Well-being and unemployment during the Great Recession: an empirical analysis across UK local authority districts

Mulligan, K., & Zieba, M. (2020). Well-being and unemployment during the Great Recession: an empirical analysis across UK local authority districts. *Regional Studies, Regional Science*, *7*(1), 267-287. https://doi.org/10.1080/21681376.2020.1784779

Published in:
Regional Studies, Regional Science

Document Version:
Publisher's PDF, also known as Version of record

Regional Studies, Regional Science

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/rsrs20

Well-being and unemployment during the Great Recession: an empirical analysis across UK local authority districts

Kevin Mulligan & Marta Zieba

To cite this article: Kevin Mulligan & Marta Zieba (2020) Well-being and unemployment during the Great Recession: an empirical analysis across UK local authority districts, Regional Studies, Regional Science, 7:1, 267-287, DOI: 10.1080/21681376.2020.1784779

To link to this article: https://doi.org/10.1080/21681376.2020.1784779

REGIONAL STUDIES, REGIONAL SCIENCE
2020, VOL. 7, NO. 1, 267–287
https://doi.org/10.1080/21681376.2020.1784779

Routledge
Taylor & Francis Group

RSA Regional Studies Association

Well-being and unemployment during the Great Recession: an empirical analysis across UK local authority districts

Kevin Mulligan [a] and Marta Zieba [b]

ABSTRACT

This paper examines the relationship between unemployment and psychological well-being before and during the Great Recession across 249 UK local authority districts (LADs). Substantial evidence demonstrates that unemployment has a large negative effect on psychological well-being. However, unique social norms develop in geographical areas with high unemployment rates, which significantly reduce the negative impact of unemployment on well-being. Though the post-2007 Great Recession period was characterized by widespread unemployment, few studies have examined the impact of this crisis on well-being in high- and low-unemployment local areas. The analysis constructs a rich panel data set which follows 15,798 individuals from 1998 to 2014, and applies difference-in-differences fixed-effects and general method of moments estimators. The findings indicate that unemployment had a large negative impact on psychological well-being. However, the magnitude of this effect did not change (or was even slightly lower) during the Great Recession. Furthermore, the unemployment social norm also ceased to have any additional effect on well-being during the Great Recession in high-unemployment LADs, as opposed to the pre-recession period.

ARTICLE HISTORY

Received 27 January 2020; Accepted 11 June 2020

KEYWORDS

unemployment; psychological well-being; Great Recession; social norm; UK local authority districts; panel data

JEL CLASSIFICATIONS

D91; I31; J64; R23; R12

INTRODUCTION

The global financial crisis of 2007, and subsequent 'Great Recession', led to a dramatic deterioration in economic and social conditions in most countries across the world (Beer et al., 2019; Van Ours, 2015). One of the most pronounced effects of the Great Recession was a large and prolonged rise in unemployment rates (Pissarides, 2013). Unemployment has a universally large negative impact on psychological well-being (Clark & Oswald, 1994; Dunlop et al., 2016). Some evidence suggests that being unemployed during the Great Recession caused a

CONTACT

[a] Department of Economics, University of Limerick, Limerick, Ireland.
(Corresponding author) marta.zieba@ul.ie
[b] Department of Economics, University of Limerick, Limerick, Ireland.

Supplemental data for this article can be accessed https://doi.org/10.1080/21681376.2020.1784779

higher level of psychological distress than in the preceding time period (e.g., Bell & Blanchflower, 2010; Drydakis, 2015; Phillips & Nugent, 2014). However, most research has focused on the relationship between unemployment and well-being *during* the Great Recession. Due primarily to restrictions in available data sets, few studies empirically test this relationship *before* and *during* the Great Recession. Therefore, this paper examines whether the impact of unemployment on psychological well-being was worse during the Great Recession, relative to the preceding period.

This issue is important for scholars in regional studies and regional science because addressing it necessitates an examination of the unemployment rate at a local level. Social norms play an important role in moderating the impact of unemployment on psychological well-being (Clark, 2003; Clark et al., 2010). Social norms of unemployment capture the phenomenon, whereby well-being is less negatively affected when unemployment is high among unemployed individuals' reference group, and worsens when unemployment is low among unemployed individuals' reference group (Stutzer & Lalive, 2004). The reference group used to operationalize social norms of unemployment is vital when estimating their moderating effect (Clark, 2003; Gathergood, 2013). Typically, social norms of unemployment have been operationalized at the geographical level using the unemployment rate in region where individuals live (e.g., Clark & Oswald, 1994). However, regions are large geographical agglomerations which may not fully capture unemployed individuals' reference group (Becchetti et al., 2017; Chadi, 2014). Therefore, we exploit a unique feature of our data set that enables us to operationalize the social norm using the local unemployment rate in 249 UK local authority districts (LADs). Based on the above, this paper poses the following research question: What influence did the Great Recession have on social norms of unemployment at the local level?

To address this question, we construct a novel panel data set by merging two rich UK data sources: The British Household Panel Survey (BHPS) and the UK Household Longitudinal Study (UKHLS; also known as 'Understanding Society'). Our final data set follows 15,798 individuals over 15 waves (1998–2014). In each wave, each individual completed the General Health Questionnaire (GHQ-12), which is a commonly used proxy measure for an individual's self-reported psychological well-being (e.g., Clark, 2003). An index based on the GHQ-12 acts as the dependent variable in this analysis. The BHPS was subsumed into the larger UKHLS from 2008 onwards. Given that the unemployment crisis of the Great Recession began in 2008, merging both the BHPS and UKHLS provides us with information on the same individuals before and during the Great Recession period. This makes the data set uniquely appropriate to address our research question. Despite the quality of the data, to our knowledge this paper represents the first academic study that merges both BHPS and UKHLS data to examine this issue. In addition, operationalizing the social norm at the local level is distinct contribution of this paper because it captures the individual heterogeneity of unemployed individuals' context and surroundings in more granular detail than was available to previous studies. In this way, this paper responds to the recent call by Beer et al. (2019) for a more comprehensive exercise in data collection and experimentation with previously unused methods to assess how unemployment impacts society at the local level.

As noted by Schmitz (2011), the line of causality from unemployment to poor well-being is often disputed because individuals with lower well-being are more likely to become (and remain) unemployed. This paper addresses this issue in two ways. First, we apply a difference-in-differences fixed-effects (FE) panel data estimator to control for individual heterogeneity. Second, we compare the results with the first-difference general methods of moments (GMM) estimator that additionally controls for any form of endogeneity in our model specification, such as the possibility of positive self-selection into unemployment based on poor mental well-being in the previous period.

Results from the analysis indicate that while unemployment has a large negative impact on psychological well-being, the magnitude of this effect did not change or fell only slightly during

the Great Recession. Furthermore, in the pre-Great Recession period being unemployed in a geographical area with a high unemployment rate reduced the negative impact of unemployment on well-being. However, the unemployment social norm ceased to have any additional effect during the Great Recession in high-unemployment LADs. These findings suggest that the unemployment crisis during the Great Recession did not have profound effects on well-established social norms.

The paper is structured as follows. The next section derives the relevant research hypotheses that are empirically tested. The third section presents the data set, the construction of the relevant variables used in the analysis and the econometric methods applied. The fourth section presents the descriptive statistics and the difference-in-differences estimation results. The fifth section concludes.

CONCEPTUAL FRAMEWORK

The seminal work of Jahoda (1982) proposed that the crucial aspects of employment that impact psychological well-being are not the manifest benefits (e.g., wages and spending power), but rather the latent benefits. Latent benefits include the general activities associated with work which engage a person both physically and mentally. Losing these non-pecuniary benefits through unemployment is associated with a large fall in psychological well-being, over and above the decrease in earnings and spending power (Stutzer & Lalive, 2004).

Unemployment during the Great Recession

An established finding in the literature is that unemployment negatively impacts psychological well-being more so than any other factor (Dolan et al., 2008; Frey & Stutzer, 2002; Stutzer & Lalive, 2004). The Great Recession produced a profound series of negative impacts on individuals' physical and mental health, such as increased financial hardship and stress (Burgard & Kalousova, 2015; Catalano et al., 2011; Egan et al., 2016; Van Ours, 2015) as well as a decline in institutional resources and the effect of austerity policies (Bell & Blanchflower, 2010; Drydakis, 2015). For these reasons, some authors suggest that the negative relationship between unemployment and psychological well-being was particularly pronounced during the Great Recession (Bell & Blanchflower, 2010; Drydakis, 2015; Phillips & Nugent, 2014). However, no studies have directly investigated the impact of being unemployed in the Great Recession (i.e., 2008–14) relative to being unemployed in the preceding period of economic stability and expansion. This is important because in a large-scale economic shock such as the Great Recession it may become more normal to be unemployed, thus shifting the social norm and lowering the negative impact of unemployment on well-being. Therefore, to set a baseline for this study we replicate the analysis performed in previous studies by first hypothesizing that:

> *Hypothesis 1: Being unemployed during the Great Recession is more psychologically distressing than being unemployed in the preceding non-recession period.*

It is important to note that the negative impact of unemployment on psychological well-being is significantly mitigated by how common it is in an unemployed individual's reference group (Stutzer & Lalive, 2004). To explain this phenomenon, unemployment has been conceptualized as a form of *social norm*. Unemployed individuals living in an area with a *strong* social norm to work (i.e., low unemployment rate) suffer higher levels of mental distress, while individuals living in an area with a *weak* social norm to work (i.e., high unemployment rate) will suffer less mental distress (Clark, 2003; Clark et al., 2010).

Social norms

Fehr and Gächter (2000, p. 166) define a social norm as '1) a behavioural regularity; that is 2) based on a socially shared belief of how one ought to behave; which triggers 3) the enforcement of the prescribed behaviour by informal social sanctions'. A particular social norm may be thought to emerge through interactions within a group, and then apply to all further in-group behaviour, with group members punishing aberrant behaviour through social sanctions (Bernhard et al., 2006).

The evolution of a social norm is dependent on the behaviour of 'relevant others' (Clark, 2003, p. 324). Bernhard et al. (2006, pp. 220–221) find that 'willingness to punish norm violations' is much higher within a defined reference group, and the punishment enforced is much harsher than in interactions with those outside the defined group. Though countries themselves do have social norms, the likelihood of this reference group of relevant others consisting of everyone in a country is quite low; when using survey data, geographical proximity is an intuitive reference group comprised of relevant others (Clark, 2011). Geographically proximate individuals typically face the same economic, social and institutional environment, and are thus more likely to have their social interactions governed by the same social norms (Becchetti et al., 2017).[1]

In terms of geographical proximity, social norms of unemployment have typically been operationalized using the regional unemployment rate (Clark & Oswald, 1994; Gathergood, 2013). A low regional unemployment rate indicates a strong social norm to work. Unemployed individuals will suffer greater psychological distress in low unemployment regions. In contrast, a high regional unemployment rate indicates a weak social norm to work.

Though the regional unemployment rate where an unemployed individual resides is a commonly more accurate approximation of that unemployed individual's context and surroundings than the entire country, regions are large geographical agglomerations that may still miss much individual heterogeneity at further micro-levels (Becchetti et al., 2017). Each region is comprised of further local subdivisions that may capture unemployed individuals' context and surroundings more accurately. Due to lack of available data on the unemployment rate at the local level, to our knowledge this potential reference group has so far been unexplored in the literature as a means of operationalizing the unemployment social norm in more granular detail.

Some research suggests that the Great Recession tended to reinforce pre-existing trends in the economy, for example, the long-run decline in manufacturing and the loss of male-centric employment (Jaimovich & Siu, 2012; Weinstein & Patrick, 2020). In a study concerned with the Great Recession in Greece, Drydakis (2015) finds that during the years 2010–13, unemployment led to higher mental health deterioration compared with the earlier pre-recession period. Based on these findings, Drydakis states that 'we cannot support the idea that being unemployed can be expected to depress people's well-being less if they are not alone in their fate' (p. 49). This statement suggests that the social norms of unemployment had no impact during the Great Recession. However, Drydakis uses the unemployment rate in the whole country as an implicit proxy for the social norm to work. Therefore, it is important to test this finding by operationalizing the social norm at a more granular level:

Hypothesis 2a: Personal unemployment has a negative impact on personal psychological well-being, but this negative impact is lower in high-unemployment localities.

Hypothesis 2b: Being unemployed in high-unemployment localities during the Great Recession is even less psychologically distressing than being unemployed in high-unemployment localities during the pre-recession period.

DATA SET AND MODEL SPECIFICATION

Constructing the data set

To examine hypotheses 1 and 2, we construct panel data using UKHLS and BHPS data sources in the UK. Information on individual level characteristics – such as psychological well-being and unemployment status – are obtained from merging two survey data sets in the UK: the 18 waves of the BHPS and the four waves of the UKHLS. To operationalize the social norm to work at the geographical level, we draw upon data on local unemployment rates from, respectively, the Office for National Statistics (ONS) and Labour Force Survey (LFS) available from the UK Data Archive.

Merged BHPS and UKHLS panel data set

The BHPS was an annual survey carried out from 1991 to 2008, yielding 18 waves of panel data. Each wave of the BHPS spans two years (e.g., Wave 2 corresponds to 1992–1993, Wave 3 corresponds to 1993–1994, etc.). The only exception is Wave 1, which captures 1991 only and which is excluded from this sample due to missing data on local unemployment rates for this year. The BHPS component joined the UKHLS sample in Wave 2 of the UKHLS. As the result, the 18th wave of the BHPS is considered as the first wave of the UKHLS. Both data sources are merged to facilitate panel data analysis before and during the Great Recession period. In the final data sample, we also exclude the years of the earlier recession shock which occurred in the UK in the early 1990s. Therefore, we use 11 out of 18 waves of the BHPS sample from 1998 to 2008, and we use four waves of the UKHLS (Waves 2–5) from 2009 to 2014. The final data set follows 15,798 individuals over the period 1998–2014 (15 waves), yielding 99,676 total observations.

Matching unemployment-rate data

A unique feature of both the BHPS and UKHLS data sets is that they record in which of the UK's 380 LADs individuals live. For the purposes of our analysis, we exclude individuals residing in LADs located in Northern Ireland (NI), mainly due to possibly large difference in the NI sample as highlighted in an UKHLS report (Chadi, 2014; University of Essex, 2017). Moreover, the LADs classification is not available in the BHPS and UKHLS surveys for NI. Hence, we include LADs located in England, Scotland and Wales in the final analysis. In addition, there is some degree of variation in how the LADs are defined over the 24-year period, and data within the BHPS sample are aggregated if their population falls to < 120,000. Therefore, we use the 2009 boundaries for LADs to construct a stable set of 249 LADs that are present in each wave from 1991 to 2014. For a final list of LADs used to match the local unemployment rate with the individual data, see Table C1 in Appendix C in the supplemental data online.[2]

Key variables used

In the following section we define our dependent variable, which is individuals' self-rated psychological well-being, as well as the key explanatory variables used to test our hypotheses.

Psychological well-being

The dependent variable used in this analysis is individuals' self-rated psychological well-being, as measured by the GHQ-12. In the GHQ-12, individuals answer 12 questions related to different aspects of their mental distress (e.g., 'Lost much sleep over worry?'). Individuals' responses to each of the 12 questions are coded on a four-point scale, from 1 denoting 'not at all' to 4 denoting 'much more than usual'. Positively phrased questions are coded in reverse. The answers to these 12 questions are then aggregated into an overall GHQ-12 score of mental distress.

In this research we use the reverse of the GHQ-12 score as a psychological well-being score, W_{it}, so that the answers coded as 1 or 2 (not indicating mental distress) are recoded to 1, whereas answers coded as 3 and 4 (indicating mental distress) are recoded to 0. Hence, our dependent variable, W_{it}, is obtained as the sum of the 12 recoded answers and it ranges from 0 (highest possible mental distress) to 12 (lowest possible mental distress). The GHQ-12 score is a commonly used proxy measure for individual psychological well-being (e.g., see Clark, 2003; Clark & Oswald, 1994; and Gathergood, 2013, for use of the GHQ-12 to measure psychological distress; see also Dolan et al., 2008, for a review of the literature on GHQ-12 and other similar measures).

Individual unemployment status

The unemployment status, U_{it}, of an individual i between 16 and 64 years old at a point in time (wave t) is measured by a dummy variable equal to 1 if the individual is unemployed and/or actively looking for work, and 0 otherwise. The question on unemployment status appears in each wave of the BHPS and UKHLS. The reference category is employed individuals in the same age group in full- or part-time employment and the self-employed individuals.

Local unemployment rate

As noted, this study uses the unemployment rate in each of the UK's LADs to operationalize the social norm to work. The local unemployment rate for each LAD that individual i officially resides in at the time of the interview in wave t is captured as L_{it}. The unemployment rate at LAD level was obtained on yearly basis from the ONS database for the years 2004–14 and on quarterly basis from the LFS for the earlier period 1998–2003. The LFS unemployment data was transformed into yearly periods to match the ONS data.

The Great Recession 'shock'

For our study, it is also important to accurately define the Great Recession period. The UK officially entered recession in January 2009, when the ONS reported that gross domestic product (GDP) had shrunk through the last three quarters of 2008. That negative growth lasted until the third quarter of 2009. However, as argued by Egan et al. (2016), this time window does not fully capture the lagged post-recession increase in unemployment rates. The national unemployment rate rose to 8.3% in August 2011, the highest level since 1994, but it only declined to 4% in 2015. Therefore, while GDP returned to its pre-crisis level between 2012 and 2013, and growth rate also stabilized over this time, the unemployment rate returned back to the pre-crisis level only in 2015. Therefore, we denote the variable 'recession shock', S_{it}, which takes a value of 1 for 2008–14, and 0 otherwise.

Interaction-term variables

We also construct interaction term variables where US_{it} captures the differential effect of being unemployed during the Great Recession period (2008–14), as opposed to being unemployed before the recession period (U_{it}). These two variables are important to test hypothesis 1.

Furthermore, to test hypotheses 2a and 2b, the unemployment rate in the LAD where unemployed individuals live (i.e., LAD) is denoted as UL_{it}. This variable will capture the impact of the social norm to work on psychological well-being. Moreover, the ULS_{it} denotes the 'social norm effect' of being unemployed in high-unemployment LAD during the Great Recession years (2008–14). In this specification, LS_{it} captures the unemployment rate in employed individuals' geographical reference group during the recession; UL_{it} captures the social norm to work effect before the recession, and US_{it} denotes the effect of being unemployed in low unemployment LAD during the recession (as opposed to ULS_{it}). The summary statistics of these variables are provided in Table 1.

Table 1. Descriptive statistics of variables.

Variables used	Total	Male	Female
Dependent variable = W_{it}, *well-being (score)*			
W_{it} total	10.272	10.561	9.970
	(2.883)	(2.581)	(3.141)
W_{it} of unemployed	9.016	9.352	8.549
	(3.722)	(3.505)	(3.957)
W_{it} of employed	10.349	10.646	10.044
	(2.806)	(2.482)	(3.075)
W_{it} of unemployed during the recession	8.934	9.263	8.509
	(3.768)	(3.511)	(4.038)
Individual explanatory variables			
A_{it}, age (years)	39.407	39.491	39.319
	(12.064)	(12.23)	(11.886)
U_{it}, unemployed dummy (share)	0.057	0.065	0.049
	(0.233)	(0.247)	(0.216)
Recession shock variables			
S_{it}, recession shock dummy (share)	0.249	0.243	0.256
	(0.433)	(0.429)	(0.436)
US_{it}, unemployed × recession dummy (share)	0.064	0.072	0.056
	(0.245)	(0.258)	(0.229)
LADs-level explanatory variables			
L_{it}, unemployment rate (%)	5.796	5.771	5.822
	(2.360)	(2.345)	(2.374)
UL_{it}, unemployment rate × unemployed (%)	6.492	6.521	6.452
	(2.521)	(2.511)	(3.255)
LS_{it}, unemployment rate × recession (%)	7.085	7.061	7.111
	(2.551)	(2.539)	(2.562)
ULS_{it}, unemployment rate × unemployed × recession (%)	7.704	7.681	7.734
	(2.684)	2.684	(2.685)
Observations	99,676	50,984	48,691
Individuals	15,798	7883	7914

Note: Means or percentage shares. Standard deviations are shown in parentheses. Panel data for 15 waves. The differences in the well-being scores between the samples are statistically significant at the 1% or 5% level based on the mean comparison *t*-tests, which are available from the authors upon request.

Empirical model

Fixed-effects (FE) model

To test hypothesis 1, we set up model 1 where a difference-in-differences FE model is applied. We regress the well-being score of an individual i in period t, W_{it}, on the covariates discussed above, as follows:

$$W_{it} = \beta_0 + \beta_i + d_t + \beta_u U_{it} + \beta_s S_{it} + \beta_{us} US_{it} + \sum_{k}^{N} \beta_k X_{ikt} + \varepsilon_{it} \quad (1)$$

where β_0 is a constant; β_i is a vector of individual fixed-effects which control for individual characteristics of respondents that do not change over time; d_t is the vector of wave fixed-effects that are common for all individuals but change over the subsequent survey waves, and each wave spans two successive years; and ε_{it} is the error term with 0 mean and constant variance. In addition to the key explanatory variables, U_{it}, S_{it} and US_{it}, defined above,[3] we control for a vector of additional time-varying covariates, X_{ikt} that are described in Table 1 and which in our case

refer to the individual's age. To test hypothesis 1, we test for the sign and statistical significance of the parameters β_u and β_{us}, respectively.

In hypotheses 2a and 2b, we argue that although during the Great Recession the psychological well-being will decline due to the unemployment status, the individual unemployment will have a less negative impact on psychological well-being in high-unemployment localities than in the pre-recession period. To test this hypothesis, we apply the same estimation method used as above and estimate model 2:

$$W_{it} = \beta_0 + \beta_i + d_t + \beta_u U_{it} + \beta_l L_{it} + \beta_s S_{it} + \beta_{ul} UL_{it} + \beta_{us} US_{it} + \beta_{ls} LS_{it} + \beta_{uls} ULS_{it} + \sum_{k}^{N} \beta_k X_{ikt} + \varepsilon_{it} \quad (2)$$

where UL_{it} is the social norm differential effect on well-being of unemployed persons in the high-unemployment local area (treatment group) which is compared with the well-being of those unemployed in the low-unemployment local area (control group captured by U_{it} coefficient). The main variable of interest is, however, ULS_{it} which tests the differential effect of social norm specifically during the Great Recession period (treatment group) as opposed to the pre-recession period (UL_{it}). Accordingly, US_{it} captures the effect on well-being of unemployed during the recession in the low unemployment localities. Furthermore, the local unemployment rate at the LADs level (captured by the variable L_{it}), controls in our empirical model for the areas that get hit by some larger economic shocks outside their control (i.e., such as closing of manufacturing plant that increases the unemployment rate for the region). Finally, the variable LS_{it} presents the high unemployment local areas that are hit during the Great Recession and their differential effect on well-being. To test hypotheses 2a and 2b, we test for the sign and statistical significance of the parameters β_{ul} and β_{uls}, respectively.

An important advantage of the models presented in equations (1) and (2) is that by including the fixed-effects, we incorporate unobserved heterogeneity not captured in the vector of control variables (Boyce, 2010; Chadi, 2014; Gathergood, 2013). The inclusion of the key interaction term variables in all models captures their differential effect on W_{it} score that will be important not only between different groups of individuals but will also vary within individual i.[4]

Correcting for potential endogeneity

It should be noted that the FE estimator provides consistent estimates of the coefficients of time-varying regressors under a limited form of endogeneity. This means that the regressors in equations (1) and (2) may be correlated with the individual fixed-effect, β_i, but not with the error term, ε_{it}. However, there might be possibility of positive self-selection into unemployment based on poor mental well-being in the past. Therefore, we also consider a richer type of endogeneity when the explanatory variables are allowed to be correlated with the error term, whereby we assume that the unemployment status and its interaction terms are endogenous. Although this panel data set does not supply us with potential valid instruments for the variables in question, we apply the first-difference transform of the explanatory variables and derive a set of valid instruments by using the lagged (historical) values of those variables. To address this, we apply a dynamic panel data estimator, also known as the Arellano and Bond (1991) one-step difference GMM estimator which was first proposed by Holtz-Eakin et al. (1988).

The difference GMM has an advantage over the conventional FE estimator as it both removes the individual fixed-effects and accommodates the use of endogenous regressors (Roodman, 2009). This method eliminates the individual effects, β_i, by first-differencing all variables in

equations (1) and (2). Thus, to test hypothesis 1 we transform equation (1) as follows:

$$\Delta W_{it} = \alpha \Delta W_{i,t-1} + \Delta d_t + \beta_u \Delta U_{it} + \beta_s \Delta S_{it} + \beta_{us} \Delta US_{it} + \sum_k^N \beta_k \Delta X_{ikt} + \Delta \varepsilon_{it} \quad (3)$$

where the individual fixed-effects are removed and all other variables have the same meaning as in equation (1), but they are now the first-difference transforms (i.e., $\Delta W_{it} = W_{it} - W_{i,t-1}$, $\Delta X_{it} = X_{it} - X_{i,t-1}$, $\Delta d_t = d_t - d_{t-1}$, $\Delta \varepsilon_{it} = \varepsilon_{it} - \varepsilon_{i,t-1}$). The specification also allows us to include the first-differenced lagged dependent variable ($\Delta W_{i,t-1}$) as the right-hand side variable. This provides a useful dynamic extension of our model since the psychological well-being in the previous year is likely to influence the well-being in the current year. Similarly, we transform equation (2) above to test hypotheses 2a and 2b:

$$\Delta W_{it} = \alpha \Delta W_{i,t-1} + \Delta d_t + \beta_u \Delta U_{it} + \beta_l \Delta L_{it} + \beta_s \Delta S_{it} + \beta_{ul} \Delta UL_{it} + \beta_{us} \Delta US_{it} + \beta_{ls} \Delta LS_{it} + \beta_{uls} \Delta ULS_{it} + \sum_k^N \beta_k \Delta X_{ikt} + \Delta \varepsilon_{it} \quad (4)$$

While the individual fixed-effects are now removed from both equations (3) and (4), the lagged dependent variable is still potentially endogenous, because the $W_{i,t-1}$ term in $\Delta W_{i,t-1} = W_{i,t-1} - W_{i,t-2}$ is correlated with $\varepsilon_{i,t-1}$ in $\Delta \varepsilon_{it} = \varepsilon_{it} - \varepsilon_{i,t-1}$. Similarly, any other variables in (3) and (4) that are not strictly exogenous become potentially endogenous because they also may be correlated with $\varepsilon_{i,t-1}$. However, unlike with the mean-deviations transform in the FE model, longer lags of the regressors (dated $T-2$ and longer), remain orthogonal to the error term and are available as valid instruments (Roodman, 2009). Thus, all possible endogenous regressors such as the lagged dependent variable, the individual unemployment status and the individual unemployment interaction variables are in their first-differences, and they are instrumented by their further lags in levels.[5]

RESULTS

Descriptive statistics

Table 1 shows the descriptive statistics of the dependent and explanatory variables used. The average well-being score (i.e., W_{it}) for the full sample is 10.27, and it is lower for women (9.97) than for men (10.56). The average W_{it} score of the unemployed respondents is lower than that of employed respondents. The average well-being of the unemployed is only slightly lower during the recession than during the whole time period, and this pattern holds both for men and women.[6]

Figure 1 presents the distribution of the psychological well-being scores for both unemployed and employed individuals, and demonstrates that the unemployed experience lower psychological well-being. Figure 2 depicts the geographical differentiation between the unemployment rate and psychological well-being at LADs levels. Figure 2 highlights that those who are unemployed in a LAD where the unemployment rate is high (i.e., high UL_{it}), experience higher psychological well-being than those who are unemployed and reside in a low unemployment local LAD (i.e., low UL_{it}).

Figure 3 examines differences in the psychological well-being of employed and unemployed individuals relative to the overall average unemployment rate at the LADs level before and during the Great Recession period. It shows that unemployed respondents who reside in high-unemployment LADs experience higher levels of well-being than the unemployed respondents residing in low unemployment LADs. However, it is not particularly apparent that the social norm effect is stronger during the Great Recession than in the earlier periods.

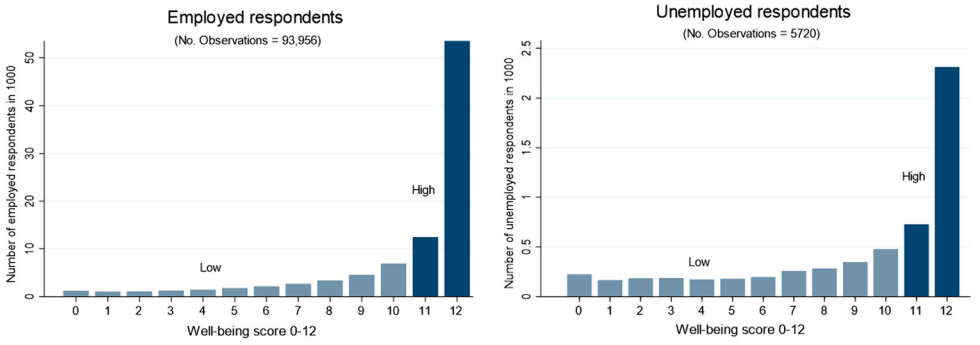
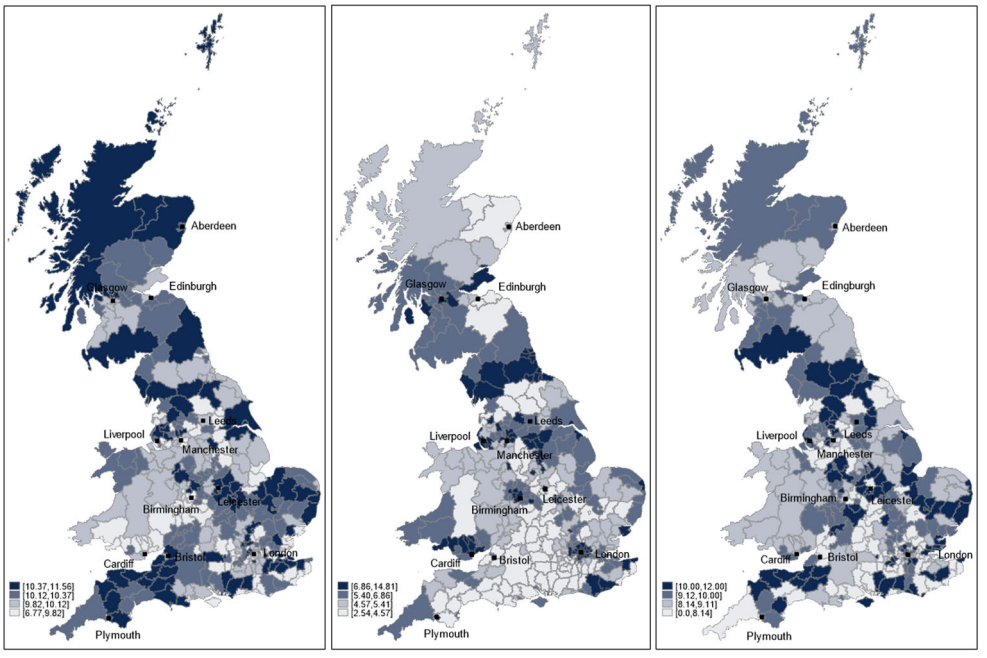


Figure 1. Distribution of well-being scores, 1998–2014.
Note: Descriptive statistics (unweighted) show the discrete distribution of well-being for employed and unemployed respondents. The dark blue bars denote the high well-being scores (≥ 1 SD above the mean W_{it}); light blue indicate the low well-being scores (< 1 SD).



A. Average well-being B. Average unemployment rate C. Average well-being of unemployed

Figure 2. Average well-being and unemployment at the local level.
Note: Dark fields denote the higher average well-being of all respondents (A), higher average local authority districts (LADs) unemployment rate (B) and higher average well-being of unemployed respondents at the LAD level (C). Light fields denote, in contrast, the lower values of these variables.

Difference-in-differences estimations

Table 2 presents the regression results for model 1 which tests hypothesis 1 and examines the effect of being unemployed before and during the Great Recession. Table 3 presents the results for model 2 which tests hypotheses 2a and 2b, examining the social norm effect of being unemployed in a high-unemployment LAD before and during the recession period.

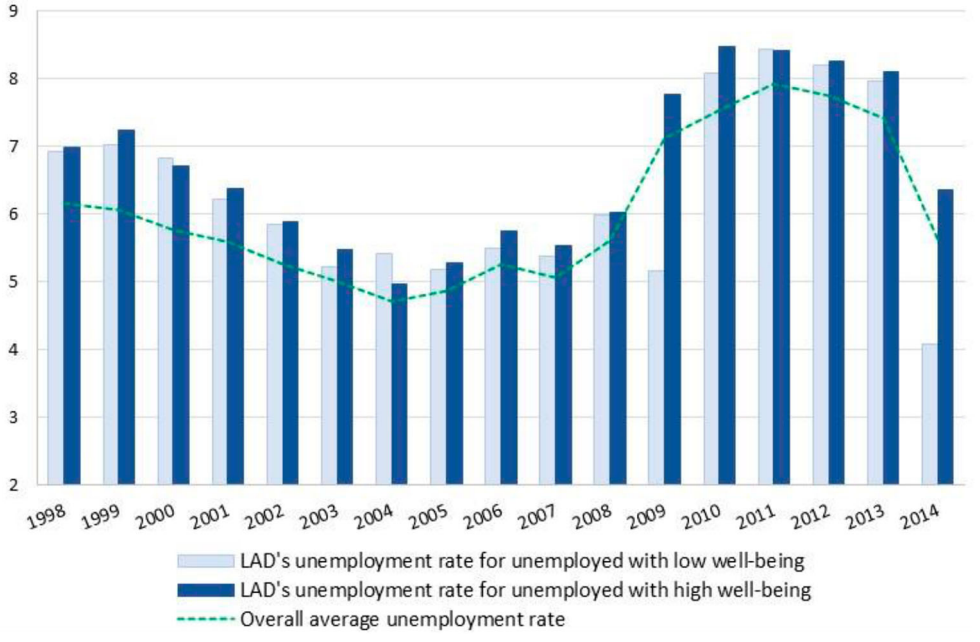


Figure 3. Local authority districts (LADs) unemployment rate and well-being scores, 1998–2014.

The estimations in Tables 2 and 3 are obtained using both the difference-in-differences FE and the dynamic difference GMM panel data estimators. The cluster robust standard errors are presented to adjust for the presence of any heteroskedasticity or serial correlation in the panel data. In each case, a Hausman specification test validates the use of the FE estimator and confirms that it is a consistent estimator, but the random-effects (RE) estimator is not. The F-test of the null hypothesis that the constant term is equal across individuals was also rejected at the 1% level indicating significance of individual fixed-effects. A test of the null hypothesis that the wave dummy variables are jointly equal to zero is also rejected at the 1% level.

To construct a GMM instrument matrix, we first investigated the potential endogeneity of our explanatory variables by using the difference-in-Hansen test. The choice of GMM model was further based on the significance of the estimated coefficients, as well as on the Arellano–Bond test for AR(1) and AR(2) in first differences. The first-differenced residuals should exhibit negative first-order serial correlation but no second-order serial correlation. The p-values for each of these tests confirm these requirements and are presented in Tables 2 and 3. Following this analysis, we treat the individual unemployment variable, U_{it}, and all unemployment interaction terms: US_{it}, UL_{it}, ULS_{it}, used in models 1 and 2, as endogenous. The first-differenced lagged dependent variable ($W_{i,t-1}$) is also instrumented by its further lags in levels. In contrast, the recession shock (S_{it}), the LADs unemployment rate (L_{it}), and their interaction term (LS_{it}) are treated as exogenous.

The GMM estimator uses multiple lags as instruments which count between 323 for model 1 (Table 2) and 480 instruments for model 2 (Table 3). This means that our models are overidentified and this issue needs to be tested. In the case of standard errors adjusted for heteroskedasticity and within firm correlation, the Sargan–Hansen test of overidentifying restrictions would be inconsistent. We report a Hansen J-statistic which has an asymptotic χ^2 distribution under the null hypothesis that the instruments are valid. The p-values of the latter test are presented in

Table 2. Results for model 1: testing hypothesis 1.

	Fixed-effects estimator			Fixed-effects estimator			Difference GMM estimator		
Dependent variable: W_{it}, well-being (score)	**Total (1)**	**Male (2)**	**Female (3)**	**Total (4)**	**Male (5)**	**Female (6)**	**Total (7)**	**Male (8)**	**Female (9)**
U_{it}, unemployed	−1.190***	−1.258***	−1.110***	n.a.	n.a.	n.a.	−1.551***	−1.789***	−1.136***
	(0.074)	(0.095)	(0.116)				(0.142)	(0.176)	(0.236)
S_{it}, recession shock	−0.361	−0.167	−0.544	−0.319	−0.103	−0.495	−0.563*	−0.358	−0.783
	(0.256)	(0.330)	(0.383)	(0.255)	(0.331)	(0.382)	(0.335)	(0.458)	(0.486)
US_{it}, unemployed during the recession	0.030	−0.045	0.129	−0.911***	−1.027***	−0.782***	−0.104	−0.083	−0.076
	(0.124)	(0.152)	(0.204)	(0.113)	(0.141)	(0.183)	(0.347)	(0.416)	(0.601)
$W_{i,t-1}$, lagged well-being	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.085***	0.116***	0.057***
							(0.008)	(0.013)	(0.011)
A_{it}, age	−0.082***	−0.044	−0.119**	−0.067**	−0.025	−0.109**	−0.235***	0.155**	−0.325**
	(0.031)	(0.039)	(0.047)	(0.031)	(0.039)	(0.048)	(0.065)	(0.078)	(0.104)
A_{it}^2, age squared	0.0007***	0.0008***	0.0005**	0.0005***	0.006***	0.00033*	0.002***	0.002***	0.002**
	(0.0001)	(0.0001)	(0.0002)	(0.0001)	(0.0001)	(0.00019)	(0.0006)	(0.0007)	(0.0009)
Individual fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wave fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	99,676	50,984	48,691	99,676	50,984	48,691	64,110	34,008	30,102
Individuals	15,798	7883	7914	15,798	7883	7914	11,143	5690	5453
Waves	15	15	15	15	15	15	13	13	13
F-statistics	21.26***	14.93***	8.08***	8.53***	6.52***	3.46***	15.95***	12.03***	5.66***
Arellano–Bond AR(1) test (*p*-value)		n.a.			n.a.		0.000	0.000	0.000
Arellano–Bond AR(1) test (*p*-value)		n.a.			n.a.		0.401	0.685	0.299
Hansen *J*-test for overidentifying restrictions (*p*-value)		n.a.			n.a.		0.248	0.173	0.372

Notes: Cluster robust standard errors are shown in parentheses. Columns (1) to (3) present the FE model for equation (1), while columns (4) to (6) present the FE model for equation (1) excluding the U_{it}, to confirm the *net* negative effect of unemployment during the Great Recession (US_{it}). Columns (7) to (9) present again the full model, including both U_{it} and US_{it}, but applying the dynamic difference GMM estimator.
***$p < 0.01$, **$p < 0.05$, *$p < 0$.

Table 3. Results for model 2: testing hypotheses 2a and 2b.

Dependent variable: W_{it}, well-being (score)	Fixed-effects estimator			Fixed-effects estimator			Difference GMM estimator		
	Total (1)	Male (2)	Female (3)	Total (4)	Male (5)	Female (6)	Total (7)	Male (8)	Female (9)
U_{it}, unemployed	−1.450***	−1.727***	−1.123***	−1.455***	−1.654***	−1.220***	−2.183***	−2.354***	−2.133***
	(0.178)	(0.224)	(0.286)	(0.152)	(0.196)	(0.239)	(0.328)	(0.392)	(0.581)
L_{it}, high-unemployment LAD	−0.0009	−0.013	0.011	−0.009	−0.017	−0.001	0.005	−0.011	0.030
	(0.008)	(0.010)	(0.013)	(0.007)	(0.009)	(0.011)	(0.022)	(0.026)	(0.031)
S_{it}, recession shock	−0.229	−0.089	−0.364	n.a.	n.a.	n.a.	−0.559	−0.412	−0.460
	(0.259)	(0.335)	(0.391)				(0.586)	(0.729)	(0.802)
UL_{it}, unemployed in high-unemployment LAD	0.045	0.082**	0.002	0.044**	0.062**	0.024	0.108**	0.093*	0.180*
	(0.028)	(0.034)	(0.465)	(0.022)	(0.027)	(0.036)	(0.050)	(0.050)	(0.097)
US_{it}, unemployed during the recession in low-unemployment LAD	−0.092	0.0007	−0.167	n.a.	n.a.	n.a.	−0.977	−0.290	−1.375
	(0.337)	(0.429)	(0.535)				(0.959)	(1.074)	(1.484)
LS_{it}, high-unemployment LAD during recession	−0.021**	−0.011	−0.031*	n.a.	n.a.	n.a.	0.002	0.015	−0.048
	(0.010)	(0.013)	(0.016)				(0.087)	(0.104)	(0.113)
ULS_{it}, unemployed in high-unemployment LAD during recession	0.007	−0.024	0.040	n.a.	n.a.	n.a.	0.101	0.022	0.132
	(0.044)	(0.055)	(0.071)				(0.124)	(0.135)	(0.201)
$W_{i,t-1}$, lagged well-being	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.084***	0.112***	0.054***
							(0.008)	(0.012)	(0.011)
A_{it}, age	−0.082***	−0.045	−0.118***	−0.078**	−0.044	−0.113**	−0.227***	−0.159**	−0.308***
	(0.031)	(0.039)	(0.047)	(0.031)	(0.039)	(0.047)	(0.064)	(0.078)	(0.103)
A_{it}^2, age squared	0.0007***	0.0008***	0.0005**	0.0007***	0.0008***	0.0005***	0.002***	0.002***	0.002**
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0006)	(0.0007)	(0.0009)
Individual fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wave fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	99,676	50,984	48,691	99,676	50,984	48,691	64,110	34,008	30,102

(*Continued*)

Table 3. Continued.

Dependent variable: W_{it}, well-being (score)	Fixed-effects estimator			Fixed-effects estimator			Difference GMM estimator		
	Total (1)	Male (2)	Female (3)	Total (4)	Male (5)	Female (6)	Total (7)	Male (8)	Female (9)
Individuals	15,798	7883	7914	15,798	7883	7914	11,143	5690	5453
Waves	15	15	15	15	15	15	13	13	13
F-statistics	17.92***	12.67***	6.89***	21.32***	15.28***	7.96***	13.53***	10.21***	4.98***
AR(1) test (*p*-value)		n.a.			n.a.		0.000	0.000	0.000
AR(2) test (*p*-value)		n.a.			n.a.		0.351	0.587	0.227
Hansen *J*-test (*p*-value)		n.a.			n.a.		0.216	0.272	0.320

Notes: Cluster robust standard errors are shown in parentheses. Columns (1) to (3) present the FE model for equation (2), while columns (4) to (6) present the FE model for equation (2), including only UL_{it} and excluding the recession variables, to confirm the overall social norm effect; while columns (7) to (9) present the dynamic difference GMM model for equation (2).

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Tables 2 and 3 and we fail to reject the null hypothesis which gives support to validity of the instruments and to the dynamic GMM panel data model.

We also compare the coefficients obtained using the difference GMM estimator with the results obtained using the standard FE estimator. The estimates are very similar overall, but the unemployment dummy variable, presented in Table 3, has a larger negative effect on the well-being score when we apply the difference GMM method in contrast to the FE estimator. Hence, the GMM application demonstrates the importance of controlling for both unobservable heterogeneity and dynamic endogeneity. However, on the other hand the difference GMM estimator is not as efficient as the FE estimator as it is losing some observations due to the first-difference transform. Overall, the potential bias for the FE is very small and the results are consistent for the two model specifications, and so they allow us to properly verify our hypotheses.

Results for model 1

Table 2 presents the results for model 1 that tests hypothesis 1. In line with previous empirical findings, the estimated coefficient for U_{it} is negative and highly significant for all samples. This indicates that individual unemployment status has a negative impact on psychological well-being. The estimated partial coefficients reported in Table 2 are interpreted as direct partial marginal effects of the relevant variables on the psychological well-being. They measure a unit change in the well-being score, W_{it}, caused by a unit change in each of the explanatory variables. Based on the FE results, we find that becoming unemployed decreases the well-being by almost 1.2 points for all individuals, 1.2 points for men and 1.1 points for women. For the difference GMM method, the marginal effect is higher and varies between 1.5 and 1.8. The magnitude of these effects is important to note. Unemployment is psychologically distressing to the extent that it can move an individual from the 'high' well-being group (i.e., 11 and 12 points) to the 'low' well-being group (≤ 10) very easily (Figure 1).

However, neither the recession period (S_{it}), nor the individual unemployment during the Great Recession period (US_{it}), is significant for all samples, implying that we do not accept hypothesis 1. Hence, the results imply that being unemployed during the recession period does not worsen the well-being of unemployed in contrast to those unemployed during the pre-recession period. To strengthen this finding, we exclude the unemployed dummy variable, U_{it}, from columns (4) to (6) of Table 2 and find that US_{it} becomes significant and negative at the 1% level, as expected. The obtained marginal effects indicate that being unemployed during the recession decreases the well-being of individuals by almost the same magnitude as before the recession period. In total magnitude terms, the effect of being unemployment is even lower in the recession period. In contrast to earlier research (Bell & Blanchflower, 2010; Drydakis, 2015; Phillips & Nugent, 2014), our finding suggests that the unemployed individuals will be hurt equally or even less during the recession period than in the pre-recession period.

Results for model 2

Results for model 2, which examines the impact of the social norm to work before and during the Great Recession (i.e., hypotheses 2a and 2b), are presented in Table 3. The coefficient for the social norm effect, UL_{it}, is highly significant and positive for all respondents and for men but not for women. The results indicate that unemployed men in LADs with the high unemployment rates have higher psychological well-being than unemployed men in LADs with low unemployment rates, as depicted by the positive and significant coefficient UL_{it}, accepting our hypothesis 2a. However, the coefficient UL_{it} is not significant for unemployed women in columns (3) and (6) of Table 3. These gender differences in the results with respect to social norm to work are in line with previous findings (Chadi, 2014; Clark et al., 2010).

Accordingly, the marginal effect of the social norm to work, captured by the UL_{it} coefficient, is between 0.04 and 0.11 for all respondents, and between 0.06 and 0.09 for men, while for

women it is not statistically significant for the FE model and only significant at the 10% level in the GMM specification. The results imply that a rise in the unemployment rate in an individual's reference group by 1 percentage point offsets the initial fall in the well-being score for men by 0.09 on the 0–12 well-being score scale.

Our main coefficient of interest, ULS_{it}, which captures the differential effect of the unemployed individuals during the Great Recession period in high-unemployment LADs is not statistically significant for all columns in Table 3. This implies that there is no significant differential impact of being unemployed during the Great Recession period (2008–14) in high-unemployment locality (LAD) in contrast to the pre-recession period (1998–2007). In other words, the social norm has not been reinforced during the Great Recession period – the social norm effect is the same before and during the recession period, and hence we do not accept hypothesis 2b. These findings suggest that the impact of the social norm to work on psychological well-being was neither weakened nor reinforced during the Great Recession. Hence, these findings imply that the Great Recession did not have an impact on the social norm to work which confirm in this respect the results presented by Drydakis (2015).

Furthermore, the LS_{it} coefficient is significant in the FE model specification in Table 3, suggesting that the local unemployment rate during the Great Recession might negatively affect the well-being of women in those localities. This finding is interesting that in terms of social norms, as it suggests the people nearest to you (in your own LAD) matter more than in the entire country. However, this coefficient is never significant for the GMM model or also in our robustness tests (see Table B2 in Appendix B in the supplemental data online), so we cannot draw conclusive findings about this coefficient.

Marginal effects

Table 4 summarizes findings in magnitude terms of the relevant effects. It first reports the marginal effects which are the unit changes of the well-being scores due to the unit changes of the explanatory variables. Second, the semi-elasticities are reported which are the percentage changes in the well-being score, evaluated at the sample mean, relatively to the unit changes of the relevant variables. Table 4 splits the results into an overall effect (i.e., the pre-recession period) and a differential effect during the Great Recession.

Our findings for the pre-recession period indicate that the individual unemployment status decreases the psychological well-being by 11.3–16.4%, for the FE estimator, and the effect is higher and varies between 21.3% and 22.2% using the more robust difference GMM estimator. Moreover, the 1 percentage point increase in the local unemployment rate which is the measure for the social norm to work effect, reduces the negative impact of unemployment for males by 0.6 −0.9% but it has no significant effect for females, for the FE estimator. From this finding, we can predict that an increase in unemployment rate by 5 percentage points would offset the negative effect on well-being by 3–4.5% which is rather a modest change. The offsetting impact of higher unemployment in the local area on the psychological well-being is small in contrast to the overall high negative effect of becoming unemployed. As noted above, we also find that the effect is only relevant for men but not for women, which is in line with other studies (e.g., Chadi, 2014; Clark et al., 2010). One of the explanations for such gender differences might be that women internalize their individual unemployment status as their own fault, in a way that men do not. This would lead women to derive little comfort from the fact that there is a weaker social norm to work in their locality. On the other hand, their social norm to work might also be mitigated by other responsibilities outside the job market, such as caring for children or other family members. However, more research in the future is required to explain why gender differences occur in the impact of unemployment on well-being, and in the functioning of unemployment social norms.

Table 4. Marginal effects and semi-elasticities of the effects.

	Unemployment effect		Social norm effect	
Model and sample	**FE**	**Difference GMM**	**FE**	**Difference GMM**
Overall effect on well-being[a]				
	ΔU_{it}	ΔU_{it}	ΔUL_{it}	ΔUL_{it}
Total	−1.45*	−2.18*	0.044*	0.11*
	(−14.2%)	(−21.2%)	(0.43%)	(1.05%)
Males	−1.73*	−2.35*	0.062*	0.093*
	(−16.4%)	(−22.2%)	(0.59%)	(0.88%)
Females	−1.12*	−2.13*	0.024	0.180*
	(−11.3%)	(−21.3%)	(0.24%)	(1.80%)
Effect on well-being during the Great Recession[a]				
	ΔUS_{it}	ΔUS_{it}	ΔULS_{it}	ΔULS_{it}
Total	−0.91*	−1.33*	0.007	0.101
	(−8.87%)	(−12.9%)	(−0.07%)	(0.98%)
Males	−1.03*	−1.31*	−0.024	0.022
	(−9.72%)	(−12.4%)	(−0.23%)	(0.21%)
Females	−0.78*	−1.43*	0.040	0.132
	(−7.84%)	(−14.3%)	(0.40%)	(1.32%)

Notes: [a]The marginal effect is the unit change in well-being due to the unit change in an explanatory variable. The semi-elasticity is the term in parentheses and denotes the percentage change in well-being score (evaluated at the sample mean) caused by the unit change in an explanatory variable.
*Statistical significance at the 5% level.

For the Great Recession period, the marginal effects and semi-elasticities are slightly different. First, the impact of being unemployed during the Great Recession on individual well-being is significant and negative for both men and women and for the whole sample. However, this effect is smaller than during the pre-recession period. Individual unemployment status decreases the well-being by 7.8–9.7% for the FE model and by 12.4–14.3% for the difference GMM model (Table 4). Moreover, the social norm to work effect, although mostly positive, is not significant during the Great Recession period, as the marginal effects are not significant in contrast to the pre-recession period. Therefore, unemployed people in the high unemployment areas during the Great Recession experienced no change in well-being relative to the overall period.

Robustness checks

We also apply a number of robustness checks to test the sensitivity of our empirical results to the changes in the variables and the data sample used. As the initial panel is unbalanced, we first want to ensure that the same individuals remain in the panel for a longer time period. We apply the same regressions using the FE estimator as those presented in Tables 2 and 3, but we include in the analysis only those individuals who remain for at least 12 waves in the panel (see Tables B1–B3 in Appendix B in the supplemental data online for the additional regression results). In this specification, approximately 75% of respondents remain in the sample for the entire time period. Both marginal effects and semi-elasticities are very close to those presented in Table 4.

To test for any sensitivity to how we defined the Great Recession period (i.e., 2008–14), we respecified it as 2008–12 and 2008–13, respectively, and found that the results for these specifications did not change. As a final robustness check, we run separate regressions excluding (1) respondents who were unemployed more than once and (2) respondents who were unemployed for the first time in pre-recession and the second time (third or fourth time, etc.) during the recession. This robustness test aims to check if the unemployed in the above categories are less distressed than those who are unemployed only once. The results from this robustness test did

not change from our main results.[7] This additional robustness test confirms that the results are not driven by individuals who become unemployed more than once in the sample.

CONCLUSIONS

The Great Recession that followed the global financial crisis of 2007 led to a major unemployment shock in most developed economies. Unemployment is associated with negative well-being more so than any other factor. Many studies argue that the increased financial strain and rising stress brought on by the economic conditions of the Great Recession should increase this negative effect. To address this issue, this paper constructed a rich UK panel data set on 15,798 individuals from 1998 to 2014 and it investigated what effect being unemployed in the Great Recession (2008–14) has on individual's self-rates psychological well-being relative to the preceding non-recession period.

We apply the robust difference-in-differences FE and GMM models that control both for unobserved individual heterogeneity and for any form endogeneity of the unemployment variable. The empirical results indicate that individual unemployment has a large negative effect on individual well-being. However, there is not enough evidence to suggest that the well-being of unemployed persons decreases further during the Great Recession period relative to the preceding period of economic recovery and expansion. Moreover, the effect of being unemployed is found to be even slightly smaller during the Great Recession period than during the pre-recession period. Based on the calculated marginal effects and semi-elasticities, while becoming unemployed decreases the well-being by 14% for all respondents in the sample, during the Great Recession their well-being falls by 9%. In contrast to Drydakis (2015), our finding suggests that the unemployed individuals will be hurt equally or even less during the recession period than in the pre-recession period. Our results are more in line with Brand (2015), who suggests that the psychological cost of unemployment may be lower in the context of a deep and prolonged unemployment crisis because individuals blame the overall economic conditions as opposed to themselves.

In addition, the mental distress of unemployment can be lower in local areas with a high unemployment rate due to social norms. Therefore, our second main finding concerns the role social norms played in moderating the effect on unemployment on psychological well-being during the Great Recession. It is important to note that while the overall national unemployment rate may rise significantly, in any geographical area, it may rise well above or fall well below this new average. It is at these granular levels where social norms surrounding unemployment and work are likely to develop and be enforced. This paper used data on the unemployment rate in 249 UK LADs to test whether unemployment hurt less in high unemployment local areas during the Great Recession period relative to the preceding period. The results indicate that during the pre-recession period (1998–2007), the psychological well-being of unemployed males living in high-unemployment localities is less negatively affected than the well-being of unemployed men living in low-unemployment localities, confirming the social norm effect. The lower well-being of unemployed males in a high-unemployment locality will be offset by about 1%. However, during the Great Recession period the social norm to work ceased to have any additional moderating effect and these findings confirm in this respect the results presented by Drydakis (2015).

We also found that the bias from self-selection into unemployment due to a lower well-being is very small, as the results are consistent between FE and GMM models. These robust empirical results ensure that we can be confident that the line of causality runs from unemployment to low psychological well-being, rather than the other way around (Schmitz, 2011). The overall findings of this study suggest that unemployed individuals suffer equally or even less during the Great Recession. In addition, during the Great Recession social norms surrounding unemployment

did not have a smaller or larger effect on well-being than during the pre-recession period. Hence, we find that there has been no departure from the standard social norm to work effect during the Great Recession but the social norm to work was equally neither mitigated nor reinforced during this period. Finally, a consistent result across the estimations is that social norms of unemployment have a significant effect for men, but no significant effect for women. Recently, Beer et al. (2019) have highlighted the important role gender can play in the various impacts of unemployment at the local level. Though beyond the scope of this paper, future research would benefit from a close examination of gender differences in the effects of social norms of unemployment.

NOTES

[1] Though geographical proximity is commonly used to operationalize social norms, is a narrow definition for the reference group of relevant others. In an increasingly globalized world, characterized by widespread access to the internet and use of social media, proximity could also transcend physical borders. However, an important aim of this study is to build on previous research that operationalizes the social norm at the regional level by using a more granular measure of the social norm at the local level.

[2] Its construction was hugely labour intensive as data for each LAD, for each year, had to be input manually.

[3] While the wave fixed-effects control for the effects that are common for all individuals but differ between the waves, the *S*-variable controls specifically for the shifts in the well-being score for all individuals in the sample and for all the recession years.

[4] The ordinary linear regression is certainly an appropriate tool in happiness research, although economists, in particular, have always been rather reluctant to interpret the well-being scores as cardinal (e.g., Clark & Oswald, 1994). However, Chadi (2014, p. 1115) rightly argues that 'the consideration of fixed individual effects is indeed substantial and likely to be more important than the ordinality of the life satisfaction responses'.

[5] After first-differencing the data, the lags such as, for example, $W_{i,t-2}$ or $U_{i,t-2}$ or further lags, are uncorrelated with $\Delta\varepsilon_{it}$ and they can be used as instruments for $\Delta W_{i,t-1}$ or ΔU_{it}, respectively. This makes the endogenous variables predetermined and not correlated with the error term ε_{it}.

[6] For a more detailed description of summary statistics from Table 1, see Appendix A in the supplemental data online.

[7] Of all 15,798 individuals, 79% of respondents were never unemployed. Of the 21% who were unemployed at some point in time, the vast majority (2107 respondents, or 13.3% of all respondents) were unemployed *only once*, while 3.4% of all individuals were unemployed twice, and 1.6% were unemployed three times, whereas only the remaining 1.4% of respondents were unemployed more than three times, and 0.6% respondents were unemployed before and then during the recession.

ACKNOWLEDGEMENTS

Access to the British Household Panel Survey (BHPS) and Understanding Society data was obtained via the UK Data Service. This research does not contain any studies performed by any of the authors with human participants or animals. Kevin Mulligan wishes to acknowledge the supervision of Helena Lenihan on a MSc dissertation, which contributed to the initial development of this study. The authors are also grateful for comments on earlier versions of this paper from participants at the 2015 RSA Irish Branch Annual Conference and the Road to ERSA 2018 Workshop. The views expressed in this paper, and any remaining errors or omissions, are our own.

DISCLOSURE STATEMENT

No potential conflict of interest was reported by the authors.

ORCID

Kevin Mulligan http://orcid.org/0000-0001-7870-2430
Marta Zieba http://orcid.org/0000-0002-9116-2413

REFERENCES

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies*, *58*(2), 277–297. https://doi.org/10.2307/2297968

Becchetti, L., Corrado, L., & Fiaschetti, M. (2017). The regional heterogeneity of wellbeing 'expenditure' preferences: Evidence from a simulated allocation choice on the BES indicators. *Journal of Economic Geography*, *17*(4), 857–891. https://doi.org/10.1093/jeg/lbw042

Beer, A., Weller, S., Barnes, T., Onur, I., Ratcliffe, J., Bailey, D., & Sotarauta, M. (2019). The urban and regional impacts of plant closures: New methods and perspectives. *Regional Studies, Regional Science*, *6*(1), 380–394. https://doi.org/10.1080/21681376.2019.1622440

Bell, D. N., & Blanchflower, D. G. (2010). UK unemployment in the Great Recession. *National Institute Economic Review*, *214*(1), R3–R25. https://doi.org/10.1177/0027950110389755

Bernhard, H., Fehr, E., & Fischbacher, U. (2006). Group affiliation and altruistic norm enforcement. *American Economic Review*, *96*(2), 217–221. https://doi.org/10.1257/000282806777212594

Boyce, C. (2010). Understanding fixed effects in human well-being. *Journal of Economic Psychology*, *31*(1), 1–16. https://doi.org/10.1016/j.joep.2009.08.009

Brand, J. (2015). The far-reaching impact of job loss and unemployment. *Annual Review of Sociology*, *41*(1), 359–375. https://doi.org/10.1146/annurev-soc-071913-043237

Burgard, S., & Kalousova, L. (2015). Effects of the Great Recession: Health and well-being. *Annual Review of Sociology*, *41*(1), 181–201. https://doi.org/10.1146/annurev-soc-073014-112204

Catalano, R., Goldman-Mellor, S., Saxton, K., Margerison-Zilko, C., Subbaraman, M., LeWinn, K., & Anderson, E. (2011). The health effects of economic decline. *Annual Review of Public Health*, *32*(1), 431–450. https://doi.org/10.1146/annurev-publhealth-031210-101146

Chadi, A. (2014). Regional unemployment and norm-induced effects on life satisfaction. *Empirical Economics*, *46*(3), 1111–1141. https://doi.org/10.1007/s00181-013-0712-7

Clark, A. E. (2003). Unemployment as a social norm: Psychological evidence from panel data. *Journal of Labor Economics*, *21*(2), 323–351. https://doi.org/10.1086/345560

Clark, A. E. (2011). Income and happiness: Getting the debate straight. *Applied Research in Quality of Life*, *6*(3), 253–263. https://doi.org/10.1007/s11482-011-9150-x

Clark, A. E., Knabe, A., & Rätzel, S. (2010). Boon or bane? Others' unemployment, well-being and job insecurity. *Labour Economics*, *17*(1), 52–61. https://doi.org/10.1016/j.labeco.2009.05.007

Clark, A. E., & Oswald, A. J. (1994). Unhappiness and unemployment. *The Economic Journal*, *104*(424), 648–659. https://doi.org/10.2307/2234639

Dolan, P., Peasgood, T., & White, M. (2008). Do we really know what makes us happy? A review of the economic literature on the factors associated with subjective well-being. *Journal of Economic Psychology*, *29*(1), 94–122. https://doi.org/10.1016/j.joep.2007.09.001

Drydakis, N. (2015). The effect of unemployment on self-reported health and mental health in Greece from 2008 to 2013: A longitudinal study before and during the financial crisis. *Social Science & Medicine*, *128*, 43–51. https://doi.org/10.1016/j.socscimed.2014.12.025

Dunlop, S., Davies, S., & Swales, K. (2016). Metropolitan misery: Why do Scots live in 'bad places to live'? *Regional Studies, Regional Science*, *3*(1), 379–398. https://doi.org/10.1080/21681376.2016.1209981

Egan, M., Daly, M., & Delaney, L. (2016). Adolescent psychological distress, unemployment, and the Great Recession: Evidence from the National Longitudinal Study of Youth 1997. *Social Science & Medicine*, *156*, 98–105. https://doi.org/10.1016/j.socscimed.2016.03.013

Fehr, E., & Gächter, S. (2000). Cooperation and punishment in public goods experiments. *American Economic Review*, *90*(4), 980–994. https://doi.org/10.1257/aer.90.4.980

Frey, B., & Stutzer, A. (2002). What can economists learn from happiness research? *Journal of Economic Literature*, *40*(2), 402–435. https://doi.org/10.1257/jel.40.2.402

Gathergood, J. (2013). An instrumental variable approach to unemployment, psychological health and social norm effects. *Health Economics*, *22*(6), 643–654. https://doi.org/10.1002/hec.2831

Holtz-Eakin, D., Newey, W., & Rosen, H. (1988). Estimating vector autoregressions with panel data. *Econometrica*, *56*(6), 1371–1396. https://doi.org/10.2307/1913103

Jahoda, M. (1982). *Employment and unemployment: A social–psychological analysis*. Cambridge University Press.

Jaimovich, N., & Siu, H. E. (2012). *Job polarization and jobless recoveries* (National Bureau of Economic Research Working Paper). https://www.nber.org/papers/w18334.pdf

Phillips, J., & Nugent, C. (2014). Suicide and the Great Recession of 2007–2009: The role of economic factors in the 50 U.S. States. *Social Science & Medicine*, *116*, 22–31. https://doi.org/10.1016/j.socscimed.2014.06.015

Pissarides, C. (2013). Unemployment in the Great Recession. *Economica*, *80*(319), 385–403. https://doi.org/10.1111/ecca.12026

Roodman, D. (2009). How to do xtabond2: An introduction to difference and system GMM in Stata. *The Stata Journal: Promoting Communications on Statistics and Stata*, *9*(1), 86–136. https://doi.org/10.1177/1536867X0900900106

Schmitz, H. (2011). Why are the unemployed in worse health? The causal effect of unemployment on health. *Labour Economics*, *18*(1), 71–78. https://doi.org/10.1016/j.labeco.2010.08.005

Stutzer, A., & Lalive, R. (2004). The role of social work norms in job searching and subjective well-being. *Journal of the European Economic Association*, *2*(4), 696–719. https://doi.org/10.1162/1542476041423331

University of Essex. Institute for Social and Economic Research, NatCen Social Research, Kantar Public. (2017). *Understanding society: Waves 1–7, 2009–2016 and harmonised BHPS: Waves 1–18, 1991–2009* [data collection] (9th ed.). UK Data Service. SN: 6614. http://doi.org/10.5255/UKDA-SN-6614-10

Van Ours, J. C. (2015). The Great Recession was not so great. *Labour Economics*, *34*, 1–12. https://doi.org/10.1016/j.labeco.2015.02.001

Weinstein, A., & Patrick, C. (2020). Recession-proof skills, cities, and resilience in economic downturns. *Journal of Regional Science*, *60*(2), 348–373. https://doi.org/10.1111/jors.12446