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Furlough and Household Financial Distress during the COVID-19 Pandemic*

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Abstract

We study how being furloughed affects household financial distress during the COVID-19 pandemic in the United Kingdom. Furlough increases the probability of late housing and bill payments by 30% and 19%, respectively. At the aggregate level, furlough increases the incidence of financial distress by 3.38 percentage points. To offset furlough-induced income reductions, individuals significantly reduce consumption and spend savings. Relative to unemployment, the potential alternative in the absence of a furlough scheme, furlough reduces the incidence of financial distress by 95%. Estimates show an 80% government contribution to furloughed workers' wages minimizes the incidence of financial distress at the lowest cost to taxpayers.

I. Introduction

Furlough schemes were one of the primary instruments governments across the world used to mitigate the economic damage of COVID-19. The policy attempts to safeguard jobs and incomes by allowing employers that are adversely affected by the pandemic to place workers on temporary leave rather than make them redundant. While the government pays the majority of a furloughed worker's wages, employers often choose not to pay the remainder. Furlough can therefore lead to large income reductions that create financial difficulties for many households. At the same time, due to their widespread usage, furlough schemes place heavy burdens on public finances. It is therefore crucial the schemes are effective in preventing household default while remaining financially sustainable.

In this paper, we present novel evidence on whether furlough provokes household financial distress. We evaluate this relationship using data from the United Kingdom (UK)

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where the Understanding Society COVID-19 database provides eight waves of nationally representative, individual-level microdata between 1 April 2020, and 30 April 2021. Despite the government contributing 80% of furloughed workers' wages up to £2,500 per month via the Coronavirus Job Retention Scheme (CJRS), the average individual experiences a furlough-induced income reduction of 14.6%. We conjecture that the negative income shock during a furlough spell compromises individuals' ability to remain current on housing and bill payments.

Using a matched difference-in-difference estimator, we find evidence that these mechanisms are operative and economically meaningful. During the pandemic, a furloughed individual is 30% more likely to be late on housing payments and 19% more likely to be late on bill payments, relative to a similar non-furloughed individual. Despite these large relative effects, owing to the low incidence of financial distress among non-furloughed workers, furlough has a modest effect on financial distress for the UK workforce.[1] Consequently, furlough increases the aggregate incidence of financial distress by 3.38 percentage points. The design of the CJRS thus appears to be successful in mitigating strong rises in the number of households experiencing financial hardship during the COVID-19 pandemic.

A key question for policymakers is, what is the optimal government contribution to furloughed workers' wages that minimizes financial distress at the lowest cost to taxpayers? Estimates show that the probability of financial distress is similar (3.5%) for individuals experiencing a furlough-induced income contraction of 20% or less. Increasing the government's contribution would thus do little to lower the incidence of financial distress. However, the probability of financial distress increases with the size of the furlough-induced income reduction above 20%. A 40% (60%) fall in monthly income due to furlough leads to a 4.20% (4.90%) increase in the probability of financial distress relative to similar non-furloughed workers. These patterns are consistent with evidence showing individuals mostly default on their financial obligations when they suffer extremely large income reductions (Gerardi *et al.*, 2017). A government contribution of 80% to monthly wages therefore minimizes the incidence of financial distress at the lowest cost to taxpayers. This is important since the CJRS is a temporary complement to the existing set of automatic stabilizers that cost £68.5 billion, equivalent to 8% of annual government expenditure.

While furlough increases the incidence of financial distress, the effects differ sharply according to home ownership status. Whereas furlough significantly increases the probability that a renter falls behind on housing payments, it has no significant effects among mortgagees. This is consistent with furloughed mortgagees using the mortgage holiday scheme to defer housing payments which allows them to reduce expenditure and free up funds to remain current on bills.[2] However, both furloughed renters and mortgagees are significantly more likely to be late on bill payments.

[1] Among non-furloughed workers 2.6% are late on housing and 13.4% are late on bill payments.

[2] The mortgage holiday scheme is a separate policy introduced by the government and lenders in response to the pandemic that aims to grant mortgagees time to stabilize their finances. Mortgagees adversely affected by the COVID-19 pandemic can defer mortgage payments by 3–6 months. This does not reduce the outstanding balance of their mortgage, and interest continues to accrue during a mortgage holiday such that the overall cost of the mortgage is higher in future. 1.9 million mortgagees took a mortgage holiday between March 2020 and July 2021.

Households may relax the financial constraints of furlough by reducing consumption. We find that while furloughed an individual is 18 percentage points more likely to cut spending relative to prepandemic levels than an individual who has not been furloughed. The reduction in expenditure persists even after returning to work, such that furloughed workers are significantly less likely to experience financial distress after their furlough spell ends. These effects are consistent with workers replenishing savings after a furlough spell, and permanent changes to consumption habits (Chronopoulos, Lukas, and Wilson, 2020). As approximately one quarter of the workforce experience furlough at least once during the pandemic, the CJRS likely has long-lasting effects on consumption behaviour for a large part of the UK population.

While furloughed, individuals draw down savings to stabilize their finances and mitigate falling income. Furlough raises the probability that an individual cuts savings in comparison to prepandemic levels by 5.6 percentage points. However, despite workers cutting expenditure and deploying savings, furlough continues to exert a significantly positive effect on financial distress suggesting these responses do not fully offset declining income for most furloughed workers.

In the absence of a furlough policy, it is likely employers would have instead made workers redundant. Estimates show furloughed workers are 95% less likely to experience financial distress relative to control individuals who become unemployed. This reflects the higher monthly income most individuals receive from furlough payments relative to unemployment benefits. It is likely that financial distress would have been more prevalent during the pandemic without a furlough scheme.

Our paper contributes to a rapidly evolving body of literature on the economic response to the COVID-19 pandemic. One line of research documents the evolution of consumption in response to COVID-19. Baker *et al.* (2020) find that during March 2020, as COVID-19 infections increased, Americans reduced consumption by between 25% and 30%. Finck and Tillmann (2022) report that household spending contracts as the number of pandemic deaths increases and that low-income households exhibit significantly larger drops in consumption than high-income households which exacerbates consumption inequality. Coibion, Gorodnichenko, and Weber (2020) study the causal effects of local lockdowns on consumer spending in the USA. Chronopoulos *et al.* (2020) examine the change in household spending in the UK using high-frequency data, demonstrating that discretionary consumption fell while groceries and stockpiles became prevalent. Coibion *et al.* (2021) evaluate how macroeconomic uncertainty during the COVID-19 pandemic affects households' spending decisions on different items. Our results complement these findings by illustrating the consumption and savings effects of furlough schemes.

A parallel stream of research uses SIR models to understand how epidemics influence the aggregate economy.[3] These models show strong feedback effects between the development of COVID-19 and economic decision making. In particular, agents endogenously respond to viral spread by reducing consumption and hours worked to a much larger degree than implied by purely epidemiological models that abstract from

[3]See, for example, Goenka and Liu (2012), Goenka, Liu, and Nguyen (2014), Eichenbaum, Rebelo, and Trabandt (2020b) and Bodenstein, Corsetti, and Guerrieri (2020). The acronym SIR denotes susceptible, infectious or recovered.

economic feedback mechanisms (Eichenbaum, Rebelo, and Trabandt, 2020a). In a New-Keynesian model with input-output linkages, Lenoël and Young (2021) evaluate the effects of the furlough scheme on unemployment. While the macroeconomic effects of the COVID-19 crisis are well documented, evidence on its impact on household finances is much more limited. A unique contribution of our paper is to highlight the microeconomic implications of the strong reduction in economic activity during the pandemic. We emphasize that furlough has long lasting effects on consumption and savings behaviour, even after workers return to their job. This result provides microeconomic support for the mechanisms present in macroeconomic SIR models, and emphasizes the importance for SIR models to account for the enduring effect of furlough on agents' behaviour.

Even before the pandemic, some countries allowed firms experiencing economic difficulties to use Short-Term-Work (STW) schemes to temporarily reduce hours worked with the government providing income support to affected workers. Yet, the literature on the effects and effectiveness on STW schemes is limited. Kopp and Siegenthaler (2021) show that the Swiss STW scheme increases establishment survival rates and lowers unemployment in the aftermath of the Great Recession by preventing rather than postponing worker dismissals. Balleer *et al.* (2016) find that the German STW programme acted as an effective job saver during the 2007 financial crisis. Christl *et al.* (2021) report that in Germany the STW programme, in conjunction with one-off monetary payments to workers with children, almost entirely offset the adverse labour market effects of the COVID-19 pandemic. Adams-Prassl *et al.* (2020b) provide real-time survey evidence on the labour market impacts of COVID-19 during March and April, 2020. Non-salaried workers and those who are able to do fewer job tasks from home are more likely to be made unemployed. Using micro-simulations, Brewer and Tasseva (2021) find that the CJRS wage subsidies provide the main insurance mechanism during April and May 2020. Our paper complements this literature by providing novel insights into how STW schemes influence financial distress and spending patterns among households. Our paper is the first to evaluate the CJRS's design and its effectiveness in preventing household financial distress over the entire time of it being in place during the COVID-19 crisis.

The paper proceeds as follows. In section II we provide background details about the furlough scheme in the UK. Section III describes the data set and econometric methods. We report results in section IV and robustness checks in section V. Section VI draws conclusions.

II. Institutional background

On 23 March 2020, the UK government implemented a national lockdown to curb the spread of COVID-19. These measures imposed a stay-at-home order banning all non-essential travel and contact with people outside one's home and closed all non-essential businesses, almost all schools, and places where people may congregate.[4] The police were given authority to enforce these measures.

[4]A small number of schools remained open for the children of key workers.

Facing a sharp increase in unemployment as employers shut down their operations, the government announced the CJRS (furlough) on 20 March 2020. The furlough scheme allows all employers with employees on a PAYE scheme to designate some or all employees as 'furloughed workers'.[5] Under the scheme, employers may place some or all workers on temporary leave while keeping them on the payroll without working. The government pays 80% of furloughed workers' wages up to a maximum of £2,500 per month, as well as national insurance and certain pension contributions. Employers have discretion about whether to pay the remaining 20%, although many chose not to. The government placed no limit on the amount of funding available through the scheme and pledged to support as many jobs as necessary.[6]

While the furlough scheme was initially due to run until 30 June 2020, the government made clear from the start it could be extended should the pandemic endure. After several extensions, from 10 June 2021, the furlough scheme was effectively closed to employees who had not been previously furloughed.[7]

From 1 July 2021, the government reduced its contribution to 70%, and mandated employers contribute at least 10%, of a worker's monthly wage. From 1 August 2021, the government further reduced its contribution to 60%, with employers paying at least 20%, of furloughed workers' monthly wages.[8] Since 1 July 2021, employers must pay the National Insurance and pension contributions that were previously paid by the government. The furlough scheme officially closed on 30 September 2021.

Our sample period spans 1 April 2020 to 30 April 2021. It therefore covers almost the entire time during which employees could be newly registered to participate in the furlough scheme, but it does not include the period of reduced government contributions.

Figure 1 illustrates the daily incidence of furlough between 1 March 2020 and 30 June 2021. The three national lockdowns are indicated by the grey shaded areas. The number of furloughed workers peaks shortly after the introduction of the furlough scheme, coinciding with the first national lockdown on 23 March 2020. Following the removal of lockdown restrictions in June 2020, the number of furloughed workers falls from approximately 7.5 million to 2.3 million before increasing again during subsequent national lockdowns. While the number of furloughed workers steadily falls after the end of the third national lockdown, on 30 June 2021, almost 2 million individuals remain furloughed. By June 2021, total government spending on furlough was £68 billion, equivalent to 8% of annual government spending.[9]

[5]PAYE is HM Revenue and Customs' system to collect income tax and national insurance from payroll employment. The system is used by all employers.

[6]See the Chancellor of the Exchequer's speech announcing the scheme https://www.gov.uk/government/speeches/the-chancellor-rishi-sunak-provides-an-updated-statement-on-coronavirus.

[7]The scheme was extended until the end of October 2020, March 2021, April 2021 and September 2021.

[8]Specifically, from 1 July 2021, until 31 July 2021, the government pays 70% of gross monthly wages up to a maximum of £2,187.50. During this period employers must pay 10% of gross monthly wages up to a maximum of £312.50. From 1 August 2021, the government pays 60% of monthly wages up to £1,875 with employers paying 20% of wages up to a maximum of £625. For further details see https://www.gov.uk/government/publications/changes-to-the-coronavirus-job-retention-scheme/changes-to-the-coronavirus-job-retention-scheme.

[9]Further information on uptake and usage of the CJRS can be found in Tetlow, Pope, and Dalton (2020b), Adams-Prassl *et al.* (2020a), Gardiner and Slaughter (2020) and Tomlinson (2021).

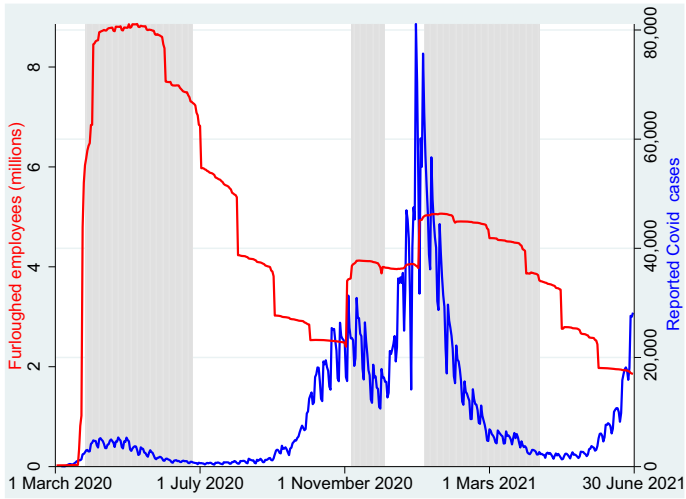

Figure 1. Incidence of Furlough during the Pandemic.
Notes: This figure plots the daily number of workers on furlough and the daily number of people testing positive for COVID-19 between 1 March 2020, and 30 June 2021. The grey bars indicate periods when national lockdown restrictions are in force. The data source for the number of furloughed employees is HM Revenue and Customs CJRS statistics. The number of daily COVID-19 cases are taken the government's covonavirus in the UK database [Colour figure can be viewed at *wileyonlinelibrary.com*]

III. Data and methods

We retrieve individual-level panel data from the Understanding Society COVID-19 Survey. Approximately 16,000 respondents to the established Understanding Society Survey completed web-based questionnaires at regular intervals during the pandemic.[10] The Survey uses a complex survey design and participants are chosen to provide a representative sample of the UK in terms of regions, age, education, and social background. A participant answers the survey on behalf of the household. Participants are sent emails and/or SMS text invites asking them to complete an online survey.[11]

During the pandemic, respondents are surveyed at eight points in time. The eight survey waves take place in April, May, June, July to August, September to October, and November to December 2020, and in January to February, and March to April 2021. For each respondent, the data provides information on issues including demographic, health, financial and socio-economic characteristics as well as pandemic-specific topics such as

[10]The Understanding Society Survey is also known as the UK Household Longitudinal Study. Understanding Society started in 2009 and builds on the British Household Panel Survey which ran from 1991 to 2009. In addition to the special COVID-19 survey, each year Understanding Society interviews approximately 40,000 households on issues about family life, income, wealth, expenditure, education, employment, health and well-being, and civic participation.

[11]For further details of the Understanding Society participants see https://www.understandingsociety.ac.uk/about/who-are-our-participants. The email/SMS text contains a link to a webpage where a participant completes the survey. See Appendix A in Data S1. Reminders are sent to participants who have yet to complete the survey that notifies them of the response deadline. Participants choose the method of communication through which Understanding Society may contact them. For further information on participant communication materials, see https://www.understandingsociety.ac.uk/sites/default/files/downloads/documentation/covid-19/fieldwork-documents/covid-19-communication-materials.pdf.

coronavirus illness, and furlough status. Importantly, the survey contains weights for each individual that allow us to construct a sample that is representative of the UK adult population.

Only individuals in employment may be furloughed. To ensure a homogeneous unit of observation, we exclude observations of retirees, and people who are self-employed or unemployed.[12] These screens leave only employees in the sample.

Financial distress is the outcome we model in the econometric tests. Owing to its broad nature, we capture financial distress using two measures. First, a dummy variable that equals 1 if an individual is late on housing (either rent or mortgage) payments, 0 otherwise. Second, a dummy variable that equals 1 if an individual is late on bill payments, 0 otherwise. Housing payments tend to be households' largest single monthly expense item while bills constitute a sizeable share of the average household's expenditure. Falling behind on either housing or bill payments indicates financial distress as a household cannot fulfil its most important financial obligations (Kuhnen and Melzer, 2018; McGowan and Nguyen, 2022).

Furlough status is the key independent variable in the regression equations. We observe whether an individual is on furlough during each wave of the Understanding Society COVID-19 Survey. We thus generate a dummy variable that equals 1 if an individual who is in employment reports they have been furloughed, 0 otherwise.[13]

The data set contains several additional variables that we use as controls in the regressions. Information is available on an individual's age, net monthly pay (i.e. take home pay after paying personal income tax and national insurance), whether their top educational qualification is at least a bachelor's degree, whether they work in a managerial, intermediate, or routine job, minority ethnicity status, gender, the number of adults and children living in the household, the pre-COVID-19 amount of non-mortgage debt, and the region in which they live.[14] The data also reports whether an individual has cut spending or spent their savings relative to prepandemic levels. For each individual, the data show whether they rent or own their home using a mortgage and if a mortgagee is deferring mortgage payments using the mortgage holiday scheme. To capture the progress of the COVID-19 pandemic, the survey details whether a person has received a letter from the National Health Service (NHS) advising them to shield during the pandemic by remaining at home and avoiding social interaction where possible, whether they are clinically vulnerable to COVID-19, and if they have tested positive for COVID-19.

Table 1 provides definitions of the variables in the data set. Table 2 reports summary statistics for each variable. 2.55% of respondents are late on housing and 13.35% are late on bill payments. Furlough is common during the pandemic: 10.8% of individual-wave

[12]Self-employed individuals are not eligible for furlough under the CJRS. Instead, they may apply for support through the Self-Employment Income Support Scheme (SEISS). The furlough and SEISS schemes differ in their design. We thus exclude self-employed individuals from the sample.

[13]Roth *et al.* (2022) and de Chaisemartin and D'Haultfoeuille (2022) review recent work and point out that in surveys such as the one used in this paper, the fact that workers can potentially have a history of being furloughed multiple times, may lead to imprecision in estimates. We aim to account for this through various robustness exercises.

[14]There are 12 regions in the data set: East England, London, North East England, North West England, Northern Ireland, the East Midlands, the West Midlands, Scotland, South East England, South West England, Yorkshire and the Humber, and Wales.

TABLE 1
Variable descriptions

Variable	*Description*
Late on housing	A dummy variable equal to 1 if an individual is late on housing payments, 0 otherwise
Late on bills	A dummy variable equal to 1 if an individual is late on bill payments, 0 otherwise
Furlough	A dummy variable equal to 1 if an individual is furloughed, 0 otherwise
Flexible furlough	A dummy variable equal to 1 if an individual is partially furloughed and continues to work part of their normal hours, 0 otherwise
Post furlough	A dummy variable equal to 1 in the waves after an individual who was furloughed returns to work, 0 otherwise
Placebo	A dummy variable equal to 1 in the month before a furlough spell begins, 0 otherwise
Unemployed	A dummy variable equal to 1 if an individual became unemployed during the pandemic, 0 otherwise
Age	Age, in years
Pay	Lagged net monthly pay (in £2020)
No university degree	A dummy variable equal to 1 if an individual's highest educational qualification is below a bachelor's degree (or equivalent), 0 otherwise
Managerial job	A dummy variable equal to 1 if an individual works in a managerial role, 0 if they work in an intermediate or routine role
Minority	A dummy variable equal to 1 if an individual is from a minority ethnic background, 0 otherwise
Male	A dummy variable equal to 1 if an individual is male, 0 otherwise
Cut spending	A dummy variable equal to 1 if an individual reports cutting spending relative to prepandemic levels, 0 otherwise
Spent savings	A dummy variable equal to 1 if an individual reports spending savings relative to prepandemic levels, 0 otherwise
Late on housing$_{2019}$	A dummy variable equal to 1 if an individual was late on housing payments during 2019, 0 otherwise
Late on housing$_{2018}$	A dummy variable equal to 1 if an individual was late on housing payments during 2018, 0 otherwise
Late on housing$_{2017}$	A dummy variable equal to 1 if an individual was late on housing payments during 2017, 0 otherwise
Late on bills$_{2019}$	A dummy variable equal to 1 if an individual was late on bill payments during 2019, 0 otherwise
Late on bills$_{2018}$	A dummy variable equal to 1 if an individual was late on bill payments during 2018, 0 otherwise
Late on bills$_{2017}$	A dummy variable equal to 1 if an individual was late on bill payments during 2017, 0 otherwise
Non-mortgage debt	Total pre-COVID-19 debt balance (excluding mortgage debt), in natural logarithms
Monthly savings	Average monthly savings during 2019, in natural logarithms
Grocery bill	Average weekly grocery bill 2019, in natural logarithms
NHS shielding	A dummy variable equal to 1 if an individual has received a letter from the National Health Service telling them to shield during the pandemic, 0 otherwise
Clinically vulnerable	A dummy variable equal to 1 if an individual receives notification from the National Health Service they are clinically vulnerable to COVID-19, 0 otherwise
Positive test	A dummy variable equal to 1 if an individual tests positive for COVID-19, 0 otherwise
Children	The number of children living in the house
Adults	The number of adults living in the house
COVID-19 infections	The mean number of COVID-19 positive tests in the region during each wave

Notes: This table provides a description of each variable in the data set and its source. The Understanding Society COVID-19 Survey is the source of all variables except Late on housing$_{2019}$, Late on housing$_{2018}$, Late on housing$_{2017}$, Late on bills$_{2019}$, Late on bills$_{2018}$, and Late on bills$_{2017}$ that are taken from the 2017 to 2019 vintages of the UK Household Longitudinal Survey Study (Understanding Society).

observations are of a person on furlough. However, 23.8% of employees experience furlough at least once during the sample period.

Empirical methodology

Our econometric methodology relies on a matched difference-in-differences design to eliminate potential omitted variables (Goldschmidt and Schmieder, 2017). We first construct a comparison group of individuals who are not furloughed using a matching

TABLE 2
Descriptive statistics

Variable	*Mean*	*SD*	*p1*	*p99*	*Obs*
Late on housing	0.0255	0.1576	0	1	38,250
Late on bills	0.1335	0.3401	0	1	38,250
Furlough	0.1081	0.3105	0	1	38,250
Partial furlough	0.0222	0.1472	0	1	38,250
Post furlough	0.1064	0.3084	0	1	38,250
Placebo	0.0175	0.1311	0	1	26,392
Age	47.3165	11.7598	17	71	38,250
Pay	1.716	1.4109	0.2000	6.2500	38,250
No university degree	0.4178	0.4932	0	1	38,250
Managerial job	0.1698	0.3754	0	1	38,250
Minority	0.0957	0.2942	0	1	38,250
Male	0.3984	0.4896	0	1	38,250
Cut spending	0.1709	0.3764	0	1	38,250
Spent savings	0.0612	0.2397	0	1	38,250
Late on housing$_{2019}$	0.0163	0.1267	0	1	38,250
Late on housing$_{2018}$	0.0243	0.154	0	1	35,197
Late on housing$_{2017}$	0.0313	0.1742	0	1	34,338
Late on bills$_{2019}$	0.017	0.1292	0	1	38,250
Late on bills$_{2018}$	0.1057	0.3075	0	1	38,250
Late on bills$_{2017}$	0.1227	0.3281	0	1	38,250
Non-mortgage debt (ln)	0.1943	1.4190	0	10.3190	38,250
Monthly savings (ln)	1.1304	2.2245	0	6.9078	38,250
Grocery bill (ln)	5.606	0.5813	2.9957	9.105	25,119
NHS shielding	0.0316	0.175	0	1	38,243
Clinically vulnerable	0.2695	0.4437	0	1	38,198
Positive test	0.0095	0.097	0	1	38,250
Children	0.6734	0.9359	0	5	38,250
Adults	1.202	0.8356	0	6	38,250

Notes: This table reports descriptive statistics for the variables in the data set. Monthly pay is reported in thousands of pounds (in £2020). 'ln' indicates a variable is measured in natural logarithms. p1 indicates the first percentile of the distribution. p99 indicates the 99th percentile of the distribution. Table 1 provides a description of each variable.

algorithm. For each furloughed individual, we take the set of non-furloughed individuals who live in the same region in 2019 (i.e. prior to the pandemic) as a potential control group. Using a probit model, we estimate

$$f_{ir} = \alpha + \Gamma X_{ir} + \delta_r + \nu_{ir}, \tag{1}$$

where f_{ir} is a dummy variable equal to 1 if individual i in region r is furloughed between April 2020 and April 2021, 0 otherwise; X_{ir} is a vector of 2019 variables (age, monthly pay, degree status, whether the individual has a managerial job, ethnic minority status, gender, and the number of children and adults living in the household); δ_r denote region fixed effects; ν_{ir} is the error term.

Appendix Table 2.C in Data S1 presents estimates of equation (1). Lower paid individuals and those without a university degree are significantly more likely to be furloughed. The remaining independent variables' coefficient estimates are statistically insignificant.

Using the estimates of equation (1), we compute propensity scores. We then use a nearest neighbour matching algorithm with a caliper of 0.05 to ensure tight matches, and match observations of furloughed individuals to their four nearest neighbours within this range, with replacement. To assess the quality of the matching procedure, we compare the characteristics of furloughed and non-furloughed workers in the unmatched and matched samples. Table 3 shows significant differences along several dimensions between the groups in the unmatched sample. Those on furlough tend to be younger, paid less, have educational qualifications below a university degree, and are less likely to work in a managerial role. Minorities tend to be under-represented and households contain fewer children and more adults. There are also significant differences in the geographical location of furloughed workers.

However, these differences are absent from the matched sample. The *t*-tests in Table 3 show there are no statistically significant differences between the matched characteristics of furloughed and non-furloughed workers, even at the 10% level. Moreover, the bias percentage statistics are less than 5% in every instance. This suggests the matching algorithm achieves balance in the characteristics of furloughed and non-furloughed workers, thereby obviating confounding differences.

Critical to obtaining valid matching estimates is overlap in the range of propensity scores across the treatment and comparison groups. Inferences about the effect of furlough cannot be made for a furloughed individual for whom there is no comparison individual with a similar propensity score. Moreover, the propensity score should have a similar distribution in the two groups. Appendix Figure 3.D in Data S1 illustrates the distributions of propensity scores among furloughed and non-furloughed individuals. The overlap in the distribution of the propensity score across the furloughed and non-furloughed groups shows they are balanced and the common support assumption holds. Together the diagnostic checks suggest that the match quality is high, as it balances the characteristics of the two groups, and achieves common support.

Using the matched sample, we estimate difference-in-difference models of the form

$$y_{irt} = \alpha + \beta F_{irt} + \gamma X_{irt} + \delta_r + \delta_t + \varepsilon_{irt}, \tag{2}$$

where y_{irt} is a dependent variable measuring financial distress (either the late housing or late bill payments dummy variables) for individual i in region r during wave t; F_{irt} is a dummy variable if the individual is on furlough, 0 otherwise; X_{irt} is a vector of control variables; δ_r and δ_t denote region and year fixed effects, respectively; ε_{irt} is the error term.

Similar to other major survey programmes, the Understanding Society COVID-19 Survey follows a multistage/complex design survey. The sample incorporates special design features such as stratification, clustering and differential selection probabilities to ensure the sample is representative of the UK population. These features must be taken into account when estimating the standard errors of regression estimators, as well as the sampling errors of descriptive statistics. In standard statistical analysis, the assumptions of random sampling and independence of observations imply that estimators are linear functions of the observed data, making the calculation of estimators' standard deviations straightforward. Neither assumption holds in the Understanding Society COVID-19 Survey because of its complex survey design (e.g. clustering and stratification). Estimators

TABLE 3
Matching diagnostics

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
	Unmatched sample					*Matched sample*				
Variable	*Furloughed*	*Non-furloughed*	*Diff*	*t-stat*	*P-value*	*Furloughed*	*Non-furloughed*	*Bias (%)*	*t-stat*	*P-value*
Age	45.30	46.49	1.19***	6.39	0.00	46.98	47.38	−3.1	−1.36	0.17
Pay	1.13	1.75	0.62***	29.13	0.00	1.19	1.19	−0.5	−0.27	0.78
Below university degree	0.59	0.41	−0.18***	−24.13	0.00	0.58	0.58	−1.7	−0.75	0.45
Managerial job	0.08	0.18	0.10***	16.51	0.00	0.08	0.08	0.4	0.2	0.84
Minority ethnicity	0.09	0.11	0.02***	4.38	0.00	0.08	0.08	−0.0	−0.01	0.99
Male	0.39	0.40	0.00	0.57	0.57	0.40	0.40	−0.8	−0.37	0.71
Children	0.63	0.68	0.05***	3.62	0.00	0.61	0.62	−0.4	−0.17	0.86
Adults	1.32	1.22	−0.10***	−7.59	0.00	1.25	1.26	−1.2	−0.53	0.60
COVID-19 infections	9.41	9.75	0.33***	14.28	0.00	9.43	9.42	0.1	0.06	0.95
Scotland	0.08	0.08	0.00	0.58	0.56	0.08	0.08	−0.1	−0.05	0.96
N Ireland	0.04	0.04	0.01***	3.07	0.00	0.03	0.03	0.5	0.25	0.80
Wales	0.06	0.06	−0.00	−1.11	0.27	0.06	0.05	0.6	0.27	0.79
North east	0.03	0.04	0.01**	2.23	0.03	0.03	0.03	−0.4	−0.17	0.87
North west	0.08	0.10	0.02***	4.67	0.00	0.08	0.07	0.7	0.32	0.75
Yorkshire	0.09	0.08	−0.01***	−3.17	0.00	0.10	0.10	−0.4	−0.16	0.88
E Midlands	0.09	0.08	−0.01***	−3.19	0.00	0.09	0.09	−0.8	−0.33	0.74
W Midlands	0.09	0.08	−0.00	−0.97	0.33	0.09	0.09	−0.1	−0.04	0.97
East	0.12	0.10	−0.01	−3.14	0.00	0.11	0.11	0.3	0.14	0.89
South east	0.14	0.14	0.00	0.15	0.88	0.14	0.15	−1.5	−0.68	0.50
South west	0.10	0.09	−0.00	−0.89	0.37	0.10	0.10	−0.2	−0.08	0.93
Observations	9,712	38,023				9,011	29,238			

Notes: Furloughed (Non-furloughed) denotes the mean value of a variable for furloughed (non-furloughed) workers within either the unmatched or matched sample; Diff is the difference in means between furloughed and non-furloughed in the unmatched sample; Bias (%) is the standardized percentage bias which is the difference of the sample means between the furloughed and non-furloughed sub-samples as a percentage of the square root of the average of the sample variances in the furloughed and non-furloughed groups; *t*-stat is the *t*-statistic from a *t*-test for equality of means between Furloughed and Non-furloughed and *P*-value is the associated *P*-value. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

TABLE 4
Characteristics of furloughed workers during the pandemic

	April	*May*	*June*	*July-August*	*September-October*	*November-December*	*January-February*	*March-April*
Wave	*2020*						*2021*	
Age (in years)	42.91	42.64	42.86	42.93	43.07	40.61	40.37	40.06
Pay (in £2020)	1,385	1,379	1,340	1,301	1,363	1,227	1,253	1,220
No university degree (in %)	65.48	63.92	62.20	62.01	57.34	66.63	64.62	69.16
Managerial job (in %)	6.89	9.13	9.12	7.10	9.78	5.90	5.55	3.63
Minority (in %)	4.58	8.21	7.87	7.23	7.48	6.18	4.50	4.68
Male (in %)	50.76	47.96	46.12	45.53	50.74	43.69	48.39	50.55

Notes: This table reports the mean of each variable for furloughed workers during each sample wave. Variable descriptions are provided in Table 1.

are therefore not linear functions of the observed data. A naive calculation of their variances would underestimate their standard errors and result in too narrow confidence intervals. For this reason, we use bootstrapping to estimate the standard errors.

IV. Results

We begin the analysis by presenting descriptive patterns showing the evolution of furloughed workers' characteristics during the pandemic. Table 4 provides a broad overview of the average furloughed individual during each sample wave. Between April and October, 2020, the mean age of furloughed workers is approximately 43 years. However, as the pandemic progresses young workers constitute a larger share of those on the scheme. The average age of furloughed workers is 40.61 years in November-December 2020, and falls to 40.06 years in March-April 2021.

We observe similar dynamics in the evolution of workers' prepandemic net monthly pay during the pandemic. In April 2020, average net monthly pay is £1,385. Through time lower-income individuals account for a greater share of furloughed workers, such that by March-April 2021, the mean value is £1,220. In contrast, Table 4 shows the educational attainment of furloughed workers remains fairly constant during the sample period: between 57% and 69% have a qualification below a university degree. Workers in managerial jobs account for less than 10% of furloughed workers during all waves. This is consistent with furlough being most prevalent in sectors with a large number of routine and intermediate workers such as retail, hospitality and manufacturing. Individuals from an ethnic minority background account for between 4.5% and 8.21% of workers on furlough. During most of the sample there is a fairly even split in the gender of furloughed workers.

The effect of furlough on income

We begin by showing the effects of furlough on income within the full sample. Figure 2 illustrates the distribution of monthly income declines among those on furlough. Approximately 35% of furloughed workers experience a reduction of 5% or less and the mean decline is 14.6%. However, monthly income falls by between 20% and 80% for

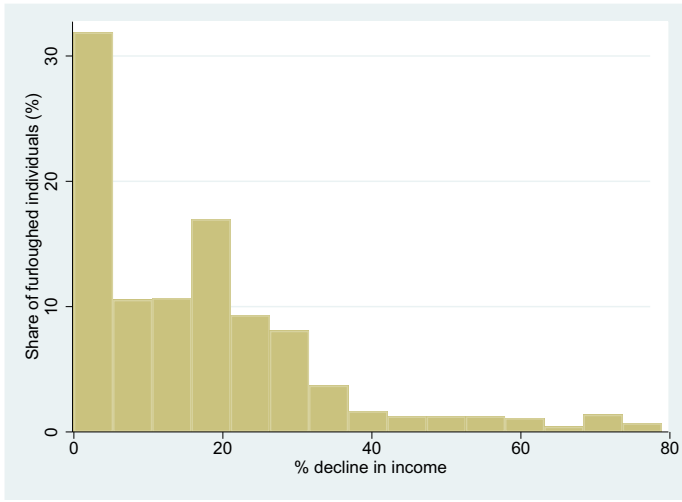

Figure 2. Distribution of furlough-induced income reductions.
Notes: This figure shows for furloughed workers the decline in their monthly income while furloughed relative to average 2019 monthly income [Colour figure can be viewed at *wileyonlinelibrary.com*]

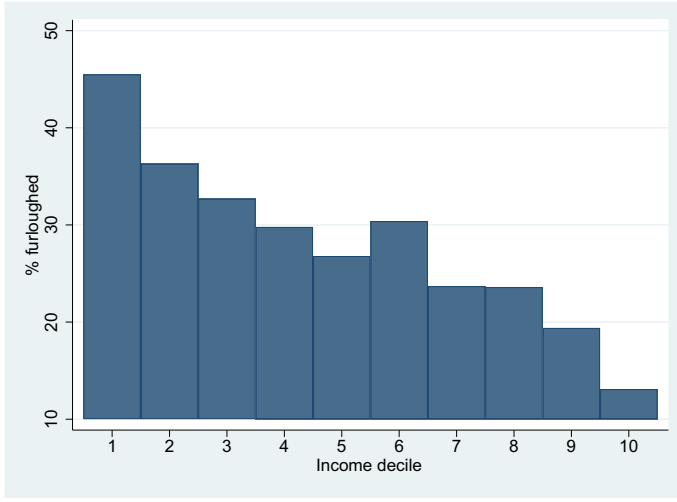

Figure 3. Share of furloughed workers across the 2019 income distribution.
Notes: This figure reports the share of workers furloughed within each decile of the 2019 monthly income distribution [Colour figure can be viewed at *wileyonlinelibrary.com*]

some workers while furloughed. This group mainly comprises individuals who earned more than £2,500 per month before the pandemic and see their income fall to £2,500 during furlough spells. 45% of this group experience a reduction in monthly income of 20% or more while on furlough.

Figure 3 shows the share of workers within each decile of the 2019 monthly income distribution that are furloughed during the pandemic. While the incidence of furlough

TABLE 5
The effect of furlough on income

Sample	*1*	*2*	*3*
Dependent variable: ΔIncome	*All*	*$Inc_{19} \leq$ £2,500*	*$Inc_{19} >$ £2,500*
Furlough	−0.2217***	−0.1973***	−0.6851***
	(−17.97)	(−18.04)	(−10.53)
Age	−0.0043***	−0.0038***	−0.0032
	(−9.21)	(−11.13)	(−1.61)
No university degree	−0.6953***	−0.07022***	−0.2364***
	(−5.50)	(−6.44)	(−6.99)
Managerial job	0.0220	0.1010***	0.0312
	(1.64)	(6.50)	(1.18)
Minority	−0.0224	−0.0218	−0.0496
	(−1.02)	(−1.16)	(−0.93)
Male	0.0372***	0.0336***	0.2355***
	(3.37)	(3.04)	(7.33)
Region FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observation	31,863	25,836	5,760

Notes: This table presents estimates of equation (2), estimated using the matched sample, using the difference between current and 2019 monthly income (ΔIncome) as the dependent variable. Table 1 provides a description of each variable. We exclude the pay variable from the set of controls due to collinearity. $Inc_{19} \leq$ £2,500 denotes individuals whose 2019 monthly earnings are less than or equal to £2,500. $Inc_{19} >$ £2,500 denotes individuals whose 2019 monthly earnings are greater than £2,500. We calculate robust standard errors with bootstrapping, and report *z*-statistics in parentheses.
*, **, *** denote statistical significance at the 10%, 5% and 1% level, respectively.

is higher among lower income deciles, higher-income workers also face substantial likelihoods of being furloughed. Within the 9th decile, 19.4% of workers are furloughed. In the top decile, the figure is 13.1%.

To more formally estimate income losses due to furlough, using the matched sample, for each individual we compute the change in monthly income between wave t and their monthly income during 2019 as, $\Delta\text{Income}_{irt} = \text{Income}_{irt} - \text{Income}_{ir}^{2019}$. We then estimate equation (2) using $\Delta\text{Income}_{irt}$ as the dependent variable. Column 1 in Table 5 displays the estimates. The furlough coefficient shows that monthly earnings fall by, on average, £221.70 relative to monthly earnings in 2019. The effect is significant at the 1% level and equates to a 14.6% decline compared to 2019 monthly income. The extent of the income losses are significantly larger among individuals who are older, without a university degree, and male.

In column 2 of Table 5 we report estimates of equation (2) using individuals whose monthly earnings were £2,500 or less in 2019. This group experience a significant £197 contraction in their monthly income during furlough, equivalent to a 13.8% reduction. Finally, we focus on individuals earning more than £2,500 per month in column 3 of the table. On average, this group's monthly income falls by approximately £685 per month once they are furloughed. Relative to their 2019 monthly income, this is equivalent to a 20.0% decrease.

TABLE 6
Financial Distress during Furlough

Dependent variable	*1* *Late on housing*	*2*	*3*	*4* *Late on bills*	*5*	*6*
Sample	*All*	*renters*	*Mortgagees*	*All*	*Renters*	*Mortgagees*
Furlough	0.0077***	0.0109***	0.0037	0.0261***	0.0294***	0.0207***
	(3.49)	(3.60)	(1.01)	(6.34)	(4.52)	(3.34)
Age	−0.0004***	−0.0006***	−0.0000	−0.0001	−0.0005***	0.0003*
	(−6.01)	(−7.50)	(−0.22)	(−0.65)	(−2.75)	(1.88)
Pay	−0.0012	−0.0007	−0.0018**	−0.0043***	−0.0043***	−0.0036***
	(−1.57)	(−0.53)	(−2.16)	(−4.25)	(−2.79)	(−3.04)
No university degree	0.0062***	0.0131***	−0.0006	0.0120	0.0129***	0.0074
	(4.73)	(5.35)	(−0.25)	(4.42)	(3.21)	(1.59)
Managerial job	−0.0075***	−0.0099***	−0.0058*	−0.0081**	−0.0188***	−0.0007
	(−2.86)	(−2.28)	(−1.89)	(−2.01)	(−3.52)	(−0.15)
Minority	0.0181***	0.0221**	0.0128***	0.0468***	0.0589***	0.0331***
	(6.63)	(5.63)	(3.42)	(9.37)	(6.91)	(4.87)
Male	0.0038***	0.0053*	0.0030	−0.0058**	−0.0090*	−0.0024
	(2.81)	(1.87)	(1.38)	(−2.21)	(−1.67)	(−0.58)
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	38,250	18,008	20,242	38,250	18,008	20,242

Notes: This table presents estimates of equation (2), estimated using the matched sample. Table 1 provides a description of each variable. We calculate robust standard errors with bootstrapping, and report the corresponding *z*-statistics in parentheses.
*, **, *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Financial distress

In view of the large income falls workers experience during furlough, we ask whether they experience financial distress. Column 1 of Table 6 presents estimates of equation (2) relating furlough to the probability that an individual is late on housing payments. The furlough coefficient is statistically significant at the 1% level. Economically, it implies that furlough increases the probability of late housing payments by 0.77 percentage points. While the effect size is small in absolute terms, it implies a 30% increase in the probability of financial distress relative to individuals who are not furloughed.[15]

Among the control variables, we find significant positive associations between education, minority ethnicity status, and male gender and being late on housing payments. Individuals whose top educational qualification is below a university degree are 0.62 percentage points more likely to be behind on housing payments whereas the probability of financial distress is 1.81 percentage points higher for people from minority ethnicity backgrounds relative to white individuals. Men are 0.38 percentage points more likely to be late on housing payments compared to women. Older people and those working in managerial roles are significantly less likely to be behind on housing payments.

Next, we ask whether furlough has differential effects on financial distress according to whether a person rents or owns their home through a mortgage. The estimates in

[15]The incidence of late housing payments among non-furloughed workers is 2.50%. Furlough thus raises the probability of late housing payments by $(0.77/2.6)\times 100\% = 29.6\%$.

columns 2 and 3 of Table 6 show that furlough is only associated with a significantly higher probability of late housing payments for renters. Renters who are furloughed are 1.09 percentage points more likely to be behind on housing payments relative to non-furloughed renters. However, furloughed mortgagees are not significantly more likely to be behind on housing payments. A potential explanation for this result could be that mortgagees make use of the mortgage holiday scheme. This policy was introduced by the government and lenders in response to the pandemic, and aims to grant mortgagees time to stabilize their finances by deferring housing payments for up to six months.

We next consider a more general measure of financial distress: whether a household is behind on bill payments. Estimates in column 4 of Table 6 show that furlough provokes a 2.61 percentage point increase in the probability of late bill payments. This is equivalent to a 19% increase relative to non-furloughed workers.[16] The coefficient estimate is statistically significant at the 5% level.

In column 5 we constrain the sample to include renters. The furlough coefficient estimate implies a statistically significant 2.94 percentage point increase in the probability that a furloughed renter is late on bill payments. In contrast to the housing payment results, we also find that furloughed mortgagees are 2.07 percentage points more likely to fall behind on bills relative to the control group. While these results show that renters are relatively more affected, they provide additional support for the view that furloughed mortgagees did experience financial distress but only on bills for which a government support package did not exist.

Some of the individuals in the sample own their home but do not have a mortgage. Appendix Table 3.E in Data S1 presents estimates of equation (2) for these owner occupiers. For this group, we find that furlough significantly increases the probability of late bill payments. This is consistent with furlough reducing owner occupiers' income and their ineligibility to reduce expenditure through the mortgage holiday scheme.[17]

One reason why furlough leads to a higher probability of financial distress is that the furlough-induced cut to workers' income prevents them from meeting their financial obligations. We therefore study how the probability of financial distress relates to the furlough-induced decline in a person's wage. Using the matched sample, we estimate

$$y_{irt} = \alpha + \beta W_{irt} + \gamma X_{irt} + \delta_r + \delta_t + \varepsilon_{irt}, \tag{3}$$

where all variables are defined as in equation (2) except y_{irt} equals 1 if individual i is late on either housing or bill payments, and W_{irt} is the percentage fall in monthly income while furloughed relative to 2019 monthly income. For each furloughed individual, we then calculate the predicted probability that they are late on payments.

[16] 13.45% of non-furloughed workers are late on bill payments during the sample period. The furlough coefficient thus implies a $(2.61/13.4)\times 100\% = 19.47\%$ increase in the probability of late bill payments relative to the mean incidence among non-furloughed workers.

[17] To control for region-specific trends and regional COVID-19 outbreaks, we include region-year fixed effects in equation (2). Appendix Table 4.F in Data S1 shows the results are robust to this change. In unreported tests we estimate equation (2) but include furlough group fixed effects. Specifically, we define a dummy variable that equals one for workers who are furloughed at some point over the course of the survey, and zero for workers who are never furloughed. This ensures the findings are not driven by selection. In these specifications, the furlough coefficient estimate in similar in economic and statistical magnitude compared to those reported in Table 6.

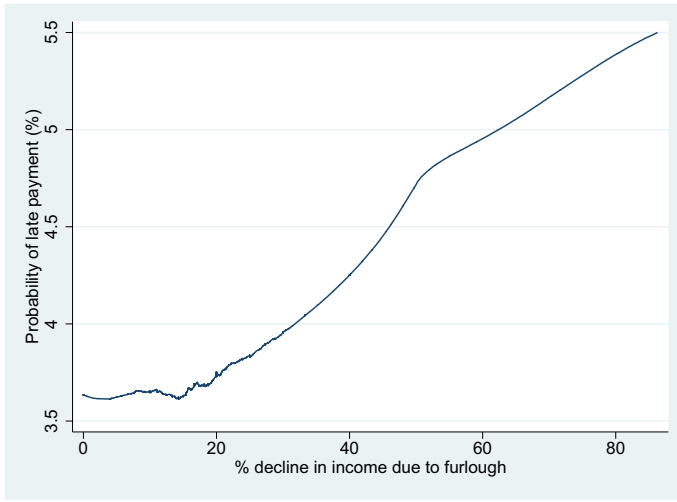

Figure 4. Financial distress and furlough-induced income falls.
Notes: This figure illustrates the probability of financial distress across the distribution of furlough-induced decline in income. The probability of financial distress for each furloughed individual is calculated using the estimates of equation (3). We use lowess smoothing to plot the predicted probabilities curve [Colour figure can be viewed at *wileyonlinelibrary.com*]

Figure 4 illustrates the predicted probability of financial distress across the distribution of furlough-induced decline in income. Interestingly, the predicted probabilities curve is highly non-linear. For income declines between 0% and 20%, the curve is essentially flat. In this region, the probability of financial distress is invariant to the furlough-induced decline in income. An implication of this result is that increasing the extent of government support from 80% to 90% of monthly wages would have little effect on reducing the incidence of financial distress.

In contrast, the probability of financial distress increases rapidly for furlough-induced income declines above 20%. For example, the probability of being late on housing payments is 4.25% for a 40% decline in income, but almost 5.25% for an 80% income decline. Most individuals who experience such large declines in income tend to be those with high prepandemic earnings whose income falls to £2,500 per month.

The evidence suggests that the furlough scheme is well designed in the sense that an increase in the government's furlough payments beyond 80% of income and the cap of £2,500 – which places a heavier burden on public finances – would not have lowered the probability of late payments. On the other hand, while a reduction in the government's contribution to furloughed workers' wages would reduce strain on the government's budget, it implies a substantial increase of the number of households in financial distress that may exacerbate other social and economic costs.

This is an important insight. Policymakers in several developed countries have adopted furlough schemes to mitigate the economic damage of COVID-19. However, these policies differ substantially in the size and rules for government contributions, in the flexibility for workers to be furloughed, and employers' eligibility to utilize the scheme. While extrapolating the findings across countries is difficult due to institutional differences, our

results suggest that a government contribution as designed under the UK CJRS minimizes financial distress and the burden on public finances.[18]

A related question is, to what extent does furlough prevent financial distress relative to unemployment – the potential alternative had furlough not existed? Using the same matching approach outlined previously, we match individuals based on their 2019 characteristics who become furloughed with those made unemployed during the sample period. We then estimate equation (2) using a dependent variable that equals 1 if an individual is late on either housing or bill payments, 0 otherwise. Appendix Table 5.F in Data S1 shows that furloughed workers are 3.29 percentage points less likely to experience financial distress relative to similar individuals who are unemployed. This equates to a 95% lower likelihood of financial distress. While unemployed workers are eligible to claim various social security payments, together these are less generous and more difficult to access than the furlough scheme. In essence, furlough protects individuals from the financial distress they would experience in unemployment because it provides a higher monthly income.

Expenditure and savings decisions, and financial distress after furlough

How does furlough affect consumption and savings decisions? Do individuals adjust their expenditure in the face of a substantial reduction in monthly income due to furlough? Alternatively, do furloughed workers use their savings to smooth consumption in the face of the negative income shock? Do these effects exist while furloughed, or do they endure after a furloughed individual returns to work?

To test these conjectures, we first estimate equation (2) using the cut spending dummy variable that equals 1 if a respondent reports they cut spending relative to their prepandemic spending levels. To capture postfurlough behaviour, we also include a dummy variable that is equal to 1 during the period after a furlough spell ends, 0 otherwise. The estimates in column 1 of Table 7 show that furlough provokes a significant 18.13 percentage point increase in the probability that an individuals cuts spending. This is an economically large effect and is not simply due to a secular reduction in consumption during the pandemic: 14.78% of non-furloughed workers report cutting spending during the sample period.

The data also show that furloughed workers are significantly more likely to reduce spending even after they return to work. In column 1 of Table 7 the postfurlough coefficient estimate implies that after furlough a person is approximately 7.27 percentage points more likely to cut spending relative to prepandemic levels. The result is significant at the 1% level. Hence, individuals permanently cut their expenditure after being furloughed and while consumption recovers when they return to work, it does not reach its prefurlough level.

[18]The 80% government wage contributions in the UK are relatively high in comparison to other countries. In Germany, for example, where a successful STW scheme was effective in offsetting the effects of the financial crisis, the government wage contribution amounts to 67% (60%) for workers with (without) children. Employers must also furlough at least 10% of the workforce to be eligible. We provide an overview about STW schemes in selected countries in Appendix B in Data S1. Tetlow, Pope, and Dalton (2020a) provide an account of the different effects of STW schemes in five countries during the first three months of the pandemic.

TABLE 7
Household expenditure and savings

Dependent variable	*1* *Cut spending*	*2*	*3*	*4* *Spent savings*	*5*	*6*
sample	*All*	*renters*	*Mortagees*	*All*	*renters*	*Mortagees*
Furlough	0.1813***	0.1751***	0.1854***	0.0580***	0.0550***	0.0599***
	(36.66)	(24.97)	(28.25)	(18.03)	(10.90)	(10.70)
Post furlough	0.0727***	0.0672***	0.0761***	0.0270***	0.0180***	0.0343***
	(14.21)	(7.66)	(9.18)	(7.21)	(3.70)	(7.45)
Age	−0.0014***	−0.0021***	−0.0002	−0.0004***	−0.0007***	0.0001
	(−10.72)	(−10.87)	(−1.10)	(−3.49)	(−6.11)	(1.30)
Pay	−0.0168***	−0.0285***	−0.0124***	−0.0118***	−0.0200***	−0.0078***
	(−8.36)	(−7.72)	(−4.46)	(−8.73)	(−10.64)	(−4.38)
No university degree	−0.0019	−0.0079	0.0040	−0.0041*	−0.0129***	0.0038
	(−0.51)	(−1.27)	(0.81)	(−1.75)	(−3.66)	(1.16)
Managerial job	−0.0295***	−0.0396***	−0.0252***	−0.0109***	−0.0095*	−0.0125***
	(−5.43)	(−4.43)	(−3.70)	(−2.78)	(−1.79)	(−2.70)
Minority	0.0495***	0.0410***	0.0571***	0.0346***	0.0332***	0.0352***
	(5.97)	(3.80)	(7.06)	(8.40)	(6.04)	(5.85)
Male	−0.0017	0.0091	−0.0103	−0.0018	0.0032	−0.0068*
	(−0.39)	(1.55)	(−1.60)	(−0.65)	(0.98)	(−1.96)
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	38,250	18,008	20,242	38,250	18,008	20,242

Notes: This table presents estimates of equation (2), estimated using the matched sample. Table 1 provides a description of each variable. We calculate robust standard errors with bootstrapping, and report *z*-statistics in parentheses.
*, **, *** denote statistical significance at the 10%, 5% and 1% level, respectively.

These effects hold across both renters and mortgagees. Columns 2 and 3 in Table 7 shows that furlough increases the probability that a renter (mortgagee) cuts spending by 17.51 (18.54) percentage points. In addition, both groups are significantly more likely to cut spending after their furlough spell ends compared to those that are not furloughed.

An alternative way to cope with furlough-induced income declines is to draw down savings. In column 4 of Table 7 we find that furlough provokes a significant 5.80 percentage point increase in the probability that an individual spends savings. This effect persists after a furlough spell ends, although the economic magnitude is somewhat smaller. Columns 5 and 6 of the table show that furlough is associated with a 5.50 and 5.99 percentage point increase in the probability that renters and mortgagees spend their savings, respectively. Each coefficient is statistically significant at the 1% level.[19]

Overall, we find that being furloughed has effects on households' spending behaviour that persist beyond the time off work. A key insight from these tests is that furlough has a more pronounced effect on individuals' decisions to reduce spending rather than use their savings. This may be due to the fact that individuals have greater discretion over consumption than savings decisions. Indeed, 46% of furloughed workers had no savings

[19]Appendix Table 6.F in Data S1 shows the results hold among workers who had positive savings before the pandemic, and who could adjust savings. Given they reduce spending and draw down savings, it seems likely they viewed furlough as potentially long lasting.

ahead of the pandemic. In the face of falling income during furlough, they may therefore have little option but to cut spending to remain within their budget.[20]

An important limitation of the qualitative response variables we use to measure changes in consumption and savings behaviour is that we cannot quantify by how much expenditure and savings fall due to furlough. Rather, we are only able to infer whether furloughed workers cut consumption or spend their savings relative to prepandemic levels.[21]

Financial distress when returning to work after furlough

How does financial distress evolve after a furlough spell ends and an individual returns to work? To examine this question, we estimate equation (2) using the Post furlough dummy variable in place of the Furlough dummy variable. We report the estimates of these tests in Table 8. Throughout columns 1 to 3 of the table the post furlough coefficient estimate is statistically insignificant and economically close to zero when late housing payments is the dependent variable. However, we find that after a furlough spell ends, an individual is significantly less likely to be late on bill payments. In column 4 the furlough ended coefficient is −0.0148 and is significant at the 1% level. The results in the remainder of Table 8 show this effect holds for both renters and mortgagees.

A potential explanation for why a previously furloughed individual is less likely to experience financial distress after returning to work are persistent changes to consumption. Previously, we found that furloughed individuals reduce spending, even after furlough ends. This is consistent with permanent cuts to discretionary spending that endure once a person returns to employment (Baker *et al.*, 2020; Chronopoulos *et al.*, 2020). Reducing expenditure provides additional funds that may be used for bill payments and to build a savings buffer that lowers the odds a household experiences financial distress in future.

V. Robustness tests

In this section, we test the robustness of the findings to rule out alternative explanations. To bias the estimates of furlough on financial distress, an omitted variable must correlate with financial distress and furlough. The decision of whether and when to furlough a worker is made by their employer. Employers' furloughing decisions are taken to optimize business performance in the face of the pandemic, and are unlikely to hinge upon their

[20]Consumption and savings behaviour may differ between lockdown and non-lockdown periods due to differences in the availability of leisure activities. Appendix Table 7.F in Data S1 shows the furlough effect is robust to controlling for whether a lockdown is in force and including furlough-lockdown interactions in the estimating equation to allow for differential responses between lockdowns while furloughed.

[21]Individuals potentially adapt to furlough the longer a spell endures in ways that reduce financial distress. We therefore examine how financial distress, expenditure and savings respond to short versus long furlough spells. We define a short (long) spell as one lasting 2 waves or less (3 waves plus) on the grounds that the average spell lasts 4.8 months which is approximately equivalent to 2 waves of data. Appendix Table 8.F in Data S1 shows that furlough provokes significant increases in the probability of late housing and bill payments, expenditure cuts, and spending savings. However, long furlough spells have little additional effect. The sole exception is for late bill payments where individuals become less likely to be late. This may reflect changes to expenditure patterns freeing up cash flow that allows workers to remain current. However, this effect only applies to the 50% of furloughed workers who experience furlough for at least three waves.

TABLE 8
Household finances after furlough

Dependent variable	*1*	*2*	*3*	*4*	*5*	*6*
	Late on housing			*Late on bills*		
sample	*All*	*Renters*	*Mortagees*	*All*	*Renters*	*Mortagees*
Post furlough	−0.0023	0.0003	−0.0060	−0.0148***	−0.0170***	−0.0137**
	(−0.83)	(0.08)	(−1.51)	(−3.53)	(−2.72)	(−2.55)
Age	−0.0004***	−0.0006***	−0.0000	−0.0001	−0.0006***	0.0003*
	(−6.71)	(−7.07)	(−0.22)	(−0.98)	(−2.91)	(1.82)
Pay	−0.0015*	−0.0010	−0.0020***	−0.0053***	−0.0055***	−0.0044***
	(−1.68)	(−0.58)	(−2.63)	(−4.26)	(−3.09)	(−3.46)
No university degree	0.0067***	0.0136***	−0.0002	0.0140***	0.0149***	0.0091**
	(3.97)	(5.35)	(−0.07)	(4.43)	(3.60)	(2.45)
Managerial job	−0.0079***	−0.0104**	−0.0060**	−0.0094**	−0.0207***	−0.0015
	(−3.03)	(−2.21)	(−2.28)	(−2.38)	(−2.92)	(−0.34)
Minority	0.0178***	0.0218***	0.0126***	0.0456***	0.0576***	0.0321***
	(6.26)	(5.30)	(4.08)	(9.87)	(7.48)	(4.70)
Male	0.0041***	0.0056**	0.0033	−0.0048	−0.0075	−0.0016
	(2.64)	(2.11)	(1.43)	(−1.57)	(−1.29)	(−0.47)
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Wave FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	38,250	18,008	20,242	38,250	18,008	20,242

Notes: This table presents estimates of equation (2), estimated using the matched sample. *Post furlough* is a dummy variable equal to 1 in the waves after an individual who was furloughed returns, 0 otherwise. Table 1 provides a description of each variable. We calculate robust standard errors with bootstrapping, and report the corresponding *z*-statistics in parentheses.
*, **, *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

employees' contemporaneous or future levels of financial distress. This feature limits the potential for omitted variables or reverse causality to bias the coefficient estimates.

Placebo tests

Placebo tests provide a window into whether the effects we attribute to furlough are due to the policy rather than confounding factors. Specifically, we should find that financial distress responds to being on furlough but not before an individual is furloughed. If there is prefurlough anticipation behaviour, the effects we attribute to furlough may instead reflect secular trends in financial distress during the COVID-19 pandemic.

We conduct the placebo tests by estimating

$$y_{irt} = \alpha + \beta \text{Placebo}_{irt} + \gamma X_{irt} + \delta_r + \delta_t + \varepsilon_{irt}, \quad (4)$$

where all variables are defined as previously except Placebo_{irt} which is a dummy variable equal to 1 during the survey wave before an individual is furloughed, 0 otherwise. During the prefurlough period, we know that the individual was in employment and not furloughed. Estimates of β should therefore be statistically insignificant, consistent with financial distress only increasing once an individual is actually furloughed. β will only be significantly different from zero if anticipatory behaviour is present.

TABLE 9
Placebo tests

Dependent variable:	*1* *Late on housing*	*2* *Late on bills*
Placebo	0.0072	0.0084
	(1.29)	(1.50)
Age	−0.0004***	−0.0003***
	(−4.45)	(−3.63)
Pay	−0.0025***	−0.0053***
	(−2.79)	(−4.51)
No university degree	0.0068***	0.0104***
	(3.27)	(6.31)
Managerial job	−0.0084***	−0.0163***
	(−3.28)	(−4.57)
Minority	0.0202***	0.0245***
	(7.68)	(9.60)
Male	0.0043**	−0.0042**
	(2.08)	(−2.38)
Region FE	Yes	Yes
Year FE	Yes	Yes
Observations	26,392	26,392

Notes: This table presents estimates of equation (4). *Placebo* is a dummy variable equal to 1 in the wave before individual *i* is furloughed, 0 otherwise. The number of observations is lower in this table than in the baseline because *Placebo* cannot be constructed for individuals already furloughed in the first wave of the survey. Table 1 provides a description of each variable. We calculate robust standard errors with bootstrapping, and report the corresponding *z*-statistics in parentheses.
*, **, *** denote statistical significance at the 10%, 5% and 1% level, respectively.

Column 1 in Table 9 presents estimates of equation (4) using late on housing payments as the dependent variable. The placebo coefficient estimate is economically small and insignificant. We obtain similar inferences in column 2 of the table when using late on bills as the dependent variable. It is therefore unlikely that our main finding reflects anticipatory behaviour, or a general upward trend in financial distress during the COVID-19 pandemic. Rather financial distress only increases once an individual is furloughed which makes it less likely that confounding factors drive the results.

Economic hardship

A potential threat to identification is an individual's history of financial distress. If financial distress is serially correlated though time, those who are late on housing and bill payments before the COVID-19 crisis may also experience financial distress during the pandemic. We therefore append equation (2) with controls for whether an individual was late on housing or bill payments in 2017, 2018, and 2019. Column 1 of Table 10 shows that individuals who were late on housing payments between 2017 and 2019 are significantly more likely to be late on housing payments during the sample period. However, this does not confound the effect of furlough. Rather, the furlough coefficient remains similar in economic and statistical magnitude as in the baseline specification. We repeat the exercise in column 2 using late on bills as the dependent variable. Historical financial distress

TABLE 10
Household financial hardship

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
	Late on							
Dependent variable:	*Housing*	*Bills*	*Housing*	*Bills*	*Housing*	*Bills*	*Housing*	*Bills*
Furlough	0.0056***	0.0253***	0.0077***	0.0263***	0.0076***	0.0259***	0.0115***	0.0254***
	(2.53)	(5.85)	(3.35)	(6.79)	(3.16)	(5.97)	(3.57)	(4.91)
Late on housing$_{2019}$	0.0330***							
	(7.23)							
Late on housing$_{2018}$	0.0288***							
	(6.05)							
Late on housing$_{2017}$	0.0212***							
	(5.22)							
Late on bills$_{2019}$		0.1427***						
		(15.49)						
Late on bills$_{2018}$		0.0423***						
		(7.07)						
Late on bills$_{2017}$		0.0066						
		(1.31)						
Non-mortgage debt			−0.0004	−0.0013				
			(−0.65)	(−1.49)				
Monthly savings					−0.0016***	−0.0051***		
					(−3.51)	(−6.62)		
Grocery bill							−0.0013	−0.0077**
							(−0.61)	(−2.42)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	32,555	38,250	38,250	38,250	38,250	38,250	19,986	19,986

Notes: This table presents estimates of equation (2), estimated using the matched sample. The unreported control variables are *age*, *pay*, *no university degree*, *managerial job*, *minority*, and *male*. Table 1 provides a description of each variable. We calculate robust standard errors with bootstrapping, and report the corresponding *z*-statistics in parentheses.
*, **, *** denote statistical significance at the 10%, 5% and 1% level, respectively.

continues to correlate with contemporary late bill payments, but the furlough coefficient is robust.

Prior research shows that financial distress correlates with indebtedness (Georgarakos, Lojschova, and Ward-Warmedinger, 2010). To rule out this channel, we control for the level of non-mortgage debt in equation (2). The results of these tests for late housing and bill payments are shown in columns 3 and 4 of Table 10. Our main finding is robust to this change.

Individuals with savings buffers may avoid financial distress during furlough by using their savings to offset the furlough-induced income decline. We therefore include a control for each individual's monthly savings during 2019 to proxy the stock of savings they can rely on during the crisis. Higher pre-COVID-19 savings levels correlate significantly and negatively with late housing and bill payments during the sample period in columns 5 and 6 of Table 10, respectively. However, the furlough coefficient remains positive and significant.

Households with high grocery bills may have the greatest incentive to become late on their financial obligations during the pandemic as they require funds for essential goods. We therefore proxy for grocery expenditure during the COVID-19 period using an individual's average weekly grocery bill in 2019. Despite this change, the estimates in columns 7 and 8 of Table 10 continue to show that furlough leads to a higher probability of late housing and bill payments, respectively.

Between March 2020 and 30 June 2020, employers were only allowed to furlough a worker for all of their hours. From 1 July 2020, the government introduced 'flexible furlough' which allowed employers to furlough employees for a fraction of their hours and continue working the rest. 19.7% of furloughed workers are on 'flexible furlough' and, on average, work 50% of their hours. Individuals placed on flexible furlough may incur smaller income losses as they remain working part time. We thus test the sensitivity of the results to defining whether a person is furloughed for all or a fraction of their hours. The results in Appendix Table 9.F in Data S1 show flexible furlough has no significant effects on financial distress, but the full furlough coefficient is similar in magnitude, significance, and sign to the baseline estimates.

Sensitivity checks

In the previous section, we found evidence that while furloughed individuals reduce spending and draw down their savings. These actions may mitigate financial distress by freeing up funds to remain current on housing and bill payments. If so, the baseline estimates may understate the full extent of furlough on financial distress.

To address this issue, we account for changing spending and savings behaviour during furlough. First, we interact the furlough and cut spending variables and include this and the cut spending variable as additional control variables in equation (2). We report the results of this test for the two financial distress outcomes in columns 1 and 2 of Table 11. The coefficient estimates show that cutting spending is associated with a significantly higher probability that an individual is in financial distress, but the interaction term shows that cutting spending during furlough significantly reduces the likelihood. Despite this

TABLE 11
Sensitivity tests

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
	All						*Remove local lockdowns*		*All*	
Sample:	*Late on*									
Dependent variable:	*Housing*	*Bills*	*Housing*	*Bills*	*Housing*	*Bills*	*Housing*	*Bills*	*Housing*	*Bills*
Furlough	0.0412**	0.0477**	0.0156*	0.0516***	0.0211**	0.0429***	0.0259***	0.0509***	0.0220***	0.0419**
	(2.17)	(2.54)	(1.87)	(2.99)	(2.55)	(2.58)	(3.24)	(3.13)	(2.69)	(2.53)
Cut spending	0.0339	0.0627***								
	(1.61)	(3.30)								
Furlough × Cut spending	−0.0393	−0.0582**								
	(−1.36)	(−2.23)								
Spent savings			0.0239*	0.0380						
			(1.92)	(1.60)						
Furlough × Spent savings			0.0136	−0.0880*						
			(0.52)	(−1.71)						
NHS shielding					−0.0060	−0.0166				
					(−0.58)	(−0.71)				
Vulnerable					0.0041	0.0176				
					(0.64)	(1.40)				
Positive test					−0.0474***	0.1527***				
					(−3.96)	(4.68)				
Adults									−0.0031	0.0016
									(−0.89)	(0.21)
Children									0.0030	0.0041
									(0.78)	(0.62)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22,546	22,546	35,566	35,566	35,511	35,511	32,522	32,522	35,566	35,566

Notes: This table presents estimates of equation (2), estimated using the matched sample. Furlough × Cut spending (Furlough × Spent savings) is a dummy variable equal to 1 if a respondent who is currently furloughed declares cutting spending (spending savings) relative to prepandemic level, 0 otherwise. The unreported control variables are *age*, *pay*, *no university degree*, *managerial job*, *minority*, and *male*. Table 1 provides a description of each variable. We calculate robust standard errors with bootstrapping, and report the corresponding *z*-statistics in parentheses.
*, **, *** denote statistical significance at the 10%, 5% and 1% level, respectively.

change, the furlough coefficient remains a positive and significant determinant of both forms of financial distress.

Next, we repeat this exercise, but study how changing savings patterns during furlough affects the inferences. We include spent savings and a furlough-spent savings interaction term as additional control variables in equation (2). In columns 3 and 4 we find that spending savings correlates with a significantly higher probability of late housing and bill payments. The interaction term's coefficient estimate is insignificant whereas furlough remains positively and significantly related to financial distress.

The pandemic may directly influence financial distress by preventing an individual from working. At the start of the crisis, the NHS wrote to people with underlying health conditions warning them to shield for a period of time by remaining at home where possible. Individuals who are clinically vulnerable to COVID-19 may also take steps such as avoiding work to prevent coming into contact with the disease. Contracting COVID-19 requires that an individual isolates at home. All of these factors may influence financial distress by restricting an individual's earnings ability. We therefore append equation (2) with controls for NHS shielding status, whether someone is clinically vulnerable to COVID-19, and if they have tested positive for COVID-19 during the sample wave. Our key finding endures in columns 5 and 6 of Table 11 but we find significantly positive relationships between all three variables and the probability of late bill payments. Those shielding are significantly more likely to be behind on housing payments.

Following the removal of national lockdown restrictions, some areas areas of the UK experienced local lockdowns to curb localized COVID-19 outbreaks. To ensure the effects of furlough are not driven by local lockdowns, we remove observations from regions where local lockdowns are present. In columns 7 and 8 of Table 11, we continue to find that furlough provokes a significant increase in the probability of financial distress.

Household composition may influence financial distress during furlough. Furloughed individuals may prioritize feeding children above housing and bill payments. In contrast, having more than one adult in the household may alleviate financial distress as multiple earners diversify a household's exposure to the adverse consequences of furlough-induced income declines. The estimates in columns 9 and 10 show that including these controls has no effect on our key finding.

There may be adverse selection among furloughed workers over time whereby the least productive workers are the last to be recalled. While we cannot directly observe worker productivity, under the assumption that workers are paid efficiency wages we use each individual's 2019 hourly wage as a proxy. Column 1 in Appendix Table 11.F in Data S1 shows the 2019 hourly wage is insignificantly related to the duration of a furlough spell. This suggests adverse selection is not present. The remaining columns in the table show that the 2019 hourly wage is not a significant determinant of financial distress.

VI. Conclusions

Using novel survey data from the UK, this paper reports first evidence on the link between a furlough scheme and household financial distress. While furlough preserves a worker's job during the COVID-19 pandemic, it provokes substantial declines their monthly income that may trigger financial distress. We find evidence that during a furlough spell,

an individual is 30% more likely to be late on housing payments and 19% more likely to be late on bill payments, relative to a similar non-furloughed individual. The large relative effects reflect the low incidence of financial distress among non-furloughed workers.

A key question surrounding the design of STW schemes is whether they deliver value to taxpayers. The CJRS cost approximately £68 billion. Our findings show that increasing the generosity of government contributions to furloughed workers' wages would have done little to insulate more households from financial distress. At the aggregate level, the furlough scheme increased the incidence of financial distress by 3.38 percentage points. This suggests the policy is well designed in that it minimizes financial distress at the lowest cost to public finances.

In the absence of a furlough scheme, employers may have had to make workers redundant. Our findings show that furloughed workers were 95% less likely to fall behind on housing and bill payments compared to similar individuals who become unemployed. Without alterations to the generosity of unemployment benefits, this suggests that the prevalence of financial distress would have been more widespread during the pandemic without a furlough policy.

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Supporting Information

Additional Supporting Information may be found in the online version of this article:

Data S1. Supporting information