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Welfare reform: Employment, mental health and intrahousehold insurance

Mike Brewer
Resolution Foundation

Thang Dang
Norwegian Institute of Public Health

Emma Tominey
University of York

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Highlights

- We estimate the treatment effect on claimant's mental health, and future employment transitions. We also analyse intrahousehold responses by looking at spillovers of the treatment effect for non-treated, i.e., partners and children.
- UC increased mental health problems but particularly for those with fewer insurance possibilities (lone parents and single adults). In households with a couple, the partner increased their labour supply in response to the reform and the claimant themselves did not experience a negative mental health effect. UC also increased employment of claimants, but mostly this was into part-time work.
- This is the fullest evaluation of the costs and benefits of UC so far. The employment effects were mostly into the lower quality part-time jobs, which have been shown to have little human capital and career development.

Why does this matter?

Universal Credit cost around £15billion to implement. It had very modest employment effects but created mental health problems.

Welfare Reform: Employment, Mental Health and Intrahousehold Insurance

Mike Brewer
Resolution Foundation

Thang Dang
Centre for Fertility and Health, Norwegian Institute of Public Health

Emma Tominey
Department of Economics, University of York; HCEO; IZA

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Abstract

The UK Universal Credit (UC) welfare reform simplified the benefits system, combining six benefit applications into one, whilst creating strict incentives for full-time employment. Exploiting a staggered roll-out, we analyse the impact of entering unemployment under UC compared to the former system on mental health, future employment transitions and intrahousehold labour supply reactions. Groups with fewer intrahousehold insurance possibilities - single adults and lone parents – experience a mental health deterioration of 8.4-13.9% sd. Whilst these groups experience an increase in employment transition, it is to part-time work. For couples UC creates an intrahousehold reaction, increasing partners' labour participation and UC partially or fully mitigates the mental health consequences of unemployment.

Keywords: Welfare reform; Mental health; Employment transitions; Universal Credit; Intrahousehold insurance
JEL codes: D13; D61; H53; I10; I14; I38; J2

1 Introduction

Governments allocate significant funds to welfare payments, which account for approximately 20% of public expenditure in OECD, UK and US[1]. Efficient delivery of the welfare state is a common objective for governments, balancing the need to provide a safety net for individuals against the goal of incentivizing self-sufficiency through work (Barr 1992; Hartley et al. 2022). Too much focus on providing a generous safety net can lead to too many individuals claiming welfare, whilst too draconian incentives can result in unintended consequences such as claimant mental health issues (Blank 1997; Blank 2002; Melander and Miotto 2023).

In this paper we evaluate a major overhaul of the welfare state in the UK - Universal Credit (UC). The former 'legacy' system was comparable to many welfare systems across the world and offered a set of benefits depending on different needs. UC instead simplified the benefit system by combining six of the largest benefit payments into one. Simultaneously, the implementation of UC strengthened the incentives to move off welfare and into sustainable full-time employment, through policy rules including changes in benefit income (Brewer et al. 2012) and increased conditionality of compulsory intensive job search of up to 30 hours per week for unemployed or low income claimants. Failure to meet the rules is punishable with benefit sanctions.[2] In moving to a stricter welfare regime, we ask whether the welfare reform created mental health effects and whether it successfully moved claimants into employment.

As UC was rolled out across the UK, benefit claimants would become eligible for UC if they experienced a change in their circumstances, such as a change in employment status. Therefore, our paper analyses the differential effect of entering unemployment under UC relative to the former welfare system on mental health and future employment transitions.[3]

Using the UK Household Longitudinal Study (UKHLS) combined with detailed administrative data on the UC rollout, we make three main contributions to the literature. First, we evaluate the effect of a stricter but simplified benefit regime on contemporaneous mental health of unemployed individuals. As many countries across the world face a similar challenge of providing a simple benefits system with incentives to move into employment, the analysis will shed light on whether it is possible do so, whilst protecting claimants' mental health.[4]

[1] In the UK, this is represents around 11% of national income (Office for Budget Responsibility 2017).

[2] The six legacy benefits combined into UC include Income Support, Income Based Jobseeker's Allowance, Income-Related Employment Support Allowance, Housing Benefit, Child Tax Credit and Working Tax Credit.

[3] In the paper we refer to the treatment effect as this differential effect of unemployment under UC compared to the former system called 'legacy'.

[4] Wickham et al. (2020) also study the mental health effect of UC, estimating a different parameter to ours. Whilst Wickham et al. (2020) compare a group of unemployed individuals to employed individuals, before and after the UC

In all estimates, we allow for treatment effect heterogeneity across household composition, distinguishing between single adult, lone parent and couple (with and without children) households. The UC welfare reform may lead to a heterogeneous treatment effect on mental health for households with just one adult compared to households with couples due to different insurance possibilities. An unemployed individual living with a partner can potentially protect against changes in benefit income or stress from stricter job search through changes in the spouse's labour supply or offering of support (see for example Cullen and Gruber 2000; Tominey 2016). However single adult households may be more vulnerable to the welfare reform. Estimating differential treatment effects across household composition is particularly important for policies aiming to minimise the negative unintended consequences from welfare reform.

Our second contribution is to estimate the effect of the strengthened incentives to work on employment transitions in period $t+1$ (the period after the spell of unemployment). A large literature has documented the long-run scars from repeated spells of unemployment, therefore a positive outcome from welfare reform would be to place claimants into well matched jobs, associated with career progression and skill accumulation.[5] To differentiate the quality of the employment transitions, we make a distinction between part- and full-time transitions, where the former has been found to lead to low skill accumulation (Blundell et al. 2016).

A third contribution is to examine the spillovers of UC onto other members of the household. If an individual is exposed to a stricter policy regime, their partner or child may absorb any mental health effects themselves, magnifying the total effect of the policy. On the other hand, living with a partner may partially mitigate some of the negative consequences of treatment if the partner responds by adjusting their labour supply (Goux et al. 2014). We estimate the treatment effect of UC on the mental health and labour supply of the partner, interactions between the parent and child and on the child's mental health (where a partner or child exist).

Our first finding is that compared to the former legacy system, UC exacerbates mental health problems among the unemployed for groups with fewer insurance possibilities - single adults and lone parents, by 8.4% and 13.9% of a standard deviation, respectively. The results are different for individuals living with a partner, who experience a zero or positive treatment effect on their mental health. To explain this difference, we explore an intrahousehold analysis which shows that

roll-out, our paper focuses specifically on the individuals within a roll-out area who were eligible for UC owing to a change in unemployment status. We evaluate the relative merit of UC in mitigating for mental health effects of entering unemployment.

[5]For papers on the longer-run negative effects of employment disruption, see Kletzer (1998) and Jarosch (2023).

in response to the focal individual's treatment (of entering unemployment whilst eligible for UC), partners' increase their labour supply across the extensive and intensive margins.

It is intuitive that a stricter welfare regime may reduce claimant's mental health, but this negative consequence may trade-off with a benefit of the welfare reform of placing individuals into high quality employment. Results show a positive treatment effect on employment transitions in $t+1$, with newly unemployed UC eligible more likely to be in employment in the subsequent year. However this movement is into part-time employment, suggesting very little long-term benefit of human capital accumulation or career progression (Blundell et al. 2016). The exception is couples without children, who experience a transition into full-time employment.

The final analysis asks, given the labour supply and mental health treatment effects, are there spillovers of the treatment effect of UC to children in the household. Results on a sub-sample of 10-15 year olds indicates that parent-child interactions are lower when the unemployed individual is eligible for UC and, for children of lone parents, there is a reduction in child happiness.

To identify the treatment effect of UC on the mental health of participants, we exploit a staggered roll-out across areas of the UK between 2013–2018 which started in the North of England and slowly moved across the whole country. So as not to overwhelm the roll-out, not all benefit claimants within a roll-out area were eligible for UC, but just those changing their employment or housing status whilst satisfying eligibility rules (explained in Section 2.4). Given this, our identification strategy estimates a panel data model with fixed effects at the individual, region and time level. This identifies the effect on mental health and employment transitions of entering unemployment under the UC versus legacy system. The intuition for the identification strategy is to compare two similar individuals who enter unemployment under different welfare systems. Whilst the effects of an individual entering unemployment across time or claiming a benefit are potentially endogenous, the focus is on the differential effect of an individual entering unemployment under the two systems. This parameter is causally identified if the roll-out is exogenous, if the common trends assumption holds and as long as there is no treatment effect heterogeneity across the timing of roll-out. We show that our strategy is robust to these assumptions.

Our paper is relevant to several strands of the economics literature. First, a large literature has linked the design of unemployment compensation programmes to labour market outcomes including employment trajectories (Nickell 1979; Narendranathan et al. 1985; Atkinson and Micklewright 1991), the duration of the unemployment spells among benefit recipients (Katz and Meyer 1990; Card and Levine 2000; Nicholson and Needels 2006; Lalive 2007; Lopes 2022) and job search effort

(Marinescu and Skandalis 2021). Going beyond labor market effects, Wanberg et al. (2020) has estimated the psychological well-being effect of unemployment compensation programmes. Our paper relates to this line of research by showing that key changes in benefit levels along with the conditions for receiving these benefits such as tightening job search requirements drive not just employment transitions, but claimant's mental health.

Second, the paper speaks to the central question of the consequences of welfare reform (Blank 2002). Previous studies on this research topic has initially focused on employment which is typically the direct target of welfare reforms (Brewer and Hoynes 2019). Accordingly, welfare reforms are helpful in raising labour supply for the affected working age population including those on disability benefits (Koenig et al. 2019), lone parents' (Brewer et al. 2006; Francesconi and Van der Klaauw 2007; Gregg et al. 2009; Codreanu and Waters 2023) and immigrant labour participation (Borjas 2003). The literature has been extended to consider broader human capital outcomes, such as improving subjective well-being for single mothers (Herbst 2013), parental behaviours (Kalil et al. 2022) and lifelong child human capital (Bailey et al. 2020) as well as other unintended consequences including disparities in political outcomes (Fetzer 2019) and increasing criminal activities (Giulietti and McConnell 2020; Tuttle 2019; Watson et al. 2019).

Third, the simplicity of the application process for welfare is a tool that can be used to effectively screen potential claimants. With increased costs in the application procedure, individuals with high opportunity costs who are high ability may opt out, improving targeting (Nichols et al. 1971). In practice evidence has suggested that increased application costs can deter high need individuals, such as those with most severe needs and low education, from making claims (Deshpande and Li 2019). In our application, the welfare reform simultaneously simplified benefit system whilst changing benefit levels and conditionality and we examine whether this reform was welfare enhancing or decreasing.

Finally, there is a small literature relating specifically to the UC effect. For example, Wickham et al. (2020) estimate the difference-in-difference effect of being unemployed versus employed, on mental health, measured across the years of rollout. Our contributions relative to Wickham et al. (2020) are i) to implement a triple difference model to identify more clearly the eligibility to UC, which switches on not just from living in a rollout area but also requiring changing employment status; ii) all of our analysis allows for heterogeneous treatment effect by household composition which turns out to be very important for the results which evidences intrahousehold insurance against negative mental health effects of the treatment; iii) we causally identify the treatment effect

on employment transitions which helps to understand whether the movements into employment are large enough to compensate for mental health effects. In addition, d'Este and Harvey (2022) estimate the effect of UC on criminal activities at a more macro area level, showing an increase in local crimes including burglaries and vehicle crimes.

The UC welfare reform has been recognised as the most radical social security reform in the UK for over 60 years (Dwyer and Wright 2014) and is estimated to cost £15 billion to implement. A "back of the envelope" calculation shows that for every single adult, lone parent or individual living as a couple with no children moved into work, 0.6, 0.3, 1.16 and 1.27 from each group develop a mental health problem. However, the employment transitions tended to be into lower quality part-time work, which does not generally contribute towards longer-run human capital accumulation (Blundell et al. 2016). On the other hand, mental health problems are costly, estimated to cost the economy around £11,992 a year, partly through lost productivity (McDaid et al. 2022), suggesting that the costs of the harsher welfare system will not outweigh the benefits.

2 Welfare system in the UK

The UK Welfare Reform Act of 2012 legislated for UC, a major reform aimed at simplifying the welfare system by replacing six means-tested benefits and in-work tax credits into one benefit. This reduced the administrative burden to applicants and welfare offices. Whilst previously benefit applicants would have to navigate different government departments and apply for benefits via telephone or paper forms, under UC claimants make one online application.

2.1 Former system

UC replaced the former benefit system, which we will refer to as the legacy system. The legacy system is common in most OECD countries, whereby a set of benefits exist for different purposes. Individuals claim separately for each benefit they are eligible for including housing benefit, income-based jobseeker's allowance (JSA), income-related employment and support allowance (ESA), income support (including support for mortgage interest), child tax credit and working tax credit (see Appendix Section 2.1 for details).[6] In general a benefit payment under the legacy system was made every 1-2 weeks to the individual claimant, except in the case of housing benefit which was paid to the landlord.

[6]Other benefits not included in the reform include disability living allowance, contribution-based JSA, contribution-based ESA, carer's allowance and child benefit.

2.2 Universal Credit

Whilst the overall objective of UC was to align six benefits into one, in practice UC was implemented along with several other individual policy changes, which aimed at providing incentives to move into sustainable employment and out of the welfare system.

Benefit levels. The total benefits paid out by the government increased through UC partly as a result of increased take-up rates, and partly as entitlements for some groups were higher under UC than the legacy system (Brewer et al. 2012). Yet, there were distributional changes in benefit income received by different groups of individuals, designed to strengthen incentives to work where these were previously weakest, including low income households (Brewer and Hoynes 2019). For example, employed couples received the greatest increase in benefits and single parents received the greatest loss. For individuals with no children, UC enabled benefit claims even if they were in low paid employment whilst under legacy there were no in work benefits for this group, which would increase incentives to move into employment.

Increased conditionality: the job search requirement. All UC claimants sign a "claimant commitment" which stipulates an intense job search criteria for either claimants out of work, receiving a low income or working just a few hours. The intention was to incentivise individuals to move into full-time employment at a self-sufficient wage, i.e. to move off welfare. To claim UC, individuals including non-parents or single parents of a child aged three or over (or five or over for before April 2017) were expected to meet the *full work-related requirements* which consist of actively spending 30 hours per week on job search. Upon being offered a job, claimants were obliged to accept if they were unemployed, or if the job increased their work hours and earnings for those already working. These activities were supported and monitored by an assigned work counsellor.[7] Failure to adequately meet this work-related commitment without acceptable reasons resulted in benefit sanctions (non-payment) - although note that the specific policy of sanctions applied across both the legacy and UC systems (see Williams 2020). The severity of the sanctions varied across the work requirement missed. The lowest level of sanction would prohibit benefits until a missed work-related meeting with the work counsellor had taken place; whilst a highest level stopped benefits for 3 months, for example if a job offer was not taken up.

[7]Several UC claimants with specific conditions are exempt from the full work-related requirements if they have one of the following conditions: insufficient ability for work or work-related activities, eligible for pension credit, pregnant and within 11 weeks of the due date, caring responsibility for a severely disabled individual or an under-one year old child, students who are aged under 21 without parental support and have a student loan or grant which will be deducted from the benefit payment, students in a couple with a student loan or grant which will be deducted from the benefit payment, or a victim of domestic violence (would be given a 13-week duration of work-related requirement exemption).

Changes in administration of payments. UC introduced a wait of at least five weeks between the UC application and receipt of the benefit which compares to 1-2 weeks under legacy.[8] A further change under UC was payment of housing benefits to the claimants rather than under legacy straight to the landlord.

As the policies shift the balance towards stronger incentives to work, at the potential cost of claimant welfare, a full evaluation should consider the UC effect on mental health in addition to employment transitions.

2.3 UC roll-out

The implementation of UC roll-out is managed by the Department of Work and Pensions (DWP). The welfare reform required substantial changes in the technology of processing welfare payments and as such UC was rolled out across local authorities slowly across time.

Figure 1 demonstrates the national expansion of the UC roll-out coverage between April 2013 and December 2018. The figure shows that by April 2013 the "Pathfinder" areas had incorporated UC into their welfare systems. There followed a quick expansion across 2015 and by the end of 2018 all local authorities in the UK had rolled out UC to some claimants.

2.4 UC eligibility

Whilst the roll-out of UC took place between 2013–2018, individuals living in a UC roll-out local authority would become eligible for UC only if they satisfied eligibility (or gateway) criteria - residing in a roll-out area, with a change to their employment or housing circumstances, single with no partner or children and aged 18–60, with no or low income (under £270 (or £330) per month if under (or older than) 25 years old), not self-employed, not in education or homeless, had savings no higher than £16,000 and if they accepted a 'claimant commitment' to work-related requirements.[9]

These conditions were changed in the following years to expand the coverage of UC whereby couples without children became eligible from July 2014 and households with children from January 2016. In our analysis, we exploit the regional roll-out variation for our identification, comparing two individuals with the same characteristics entering unemployment under two different policy regimes. Analysis is run separately across household composition and consequently for identification, we

[8] From the initial pilot, DWP learnt that the delay in benefit payments led claimants to struggle to pay their bills and so from April 2014, claimants could apply for a loan (known as a UC advance) to cover their bills or living expenditures until their first payment was received. The advance is paid off across the subsequent 12 months, taken directly from the welfare payment.

[9] This strict condition allowed DWP to prevent a rush of applicants transferring from the legacy system to UC within a local authority.

exploit the geographical variation in roll-out rather than the policy variation related to individuals' traits.

As of July 2019, the UK government planned a "managed migration" where all benefit claimants would be moved to UC. A pilot was initiated in Harrogate, Yorkshire, postponed in March 2020 due to COVID but re-started in June 2022. The current plan is to have UC as the only welfare system in the UK by 2026.

3 Data

The main data source is the UK Household Longitudinal Study (UKHLS), matched with detailed administrative data on the roll-out of UC. The UKHLS is a large and nationally representative panel survey which replaced the former British Household Panel Survey (BHPS). Our study uses a panel sample of UKHLS including waves 1 (2009–2011), wave 2 (2010–2012), wave 3 (2011–2013), wave 4 (2012–2014), wave 5 (2013–2015), wave 6 (2014–2016), wave 7 (2015–2017), wave 8 (2016–2018) and wave 9 (2017–2019). This survey design is suitable for evaluating the effect of UC, which rolled out between 2013–2018. Each UKHLS wave contains information including socio-economic and demographic status, health, employment and social benefits of about 40,000 households in wave 1, across the United Kingdom.

Because the strict age condition for claiming UC is between 18 and 60, our main sample is constructed based on an unbalanced panel sample of working-age individuals aged 18–60. To investigate if the treatment effect of being eligible for UC on mental health among newly unemployed individuals is heterogenous across household composition, we separate our total sample into different subgroups for the analysis: single adults, lone parents, couples without children and couples with children in each survey wave.

Our total sample consists of 199,563 individual-year observations aged 18-60 in which there are 49,571 individuals and on average one individual appears in six UKHLS waves. Other sub-samples include 54,326, 15,457, 72,733, 57,047 individual-year observations for single adults, lone parents, couples without children and couples with children. Table 1 presents summary statistics of key variables for the total sample (columns 1-2), and for the sub-samples defined by household composition (columns 3-6). In the following sub-sections, we report details construction of key variables in the analysis.

3.1 Eligibility for UC

Across time eligibility to UC varied across region and across a set of criteria linked to individual traits. An indicator for living in a UC roll-out area is constructed from high-quality administrative data containing the year and month of UC roll-out across the local authority districts based on the information released by the Department for Work and Pensions and the UK Parliament (see Department for Work and Pensions 2018; House of Commons Library 2018). This data is merged into the UKHLS sample based on indicators for the local authority district along with the interview month to define eligibility in the specific month that we observe individuals.

Individuals are eligible for UC if they live in a roll-out area and satisfy some gateway conditions. Given this, eligibility for UC takes the value of 1 if an individual satisfies the following conditions and 0 otherwise:

- April 2013–June 2014: aged 18–60, living in an UC area, single with no children in the household, not self-employed or a fulltime student;
- July 2014–December 2015: aged 18–60, living in an UC area, single with no children or couples without children in the household, not self-employed or a fulltime student;
- January 2016–May 2019: aged 18–60, living in an UC area, not self-employed or a fulltime student.

We combine the eligibility variable with an indicator for unemployment in a panel data model across individuals, to identify the effect of entering unemployment whilst satisfying the eligibility criteria for UC in the same month of the survey.

Table 2 shows the status of UC eligibility across the years in our sample. The proportion of individuals eligible for UC is zero for the years prior to the welfare reform in 2013. The UC roll-out started in 2013 and 2014 in several pilot areas, reflecting low eligibility of 0.1% in 2013 and 1.5% in 2014 for the total sample and 0.3% in 2013 and 2.3% in 2014 for single adults and 2% in 2014 for couples without children. Across time, the UC criteria expanded to include households with children and reached more areas, such that eligibility for UC increased to 80% in the total sample by 2019. For the latter group of couples with children, almost all areas were rolled out to UC at the same time. For this reason, we will not identify the policy effect through a staggered rollout but by a policy being switched from off - to on.

3.2 Mental health

Mental health score. The UKHLS 12–item General Health Questionnaire (GHQ–12) is used to construct the score of mental health (Jackson 2007). The GHQ–12 provides short self-reported measures of mental ability in a non-clinical setting with several scores given to specify the severity of symptoms of anxiety, mental illnesses and depression. The measures have been used in economics research (for example Baird et al. 2013) and validation studies have shown that the GHQ generates measures of psychological distress which has a large association with mental disorders (Jackson 2007).

In the UKHLS data, the GHQ–12 asks the participants experience of the following 12 conditions: *lack of concentration; loss of sleep; playing a useful role in life; being capable of making decisions; constantly under strain; problem overcoming difficulties; enjoy day-to-day activities; ability to face problems; unhappy or depressed; losing confidence; believe worthless; and general happiness.* For each component, the respondents respond with a four-point Likert-scale from 1 to 4, in which a higher number represents a poorer status of that mental health component.

For example, the question which is used to measure the mental ability of the *concentration* component is: *The next questions are about how you have been feeling over the last few weeks. Have you recently been able to concentrate on whatever you're doing? (1) Better than usual, (2) Same as usual, (3) Less than usual, (4) Much less than usual.* Meanwhile, the question used to elicit the information about *loss of sleep* is: *Have you recently lost much sleep over worry? (1) Not at all; (2) No more than usual; (3) Rather more than usual; (4) Much more than usual.* See Appendix Table A.1 for details on the four possible answers for each component.

We use factor analysis to construct a continuous score for mental health.[10]. Using factor analysis allows us estimate a latent variable for mental health by combining information on each of the 12 scores which each measure mental health with error. Appendix Section A.2 provides details on the factor analysis and Table A.2 reports the factor loadings of the 12 mental health measures. The reference loading is based on *concentration* with a fixed score of 1. Among estimated coefficients, *unhappy and depression* has the highest loading with a score of 2.18 whilst *capable of making decisions* has the lowest factor loading of 0.83.

A higher mental health score represents better mental health and in the analysis the score is standardised to have a mean of zero and a standard deviation of one.[11] Table 1 reports the mean mental health score in the full sample of 0, single adults and lone parents have a negative score

[10] Aggregating the score by summing across components creates measurement error (Hausman et al. 1998)
[11] We also construct a similar measure of mental health score for the partner of the focal individual.

(-0.079 and -0.169) and couples without or with children have a positive score for mental health (0.057 and 0.048).

Poor mental health. Our second mental health measure is a binary variable which indicates psychiatric problems including severe depression or anxiety. Tseliou et al. (2018) suggest coding each of the 12 answers to the GHQ-12 to take the value of 0 for an answer indicating the condition was experienced not at all or the same as usual and 1 otherwise. The study showed that a score of 4 or higher across the 12 conditions was highly related to prescription data for stress, anxiety or depression. Table 1 reports that 18% of the total sample experience poor mental health, with higher values for single adults or lone parents at 21-24% compared to couples.

3.3 Employment and income

Own unemployment and employment status. To construct a measure of contemporaneous unemployment and future employment, we rely on the following question asking the UKHLS respondents about their current economic activity: *Which of these best describes your current employment situation? (1) Self employed; (2) In paid employment (full or part-time); (3) Unemployed; (4) Retired; (5) On maternity leave; (6) Looking after family or home; (7) Full-time student; (8) Long-term sick or disabled; (9) On a government training scheme; (10) Unpaid worker in family business: (11) Working in an apprenticeship; (97) Doing something else.*

An indicator for unemployment takes a value of 1 if the answer for the above question is *(3) Unemployed* and 0 otherwise. From Table 1, 6.5% of the total sample are unemployed. The rates of unemployment are lager among single adults and lone parents (10.2-12.7%) than couples without or with children (4.1-4.3%).

We create also a variable indicating future employment transitions to assess whether UC incentivises a return to work. Future employment is defined for the subsequent UKHLS wave (t+1) to take the value of 1 if the individual reports being in any paid employment and 0 otherwise. Using reported hours of work over the last week, we construct an indicator for working part-time as those working between 1-29 hours, and full-time as 30 hours and over per week.

Partner's labour supply. Each household member answers questions relating to their own employment status and their hours worked. We define the employment status and hours worked of partners of the benefit claimant in a similar way as for the individual in the contemporary year.

Household income. We record benefit income from reported monthly income received across the full set of UK benefits. Because benefits under UC were calculated at the household level,

benefit income is measured as the log of the full set of household benefits. These are measured in GB 2010 prices.

Household income is measured as the contemporaneous monthly net income from the labour market and all other sources taking away any taxes, deductions and benefits. Log household income is measured in GB 2010 prices.

Table 1 reports summary statistics for the total sample and sub-samples by household composition. Monthly benefit and household income is £404 and £3143 in the total sample and on average individuals claim 0.651 benefits.

3.4 Child outcomes

The UKHLS data includes a youth panel of adolescents aged 10–15 who were born to adult individuals in the main sample. We exploit this data set to construct several measures for children's outcomes which are likely driven by the UC reform. To test whether parents' treatment causes a spillover effect on the child, we specifically focus on (i) parent-child interactions between parents and child, and parents helping with homework as proxy measures for parents' time spent on children; and (ii) child happy with life and child mental health difficulties for children's resulting well-being.

Parent-child interactions. The variable of parent-child interactions is measured by using the information about the six following activities their parent(s) offering to the child: (i) discussing books at home, (ii) discussing TV at home, (iii) giving books as presents, (iv) taking to museums or art galleries, (v) taking to watch live sport, and (vi) taking to see theatre, dance performance or classical music. Each of these activities are asked using four scales "often", "sometimes", "rarely" and "never". We construct a dummy for each activity if the response is "often" or "sometimes". We then create the total number of parent-child social interactions by summing up these indicators.

Parent helping with homework. The data includes the information about whether child received help for their homework from his parent(s). We We construct a dummy for parent helping with homework that takes a value of 1 if the answer is "yes", and 0 if the answer is "no".

Child happy with life. Our measures of children's subjective well-being draw on satisfaction about life as a whole. Child was asked using different scales from 1 to 7 to indicate different levels of happiness where 1 is "completely happy" and 7 is "not at all happy." We code our dummy for being happy that takes a value of 1 if the response is 1, 2 or 3, and 0 otherwise.

Child mental difficulties. We use the information about children's self-completed answers to the Strengths and Difficulties Questionnaire (SDQ) to construct a continuous score for children's

mental health difficulties. The SDQ provides reliable measures for adolescents' mental health difficulties and socio-emotional skills. It elicited four components of adolescents' negative behaviours, including (i) emotional problems, (ii) conduct problems, (iii) hyperactivity/inattention, and (iv) peer relationship problems. Each component is measured with a score ranging from 0 to 10. We sum up all these four measures to create a total score for mental health difficulties in which a higher score indicates a poorer status of mental health. The score is then standardised to have a mean of zero and a standard deviation of one.

3.5 Control variables

Our research question estimates the differential effect of being unemployed on mental health, across the UC versus legacy benefit system. The benchmark controls are linked to the time-varying eligibility criteria of UC. We include as controls age, age squared, an indicator for cohabiting with (at least one) other adult, an indicator for having a child, an indicator for being a full-time student and for being self-employed.

In sensitivity analysis, we add two more controls. The first additional control is an indicator for having a previous mental disorder which is constructed using a question asking whether the individual had a depression problem in the past from the UKLHS data.

Second, highest educational qualifications are classified into several categories which are used for constructing dummies for the highest educational levels including higher degree (any degree beyond a bachelor's degree), first degree (an undergraduate degree), higher diploma (a level 2 qualification on the Regulated Qualifications Framework), A-level (Advanced-level set of qualifications which are typically taken at age 18) and GCSE/O-level (the GCSE level is the General Certification of Secondary Education which is a higher level set of qualifications which are typically taken at age 16 and the O-level is the Ordinary level is a subject-based qualification conferred as a component of the General Certificate of Education).

The average age of the individuals across all waves of our sample is nearly 40 years old. Whilst 65% of the total sample are cohabiting, 36% have a child, 5.9% are full-time students and 8.8% of the sample are self-employed.

4 Methodology

4.1 Estimation of the treatment effect

UC was exogenously rolled out across regions and time. Given that within roll-out region, individuals changing employment status would be eligible for UC if they lived in a rollout area, our panel

data model includes fixed effects for region and time to exploit the exogenous roll-out of UC; and individual fixed effects to identify individuals changing their unemployment status across time.

For outcome Y_{idt}={mental health; full-time employment; part-time employment} of individual i, living in local authority district d and observed in year t, we run the regression

$$Y_{idt} = \alpha_0 + \alpha_1 U_{idt} + \alpha_2 D_{idt} + \alpha_3 U_{idt} \times D_{idt} + \boldsymbol{\alpha}_4 \boldsymbol{X}'_{idt} + \phi_i + \phi_d + \phi_t + \epsilon_{idt} \quad (1)$$

where U_{idt} is a dummy variable indicating whether the individual is unemployed and D_{idt} is a dummy variable which takes the value 1 if the individual is eligible for UC and 0 otherwise.[12]

Welfare programmes should balance the protection of mental health when becoming unemployed by providing income support and job search assistance, with incentives to return to work. To understand whether UC mitigates or exacerbates these effects of being unemployed, we include an interaction term between being unemployed and eligibility for UC denoted $U_{idt} \times D_{idt}$. The coefficient α_3 - our parameter of interest - is the differential effect of an individual entering unemployment under UC compared to the legacy benefit system on the individual's outcomes.

In the estimation model, we include fixed effects for the individual, local authority district and year, denoted by ϕ_i, ϕ_d and ϕ_t, respectively. This means that the variation for identification in a triple difference setup is interpreted as comparing two individuals who become unemployed within the same region but at a different period, so that in the one case the individual is eligible for UC and in the other region they are eligible for legacy.

$\boldsymbol{X}'_{idt}$ denotes the set of covariates in our model, including age, age squared, indicators for cohabitation, presence of child, full-time education and self-employment status. These controls reflect the time-changing eligibility criteria of UC.[13] ϵ_{idt} is an error term assumed to have conditional mean zero. We cluster the standard errors at the local authority district level - the level of the treatment variation.

The coefficient of unemployment (α_1) estimates the change in outcome Y_{idt} from an individual entering a state of unemployment, but is not likely to be causal given the possibility of entering unemployment due to reasons related to their potential outcomes (such as their mental health or employability). Therefore, in our analysis we will interpret α_1 descriptively. Instead, the purpose of our analysis is to estimate whether the UC welfare reform can affect the treatment effects from

[12] Eligibility for UC is defined in Section 3.1 and takes the value of 1 if the individual lives in a roll-out region and meets the eligibility criteria in that time period.

[13] Because we estimate the differential effect of unemployment across the welfare systems, individual characteristics should not bias our result if the roll-out of UC was exogenous. To reassure that this is the case, we include further controls in a sensitivity analysis of Section 4.2 including gender, prior mental health problems and education; and a further sensitivity analysis drops all controls X.

unemployment. Even if the cause of unemployment is endogenous, the exposure to UC versus legacy is not, due to the staggered roll-out of UC across time and local authority districts as discussed in Section 2.3 and validated in Section 4.2. Hence we can interpret the differential treatment effects across the welfare systems as a causal treatment effect.

We allow the treatment effect to vary across household type defined as single adults; lone parents; cohabiting couples without children and cohabiting couples with children. This is important because, for any change in policy rules from the welfare reform, the insurance possibilities within households to protect mental health and consumption will vary according to the presence of another adult and/or children within the households, leading to potentially heterogeneous treatment effects on welfare and employment transitions.

4.2 Validity of identification strategy

Our identification strategy assumes that the staggered roll-out across local authority districts is exogenous. To show that the timing of roll-out is not related to local characteristics in Appendix Table A.3 we regress district level characteristics against the month and year of the local authority roll-out. Local characteristics from the 2011 UK censuses include demographic information on ethnicity, labour market attachment, marital status and health of the local population before the UC reform. These measures are aggregated at the local authority district level. Table A.3 shows that the date of UC roll-out is not correlated to these local characteristics. In column 9, when we regress the UC roll-out date on all of these characteristics in one specification, we find that all coefficients for these characteristics are individually statistically insignificant and we reject joint significance of the variables. These findings support our hypothesis that the timing of UC roll-out is exogenous to local socio-demographic characteristics.

One further possible threat facing our research design is selection into or out of unemployment as a consequence of UC roll-out. In Appendix Table A.4, we regress a dummy for living in a UC roll-out area and the benchmark control variables on an indicator for being unemployed. Our results show that there is no link between living in UC roll-out area and unemployment for the entire sample as well as various subgroups (single adults, lone parents, and couples without or with children).

Recent research has highlighted a potential bias from estimating treatment effects from a staggered roll-out by using a two-way fixed effect model (see De Chaisemartin and d'Haultfoeuille 2020; Callaway and Sant'Anna 2021; Goodman-Bacon 2021; Sun and Abraham 2021). A bias is possible as the D-in-D estimator estimates the weighted sum of the average treatment effects for each region

and year and these weights may be negative. In our case, across time different groups of individuals were eligible for UC - starting with single adults from the pilot study and extended first to couples with no children and finally to households with children. We undertake our analysis separately for each of these groups of households specifically in order to identify treatment effect heterogeneity.

But even within group we exploit a staggered roll-out for all but the claimants with children (for example, for single adults and couples without children). We follow the principles of Callaway and Sant'Anna (2021) and implemented by Lundborg et al. (2021) which is to estimate our benchmark model separately according the date the regions first implemented UC in Section 5.4.

5 Results

5.1 Treatment effect on contemporaneous outcomes

5.1.1 Mental health

We report in Table 3 the treatment effect of UC on claimant mental health. The table reports the parameters of interest from our benchmark model (Equation 1) which are an indicator for being unemployed; an indicator for UC eligibility and an interaction between the two. The latter coefficient is our treatment effect and identifies the effect of an individual becoming unemployed whilst eligible for UC versus legacy benefits. The panel data model includes fixed effects at the individual, year and local authority district level and all regressions include a set of controls linked to eligibility.

To study treatment effect heterogeneity by household composition, column 1 reports estimates for the full sample and we report in columns 2-5 estimates for the sub-samples of single adults (not cohabiting with another adult, eligible from the pilot in 2013), lone parents (eligible from January 2016), couples without children (eligible since July 2014) and couples with children (eligible from January 2016). Panel a) and b) of Table 3 report the benchmark results for the continuous mental health factor and a binary indicator for poor mental health respectively.

The results show that as an individual enters unemployment, their mental health deteriorates by 14-22.9% of a standard deviation across the different samples (panel a) whilst the incidence of mental health problems increases by 5.9-8.9 percentage points (panel b). This is not a surprise and is consistent with the literature estimating poor mental health consequences of unemployment (see Björklund 1985; Hamilton et al. 1997; Tefft 2011). Eligibility is defined as living in a roll-out area and satisfying the specific criteria for claiming UC. The results suggest lower mental health for

those eligible versus non-eligible for UC of 2.8-12% of a standard deviation (panel a) or increased incidence of mental health problems (panel b).

Moving to our parameter of interest, the negative coefficient on the interaction between unemployed and UC in columns 1-4 suggests that for all samples except couples with children, the UC system exacerbates mental health deterioration of unemployment, compared to the legacy system (where the latter is similar to many welfare systems across the world). The differential effect of UC is to lower mental health by a further 13.9% for lone parents, 8.4% for single adults and 0.7% of a standard deviation for couples with children, although the latter coefficient is not statistically different to zero. Interestingly, for the sample of couples with children, whilst unemployment lowers mental health by 22% of a standard deviation, eligibility for UC attenuates the effect by improving mental health by 25% of a standard deviation relative to the legacy system. These results are consistent in panel b) of Table 3, which indicate that entering unemployment whilst eligible for UC raises mental health problems for lone parents, single adults and couples without children by 5.2, 2.7 and 2.8 percentage points respectively but reduces the incidence for couples with children by 9.4 percentage points.[14]

There is clear heterogeneity in the treatment effects. Single adults and lone parents are the two groups without access to insurance either in the form of spousal income or support and we see an unintended consequence of the welfare reform is to exacerbate mental health problems from entering unemployment for these groups. For couples with no children the treatment effect is effectively zero whilst it is positive for couples with children. To understand why the estimates vary so much across household composition, we next estimate the treatment effects on the other partner's labour supply (where a partner exists).

5.1.2 Intrahousehold response

Our estimates have shown wide heterogeneity in the effect of UC on claimant's mental health. For this reason we examine the response of the partner to individual unemployment under the two benefit regimes, to see whether intrahousehold responses can explain why for single adults and lone parents UC exacerbates - but for couples with children UC acts as a mediator to - the mental health effects of entering unemployment.[15]

Under the assumptions that treatment is randomized across regions and time and the common trends assumption, we can identify the causal effect of exposure to becoming unemployed whilst

[14] See Appendix Table A.5 and Table A.6 for the full regression results.

[15] Previous research has documented spillovers of welfare reforms across household members (see for example Johnsen et al. 2022).

eligible for UC (relative to legacy) on a set of household outcomes. Table 4 estimates the causal treatment effect of UC from the benchmark model (Equation 1), replacing the dependent variable with the partner's mental health (panel a), the partner's contemporaneous employment status (panel b) and hours (panel c), log benefit income (panel d), and log household income (panel e).

The table reports the coefficient on the interaction term between unemployment and UC, identifying the differential effect of becoming unemployed under the UC versus legacy system for the samples of single adults, lone parents, couples without children and couples with children across columns 1-4 respectively.

There is a clear intrahousehold response to UC. Firstly there is no statistically significant detrimental treatment effect on the mental health of the partner (panel a). From panels b) and c), in response to the individual becoming unemployed whilst eligible for UC, the partner increases their contemporaneous labour participation by 4.9 and 3.7 percentage points for couples without and with children respectively, and their weekly working hours by 1.8 and 1.5.[16]

Does this partner reaction helps to smooth household income flows? Brewer et al. (2012) estimate that the UC reform raises benefit income for a set of households including couples with children, but lowers income for those with weaker attachment to the labour market such as single adults or lone parents. This is partially reflected in our results. From panel d), comparing two individuals living in the same region but becoming unemployed under two welfare systems, benefit income is statistically significantly lower by 52.3% and 57% for single adults or couples with children, although not statistically different for lone parents or couples without children. As the partner reacts to UC by raising hours of work, we consider next the effect on household income. Indeed, panel e) suggests that the treatment effect of entering unemployment whilst on UC for the individuals with a partner - couples without (column 3) or with children (column 4) - is to raise household income compared to the legacy system by 4.2% and 4.7% respectively. On the other hand, for the more vulnerable households without access to intrahousehold insurance, entering unemployment whilst eligible for UC rather than legacy leads to lower household income by 15.9% and 2.3% for single adults and lone parents respectively, although the latter coefficient is not statistically significant. The reduction in household income under UC for unemployed single adults and the increase for couples may partially explain the negative treatment effect of UC on

[16] Table A.7 in Appendix shows that the partner employment effect for couples without children is driven by a movement into full-time work. The coefficient for couples with children is qualitatively larger for the movement into part-time work, although neither this or the effect on full-time work are statistically significant.

mental health for single adults and lone parents compared to a zero or positive treatment effect for the couples.

5.2 Treatment effect on future employment transitions

The pilot analysis from the UK government suggested that UC did cause movement back into employment (Department for Work and Pensions 2014), focusing just on single adults.[17] We study the question further by asking whether variation driven by the full rollout of UC for newly unemployed increased movements back into work, whether the employment was part- or full-time and explore heterogeneity across different groups of household composition.

Table 5 estimates the benchmark model from Equation 1 with the dependent variable an indicator for being in work (panel a), in full-time employment (panel b) and part-time employment (panel c) in the subsequent year following the initial spell of unemployment.[18]

From panel a), we can confirm the findings of the pilot study that UC does induce newly unemployed to return to employment in the subsequent period relative to the legacy system, for a subset of the household groups. Entering unemployment whilst on UC raises employment by 8.6 percentage points for the single adults and by 5.6 percentage points for the couples with children. For other groups, there is no statistically significant effect on employment.

In order to understand the benefits of UC on employment, we analyse in panels b) and c) whether UC increased employment into full-time or part-time jobs. From panel a), there is no statistically significant interaction between the incidence of unemployment and UC on full-time employment for any household composition, except for the couples with children (column 4). For these individuals, newly unemployed individuals eligible for UC are 5.4 percentage points more likely to be in full-time employment in the next period compared to a newly employed individual on the legacy benefits. This increase in full-time employment for couples with no children is partially explained by a fall in part-time work, seen in panel b).

For the other groups, UC induces an increase in part-time employment for the single adults, lone parents and couples with children by 6.6, 9.6 and 6.5 percentage points respectively. Therefore, for most groups, the employment effects of UC are into part-time work, which has been shown to be relatively lower quality jobs, leading to zero or little human capital accumulation and rarely progress to a more stable career (Blundell et al. 2016).

[17] Department for Work and Pensions (2014) found that 69% of UC single claimants found a job between making their claim six months later compared to 65% of legacy claimants.

[18] The sample size has fallen as for some individuals we do not observe a wave after the initial period of unemployment.

5.3 Comparison of welfare and employment effects

To summarise, the results so far suggest that UC eligibility exacerbates negative mental health effects of unemployment relative to legacy, but with some evidence of strengthened incentives to work for some groups. We use our estimates to evaluate this trade-off, asking for every individual moved into employment, how many were found to develop mental health problems.

Combining the estimates of Table 3 and Table 5, we can see that for the total sample of individuals, every person put into employment (panel a of Table 5), 0.6 develop mental health problems (panel b of Table 3). Similarly, for single adults, lone parents and individuals living as a couple with no children, for each individual moved into employment through UC, 0.3, 1.16 and 1.27 individuals develop a mental health problem. There was no trade-off for the individuals living as a couple with children, as the positive employment effect was coupled with a positive mental health effect of UC. The burden is particularly large for the lone parents.

5.4 Sensitivity and heterogeneity

In this section, we test for the sensitivity of our benchmark estimates to the assumptions of treatment effect homogeneity across time in the staggered roll-out; and to the sensitivity of the set of controls. We include gender heterogeneity analysis and finally examine the consequence of household composition changing across time. We report these results for individual outcomes of mental health and future employment transitions.

Our identification of the differential effect of unemployment on mental health caused by the welfare reform comes from a staggered roll-out across regions. Estimating a two-way fixed effect can result in biased estimates if there is treatment effect heterogeneity across the years of roll-out.[19] The difference-in-difference estimator will calculate a weighted sum of the average treatment effects (ATE) in each region and year with weights that may be negative.

Callaway and Sant'Anna (2021) propose analysis of the ATE parameter which varies across groups defined by the date first treated. In Appendix Table A.8-Table A.12, we compare estimates separately across early, late roll-out regions and excluding both early and late implementers. In nearly all specifications the estimated treatment effects are similar to our benchmark estimation.[20] We conclude that in general our estimates are not biased by treatment effect heterogeneity.

[19] See Goodman-Bacon (2021), De Chaisemartin and d'Haultfoeuille (2020), Callaway and Sant'Anna (2021), Sun and Abraham (2021) and Borusyak et al. (2021).

[20] An exception is estimating the effect on poor mental health, where estimates are similar except for the early implementer sample were the coefficients fall.

If the roll-out of UC was truly exogenous, our estimates should not be sensitive to excluding all control variables, or to including additional variables, unless these variables were correlated with the roll-out. To understand how sensitive our results are to the control variables and assess the validity of our strategy, panel a) of Appendix Table A.13-Table A.17 excludes all covariates from the analysis. The results reported in the table are very similar to the benchmark estimates and our conclusions remain. In panel b) of Table A.13-Table A.17 we widen the set of controls in the model beyond the eligibility criteria, to include the incidence of a prior mental health disorder, highest educational qualifications and gender. Omitting these controls should not induce a bias in our estimated treatment effect, which identifies the differential effect of unemployment across the two welfare systems, as long as the roll-out of UC was exogenous. Indeed, including the additional controls leads to results similar to the benchmark.

In the benchmark analysis, eligibility to UC depends not just on the roll-out date but also on a set of eligibility criteria. To ensure that our results are not driven by the latter, panel c) of Table A.13-Table A.17 estimates the benchmark analysis for a sub-sample in which we exclude those who do not meet the UC eligibility criteria including self-employed individuals and fulltime students. The estimates are very similar to the benchmark estimates.

It may be that the treatment effect of UC on mental health differs across gender. Appendix Table A.18-Table A.22 interacts the variables unemployed, eligibility for UC and the interaction with a male dummy. Looking across the many tables, one result that is clear is that single males fare worse on UC. They are more likely to be associated with poor mental health (Table A.19) and are less likely to find employment (Table A.20). On the other hand, the mental health of males in couples are often less negatively affected and are more likely to transition into employment than female couples.

Finally, we define household composition within each wave but it is very likely that this definition changes across wave. If a household changes the status, for example moving from a lone parent household to a couple with children, the baseline value of mental health will not be included in the within-subgroup analysis. In Appendix Table A.23 the sample is restricted to those households who do not change their status in between the wave pre- and post-rollout of UC. Reassuringly, the estimates are very similar to our benchmark suggesting that they are robust to the final sensitivity analysis.

6 Spillovers to children

We found that lone parents or individuals living with a partner and children transition from unemployment to part-time work as a result of UC eligibility and, face negative or positive contemporaneous mental health effects respectively. We know from a large literature that parents' labour supply (Nicoletti et al. 2023) and mental health (Powdthavee and Vignoles 2008) can influence child development and we ask whether there is a treatment effect also on children.

To do so, we exploit questions from a panel survey given to children of UKHLS aged 10-15 to ask whether UC differentially changed the interactions between parents and children, child mental health and happiness, for a newly unemployed parent.

In Table 6, we re-estimate a model similar to the benchmark (Equation 1) but with two key changes. Firstly the unemployment status is defined to take the value of 1 if at least one parent is unemployed and 0 otherwise; and secondly the dependent variable is changed to measure parent-child interactions (panel a), an indicator for the parent helping the child with homework (panel b) a measure for whether the child is happy with life in general (panel c) and a measure of child mental health which is the overall score of the Strengths and Difficulty Questionnaire (SDQ) (panel d).[21] In the estimation model, we also add a set of controls for child's characteristics, including age dummies and a dummy for being a boy.

The results suggest that there is a UC treatment effect (relative to legacy) on the time that parents spend with their children, reducing parent-child interactions by 0.25 and 0.28 for lone parents and couples with children respectively, and reducing the incidence of the lone parent helping with homework. The children of lone parents are less likely to report being happy with life. However, we detect no statistically significant treatment effect of UC on the overall SDQ score, measuring child mental health.[22] The unintended consequences of UC therefore extend beyond the mental health of claimants, and affect even children of eligible parents.

7 Conclusion

This paper has analysed the intended and the unintended consequences of a welfare reform in the UK from a system common in many OECD countries where individuals or households apply for a range of benefits, to a universal credit system which replaced six benefit applications and

[21] The SDQ is an international standardised test measuring children's behaviours and emotions in several contexts Goodman (1997). It is largely used in psychology as well as in the human capital literature within economics and correlates with Diagnosis of Autism Spectrum Disorder (ASD) and Attention Deficit Hyperactivity Disorder (ADHD).

[22] There is no effect on the sub-elements of the SDQ, or if we use cut-off thresholds from the SDQ to define behavioural difficulties.

payments into just one. The benefit reform was aimed at reducing the administrative burden to the government agencies and individual claimants whilst strengthening the incentives of individuals to move into employment and away from the welfare state.

Individuals became eligible for UC not just by living in a roll-out area and satisfying eligibility criteria, but additionally if they changed their housing or employment status. Given this, we estimate a panel data model, including fixed effects at the individual, local district and time level which identifies the differential effect of entering unemployment under the reformed UC system compared to the former 'legacy' system.

Our results suggest that a single adult or lone parent entering unemployment under UC experiences a greater reduction in their mental health compared to a comparable individual entering unemployment under the former legacy system. On the other hand, for couples without or with children, the differential effect on mental health is negligible or even positive. This may be explained by the intrahousehold response, whereby the spouse of a treated individual reacted to treatment by increasing their own labour supply.

Did UC effectively raise employment of treated individuals? An individual entering unemployment under UC was more likely to be in part-time employment in the next period, but UC only induced a movement into full-time work for individuals living with a couple but no children. Part-time individuals are still eligible for benefits in the UK, if their income is low enough. Therefore the benefits of UC are unlikely to outweigh the mental health costs of the policy.

Lessons can be learnt from the UK welfare reform for any government wishing to understand the consequences of moving towards a stricter benefit regime with strong incentives to move back into employment. In particular, we learn that incentivising a movement off benefits through additional conditionality or reduced benefit income can be felt more harshly by households with fewer insurance possibilities, such as lone parents and single adults.

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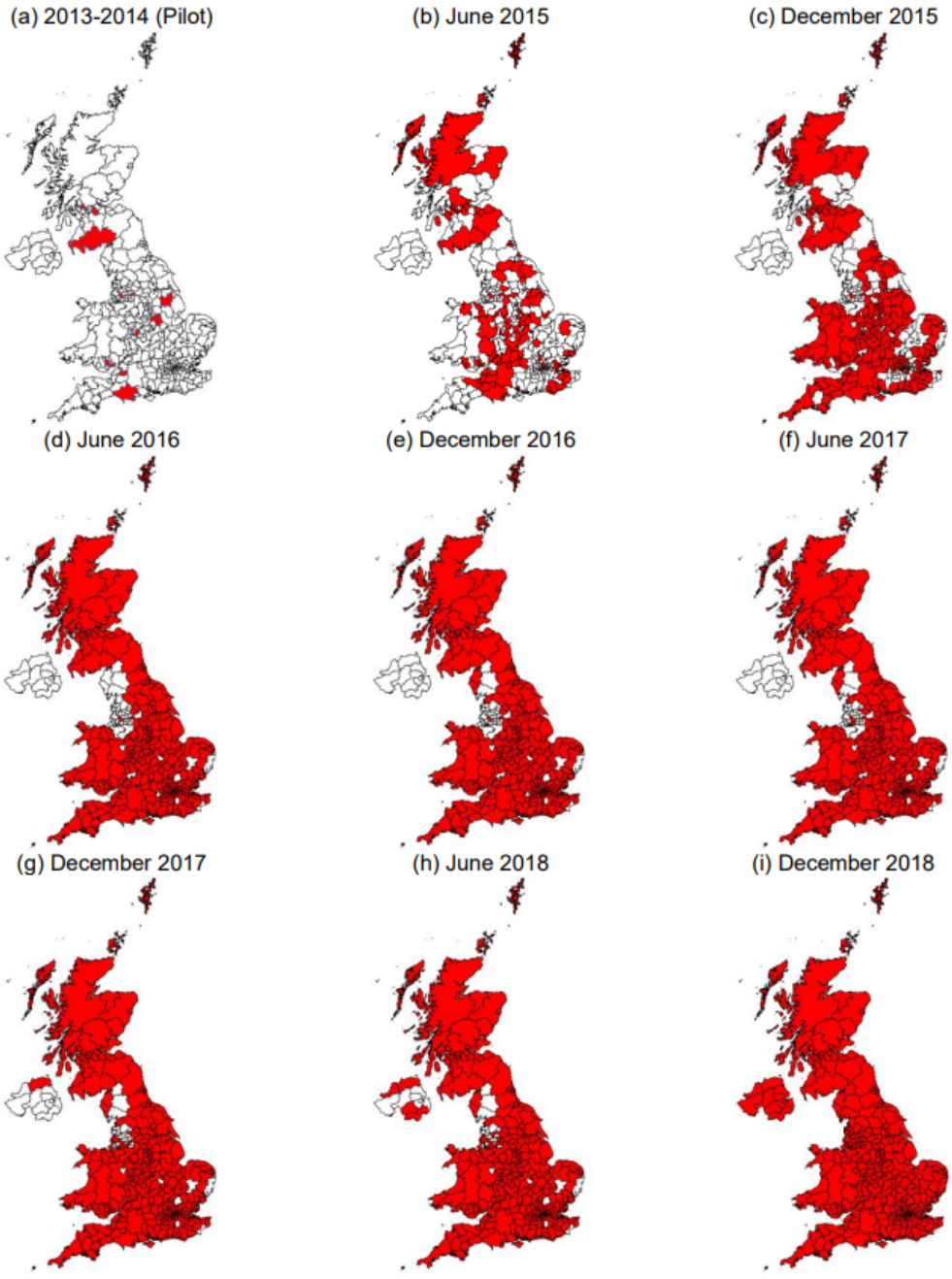
Figures and Tables

Figure 1: Roll-out of UC



This figure illustrates the geographic expansion of the UC roll-out coverage between April 2013 and December 2018. Each panel shows the geographic coverage of UC roll-out at a specific time. The roll-out dates are at the local authority district level. Data source: UK's Department for Work and Pensions (DWP).

Table 1: Summary statistics

	(1) Total	(2)	(3) Single adults	(4) Lone parents	(5) Couples no children	(6) Couples with children
	Mean	SD	Mean	Mean	Mean	Mean
Unemployed	0.065	0.246	0.102	0.127	0.041	0.043
Individual outcomes						
Mental health score (std)	0.000	1.000	-0.079	-0.169	0.057	0.048
Poor mental health	0.184	0.388	0.217	0.241	0.167	0.161
Employment (t+1)	0.763	0.425	0.701	0.595	0.833	0.776
Full-time employment (t+1)	0.535	0.499	0.533	0.296	0.644	0.474
Part-time employment (t+1)	0.228	0.419	0.168	0.299	0.188	0.303
Household outcomes						
Partner mental health score (std)	0.000	1.000	-	-	-0.009	0.011
Partner employment	0.659	0.474	-	-	0.658	0.660
Partner hours of work	20.692	18.731	-	-	20.382	21.088
Benefit income (£)	404.1	591.81	360.12	955.46	231.82	516.23
Household income (£)	3142.594	3882.017	2656.121	2223.693	3553.198	3331.337
Child outcomes						
Parent-child interactions	2.493	1.526	-	2.467	-	2.503
Parent helping with homework	0.743	0.437	-	0.697	-	0.759
Child happy with life	0.883	0.321	-	0.886	-	0.882
Child mental difficulty score (std)	0.000	1.000	-	-0.046	-	0.014
Controls						
Age	39.848	12.045	34.843	33.659	45.690	38.843
Cohabitation	0.650	0.477	0.000	0.000	1.000	1.000
Have a child	0.363	0.481	0.000	1.000	0.000	1.000
Fulltime student	0.059	0.235	0.159	0.123	0.009	0.009
Self-employed	0.088	0.283	0.059	0.046	0.114	0.094
Observations	199,563		54,326	15,457	72,733	57,047

Notes: This table presents summary statistics for the main variables used for our analysis. Columns 1-2 shows the mean and standard deviation for the total sample; and remaining columns show the mean for single adults (column 3), lone parents (column 4), couples without children (column 5) and couples with children (column 6), respectively. The sample sizes for *future (full-/part-time) employment* measured in the subsequent wave of the UKHLS are 149,992 (total), 38,198 (single adults), 12,027 (lone parents), 53,117 (couples without children), and 46,650 (couples with children), respectively. The total sample size for partner outcomes is 129,780. Source: UKLHS (2009–2019).

Table 2: Eligibility status

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Total		Single adults		Lone parents		Couples without children		Couples with children	
	N	% Eligible	N	% Eligible	N	% Eligible	N	% Eligible	N	% Eligible
2009	16,747	0.0%	4,087	0.0%	1,730	0.0%	5,252	0.0%	5,678	0.0%
2010	27,908	0.0%	6,831	0.0%	2,935	0.0%	8,451	0.0%	9,691	0.0%
2011	24,316	0.0%	5,904	0.0%	2,435	0.0%	7,364	0.0%	8,613	0.0%
2012	23,012	0.0%	5,577	0.0%	2,335	0.0%	6,975	0.0%	8,125	0.0%
2013	21,957	0.1%	6,053	0.3%	1,678	0.0%	6,773	0.0%	7,453	0.0%
2014	19,918	1.5%	5,821	2.3%	1,079	0.0%	7,775	2.0%	5,243	0.0%
2015	18,430	18.3%	5,419	22.3%	935	0.0%	8,560	25.4%	3,516	0.0%
2016	19,310	74.9%	5,928	66.5%	1,004	78.3%	8,784	77.3%	3,594	81.7%
2017	18,404	78.3%	5,723	69.8%	847	82.5%	8,487	80.9%	3,347	85.3%
2018	8,723	80.8%	2,699	72.4%	433	85.0%	3,977	83.2%	1,614	87.8%
2019	838	80.1%	284	70.1%	46	89.1%	335	83.9%	173	86.7%
Total	199,563		54,326		15,457		72,733		57,047	

Notes: This table reports the eligibility for UC across years for the total sample and the sub-samples of single adults, lone parents, couples without children and couples with children. For each sub-sample, the first column reports the total number of observations and the second column the percentage of UC eligible from the total number of observations within the sub-sample. Eligibility takes the value of 1 if an individual lives in a roll-out area and satisfies the relevant eligibility criteria described in Section 3. Source: UKLHS (2009–2019).

Table 3: Treatment effect on mental health

	(1) Total	(2) Single adults	(3) Lone parents	(4) Couples without children	(5) Couples with children
a) Mental health score					
Unemployed	-0.201***	-0.206***	-0.140***	-0.229***	-0.223***
	(0.009)	(0.016)	(0.026)	(0.018)	(0.019)
UC eligibility	-0.037***	-0.023	-0.120***	-0.028***	-0.026
	(0.008)	(0.015)	(0.040)	(0.011)	(0.018)
Unemployed x UC eligibility	-0.064***	-0.084***	-0.139*	-0.007	0.254***
	(0.019)	(0.029)	(0.072)	(0.033)	(0.051)
b) Poor mental health					
Unemployed	0.077***	0.075***	0.059***	0.089***	0.086***
	(0.004)	(0.007)	(0.011)	(0.008)	(0.009)
UC eligibility	0.011***	0.003	0.033*	0.006	0.009
	(0.003)	(0.006)	(0.017)	(0.005)	(0.008)
Unemployed x UC eligibility	0.028***	0.027**	0.052*	0.028*	-0.094***
	(0.008)	(0.012)	(0.031)	(0.015)	(0.023)
Number of individuals	49,571	18,566	6,134	21,884	16,829
Observations	199,563	54,326	15,457	72,733	57,047

Notes: This table shows the treatment effect on the focal individual's mental health outcomes. The dependent variable is a standardised factor of positive mental health from the GHQ-12 (panel a) and an indicator for poor mental health (panel b). The sample is restricted to observations aged 18–60. Standard errors appeared in parentheses below coefficients are clustered at the local authority district level. Regressions include fixed effects for individual, year and local authority district. Further controls include age, age squared and dummies for cohabitation, having a child, fulltime student and being self-employed. The coefficient for **Unemployed x UC eligibility** is the parameter of interest and measures the differential effect of entering unemployment under UC versus the former legacy system on mental health. Full regression results additionally reporting the coefficients for control variables are shown in Appendix Table A.5 and Table A.6, respectively. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: UKLHS (2009–2019).

Table 4: Intrahousehold response

	(1) Single adults	(2) Lone parents	(3) Couples without children	(4) Couples with children
a) Partner mental health score				
Unemployed x UC eligibility	-	-	-0.014	0.071
			(0.037)	(0.055)
b) Partner employment				
Unemployed x UC eligibility	-	-	0.049***	0.037*
			(0.014)	(0.022)
c) Partner hours of work				
Unemployed x UC eligibility	-	-	1.807***	1.466*
			(0.523)	(0.840)
d) Log benefit income				
Unemployed x UC eligibility	-0.523***	0.122	-0.570***	0.040
	(0.090)	(0.074)	(0.114)	(0.107)
e) Log household income				
Unemployed x UC eligibility	-0.159***	-0.023	0.042*	0.047*
	(0.033)	(0.038)	(0.022)	(0.027)
Number of individuals	18,566	6,134	21,884	16,829
Observations	54,326	15,457	72,733	57,047

Notes: This table shows the coefficients for the treatment effect on partner's wellbeing, labour supply and household income. The dependent variables in the first three rows are the focal individual's other partner's standardised mental health score, an indicator for being employed and hours worked in the week before survey. The dependent variables in the last two rows are the log of benefit income and household income (measured in 2010 prices) of the focal individual. The sample is restricted to observations aged 18–60. Standard errors appeared in parentheses below coefficients are clustered at the local authority district level. Regressions include fixed effects for individual, year and local authority district. Further controls include age, age squared and dummies for cohabitation, having a child, full-time student and being self-employed. The coefficient for **Unemployed x UC eligibility** is the parameter of interest. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: UKLHS (2009–2019).

Table 5: Treatment effect on employment transitions in t+1

	(1) Total	(2) Single adults	(3) Lone parents	(4) Couples without children	(5) Couples with children
a) Employment t+1					
Unemployed	-0.023***	-0.001	-0.004	-0.004	0.017**
	(0.004)	(0.006)	(0.010)	(0.006)	(0.007)
UC eligibility	-0.012***	-0.037***	0.010	-0.003	0.014*
	(0.003)	(0.006)	(0.018)	(0.004)	(0.008)
Unemployed x UC eligibility	0.046***	0.086***	0.045	0.022	0.056**
	(0.009)	(0.014)	(0.037)	(0.014)	(0.028)
b) Full-time employment t+1					
Unemployed	-0.038***	-0.037***	0.010	-0.022***	0.002
	(0.004)	(0.007)	(0.009)	(0.008)	(0.008)
UC eligibility	-0.009**	-0.024***	0.009	-0.006	0.016*
	(0.004)	(0.007)	(0.016)	(0.005)	(0.009)
Unemployed x UC eligibility	0.012	0.020	-0.047	0.054***	-0.008
	(0.010)	(0.016)	(0.033)	(0.018)	(0.032)
c) Part-time employment t+1					
Unemployed	0.015***	0.036***	-0.014	0.018**	0.015
	(0.004)	(0.007)	(0.011)	(0.008)	(0.009)
UC eligibility	-0.002	-0.012*	0.001	0.004	-0.002
	(0.004)	(0.007)	(0.020)	(0.005)	(0.010)
Unemployed x UC eligibility	0.034***	0.066***	0.093**	-0.032*	0.065*
	(0.010)	(0.015)	(0.042)	(0.017)	(0.036)
Number of individuals	37,035	12,810	4,697	16,721	13,669
Observations	149,992	38,198	12,027	53,117	46,650

Notes: This table shows the treatment effect of unemployment across eligibility for UC on future employment. The dependent variable is a dummy for having: a paid job (panel), a full-time job (panel b), and a part-time job (panel c) all measured in the subsequent wave of the UKHLS. The sample is restricted to observations aged 18–60. Standard errors appeared in parentheses below coefficients are clustered at the local authority district level. Regressions include fixed effects for individual, year and local authority district. Further controls include age, age squared and dummies for cohabitation, indicator for a child, full-time student and being self-employed. The coefficient for **Unemployed x UC eligibility** is the parameter of interest. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: UKLHS (2009–2019).

Table 6: Spillovers to children

	(1) Lone parents	(2) Couples with children
a) Parent-child interactions		
Parent unemployed	0.092	0.035
	(0.072)	(0.038)
Parent UC eligibility	0.010	-0.023
	(0.071)	(0.037)
Parent unemployed x UC eligibility	-0.253*	-0.228**
	(0.144)	(0.093)
Observations	4,169	11,615
b) Parent helping with homework		
Parent unemployed	0.026	-0.000
	(0.023)	(0.012)
Parent UC eligibility	-0.008	0.005
	(0.020)	(0.010)
Parent unemployed x UC eligibility	-0.123***	-0.037
	(0.040)	(0.024)
Observations	4,884	13,709
c) Child happy with life		
Parent unemployed	0.090***	-0.000
	(0.018)	(0.009)
Parent UC eligibility	-0.026	-0.003
	(0.018)	(0.008)
Parent unemployed x UC eligibility	-0.124***	-0.008
	(0.036)	(0.021)
Observations	8,368	25,908
d) Child mental difficulty score		
Parent unemployed	-0.140**	-0.013
	(0.057)	(0.027)
Parent UC eligibility	0.012	0.093***
	(0.050)	(0.023)
Parent unemployed x UC eligibility	-0.120	-0.077
	(0.105)	(0.069)
Observations	4,365	14,796

Notes: This table show the treatment effect on the child of the focal individual. The sample is restricted to children aged 10–15 answering the youth questionnaire. Parent-child interactions is the number of activities recorded as taking place often or sometimes, from a list of discussing books, discussing TV, giving books, trips to museums or art galleries, watching live sport, theatre trips. The child mental difficulty score is the overall score from the Strengths and Difficulties questionnaire. Standard errors appeared in parentheses below coefficients are clustered at the local authority district level. Regressions include fixed effects for individual, year and local authority district. Further controls for child characteristics include dummies for child's age and a dummy for child's gender as a boy. The coefficient for **Unemployed x UC eligibility** is the parameter of interest. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: UKLHS (2009–2019).

A Online Appendix

A.1 Details on legacy benefits

Income based JSA offers financial support whilst looking for work. Eligible individuals would have worked as an employee and paid national insurance in the last 2 to 3 years be aged 18 to pension age, not in full-time education and available for work but currently out of work. Payments made every 2 weeks.

Income based Employment Support Allowance (ESA) is paid for individuals with a disability or health condition which affects how much they can work. For employed, self-employed, unemployed to give money for living costs if out of work and support getting back to work if and when able.

Income support is for those with low or no income with savings less than £16,000, aged 16 up to the pension age, not in full-time work and satisfying one of these conditions: lone parent, lone foster parent, carer, on parental leave, unable to work and receiving benefits for sickness or disability, in full-time education (not university) age 16-20 and a parent or not living with a parent, a refugee learning English, in custody or due to attend court or a tribunal. It is usually paid to claimants every 2 weeks.

Housing benefit offers help paying rent for unemployed, low income or claiming benefits. This benefit is not eligible under if paying a mortgage rather than rent. Importantly, payments are made straight to the landlords.

Working tax credits eligibility requires working a certain number of hours per week which varies across demographic, from at least 16 hours for single with at least one child, over 60s or disabled and at least 30 hours for age 25-59.

Child Tax credits is an extension of working tax credits for those with children, where since 2017 payments are made only for the first two children.

A.2 Factor analysis

In this section, we show how we perform our factor analysis for the mental health measurement, including 12 components of mental health (concentration; loss of sleep; playing a useful role; being capable of making decisions; constantly under strain; problem overcoming difficulties; enjoy day-to-day activities; ability to face problems; unhappy or depressed; losing confidence; believe worthless; and general happiness). We particular estimate the following equation:

$$Y_{ic} = \alpha_c + \beta_c \gamma_{ic} + e_{ic} \tag{2}$$

where Y_{ic} is the c-th component of the mental health of individual i ($c = 1, ..., 12$). α_c is the intercept of and β_c is a factor loading specific for mental health component c. e_{ic} is the measure-specific measurement error which has mean zero and is assumed to be uncorrelated with γ_{ic} and also independently distributed across individuals and mental health components. Finally, γ_{ic} is the latent factor for mental health-specific component c which can be identified and extracted by setting the factor mean to 0 and β_1 to 1.

A.3 Tables

Table A.1: General Health Questionnaire -12

	Mental health measure	(1) Scale 1	(2) Scale 2	(3) Scale 3	(4) Scale 4
GHQ 1	Concentration	Better than usual	Same as usual	Less than usual	Much less than usual
GHQ 2	Loss of sleep	Not at all	No more than usual	Rather more than usual	Much more than usual
GHQ 3	Playing a useful role	More so than usual	Same as usual	Less so than usual	Much less than usual
GHQ 4	Capable of making decisions	More so than usual	Same as usual	Less so than usual	Much less capable
GHQ 5	Constantly under strain	Not at all	No more than usual	Rather more than usual	Much more than usual
GHQ 6	Problem overcoming difficulties	Not at all	No more than usual	Rather more than usual	Much more than usual
GHQ 7	Enjoy day-to-day activities	More so than usual	Same as usual	Less so than usual	Much less than usual
GHQ 8	Ability to face problems	More so than usual	Same as usual	Less able than usual	Much less able
GHQ 9	Unhappy or depressed	Not at all	No more than usual	Rather more than usual	Much more than usual
GHQ 10	Losing confidence	Not at all	No more than usual	Rather more than usual	Much more than usual
GHQ 11	Believe worthless	Not at all	No more than usual	Rather more than usual	Much more than usual
GHQ 12	General happiness	More so than usual	About the same as usual	Less so than usual	Much less than usual

Notes: This table shows the measurement of 12 mental health measures from General Health Questionnaire–12. Columns 1-4 show four different scales indicating the mental health degree for each measure which ranges from a positive (negative) to negative (positive) score. Source: UKLHS Questionnaire (2009–2019).

Table A.2: Factor loadings of mental health measures

	Mental health measure	Factor loadings	Signal
GHQ 1	Concentration	1.0000	0.1743
GHQ 2	Loss of sleep	1.6961	0.3707
GHQ 3	Playing a useful role	1.0143	0.2172
GHQ 4	Capable of making decisions	0.8311	0.1553
GHQ 5	Constantly under strain	1.7365	0.3308
GHQ 6	Problem overcoming difficulties	1.7979	0.2648
GHQ 7	Enjoy day-to-day activities	1.1563	0.1753
GHQ 8	Ability to face problems	0.9597	0.1526
GHQ 9	Unhappy or depressed	2.1819	0.2403
GHQ 10	Losing confidence	2.0926	0.2491
GHQ 11	Believe worthless	1.7325	0.2433
GHQ 12	General happiness	1.2732	0.1886

Notes: This table presents the factor analysis results for 12 measures of mental health problems using General Health Questionnaire–12 as described in Table A.1. Columns 1 and 2 respectively present the factor loadings and signal estimates for each of these mental health measures. Reference category is *Concentration* (QHQ 1). Source: UKLHS (2009–2019).

Table A.3: Balance tests

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Population (log, 1000 persons)	-0.2673								-0.5912
	(1.0918)								(1.2703)
Share of white population (%)		0.0534							0.0475
		(0.0555)							(0.0911)
Share of working-age population aged 16-64 (%)			-0.0646						-0.4029
			(0.2202)						(0.5264)
Share of being married for those aged 16 and over (%)				-0.0841					-0.3110
				(0.1113)					(0.3014)
Share of economically active population aged 16-74 (%)					-0.3430				-0.3041
					(0.3148)				(0.5443)
Share of population aged 16-74 with a full-time job (%)						-0.1805			0.1008
						(0.2525)			(0.3744)
Share of households with unshared dwelling (%)							4.2876		9.1381
							(6.8480)		(11.4806)
Share of population with very good health (%)								-0.3676	-0.2624
								(0.3379)	(0.3855)
p-value for joint significance of covariates									0.6446
R-squared	0.0002	0.0024	0.0002	0.0015	0.0031	0.0013	0.0010	0.0031	0.0159
Observations	382	382	382	382	382	382	382	382	382

Notes: This table presents the correlational estimates for the relationship between the timing of UC roll-out and local authority district characteristics. Observations are measured at the local authority district level. The dependent variable is the UC roll-out date (month and year). Standard errors appear in parentheses below coefficients. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: UK Census (2011).

Table A.4: The relationship between living in UC area and unemployment

	(1) Total	(2) Single adults	(3) Lone parents	(4) Couples without children	(5) Couples with children
Living in UC area	0.000	0.006	0.004	0.002	0.000
	(0.002)	(0.004)	(0.007)	(0.003)	(0.004)
Age	-0.016***	-0.029***	-0.010**	-0.006***	-0.008***
	(0.001)	(0.002)	(0.005)	(0.001)	(0.002)
Age squared	0.000***	0.000***	0.000	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Cohabitation	-0.019***	-	-	-	-
	(0.002)				
Having a child	0.000	-	-	-	-
	(0.002)				
Fulltime student	-0.177***	-0.209***	-0.259**	-0.116***	-0.078**
	(0.003)	(0.005)	(0.012)	(0.008)	(0.008)
Self-employed	-0.090***	-0.157***	-0.150***	-0.073***	-0.075***
	(0.003)	(0.007)	(0.017)	(0.003)	(0.004)
Number of individuals	49,571	18,566	6,134	21,884	16,829
Observations	199,563	54,326	15,457	72,733	57,047

Notes: This table shows the correlates between living in UC roll-out area and unemployment. The dependent variable is a dummy for being unemployed. The sample is restricted to observations aged 18–60. Standard errors appeared in parentheses below coefficients are clustered at the local authority district level. Regressions include fixed effects for individual, year and local authority district. Further controls include age, age squared and dummies for cohabitation, having a child, fulltime student and being self-employed. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: UKLHS (2009–2019).

Table A.5: Treatment effect on mental health score (augmented version)

	(1) Total	(2) Single adults	(3) Lone parents	(4) Couples without children	(5) Couples with children
Unemployed	-0.201***	-0.206***	-0.140***	-0.229***	-0.223***
	(0.009)	(0.016)	(0.026)	(0.018)	(0.019)
UC eligibility	-0.037***	-0.023	-0.120***	-0.028***	-0.026
	(0.008)	(0.015)	(0.040)	(0.011)	(0.018)
Unemployed x UC eligibility	-0.064***	-0.084***	-0.139*	-0.007	0.254***
	(0.019)	(0.029)	(0.072)	(0.033)	(0.051)
Age	-0.048***	-0.058***	-0.055***	-0.045***	-0.037***
	(0.003)	(0.006)	(0.015)	(0.006)	(0.008)
Age squared	0.001***	0.001***	0.001***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Cohabitation	0.074***	-	-	-	-
	(0.009)				
Having a child	0.016***	-	-	-	-
	(0.006)				
Full-time student	-0.065***	-0.093***	-0.081**	-0.052	-0.075**
	(0.012)	(0.016)	(0.039)	(0.037)	(0.037)
Self-employed	0.042***	0.066***	0.003	0.040***	0.055***
	(0.010)	(0.024)	(0.053)	(0.015)	(0.017)
Number of individuals	49,571	18,566	6,134	21,884	16,829
Observations	199,563	54,326	15,457	72,733	57,047

Notes: This table is an augmented version of panel a of Table 3 in which additionally reports coefficients for control variables. The sample is restricted to observations aged 18–60. Standard errors appeared in parentheses below coefficients are clustered at the local authority district level. Regressions include fixed effects for individual, year and local authority district. Further controls include age, age squared and dummies for cohabitation, having a child, full-time student and being self-employed. The coefficient for **Unemployed x UC eligibility** is the parameter of interest. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: UKLHS (2009–2019).

Table A.6: Treatment effect on poor mental health (augmented version)

	(1) Total	(2) Single adults	(3) Lone parents	(4) Couples without children	(5) Couples with children
Unemployed	0.077***	0.075***	0.059***	0.089***	0.086***
	(0.004)	(0.007)	(0.011)	(0.008)	(0.009)
UC eligibility	0.011***	0.003	0.033*	0.006	0.009
	(0.003)	(0.006)	(0.017)	(0.005)	(0.008)
Unemployed x UC eligibility	0.028***	0.027**	0.052*	0.028*	-0.094***
	(0.008)	(0.012)	(0.031)	(0.015)	(0.023)
Age	0.011***	0.010***	0.018***	0.012***	0.008**
	(0.001)	(0.002)	(0.007)	(0.003)	(0.004)
Age squared	-0.000***	-0.000***	-0.000***	-0.000***	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Cohabitation	-0.025***	-	-	-	-
	(0.004)				
Having a child	-0.005*	-	-	-	-
	(0.003)				
Full-time student	0.028***	0.028***	0.046***	0.012	0.026
	(0.005)	(0.007)	(0.017)	(0.017)	(0.017)
Self-employed	-0.009**	-0.019*	0.021	-0.008	-0.019**
	(0.004)	(0.010)	(0.023)	(0.007)	(0.008)
Number of individuals	49,571	18,566	6,134	21,884	16,829
Observations	199,563	54,326	15,457	72,733	57,047

Notes: This table is an augmented version of panel b of Table 3 in which additionally reports coefficients for control variables. The sample is restricted to observations aged 18–60. Standard errors appeared in parentheses below coefficients are clustered at the local authority district level. Regressions include fixed effects for individual, year and local authority district. Further controls include age, age squared and dummies for cohabitation, having a child, full-time student and being self-employed. The coefficient for **Unemployed x UC eligibility** is the parameter of interest. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: UKLHS (2009–2019).

Table A.7: Treatment effect on partner's full-time and part-time employment

	(1) Couples without children	(2) Couples with children
a) Partner full-time employment		
Unemployed x UC eligibility	0.039***	0.015
	(0.014)	(0.021)
b) Partner part-time employment		
Unemployed x UC eligibility	0.010	0.021
	(0.013)	(0.020)
Number of individuals	21,884	16,829
Observations	72,733	57,047

Notes: This table shows the treatment effect on partner's full- and part-time employment. The dependent variable is a dummy for having a full-time job (panel a) and a dummy for having a part-time job (panel b) for the partner of the focal individual, separately for couples without children (column 1) and couples with children (column 2). The sample is restricted to observations aged 18–60. Standard errors appeared in parentheses below coefficients are clustered at the local authority district level. Regressions include fixed effects for individual, year and local authority district. Further controls include age, age squared and dummies for cohabitation, having a child, full-time student and being self-employed. The coefficient for **Unemployed x UC eligibility** is the parameter of interest. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: UKLHS (2009–2019).

Table A.8: Heterogeneity across the timing of roll-out: Mental health score

	(1) Single adults	(2) Lone parents	(3) Couples without children	(4) Couples with children
a) Benchmark				
Unemployed x UC eligibility	-0.084***	-0.139*	-0.007	0.254***
	(0.029)	(0.072)	(0.033)	(0.051)
Observations	54,326	15,457	72,733	57,047
b) Early implementers (2015 or earlier)				
Unemployed x UC eligibility	-0.034		0.018	
	(0.063)		(0.071)	
Observations	8,444		13,441	
c) Late implementers (2016 or later)				
Unemployed x UC eligibility	-0.109***	-0.016	-0.029	0.258***
	(0.034)	(0.080)	(0.039)	(0.057)
Observations	45,882	13,084	59,292	46,378
d) Excluding 2013 and 2014 implementers				
Unemployed x UC eligibility	-0.085***	-0.148**	-0.025	0.280***
	(0.030)	(0.073)	(0.034)	(0.052)
Observations	53,387	15,118	71,112	55,726
e) Excluding 2018-2019 implementers				
Unemployed x UC eligibility	-0.100***	-0.137	0.009	0.256***
	(0.035)	(0.085)	(0.039)	(0.060)
Observations	30,305	8,711	46,450	36,862

Notes: This table shows the heterogeneity for the treatment effect across the timing of roll-out for mental health score. The benchmark estimates from panel a) is compared to the restricted sample sub-groups of early or late implementers in panels b) and c); to all areas excluding the early implementers (panel d); and to all areas excluding the late implementers (panel e). The sample is restricted to observations aged 18–60. Standard errors appeared in parentheses below coefficients are clustered at the local authority district level. Regressions include fixed effects for individual, year and local authority district. Further controls include an indicator for unemployment, an eligibility indicator, age, age squared and dummies for cohabitation, having a child, full-time student and being self-employed. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: UKLHS (2009–2019).

Table A.9: Heterogeneity across the timing of roll-out: Poor mental health

	(1) Single adults	(2) Lone parents	(3) Couples without children	(4) Couples with children
a) Benchmark				
Unemployed x UC eligibility	0.027**	0.052*	0.028*	-0.094***
	(0.012)	(0.031)	(0.015)	(0.023)
Observations	54,326	15,457	72,733	57,047
b) Early implementers (2015 or earlier)				
Unemployed x UC eligibility	0.008		0.019	
	(0.027)		(0.032)	
Observations	8,444		13,441	
c) Late implementers (2016 or later)				
Unemployed x UC eligibility	0.036**	0.059*	0.034*	-0.092***
	(0.014)	(0.035)	(0.017)	(0.026)
Observations	45,882	13,084	59,292	46,378
d) Excluding 2013 and 2014 implementers				
Unemployed x UC eligibility	0.025*	0.057*	0.040***	-0.106***
	(0.013)	(0.031)	(0.015)	(0.024)
Observations	53,387	15,118	71,112	55,726
e) Excluding 2018-2019 implementers				
Unemployed x UC eligibility	0.037**	0.050	0.024	-0.091***
	(0.015)	(0.037)	(0.017)	(0.028)
Observations	30,305	8,711	46,450	36,862

Notes: This table shows the heterogeneity for the treatment effect across the timing of roll-out for poor mental health. The benchmark estimates from panel a) is compared to the restricted sample sub-groups of early or late implementers in panels b) and c); to all areas excluding the early implementers (panel d); and to all areas excluding the late implementers (panel e). The sample is restricted to observations aged 18–60. Standard errors appeared in parentheses below coefficients are clustered at the local authority district level. Regressions include fixed effects for individual, year and local authority district. Further controls include an indicator for unemployment, an eligibility indicator, age, age squared and dummies for cohabitation, having a child, fulltime student and being self-employed. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: UKLHS (2009–2019).

Table A.10: Heterogeneity across the timing of roll-out: Employment in t+1

	(1) Single adults	(2) Lone parents	(3) Couples without children	(4) Couples with children
a) Benchmark				
Unemployed x UC eligibility	0.086***	0.045	0.022	0.056**
	(0.014)	(0.037)	(0.014)	(0.028)
Observations	38,198	12,027	53,117	46,650
b) Early implementers (2015 or earlier)				
Unemployed x UC eligibility	0.102***		0.045*	
	(0.024)		(0.024)	
Observations	7,100		10,980	
c) Late implementers (2016 or later)				
Unemployed x UC eligibility	0.082***	0.052	0.018	0.107***
	(0.017)	(0.042)	(0.017)	(0.031)
Observations	31,098	9,919	42,137	36,993
d) Excluding 2013 and 2014 implementers				
Unemployed x UC eligibility	0.086***	0.034	0.011	0.073***
	(0.014)	(0.038)	(0.014)	(0.028)
Observations	37,416	11,721	51,790	45,468
e) Excluding 2018-2019 implementers				
Unemployed x UC eligibility	0.104***	0.023	0.024	0.064**
	(0.015)	(0.042)	(0.015)	(0.030)
Observations	25,238	7,786	37,534	33,403

Notes: This table shows the heterogeneity for the treatment effect across the timing of roll-out for on future employment measured in the subsequent wave of the UKHLS. The benchmark estimates from panel a) is compared to the restricted sample sub-groups of early or late implementers in panels b) and c); to all areas excluding the early implementers (panel d); and to all areas excluding the late implementers (panel e). The sample is restricted to observations aged 18–60. Standard errors appeared in parentheses below coefficients are clustered at the local authority district level. Regressions include fixed effects for individual, year and local authority district. Further controls include an indicator for unemployment, an eligibility indicator, age, age squared and dummies for cohabitation, having a child, fulltime student and being self-employed. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: UKLHS (2009–2019).

Table A.11: Heterogeneity across the timing of roll-out: Full-time employment in t+1

	(1) Single adults	(2) Lone parents	(3) Couples without children	(4) Couples with children
a) Benchmark				
Unemployed x UC eligibility	0.020	-0.047	0.054***	-0.008
	(0.016)	(0.033)	(0.018)	(0.032)
Observations	38,198	12,027	53,117	46,650
b) Early implementers (2015 or earlier)				
Unemployed x UC eligibility	0.042		0.104***	
	(0.028)		(0.032)	
Observations	7,100		10,980	
c) Late implementers (2016 or later)				
Unemployed x UC eligibility	0.014	-0.035	0.033	0.014
	(0.019)	(0.038)	(0.022)	(0.036)
Observations	31,098	9,919	42,137	36,993
d) Excluding 2013 and 2014 implementers				
Unemployed x UC eligibility	0.024	-0.043	0.053***	-0.006
	(0.016)	(0.034)	(0.018)	(0.032)
Observations	37,416	11,721	51,790	45,468
e) Excluding 2018-2019 implementers				
Unemployed x UC eligibility	0.035**	-0.056	0.063***	-0.012
	(0.017)	(0.038)	(0.019)	(0.034)
Observations	25,238	7,786	37,534	33,403

Notes: This table shows the heterogeneity for the treatment effect across the timing of roll-out on future full-time employment measured in the subsequent wave of the UKHLS. The benchmark estimates from panel a) is compared to the restricted sample sub-groups of early or late implementers in panels b) and c); to all areas excluding the early implementers (panel d); and to all areas excluding the late implementers (panel e). The sample is restricted to observations aged 18–60. Standard errors appeared in parentheses below coefficients are clustered at the local authority district level. Regressions include fixed effects for individual, year and local authority district. Further controls include an indicator for unemployment, an eligibility indicator, age, age squared and dummies for cohabitation, having a child, fulltime student and being self-employed. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: UKLHS (2009–2019).

Table A.12: Heterogeneity across the timing of roll-out: Part-time employment in t+1

	(1) Single adults	(2) Lone parents	(3) Couples without children	(4) Couples with children
a) Benchmark				
Unemployed x UC eligibility	0.066***	0.093**	-0.032*	0.065*
	(0.015)	(0.042)	(0.017)	(0.036)
Observations	38,198	12,027	53,117	46,650
b) Early implementers (2015 or earlier)				
Unemployed x UC eligibility	0.060**		-0.060*	
	(0.026)		(0.031)	
Observations	7,100		10,980	
c) Late implementers (2016 or later)				
Unemployed x UC eligibility	0.068***	0.087*	-0.015	0.093**
	(0.018)	(0.047)	(0.022)	(0.041)
Observations	31,098	9,919	42,137	36,993
d) Excluding 2013 and 2014 implementers				
Unemployed x UC eligibility	0.062***	0.077*	-0.043**	0.079**
	(0.015)	(0.042)	(0.018)	(0.037)
Observations	37,416	11,721	51,790	45,468
e) Excluding 2018-2019 implementers				
Unemployed x UC eligibility	0.069***	0.079*	-0.039**	0.075*
	(0.016)	(0.048)	(0.019)	(0.039)
Observations	25,238	7,786	37,534	33,403

Notes: This table shows the heterogeneity for the treatment effect across the timing of roll-out on future part-time employment measured in the subsequent wave of the UKHLS. The benchmark estimates from panel a is compared to the restricted sample sub-groups of early or late implementers in panels b) and c; to all areas excluding the early implementers (panel d); and to all areas excluding the late implementers (panel e). The sample is restricted to observations aged 18–60. Standard errors appeared in parentheses below coefficients are clustered at the local authority district level. Regressions include fixed effects for individual, year and local authority district. Further controls include an indicator for unemployment, an eligibility indicator, age, age squared and dummies for cohabitation, having a child, fulltime student and being self-employed. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: UKLHS (2009–2019).

Table A.13: Changing the sets of controls and sample: Mental health score

	(1) Single adults	(2) Lone parents	(3) Couples without children	(4) Couples with children
a) No controls				
Unemployed x UC eligibility	-0.095***	-0.159**	-0.008	0.249***
	(0.029)	(0.072)	(0.033)	(0.051)
Number of individuals	18,566	6,134	21,884	16,829
Observations	54,326	15,457	72,733	57,047
b) Additional controls				
Unemployed x UC eligibility	-0.093***	-0.144**	-0.010	0.252***
	(0.029)	(0.072)	(0.033)	(0.051)
Number of individuals	18,566	6,134	21,884	16,829
Observations	54,326	15,457	72,733	57,047
c) Excluding self-employed and students				
Unemployed x UC eligibility	-0.072**	-0.137*	-0.007	0.269***
	(0.031)	(0.075)	(0.034)	(0.052)
Number of individuals	15,130	5,080	19,916	15,639
Observations	42,505	12,840	63,786	51,139

Notes: This table presents a sensitivity analysis of the benchmark estimates of the treatment effect on mental health score but excludes all controls except for an indicator for unemployment, UC eligibility and their interaction (panel a); includes benchmark controls plus additionally an indicator for prior mental health disorder and highest educational levels (higher degree, first degree, higher diploma, A-level and GCSE/0-level) (panel b); estimates on the benchmark model but excludes individuals not eligibility for UC because of being self-employed or a student (panel c). The sample is restricted to observations aged 18–60. Standard errors appeared in parentheses below coefficients are clustered at the local authority district level. Regressions include fixed effects for individual, year and local authority district. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: UKLHS (2009–2019).

Table A.14: Changing the sets of controls and sample: Poor mental health

	(1) Single adults	(2) Lone parents	(3) Couples without children	(4) Couples with children
a) No controls				
Unemployed x UC eligibility	0.029**	0.060*	0.028*	-0.093***
	(0.012)	(0.031)	(0.015)	(0.023)
Number of individuals	18,566	6,134	21,884	16,829
Observations	54,326	15,457	72,733	57,047
b) Additional controls				
Unemployed x UC eligibility	0.030**	0.055*	0.028*	-0.093***
	(0.012)	(0.031)	(0.015)	(0.023)
Number of individuals	18,566	6,134	21,884	16,829
Observations	54,326	15,457	72,733	57,047
c) Excluding self-employed and students				
Unemployed x UC eligibility	0.017	0.060*	0.027*	-0.097***
	(0.013)	(0.032)	(0.015)	(0.023)
Number of individuals	15,130	5,080	19,916	15,639
Observations	42,505	12,840	63,786	51,139

Notes: This table presents a sensitivity analysis of the benchmark estimates of the treatment effect on *poor mental health* but excludes all controls except for an indicator for unemployment, UC eligibility and their interaction (panel a); includes benchmark controls plus additionally an indicator for prior mental health disorder and highest educational levels (higher degree, first degree, higher diploma, A-level and GCSE/0-level) (panel b); estimates on the benchmark model but excludes individuals not eligibility for UC because of being self-employed or a student (panel c). The sample is restricted to observations aged 18–60. Standard errors appeared in parentheses below coefficients are clustered at the local authority district level. Regressions include fixed effects for individual, year and local authority district. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: UKLHS (2009–2019).

Table A.15: Changing the sets of controls and sample: Employment in t+1

	(1) Single adults	(2) Lone parents	(3) Couples without children	(4) Couples with children
a) No controls				
Unemployed x UC eligibility	0.090***	0.059	0.024*	0.064**
	(0.014)	(0.038)	(0.014)	(0.028)
Number of individuals	12,810	4,697	16,721	13,669
Observations	38,198	12,027	53,117	46,650
b) Additional controls				
Unemployed x UC eligibility	0.089***	0.048	0.022	0.057**
	(0.014)	(0.037)	(0.014)	(0.028)
Number of individuals	12,810	4,697	16,721	13,669
Observations	38,198	12,027	53,117	46,650
c) Excluding self-employed and students				
Unemployed x UC eligibility	0.098***	0.053	0.024*	0.067**
	(0.012)	(0.036)	(0.014)	(0.027)
Number of individuals	10,572	3,864	15,256	12,714
Observations	30,235	9,947	46,765	41,868

Notes: This table presents a sensitivity analysis of the benchmark estimates of the treatment effect on future employment measured in the subsequent wave of the UKHLS but excludes all controls except for an indicator for unemployment, UC eligibility and their interaction (panel a); includes benchmark controls plus additionally an indicator for prior mental health disorder and highest educational levels (higher degree, first degree, higher diploma, A-level and GCSE/0-level) (panel b); estimates on the benchmark model but excludes individuals not eligibility for UC because of being self-employed or a student (panel c). The sample is restricted to observations aged 18–60. Standard errors appeared in parentheses below coefficients are clustered at the local authority district level. Regressions include fixed effects for individual, year and local authority district. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: UKLHS (2009–2019).

Table A.16: Changing the sets of controls and sample: Full-time employment in t+1

	(1) Single adults	(2) Lone parents	(3) Couples without children	(4) Couples with children
a) No controls				
Unemployed x UC eligibility	0.019	-0.047	0.054***	-0.007
	(0.016)	(0.033)	(0.018)	(0.032)
Number of individuals	12,810	4,697	16,721	13,669
Observations	38,198	12,027	53,117	46,650
b) Additional controls				
Unemployed x UC eligibility	0.024	-0.045	0.054***	-0.007
	(0.015)	(0.033)	(0.018)	(0.032)
Number of individuals	12,810	4,697	16,721	13,669
Observations	38,198	12,027	53,117	46,650
c) Excluding self-employed and students				
Unemployed x UC eligibility	0.031**	-0.041	0.060***	-0.003
	(0.015)	(0.032)	(0.017)	(0.030)
Number of individuals	10,572	3,864	15,256	12,714
Observations	30,235	9,947	46,765	41,868

Notes: This table presents a sensitivity analysis of the benchmark estimates of the treatment effect on future full-time employment measured in the subsequent wave of the UKHLS but excludes all controls except for an indicator for unemployment, UC eligibility and their interaction (panel a); includes benchmark controls plus additionally an indicator for prior mental health disorder and highest educational levels (higher degree, first degree, higher diploma, A-level and GCSE/0-level) (panel b); estimates on the benchmark model but excludes individuals not eligibility for UC because of being self-employed or a student (panel c). The sample is restricted to observations aged 18–60. Standard errors appeared in parentheses below coefficients are clustered at the local authority district level. Regressions include fixed effects for individual, year and local authority district. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: UKLHS (2009–2019).

Table A.17: Changing the sets of controls and sample: Part-time employment in t+1

	(1) Single adults	(2) Lone parents	(3) Couples without children	(4) Couples with children
a) No controls				
Unemployed x UC eligibility	0.071***	0.105**	-0.031*	0.070**
	(0.015)	(0.042)	(0.017)	(0.036)
Number of individuals	12,810	4,697	16,721	13,669
Observations	38,198	12,027	53,117	46,650
b) Additional controls				
Unemployed x UC eligibility	0.066***	0.093**	-0.032*	0.064*
	(0.015)	(0.042)	(0.017)	(0.036)
Number of individuals	12,810	4,697	16,721	13,669
Observations	38,198	12,027	53,117	46,650
c) Excluding self-employed and students				
Unemployed x UC eligibility	0.067***	0.094**	-0.036**	0.070**
	(0.014)	(0.041)	(0.016)	(0.035)
Number of individuals	10,572	3,864	15,256	12,714
Observations	30,235	9,947	46,765	41,868

Notes: This table presents a sensitivity analysis of the benchmark estimates of the treatment effect on future part-time employment measured in the subsequent wave of the UKHLS but excludes all controls except for an indicator for unemployment, UC eligibility and their interaction (panel a); includes benchmark controls plus additionally an indicator for prior mental health disorder and highest educational levels (higher degree, first degree, higher diploma, A-level and GCSE/0-level) (panel b); estimates on the benchmark model but excludes individuals not eligibility for UC because of being self-employed or a student (panel c). The sample is restricted to observations aged 18–60. Standard errors appeared in parentheses below coefficients are clustered at the local authority district level. Regressions include fixed effects for individual, year and local authority district. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: UKLHS (2009–2019).

Table A.18: Heterogeneity by gender: Mental health score

	(1) Single adults	(2) Lone parents	(3) Couples without children	(4) Couples with children
Unemployed	-0.250***	-0.137***	-0.222***	-0.129***
	(0.025)	(0.028)	(0.026)	(0.025)
UC eligibility	-0.021	-0.125***	-0.033**	-0.025
	(0.017)	(0.041)	(0.013)	(0.018)
Unemployed x Male	0.075**	-0.025	-0.014	-0.222***
	(0.032)	(0.082)	(0.036)	(0.039)
UC eligibility x Male	-0.006	0.155	0.009	0.031
	(0.020)	(0.136)	(0.014)	(0.083)
Unemployed x UC eligibility	-0.029	-0.136*	0.016	0.149***
	(0.045)	(0.074)	(0.050)	(0.054)
Unemployed x UC eligibility x Male	-0.092	-0.198	-0.039	0.806***
	(0.059)	(0.395)	(0.067)	(0.311)
Number of individuals	18,566	6,134	21,884	16,829
Observations	54,326	15,457	72,733	57,047

Notes: This table shows the gender heterogeneity for the treatment effect on mental health score. The sample is restricted to observations aged 18–60. Standard errors appeared in parentheses below coefficients are clustered at the local authority district level. Regressions include fixed effects for individual, year and local authority district. Further controls include age, age squared and dummies for cohabitation, having a child, fulltime student and being self-employed. The coefficients for **Unemployed x UC eligibility** and **Unemployed x UC eligibility x Male** are the parameters of interest. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: UKLHS (2009–2019).

Table A.19: Heterogeneity by gender: Poor mental health

	(1) Single adults	(2) Lone parents	(3) Couples without children	(4) Couples with children
Unemployed	0.077***	0.062***	0.074***	0.061***
	(0.011)	(0.012)	(0.012)	(0.011)
UC eligibility	0.003	0.037**	0.018***	0.009
	(0.007)	(0.017)	(0.006)	(0.008)
Unemployed x Male	-0.002	-0.024	0.031*	0.058***
	(0.014)	(0.035)	(0.016)	(0.018)
UC eligibility x Male	-0.001	-0.114*	-0.021***	-0.001
	(0.008)	(0.058)	(0.006)	(0.038)
Unemployed x UC eligibility	-0.006	0.046	0.012	-0.066***
	(0.019)	(0.032)	(0.023)	(0.025)
Unemployed x UC eligibility x Male	0.056**	0.169	0.024	-0.234*
	(0.025)	(0.170)	(0.030)	(0.141)
Number of individuals	18,566	6,134	21,884	16,829
Observations	54,326	15,457	72,733	57,047

Notes: This table shows the gender heterogeneity for the treatment effect on poor mental health. The sample is restricted to observations aged 18–60. Standard errors appeared in parentheses below coefficients are clustered at the local authority district level. Regressions include fixed effects for individual, year and local authority district. Further controls include age, age squared and dummies for cohabitation, having a child, fulltime student and being self-employed. The coefficients for **Unemployed x UC eligibility** and **Unemployed x UC eligibility x Male** are the parameters of interest. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: UKLHS (2009–2019).

Table A.20: Heterogeneity by gender: Employment in t+1

	(1) Single adults	(2) Lone parents	(3) Couples without children	(4) Couples with children
Unemployed	0.018*	-0.015	-0.006	-0.022**
	(0.010)	(0.011)	(0.009)	(0.009)
UC eligibility	-0.043***	0.008	-0.010**	0.014*
	(0.008)	(0.018)	(0.005)	(0.008)
Unemployed x Male	-0.032**	0.101***	0.006	0.096***
	(0.013)	(0.031)	(0.013)	(0.014)
UC eligibility x Male	0.013	0.023	0.014**	-0.048
	(0.009)	(0.063)	(0.005)	(0.035)
Unemployed x UC eligibility	0.144***	0.059	-0.032	0.083***
	(0.021)	(0.038)	(0.021)	(0.029)
Unemployed x UC eligibility x Male	-0.102***	-0.193	0.093***	0.254*
	(0.028)	(0.196)	(0.028)	(0.150)
Number of individuals	12,810	4,697	16,721	13,669
Observations	38,198	12,027	53,117	46,650

Notes: This table shows the gender heterogeneity for the treatment effect on future employment measured in the subsequent wave of the UKHLS. The sample is restricted to observations aged 18–60. Standard errors appeared in parentheses below coefficients are clustered at the local authority district level. Regressions include fixed effects for individual, year and local authority district. Further controls include age, age squared and dummies for cohabitation, having a child, fulltime student and being self-employed. The coefficients for **Unemployed x UC eligibility** and **Unemployed x UC eligibility x Male** are the parameters of interest. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: UKLHS (2009–2019).

Table A.21: Heterogeneity by gender: Full-time employment in t+1

	(1) Single adults	(2) Lone parents	(3) Couples without children	(4) Couples with children
Unemployed	-0.014	0.006	-0.022*	-0.011
	(0.011)	(0.010)	(0.011)	(0.011)
UC eligibility	-0.024***	0.009	-0.011*	0.017*
	(0.008)	(0.016)	(0.006)	(0.009)
Unemployed x Male	-0.040***	0.042	0.002	0.031*
	(0.014)	(0.028)	(0.017)	(0.016)
UC eligibility x Male	0.000	-0.026	0.008	-0.056
	(0.010)	(0.056)	(0.007)	(0.040)
Unemployed x UC eligibility	0.074***	-0.043	0.030	0.004
	(0.024)	(0.034)	(0.027)	(0.033)
Unemployed x UC eligibility x Male	-0.093***	-0.028	0.041	-0.007
	(0.032)	(0.175)	(0.036)	(0.172)
Number of individuals	12,810	4,697	16,721	13,669
Observations	38,198	12,027	53,117	46,650

Notes: This table shows the gender heterogeneity for the treatment effect on future full-time employment measured in the subsequent wave of the UKHLS. The sample is restricted to observations aged 18–60. Standard errors appeared in parentheses below coefficients are clustered at the local authority district level. Regressions include fixed effects for individual, year and local authority district. Further controls include age, age squared and dummies for cohabitation, having a child, fulltime student and being self-employed. The coefficients for **Unemployed x UC eligibility** and **Unemployed x UC eligibility x Male** are the parameters of interest. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: UKLHS (2009–2019).

Table A.22: Heterogeneity by gender: Part-time employment in t+1

	(1) Single adults	(2) Lone parents	(3) Couples without children	(4) Couples with children
Unemployed	0.032***	-0.021*	0.016	-0.012
	(0.010)	(0.012)	(0.011)	(0.012)
UC eligibility	-0.018**	-0.001	0.001	-0.003
	(0.008)	(0.020)	(0.006)	(0.010)
Unemployed x Male	0.008	0.059*	0.004	0.065***
	(0.014)	(0.035)	(0.016)	(0.019)
UC eligibility x Male	0.013	0.049	0.005	0.008
	(0.010)	(0.070)	(0.007)	(0.046)
Unemployed x UC eligibility	0.070***	0.102**	-0.062**	0.078**
	(0.023)	(0.043)	(0.026)	(0.037)
Unemployed x UC eligibility x Male	-0.009	-0.165	0.053	0.261
	(0.030)	(0.220)	(0.035)	(0.196)
Number of individuals	12,810	4,697	16,721	13,669
Observations	38,198	12,027	53,117	46,650

Notes: This table shows the gender heterogeneity for the treatment effect on future part-time employment measured in the subsequent wave of the UKHLS. The sample is restricted to observations aged 18–60. Standard errors appeared in parentheses below coefficients are clustered at the local authority district level. Regressions include fixed effects for individual, year and local authority district. Further controls include age, age squared and dummies for cohabitation, having a child, fulltime student and being self-employed. The coefficients for **Unemployed x UC eligibility** and **Unemployed x UC eligibility x Male** are the parameters of interest. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: UKLHS (2009–2019).

Table A.23: Same household status across pre- and post-rollout waves

	(1) Single adults	(2) Lone parents	(3) Couples without children	(4) Couples with children
a) Mental health score				
Unemployed x UC eligibility	-0.094**	-0.200**	0.085-	0.199***
	(0.038)	(0.094)	(0.045)	(0.065)
Number of individuals	6,154	1,878	9,321	7,410
Observations	26,634	6,134	35,900	29,074
b) Poor mental health				
Unemployed x UC eligibility	0.031*	0.071*	0.008	-0.070**
	(0.016)	(0.041)	(0.020)	(0.030)
Number of individuals	6,154	1,878	9,321	7,410
Observations	26,634	6,134	35,900	29,074
c) Employment t+1				
Unemployed x UC eligibility	0.114***	0.020	0.040**	-0.019
	(0.016)	(0.045)	(0.018)	(0.032)
Number of individuals	5,555	1,785	8,254	7,189
Observations	18,780	5,340	27,592	25,760
d) Full-time employment t+1				
Unemployed x UC eligibility	0.051***	-0.046	0.091***	-0.053
	(0.019)	(0.041)	(0.023)	(0.038)
Number of individuals	5,555	1,785	8,254	7,189
Observations	18,780	5,340	27,592	25,760
d) Part-time employment t+1				
Unemployed x UC eligibility	0.063***	0.066	-0.051**	0.034
	(0.017)	(0.052)	(0.022)	(0.044)
Number of individuals	5,555	1,785	8,254	7,189
Observations	18,780	5,340	27,592	25,760

Notes: This table shows the treatment effect on individual outcomes for those who report the same household status in between the wave pre- and post-UC rollout. The sample is restricted to observations aged 18–60. Standard errors appeared in parentheses below coefficients are clustered at the local authority district level. Regressions include fixed effects for individual, year and local authority district. Further controls include age, age squared and dummies for cohabitation, having a child, full-time student and being self-employed. The coefficient for **Unemployed x UC eligibility** is the parameter of interest. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: UKLHS (2009–2019).

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