an individual was exposed to the events. Thus, we define those individuals who experienced any of these life events during the sample period as the treatment group and those individuals who had never experienced any of these events during the sample period as the control group. We restrict our sample such that individuals from the treatment group had not experienced any of the life events for five years before the treatment. Also, we define the pre-treatment period as the years before the occurrence of an event, and the post-treatment period as the year of the occurrence of the event. To make sure that both the level and the trend of the control group's pre-treatment outcome are as close as possible to the treatment group's and, thus, exclude any possible selection based on the observables, we combine our DiD approach with a propensity score matching (PSM) approach. This allows us to attribute any outcome differences between the two groups to the occurrence of the events. Furthermore, we conduct an array of tests to validate our method, including balance tests, pre-treatment outcome plots, a falsification test, and placebo tests. We then use the triple difference (DDD) approach to further examine if the negative mental health impact of the events increases with the levels of job insecurity and job stress, respectively, experienced by individuals before the events.

Our results confirm that job insecurity and job stress exacerbate the negative impact of the life events on mental health. More specifically, if we compare the effect of any negative life event occurrence between workers with a job security score below 5 (on a 10-point Likert scale) on the one hand, and 5 and above on the other hand, the mental health score decline for the latter is more than three times the former's (-2.6 units versus -0.81 units). Likewise, if we compare the impact between workers with a job stress score below 5 (on a 7-point Likert scale) on the one hand, and 5 and above on the other hand, the mental health score decline of the latter is about 2.7 times the former's (-1.91 units versus -0.72 units). Furthermore, the results suggest that there is a large gender difference in the amplifying role of job insecurity and job stress. Job insecurity is found to affect females only and but not males. A possible explanation for this gender difference is that female workers may find it more difficult to re-enter the labour market once they lose their jobs, as compared to male workers. As such, job insecurity plays a relatively larger role in the mental health of females than their males counterpart's. On the contrary, job stress is found to affect both females and males but the effect on male is much weaker. This may be due to differences in the way females and males cope with job-related stress (Eriksen et al., 2016)

Our findings have important implications. In recent years until the pandemic, the gig economy has been blooming but its flexible job arrangement has led to minimal job security and protection and, hence, higher job insecurity. Likewise, while competition in the labour market may drive up productivity, it comes with the cost of heightening stress among workers. Against this background, our findings add additional weight to the argument about the importance of having a sustainable workplace culture and work-life balance.

The rest of the paper is organized as follows. Section 2 describes the dataset and the sample selection process. Section 3 explains the methodology. Section 4 presents the main results and Section 5 the robustness checks results. The last section concludes.

2 Data

2.1 The HILDA Survey

We use a large set of panel data from HILDA, an Australian nationwide household based survey for 18 waves from 2002 to 2019. The survey collects rich information about economic and labour force status, employment history, job characteristics, health and wellbeing, major life events, and demographic background of Australians. For those who are employed, HILDA surveys various aspects of their jobs. Given that our analysis focuses on the conditions of the individuals' current main job, we focus on two aspects: job insecurity and job stress. Both of these variables are measured on a Likert-like scale.

HILDA also surveys the respondents on whether they experienced specific major life events (21 varieties in total) in the past 12 months. These life events include, changes in marital status (married, separated) and family members (childbirth, death in the family), illness or injury (the subject or a family member), victims of property crimes or physical violence, changes in work force status (retirement, firing, promotion, turnover), and changes in financial situation. In our analysis we focus on five life events namely (i) the death of a close relative or family member (such as the death of parent or sibling, *excluding* the death of spouse or child), (ii) the death of a close friend, (iii) the victim of a property crime (e.g., theft, housebreaking), (iv) the victim of physical violence (e.g., assault), and (v) the serious injury or illness to a close relative or family member. We focus on these five events for two main reasons. First, the occurrence of such events is completely exogenous, thus, the events used can be considered as if randomized in our sample, at least in terms of their timing or conditional on individual fixed effects. Second, while such events may affect the respondents' mental health status, it is unlikely to *directly* affect their pre-treatment job conditions. However, given that information on job conditions in HILDA is self-reported, it is possible that the subject's perspectives change after a significant life event, even if the job conditions objectively remain the same. Therefore, to ensure that the five aforementioned life events are not correlated with the respondent's perceived job conditions, we (i) use the information on the job conditions at the year prior to an event, and (ii) only focus on those respondents who did not change jobs one year before the event and during the event year.

For the main analysis, we consider that a person is treated if any of the five events befall on them,² and a person is considered to be a control if the person has not experienced any of the five life events. The other 16 life events are included as part of the controls in estimations. By using these life events as a source of exogenous shocks on mental health, we analyze how individuals' job conditions may amplify the impact of mental health shocks originating from sources unrelated to the labour market.

2.2 The sample restriction process

The main objective of this study is to investigate the amplifying effect of adverse job conditions on mental health changes. Therefore, we focus on adults who are over 18 years of age and are employed in the year the event occurs and in the preceding year. As explained earlier, we use the information on the job insecurity and job stress of individuals one year prior to the occurrence of the event. For the main analysis, we use

²We have considered single event like Frijters et al. (2014), but given that we impose additional constraints on the data we have a smaller number of observation in the treatment group leads to very large standard errors and, thus, imprecise estimations.

a DiD framework with panel data to measure the impact of mental health shocks originating from sources unrelated to the labour market (i.e., the five selected life events). We assume that job security and job stress do not affect the probability of events occurring, at least in a given year. Therefore, we define the treatment and the control groups based on whether the events occur.

First, we define the treatment group as those who experienced at least one of the five events³ for the first time during the observation window. In other words, the treatment group should not experience any of the five life events during the pre-treatment period. However, given that the event can occur any year during the total data period from 2002 to 2019, the length of the pre-treatment period could be different for each treated individual. For example, the pre-treatment period would be 4-year (from 2002 to 2005) for those who experience the event for the first time in 2006. Likewise, the pre-treatment period would be 17-year (from 2002 to 2018) for those who experience the event for the first time in 2019. In addition, because the data is left-censored and there is no historical information for life events, we could only know the timing of the event within 18 waves of our data. Thus, using all available years within the entire data period as the pre-treatment period would result in a different level of restriction on selecting individuals for each event year. Therefore, we decide to use the observation window of six years⁴. That is, we include the data for up to five years prior to the occurrence of the event to the year the event occurred, i.e., six years in total. Since our objective is to identify the role of job conditions as an amplifier at the time of the shock⁵, we do not consider the periods after the event year. We consider all the events that occurred between 2005 and 2019. Given that we need at least a three years window prior to the event to define treatment and control groups, we do not include the individuals who experience events in years 2002, 2003, and 2004 in our treatment group. As for events occurring in years 2005 and 2006, we use data for four and five years respectively⁶. In sum, the treatment group includes individuals (i) who experience at least one of the five events between 2005 to 2019, (ii) do not experience the event in the 5 years prior to the event, and (iii) work in the same job in the year of event and one year prior.

Second, we define the control group as those who do not experience any of five life events during the same 6-year observation window of the treatment group. That is, we select those who do not experience the event within each observation window (i.e., we repeat the process of assigning individuals to the control group 10 times for each of the 10 observation windows of 2002-2005, 2002-2006, 2002-2007, 2003-2008, 2004-2009, ..., and 2014-2019). Since there is no natural event year that we can allocate for the individuals in the control group, we need to use the definition based on the observation window. Thus, we can define the event year for individuals in the control group to be the same as their matched individual in the treatment

³We do not distinguish between people who experience one event and those who experience multiple events in a single year, because the exact source of mental health shocks is not our primary interest.

⁴Based on the previous studies, it is necessary that no events occur for at least three years prior to the event to avoid the long-term effects of past events. For example, Mervin and Frijters (2014) estimates the impact of some life events based on HILDA on mental health, and the effects of losing a friend, the victim of a property crime, and the victim of physical violence last less than three years.

⁵Depending on the nature of the shock and the characteristics of the job condition, the latter could be a moderator or an amplifier. In this paper, we focus on the impact of negative mental health shock and the potential role of undesirable job conditions in amplifying the impact.

⁶The results change little even after excluding the events in 2005 and 2006, which will reduce the sample size by about 12% from our final sample. We include these events to maximize the sample size.

group. All the individuals in the control group also do not change jobs in the event year and in the preceding year. Given that our sample restriction must be compatible with our empirical strategy, we have to introduce some additional restrictions to apply the DiD framework. That is, there should be no inherent level or trend difference in the outcomes between the treatment and control groups. To address this issue, for each individual in the treatment group, we match them with someone in the control group using propensity score matching (PSM). We choose the predictors from observed variables five years prior to the events for the PSM model so that the treatment and control groups are of similar levels and trend of pre-treatment mental health and other observed characteristics (i.e., balance is achieved between the two groups) and, thereby, any difference in their post-event mental health is more likely to be due to the life event shock. The propensity scores are estimated using a logit specification. The matching is performed with replacement using the nearest neighbor method with caliper of a very small tolerance level (caliper of 0.03 for the main analysis).

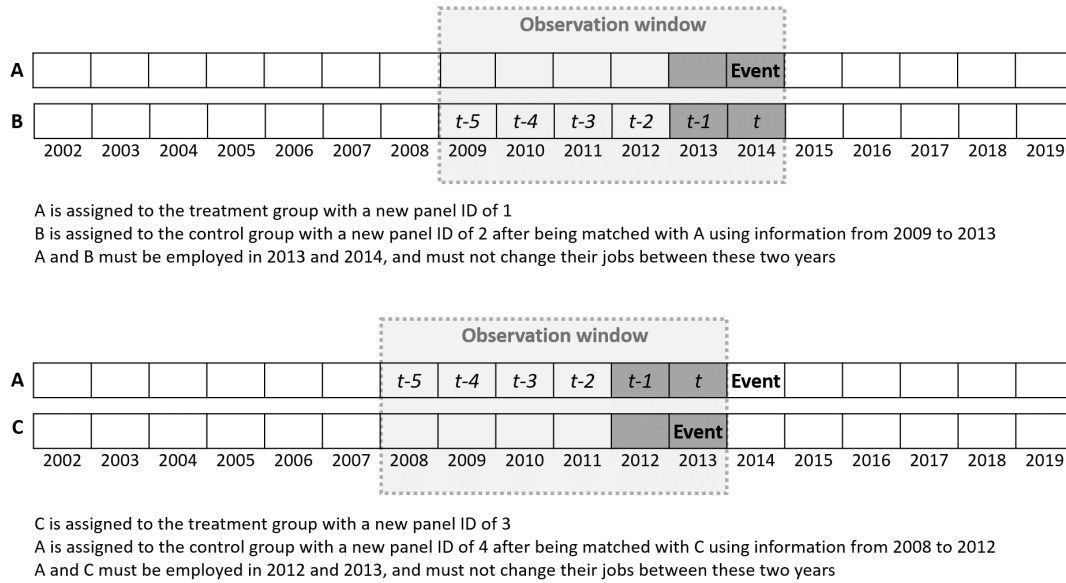


Figure 1: Example of the sample selection process

Given that we perform the process of assigning individuals to the treatment group and the control group in each observation window, there can be a case where the same person is assigned to the treatment group in one set of periods and be assigned to the control group in another set of periods. We illustrate the case in Figure 1. For example, if person A experienced one or more of the selected life events in 2014 for the first time, then person A is assigned to the treatment group and the observed data from 2009 to 2014 are used accordingly. At the same time, person A also can be assigned to the control group for the period from 2002 to 2013 and can be compared to people who experienced the events during this 12-year period. For instance, when determining a control group compared to a treatment group for the event year 2013 (and the corresponding observation window is from 2008 to 2013), person A can be included in the control group if person A meets our definition of the control group. For that to happen, person A must: (1) work at the same job in 2012 and 2013; (2) not experience any of 5 life events from 2008 to 2013; and (3) be selected as part

of the control group based on the PSM using the information from 2008 to 2013. In the same manner, person A can be considered as candidate for the control group for the event year from 2005 (observation window from 2002 to 2004) to 2012 (observation window from 2007 to 2011). To maximize the sample size, we allow the case in our data⁷. We include the case by assigning a new individual panel ID to the treatment and control within each observation window after matching is done and append all yearly matched samples to be the final sample. The final sample contains 109,979 observations of 20,363 people.

2.3 Summary statistics of key variables

In this paper, mental health is measured using the Mental Health Inventory, also known as the MHI-5. The MHI-5 is a widely used measure of mental health because of its superior psychometric properties (Berwick et al., 1991; Bubonya et al., 2017; Kelly et al., 2008). It aims to capture a respondent's emotional state and nervousness over the past four weeks from the time of the survey. The MHI-5 score is constructed based on a respondent's answers to the questions that: *How much of the time during the last 4 weeks, have you...(1) been a nervous person?; (2) felt so down in the dumps that nothing could cheer you up?; (3) felt calm and peaceful?; (4) felt down?; and (5) been a happy person?*. The six possible categorical answers for each question range from "All of the time" to "None of the time". Note that questions (3) and (5) are positive questions while the rest are negative ones. Following the standard practice, we use a transformed scale of the MHI-5 that has a range of 0-100, with a larger value meaning better mental health.

HILDA asks questions that measure various aspects of the current main job of individuals, including "...how satisfied or dissatisfied you are with...your job security" and "my job is more stressful than I had ever imagined". The possible answers of these questions are measured on a Likert-like scale. Job security is scored from 0 to 10 with a larger value meaning higher job security, whereas job stress is scored from 1 to 7 with a larger value meaning more stress. To harmonize measures for both job attributes so that they both reflect negative aspects of a job, we reverse the job security measure into a job insecurity measure so that a larger value means higher insecurity. Both job conditions are measured one year prior to the event so that they are not affected by the occurrence of the event.

We also include sociodemographic characteristics such as age (year), gender (1 for female, 0 otherwise), foreigner (1 for foreigner, 0 otherwise), language (1 for speaking a language other than English, 0 otherwise), the marital status (1 for legally married or de facto, 0 otherwise), duration of the current marital/de facto relationship (year, 0 for single people), the number of family members, the number of dependent children under 14, physical functioning, educational attainment (1 for complete year 12, 0 otherwise), income (the logarithmic value of the household financial year disposable income per family member), and labour force status (1 for full time worker and 0 for part timers or unemployed).⁸

Table 1 provides the summary statistics of the variables for the final sample. There are 3,407 people in the treatment group and 16,956 people in the control group. Mean and standard deviations of all variables are measured before the event occurred except that those for age are measured in the year of events occurred

⁷We also use a more stringent sample restriction by limiting the data to individuals assigned in the observation window only once. All key findings remain unchanged. The details are reported as a robustness check in section 5.1.

⁸We only restrict the sample to include people who are employed for the same job in $t - 1$ and t , however, people could be unemployed from $t - 6$ to $t - 2$.

	Treatment	Control	Difference
Mental health			
Mental Health Inventory (MHI-5)	77.42 (14.42)	77.46 (14.49)	-0.04
Demographic background			
Age at the event year (years)	46.09 (11.08)	46.12 (11.03)	-0.03
Female	0.49 (0.50)	0.49 (0.50)	0.003
Foreigner	0.22 (0.42)	0.22 (0.41)	0.005
Speake non-English at home	0.09 (0.29)	0.10 (0.30)	-0.004
Married/de facto	0.77 (0.42)	0.77 (0.42)	0.002
Marriage duration (years)	11.48 (11.75)	11.21 (11.74)	0.26**
Family size	3.04 (1.36)	3.05 (1.38)	-0.007
Number of dependent under 14	0.75 (1.03)	0.75 (1.02)	-0.007
Physical functioning	90.61 (15.72)	90.58 (16.03)	0.04
Socioeconomic background			
College education	0.36 (0.48)	0.36 (0.48)	0.003
Household income per capita (AUD)	57419 (36367)	57298 (35304)	121.2
Labor market conditions			
Full-time worker	0.69 (0.46)	0.69 (0.46)	0.003
Part-time worker	0.27 (0.44)	0.27 (0.44)	-0.002
Share of observations by job insecurity score (%)			
0	24.63	23.53	1.10
1	25.27	24.83	0.44
2	23.80	23.47	0.34
3	10.77	12.76	-1.98***
4	5.22	5.33	-0.11
5	4.99	5.27	-0.28
6	1.70	1.52	0.19
7	1.85	1.41	0.44*
8	1.26	1.04	0.22
9	0.26	0.62	-0.34**
10	0.23	0.24	-0.00
Share of observations by job stress score (%)			
1	16.88	16.83	0.08
2	25.39	24.36	1.03
3	16.06	17.20	-1.15
4	18.78	17.75	1.03
5	13.97	15.05	1.08
6	6.75	6.58	0.17
7	2.17	2.24	0.06
Total number of observations	18,467	91,512	
Number of people	3,407	16,956	

Table 1: Summary statistics by treatment status

Note: The means and standard deviations of all variables are measured before an event occurred unless stated otherwise. Household income is calculated as the total household income divided by the square root of the number of household members to allow for resource sharing within a household. The marital status variable includes those legally married and those in a de facto relationship.

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

and those for the two job conditions in the preceding year. We note that in the absence of life events, there is no difference in the means of mental health between the treatment and control groups. There are no significant differences in the mean of all control variables except for the marriage (including de facto relationship) duration, where the difference between the two groups is 0.26 years or 3 months on average. Also, the distributions of the two job condition variables, job insecurity and job stress, are almost identical across the two groups. In addition to these descriptive statistics in Table 1, we examine whether the job conditions between the treatment and control groups differ significantly before the event. In Table 2, we find no significant difference between two groups in job conditions variables, attesting that the two groups are comparable in terms of job conditions.

	(1)	(2)	(3)	(4)
	Insecurity	Stress	Insecurity	Stress
Treat	-0.042 (0.035)	-0.024 (0.031)	-0.040 (0.035)	-0.012 (0.030)
Controls	NO	NO	YES	YES
N	20,041	20,041	20,041	20,041
R^2	0.000	0.000	0.053	0.067

Table 2: The difference in the job conditions by treatment status

Note: Estimates are based on the data of one year before an event occurred. Standard errors, clustered at the individual level, are in parentheses. Individual characteristics, region fixed effect, year fixed effect, and all other life events are included as control variables. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

3 Empirical Framework

We estimate the impact of the life events using the coefficient on the 'Treat $\times$ After' term, γ , in the following DiD model:

$$y_{ist} = \beta_0 + \beta_1 Treat_{ist} + \beta_2 After_{ist} + \gamma Treat_{ist} \times After_{ist} + X_{ist}\pi + \mu_s + v_t + \varepsilon_{ist} \quad (1)$$

where y_{ist} is mental health of individual i in region s in year t ,⁹ $Treat_{ist}$ is a binary indicator that takes the value of 1 if the individual experienced the event shock during the observation period and 0 otherwise, $After_{ist}$ is a binary indicator for the year of the event and afterward, X_{ist} is a vector of observed characteristics of individual i , and μ_s represents region fixed effects (FEs), and v_t year FEs.

To justify the validity of the proposed approach for our data set, we perform three sets of tests on our data set (namely a balance test, a pre-treatment outcome plot, and a falsification test), and check if there are any inherent level or trend differences between the treatment and control groups outcomes. If the results of

⁹The country is divided into 13 major statistical regions.

these tests indicate the absence of systematic difference in pre-treatment mental health outcomes between the treatment and control group, then we can justifiably attribute any differences in the outcome of interest to the occurrence of the life events.

First, we perform a balance test and present the results in Table 1. The results show that there is no significant difference between the two mean mental health score prior to the occurrence of the events: it is 77.42 for the treatment group and 77.46 for the control group (p -value of the difference is 0.76). We also find no significant difference in other observed variables before the occurrence of life events.

Second, to examine whether there were pre-existing differences in the mental health outcome before the occurrence of any of the aforementioned life events, we perform an event-study using the following equation:

$$y_{ist} = \beta_0 + \beta_1 Treat_{ist} + \sum_{j=-5}^0 \beta_j \tau(j) + \sum_{j=-5}^0 \gamma_j \tau(j) \times Treat_{ist} \quad (2)$$

$$+ X_{ist}\pi + \mu_s + v_t + \varepsilon_{ist}$$

where $\tau(j)$ is a binary indicator of the number of years prior or post the occurrence of any of the five life events. For instance, $\tau(-1)$ has the value of 1 if year t is one year before the events, and 0 otherwise; $\tau(-2)$ has the value of 1 if year t is two years before the events, and 0 otherwise; and so forth.

In Figure 2, we plot the mean of the mental health scores across the treatment and control groups to visually inspect their trends. The figure shows that mental health scores for both groups move closely to each other over the five years before the events, i.e., year $(t - 5)$ to year $(t - 1)$, but only the treatment group exhibits a drop at the event year t while the control group's score remains stable. In Figure 3, we plot the mean and 95% confidence interval for the mental health score of the treatment group relative to the control group, using the estimates of γ_j from equation (1) for $j = -5, -4, \dots, 0$. The difference is normalised to zero at year $t - 1$. Figure 3 shows that the treatment group's mental health score is not statistically different from the control group's before the events but has a discernible drop afterward. Both figures confirm that the means of mental health scores for the treatment and control groups are not significantly different for the five years before the events, and that the pre-treatment trend of their mental health scores are also similar, but the individuals who experienced the life events saw their mental health deteriorate at the very first year when the events occurred. Finally, we conduct a falsification test to further justify our identification strategy. The results, presented in Section 5, support our claim that it is unlikely that unobserved factors may play some role and confound the effects at the year of the events. To summarize, the findings of all these tests support our claim that the DiD approach is appropriate to identify the impact of the life events on the outcome of interest.

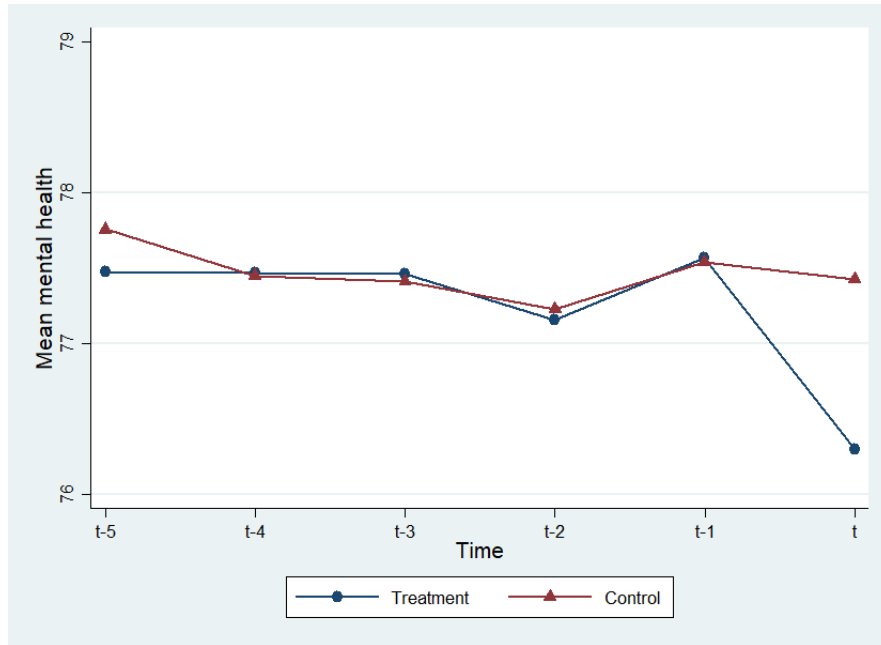


Figure 2: Mean mental health scores of the treatment and control groups

Note: The year of the occurrence of an event is indicated as t. The unit of the timeline is year.

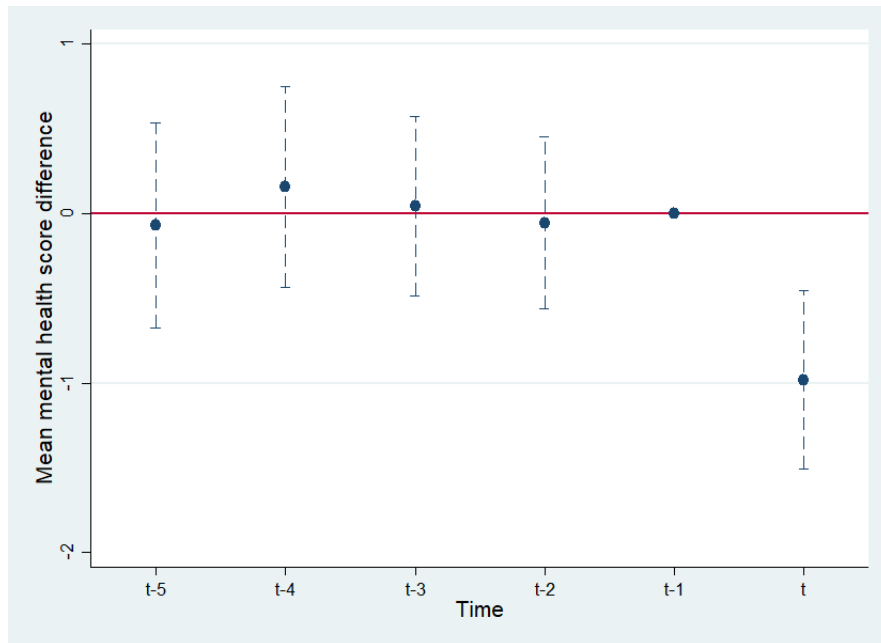


Figure 3: Mean mental health score difference between the treatment and control groups

Note: The coefficients of ' $Treat \times t-j$ ', which measures the mental health difference between the treatment group and the control group relative to baseline period, are presented with the point estimates and 95% confidence intervals after controlling the covariates. The unit of the timeline is year.

Given that our objective is to assess the role of job insecurity and job stress on mental health changes arising from the occurrence of *negative* life events, we expect that high levels of job insecurity and high job stress will amplify the adverse impacts of these shocks on mental health. To test and quantify the amplifying effect of the two job conditions, we implement a triple difference (DDD) analysis, which is an extended DiD framework. As depicted in equation (3), we incorporate three additional interaction terms with the job condition variable. The coefficient on the ‘Treat×After×Job Condition’ term, δ , captures any amplifying effects that the job condition has on the mental health effects of the events, i.e., how the impact varies with different values of the job condition variable.

$$\begin{aligned}
y_{ist} = & \beta_0 + \beta_1 Treat_{ist} + \beta_2 After_{ist} \\
& + \beta_3 JobCondition_{ist} + \gamma Treat_{ist} \times After_{ist} \\
& + \beta_4 Treat_{ist} \times JobCondition_{ist} + \beta_5 After_{ist} \times JobCondition_{ist} \\
& + \delta Treat_{ist} \times After_{ist} \times JobCondition_{ist} \\
& + X_{ist}\pi + \mu_s + v_t + \varepsilon_{ist}
\end{aligned} \tag{3}$$

where $JobCondition_{ist}$ is a measure of job condition of individual i measured at $t - 1$, one year before the events.

4 Results

4.1 Effects of event shocks on mental health

In Table 3, we report the estimation results of the DiD model as described in equation (1). The coefficients on the ‘Treat×After’ term identifies the impact of the life events on mental health. The specifications in the columns differ by FEs and the inclusion of control variables. The results of all four estimations in Table 3 are consistent with each other, and the decrease in mental health score after the events ranges from 0.89 to 1.09 units. The specification of column (4) with FEs and controls is our preferred one because it is most exhaustive in accounting for unobserved time-invariant confounding factors as well as observed time-variant ones. In what follows, we use this specification to estimate the amplifying effect of job conditions, which is the main outcome of interest of our study.

4.2 Amplifier effects of job conditions

Tables 4 presents the heterogeneous effects of the life events on mental health by job insecurity. In column (1), the job insecurity variable enters the model as a ordinal scale variable that moves from one category to another along the Likert scale. In column (1), the coefficient on the ‘Treat×After’ term captures the impact of the events on the mental health of people with a job insecurity score of zero (i.e., perfectly secure), and that on ‘Treat×After×Job Insecurity’ captures the amplifying effect of job insecurity. The latter coefficient is insignificant and, therefore, the associated regression model does not reveal any significant amplifying

	(1)	(2)	(3)	(4)
Treat	-0.040 (0.227)		-0.031 (0.210)	
After	-0.038 (0.086)	-0.022 (0.091)	-0.092 (0.107)	0.034 (0.115)
Treat×After	-1.088*** (0.219)	-1.061*** (0.238)	-0.892*** (0.218)	-0.995*** (0.234)
Model	OLS	FE	OLS	FE
Controls	NO	NO	YES	YES
<i>N</i>	109,979	109,979	109,979	109,979
<i>R</i> ²	0.001	0.670	0.097	0.679

Table 3: The mental health impact of life events

Note: Standard errors, clustered at the individual level, are in parentheses. Individual characteristics, region fixed effect, year fixed effect, and all other life events are included as control variables. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

effect of job insecurity. However, the model in column (1) assumes that the DiD effect and the job insecurity measure are linearly related, but the amplifying effect may only occur at high levels of job insecurity of the job insecurity measure. Thus, we also estimate results using binary indicators for 10 cutoff points of the job insecurity score.

The results for the dichotomized job insecurity measure are reported in columns (2) to (11). For example, in column (2), the binary job insecurity variable has a value of 1 if the job insecurity measure is equal to 1 or above, and 0 otherwise; in column (3), it has a value of 1 if the job security measure is equal to 2 or above, and 0 otherwise; and so forth. As the cutoff point for the binary job insecurity variable changes, the baseline group also changes. As a result, one should be cautious of directly comparing the coefficient of ‘Treat×After×Job Insecurity’ across the columns. To facilitate a direct comparison of the results across columns (2) to (11), we include the overall effect for the treatment group, denoted as the ‘Total effect’, in the table. The total effect is the sum of the baseline and amplifying effects. For instance, the results in column (5) show that, people who have a job insecurity measure of 4 or above are expected to experience a decline in their mental health scores by 1.907 units after the negative life events, and those in column (6) show that the decline deepens to 2.596 units for those with a job insecurity measure of 5 or above. It can be seen that, except for column (8) and, to a less extent, column (7), the total effect estimates in all other columns are highly significant and of the expected negative sign. Excluding the results from columns (7) and (8), the results exhibit a clear monotonic trend in the total effect across columns (2) to (11). We further illustrate the results in Figure 4. The figure shows the baseline effect, amplifying effect, and the total effect and its 95% confidence intervals. The figure highlights the finding that both the amplifying and total effects increase (in absolute terms) steeply when the job insecurity measure reaches the highest end of 8 or above.

Similarly, Table 5 present the estimation results for job stress. In column (1) of Table 5, the coefficient ‘Treat×After×Job Stress’ is significant, unlike the case of job insecurity. In the column, the job stress

variable enters the model like a continuous variable, but it should be reiterated that it is in fact a Likert scale variable having values from 1 to 7. The results in column (1) shows that a one unit increase in job stress can significantly exacerbate the negative impact of the event shock on mental health by 0.499 units. We also estimate results using binary indicators for 6 cutoff points of the job stress score. Again, we compute the total effect as the sum of the coefficients on 'Treat×After' and 'Treat×After×Job Stress'. The total effects in columns (2) to (6) are all negative and significant and display a moderate monotonic trend. In column (7), where the cutoff for the job stress measure is at its highest level, the total effect is insignificant because there are too few workers with this level of job stress (about 2% of total individuals as described in Table 1) to generate a precise estimation. The results are illustrated in Figure 5.

Overall, the results presented in this subsection support our hypothesis that job insecurity and job stress exacerbate the impact of negative life events (shocks) to mental health. In other word, the mental health impact of negative event shocks on workers is highly heterogeneous in the two job conditions.

4.3 Gender differences

Male and female workers may perceive and react to their job conditions differently (Emslie et al., 1999); for instance, males and females tend to have different psychological and biological reaction to stress (Verma et al., 2011). In this case, the amplifying effect of the same job conditions may differ by gender. In this subsection, we explore if there is any gender heterogeneity within the heterogeneity in job conditions that we evidence earlier.

The results for job insecurity by gender are provided in Table 6 and Figure 6 for females and Table 7 and Figure 7 for males. A comparison of these gender-specific results and the full sample results obtained earlier reveals that the full sample result are driven mostly by females. In particular, in Table 6 , the total effect variable is significant at the 1 percent or 5 percent level in 10 out of 11 columns, while in Table 7 , it is significant only at the 10 percent level in two columns.

Likewise, the results for job stress by gender are provided in Table 8 and Figure 8 for females and Table 9 and Figure 9 for males. Once again, the results for females resembles the results for the full sample, indicating that it is the females that drives the full sample result. However, different from job insecurity, there are also some weak evidence that job stress may also affect male workers. In particular, in Table 9 , the amplifying effect term for males is significant at the 5 percent and 10 percent level in columns (3) and (4) respectively, and the total effect term is significant at the 5 percent level in both column and at the 10 percent level in column (7).

Overall, we find that both job insecurity and job stress exacerbate the effect of negative mental shocks mostly for females. This finding may be due to the fact that job insecurity is in general a bigger issue for females than for males because it typically takes a long time for the former to find a new job if they are fired.¹⁰

¹⁰ Although we do not have information regarding how long it takes for a males or a females to find a job in Australia, data from the Australian Bureau of Statistics show that the past decade, males have a higher job mobility than females. For example, in 2017, 8.3% of males changed job, compared to 7% of females.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
After	0.070 (0.148)	0.399** (0.189)	0.105 (0.145)	-0.015 (0.125)	0.021 (0.120)	0.012 (0.118)	0.064 (0.116)	0.059 (0.116)	0.023 (0.115)	0.008 (0.115)	0.027 (0.115)
Treat×After	-0.699** (0.330)	-1.839*** (0.459)	-1.045*** (0.321)	-0.694*** (0.263)	-0.829*** (0.251)	-0.813*** (0.243)	-0.932*** (0.238)	-0.949*** (0.237)	-0.922*** (0.236)	-0.950*** (0.235)	-0.973*** (0.235)
Treat×Job Insecurity	-0.019 (0.052)	-0.480** (0.203)	-0.138 (0.180)	0.175 (0.211)	0.084 (0.277)	0.223 (0.342)	-0.637 (0.490)	-0.748 (0.573)	0.557 (0.672)	2.916*** (1.074)	2.878 (2.097)
Treat×After×Job Insecurity	-0.157 (0.135)	1.110** (0.534)	0.096 (0.469)	-1.134** (0.566)	-1.079 (0.689)	-1.783** (0.874)	-1.135 (1.232)	-1.233 (1.442)	-4.090** (1.927)	-6.666*** (2.217)	-9.010*** (3.464)
Total effect		-0.729*** (0.272)	-0.949*** (0.342)	-1.828*** (0.502)	-1.907*** (0.642)	-2.596*** (0.839)	-2.067* (1.208)	-2.182 (1.422)	-5.012*** (1.912)	-7.617*** (2.205)	-9.984*** (3.455)
Job insecurity (cutoff point)	(cont.)	(≥1)	(≥2)	(≥3)	(≥4)	(≥5)	(≥6)	(≥7)	(≥8)	(≥9)	(≥10)
N	109,979	109,979	109,979	109,979	109,979	109,979	109,979	109,979	109,979	109,979	109,979
R ²	0.679	0.679	0.679	0.679	0.679	0.679	0.679	0.679	0.679	0.679	0.679

Table 4: The mental health impact of life events by job insecurity

Note: Clustered standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The ‘Total effect’ for the high job insecurity group is the sum of the coefficients of ‘Treat×After’ and ‘Treat×After×Job Insecurity’.

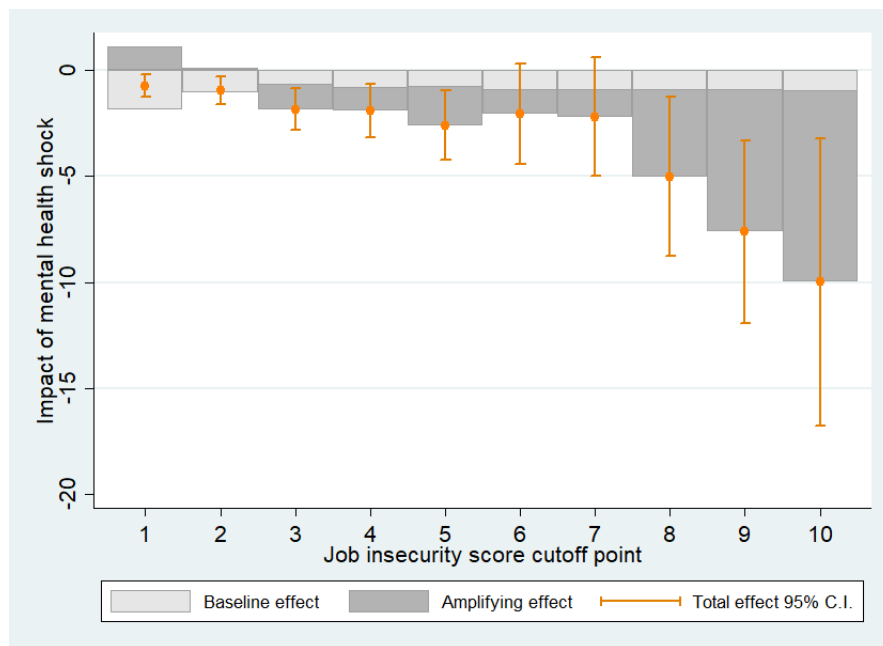


Figure 4: Amplifying effects of job insecurity

Note: The data are sourced from columns (2) to (11) of Table 4. The ‘Baseline effect’ is the coefficient on ‘Treat×After’, the ‘Amplifying effect’ that on ‘Treat×After×Job Insecurity’, and the ‘Total effect’ is the sum of the two. Only the 95% confidence intervals of the ‘Total effect’ are shown here.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
After	-0.115 (0.209)	0.144 (0.219)	-0.113 (0.151)	-0.038 (0.134)	-0.026 (0.123)	0.032 (0.117)	0.044 (0.115)
Treat×After	0.587 (0.499)	0.165 (0.532)	-0.040 (0.342)	-0.354 (0.288)	-0.720*** (0.262)	-0.877*** (0.243)	-0.985*** (0.237)
Treat×Job Stress	0.046 (0.058)	-0.134 (0.228)	0.250 (0.180)	0.172 (0.185)	0.250 (0.221)	0.025 (0.357)	-0.425 (0.778)
Treat×After×Job Stress	0.499*** (0.148)	-1.394** (0.592)	-1.651*** (0.468)	-1.540*** (0.486)	-1.189** (0.579)	-1.321 (0.906)	-0.492 (1.648)
Total effect		-1.229*** (0.260)	-1.691*** (0.319)	-1.894*** (0.391)	-1.909*** (0.516)	-2.198** (0.873)	-1.477 (1.631)
Job stress (cutoff point)	(cont.)	(≥2)	(≥3)	(≥4)	(≥5)	(≥6)	(≥7)
<i>N</i>	109,979	109,979	109,979	109,979	109,979	109,979	109,979
<i>R</i> ²	0.679	0.679	0.679	0.679	0.679	0.679	0.679

Table 5: The mental health impact of life events by job stress

Note: Clustered standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The 'Total effect' for the high job stress group is the sum of the coefficients of 'Treat×After' and 'Treat×After×Job Stress'.

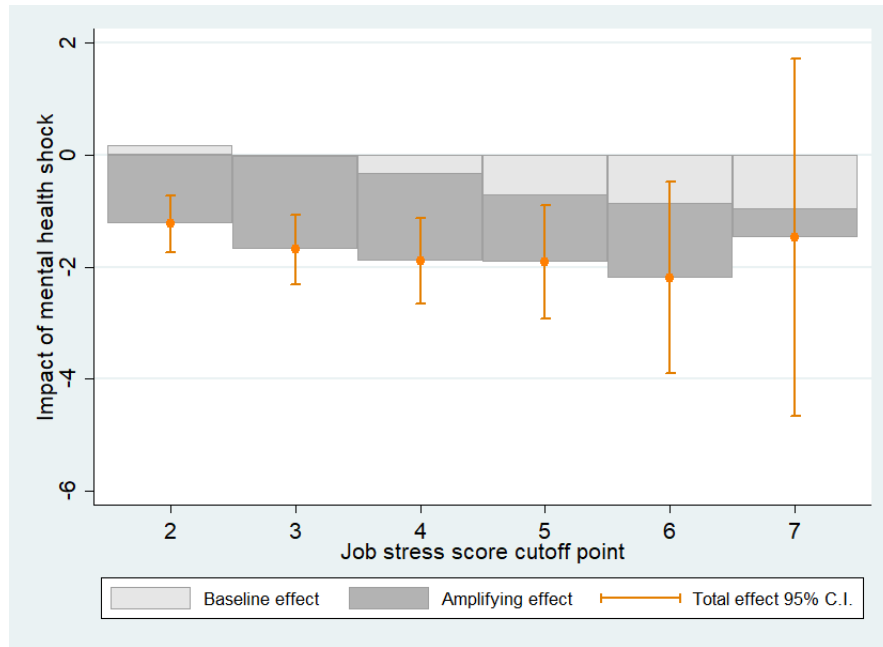


Figure 5: Amplifying effects of job stress

Note: The data are sourced from columns (2) to (7) of Table 5. The 'Baseline effect' is the coefficient on 'Treat×After', the 'Amplifying effect' that on 'Treat×After×Job Stress', and the 'Total effect' is the sum of the two. Only the 95% confidence intervals of the 'Total effect' are shown here.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
After	-0.259 (0.221)	0.084 (0.274)	-0.250 (0.215)	-0.283 (0.190)	-0.209 (0.182)	-0.171 (0.179)	-0.151 (0.176)	-0.112 (0.175)	-0.154 (0.174)	-0.186 (0.173)	-0.163 (0.173)
Treat×After	-0.762 (0.499)	-1.689** (0.678)	-1.146** (0.485)	-1.045*** (0.400)	-1.255*** (0.384)	-1.278*** (0.369)	-1.484*** (0.362)	-1.546*** (0.359)	-1.523*** (0.359)	-1.551*** (0.358)	-1.584*** (0.358)
Treat×Job Insecurity	0.062 (0.077)	-0.311 (0.296)	0.219 (0.271)	0.535* (0.325)	0.423 (0.416)	0.262 (0.506)	0.136 (0.742)	-0.999 (0.891)	0.442 (0.972)	4.346*** (1.460)	8.017*** (2.157)
Treat×After×Job Insecurity	-0.463** (0.207)	0.099 (0.798)	-0.967 (0.713)	-2.236*** (0.862)	-2.302** (1.027)	-3.219** (1.325)	-2.467 (1.890)	-1.906 (2.486)	-5.390* (3.269)	-10.109*** (3.375)	-12.216*** (4.326)
Total effect		-1.590*** (0.420)	-2.113*** (0.524)	-3.281*** (0.765)	-3.557*** (0.953)	-4.497*** (1.273)	-3.952** (1.855)	-3.452 (2.460)	-6.913** (3.250)	-11.660*** (3.355)	-13.800*** (4.311)
Job insecurity (cutoff point)	(cont.)	(≥1)	(≥2)	(≥3)	(≥4)	(≥5)	(≥6)	(≥7)	(≥8)	(≥9)	(≥10)
N	53,658	53,658	53,658	53,658	53,658	53,658	53,658	53,658	53,658	53,658	53,658
R ²	0.664	0.664	0.664	0.664	0.664	0.664	0.664	0.664	0.664	0.664	0.664

Table 6: The mental health impact of life events by job insecurity (females)

Note: Clustered standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Total effect is for high job insecurity group the sum of the coefficients of 'Treat×After' and 'Treat×After×Job Insecurity'.

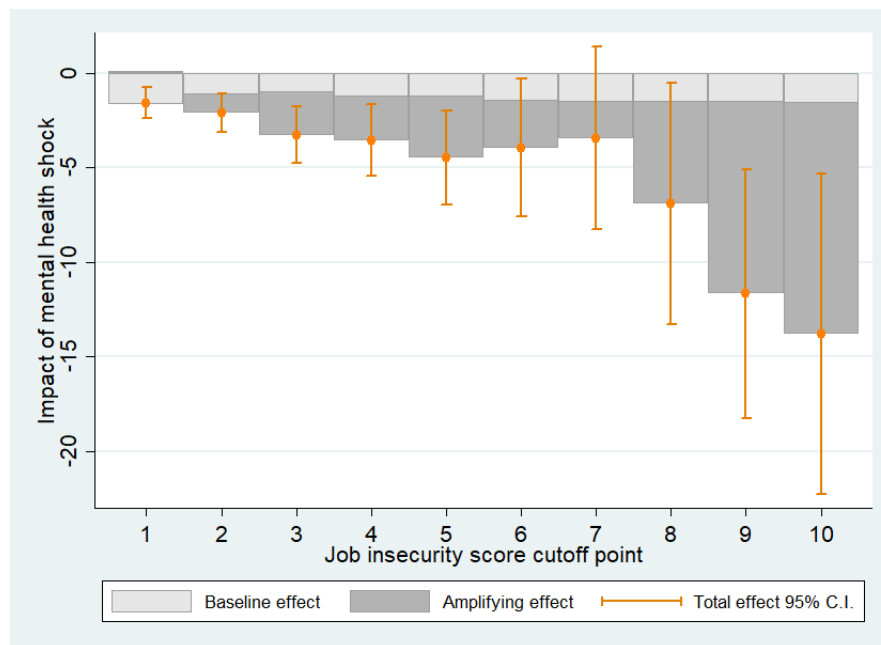


Figure 6: Amplifying effect of job insecurity (females)

Note: The data are sourced from columns (2) to (11) of Table 6. The 'Baseline effect' is the coefficient on 'Treat×After', the 'Amplifying effect' that on 'Treat×After×Job Insecurity', and the 'Total effect' is the sum of the two. Only the 95% confidence intervals of the 'Total effect' are shown here.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
After	0.343* (0.195)	0.637** (0.257)	0.397** (0.193)	0.211 (0.164)	0.214 (0.156)	0.165 (0.154)	0.255* (0.153)	0.206 (0.153)	0.179 (0.152)	0.179 (0.152)	0.195 (0.152)
Treat×After	-0.689 (0.424)	-2.019*** (0.597)	-0.967** (0.415)	-0.381 (0.340)	-0.451 (0.326)	-0.399 (0.317)	-0.443 (0.311)	-0.413 (0.311)	-0.384 (0.308)	-0.409 (0.306)	-0.424 (0.305)
Treat×Job Insecurity	-0.076 (0.070)	-0.567** (0.275)	-0.378 (0.239)	-0.066 (0.274)	-0.148 (0.367)	0.247 (0.462)	-1.297** (0.642)	-0.463 (0.726)	0.615 (0.914)	1.353 (1.530)	-1.966 (2.956)
Treat×After×Job Insecurity	0.128 (0.170)	2.019*** (0.693)	1.006* (0.609)	-0.208 (0.738)	0.097 (0.910)	-0.352 (1.114)	0.202 (1.551)	-0.562 (1.515)	-2.784 (2.101)	-3.796 (2.853)	-7.408* (4.170)
Total effect		-0.000 (0.352)	0.038 (0.444)	-0.589 (0.655)	-0.355 (0.850)	-0.752 (1.067)	-0.241 (1.520)	-0.976 (1.482)	-3.168 (2.079)	-4.206 (2.837)	-7.832* (4.160)
Job insecurity (cutoff point)	(cont.)	(≥1)	(≥2)	(≥3)	(≥4)	(≥5)	(≥6)	(≥7)	(≥8)	(≥9)	(≥10)
N	56,321	56,321	56,321	56,321	56,321	56,321	56,321	56,321	56,321	56,321	56,321
R ²	0.695	0.695	0.695	0.695	0.695	0.695	0.695	0.695	0.695	0.695	0.695

Table 7: The mental health impact of life events by job insecurity (males)

Note: Clustered standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The ‘Total effect’ for the high job insecurity group is the sum of the coefficients of ‘Treat×After’ and ‘Treat×After×Job Insecurity’.

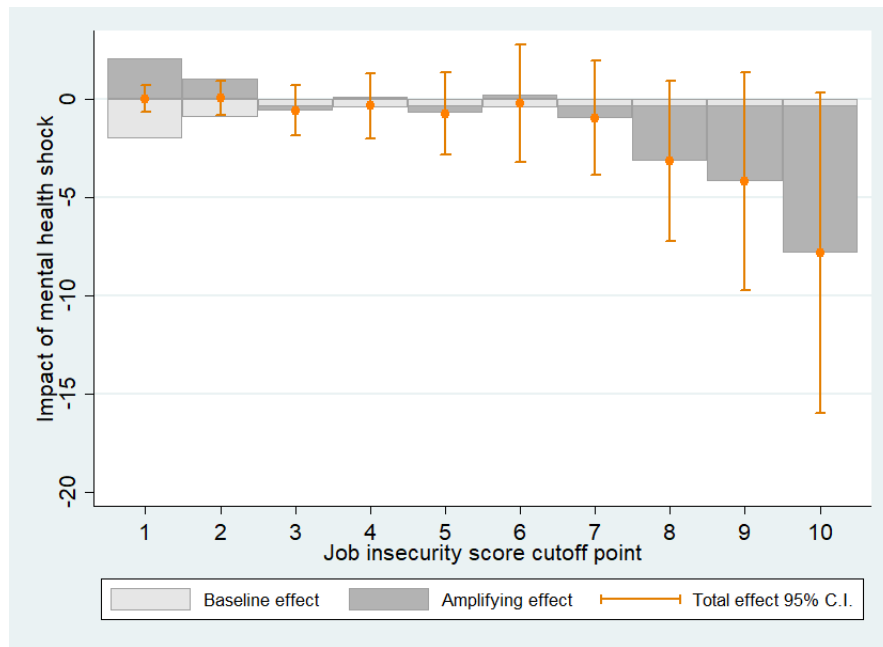


Figure 7: Amplifying effect of job insecurity (males)

Note: The data are sourced from columns (2) to (11) of Table 7. The ‘Baseline effect’ is the coefficient on ‘Treat×After’, the ‘Amplifying effect’ that on ‘Treat×After×Job Insecurity’, and the ‘Total effect’ is the sum of the two. Only the 95% confidence intervals of the ‘Total effect’ are shown here.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
After	-0.283 (0.299)	-0.181 (0.296)	-0.418* (0.222)	-0.248 (0.200)	-0.196 (0.188)	-0.110 (0.178)	-0.075 (0.174)
Treat×After	0.286 (0.752)	-0.121 (0.810)	-0.378 (0.537)	-0.787* (0.449)	-1.190*** (0.408)	-1.479*** (0.376)	-1.668*** (0.362)
Treat×Job Stress	0.043 (0.082)	0.045 (0.314)	0.473* (0.268)	0.249 (0.277)	0.203 (0.320)	-0.333 (0.492)	-2.314** (1.050)
Treat×After×Job Stress	-0.597*** (0.214)	-1.820** (0.902)	-2.155*** (0.717)	-1.969*** (0.732)	-1.758** (0.837)	-1.334 (1.198)	1.811 (2.182)
Total effect		-1.941*** (0.397)	-2.534*** (0.476)	-2.756*** (0.578)	-2.947*** (0.732)	-2.812** (1.138)	0.143 (2.152)
Job stress (cutoff point)	(cont.)	(≥2)	(≥3)	(≥4)	(≥5)	(≥6)	(≥7)
N	53,658	53,658	53,658	53,658	53,658	53,658	53,658
R ²	0.664	0.664	0.664	0.664	0.664	0.664	0.664

Table 8: The mental health impact of life events by job stress (females)

Note: Clustered standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The ‘Total effect’ for the high job stress group is the sum of the coefficients of ‘Treat×After’ and ‘Treat×After×Job Stress’.

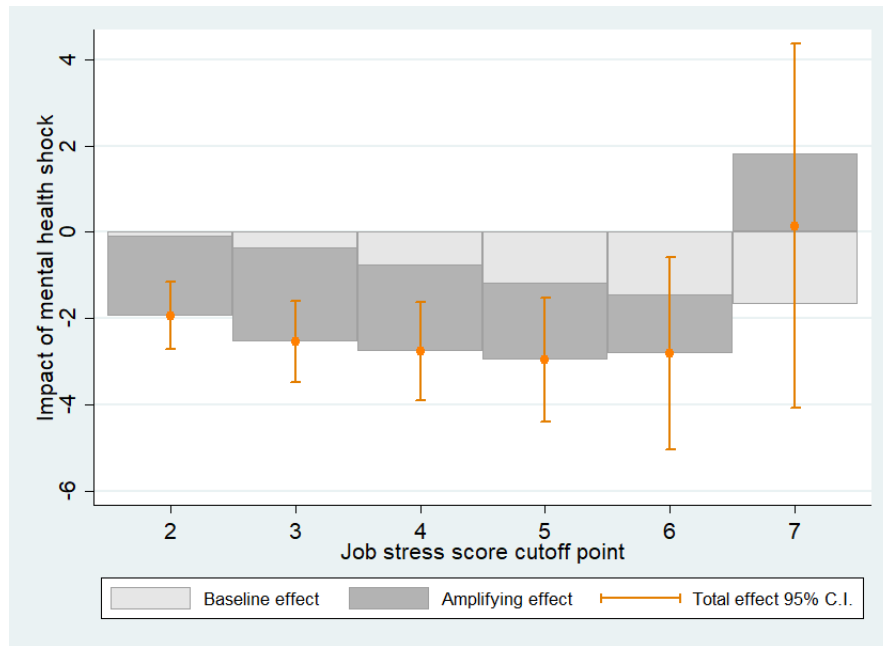


Figure 8: Amplifying effect of job stress (females)

Note: The data are sourced from columns (2) to (7) of Table 8. The ‘Baseline effect’ is the coefficient on ‘Treat×After’, the ‘Amplifying effect’ that on ‘Treat×After×Job Stress’, and the ‘Total effect’ is the sum of the two. Only the 95% confidence intervals of the ‘Total effect’ are shown here.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
After	0.003 (0.290)	0.441 (0.326)	0.147 (0.205)	0.139 (0.178)	0.117 (0.161)	0.155 (0.153)	0.147 (0.151)
Treat×After	0.820 (0.651)	0.501 (0.672)	0.272 (0.425)	0.033 (0.366)	-0.302 (0.334)	-0.349 (0.311)	-0.375 (0.307)
Treat×Job Stress	0.059 (0.081)	-0.295 (0.334)	0.073 (0.241)	0.121 (0.247)	0.324 (0.303)	0.468 (0.518)	2.521** (1.080)
Treat×After×Job Stress	-0.398** (0.201)	-1.113 (0.752)	-1.215** (0.602)	-1.136* (0.640)	-0.605 (0.793)	-1.135 (1.379)	-3.718 (2.355)
Total effect		-0.613* (0.339)	-0.942** (0.425)	-1.103** (0.524)	-0.907 (0.719)	-1.484 (1.343)	-4.093* (2.335)
Job stress (cutoff point)	(cont.)	(≥2)	(≥3)	(≥4)	(≥5)	(≥6)	(≥7)
<i>N</i>	56,321	56,321	56,321	56,321	56,321	56,321	56,321
<i>R</i> ²	0.695	0.695	0.695	0.695	0.695	0.695	0.695

Table 9: The mental health impact of life events by job stress (males)

Note: Clustered standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The 'Total effect' for the high job stress group is the sum of the coefficients of 'Treat×After' and 'Treat×After×Job Stress'.

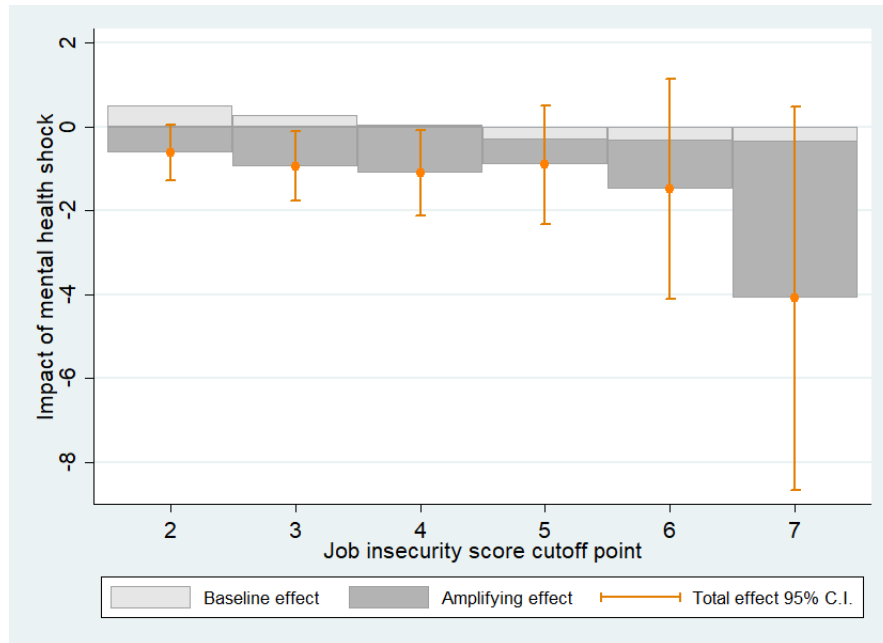


Figure 9: Amplifying effect of job stress (males)

Note: The data are sourced from columns (2) to (7) of Table 9. The 'Baseline effect' is the coefficient on 'Treat×After', the 'Amplifying effect' that on 'Treat×After×Job Stress', and the 'Total effect' is the sum of the two. Only the 95% confidence intervals of the 'Total effect' are shown here.

5 Robustness checks

In this section, we examine the robustness of the main results using an array of tests. Specifically, we conduct (i) a test for the robustness of the main results using a more stringent sample restriction process; (ii) a falsification test using commuting time as an alternative outcome; and (iii) two placebo tests with random assignment of the treatment and amplifiers, respectively.

5.1 Robustness to sample restriction

To confirm whether our main results are robust to sample restriction, we use a different sample restriction process to that performed in Section 2.2. We redefine the treatment group as those who experienced any of the five events *for the first time during the data period* (i.e., 2005 to 2019) and include their observations from 2002 to to the year the event occurred. That is, we analyze the data from the first year available from the HILDA to the year in which an individual first experienced one of the events. We also redefine the control group as those who had never experienced any of the five life events during the same observation window. In addition, a person can be *included in the observation window only once*. That is, once the person is selected into either the treatment group or the control group for a certain event year, the person will not be included in the remaining sample selection process. All other conditions are the same as our main sample restriction process. Once again, we perform the PSM (the nearest neighbor method with replacement and a caliper of 0.01 based on the logit specification) for all event years from 2005 to 2019. The final sample for this robustness test contains 46,973 observations of 8,421 people, roughly about 40 percent the size of the original sample.

Based on this new sample restriction, we re-do the balance test and find no difference in means of mental health between the treatment and control group prior to the occurrence of the event with a p -value of 0.67. Also, we find no significant difference in job conditions between the treatment and control groups before the event. We then replicate all the analyses performed in Section 4. As seen in Figures 10 and 11 (and Figure 12 and Tables 16 to 22 in the appendix),¹¹ all the results are consistent with the our main results. That is, for people who experienced negative life events (as defined in the main specification), being in an insecure or stressful job exacerbates the adverse impact of these life events on their mental health.

¹¹Tables 19 to 22 in the appendix provide the gender specific results with the new sample restrictions. Except for the job insecurity results for male, all the results are qualitatively similar to the original results.

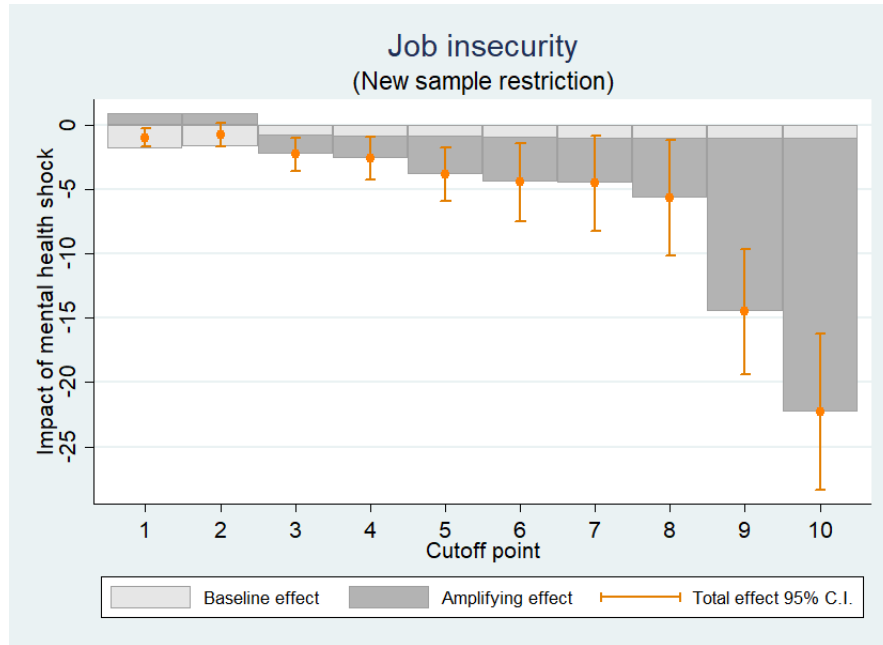


Figure 10: Amplifying effects of job insecurity (new sample restriction)

Note: The data are sourced from columns (2) to (11) of Table 17 in the appendix. The 'Baseline effect' is the coefficient on 'Treat×After', the 'Amplifying effect' that on 'Treat×After×Job Insecurity', and the 'Total effect' is the sum of the two. Only the 95% confidence intervals of the 'Total effect' are shown here.

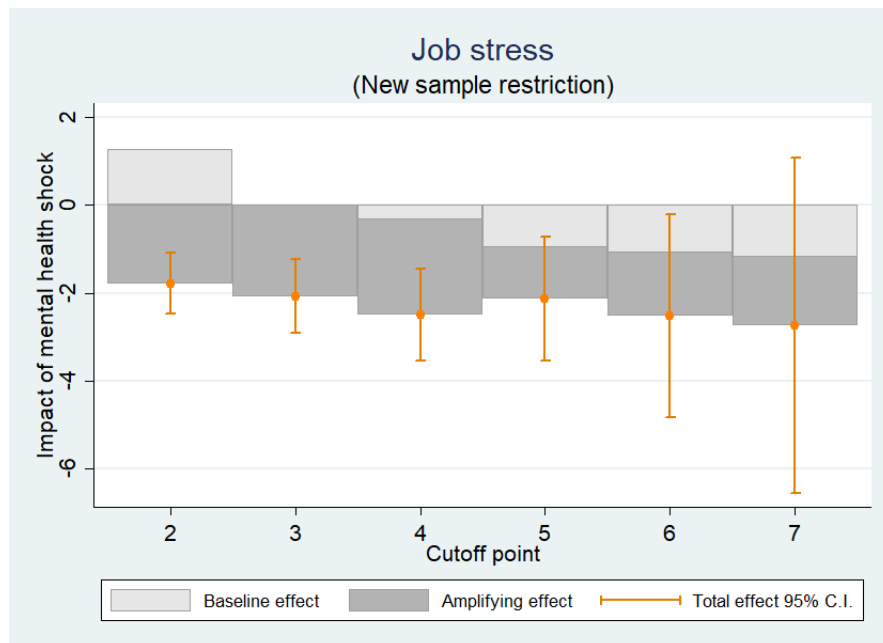


Figure 11: Amplifying effects of job stress (new sample restriction)

Note: The data are sourced from columns (2) to (11) of Table 18 in the appendix. The 'Baseline effect' is the coefficient on 'Treat×After', the 'Amplifying effect' that on 'Treat×After×Job Stress', and the 'Total effect' is the sum of the two. Only the 95% confidence intervals of the 'Total effect' are shown here.

5.2 Falsification test

The falsification test uses the same event as in the main result section, however, we investigate an outcome that should be affected neither by the events nor by the job conditions. The falsification test aims to test if the previously identified mental health impacts and the amplifying effects of the job conditions will cease to exist when we use an outcome that *should not be affected* by the event and the job conditions. The rationale for the test is that, if the main results were driven by some unobserved confounding factors rather than the occurrence of life events and the adverse job conditions, then these same omitted factors could potentially affect a seemingly irrelevant alternative outcome. Therefore, the presence of any significant results for the life events or job conditions variables can be considered as evidence that would invalidate our main results. For that purpose, we choose the time spent on traveling to and from the place of paid employment in a typical week as an alternative outcome. Since we restrict the sample to those who work at the same job at least one year prior to the event and the year the events occurred, the commuting time (measured in hours) should not be affected by the events and the amplifier. The results in Table 10 and Table 11 bear out this prediction entirely as no single DiD or DDD effect item is significant at the standard levels.

5.3 Placebo tests

We perform two placebo tests using the five events together, one for examining the DiD effect and the other one for examining the amplifying effect of the job conditions. One way to perform a placebo test on the DiD effect is to exclude the treatment group from the sample and to randomly construct a placebo treatment group from the control group. As the control group is not exposed to the events, the placebo treatment group should register no mental health impact from the life events and thus, no amplifying effect from the job conditions. That is exactly what we see in the results presented in Tables 12 and 13.

For the second test, we construct placebo amplifiers by randomly assigning job insecurity and job stress scores to people but maintaining the original distributions of the two scores. The results in Tables 14 and 15 show that, as expected, there is no amplifying effect from the placebo job conditions on the impact of the mental health shock.¹²

¹²It should be noticed that the DiD effect remains significant for most columns because the treatment group is the same as the original one in this second placebo test.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
After	-0.007 (0.044)	-0.083 (0.057)	-0.049 (0.043)	-0.012 (0.038)	0.027 (0.036)	0.021 (0.036)	0.021 (0.035)	0.021 (0.035)	0.019 (0.035)	0.020 (0.035)	0.014 (0.034)
Treat×After	-0.068 (0.094)	0.098 (0.132)	-0.028 (0.092)	-0.052 (0.076)	-0.084 (0.072)	-0.073 (0.070)	-0.085 (0.068)	-0.073 (0.067)	-0.068 (0.067)	-0.063 (0.067)	-0.058 (0.067)
Treat×Job Insecurity	0.011 (0.015)	0.129** (0.062)	0.124** (0.055)	0.097 (0.065)	-0.075 (0.083)	-0.059 (0.101)	-0.130 (0.141)	-0.174 (0.162)	-0.204 (0.185)	-0.503 (0.314)	0.237 (0.597)
Treat×After×Job Insecurity	0.004 (0.037)	-0.208 (0.153)	-0.062 (0.133)	-0.026 (0.155)	0.150 (0.186)	0.124 (0.231)	0.476 (0.323)	0.359 (0.399)	0.402 (0.522)	0.072 (0.636)	-1.049 (0.980)
Total effect		-0.110 (0.077)	-0.090 (0.096)	-0.078 (0.135)	0.066 (0.172)	0.051 (0.221)	0.391 (0.316)	0.286 (0.393)	0.334 (0.518)	0.009 (0.632)	-1.107 (0.977)
Job insecurity (cutoff point)	(cont.)	(≥1)	(≥2)	(≥3)	(≥4)	(≥5)	(≥6)	(≥7)	(≥8)	(≥9)	(≥10)
<i>N</i>	103,073	103,073	103,073	103,073	103,073	103,073	103,073	103,073	103,073	103,073	103,073
<i>R</i> ²	0.612	0.612	0.612	0.612	0.612	0.612	0.612	0.612	0.612	0.612	0.612

Table 10: Falsification tests for job insecurity (commuting time)

Note: Clustered standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The ‘Total effect’ for the high job insecurity group is the sum of the coefficients of ‘Treat×After’ and ‘Treat×After×Job Insecurity’.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
After	-0.013 (0.060)	0.001 (0.062)	0.002 (0.044)	-0.024 (0.040)	0.027 (0.037)	0.021 (0.035)	0.008 (0.034)
Treat×After	0.013 (0.141)	-0.107 (0.145)	-0.059 (0.099)	-0.000 (0.086)	-0.049 (0.076)	-0.052 (0.070)	-0.046 (0.067)
Treat×Job Stress	0.009 (0.016)	0.017 (0.066)	0.022 (0.055)	0.095* (0.057)	-0.049 (0.064)	-0.072 (0.093)	0.326 (0.199)
Treat×After×Job Stress	-0.023 (0.040)	0.056 (0.163)	-0.003 (0.134)	-0.146 (0.136)	-0.056 (0.159)	-0.098 (0.229)	-0.709 (0.515)
Total effect		-0.051 (0.074)	-0.062 (0.090)	-0.146 (0.105)	-0.105 (0.140)	-0.150 (0.278)	-0.755 (0.510)
Job stress (cutoff point)	(cont.)	(≥2)	(≥3)	(≥4)	(≥5)	(≥6)	(≥7)
<i>N</i>	103,073	103,073	103,073	103,073	103,073	103,073	103,073
<i>R</i> ²	0.612	0.612	0.612	0.612	0.612	0.612	0.612

Table 11: Falsification tests for job stress (commuting time)

Note: Clustered standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The ‘Total effect’ for the high job stress group is the sum of the coefficients of ‘Treat×After’ and ‘Treat×After×Job Stress’.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
After	0.002 (0.162)	0.368* (0.206)	0.085 (0.159)	-0.089 (0.138)	-0.052 (0.132)	-0.069 (0.129)	-0.001 (0.128)	-0.009 (0.127)	-0.040 (0.127)	-0.058 (0.126)	-0.037 (0.126)
Treat×After	0.301 (0.341)	0.131 (0.476)	0.017 (0.337)	0.335 (0.273)	0.325 (0.254)	0.369 (0.248)	0.285 (0.244)	0.299 (0.243)	0.275 (0.242)	0.291 (0.240)	0.278 (0.240)
Treat×Job Insecurity	-0.016 (0.057)	-0.525** (0.221)	-0.222 (0.198)	0.212 (0.231)	0.141 (0.303)	0.376 (0.374)	-0.595 (0.538)	-0.623 (0.631)	0.514 (0.745)	3.208*** (1.214)	2.698 (2.276)
Treat×After×Job Insecurity	-0.012 (0.138)	0.200 (0.550)	0.506 (0.479)	-0.199 (0.559)	-0.314 (0.740)	-0.972 (0.908)	-0.238 (1.272)	-0.824 (1.464)	0.263 (1.672)	-1.698 (2.512)	1.654 (5.498)
Total effect		0.331 (0.276)	0.523 (0.340)	0.136 (0.488)	0.011 (0.695)	-0.603 (0.874)	0.047 (1.249)	-0.525 (1.444)	0.538 (1.655)	-1.407 (2.501)	1.932 (5.493)
Job insecurity (cutoff point)	(cont.)	(≥1)	(≥2)	(≥3)	(≥4)	(≥5)	(≥6)	(≥7)	(≥8)	(≥9)	(≥10)
<i>N</i>	91,512	91,512	91,512	91,512	91,512	91,512	91,512	91,512	91,512	91,512	91,512
<i>R</i> ²	0.682	0.682	0.682	0.682	0.682	0.682	0.682	0.682	0.682	0.682	0.682

Table 12: Placebo tests for job insecurity (random assignment of treatment)

Note: Clustered standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The ‘Total effect’ for the high job insecurity group is the sum of the coefficients of ‘Treat×After’ and ‘Treat×After×Job Insecurity’.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
After	-0.158 (0.230)	0.110 (0.242)	-0.156 (0.166)	-0.052 (0.147)	-0.060 (0.135)	0.014 (0.128)	0.018 (0.126)
Treat×After	0.184 (0.519)	0.152 (0.530)	0.168 (0.357)	-0.006 (0.305)	0.104 (0.275)	0.005 (0.254)	0.049 (0.247)
Treat×Job Stress	0.054 (0.064) (0.063)	-0.118 (0.252) (0.249)	0.289 (0.197) (0.198)	0.156 (0.202) (0.204)	0.304 (0.241) (0.242)	-0.015 (0.394) (0.391)	-0.267 (0.890) (0.821)
Treat×After×Job Stress	-0.050 (0.153)	-0.154 (0.597)	-0.245 (0.488)	0.069 (0.506)	-0.330 (0.597)	0.201 (0.935)	-0.744 (1.832)
Total effect		-0.002 (0.275)	-0.077 (0.334)	0.063 (0.404)	-0.226 (0.530)	0.206 (0.890)	-0.695 (1.816)
Job stress (cutoff point)	(cont.)	(≥2)	(≥3)	(≥4)	(≥5)	(≥6)	(≥7)
<i>N</i>	91,512	91,512	91,512	91,512	91,512	91,512	91,512
<i>R</i> ²	0.682	0.682	0.682	0.682	0.682	0.682	0.682

Table 13: Placebo tests for job stress (random assignment of treatment)

Note: Clustered standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The ‘Total effect’ for the high job stress group is the sum of the coefficients of ‘Treat×After’ and ‘Treat×After×Job Stress’.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
After	-0.199 (0.149)	0.059 (0.199)	-0.141 (0.150)	-0.101 (0.128)	-0.033 (0.121)	-0.018 (0.119)	-0.016 (0.117)	-0.009 (0.116)	0.010 (0.115)	0.017 (0.115)	0.027 (0.115)
Treat×After	-0.662* (0.338)	-0.374 (0.474)	-0.737** (0.330)	-0.878*** (0.275)	-0.887*** (0.255)	-0.945*** (0.247)	-0.956*** (0.240)	-0.972*** (0.238)	-0.986*** (0.236)	-0.964*** (0.235)	-0.992*** (0.235)
Treat×Job Insecurity	0.121** (0.048)	-0.033 (0.213)	0.341* (0.181)	0.482** (0.198)	0.431* (0.246)	0.510* (0.295)	1.016** (0.400)	1.287*** (0.470)	1.253** (0.612)	2.193** (0.910)	3.087 (1.946)
Treat×After×Job Insecurity	-0.173 (0.130)	-0.815 (0.545)	-0.501 (0.469)	-0.416 (0.528)	-0.699 (0.653)	-0.495 (0.779)	-0.764 (1.118)	-0.701 (1.333)	-0.398 (2.060)	-3.730 (3.448)	-1.833 (4.512)
Total effect		-1.189*** (0.270)	-1.238*** (0.333)	-1.295*** (0.451)	-1.586*** (0.601)	-1.440* (0.739)	-1.720 (1.092)	-1.673 (1.311)	-1.385 (2.046)	-4.695 (3.440)	-2.825 (4.506)
Job insecurity (cutoff point)	(cont.)	(≥1)	(≥2)	(≥3)	(≥4)	(≥5)	(≥6)	(≥7)	(≥8)	(≥9)	(≥10)
N	109,979	109,979	109,979	109,979	109,979	109,979	109,979	109,979	109,979	109,979	109,979
R ²	0.679	0.679	0.679	0.679	0.679	0.679	0.679	0.679	0.679	0.679	0.679

Table 14: Placebo tests for job insecurity (random assignment of amplifier)

Note: Clustered standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The ‘Total effect’ for the high job insecurity group is the sum of the coefficients of ‘Treat×After’ and ‘Treat×After×Job Insecurity’.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
After	0.185 (0.211)	0.015 (0.229)	0.157 (0.158)	0.116 (0.138)	0.039 (0.126)	0.031 (0.118)	0.062 (0.115)
Treat×After	-1.038** (0.519)	-0.838 (0.559)	-0.961*** (0.367)	-0.992*** (0.309)	-1.060*** (0.272)	-1.018*** (0.245)	-1.002*** (0.237)
Treat×Job Stress	-0.047 (0.055)	0.023 (0.239)	-0.210 (0.184)	-0.197 (0.182)	-0.020 (0.208)	0.035 (0.312)	-1.235* (0.632)
Treat×After×Job Stress	0.013 (0.145)	-0.189 (0.616)	-0.062 (0.477)	-0.008 (0.475)	0.273 (0.537)	0.272 (0.857)	0.339 (1.687)
Total effect		-1.027*** (0.258)	-1.022*** (0.305)	-1.001*** (0.360)	-0.786* (0.463)	-0.747 (0.822)	-0.663 (1.670)
Job stress (cutoff point)	(cont.)	(≥2)	(≥3)	(≥4)	(≥5)	(≥6)	(≥7)
N	109,979	109,979	109,979	109,979	109,979	109,979	109,979
R ²	0.679	0.679	0.679	0.679	0.679	0.679	0.679

Table 15: Placebo tests for job stress (random assignment of amplifier)

Note: Clustered standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The ‘Total effect’ for the high job stress group is the sum of the coefficients of ‘Treat×After’ and ‘Treat×After×Job Stress’.

6 Conclusions

Workplace is one of the most important venues where social interaction take places. Therefore, job conditions could be important to the mental health of working people and, thus, their resilience to mental health shocks. It also can have an indirect impact on the mental health of their family members and thus have effects that expands outside the workers circle. There is a large body of literature that investigates the impact of job-related stress and job insecurity on mental health and wellbeing however, little is known on the moderating/amplifying role of job attributes on changes in mental health and wellbeing arising from the occurrence of adverse life events. In this paper we fill this gap in the literature by investigating two job attributes: job insecurity and job-related stress.

By focusing on life events that do not have any impact on labour market outcomes and carefully defining treatment and control groups, we were able to identify the impact of exogenous mental health shocks. This, in turn, allowed us to highlight how job insecurity and job-related stress could exacerbate the adverse effects of negative life events on mental health. Indeed, people who are already weighted down by job insecurity and job-related stress are likely to have less mental strength reserve to deal with the consequence's adverse shocks, even if those shocks are not related to their employment. Another noteworthy finding is that job insecurity and job stress have different amplifying effects on males and females. Both job insecurity and job stress are found to exacerbate the effect of negative mental shocks for females while only job stress has some weak exacerbation effect for males. The findings suggest that female worker's mental health reaction to life events are more strongly affected by their job conditions, and the role of job insecurity is particularly important for them. Even if job conditions cannot be altered for some reasons, it may still be possible to mitigate their adverse effects using better work place practice. For example, social support was found to mitigate the impact of job stress, especially for female (Rivera-Torres et al., 2013).

The findings of this paper speak against the trend of declining job security disguised as labour market flexibility or the acceptance of work-related stress as a natural by-product of efficiency-inducing competition. As such, the paper lends its support to campaigns for a more secure and more sustainable work environment and culture. Obviously, job insecurity and job stress have direct effects on workers' mental health which in turn may affect their productivity. If they also have amplifying effects on work-unrelated mental health shocks, this will add another reason of why it is crucial to maintain work-life balance.

Appendix

As described in Section 5.1, we use more stringent sample restrictions and replicate all analyses performed in Section 4 to test the robustness of the main results. Figure 12 shows that there is no significant pre-treatment difference in mental health scores between the treatment and control groups, and as seen in Table 16, the mental health score of treated individuals decreases by 0.8 units to 1.3 units after the events compared to those in the control group.

In Table 17, the negative impact of the events for the individuals with less job security (i.e., the total effect) increases steeply across columns (2) to (11). Also, overall, the impact is much greater than the results in Table 4. For example, the total effect increases (in absolute terms) from 0.73 units to 9.98 units in Table 4, while the total effect increases from -1.00 units to -22.28 units in Table 17. Since we restrict the sample to those who experience the events for the first time during the entire data period of 18 years, the estimated impact of the negative shocks can be greater than the main results, as these people had no (observed) prior experience with handling such events. Similarly, as seen in Table 18, the results for the job stress are also consistent with the main results.

Tables 19 to 22 present the results for job insecurity and job stress by gender. Although columns (9) to (11) indicate that the impact of the life events is substantial for males with the most insecure jobs, we find that, in general, both job insecurity and job stress exacerbate the effect of negative mental shocks mostly for females.

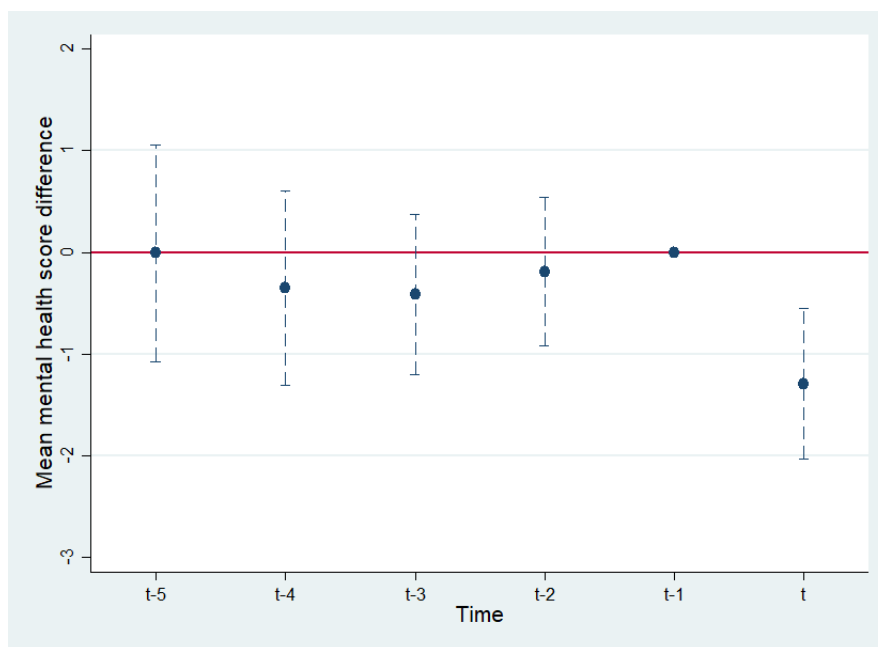


Figure 12: Mean mental health score difference between treatment and control (new sample restriction)

Note: The coefficients of 'Treat $\times$ t-j', which measures the mental health difference between the treatment group and the control group relative to baseline period, are presented with the point estimates and 95% confidence intervals after controlling the covariates. The unit of the timeline is year.

	(1)	(2)	(3)	(4)
Treat	-0.073 (0.330)		-0.282 (0.312)	
After	0.315* (0.176)	0.530*** (0.164)	-0.088 (0.209)	0.246 (0.186)
Treat×After	-1.085*** (0.328)	-1.286*** (0.324)	-0.809** (0.320)	-1.221*** (0.320)
Model	OLS	FE	OLS	FE
Controls	NO	NO	YES	YES
<i>N</i>	46,973	46,973	46,973	46,973
<i>R</i> ²	0.000	0.642	0.094	0.652
<i>F</i> (<i>P</i> -value)	4.30 (0.005)	8.88 (0.000)	32.81 (0.000)	12.58 (0.000)

Table 16: The mental health impact of life events (new sample restriction)

Note: Standard errors, clustered at the individual level, are in parentheses. Individual characteristics, region fixed effect, year fixed effect, and all other life events are included as control variables. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
After	0.006 (0.252)	0.642* (0.359)	0.626** (0.246)	0.104 (0.215)	0.131 (0.203)	0.072 (0.194)	0.146 (0.189)	0.193 (0.188)	0.175 (0.187)	0.131 (0.186)	0.151 (0.185)
Treat×After	-0.687 (0.457)	-1.887*** (0.648)	-1.677*** (0.451)	-0.829** (0.366)	-0.953*** (0.347)	-0.930*** (0.335)	-1.039*** (0.327)	-1.096*** (0.324)	-1.122*** (0.323)	-1.091*** (0.321)	-1.124*** (0.320)
Treat×Job Insecurity	0.123 (0.085)	-0.530 (0.391)	-0.758** (0.326)	0.518 (0.339)	0.642* (0.387)	1.660*** (0.487)	1.701** (0.714)	1.276 (0.845)	2.658** (1.131)	9.324*** (1.591)	17.174*** (2.738)
Treat×After×Job Insecurity	-0.280 (0.178)	0.886 (0.742)	0.901 (0.637)	-1.458* (0.745)	-1.666* (0.906)	-2.910*** (1.111)	-3.427** (1.565)	-3.437* (1.916)	-4.569** (2.308)	-13.423*** (2.490)	-21.157*** (3.110)
Total effect		-1.001*** (0.366)	-0.775* (0.452)	-2.287*** (0.650)	-2.618*** (0.838)	-3.840*** (1.059)	-4.466*** (1.531)	-4.533** (1.889)	-5.692** (2.285)	-14.514*** (2.468)	-22.281*** (3.095)
Job insecurity (cutoff point)	(cont.)	(≥1)	(≥2)	(≥3)	(≥4)	(≥5)	(≥6)	(≥7)	(≥8)	(≥9)	(≥10)
<i>N</i>	46,973	46,973	46,973	46,973	46,973	46,973	46,973	46,973	46,973	46,973	46,973
<i>R</i> ²	0.652	0.652	0.652	0.652	0.652	0.652	0.652	0.652	0.652	0.653	0.653

Table 17: The mental health impact of life events by job insecurity (new sample restriction)

Note: Clustered standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The ‘Total effect’ for the high job insecurity group is the sum of the coefficients of ‘Treat×After’ and ‘Treat×After×Job Insecurity’.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
After	-0.627* (0.357)	-1.242*** (0.374)	-0.029 (0.253)	-0.172 (0.216)	0.279 (0.201)	0.167 (0.191)	0.195 (0.187)
Treat×After	0.976 (0.680)	1.274* (0.742)	-0.025 (0.468)	-0.338 (0.392)	-0.968*** (0.355)	-1.092*** (0.332)	-1.190*** (0.324)
Treat×Job Stress	0.280*** (0.104)	1.857*** (0.409)	0.472 (0.323)	1.046*** (0.343)	-0.154 (0.406)	0.852 (0.628)	2.182* (1.314)
Treat×After×Job Stress	-0.698*** (0.201)	-3.055*** (0.822)	-2.050*** (0.635)	-2.163*** (0.662)	-1.170 (0.800)	-1.426 (1.220)	-1.549 (1.969)
Total effect		-1.781*** (0.354)	-2.075*** (0.432)	-2.501*** (0.535)	-2.138*** (0.719)	-2.519** (1.174)	-2.738 (1.944)
Job stress (cutoff point)	(cont.)	(≥2)	(≥3)	(≥4)	(≥5)	(≥6)	(≥7)
N	46,973	46,973	46,973	46,973	46,973	46,973	46,973
R ²	0.652	0.653	0.652	0.652	0.652	0.652	0.652

Table 18: The mental health impact of lif events by job stress (new sample restriction)

Note: Clustered standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The ‘Total effect’ for the high job stress group is the sum of the coefficients of ‘Treat×After’ and ‘Treat×After×Job Stress’.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
After	-0.513 (0.344)	-0.290 (0.488)	-0.427 (0.334)	-0.504* (0.305)	-0.482 (0.302)	-0.667** (0.292)	-0.516* (0.287)	-0.463 (0.286)	-0.469 (0.285)	-0.506* (0.283)	-0.492* (0.281)
Treat×After	-0.409 (0.687)	-1.162 (0.930)	-0.995 (0.678)	-0.832 (0.552)	-0.872* (0.527)	-0.727 (0.510)	-0.958* (0.499)	-1.051** (0.496)	-1.147** (0.496)	-1.124** (0.493)	-1.165** (0.492)
Treat×Job Insecurity	0.010 (0.109)	-0.280 (0.538)	-0.146 (0.486)	0.046 (0.563)	-0.090 (0.625)	1.902*** (0.702)	0.358 (0.989)	-0.849 (0.896)	-1.096* (0.643)	1.092*** (0.383)	-0.307 (0.491)
Treat×After×Job Insecurity	-0.426 (0.277)	-0.010 (1.084)	-0.348 (0.976)	-1.350 (1.160)	-2.080 (1.410)	-4.822*** (1.784)	-4.653* (2.640)	-4.067 (3.243)	-2.331 (3.953)	-11.452*** (3.811)	-2.070** (0.809)
Total effect		-1.172** (0.572)	-1.342* (0.708)	-2.183** (1.029)	-2.952** (1.313)	-5.549*** (1.712)	-5.610** (2.593)	-5.119 (3.206)	-3.478 (3.924)	-12.576*** (3.774)	-3.236*** (0.617)
Job insecurity (cutoff point)	(cont.)	(≥1)	(≥2)	(≥3)	(≥4)	(≥5)	(≥6)	(≥7)	(≥8)	(≥9)	(≥10)
N	20,816	20,816	20,816	20,816	20,816	20,816	20,816	20,816	20,816	20,816	20,816
R ²	0.644	0.644	0.644	0.644	0.644	0.644	0.644	0.644	0.644	0.644	0.644

Table 19: The mental health impact of lif events by job insecurity (female; new sample restriction)

Note: Clustered standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The ‘Total effect’ for the high job insecurity group is the sum of the coefficients of ‘Treat×After’ and ‘Treat×After×Job Insecurity’.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
After	0.187 (0.364)	1.097** (0.529)	1.202*** (0.359)	0.401 (0.302)	0.425 (0.274)	0.513** (0.258)	0.515** (0.249)	0.537** (0.247)	0.506** (0.246)	0.462* (0.246)	0.482** (0.246)
Treat×After	-0.879 (0.610)	-2.515*** (0.906)	-2.174*** (0.603)	-0.752 (0.488)	-0.929** (0.459)	-1.044** (0.444)	-1.028** (0.431)	-1.030** (0.427)	-0.984** (0.423)	-0.952** (0.421)	-0.976** (0.420)
Treat×Job Insecurity	0.227* (0.126)	-0.571 (0.574)	-1.003** (0.452)	0.848* (0.436)	1.196** (0.499)	1.252* (0.677)	2.396** (1.032)	2.826** (1.330)	5.408*** (1.813)	16.584*** (2.133)	22.658*** (2.135)
Treat×After×Job Insecurity	-0.126 (0.231)	1.765* (1.025)	1.928** (0.848)	-1.366 (0.975)	-1.163 (1.170)	-0.932 (1.381)	-2.015 (1.882)	-2.844 (2.287)	-6.423** (2.860)	-18.680*** (2.832)	-27.333*** (3.062)
Total effect		-0.750 (0.475)	-0.246 (0.592)	-2.119** (0.843)	-2.093* (1.076)	-1.976 (1.307)	-3.043* (1.833)	-3.874* (2.248)	-7.407*** (2.829)	-19.633*** (2.800)	-28.309*** (3.037)
Job insecurity (cutoff point)	(cont.)	(≥1)	(≥2)	(≥3)	(≥4)	(≥5)	(≥6)	(≥7)	(≥8)	(≥9)	(≥10)
N	26,157	26,157	26,157	26,157	26,157	26,157	26,157	26,157	26,157	26,157	26,157
R ²	0.664	0.664	0.664	0.664	0.664	0.664	0.664	0.664	0.664	0.665	0.665

Table 20: The mental health impact of lif events by job insecurity (male; new sample restriction)

Note: Clustered standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The ‘Total effect’ for the high job insecurity group is the sum of the coefficients of ‘Treat×After’ and ‘Treat×After×Job Insecurity’.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
After	-1.326*** (0.503)	-2.616*** (0.505)	-0.986*** (0.376)	-0.694** (0.334)	-0.555* (0.308)	-0.393 (0.286)	-0.491* (0.280)
Treat×After	1.676 (1.035)	1.789 (1.153)	0.249 (0.736)	-0.044 (0.615)	-0.420 (0.562)	-1.051** (0.515)	-1.201** (0.499)
Treat×Job Stress	0.274* (0.141)	2.756*** (0.563)	0.943** (0.478)	0.511 (0.497)	0.257 (0.538)	-1.068 (0.816)	-0.115 (1.988)
Treat×After×Job Stress	-0.908*** (0.292)	-3.761*** (1.270)	-2.576*** (0.979)	-2.746*** (0.997)	-3.154*** (1.123)	-1.221 (1.665)	0.984 (2.903)
Total effect		-1.972*** (0.542)	-2.328*** (0.652)	-2.791*** (0.791)	-3.574*** (0.977)	-2.271 (1.586)	-0.217 (2.867)
Job stress (cutoff point)	(cont.)	(≥2)	(≥3)	(≥4)	(≥5)	(≥6)	(≥7)
N	20,816	20,816	20,816	20,816	20,816	20,816	20,816
R ²	0.644	0.644	0.644	0.644	0.644	0.644	0.644

Table 21: The mental health impact of lif events by job stress (female; new sample restriction)

Note: Clustered standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The ‘Total effect’ for the high job stress group is the sum of the coefficients of ‘Treat×After’ and ‘Treat×After×Job Stress’.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
After	-0.093 (0.513)	-0.011 (0.568)	0.717** (0.343)	0.168 (0.281)	0.789*** (0.266)	0.422 (0.257)	0.553** (0.250)
Treat×After	0.293 (0.901)	0.840 (0.953)	-0.266 (0.592)	-0.547 (0.505)	-1.313*** (0.453)	-1.024** (0.431)	-1.062** (0.425)
Treat×Job Stress	0.237 (0.152)	0.808 (0.610)	-0.099 (0.440)	1.234*** (0.468)	-0.661 (0.599)	2.628*** (0.905)	3.362** (1.715)
Treat×After×Job Stress	-0.457* (0.277)	-2.368** (1.060)	-1.476* (0.826)	-1.494* (0.883)	0.787 (1.136)	-1.255 (1.743)	-3.086 (2.556)
Total effect		-1.529*** (0.465)	-1.742*** (0.575)	-2.042*** (0.724)	-0.525 (1.046)	-2.280 (1.690)	-4.148* (2.521)
Job stress (cutoff point)	(cont.)	(≥2)	(≥3)	(≥4)	(≥5)	(≥6)	(≥7)
<i>N</i>	26,157	26,157	26,157	26,157	26,157	26,157	26,157
<i>R</i> ²	0.664	0.664	0.664	0.664	0.664	0.664	0.664

Table 22: The mental health impact of lif events by job stress (male; new sample restriction)

Note: Clustered standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The ‘Total effect’ for the high job stress group is the sum of the coefficients of ‘Treat×After’ and ‘Treat×After×Job Stress’.

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