

Temporary employment, work stress and mental health before and after the Spanish economic recession

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INTRODUCTION

One of the most frequent adverse health effects of temporary employment reported in the literature has been the risk of developing psychosocial problems but also higher risk of occupational injuries and, in the long term, heart attacks for workers engaged in chronic temporary employment (Quinlan et al. 2001; Virtanen et al. 2005a). The economic recession initiated in 2008, which rose sharply unemployment rates across the European Mediterranean countries, fuelled job insecurity for both temporary and permanent employees.

The aim of this research is to analyse if the economic recession has additionally changed mental health and job related stress of temporary vs. permanent employment in Spain. The analysis of the Spanish case is of particular interest for two reasons: first, the Spanish economy was shocked by a sudden sharp rise in unemployment rates, reduction of salaries and unemployment benefits, and the retrenchment of the public spending that caused a double-dip recession; and second, the Spanish labour market is characterised by a segmented labour market, with permanent employees enjoying relatively strong protection employment legislation (before the labour reform of 2012) compared to other European countries and with high rates of temporary employment. This type of contract has been extensively overused in Spain to avoid permanent contracts due to the high difference in firing costs between the two types of workers. After the burst of the economic recession, unemployment increased rapidly from less than 10% to reach 27% in 2013. While temporary employment decreased remarkably from 5.6 to 3.2 million over the same period, permanent employment remained stable around 10.8 million (INE 2016). This situation that can be seen as a “natural experiment” because of the differential effect of the economic recession on layoffs and, as a result, on the composition of the employment by type of contract. It is worth to remark that even after the economic recession, temporary employment remained high at 23.3%, among the highest rates in Europe.

The economic recession may have increased psychosocial problems for both permanent and temporary employees at least through four ways. First, the massive layoff could lead to a rise in job insecurity due to the fear of losing the job, augmenting feelings of

personal vulnerability, and probably affecting more temporary than permanent employees due to the lower firing costs for them. Second, survivor workers may be more protected towards psychosocial problems due to the positive effects of keeping their jobs in a context of increasing unemployment. Such a positive effect of ‘others unemployment’ has been reported for Spain (Borra and Gómez-García 2016). Third, firm downsizing may have increased work overload, which in turn increases stress levels (Mucci et al. 2016). Last, compositional differences in health levels of permanent and temporary employment may operate, so that due to a ‘healthy survivor effect’ (Virtanen et al. 2005a) a reduction in temporary employment rate may dilute health differences among both types of employment.

Evidence on the health effects of the economic recession in Spain has been previously reported for the unemployed (Urbanos-Garrido and Lopez-Valcarcel 2015), those attending primary care services (Gili et al. 2013), and for the working population (Bartoll et al. 2013). However, specific empirical evidence by type of labour contract in Spain is scarce (Sánchez-Moreno et al. 2016). To shed more light on this issue, the objective of the paper is twofold. First, we aim to estimate the effect of temporary employment on work stress and mental health. Second, we investigate whether the economic recession worsened work stress and mental health outcomes for temporary and permanent workers. We also aim to assess the mediating role of work stress in the association between temporary employment and mental health. To estimate these effects, we apply a difference-in-differences (DiD) estimation framework with propensity score weights. To consider the possibility of heterogeneous effects, we also perform a DiD analysis by socioeconomic subgroups of employees.

Background

Temporary employment, work stress and mental health

Two main models have been proposed to explain the consequences of working conditions on psychosocial problems. The Demands-Control-Support (DCS) model explains job strain as the mismatch between high job demands and low control over one’s work (Karasek and Theorell 1990). The Effort-Reward-Imbalance (ERI) model

states that job strain comes from an imbalance between employee effort and perceived low compensation for that effort (Siegrist 1996). Both the demand-control and effort-reward imbalance models tend to be commonly referred to as models of “work stressors”. For temporary workers, job insecurity is positively associated to job strain (Cuyper et al. 2008). Both work stress and job insecurity act as potential mediators in the association between temporary employment and mental health outcomes.

Several systematic reviews have established a link between work stress and the presence of poorer mental health (Stansfeld and Candy 2006; Bonde 2008; Nieuwenhuijsen et al. 2010). Strikingly, some empirical evidence shows that permanent employees reported higher levels of stress, overload, and job demands, while temporary workers had lower stress, less involvement in the organisation, but much distress coming from job insecurity (Benavides and Benach 1999; Eiken and Saksvik 2009; Inoue et al. 2010). According to these findings, greater job insecurity induces temporary workers to have greater job strain, but the combination with fewer job demands could end with lower job strain in net terms (Parker 2002). However, it is disputable to what extent the economic recession may have worsened this net effect on job strain. A systematic review reported job stress effects of the recent economic recession due to staff reductions combined with increased workloads leading to mood disorders, anxiety, and psychosocial distress (Mucci et al. 2016). Analogous research for Spain, shows an intensification of work activities and a notable increase in job strain exposure during the economic recession in Spain (Utzet et al. 2015). Regarding differences in work stress by socioeconomic position, higher status should provide more autonomy, stability, and control over work, but the feeling of being unable to meet work demands is also commonly reported (Damaske et al. 2016; Moen et al. 2013). In this regard, the potential mediation role of work stress on mental health will be also explored for the overall and some selected subgroups of the sample.

The association between temporary jobs and mental health is widely heterogeneous depending on the type of study, the heterogeneity of the temporary employment, and the contextual labour market settings (Cuyper et al. 2008). The adverse health effects for temporary employment appears to be weaker with longitudinal data than in cross-

sectional designs (Bamberger et al. 2012). For instance, a longitudinal study of British workers found no evidence of a significant impact of temporary contracts on workers' mental health, once controlling for background characteristics, with the exception of worsening job satisfaction among casual/seasonal workers (Bardasi and Francesconi 2004). Regarding the effects by type of temporary job, poorer mental health has been found higher for periphery employees (e.g., seasonal, on-call or temporary agency workers) than for common fixed-term ones (e.g. project workers). A follow-up study in Sweden highlighted psychosocial distress to be sensitive to light and heavy chronic temporary employment compared to permanent jobs (Virtanen et al. 2011). Highlighting the importance of contextual labour market settings Gash et al. (2007), by analysing transitions from unemployment to employment, observe larger beneficial health effects for those getting a permanent job solely among men in Germany, but vanishing effects are reported for Spain, probably due to the high rotation of temporary contracts.

Four systematic reviews highlight a link between job insecurity and adverse health effects. An early literature review by Quinlan et al. (2001) evidenced an association between job insecurity and adverse health outcomes in 14 out of the 24 studies reviewed. Two subsequent meta-analyses (Sverke et al. 2002; Cheng and Chan 2008) indicated that many studies found a non-significant or moderate negative association between job insecurity and mental health, but few studies reported a strong association. The negative association was more likely to occur among manual workers who were exposed to a higher degree of uncertainty over future work and hence more dependent on paid work (Sverke et al. 2002), and was stronger among older workers who were less likely to find comparable jobs and tend to have more family obligations (Cheng and Chan 2008). Ferrie et al. (2002), based on the Whitehall II cohort study for UK, evidence a strong association between chronic job insecurity and minor psychiatric morbidity. The mediating role of job strain is evident when, after adding job control to a set of socioeconomic covariates, the association between job insecurity and mental health outcomes increased substantially (Ferrie et al. 2005). Similar results have been found for a wider sample of European countries (Cottini and Lucifora 2013).

As highlighted by this literature, the effects of temporary employment on mental health may also differ by socioeconomic status. In this research, we explore these differences by age, educational level and living in regions with different unemployment rates.

Empirical strategies

As far as we know, only one study has examined the effects of the recent economic recession on the association between mental health and temporary employment, reporting a declining gap in mental health between temporary and permanent employment during this period (Sánchez-Moreno et al. 2016). A limitation of this latter paper, and others in the literature, is that they mostly rely on observational studies without properly accounting for compositional effects and bias reduction (Frasquilho et al. 2015). The review of Virtanen et al. (2005a) summarises nicely the complexities of the issue at hand, and the difficulties of achieving conclusive results, such as the presence of several confounding sources and compositional effects. Interestingly, the 'healthy hire effect' dynamics may bias results when comparing temporary and permanent employment: at one side there is the combination of the 'healthy hire effect' (i.e. the healthiest members of the labour market are the most likely to get a job) and the 'wearing off of selection' (i.e. the attenuation of the healthy effect by the accumulation of exposure to hazards) which may affect more permanent employees. On the other side, the 'healthy worker survivor effect' (i.e., the healthiest workers are the most likely to stay employed) may operate more strongly among temporary employment. Several empirical strategies have been used in the literature to deal with the reverse causality problem (i.e., a selection into temporary employment by workers with previous psychosocial problems). Such approaches ultimately depended on the study design by focusing on dynamic changes in employment status, either adjusting for prior health status or individual fixed-effects estimation in longitudinal studies (Bardasi and Francesconi 2004; Rodriguez 2002; Robone et al. 2011; Ehlert and Schaff 2011), by using instrumental variables in observational and cross-sectional data (Caroli and Godard 2016), or by sample restriction (Dooley et al. 1987; Ferrie 2001; Virtanen et al. 2005b). In addition of considering a wide range of potential confounders, we include a measure of physical health (diagnosed chronic ill conditions) to control for the potential

self-selection of workers with ill health status (the ‘healthier worker effect’) on temporary contracts (Urbanos-Garrido and Lopez-Valcarcel 2015).

The empirical strategy used in this investigation is to match exposed and unexposed populations on a set of covariates regarding the probability of being treated, computing a propensity score (PS)—in our case, of having a temporary job (Rosenbaum and Rubin 1983). This framework has been applied in evaluations of the health effects of precariousness and temporary employment (Kim et al. 2008; Quesnel-Vallée et al. 2010; Carrieri et al. 2014).

Data and Methods

Data

Our sample was drawn from two waves of the Spanish National Health Survey in 2006/07, before the economic recession, and 2011/12, during the economic recession. It is a cross-sectional and nationally representative survey of the Spanish population covering a considerable range of socioeconomic and health related indicators, including self-perceived health, mental health, chronic conditions, social support, use of health services, and lifestyles related to health. The sample is representative at regional level (NUTS2 - Nomenclature of Territorial Units for Statistics) and units are selected in a multiple-stage design: from census tracks stratified by municipality size, to households and individuals. To achieve a homogeneous salaried working population, we excluded those aged below 25 (as these ages correspond with the finalisation of the education period), those above 64 years old (the retirement age), workers with atypical working days (e.g., at night, irregular shifts, and others), and immigrants. We also excluded Ceuta and Melilla, two Spanish enclaves in Morocco, for their peculiar idiosyncratic characteristics and low representativeness in the sample. Our final sample includes 6,708 observations (3,043 men and 3,665 women) for the 2006/07 survey and 4,576 observations (2,330 men and 2,246 women) for the 2011/12 survey.

Methods

Treatment effects

To obtain the treatment effect of a temporary job on work stress and mental health status, the PS weighting technique is used. This technique minimises the selection bias, a problem arising in observational studies to identify the effect of the treatment group (temporary employment) and the control group (permanent employment) on average characteristics that are relevant for the outcome (work stress and mental health).

Our interest is in estimating the ATT effect (Average Treatment Effect on the Treated), that is, the average treatment effect of temporary employment on the health status of temporary workers. Let Y_{1i} be the health outcome of subject i if she/he were to receive the treatment (temporary employment) and let Y_{0i} denote the health outcome of subject i if not. D_i is the binary treatment variable (1: temporary contract; 0: non-temporary employment). The ATT effect is defined as the expected difference:

$$ATT = E(Y_{1i} - Y_{0i} \mid D_i = 1) = E(Y_{1i} \mid D_i = 1) - E(Y_{0i} \mid D_i = 1) \quad (1)$$

where the first-term of the right-hand side of equation (1) is the average health outcome of workers in temporary employment, while the second term is the counterfactual or unobserved potential average health outcome of temporary workers had they been in permanent employment. As the researcher cannot observe the term $Y_{0i} \mid D_i = 1$, a comparison/control group is generated to provide a consistent estimate. We estimate treatment effects by matching treated individuals (temporary employment) with untreated or control subjects (permanent employment) with a similar distribution of observable characteristics using the PS. Specifically, PS are calculated from a logistic regression estimated separately for 2006/07 and 2011/12 and distinguishing by gender. This method assumes that all relevant differences between treated and non-treated groups are captured by the observable covariates. To satisfy this assumption, it is important to include in the propensity estimation all variables known to be related to both treatment assignment and health outcomes, including quadratic and interaction

terms as additional covariates (Stuart 2010). We have used the kernel matching method with an Epanechnikov distance, as it was the most effective in reducing the standardised bias across covariates. As (nearly) all possible observations are used with kernel matching, even those that may have bad matches, a common support condition to minimise this drawback is required. The common support requirement reduces the working sample to 6,236 observations (2,766 men and 3,470 women) in 2006/07 and 4,366 observations (2,206 men and 2,160 women) in 2011/12. Standard errors have been computed by bootstrapping 1,000 iterations.

To assess the performance of the PS, we compute a test of classification (c-test) of the percentage correctly classified among predicted versus treated. We also assess the validity of the covariate balance by analysing the standardised percentage in bias reduction for each variable and checking the Rubins' B and R statistics. As a robustness check, we perform the 4-nearest neighbour and radius matching methods within a caliper distance of 0.25 standard deviations. As previously explained, to control for the 'healthier worker effect' we take into account if the worker has a chronic disease in the computation of the PS. To minimise the potential effects of reverse causality, we compute the same procedures excluding chronic diseases in the PS computation as covariates.

Using PS to weight observations is recommended for small samples, as it allows the retention of most cases and does not require normality in the outcome variable. Hirano et al. (2003) show that weighting by the inverse of the PS leads to an efficient estimate of the ATT coefficient. Thus, for estimating the ATT effect the weight is defined as,

$$w_i = D_i + (1 - D_i) \frac{\hat{e}_i(X_i)}{(1 - \hat{e}_i(X_i))} \quad (2)$$

where \hat{e}_i is the computed PS, then a treated participant receives a weight of 1, whereas a control individual ($D_i = 0$) is weighted using the term $\frac{\hat{e}_i(X_i)}{(1 - \hat{e}_i(X_i))}$. In this way, both groups are weighted to represent the treatment group. This is equivalent to weight by the odds

of the propensity. The PS weighting has been used in the DiD regression analysis described below.

Estimates of the incremental recession effect: Difference-in-differences

An estimate of the change of the treatment effect during the economic recession is obtained by using a DiD approach (Angrist and Krueger 1991; Card and Krueger 1994). In particular, we have estimated a linear regression model with pooled data of both surveys for men and women. The linear probability model leads to similar results to those obtained by running logit or probit binary regression models (Angrist and Pischke 2008). Controlling by a set of individuals' covariates (X), the model includes three main fixed effects: one for a time trend (δ), another for being in the treatment group (λ), and the key parameter of interest or DiD effect, measured by the interaction between them (γ):

$$Y_{it} = \alpha + \lambda D_{it} + \delta t + \gamma(D_{it} * t) + X'_{it} \beta_t + \varepsilon_{it} \quad i=1...N, t=0,1 \quad (3)$$

where $t = 0$ means 2006/07 (before the recession), $t = 1$ denotes 2011/12 (after the recession), and Y represents the health outcomes (i.e., work stress and mental health). The unbiased nature of the structural estimators depends on the parallel time-paths assumption. To make that assumption as plausible as possible, we include in X all observed covariates that may influence the outcome and relate to temporary employment before and during the recession. Under the usual hypothesis on the stochastic term ε_{it} (zero mean and independence of the regressors), the parameter λ provides information on the effects of temporary employment on outcomes before and during ($\lambda + \gamma$) the economic recession. Note that this regression is run on the reweighted sample, as previously mentioned.

Likewise, to explore the effects of temporary contracts by socioeconomic level and the contextual role of the economic cycle, we stratify the sample according to several socioeconomic subgroups for both men and women. Finally, to assess the potential mediating role of stress in the association between temporary employment and mental

health, we add work stress as an extra covariate in equation (3) when mental health is the dependent variable.

Variables definition

The treatment variable considered in our analysis is to have a temporary employment coded with 1 and a non-temporary/permanent job with 0.

We measure work stress through the responses given to the question “Overall and considering the conditions in which you do your work, indicate how you consider the level of stress of your work on a scale of 1 (not stressful) to 7 (very stressful).” Supportive evidence for using a single item measure is given by its acceptable reliability and the significant correlations with domains of the DCS and ERI models with a kappa between 0.804 and 0.868 (Arapovic-Johansson et al. 2017; Elo et al. 2003). The importance of distinguishing between low and high work stress for health outcomes is present at these psychosocial occupational models. We apply Virtanen et al. (2005b) to obtain the cut-off point for high work stress by adding one standard deviation to the mean, which leaves 25% of the distribution above score 5. Accordingly, responses with values 1 to 5 are collapsed as low and medium stress, coded as 0, and response values of 6 or 7 are considered high stress, coded as 1. Hereafter we refer to high work stress as simply work stress.

Mental health is measured using the 12-item General Health Questionnaire (GHQ-12), a screening instrument designed to detect emotional, mood-related problems and psychological distress, validated for the Spanish population (Sánchez-López and Dresch 2008). GHQ-12 consists of 12 items in a Likert-type scale with four response categories (coded from 0 to 3). We used a two-point scoring method, with responses 0 and 1 recoded to 0 (“No problem”) and responses 2 and 3 recoded to 1 (“With problems”) and summed for all the questions defining the Goldberg index. The final instrument considers individuals reporting 3 or more mental health problems (coded with 1) to be at risk of poor mental health and 0 otherwise (Goldberg 1978).

As additional controls, we consider several socioeconomic characteristics that have been shown to be important determinants of health outcomes. Specifically, age—accounting for an imperfect measurement of health status—is categorised in three 10-year intervals from 25 to 64 allowing for a non-linear association. Based on civil status, responses given to widowed, single, divorced, and legally separated categories are collapsed into the category of “non-married,” leaving married as the base category. Respondents who contribute most to their household budget are referred to as the ‘main breadwinner.’ Being the main breadwinner may impose a psychological distress due to family obligations and dependence on the job (Bernard 1981). Education level (based on the International Standard Classification of Education, ISCED), is classified in three categories: university, as the reference category; secondary education; and primary or less than primary education. Having children (≤ 7 years old) is another control that may be correlated with the working family balance. However, this control is only used in the whole analysis for women, since they carry out most of the children’s care under the traditional Mediterranean family model. Household income, reported in the survey by means of several income intervals, has been first equalised to account for household size and composition and then collapsed into four categories along with a fifth category of missing values (11.4% for 2006/07 and 23.4% for 2011/12). Moreover, to control for health status and need, we consider a dummy for self-reporting diagnosed chronicity within a wide range of chronic diseases. Job characteristics are also incorporated. Working schedule is coded in four categories: full-time (base category), part-time in the mornings, part-time in the evenings and reduced working time. Occupation type is collapsed into three categories; managerial and technical staff (base category), intermediate occupations and manual workers. We also consider the activity sector (coded into nine dummies) and regional dummies for the 17 NUTS2 regions in Spain.

To explore differences by socioeconomic group, DID is further analysed by age (younger and older than 34 years old), and by education level (employees with a university degree and those with less education). Moreover to consider the contextual effects of regional economic conditions, regions are classified into two clusters of low and high

unemployment rates according to their relative level compared to the national mean in 2006 using data from the Labour Force Survey (INE 2016).

RESULTS

Descriptive statistics

The logistic regression used to compute the PS predicts correctly (between 76% and 82%) the conditional probability of being in temporary employment for both men and women in either period. The matching estimates successively reduce the mean standardised bias at around 90% and the Rubin's B statistic, which measures the absolute standardised difference of the mean of the PS in the treated and control groups, is well below 25% as recommended (available upon request).

Table 1 shows the time trend of selected variables in the two periods examined and split by gender. Interestingly, the rate of temporary employment has declined significantly for women (from 29.2% to 23.5%) and men (from 22.3% to 19.3%) between 2006/07 and 2011/12. We also observe for both genders a statistically significant increase in high work stress (men: from 21.5% to 25.3%; women: from 23.2% to 30.1%), mostly driven by temporary employment among men (from 14.8% to 24.5%) and for both temporary and permanent employment among women (from 23.8% to 30.7% and from 21.8% to 28.2%). Regarding mental health, we document a decline in poor mental health in these two periods and for both genders (men: from 12.3% to 10.2%; women: from 20.9% to 17.8%) driven by having a permanent contract. It is also worth mentioning the ageing of the workforce between periods; the decrease in the reporting of chronic conditions and the increase in the share of breadwinners among women only (see Table A1 in the Appendix for a complete information on covariates by type of employment).

Matching estimates

Table 2 shows the ATT effect of temporary employment on each outcome (work stress and mental health) before and during the economic recession through PS matching. Our estimates show that having a temporary job is associated with a statistically significant increase of 4.2% in poor mental health solely among men when compared to those with permanent jobs in the pre-crisis period 2006/07. Moreover, we report a slightly higher

positive association with poor mental health (5.2%) in 2011/12. For women, no significant association of temporality on health outcomes are observed in either of the periods in our data. The robustness check performed with 4-nearest neighbour and radius matching gave similar results (available upon request).

Difference-in-difference estimates

Table 3 reports the estimates of equation (2) for each health outcome for men and women for the full sample, respectively. Interestingly, we find no evidence of an incremental effect on poor mental health and work stress attributed to the economic recession. No statistically significant effects are revealed for women, confirming our previous matching estimates. Our DiD results reveal a time trend effect that seems to additionally increase high labour stress by 16.7% during the period for both permanent and temporary employment, although just for the sample of men.

To investigate if the results vary among subgroups, we stratify our sample by socioeconomic variables. Table 4 shows a significant negative impact of working under a temporary contract on high stress at the pre-crisis period among older men only (-4.7%). However, because of the Great Recession, high work stress levels increased among older salaried workers (7.2%) and remarkably among employees with a university degree (19.2%). It is worth mention that work-stress increases for temporary employees among older workers (20%). Table 4 also evidences that temporary employment increases poor mental health rates among men in the pre-crisis period, especially in the groups of older working adults (5.6%), those with a non-university degree (5.6%) and those residing in regions with a high unemployment rate (6.1%). However, we find that the economic recession only seems additionally deteriorate mental health among those with university degrees (13.9%). For women, no significant DiD estimates are found for work-stress and mental health.

We obtain similar results in the sensibility analysis after excluding chronic conditions in the PS computation for the whole sample (available upon request).

The mediating role of work stress

The estimates of the potential mediating role of work stress in the association between temporary employment and mental health are reported in Table 5. We show that the detrimental impact of the economic recession on mental health remains significant and similar in size to the estimates reported in Tables 3 and 4, which we interpret as a sign of no or a moderate mediating role.

DISCUSSION AND CONCLUSION

This paper aims to estimate the effect of temporary employment on work stress and mental health and to investigate whether the economic recession worsened these two health outcomes. We also aim to assess the mediating role of work stress. We use a DiD estimation framework with propensity score weights.

First, our results seem to indicate that having a temporary contract in Spain has no impact on the levels of work stress for 2006/07 and 2011/12 and both genders. This finding may be surprising, as it is expected that temporary workers may be willing to exert more effort and assume more demands, thus suffering from higher levels of labour stress, as part of a signalling strategy to step into a permanent position. However, this signalling mechanism might be weaker in countries characterised by highly segmented labour markets where the transition to permanent jobs is more constrained. We hypothesise that this could be the case in Spain, a country characterised by high rates of short, temporary contracts. Our results are also at odd with some literature that shows evidence that permanent employees reported higher levels of stress than temporary ones but these more job insecurity (Benavides and Benach 1999; Eiken and Saksvik 2009; Inoue et al. 2010). According to our results, only older male workers in temporary employment experience, at base line, the combination of lower levels of work stress but higher psychosocial distress.

Second, our findings show that due to the economic recession work stress has increased among some subgroups of temporary workers. In particular, we report significant effects only for older salaried workers and those with a university degree. This finding is compatible with previous research showing an intensification of work activities and a notable increase in job strain exposure during the economic recession in Spain (Utzet et

al. 2015). We have to bear in mind that larger drop in temporary employment was among young population so that overload felt on adult workers. Individuals with higher job status may enjoy more authority, control over work and more job stability, but at a cost of more work stress, with more time demands, greater interpersonal conflict, and greater conflict over use of authority than low status jobs (Damaske et al. 2016). This “stress of higher status” hypothesis may have intensified in the context of massive layoff for temporary employment. The increase of work stress for male employees in low regional unemployment could be related with the so called ‘(un)employment as a social norm’. According to which workers with high (low) employability suffer larger (smaller) decrease in well-being in low (high) regional unemployment (Clark et al. 2010). Due to the ‘employment as a social norm’, temporary workers may be willing to show more effort for fear to lose the job. It is worth noting that this subgroup is the only one with both a time increase in work stress and in poorer mental health.

Third, mirroring previous research that positively links temporary employment with poor mental health (Quinlan et al. 2001; Virtanen et al. 2005a), we show this same pattern and reveal that this is true in both periods (pre- and post-crisis), although only for men. As expected, we find a positive link between temporary employment and poor mental health in the pre-crisis period among older adults, as they are less likely to find comparable jobs and tend to have more family obligations (Cheng and Chan 2008), among manual workers who experience higher employment turnover (Sverke et al. 2002), and among workers in regions with high unemployment who have fewer re-employment opportunities (Origo and Pagani 2009). Surprisingly, while we expected to find a deepening of mental health problems for temporary employees as a result of the worsening of Spain’s economy, we found no significant impacts for our sample of men and women or for most of our population subgroups, with the exception of male workers. Several factors may be related to the overall lack of change in mental health. First, the ‘healthy worker effect’ tends to reduce observed differences among temporary and permanent employment (Virtanen et al. 2005a). Second, it has been pointed that employees may respond to the adverse working conditions with an ‘inhibitor mechanism’ and being more collaborative with firms goals to avoid being laid off (Catalano et al. 2011). Similarly, the negative impact on psychosocial distress due to the

increase in job insecurity may be compensated by the positive effect of keeping the job (Borra and Gómez-García 2016). We find, however, a deepening of poor mental health among male temporary workers with a university degree. It has been suggested that non manual workers may suffer a “status inconsistency” when faced with threats of unemployment (Sverke et al. 2002) being more sensitive to changes in labour market due to the failure of expectations over work (Connelly and Gallagher 2004) and exhibit a stronger reaction to financial stress (Sturgeon et al. 2016). Work stress had a null or moderated mediating role for these groups.

Our empirical estimates report no significant effects for salaried women regarding both outcomes. A potential explanation of this result is that women may find psychological compensation in their family role as a substitute for employment in the traditional family (Waters and Moore 2001).

As far as we know, this paper makes several improvements to previous analyses like the reduction in bias selection from the ‘healthy worker effect’ due to the use of PS and DiD combination, the inclusion of a wide range of potential confounding variables, the minimisation of reverse causality by including chronic conditions as additional covariates, or the exploration of worker heterogeneity (Ojala et al. 2018). However, our paper has some limitations. The analysis would benefit if the original database had a variable for past work experience or previous mental health state to avoid possible self-selection. Previous trends cannot also be ruled out as our dataset is not longitudinal. It was not possible either to consider heterogeneity in temporary employment by type or by length of the temporary contract due to the small sample size, which we believe could qualify our findings at a certain point due to the high rotation of contracts for temporary employment in Spain. Finally, to apply DiD estimators satisfactorily requires that the parallel trend assumption holds; that is, no other significant changes have occurred outside the intervention that could have impacted the treatment and controls. In particular, the labour reforms implemented in 2006 and 2010 did not significantly affect the duality in the Spanish labour market, and trends in temporary and indefinite contracts remained mostly unchanged (Ruesga Benito 2010). Indeed, the economic recession has not changed the overuse of temporary employment in Spain, nor the

segmented labour market (Felgueroso et al. 2018). Since the economic recession, on average, most of the total new contracts have been temporary. Given the high rotation of temporary contracts, a significant proportion of the workforce swings between temporary jobs and unemployment. The economic recession appears to have tightened working conditions for both temporary and permanent male employees, but differences in poor mental health for temporary employment remain and the prospects do not appear to change in the next future.

Taking all these into account, the policy implications of our empirical analysis for Spain are clear: there is a need to strengthen reemployment policies to diminish perceived job insecurity; the government should also reinforce practices of stress prevention at the firm level to diminish adverse consequences on mental health and to actively reorient health services in support of psychosocial work problems (Nexø et al. 2018). In that respect, stakeholders should be involved in the development of legislation and guidelines aimed at preventive interventions that identify the causes of psychosocial hazards by managerial procedures and that increase literacy about mental health problems.

Conflict of interest:

No competing interest

Table 1. Selected descriptive

	Mean (St.dev)		p-value	Mean (St.dev.)		p-value
	Men			Women		
	2006/07	2011/12		2006/07	2011/12	
	N=2766	N=2206		N=3470	N=2160	
High work stress	21.5 (0.411)	25.3 (0.435)	0.011	23.2 (0.422)	30.1 (0.459)	0.000
Permanent	23.5 (0.424)	25.5 (0.436)	0.220	23.8 (0.426)	30.7 (0.461)	0.000
Temporary	14.8 (0.355)	24.5 (0.431)	0.001	21.8 (0.413)	28.2 (0.451)	0.031
Poor mental health	12.3 (0.329)	10.2 (0.303)	0.049	20.9 (0.407)	17.8 (0.382)	0.015
Permanent	11.4 (0.318)	9.1 (0.287)	0.045	20.6 (0.404)	17.1 (0.376)	0.018
Temporary	15.8 (0.365)	14.7 (0.355)	0.716	21.8 (0.413)	20.0 (0.401)	0.519
Temporary employment	22.3 (0.416)	19.3 (0.395)	0.046	29.2 (0.455)	23.5 (0.424)	0.000

Table 2. Matching estimates: Effects of temporary employment

	Year 2006/07					Year 2011/12				
	% Temporary	% Counter- factual Non- temporary	Impact	SE	t- value	% Temporary	% Counter- factual Non- temporary	Impact	SE	t- value
	E(Y ₁ D=1)	E(Y ₀ D=1)	ATT			E(Y ₁ D=1)	E(Y ₀ D=1)	ATT		
Men										
High work stress	0.1657	0.2015	-0.0358	0.0223	-1.61	0.2295	0.2157	0.0137	0.0265	0.52
Poor mental health	0.1508	0.1084	0.0424*	0.0194	2.18	0.1618	0.1101	0.0517*	0.0218	2.37
Women										
High work stress	0.2114	0.2198	-0.0084	0.0180	-0.46	0.2777	0.2865	-0.0868	0.0267	-0.32
Poor mental health	0.2282	0.2171	0.0111	0.0179	0.62	0.2179	0.2099	0.0080	0.0241	0.33

*p-value<0.05;**p-value<0.01;***p-value<0.001. Standard errors computed by bootstrapping methods (1000 iterations). Common support option was used. Controls: age, civil status, main breadwinner, young children, education, income, chronic diseases, working schedule, occupation type, sector of activity, and region of residence.

Table 3. Difference-in-difference estimates of temporary employment.

		High work stress			Poor mental health		
		(λ) Effect at base year	(δ) Time effect	(γ) Change effect	(λ) Effect at base year	(δ) Time effect	(γ) Change effect
Men	N=4972	-0.0311 (0.0176)	0.1669* (0.0695)	0.0575 (0.0306)	0.0418** (0.0109)	-0.0046 (0.0642)	0.0082 (0.0269)
Women	N=5630	-0.0069 (0.0232)	-0.0207 (0.0861)	-0.0002 (0.0355)	0.0138 (0.0161)	0.0579 (0.0732)	-0.0058 (0.0255)

*p-value<0.05;**p-value<0.01;***p-value<0.001. Robust standard errors in parenthesis. Controls: age, civil status, main breadwinner, young children, education, income, chronic diseases, working schedule, occupation type, sector of activity, and region of residence.

Table 4. Difference-in-difference: stratified estimates of temporary employment

			High work stress			Poor mental health		
			(λ) Effect at base year	(δ) Time effect	(γ) Change effect	(λ) Effect at base year	(δ) Time effect	(γ) Change effect
Men								
Age	Young adults <34y	N=1219	-0.0058 (0.0355)	0.2095 (0.1353)	0.0124 (0.0651)	0.0144 (0.0281)	0.0281 (0.1290)	0.0374 (0.0280)
	Old adults	N=3753	-0.0475* (0.0156)	0.2005* (0.0716)	0.0772** (0.0235)	0.0562** (0.0183)	-0.0965 (0.0780)	-0.0163 (0.0258)
Education level	University	N=1265	-0.0512 (0.0427)	0.3290 (0.2391)	0.1922* (0.0828)	-0.0200 (0.0412)	0.1530 (0.2148)	0.1394* (0.0572)
	Non-university	N=3707	-0.0247 (0.0194)	0.0892 (0.0866)	0.0250 (0.0273)	0.0559*** (0.0130)	-0.0993 (0.0898)	-0.0215 (0.0327)
Regional unemployment	Low	N=2683	-0.0151 (0.0300)	0.2281 (0.1117)	0.0509 (0.0221)	0.0200 (0.0178)	0.2339 (0.1241)	0.0335 (0.0492)
	High	N=2289	-0.0358 (0.0211)	0.0176 (0.0891)	0.0472 (0.0500)	0.0607** (0.0142)	-0.0503 (0.0515)	-0.0120 (0.0295)
Women								
Age	Young adults <34y	N=1502	-0.0265 (0.0339)	-0.2327 (0.1757)	-0.0242 (0.0553)	0.0584 (0.0308)	0.0868 (0.1239)	-0.0661 (0.0472)
	Old adults	N=4128	-0.0009 (0.0232)	0.1371 (0.0845)	0.0248 (0.0419)	-0.0129 (0.0165)	0.0417 (0.0872)	0.0242 (0.0297)
Education level	University	N=1950	-0.0490 (0.0286)	-0.1759 (0.1567)	0.0653 (0.0544)	0.0524 (0.0417)	-0.0774 (0.0836)	-0.0748 (0.0600)
	Non-university	N=3680	0.0084 (0.0281)	0.1543 (0.0839)	-0.0249 (0.0505)	0.0007 (0.0163)	0.2220 (0.1360)	0.0108 (0.0256)
Regional unemployment	Low	N=3243	-0.0308 (0.0336)	-0.0462 (0.0926)	0.0331 (0.0500)	0.0007 (0.0244)	0.0609 (0.0975)	0.0406 (0.0418)
	High	N=2387	0.0205 (0.0319)	0.1283 (0.1762)	-0.0391 (0.0448)	0.0306 (0.0223)	-0.0806 (0.1157)	-0.0386 (0.0346)

*p-value<0.05; **p-value<0.01; ***p-value<0.001. Robust standard errors in parenthesis. Controls: age, civil status, main breadwinner, young children, education, income, chronic diseases, working schedule, occupation type, sector of activity, and region of residence.

Table 5. The mediating role of work stress

		Poor mental health			
		(λ) Effect at base year	(δ) Time effect	(γ) Change effect	High work Stress
Men					
Full sample		0.0452*** (0.0112)	-0.0226 (0.0641)	0.0020 (0.0287)	0.1078*** (0.0207)
Age	Young adults <34y	0.0152 (0.0300)	-0.0023 (0.1247)	0.0356 (0.0301)	0.1448*** (0.0293)
	Old adults	0.0605** (0.0175)	-0.1145 (0.0759)	-0.0232 (0.0264)	0.0898** (0.0244)
Education level	University	-0.0140 (0.0388)	0.1143 (0.2207)	0.1168* (0.0546)	0.1175** (0.0298)
	Non- university	0.0585*** (0.0142)	-0.1088 (0.0867)	-0.0242 (0.0342)	0.1057*** (0.0220)
Regional unemployment	Low	0.0213 (0.0179)	0.2150 (0.1349)	0.0293 (0.0499)	0.0829 (0.0370)
	High	0.0644** (0.0149)	-0.0521 (0.0500)	-0.0169 (0.0338)	0.1041** (0.0291)
Women					
Full sample		0.0145 (0.0156)	0.0598 (0.0705)	-0.0058 (0.0240)	0.0943*** (0.0233)
Age	Young adults <34y	0.0599 (0.0295)	0.1005 (0.1249)	-0.0646 (0.0478)	0.0592 (0.0300)
	Old adults	-0.0128 (0.0156)	0.0266 (0.0884)	0.0215 (0.0266)	0.1099*** (0.0268)
Education level	University	0.0541 (0.0421)	-0.0710 (0.0826)	-0.0771 (0.0601)	0.0365 (0.0286)
	Non- university	-0.0002 (0.0167)	0.2042 (0.1361)	0.0137 (0.0237)	0.1153** (0.0302)
Regional unemployment	Low	0.0035 (0.0253)	0.0652 (0.0933)	0.0375 (0.0421)	0.0925** (0.0254)
	High	0.0287 (0.0202)	-0.0926 (0.1092)	-0.0350 (0.0321)	0.0930 (0.0415)

*p-value<0.05; **p-value<0.01; ***p-value <0.001. Robust standard errors in parenthesis. Controls: age, civil status, main breadwinner, young children, education, income, chronic diseases, working schedule, occupation, sector of activity, region of residence, and work stress.

Appendix

Table A1. Sample mean and standard deviation (sd) by type of employment

	Permanent		p- value	Temporary		p-value
	Mean (sd)			Mean (sd)		
	2006/07	2011/12		2006/07	2011/12	
Men	N=2229	N=1792		N=537	N=414	
Main breadwinner	80.2 (39.9)	77.6 (41.7)	0.134	58.7 (49.3)	64.8 (47.8)	0.140
Not married	30.9 (46.2)	31.1 (46.3)	0.907	53.2 (49.9)	51 (50.1)	0.590
Age 25-34	27.7 (44.7)	22.7 (41.9)	0.015	54 (49.9)	43.4 (49.6)	0.036
Age 35-44	34.1 (47.4)	34.1 (47.4)		23.5 (42.5)	29.1 (45.5)	
Age 45-54	24.5 (43)	27.6 (44.7)		15.9 (36.6)	20.8 (40.6)	
Age 55-64	13.7 (34.4)	15.6 (36.2)		6.58 (24.8)	6.76 (25.1)	
#kids<=7	26.8 (44.5)	26.5 (44.1)	0.804	23.1 (42.2)	22.5 (41.8)	0.862
Chronic conditions	52.1 (50)	41.4 (49.3)	0.000	52.6 (50)	38.7 (48.8)	0.001
University educ.	28.7 (45.2)	25.6 (43.7)	0.071	16.7 (37.4)	19.1 (39.3)	0.139
Secondary educ.	33.2 (47.1)	37 (48.3)		25.6 (43.7)	31.5 (46.5)	
Primary & less educ.	38.1 (48.6)	37.4 (48.4)		57.6 (49.5)	49.4 (50.1)	
Managerial & tech.	26.2 (44)	26.2 (44)	0.329	17.2 (37.8)	18.1 (38.6)	0.932
Intermediary	25 (43.3)	22.6 (41.9)		13.8 (34.5)	14.3 (35.1)	
Manual	48.8 (50)	51.1 (50)		69 (46.3)	67.5 (46.9)	
Very low income*	28.9 (45.3)	20 (40)	0.000	40 (49)	33.2 (47.2)	0.000
Low	12.6 (33.2)	15.1 (35.9)		20.5 (40.4)	16 (36.7)	
High	16.5 (37.1)	9.62 (29.5)		15.7 (36.5)	7.9 (27)	
Very high	34.9 (47.7)	33.3 (47.1)		16.8 (37.4)	18.8 (39.1)	
Missing income	7.1 (25.7)	21.9 (41.4)		6.99 (25.5)	24.1 (42.8)	
Full-time	64.1 (48)	61.4 (48.7)	0.009	63.7 (48.1)	59.9 (49.1)	0.805
Part-time mornings	31.3 (46.4)	34.1 (47.4)		29.4 (45.6)	33 (47.1)	
Part-time evenings	4.09 (19.8)	3.09 (17.3)		4.71 (21.2)	4.61 (21)	
Reduced	0.478 (6.9)	1.49 (12.1)		2.2 (14.7)	2.54 (15.8)	
Women	N=2576	N=1692		N=894	N=468	
Main breadwinner	34 (47.4)	43.4 (49.6)	0.000	22.1 (41.5)	34.1 (47.5)	0.000
Not married	35.6 (47.9)	37.5 (48.4)	0.289	44.1 (49.7)	45.3 (49.8)	0.730
Age 25-34	31.7 (46.5)	24.3 (42.9)	0.000	45.5 (49.8)	41.4 (49.3)	0.062
Age 35-44	35 (47.7)	34.4 (47.5)		31.5 (46.5)	27.8 (44.9)	
Age 45-54	24.4 (43)	29 (45.4)		17.3 (37.9)	23 (42.1)	
Age 55-64	8.88 (28.5)	12.3 (32.9)		5.62 (23)	7.82 (26.9)	
#kids<=7	26.7 (44.3)	25.5 (43.6)	0.465	23.2 (42.3)	23.7 (42.6)	0.863
Chronic conditions	63.8 (48.1)	55.8 (49.7)	0.000	66.1 (47.4)	57.8 (49.4)	0.015
University educ.	38.2 (48.6)	36.9 (48.3)	0.435	27.6 (44.7)	27.7 (44.8)	0.983
Secondary educ.	33.9 (47.3)	36.2 (48.1)		30.7 (46.1)	30.1 (45.9)	
Primary & less educ.	27.9 (44.9)	26.9 (44.3)		41.7 (49.3)	42.2 (49.4)	
Managerial & tech.	25.9 (43.8)	31 (46.2)	0.005	19.5 (39.6)	21.3 (41)	0.435
Intermediary	37.7 (48.5)	32.9 (47)		19.7 (39.8)	22.4 (41.7)	
Manual	36.4 (48.1)	36.1 (48)		60.8 (48.8)	56.4 (49.6)	
Very low income*	18.4 (38.7)	15.6 (36.3)	0.000	36.9 (48.3)	33 (47.1)	0.000
Low	13.1 (33.8)	14.9 (35.6)		14.7 (35.5)	16.4 (37)	
High	18.8 (39)	12.6 (33.2)		17.4 (37.9)	8.48 (27.9)	
Very high	38.6 (48.7)	31.4 (46.4)		20.8 (40.6)	20.4 (40.4)	
Missing income	11.1 (31.5)	25.5 (43.6)		10.1 (30.2)	21.7 (41.3)	
Full-time	42.6 (49.5)	42.3 (49.4)	0.760	34.4 (47.5)	38.1 (48.6)	0.705
Part-time mornings	41.9 (49.4)	43.5 (49.6)		44.7 (49.8)	42.2 (49.4)	
Part-time evenings	6.27 (24.2)	5.86 (23.5)		9.59 (29.5)	8.47 (27.9)	
Reduced	9.2 (28.9)	8.34 (27.7)		11.3 (31.7)	11.3 (31.6)	

Note: Descriptive statistics based on the National Health Surveys for 2006/07 and 2011/12. Descriptive for the 17 regional dummies and economic activity are omitted for space reasons. but are accounted for in the estimations.
 *Monthly net income thresholds considered are: low (0-1000€); medium (1000-1575); high (1575-2725); very high (2725-4500).

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