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Did the UK Policy Response to Covid-19 Protect Household Incomes?*

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Abstract

We analyse the UK policy response to Covid-19 and its impact on household incomes in the UK in April and May 2020, using microsimulation methods. We estimate that households will lose a substantial share of their net income (7% on average). As a proportion of income, the losses due to the crisis are largest for previously higher-income families. However, the overall impact of the crisis on income inequality is small. Earnings subsidies (the Coronavirus Job Retention Scheme) will protect household finances and provide the main insurance mechanism during the crisis. Besides subsidies, Covid-related increases to state benefits, as well as the automatic stabilisers in the tax and benefit system, will play an important role in mitigating the income losses. Analysing the impact of a near-decade of austerity on the UK safety net, we find that, compared to 2011 policies, the 2020 *pre-Covid* tax-benefit policies would have been less effective in insuring incomes against the shocks. The extra benefit spending in response to the pandemic will strengthen the safety net, providing important additional income protection.

JEL codes: D31, E24, H24
Keywords: Covid-19; income distribution; earnings subsidies and tax-benefit policies

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1 Introduction

This paper studies the fiscal and distributional impact of Covid-19 in April and May 2020 in the UK. We assess how much income protection is provided by the new earnings subsidies (the Coronavirus Job Retention Scheme and the Self-Employment Income Support Scheme) and Covid-related increases to benefits, as well as looking at how effective are the tax-benefit automatic stabilisers in protecting household finances during recessions. We also analyse how austerity over the last decade has affected the UK safety net.

In more detail, our baseline is the income distribution before Covid-19. Then, using individual-level data from the Understanding Society COVID-19 Study on employment and earnings changes by sex, age and industry, we simulate similarly-sized employment and earnings shocks on the sample of workers from the Family Resources Survey 2018/19. Workers affected by the shocks become unemployed or furloughed, or stay employed (not furloughed) but their hours and earnings fall. Furloughed workers receive earnings subsidies from the Coronavirus Job Retention Scheme while self-employed can receive support from the Self-Employment Income Support Scheme. Using the tax-benefit model UKMOD, we then calculate household income tax liabilities and benefit entitlements before and after the employment and earnings shocks. The changes in income taxes and state benefits due to the shocks capture the automatic stabilisation response of the tax-benefit system before the Covid-related benefit increases (Auerbach and Feenberg 2000). Finally, we estimate the effect of Covid-related increases to state benefits on household incomes, keeping fixed the earnings distribution. The analysis provides an average estimate of the distributional impact of Covid-19 during the period of the fullest lockdown, i.e. averaged over the months of April and May 2020.

We find that households will lose a substantial proportion of their income, of 6.9% on average, due to Covid-related employment and earnings shocks. The earnings subsidies for furloughed workers from the Coronavirus Job Retention Scheme will protect household finances from the shocks, accounting for 13.2% of baseline net income. They will support households across the entire income distribution and will provide the main insurance mechanism against the negative income shocks. The Self-Employment Income Support Scheme will also contribute to income gains at all parts of the distribution, of 1.3% on average. Net of the subsidies, the loss in earnings from both employment and self-employment will amount to a substantial 12.6% of net income.

Besides the earnings subsidies, the Covid-related benefit increases and tax-benefit automatic stabilisers will also have an important role in mitigating income losses. Comparing the impact of the benefit increases and automatic stabilisers on net incomes, it is the latter that will have the bigger effect on net incomes, underlining the importance of tax-benefit designs in protecting household incomes during economic downturn. On the other hand, different parts of the distribution rely on different types of policy for mitigating income shocks, stressing the importance of both automatic stabilisers and governments' responses to crises in determining the amount of income protection.

Income from social security benefits – both the system that was in place before the crisis, and the Covid-related increases – contribute to income gains mostly at the bottom of the distribution. Households will benefit mainly from means-tested benefits such as Universal Credit (UC), but the unemployment benefit (Jobseeker's Allowance) will also contribute to small income gains across all parts of the distribution, highlighting the importance of provision and access to social insurance benefits.

Assessing the impact of a near-decade of austerity on the UK safety net, we show that, compared to the 2011 policies, the 2020 *pre-Covid* tax-benefit policies would have been less effective in providing insurance against the shocks for all parts of the distribution. In particular the 2011 system would have raised net income by additional 2% in the poorest decile compared to the 2020 *pre-Covid* system. The extra Covid benefit spending will strengthen the UK safety net, so compared to the 2011 system, the 2020 *post-Covid* system would provide higher levels of income protection in the bottom 5 deciles. But although the Covid-related benefit increases strengthen the safety net, these measures are due to last only during the current financial year.

This paper relates to several strands of literature. It relates to the now fast-growing literature on the economic and distributional impact of Covid-19. Using the Understanding Society COVID-19 data, Crossley et al. (2020) analyse the economic impact of the pandemic in the UK on employment and earnings, and the ways different household types mitigate the negative shocks, highlighting the importance of transfers from family and friends. Using timely data on the US, Han et al. (2020) assess the impact of the coronavirus crisis and increases to government assistance on US poverty. Adams-Prassl et al. (2020) assess differences in the labour market impact of Covid-19 in the UK, Germany and US. Brewer and Gardiner (forthcoming) analyse the design and beneficiaries of the UK policy response to the pandemic, focusing in particular on low-income households. By simulating employment shocks and using a tax-benefit model, Figari and Fiorio (2020), Beirne et al. (2020) and Bronka et al. (2020) assess the distributional impact of Covid-19 in Italy, Ireland and the UK, respectively. There has been also growing evidence on the impact of the crisis on the US labour market (Coibion et al. 2020b; Cajner et al. 2020) and private spending (Baker et al. 2020; Coibion et al. 2020a).

The current paper builds on and contributes to the existing literature in several ways. First, as survey micro-data on household incomes during the pandemic will only become available with a few years' lag, the present paper addresses this data limitation by combining different data sources and a tax-benefit model to predict household circumstances during Covid-19. Second, the paper brings new insights into the importance of different types of policy in mitigating income losses along the income distribution and quantifies the income compensation provided by the policy response. It also examines empirically how policy reforms over the last decade have reduced the ability of the UK safety net to cushion negative economic shocks. As such, it also contributes to the evidence on the mitigating role of tax-benefit policies during recessions. Income taxes and unemployment insurance benefits have been found to be particularly important in providing income protection and income and consumption smoothing during recessions (Larrimore et al. 2015; Fernández Salgado et al. 2014; Dolls et al. 2012; Kniesner and Ziliak 2002a,b; Auerbach and Feenberg 2000). Furthermore, means-tested benefits have been shown to be effective in providing a much-needed safety net for households during economic downturns (Bitler et al. 2017; Bitler and Hoynes 2016). Recent analysis has also highlighted the importance of tax and benefit automatic stabilisers for income redistribution (Paulus and Tasseva 2020).

The rest of the paper is structured as follows: Section 2 describes the UK policy response to Covid-19 and the tax-benefit policies that will play a role in protecting household incomes from the negative income shocks. Section 3 discusses the decomposition approach to identify the effect of earnings subsidies, tax-benefit automatic stabilisers and Covid-related benefit increases; the data and the simulation of employment and earnings shocks; and the tax-benefit model UKMOD. Section 4 discusses the results and section 5 concludes.

2 The UK policy response to Covid-19 and tax-benefit policies

During the Covid-crisis, access to unemployment and income-related benefits as well as income taxes and national insurance contributions will provide insurance against the economic shocks. In addition, the UK government introduced a package of policy measures in response to Covid-19. These include income protection schemes for workers and increases to state benefits. This section describes the Covid-related policy measures, as well as discussing which tax-benefit policies will play a role in stabilising household incomes during the crisis.

To support businesses and workers, the Coronavirus Job Retention Scheme (henceforth CRJS) was introduced to subsidise the earnings of furloughed employees. This allows companies to reduce the hours of workers to zero without laying them off, removing the costs of searching and re-hiring workers later on. In April and May, the CJRS paid 80% of gross earnings up to a maximum of £2,500 per month. Initially the scheme was set for 4 months but on May 12, 2020 it was extended until the end of October. The Office for Budget Responsibility estimates the cost of the scheme to £60 billion for the 8-months duration of the scheme (OBR, 2020). Similarly, the Self-Employment Income Support Scheme (hereafter SEISS) was introduced to provide support for self-employed. The scheme was opened for claims on May 12. It is calculated based on the person's average trading profit over the 3 previous tax years and equals 80% of the average profit, paid in a single instalment covering three-months worth of profit, up to £7,500 in total.[1] OBR estimates the scheme to cost £15 billion (OBR, 2020).

In addition to the earnings subsidies, families affected by the economic shocks can access a range of state benefits to compensate for the losses in earned income. The main ones are the unemployment benefit, Jobseeker's Allowance (JSA), and the means-tested benefit Universal Credit (UC). The contribution-based Jobseeker's Allowance (JSA) is a flat-rate unemployment benefit paid up to 6 months while looking for a job. The benefit is available to those who have paid employees' national insurance contributions. It has two rates: for those aged under 25 (£58.9 per week) and a more generous rate for those aged 25+ (£74.35 per week). UC is an income-tested benefit for working-age people on low-incomes or who are unemployed. It was introduced in 2014 with the aim to gradually replace a range of income-related benefits and tax credits, by combining them into a single state transfer. The benefit consists of a basic 'standard allowance' and extra payments which depend on the person's and their family's circumstances, including additional amounts in respect of children, and to those who are renting. UC is withdrawn in line with the joint earnings of the family, and overall entitlement is subject to a maximum ceiling known as a benefit cap.[2] Prior to Covid-19, the UC rate for singles aged 25+ was the same as JSA, £323 per month, while the rate for couples was about 1.6 times higher, £507 per month.

In response to the crisis, the UK Government increased the level of UC for all family types by £20 a week. In relative terms, this is a substantial increase of 28% for singles aged 25+ and 17% for couples. Access to UC for the self-employed

[1] Individuals, whose business has been adversely affected by the pandemic, can apply for the grant. Their profits should not exceed £50,000 per year and must account for more than half of the person's income. Individuals must have submitted Self Assessment tax return for the tax year 2018 to 2019.

[2] If due to the change in their circumstances families become subject to the benefit cap, they can be exempt from it by the 39 weeks "grace period". However, the cap will bite if already prior to the shock families were not exempt from it.

was also improved by suspending the Minimum Income Floor: this reduced UC entitlement for those earning less than the equivalent of a certain number of hours at the minimum wage rate. Other Covid-related changes included increases to Housing Benefit (HB) and the UC component which support low-income families with paying their rent. The maximum benefit amount is determined by the so-called Local Housing Allowance (LHA) rates, which have been generally lagging behind price growth since 2012. In response to Covid-19, the LHA rates were increased and re-aligned to the 30th percentile of the distribution of private market rents. Finally, the amount of earnings disregarded in calculating the entitlements to HB and Council Tax Reduction (a benefit that supports families with paying property tax) was also increased (from £17.1 to £37.1 per week). As with UC, the standard allowance rates for Working Tax Credit – an in-work benefit and one of the benefits that UC is replacing – also went up by £20 a week. At the time of writing, these changes were due to expire in April 2021. OBR estimates the costs for the benefit increases to £8 billion (OBR, 2020).

One contribution of this paper is to identify how the tax and benefit system automatically responds to cushion the impact of labour market shocks. As well as the means-tested benefit system, income tax and national insurance contributions (NIC) also have an important role to play in mitigating income losses. The income tax schedule in the UK is progressive, as are NIC for most parts of the distribution. Thus, as earnings drop due to the economic shocks, income tax payments and NIC also decrease, so that after-tax income drops by less than pre-tax income.

3 Data and Methodology

3.1 Estimating the distributional impact of the crisis

Our aim is to estimate the impact of the crisis on the income distribution using the methodology from Paulus and Tasseva (2020) and Bargain and Callan (2010) who combine household micro-data with tax-benefit microsimulation techniques. We also decompose the changes in the income distribution to identify separately the distributional impact of: earnings losses; earnings subsidies; tax-benefit policies before the Covid-related benefit increases (which we refer to as the automatic stabilisation response of policies); and the Covid benefit increases.

Impact of the crisis

Let us denote with y gross (pre-tax) market income; with $t(y)$ income tax and NIC, which are a function of y; and with $b(t, y)$ state benefits which are a function of t and y. Household net income B (for *baseline*) is then:

$$B = y - t(y) + b(t, y) \tag{1}$$

An economic shock occurs which raises unemployment and lowers gross earnings. The UK Government responded by introducing earnings subsidies and increases to state benefits, so that gross market income after the shock (y_k) plus subsidies (k) is y'; income tax liabilities and NIC after earnings changes are $t(y')$; and state benefits after earnings and benefit changes are $b''(t, y')$. Household net income after the shock can be shown to be:

$$D = y' - t(y') + b''(t, y') \tag{2}$$

and the difference between D and B gives the impact of the crisis on household incomes.

Decomposing changes in the income distribution

We can introduce an intermediate counterfactual scenario C after the shock and earnings subsidies, but before the crisis-related benefit increases. This allows us to decompose the change in income Δ:

$$\begin{aligned} \Delta = D - B = \\ \underbrace{D - C}_{\text{benefit policy changes}} + \underbrace{C - B}_{\text{earnings changes+automatic stabilisers}} = \\ \underbrace{y' - t(y') + b''(t, y') - (y' - t(y') + b(t, y'))}_{\text{benefit policy changes}} \\ + \underbrace{y' - t(y') + b(t, y') - (y - t(y) + b(t, y))}_{\text{earnings changes+automatic stabilisers}} \end{aligned} \tag{3}$$

where the difference between D and C gives the effect of benefit increases (P), keeping fixed the distribution of gross market incomes, tax liabilities and NIC. The difference between C and B gives the total effect of earnings changes plus automatic changes to income tax, NIC and benefits, keeping fixed the tax-benefit rules at their pre-crisis levels (i.e. effect of automatic stabilisers).

Let us now denote as I a functional of income. If I is additively decomposable by income source, e.g. mean net income, we can break down the difference between C and B further into earnings losses (E), earnings subsidies (K), income tax and

NIC as automatic stabilisers (S^t) and benefits as automatic stabilisers (S^b):

$$\begin{aligned} E &= I[y_k] - I[y] \\ K &= I[y'] - I[y_k] \\ S^t &= I[t(y)] - I[t(y')] \\ S^b &= I[b(t, y')] - I[b(t, y)] \end{aligned} \tag{4}$$

If I is not additively decomposable by income source, e.g. an inequality indicator such as the Gini coefficient, we approximate the contribution of automatic stabilisers by taking the difference in I based on different income concepts:

$$\begin{gathered} E + K = I[y'] - I[y] \\ S^t = I[y' - t'(y)] - I[y - t(y)] - (E + K) \\ S^b = I[y' - t'(y) + b(t, y')] - I[y - t(y) + b(t, y)] - (I[y' - t'(y)] - I[y - t(y)]) = \\ I[C] - I[B] - S^t - (E + K) \end{gathered} \tag{5}$$

where $I[y' - t'(y)]/I[y - t(y)]$ is estimated based on gross market income net of taxes and NIC.[3]

3.2 The data and simulation of shocks

We use the Family Resources Survey (FRS) micro-data for 2018/19 (DWP, 2020), combined with information on employment and earnings shocks from the Understanding Society (UK Household Longitudinal Study-UKHLS) COVID-19 Study (University of Essex, 2020a). The FRS 2018/19 are the latest FRS data available at the time of writing. The FRS can be considered as the benchmark for household incomes data in the UK. They are used for official income statistics by the Department for Work and Pensions, and by the Institute for Fiscal Studies in their annual reports on income trends. We then use information on the labour market situation and earnings of individuals in April and May 2020 from the UKHLS COVID-19 Study to simulate similarly-sized employment and earnings shocks in the FRS.

In more detail: we uprate financial values in the FRS income data to (pre-Covid-19) 2020 prices to account for growth in average earnings and statutory indexation for disability benefits, public pensions, statutory maternity pay, maternity allowance and the statutory sickness pay (we do not directly simulate changes in the labour

[3] We can rewrite the effect of earnings changes and automatic stabilisaters as: $I[y' - t(y') + b(t, y')] - I[y - t(y) + b(t, y)] = I[y'] - I[t(y')] + I[b(t, y')] - (I[y] - I[t(y)] + I[b(t, y)]) + \eta$, where η is a residual term. For additively decomposable measures, such as mean income, η is zero but it is non-zero for measures which are not additively decomposable by income source, such as Gini. Hence, when we decompose the change in inequality indicators, our estimate for the contribution of automatic stabilisers contains a residual.

market and population structure since 2018-19). These are the data used in the *baseline*, i.e. before the employment and earnings shocks, and so they are our simulation of what the UK population would have looked like in April and May 2020 had there been no coronavirus crisis.

Next, we use the UKHLS COVID-19 Study as our source of data on what sort of employment and earnings shocks have been caused by the crisis. Our aim is to simulate similar-in-size shocks on the FRS sample of workers such that the FRS data with simulated shocks form the underlying data for scenarios C and D.

The UKHLS is a long-running annual household panel study, and the UKHLS COVID-19 data, which were collected through an on-line and phone survey in April and May 2020, were an addition to the usual annual waves that collected information on the labour market situation and earnings of individuals in April and May 2020 and how these had changed since February 2020 (i.e. before the crisis had affected the labour market in the UK). We estimate two multinomial logit models on the UKHLS data, separately for the April and May waves, one on a sample of employed adults and one on a sample of self-employed adults, both restricted to those who had positive earnings in February 2020 (before Covid-19). For the sample of formerly employed workers, the dependent variable is employment status in April/May 2020 and has four outcomes: i) still employed and with no drop in earnings, ii) still employed (not furloughed) but with reduced working hours and earnings, iii) furloughed, and iv) not employed.[4] The control variables include sex, age and industry (13 categories) and their interactions; household type; baseline earnings quintile; and number of baseline working hours in bands by sex. For the sample of formerly self-employed workers, the dependent variable is self-employment status in April/May 2020 with the following three outcomes: a) still self-employed and with no drop in earnings, b) still self-employed but with reduced hours and earnings, and c) no longer engaged in self-employment. The control variables include sex, age, industry, household type, baseline earnings ventile, and number of baseline working hours in bands by sex. In addition, the May wave of the UKHLS COVID-19 data includes information on entitlement to the SEISS grant. We run a logit model on the sample of formerly self-employed workers to estimate the likelihood of receiving the SEISS grant, controlling for the change in self-employment status since the coronavirus crisis. Results from the multinomial logit, based on the April and May waves separately, are reported in Table A.1 (for the employed) and Table A.2 (for the self-employed), and results from the logit model, based on the May wave only, are reported in Table A.3.[5]

[4] *No drop in earnings* constitutes a drop of no more than £5 per week. *Reduced hours and earnings* implies a fall of more than £5 in earnings and at least 1 working hour per week.

[5] Industry was collected at Wave 9 (2017-18) of Understanding Society (University of Essex, 2020b).

We then use the estimated coefficients from the multinomial logit to predict the probability of each outcome for each individual in the FRS sample of workers with positive earnings. We than randomly assign each individual to one of the outcomes, respecting these predicted probabilities. Following the same approach, we use the estimated coefficients from the logit model and the simulated self-employment status after the shock to predict the probability for being entitled to the SEISS grant. In total, 1.1 million workers in the FRS are simulated to be newly unemployed (having applied the grossing weights), 7.3 million workers to be furloughed and 3.1 million workers to experience a drop in working hours and earnings (but not furloughed). Thus, the majority of workers affected by the coronavirus shock will experience a drop in earnings rather than a complete loss in earned income. Overall, 1.8 million self-employed are simulated to receive a grant from the SEISS.

Self-employed predicted to be entitled to the SEISS grant receive the subsidy in May only (when it was first paid out). We estimate the size of the grant as if it was made on a monthly basis (rather than the actual size worth three months of profits) and base our calculations on (baseline) total gross self-employed earnings (FRS variable *seincam2*).[6] Employees who are predicted to be furloughed (outcome iii) receive the CJRS subsidy in April and May. To calculate how much workers are entitled to under the scheme, we use information on (baseline) total gross earnings from employment (FRS variable *inearns*). Finally, employed and self-employed in the FRS with hours and earnings reduction (outcomes ii and b, respectively) experience a drop in earnings and hours which we simulate as the mean relative drop in earnings by sex in the UKHLS COVID-19 sample amongst those reporting a drop. For employed, the drop is 41% for men and 43% for women in April and 21% for both men and women in May. For self-employed, the drop is 74% for both men and women in April and 62% for men and 56% for women in May.

Table 1 shows the characteristics of workers in the FRS by employment status after the simulated shocks. There is a clear age, education and income gradient among the workers affected by the shocks. A larger share of the newly unemployed are aged 20-29 compared to the other age groups. The newly unemployed are also more likely to come from the lowest earnings quintile. Furloughed workers are more likely to be young, male, lower educated, and to be from the bottom and middle of the earnings distribution. In comparison, those with reduced working hours and earnings (but not furloughed) are more likely to be older, male, and in the bottom earnings quintile. Those with no drop in their earnings ('no change') are more likely to be older, female, higher educated, and from the upper part of the earnings

[6] In reality, the grant is calculated based on the average of last three-years profits and provided only to those with profits up to £50,000 per year. As we do not observe this information in the FRS and UKHLS data, we do not account for it in the simulations.

distribution.

Table 1: Characteristics of workers by employment status

	Unemployed	Furloughed	Reduced hours & earnings	No change
Age group:				
20-29	6.0	34.5	7.1	52.4
30-39	3.9	25.6	10.7	59.7
40-49	3.5	23.4	11.9	61.3
50-59	2.7	22.2	13.5	61.6
60+	3.0	24.6	16.4	56.1
Men	4.0	27.7	12.1	56.2
Women	3.9	24.5	10.2	61.5
In a household with:				
children	4.8	26.7	10.4	58.1
1 earner	3.4	25.4	11.8	59.4
2+ earners	4.1	26.5	11.0	58.5
Completed education aged:				
16 or less	3.8	29.6	12.0	54.6
17-19	3.9	28.6	10.6	56.9
20+	4.1	20.9	11.0	64.0
Earnings quintile:				
1	8.5	31.8	15.2	44.5
2	2.9	33.5	11.9	51.7
3	2.7	29.2	9.9	58.3
4	3.6	22.2	8.7	65.5
5	2.5	15.4	10.8	71.4
Number of (in thousand):				
employed	956	7,291	1,343	14,621
self-employed	140	0	1,769	1,722
all	1,096	7,291	3,112	16,343
Receiving SEISS grant	114	0	1,185	491

Notes: The table shows the share of workers (in %) by different characteristics simulated to be newly unemployed, furloughed, with reduced hours and earnings (not furloughed) and with no drop to earnings (no change). The results are based on average monthly estimates, except for the number of those receiving the SEISS grant which refers to May only. The sample includes individuals with positive earnings from employment and/or self-employment and aged 20-63. Employed with earnings from employment only. Self-employed with earnings from self-employment (and employment).
Source: Own calculations with FRS and Understanding Society COVID-19 data.

Table 2 and Table 3 show the distribution of workers in the FRS by industry and occupation, respectively, by employment status after the simulated shocks. Workers in accommodation and food services, construction and real estate, and the arts, entertainment and recreation are most likely to become unemployed, furloughed or have their earnings and hours reduced, as are workers in elementary, skilled trades and process, plant and machine operatives occupations.

Table 2: Share of workers (in %) by industry

	Unemployed	Furloughed	Reduced hours & earnings	No change
Agriculture, Mining, Manufacture, Utilities	5.1	36.9	7.9	50.1
Construction and Real Estate	2.4	38.4	19.8	39.4
Wholesale and Retail Trade	5.6	36.1	6.8	51.5
Transportation and Storage	1.8	35.1	13.2	49.9
Accommodation and Food	11.5	57.2	10.2	21.1
Information and Communication	3.1	8.5	10.7	77.8
Financial and Insurance Activities	2.2	6.2	4.0	87.7
Professional, Scientific and Technical Activities	1.8	18.4	14.8	65.0
Administrative and Support Service	2.3	31.1	21.6	45.1
Public Administration and Defence	1.8	8.2	4.6	85.4
Education	4.0	13.7	10.6	71.7
Human Health and Social Work	4.5	12.1	9.0	74.4

Arts, Entertainment, Recreation and Other	2.0	37.3	18.8	42.0

Notes: The table shows, for a given sector, the share of workers (in %) simulated to be newly unemployed, furloughed, with reduced hours and earnings (not furloughed) and with no drop to earnings (no change). The results are based on average monthly estimates. The sample includes individuals with positive earnings from employment and/or self-employment and aged 20-63.
Source: Own calculations with the FRS and Understanding Society COVID-19 data.

Table 3: Share of workers (in %) by occupation

	Unemployed	Furloughed	Reduced hours & earnings	No change
missing	.0	17.9	6.1	76.0
Managers, Directors and Senior Officials	3.0	24.6	12.3	60.2
Professional Occupations	3.0	15.3	9.7	72.1
Associate Prof. and Technical Occupations	2.7	18.8	11.0	67.5
Admin and Secretarial Occupations	3.3	26.4	7.4	62.9
Skilled Trades Occupations	4.1	32.8	19.5	43.6
Caring, Leisure and Other Service Occupations	4.9	21.3	11.2	62.6
Sales and Customer Service	7.0	36.0	6.0	51.0
Process, Plant and Machine Operatives	4.2	35.5	13.5	46.8
Elementary Occupations	5.9	44.7	10.1	39.2

Notes: The table shows, for a given occupation, the share of workers (in %) simulated to be newly unemployed, furloughed, with reduced hours and earnings (not furloughed) and with no drop to earnings (no change). The results are based on average monthly estimates. The sample includes individuals with positive earnings from employment and/or self-employment and aged 20-63.
Source: Own calculations with the FRS and Understanding Society COVID-19 data.

3.3 The tax-benefit model UKMOD

The measure of household net income in this paper is cash income and is the sum of gross market incomes, state pensions, national insurance and means-tested benefits minus income tax and NIC liabilities. To account for household composition and economies of scale, household net incomes are equivalised using the modified OECD equivalence scale (with a value of 1 for a couple without children).

To calculate income tax liabilities, NIC and entitlements to benefits, we use the tax-benefit model UKMOD, a spin-off model of the UK component in the EU-wide tax-benefit model EUROMOD (see Sutherland and Figari (2013) and Figari et al. (2015) for information on EUROMOD and Reis and Tasseva (2020) for information on UKMOD). UKMOD simulates for each individual and household in the FRS their taxes and benefits based on their gross earnings, other sources of income, their individual and household characteristics, and the tax-benefit measures that were in place at a given time period. UKMOD calculations account for non-take-up of income-related benefits (see Appendix C).

In the baseline and scenario C, UKMOD calculates net incomes based on the tax-benefit rules that would have applied in April/May 2020 in a world where the Covid-19 did not happen, that is, using the policies that were confirmed in the government Budget on 11 March 2020. The amount of income tax and NIC paid and state benefits received by households differ between the baseline and scenario C because of the simulated shocks in C. By comparing the baseline and scenario C, we can estimate the fiscal and distributional impact of the earnings subsidies and assess the effectiveness of the pre-Covid tax-benefit system in cushioning economic shocks. We refer to this as the automatic stabilisation effect of policies (see Paulus and Tasseva 2020, Dolls et al. 2012).

In scenario *D*, UKMOD re-calculates net incomes accounting for the benefit increases that the UK government introduced in response to the crisis. Thus, although the earnings data are the same in scenarios *C* and *D*, the amount of state benefits received by households differ because scenario *D* includes the Covid-related increases in benefit levels (there are no changes in taxes paid by households between scenarios *C* and *D*).

UKMOD calculations for scenarios *C* and *D* are done separately for April and May. In the remainder of the paper, we show results for the income distribution in scenarios *C* and *D*, based on household incomes averaged over April and May.

4 Results

This section assesses the impact of the crisis, and of the UK policy response to Covid-19, on the fiscal budget and the household income distribution. It also looks in more detail at the impact of the increase to state benefits announced by the government when the crisis hit, as well as at how effective the tax-benefit system would have been in responding to the economic shocks without these measures. Finally, it analyses the impact of a near-decade austerity on the UK safety net by assessing how the tax and benefit system of 2011-12 would have protected households from the Covid shock.

4.1 Changes to earnings and the fiscal budget

Table 4 reports the level and changes to total employee and self-employed monthly earnings, subsidies from CJRS and SEISS, government revenues from income tax and NIC, and government spending on state benefits. Column 2 shows the levels in the baseline (before Covid-19). Column 3 shows the impact of the Covid employment and earnings shocks and the full UK policy response (i.e. scenario *D* versus the baseline) in million £. Table 5 shows the baseline number and the change to the number of earners, taxpayers and state benefit recipients.

Earnings and earnings subsidies from the CJRS and SEISS

The labour market shock means that total employee and self-employed earnings will fall by £8 billion (11.4%) and £3.2 billion (33.4%), respectively. This will be mainly due to workers and self-employed experiencing a cut to their earnings rather than losing their job. Subsidies from the CJRS will amount to a substantial £10.7 billion, or 15.3% of total employee earnings in the baseline. Spending on grants from the SEISS will amount to £2.1 billion, or 22% of total baseline self-employed earnings. The government will get about 20.1% of the spending on CJRS and SEISS back in the form of income tax and NI contributions.

The shock is simulated to reduce the number of employed and self-employed workers by 956,000 and 140,000, respectively, while 7.3 million workers are simulated to be furloughed and on the CJRS and 1.8 million self-employed to receive a grant from the SEISS. This compares to an estimated 8.7 million jobs that had been furloughed and 2.5 million claims to the SEISS by 31 May.[7]

Income tax and NIC

As earnings fall, revenues from income tax will also fall by a substantial £2.3 billion (16.2%) per month, and revenues from NIC by £1 billion (13%). This translates to 1.5 million people being fully exempt from paying income tax and NIC as their income falls below the Personal Allowance and the NIC Primary Threshold.

Benefit spending

Benefit spending will go up substantially. This will be mainly due to the spending expansion of the main means-tested benefit, Universal Credit (UC), as well as the contributory unemployment benefit, Jobseeker's Allowance (JSA). There will be also increased spending on the Working Tax Credit (WTC), Housing Benefit (HB), Council Tax Reduction (CTR) and Child Benefit (CB).

Spending on UC will expand substantially by £0.8 billion (28.2%) and the number of UC claimants is simulated to rise by 1.1 million (27.2%) to 5.2 million. Thus, UC will provide important safety net during this crisis. For comparison, based on figures published by the Department for Work and Pensions, the record number of claims led to 2.4 million starts to UC in the period 13 March 2020 to 14 May 2020 bringing the total number of people on UC to 5.3 million.[8] The savings made due to the benefit cap applied on UC are noteworthy, and are simulated to be worth £334 per affected family per month, on average (although they make up a small proportion of the total spend on UC).

Spending on JSA will also increase substantially by £261 million, and the number of JSA claims is simulated to rise by 837,000 due to the sharp rise in the number of unemployed, highlighting the effectiveness of unemployment benefits in providing insurance during economic downturn (Dolls et al. 2012; Auerbach and Feenberg

[7]https://www.gov.uk/government/collections/hmrc-coronavirus-covid-19-statistics

[8]https://www.gov.uk/government/publications/universal-credit-statistics-29-april-2013-to-9-july-2020/universal-credit-statistics-29-april-2013-to-9-july-2020#starts-on-uc-header

2000). Spending on WTC, HB (for non-working age families) and CTR will also rise, providing additional income protection for families. The number of families simulated to be entitled to CB increases, as 159,000 families with a higher earner see their earnings fall sufficiently so that they do not see their CB entitlement withdrawn.

Looking at the combined change in income tax and NI revenues less spending on state benefits, we simulate the shock in April-May to have reduced the net fiscal balance by £16.3 billion per month. About 72% of this will be due to subsidies through CJRS and SEISS, 20% due to losses in income tax and NIC revenues, and 7% due to increased benefit spending.

Table 4: Change in total earnings, revenues and spending (in million £ and per month)

	Baseline (in levels)	**Impact of crisis** (change to baseline)
Employee earnings	69,906	-7,961
Self-employed earnings	9,593	-3,208
Earnings subsidies from CJRS	0	10,690
Earnings subsidies from SEISS*	0	2,114
Revenues from income tax + NIC	22,005	-3,317
Income tax	14,308	-2,317
Employee NIC	7,266	-891
Self-employed NIC	432	-109
Spending on benefits	6,163	1,206
Universal Credit (UC)	2,860	805
Savings from UC benefit cap	27	14
Jobseeker's Allowance (JSA)	10	261
Working Tax Credit (WTC)	76	28
Housing Benefit (HB)	707	24
Child Benefit (CB)	961	26
Council Tax Reduction (CTR)	385	26
Other means-tested benefits	1,164	36
Revenues–spending	15,842	-16,270

Notes: *Spending on SEISS for May only. All other results are based on average monthly estimates. Other means-tested benefits include the Child Tax Credit, Income support, income-related Employment and Support Allowance, income-based JSA, Pension Credit, Scottish benefits (Sure Start Maternity Grant and Best Start Grant). No simulations to Statutory Sickness Pay.
Source: Own calculations with UKMOD and FRS.

Table 5: Change in number of earners, tax payers and state benefit recipients (in thousand)

	Baseline (in levels)	**Impact of crisis** (change to baseline)
Employed	26,714	-956
Self-employed	4,167	-140
Furloughed workers on CJRS	0	7,291
Self-employed on SEISS*	0	1,791
Income tax + NIC payers	32,769	-1,497
Income tax	29,925	-1,977
Employee NIC	23,908	-1,047
Self-employed NIC	3,057	-531
Benefit recipients	13,313	1,471
Universal Credit (UC)	4,071	1,107
Affected by UC benefit cap	82	40
Jobseeker's Allowance (JSA)	34	837
Working Tax Credit (WTC)	298	0
Housing Benefit (HB)	2,001	8
Child Benefit (CB)	7,107	159
Council Tax Reduction (CTR)	5,270	322
Other means-tested benefits	3,357	57

Notes: *Number of self-employed on SEISS in May 2020. All other results are based on average monthly estimates. Other means-tested benefits include the Child Tax Credit, Income support, income-related Employment and Support Allowance, income-based JSA, Pension Credit, Scottish benefits (Sure Start Maternity Grant and Best Start Grant). No simulations to Statutory Sickness Pay.
Source: Own calculations with UKMOD and FRS.

4.2 The impact of the crisis on the distribution of income

The distributional impact of the shock to earnings, and of the tax-benefit response

Figure 1 shows the distributional impact of the shock to earnings and the tax-benefit response by showing the difference in mean equivalised household net income between the baseline and scenario D, where households are ranked based on their net income before Covid-19, for each decile group (1-10), and for the whole population (All). As well as showing the change in net income (black circle), we also show the change due to employee earnings and self-employed earnings; subsidies from CJRS (where someone is put on the CJRS, this is treated as if they lost all their earnings and then gained a new source of income, CJRS payments) and SEISS; income tax + NIC; and all benefits. A negative change means a fall in net income.

In summary, households will lose a large proportion of their income due to the pandemic, with losses higher in the middle and top of the distribution than at the bottom. Subsidies from CJRS will play a crucial role in supporting household finances across the entire distribution. They will provide the main insurance mechanism during the crisis. Subsidies from SEISS will also provide income support across the distribution, with somewhat larger benefits at the bottom. Reductions in income taxes and NIC will provide additional income protection for households at the top, while increases to benefit entitlements will protect households at the bottom of the distribution.

In more detail, we estimate that the average loss in net income will be 6.9%. Breaking down the change by income source shows that earnings subsidies from the CJRS will account for a large share of the average baseline income, i.e. 13.2%. Subsidies from the SEISS will contribute to a smaller income gain of 1.3% on average. Net of subsidies, the loss in earnings from both employment and self-employment will amount to a substantial 12.6% of mean net baseline income. Automatic reductions in income taxes and NIC will also help mitigate income losses, contributing to an average gain in net income of 4.1%. A smaller gain of 1.6% will come from state benefits.

Across the income distribution, the top eight decile groups will lose out, on average, with losses proportionally larger in the middle and top of the distribution than at the bottom. The fact that the losses in earned income are skewed towards high-income families mostly reflects the way that earners are distributed across the household income distribution: there are substantially more no-earner and fewer two-earner households at the bottom than in the middle or top of the distribution (see Table A.5). If we only focus on households with one earner, then the losses in earned income, as a proportion of baseline net income, are largest at the bottom of the distribution (see Figure B.1). The losses in earned income for households with two-and-more earners are somewhat more equally distributed (see Figure B.2).[9]

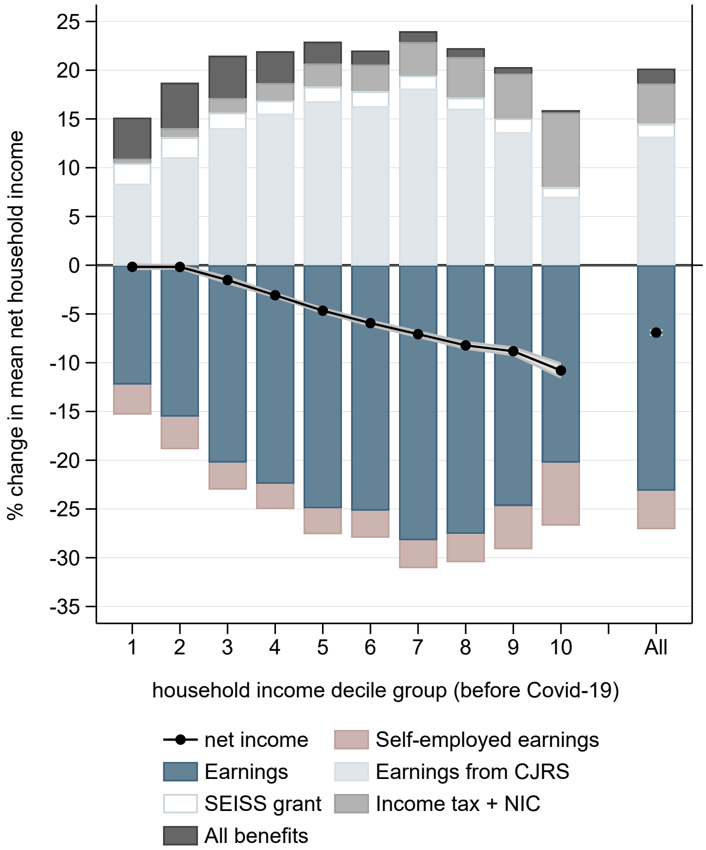
The CJRS and SEISS earnings subsidies combined provide a very important safety net across all deciles, amounting to 10.5% of the baseline net income in the poorest decile up to 19.5% in the seventh decile. In the richest decile, the cap on the CJRS subsidy will make the scheme less effective in insuring household incomes against the shocks.

After the earnings subsidies, reductions in income tax and NIC will also help mitigate income losses. They will absorb a higher proportion of the losses the higher the decile group, due to the progressive nature of the income tax and NIC schedule. In other words, income tax and NIC will shield higher-earners more than lower-earners (in fact, in the richest 10th decile, they will mitigate an equal share of the income loss as the CJRS and SEISS subsidies combined).

At the bottom of the distribution, state benefits will play an important role in alleviating pressure on the households budgets. In the bottom three deciles, state benefits will contribute to sizeable income gains of 4-5%.

[9] These results are broadly consistent with the estimates for the distributional impact of the pandemic on working households by HM Treasury (2020).

Figure 1: Impact of the crisis and policy response to Covid-19 on mean net income by decile of *pre-crisis* income



Notes: The figure shows the distributional impact of the employment and earnings shocks and the UK policy response, i.e. the *baseline* versus scenario D. Results based on average monthly estimates. Changes in income based on equivalised household net income.
Source: Own calculations using UKMOD and FRS.

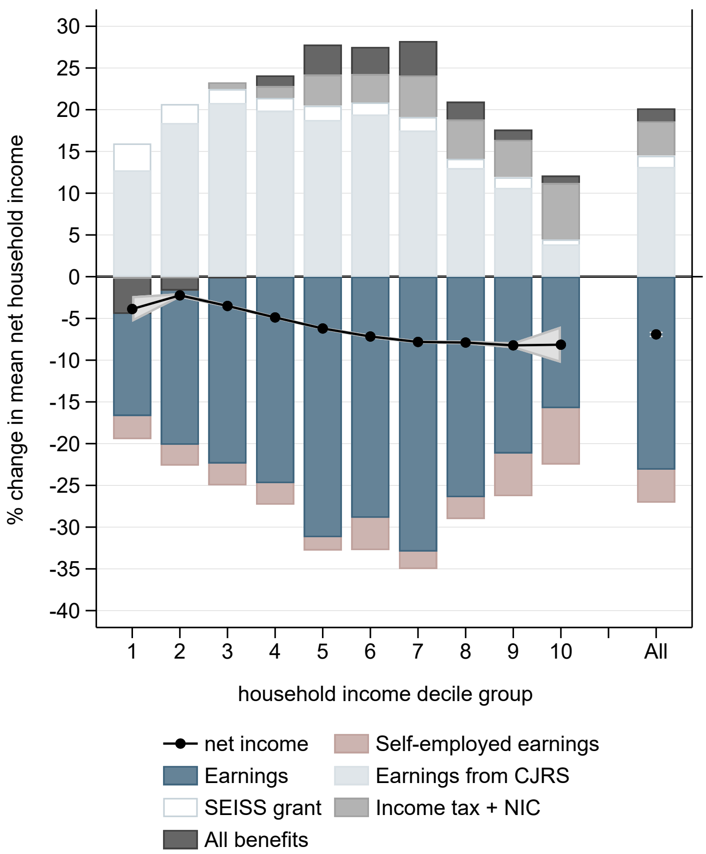
Changes in the distribution of income

Figure 2 presents these results in a different way, by comparing the level and composition of household net incomes in the baseline and scenario D, and doing this within each decile group having re-ranked households. The pattern of income changes is somewhat different from that shown in Figure 1 because the re-ranking effect is so large. Figure 2 shows that the crisis is simulated to lead to a large rise in the number of adults with very low disposable income (caused by those who lose all their earnings as a result of the crisis), such that the bottom decile will see a drop of 3.9% (larger than the drop in deciles two and three). The pattern of changes in income across the decile groups is broadly consistent with a reduction in inequality.

Figure 3 shows the impact of Covid-19 on income inequality based on the Gini coefficient, coefficient of variation (CV), mean log deviation (MLD) and the Theil index (TI). The total change in inequality (black dot) is decomposed into the contribution of earnings changes (i.e. earnings losses net of subsidies) and of tax-benefit policies. In line with Figure 2, we find that net income inequality will fall slightly. Breaking down the change in net income inequality shows that earnings changes and tax-benefit policies will have opposing effects on inequality. Disparities in earnings will increase although the increase will be statistically significant only for the Gini coefficient (0.005). However, tax-benefit policies will more than offset the increased inequality in earned income. We return to the distributional impact of tax-benefit policies in the next section.

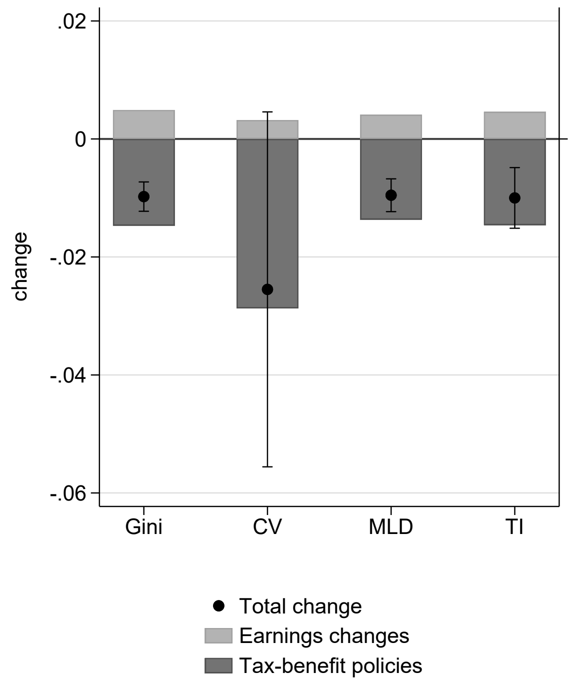
Looking at changes in income poverty, we estimate that the poverty rate and poverty gap will increase due to Covid-19 using a fixed poverty line at 60% of the median baseline income, but will fall using a floating poverty line due to a significant drop in median income (see Table A.5 and Table A.6, respectively). For the overall population, the poverty rate will increase from 16.5% to 17.7% with a fixed poverty line while it will go down to 13.7% with a floating poverty line.

Figure 2: Impact of the crisis and policy response to Covid-19 on mean net income; households ranking not fixed



Notes: The figure shows the distributional impact of the employment and earnings shocks and the UK policy response, i.e. the *baseline* versus scenario *D*. Results based on average monthly estimates. Changes in income based on equivalised household net income. Households ranking based on the respective (baseline or post-Covid) income distribution.
Source: Own calculations using UKMOD and FRS.

Figure 3: Impact of the crisis and policy response to Covid-19 on income inequality



Notes: The figure shows the impact on inequality of the employment and earnings shocks and the UK policy response, i.e. the *baseline* versus scenario *D*. CV=coefficient of variation; MLD=mean log deviation; TI=Theil index. Results based on average monthly estimates of income. Changes in income inequality based on equivalised household net income.
Source: Own calculations using UKMOD and FRS.

4.3 The distributional impact of the Covid-19 increases to state benefits and tax-benefit stabilisers

In this section, we analyse separately the contribution of the state benefit increases announced in response to Covid-19 and the contribution of the tax-benefit system that we would have had in their absence (i.e. the one confirmed in the government's March 2020 Budget): we refer to this latter one as the automatic stabilisers.

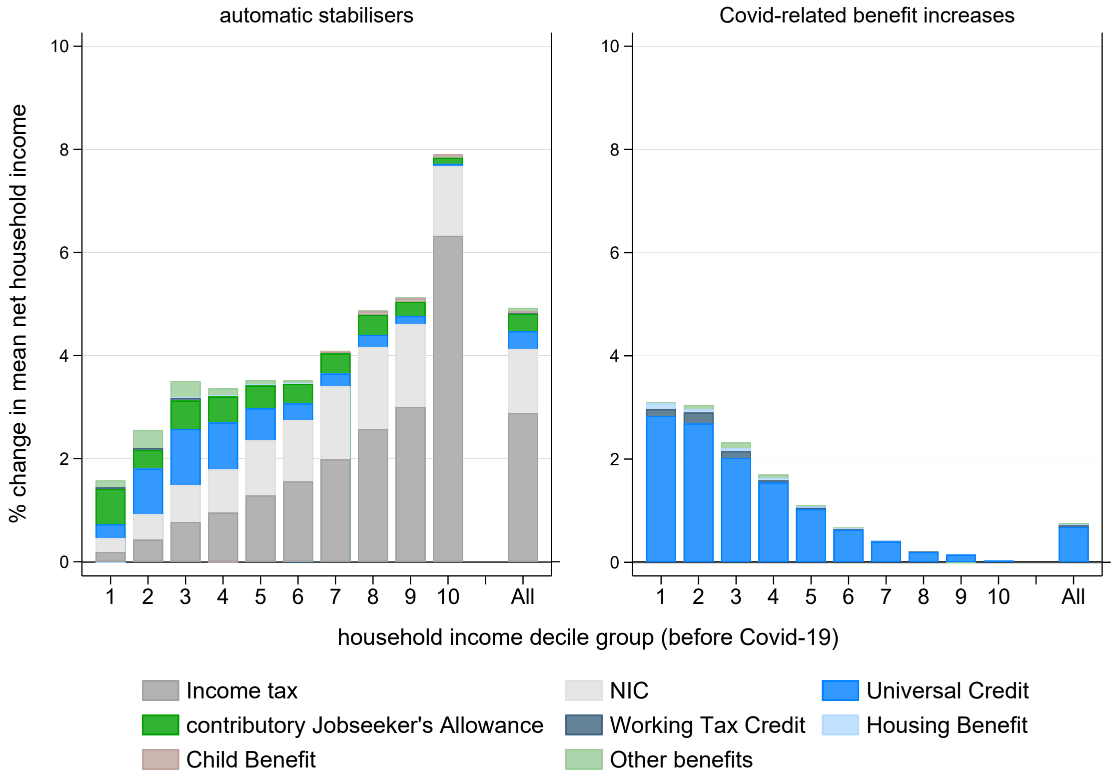
Figure 4 repeats the change in net income due to state benefit entitlements, and income tax and NIC liabilities that was shown in Figure 1, but now shows in the left plot, the impact of the automatic stabilisers and in the right plot, the impact of Covid-related benefit increases (for the estimation of the effect of benefit increases and automatic stabilisers, see equations 3 and 4, respectively). Comparing the total impact of the automatic stabilisers versus the total effect of Covid-related benefit increases on mean net incomes, it is clear that the former has the most impact on net incomes, on average. This underlines the importance of tax-benefit designs in protecting household incomes during economic downturn. On the other hand, different parts of the distribution rely on different types of policy for mitigating income shocks, stressing the importance of both automatic stabilisers and governments' responses to crises for providing income protection (see e.g. Paulus and Tasseva 2020).

In more detail, looking at the plot on the left, income taxes and NIC will have the most sizeable effect on mean net income. Furthermore, they compensate most for income losses at the upper end of the distribution, due to the progressivity of the system. In the richest top decile, income tax and NIC will contribute to a gain of 6.3% and 1.3%, respectively. In other words, after the drop in earnings, the top decile will retain in total 7.7% of its baseline income due to lower tax liabilities and NIC. This emphasises the role of income taxes and NIC as an important source for income insurance (Kniesner and Ziliak 2002a,b).

However, income taxes and NIC will have less impact at the bottom of the distribution where, on average, they account for a much smaller share of baseline income (for example, someone earning £16,800 per year, i.e. working 37 hours a week at the National Living Wage level, would pay 5% of gross income in income tax, compared to 15% if earning £50,000 per year).

What protects most households at the bottom of the distribution during recessions are state benefits: in the case of the current crisis it is mainly the means-tested benefit UC. As a stabiliser (left plot), UC will provide a safety-net mainly for the bottom six deciles. The Covid-related increases to UC (right plot) contribute to additional income gains targeted at the bottom of the distribution. For the poorest decile, this would amount to an average gain in equivalised net income of 2.8%. The stabilisation effect of UC and the UC stimulus package will benefit most households with children, lone mothers, one-earner families and those in privately rented or social housing (Figure B.6). After UC, the unemployment benefit JSA (left plot) will also contribute to small income gains across all parts of the distribution highlighting the importance of provision and access to social insurance benefits. For households with two-and-more earners the gains from JSA will be quite sizeable, especially in the bottom four deciles (Figure B.4). The increases to WTC and HB (right plot) will have a small positive effect on net incomes.

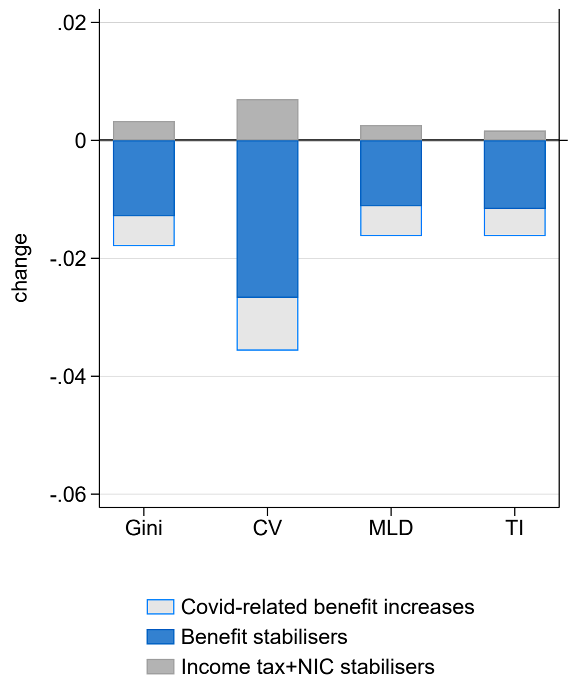
Figure 4: Impact of the crisis and policy response to Covid-19 on mean net income by decile and tax-benefit policy



Notes: Left plot shows impact of automatic stabilisers, i.e. the *baseline* versus scenario *C*. Right plot shows impact of Covid-related benefit increases, i.e. scenario *C* versus *D*. Results based on average monthly estimates. Changes in total net income and the contribution of earnings changes, CJRS subsidies and SEISS grant are omitted. Changes in income based on equivalised household net income. Other benefits include the Council Tax Reduction, Child Tax Credit, Income support, income-related Employment and Support Allowance, income-based JSA, Pension Credit, Scottish benefits (Sure Start Maternity Grant and Best Start Grant). No simulations to Statutory Sickness Pay.
Source: Own calculations using UKMOD and FRS.

Next, we look at the impact of tax-benefit policies on income inequality measured by Gini, CV, MLD and TI. Figure 5 shows the separate contribution of benefits (breaking down their contribution into stabilisers and Covid-related benefit increases) and tax+NIC stabilisers to the total change in inequality. The total change in inequality and contribution of earnings changes are omitted. Table A.7 includes all estimates for the baseline level and changes in inequality. The key result is that benefits (both automatic stabilisers and Covid-related benefit increases) will contribute to an inequality reduction, highlighting their importance for redistribution; while income tax and NIC will have little impact on inequality. Overall, benefits will reduce the Gini coefficient by 0.018, CV by 0.036, MLD by 0.016 and TI by 0.017.

Figure 5: Decomposing the change in income inequality by tax-benefit policy



Notes: CV=coefficient of variation; MLD=mean log deviation; TI=Theil index. Results based on average monthly estimates of income. Changes in income inequality based on equivalised household net income. Total change in inequality and contribution of earnings changes are omitted.
Source: Own calculations using UKMOD and FRS.

4.4 The impact of austerity on the UK safety net

In this section, we explore the impact of a near-decade of austerity on the effectiveness of tax-benefit policies in providing income protection. In the last decade, there have been various cuts made to eligibility, or freezes made to the nominal entitlements (De Agostini et al. 2018; Bourquin et al. 2019). On the tax side, the top marginal tax rate was reduced from 50% to 45% and the zero tax band (Personal Allowance) has grown faster than prices, but the higher income tax thresholds and the point at which the Personal Allowance is tapered away have deteriorated in real terms.

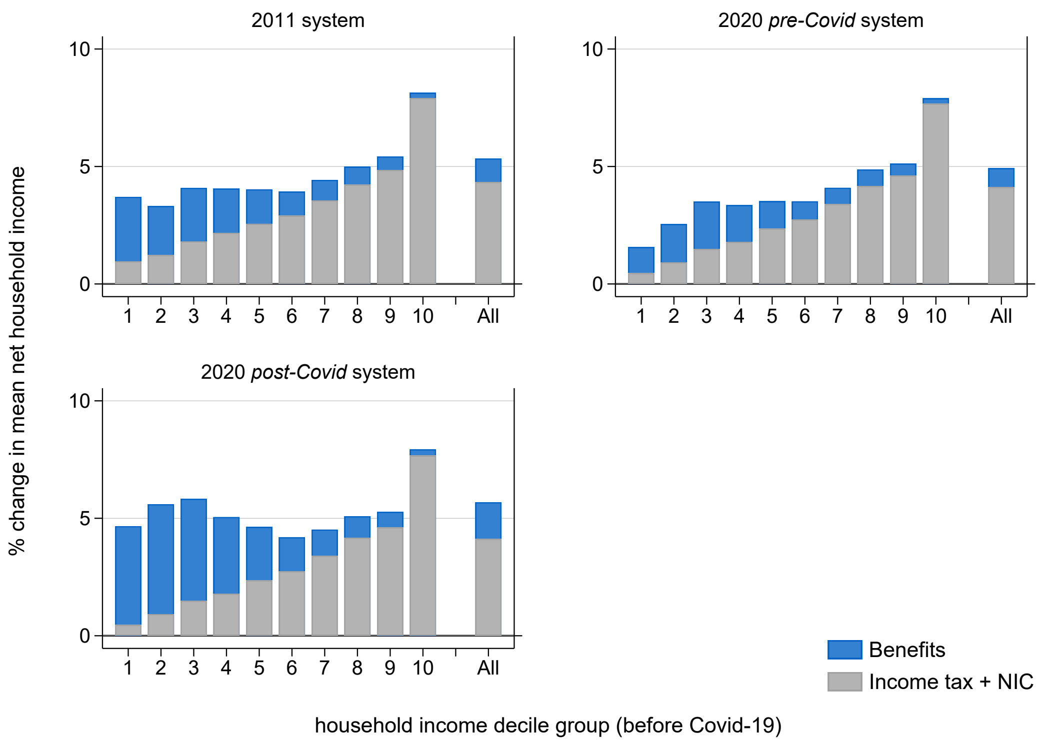
To assess the impact of austerity on the UK safety net, we compare the distributional impact of tax and benefit policies had the 2011 system been in place today (indexed by CPI) versus the 2020 *pre-Covid* and the 2020 *post-Covid* systems (Figure 6). To estimate the impact of the 2011 policies, we use the tax-benefit model UKMOD to apply the indexed 2011 tax-benefit policies on the household micro-data a) before Covid-19 and b) after the simulation of employment and earnings shocks.

Comparing the distributional impact of the 2011 with the 2020 *pre-Covid* system shows that, due to austerity measures, for all parts of the distribution the 2020 *pre-*

Covid system would have been less effective in providing insurance against shocks. In particular in the poorest decile, the 2011 tax-benefit policies would have raised net income by an additional 2.1% compared to the 2020 *pre-Covid* policies.

The emergency benefit package in response to the pandemic will strengthen the UK safety net and, compared to 2011, the 2020 *post-Covid* system will provide more insurance in deciles 1 to 5 and about the same in the rest of the distribution. Nevertheless, although the Covid-related benefit increases provide additional income insurance, these protections are temporary measures and do not undo the impact of austerity measures over the years.

Figure 6: The impact of the 2011 versus the 2020 pre-/post-Covid tax-benefit systems on household net incomes



Notes: 2020 *pre-Covid* and 2020 *post-Covid* systems based on scenarios *C* and *D*, respectively. 2011 tax-benefit parameters in 2020 prices and applied on the earnings distribution before and after Covid-19 to estimate effect of automatic stabilisers.
Source: Own calculations using UKMOD and FRS.

5 Conclusions

Governments across the globe have taken drastic measures to address the economic costs of Covid-19. The UK government introduced income protection in the form of earnings subsidies for workers, and raised the level of means-tested state benefits. Families experiencing income losses due to Covid-19 can rely on state support through these measures as well as through the built-in automatic stabilisation response of the tax-benefit system.

Combining different sources of household micro-data and a tax-benefit model, we estimate the fiscal and distributional impact of Covid-19 during April and May 2020. We assess separately the impact of earnings losses, government's earnings subsidies (the Coronavirus Job Retention Scheme and the Self-Employment Income Support Scheme), state benefit increases and tax-benefit automatic stabilisers.

We simulate that UK households will, on average, sustain income losses in net income due to Covid-19 of 6.9%. Earned income falls by a substantial 12.6% of baseline net income. Earnings subsidies for furloughed workers will play a major role in protecting household incomes, accounting for 13.2% of baseline net income. They will support households across the entire income distribution and will provide the main insurance mechanism against the negative income shocks. The SEISS grant will also provide small income gains of 1.3% on average.

Besides the earnings subsidies, tax-benefit policies will provide needed income protection for families. At the bottom of the distribution, UC as a stabiliser will help families cope with the shocks. Covid-related increases to UC payments will be especially targeted at the poorest decile, contributing to a net income gain of 3%. The unemployment benefit JSA will also help mitigate income losses, providing insurance against the shocks across the entire distribution. But the tax system itself also cushions the shock, and automatic reductions in income tax and national insurance contributions are worth 4.1%, on average, of the pre-Covid baseline income, with the middle and top of the distribution benefiting mostly from income tax and NIC stabilisers due to the progressivity of the tax schedule and NIC.

Finally, we look at the impact of a near-decade of austerity measures on the UK safety net. Compared to the 2011 system, we show that the 2020 *pre-Covid* tax-benefit system would have been less effective in providing insurance against the shocks. The extra Covid benefit spending will strengthen the safety net, so the 2020 *post-Covid* system would provide higher level of income protection at the bottom half of the distribution than the 2011 system. But although the Covid-related benefit increases strengthen the safety net, these protections are temporary measures and do not undo the impact of austerity over the years.

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Supplementary Materials

A Tables

Table A.1: Multinomial logit of employment status in **April** 2020
(base outcome = no drop in earnings)

	Reduced hours & earnings	Furloughed	Unemployed
Constant	-1.948	-.120	-6.422*
	(2.722)	(.871)	(3.320)
Men	-.422	-.633	9.506**
	(2.895)	(1.360)	(4.312)
Age	.005	.014	.089
	(.059)	(.018)	(.058)
Men x Age	.016	-.007	-.175**
	(.061)	(.025)	(.081)
Household type:			

Single adult, no children	.368	-.092	.029
	(.376)	(.187)	(.554)
Single adult living with children	.590	-.193	-.204
	(.448)	(.190)	(.640)
Multiple adults, no children	.340	-.002	-.070
	(.398)	(.192)	(.546)
Multiple adults living with children	.071	.149	.124
	(.422)	(.196)	(.658)
Earnings quintile:			
1	ref	ref	ref
2	-.159	-.313*	-2.136***
	(.248)	(.173)	(.613)
3	-.806**	-.716***	-1.171*
	(.338)	(.184)	(.621)
4	-.867**	-1.230***	-.627
	(.377)	(.196)	(.595)
5	-.497	-1.786***	-1.788***
	(.385)	(.219)	(.637)
Sex x Hours in work:			
Women x less than 20	ref	ref	ref
Women x 20-34	-.692***	-.187	-.747*
	(.264)	(.203)	(.447)
Men x 20-34	-.369	1.398**	-.160
	(.828)	(.609)	(.840)
Women x 35+	-.934***	-.349	-.904
	(.343)	(.234)	(.632)
Men x 35+	-.754	1.264**	-.510
	(.616)	(.567)	(1.028)
Sector:			
Agriculture, Mining, Manufacture, Utilities	ref	ref	ref
Construction and Real Estate	-8.161**	-.421	2.081
	(4.098)	(1.449)	(3.484)
Wholesale and Retail Trade	-2.520	-.838	7.298**
	(2.892)	(1.000)	(3.470)
Transportation and Storage	1.923	1.647	-.453
	(5.230)	(1.853)	(3.972)
Accommodation and Food	-.163	.473	6.314*
	(2.919)	(1.122)	(3.584)
Information and Communication	4.024	-.950	5.539
	(3.333)	(2.355)	(3.895)
Financial and Insurance Activities	-.800	-.148	15.868***
	(3.037)	(1.934)	(4.756)
Professional, Scientific and Technical Activities	.894	.332	8.801**
	(3.200)	(1.203)	(4.104)
Administrative and Support Service	-4.514	.142	-10.077***
	(3.311)	(1.488)	(3.376)
Public Administration and Defence	-1.383	-.922	1.699
	(4.043)	(1.646)	(6.075)
Education	1.012	-.800	4.981
	(2.703)	(1.002)	(3.697)
Human Health and Social Work	-.126	.045	1.046
	(2.817)	(1.014)	(3.534)
Arts, Entertainment, Recreation and Other	3.427	3.496***	7.721**
	(3.323)	(1.232)	(3.713)
Sex x Sector:			
Women x Agriculture, Mining, Manufacture, Utilities	ref	ref	ref
Men x Construction and Real Estate	12.097***	3.530	-8.100*
	(4.455)	(2.176)	(4.911)
Men x Wholesale and Retail Trade	2.367	1.445	-9.201*
	(3.232)	(1.512)	(4.759)
Men x Transportation and Storage	-.141	1.120	-4.528
	(5.613)	(2.257)	(5.416)
Men x Accommodation and Food	2.932	3.810**	-8.809*
	(3.456)	(1.821)	(5.315)
Men x Information and Communication	-5.921	-1.330	-13.164***
	(4.304)	(3.211)	(4.659)
Men x Financial and Insurance Activities	.145	-.097	-32.385***
	(4.518)	(2.809)	(11.899)
Men x Professional, Scientific and Technical Activities	1.898	-1.881	-22.689***
	(3.959)	(1.912)	(5.302)
Men x Administrative and Support Service	7.266**	1.641	3.286
	(3.676)	(2.264)	(4.447)
Men x Public Administration and Defence	3.099	.603	-9.862

	(5.021)	(2.658)	(7.007)
Men x Education	1.046	-1.151	-9.151*
	(3.104)	(1.972)	(4.738)
Men x Human Health and Social Work	-.691	.073	19.547
	(3.337)	(1.913)	(15.028)
Men x Arts, Entertainment, Recreation and Other	-1.776	-2.179	-26.624***
	(3.707)	(1.862)	(4.592)
Age x Sector:			
Age x Agriculture, Mining, Manufacture, Utilities	ref	ref	ref
Age x Construction and Real Estate	.143*	.002	-.046
	(.080)	(.032)	(.061)
Age x Wholesale and Retail Trade	.043	.011	-.139**
	(.063)	(.023)	(.066)
Age x Transportation and Storage	-.033	-.047	.001
	(.111)	(.041)	(.073)
Age x Accommodation and Food	.023	.010	-.098
	(.064)	(.026)	(.068)
Age x Information and Communication	-.072	.014	-.072
	(.077)	(.051)	(.072)
Age x Financial and Insurance Activities	.007	-.024	-.494***
	(.068)	(.042)	(.134)
Age x Professional, Scientific and Technical Activities	-.030	-.013	-.207**
	(.070)	(.026)	(.091)
Age x Administrative and Support Service	.083	-.005	-.080
	(.070)	(.032)	(.062)
Age x Public Administration and Defence	.018	-.029	-.039
	(.084)	(.035)	(.115)
Age x Education	-.030	-.005	-.091
	(.059)	(.021)	(.068)
Age x Human Health and Social Work	.000	-.035	-.025
	(.061)	(.022)	(.065)
Age x Arts, Entertainment, Recreation and Other	-.062	-.063**	-.140**
	(.073)	(.026)	(.068)
Sex x Age x Sector:			
Women x Age x Agriculture, Mining, Manufacture, U	ref	ref	ref
Men x Age x Construction and Real Estate	-.222**	-.054	.169*
	(.087)	(.046)	(.093)
Men x Age x Wholesale and Retail Trade	-.058	-.030	.159*
	(.070)	(.033)	(.096)
Men x Age x Transportation and Storage	-.004	-.016	.096
	(.119)	(.048)	(.105)
Men x Age x Accommodation and Food	-.040	-.075*	.144
	(.076)	(.041)	(.119)
Men x Age x Information and Communication	.092	-.018	.118
	(.096)	(.068)	(.090)
Men x Age x Financial and Insurance Activities	-.006	-.024	.793***
	(.099)	(.061)	(.239)
Men x Age x Professional, Scientific and Technical Activities	-.037	.029	.443***
	(.087)	(.040)	(.117)
Men x Age x Administrative and Support Service	-.117	-.063	.191**
	(.082)	(.051)	(.089)
Men x Age x Public Administration and Defence	-.083	.004	.183
	(.106)	(.059)	(.134)
Men x Age x Education	-.036	.010	.151
	(.067)	(.039)	(.093)
Men x Age x Human Health and Social Work	-.017	-.024	-.767
	(.071)	(.042)	(.545)
Men x Age x Arts, Entertainment, Recreation and Other	.001	.019	.209**
	(.077)	(.039)	(.090)
N	6122		

(table continued) Multinomial logit of employment status in **May** 2020
(base outcome = no drop in earnings)

	Reduced hours & earnings	Furloughed	Unemployed
Constant	-2.491	-.181	-13.032***
	(1.549)	(1.096)	(2.312)
Men	1.023	-1.415	12.855***
	(2.037)	(1.702)	(3.281)

Age	.008	.014	.197***
	(.033)	(.022)	(.040)
Men x Age	.011	-.007	-.236***
	(.041)	(.030)	(.056)
Household type:			
Single adult, no children	-.091	.521**	.598
	(.279)	(.210)	(.498)
Single adult living with children	.262	.445**	-1.134*
	(.248)	(.214)	(.617)
Multiple adults, no children	-.073	.512**	.283
	(.297)	(.234)	(.521)
Multiple adults living with children	-.252	.588**	1.040
	(.326)	(.246)	(.639)
Earnings quintile:			
1	ref	ref	ref
2	.335	-.137	-.542
	(.263)	(.232)	(.370)
3	-.079	-.407	-.496
	(.323)	(.253)	(.489)
4	-.507	-.625**	-.503
	(.331)	(.257)	(.525)
5	.104	-1.232***	-.742
	(.309)	(.294)	(.501)
Sex x Hours in work:			
Women x less than 20	ref	ref	ref
Women x 20-34	.241	-.249	-1.409***
	(.315)	(.246)	(.378)
Men x 20-34	-1.650*	1.566*	.723
	(.842)	(.847)	(1.286)
Women x 35+	.192	-.497*	-2.203***
	(.367)	(.295)	(.517)
Men x 35+	-1.085*	1.460*	-.553
	(.615)	(.826)	(1.275)
Sector:			
Agriculture, Mining, Manufacture, Utilities	ref	ref	ref
Construction and Real Estate	-7.217**	-1.819	9.513***
	(3.239)	(1.721)	(2.610)
Wholesale and Retail Trade	-2.437	-1.509	13.781***
	(1.962)	(1.225)	(2.402)
Transportation and Storage	-21.692***	.448	8.226
	(6.438)	(1.973)	(8.321)
Accommodation and Food	-1.905	.090	12.381***
	(1.923)	(1.390)	(2.722)
Information and Communication	-2.643	-4.255**	9.428**
	(2.061)	(2.143)	(4.595)
Financial and Insurance Activities	-1.243	-.835	12.646***
	(1.982)	(2.419)	(3.626)
Professional, Scientific and Technical Activities	1.923	.608	13.689***
	(2.033)	(1.458)	(2.638)
Administrative and Support Service	.934	.378	-2.475
	(2.477)	(1.558)	(2.439)
Public Administration and Defence	-.522	-3.334*	9.327*
	(2.311)	(1.756)	(5.122)
Education	.346	-1.328	13.103***
	(1.658)	(1.301)	(2.873)
Human Health and Social Work	-2.295	-.453	12.241***
	(2.002)	(1.291)	(2.257)
Arts, Entertainment, Recreation and Other	-1.981	2.666*	15.538***
	(3.527)	(1.517)	(2.873)
Sex x Sector:			
Women x Agriculture, Mining, Manufacture, Utilities	ref	ref	ref
Men x Construction and Real Estate	9.346**	3.622	-16.567***
	(3.646)	(2.312)	(3.628)
Men x Wholesale and Retail Trade	.791	1.342	-16.268***
	(2.699)	(1.857)	(3.569)
Men x Transportation and Storage	21.571***	.722	-17.409*
	(7.027)	(2.470)	(9.926)
Men x Accommodation and Food	-16.206***	2.187	-10.007**
	(2.528)	(2.136)	(4.238)
Men x Information and Communication	1.709	2.583	-6.475
	(2.846)	(3.281)	(6.260)
Men x Financial and Insurance Activities	-7.973***	-1.973	-18.664***
	(2.803)	(3.004)	(6.967)

Men x Professional, Scientific and Technical Activities	-1.767	-3.172	-24.255***
	(2.674)	(2.124)	(3.634)
Men x Administrative and Support Service	2.976	4.560*	1.044
	(3.254)	(2.496)	(3.729)
Men x Public Administration and Defence	2.249	1.392	-13.955**
	(2.986)	(3.527)	(5.902)
Men x Education	.439	-.161	-21.322***
	(2.358)	(2.318)	(6.169)
Men x Human Health and Social Work	.056	-2.992	-6.418
	(4.075)	(2.476)	(5.239)
Men x Arts, Entertainment, Recreation and Other	-16.722	-3.161	-33.847***
	(13.953)	(2.393)	(3.692)
Age x Sector:			
Age x Agriculture, Mining, Manufacture, Utilities	ref	ref	ref
Age x Construction and Real Estate	.135**	.024	-.165***
	(.062)	(.036)	(.046)
Age x Wholesale and Retail Trade	.035	.019	-.235***
	(.042)	(.027)	(.047)
Age x Transportation and Storage	.393***	-.026	-.119
	(.118)	(.043)	(.154)
Age x Accommodation and Food	.058	.006	-.177***
	(.043)	(.032)	(.052)
Age x Information and Communication	.028	.070	-.121
	(.042)	(.047)	(.091)
Age x Financial and Insurance Activities	.018	-.047	-.240***
	(.043)	(.059)	(.084)
Age x Professional, Scientific and Technical Activities	-.046	-.028	-.250***
	(.044)	(.031)	(.050)
Age x Administrative and Support Service	-.002	-.016	-.205***
	(.052)	(.035)	(.048)
Age x Public Administration and Defence	-.012	.009	-.164*
	(.050)	(.036)	(.097)
Age x Education	-.004	-.011	-.225***
	(.036)	(.027)	(.053)
Age x Human Health and Social Work	.045	-.032	-.210***
	(.044)	(.027)	(.042)
Age x Arts, Entertainment, Recreation and Other	.021	-.056*	-.294***
	(.069)	(.032)	(.064)
Sex x Age x Sector:			
Women x Age x Agriculture, Mining, Manufacture, U	ref	ref	ref
Men x Age x Construction and Real Estate	-.185***	-.056	.276***
	(.070)	(.048)	(.062)
Men x Age x Wholesale and Retail Trade	-.017	-.024	.271***
	(.059)	(.040)	(.076)
Men x Age x Transportation and Storage	-.390***	-.008	.280
	(.131)	(.051)	(.184)
Men x Age x Accommodation and Food	-.025	-.021	.191**
	(.055)	(.046)	(.083)
Men x Age x Information and Communication	-.031	-.083	-.000
	(.059)	(.066)	(.149)
Men x Age x Financial and Insurance Activities	.117*	.046	.346**
	(.061)	(.067)	(.144)
Men x Age x Professional, Scientific and Technical Activities	.048	.067	.429***
	(.057)	(.044)	(.072)
Men x Age x Administrative and Support Service	-.056	-.112**	.206***
	(.071)	(.054)	(.076)
Men x Age x Public Administration and Defence	-.039	-.009	.243**
	(.063)	(.076)	(.110)
Men x Age x Education	-.014	.008	.363***
	(.050)	(.047)	(.110)
Men x Age x Human Health and Social Work	-.033	.047	.003
	(.087)	(.051)	(.157)
Men x Age x Arts, Entertainment, Recreation and Other	.299	.050	.338***
	(.254)	(.050)	(.079)
N	4954		

Notes: The dependent variable is employment status in April/May 2020. The model is estimated on the sample of employees, aged 20-63, with positive earnings from employment only in January/February 2020. The base outcome is *no drop in earnings*, i.e. of no more than £5 per week. The outcome *reduced hours and earnings* implies a fall of more than £5 in earnings and 1 working hour per week. Standard errors at a confidence level of 95% are shown in parenthesis. Significance levels indicated as * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
Source: Own calculations with Understanding Society COVID-19 data.

Table A.2: Multinomial logit of self-employment status in **April** 2020 (base outcome = no drop in earnings)

	Reduced hours & earnings	Unemployed
Constant	-1.059	-3.782**
	(.830)	(1.899)
Men	-.280	-1.575
	(.438)	(1.059)
Age	-.004	.006
	(.011)	(.025)
Household type:		
Single adult, no children	.233	-.655
	(.331)	(.758)
Single adult living with children	.229	-.562
	(.332)	(.756)
Multiple adults, no children	.448	-1.112
	(.325)	(.815)
Multiple adults living with children	.332	.475
	(.384)	(.797)
Earnings ventile:		
1	ref	ref
2	-.481	.169
	(.481)	(1.052)
3	1.254**	1.516
	(.519)	(1.235)
4	.416	-.241
	(.521)	(1.464)
5	.647	1.506
	(.637)	(1.618)
6	-.057	-14.304***
	(.668)	(1.218)
7	.528	2.311*
	(.572)	(1.358)
8	1.256	-13.852***
	(1.157)	(1.610)
9	.762	-14.031***
	(.790)	(1.279)
10	1.326**	.908
	(.580)	(1.654)
11	1.289*	1.948
	(.682)	(1.319)
12	.287	-13.840***
	(.636)	(1.234)
13	.384	-14.126***
	(.724)	(1.435)
14	.283	-13.641***
	(.545)	(1.229)
15	.082	1.434
	(.579)	(1.801)
16	1.159*	2.689*
	(.625)	(1.541)
17	.416	-13.382***
	(.683)	(1.424)
18	.868	3.211**
	(.656)	(1.499)
19	.418	1.540
	(.562)	(1.687)
20	-.335	1.818
	(.524)	(1.352)
Sex x Hours in work:		
Women x less than 20	ref	ref
Men x less than 20	-.341	-.658
	(.512)	(1.279)
Women x 20-34	.233	-1.009
	(.432)	(.991)
Men x 20-34	.480	.922
	(.377)	(.950)
Women x 35+	.014	-.049
	(.448)	(1.143)
Sector:		
Agriculture, Mining, Manufacture, Utilities	ref	ref
Construction and Real Estate	1.933***	2.531**

	(.478)	(1.033)
Wholesale and Retail Trade	1.291***	.611
	(.472)	(1.475)
Transportation and Storage	1.347**	-2.821**
	(.537)	(1.363)
Accommodation and Food	3.787***	4.080**
	(1.144)	(1.644)
Information and Communication	1.205**	2.892***
	(.577)	(1.033)
Financial and Insurance Activities	-.589	-15.483***
	(.959)	(1.138)
Professional, Scientific and Technical Activities	.324	-.539
	(.455)	(1.392)
Administrative and Support Service	1.729***	3.336***
	(.537)	(1.067)
Public Administration and Defence	1.126*	-14.502***
	(.670)	(1.078)
Education	.654	.548
	(.452)	(1.188)
Human Health and Social Work	.830*	-.857
	(.445)	(1.518)
Arts, Entertainment, Recreation and Other	1.676***	1.166
	(.472)	(1.126)
N	1365	

(table continued) Multinomial logit of self-employment status in **May** 2020 (base outcome = no drop in earnings)

	Reduced hours & earnings	Unemployed
Constant	-.765	-17.133***
	(1.028)	(2.465)
Men	-.625	-2.465*
	(.474)	(1.353)
Age	-.012	.017
	(.012)	(.037)
Household type:		
Single adult, no children	-.214	-.479
	(.366)	(.714)
Single adult living with children	.167	-1.692
	(.356)	(1.325)
Multiple adults, no children	-.192	-1.798*
	(.397)	(1.012)
Multiple adults living with children	-.681	-.656
	(.426)	(.737)
Earnings ventile:		
1	ref	ref
2	.009	-.180
	(.505)	(1.057)
3	.463	-.525
	(.541)	(1.586)
4	.681	1.559
	(.545)	(1.326)
5	.880	-13.742***
	(.658)	(1.390)
6	.062	-15.467***
	(.657)	(1.453)
7	.276	3.012*
	(.904)	(1.602)
8	.804	1.299
	(.715)	(1.629)
9	.727	-14.601***
	(.831)	(1.086)
10	1.140**	.340
	(.577)	(1.517)
11	1.227	1.477
	(.800)	(1.962)
12	1.337*	-13.446***
	(.706)	(1.666)
13	1.573*	-11.738***

	(.870)	(1.653)
14	.807	-13.703***
	(.584)	(1.464)
15	1.539**	1.722
	(.732)	(1.903)
16	1.791*	-13.965***
	(1.048)	(1.972)
17	2.254***	1.378
	(.676)	(2.086)
18	.402	-15.490***
	(.724)	(1.292)
19	2.620***	3.414*
	(.688)	(2.024)
20	1.226*	3.231*
	(.633)	(1.716)
Sex x Hours in work:		
Women x less than 20	ref	ref
Men x less than 20	.039	3.100**
	(.584)	(1.213)
Women x 20-34	.318	-1.177
	(.471)	(1.023)
Men x 20-34	1.123***	1.343
	(.404)	(.836)
Women x 35+	.142	-2.240*
	(.456)	(1.237)
Sector:		
Agriculture, Mining, Manufacture, Utilities	ref	ref
Construction and Real Estate	.598	16.229***
	(.636)	(1.017)
Wholesale and Retail Trade	.827	15.412***
	(.653)	(1.191)
Transportation and Storage	.577	15.618***
	(.718)	(1.104)
Accommodation and Food	2.081**	16.001***
	(.811)	(1.434)
Information and Communication	.657	15.146***
	(.733)	(1.149)
Financial and Insurance Activities	-1.661	-2.864**
	(1.117)	(1.367)
Professional, Scientific and Technical Activities	.460	13.804***
	(.647)	(1.505)
Administrative and Support Service	1.088	15.957***
	(.709)	(.907)
Public Administration and Defence	.165	-1.335
	(.738)	(1.066)
Education	.495	-.667
	(.638)	(1.201)
Human Health and Social Work	.676	13.987***
	(.633)	(1.388)
Arts, Entertainment, Recreation and Other	1.307**	14.593***
	(.650)	(1.031)
N	1074	

Notes: The dependent variable is self-employment status in April/May 2020. The model is estimated on the sample of self-employed, aged 20-63, with positive earnings from self-employment in January/February 2020. The base outcome is *no drop in earnings*, i.e. of no more than £5 per week. The outcome *reduced hours and earnings* implies a fall of more than £5 in earnings and 1 working hour per week. Significance levels indicated as * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
Source: Own calculations with Understanding Society COVID-19 data.

Table A.3: Logit for receiving the SEISS grant in **May** 2020

Constant	-1.633
	(1.031)
Men	1.153**
	(.446)
Age	.005
	(.012)
Self-employment status in May vs Jan/Feb:	
No change	ref
With reduced hours and earnings	.420*

	(.229)
Unemployed	-.279
	(.516)
Household type:	
Single adult, no children	.393
	(.468)
Single adult living with children	.309
	(.464)
Multiple adults, no children	-.262
	(.512)
Multiple adults living with children	.360
	(.523)
Earnings ventile:	
1	ref
2	.286
	(.562)
3	-.083
	(.589)
4	.051
	(.567)
5	.287
	(.734)
6	-.069
	(.670)
7	-.483
	(.799)
8	-.074
	(.710)
9	-1.192
	(1.028)
10	.239
	(.608)
11	-1.009
	(.696)
12	-1.122
	(.768)
13	-1.284
	(1.073)
14	-.297
	(.608)
15	-.781
	(.681)
16	-1.226
	(.960)
17	-.959
	(.696)
18	-.687
	(.771)
19	-.398
	(.600)
20	-1.446**
	(.600)
Sex x Hours in work:	
Women x less than 20	ref
Men x less than 20	-2.613***
	(.621)
Women x 20-34	.678
	(.461)
Men x 20-34	-.476
	(.385)
Women x 35+	.603
	(.447)
Sector:	
Agriculture, Mining, Manufacture, Utilities	ref
Construction and Real Estate	.838
	(.580)
Wholesale and Retail Trade	.417
	(.599)
Transportation and Storage	1.609**
	(.698)
Accommodation and Food	1.223
	(.913)
Information and Communication	.370

	(.613)
Financial and Insurance Activities	.008
	(1.011)
Professional, Scientific and Technical Activities	.475
	(.555)
Administrative and Support Service	1.053*
	(.580)
Public Administration and Defence	-.252
	(.828)
Education	.443
	(.582)
Human Health and Social Work	.422
	(.550)
Arts, Entertainment, Recreation and Other	1.255**
	(.578)
N	1074

Notes: The model is estimated on the sample of self-employed, aged 20-63, with positive earnings from self-employment in January/February 2020. Standard errors at a confidence level of 95% are shown in parenthesis. Significance levels indicated as * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
Source: Own calculations with Understanding Society COVID-19 data.

Table A.4: Household composition in the income distribution

	no earner	1 earner	2+ earners	with children	with 3+ children	with disability	with elderly	lone mother
decile								
1	22.3	9.7	1.6	9.6	18.4	6.9	12.0	15.2
2	15.7	12.2	2.5	12.6	22.6	11.2	12.1	21.8
3	14.6	11.9	4.5	12.2	17.4	13.9	13.3	20.3
4	12.8	10.6	7.0	11.9	11.4	19.5	12.4	14.0
5	10.2	11.2	8.7	10.9	8.3	17.3	11.7	10.5
6	8.1	9.7	11.6	10.4	5.5	13.9	10.6	7.2
7	5.2	9.4	14.1	9.6	4.7	8.1	8.2	6.2
8	4.1	8.1	15.7	8.3	4.5	4.5	7.3	1.9
9	3.7	8.3	16.6	7.0	3.1	3.0	6.3	1.9
10	3.3	8.7	17.8	7.4	4.1	1.6	6.1	.9
n households	9,826,848	7,949,500	10,049,547	7,801,746	1,292,746	3,679,514	8,597,443	1,661,870

(table continued)

	single-person hh:	single-person hh:	accommodation		
	women	men	own	private rent	social rent/other
decile					
1	18.9	17.6	9.5	10.2	18.4
2	14.0	10.3	7.9	10.5	16.7
3	13.3	12.2	7.2	11.3	19.6
4	13.4	10.6	8.2	11.5	15.1
5	10.8	9.9	9.5	10.5	11.2
6	9.6	8.2	10.1	10.2	8.5
7	6.7	7.7	11.0	9.3	5.2
8	4.8	6.5	11.3	9.4	2.9
9	3.9	8.5	12.1	9.1	1.7
10	4.6	8.7	13.3	8.0	.8
n households	4,308,600	3,795,195	17,687,422	5,112,757	5,025,716

Notes: The table shows, for a given household type, what proportion (in %) of households are situated in each decile group. Income decile groups based on household equivalised net income before Covid-19. Each column refers to a household with certain characteristics. Household types for presence of earners are based on employment status before Covid-19. Household types can be overlapping.
Source: Own calculations with UKMOD and FRS.

Table A.5: Change in the poverty rate in % points

	Baseline (in %)	Impact of crisis (change to baseline)	
		fixed	floating
All	16.491***	1.173***	-2.744***
	(.350)	(.226)	(.257)
Women	17.040***	1.161***	-2.873***
	(.397)	(.215)	(.268)
Men	15.927***	1.185***	-2.612***
	(.388)	(.268)	(.293)
Children	21.505***	1.514***	-4.484***
	(.715)	(.461)	(.491)

Notes: The table shows the impact on the poverty rate of the employment and earnings shocks and the UK policy response, i.e. the *baseline* versus scenario D. The poverty rate is the % of people with household equivalised net income below the poverty line. The poverty line is 60% of the median household equivalised net income in the baseline (fixed) or of the respective scenario (floating). Standard errors at a confidence level of 95% are shown in parenthesis. Bootstrapped standard errors after 200 replications. Significance levels indicated as * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
Source: Own calculations with UKMOD and FRS.

Table A.6: Change in the poverty gap in % points

	Baseline (in %)	Impact of crisis (change to baseline)	
		fixed	floating
All	4.164***	.383***	-.452***
	(.116)	(.043)	(.062)
Women	4.194***	.392***	-.479***
	(.120)	(.045)	(.065)
Men	4.133***	.373***	-.425***
	(.137)	(.047)	(.065)
Children	4.980***	.646***	-.434***
	(.244)	(.091)	(.113)

Notes: The table shows the impact on the poverty gap of the employment and earnings shocks and the UK policy response, i.e. the *baseline* versus scenario D. The poverty gap is the mean shortfall of the total population from the poverty line (counting the non-poor as having zero shortfall), expressed in % of the poverty line. The poverty line is 60% of the median household equivalised net income in the baseline (fixed) or of the respective scenario (floating). Standard errors at a confidence level of 95% are shown in parenthesis. Bootstrapped standard errors after 200 replications. Significance levels indicated as * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
Source: Own calculations with UKMOD and FRS.

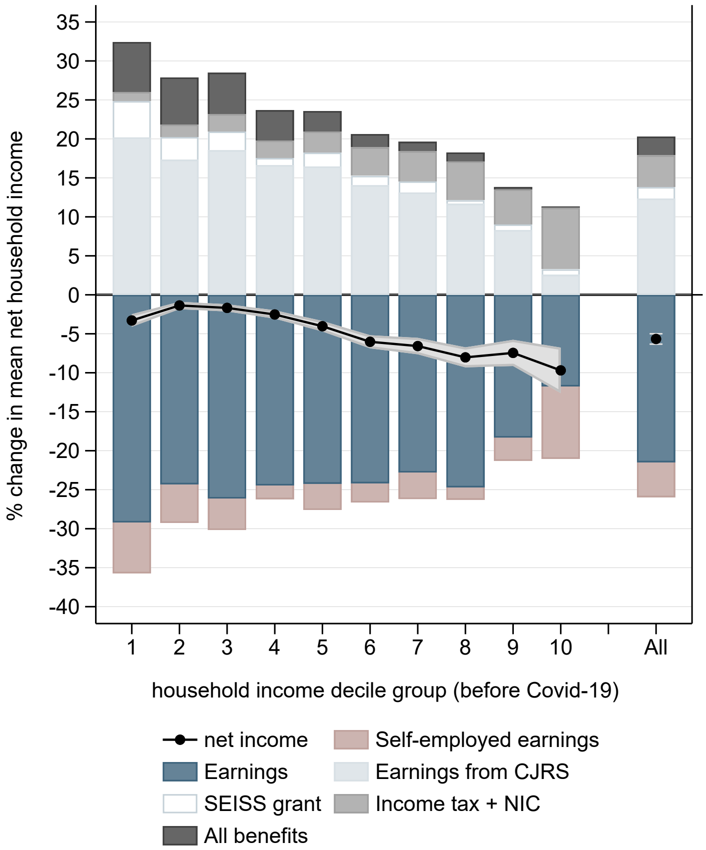
Table A.7: Decomposing changes in income inequality

	Baseline (in levels)	**Impact of crisis** (change to baseline) $E+K$	S_t	S_b	P	Δ
Gini	.310***	.005***	.003***	-.013***	-.005***	-.010***
	(.003)	(.002)	(.000)	(.000)	(.000)	(.001)
CV	.685***	.003	.007	-.027***	-.009***	-.025*
	(.029)	(.027)	(.010)	(.002)	(.000)	(.015)
MLD	.165***	.004	.003	-.011***	-.005***	-.010***
	(.004)	(.003)	(.002)	(.002)	(.000)	(.001)
TI	.169***	.005	.002	-.012***	-.005***	-.010***
	(.006)	(.005)	(.002)	(.001)	(.000)	(.003)

Notes: Inequality estimates based on equivalised household income. The total change Δ is decomposed into: the contribution of earnings changes ($E+K$), tax/NIC and benefit automatic stabilisers (S_t and S_b), and Covid-related benefit increases (P). Standard errors at a confidence level of 95% are shown in parenthesis. Bootstrapped standard errors after 200 replications. Significance levels indicated as * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
Source: Own calculations with UKMOD and FRS.

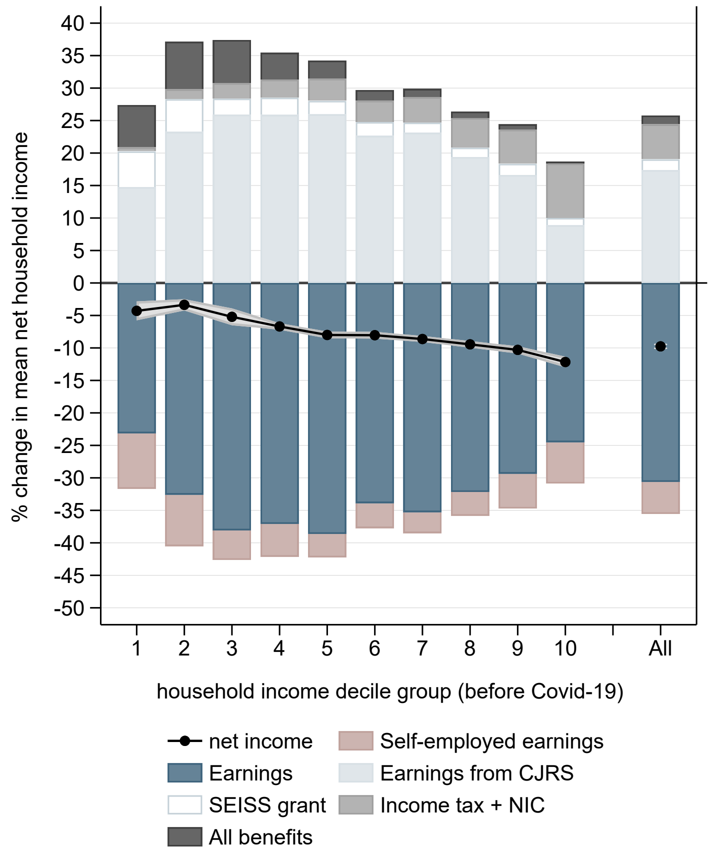
B Figures

Figure B.1: Impact of the crisis and policy response to Covid-19 on mean net income by decile: **households with 1 earner**



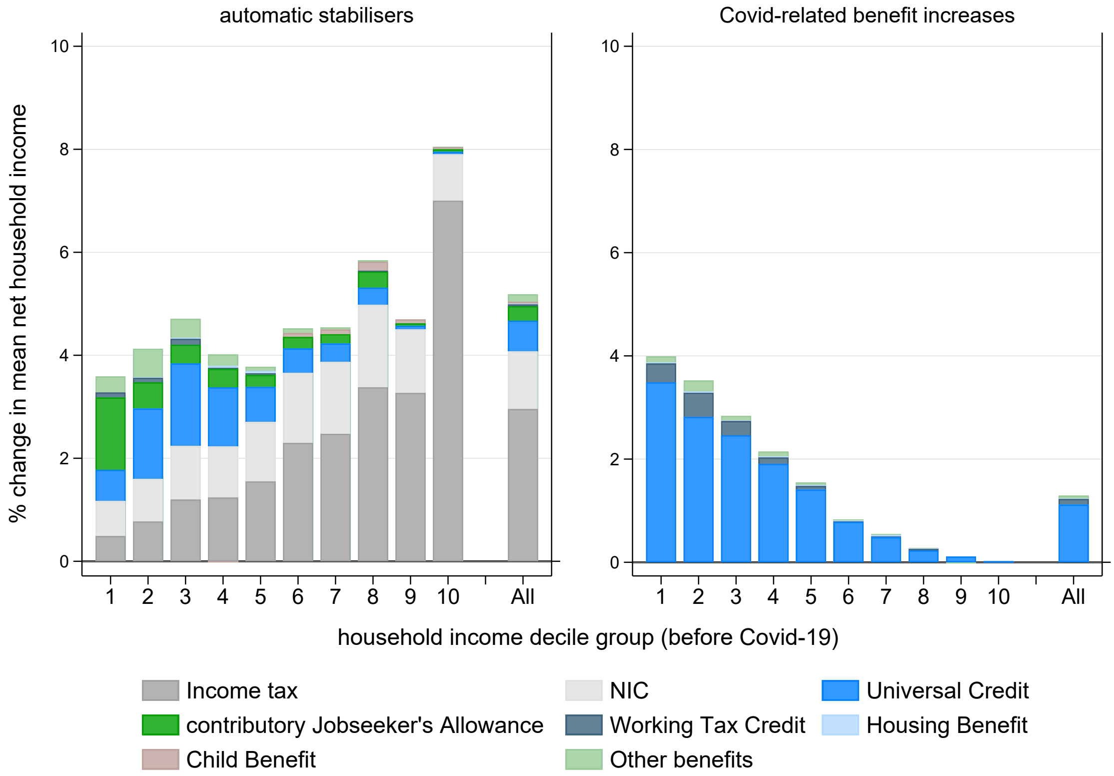
Notes: The figure shows the distributional impact of the employment and earnings shocks and the UK policy response, i.e. the *baseline* versus scenario *D*. Changes in income based on equivalised household net income. All-population deciles.
Source: Own calculations using UKMOD and FRS.

Figure B.2: Impact of the crisis and policy response to Covid-19 on mean net income by decile: **households with 2+ earners**



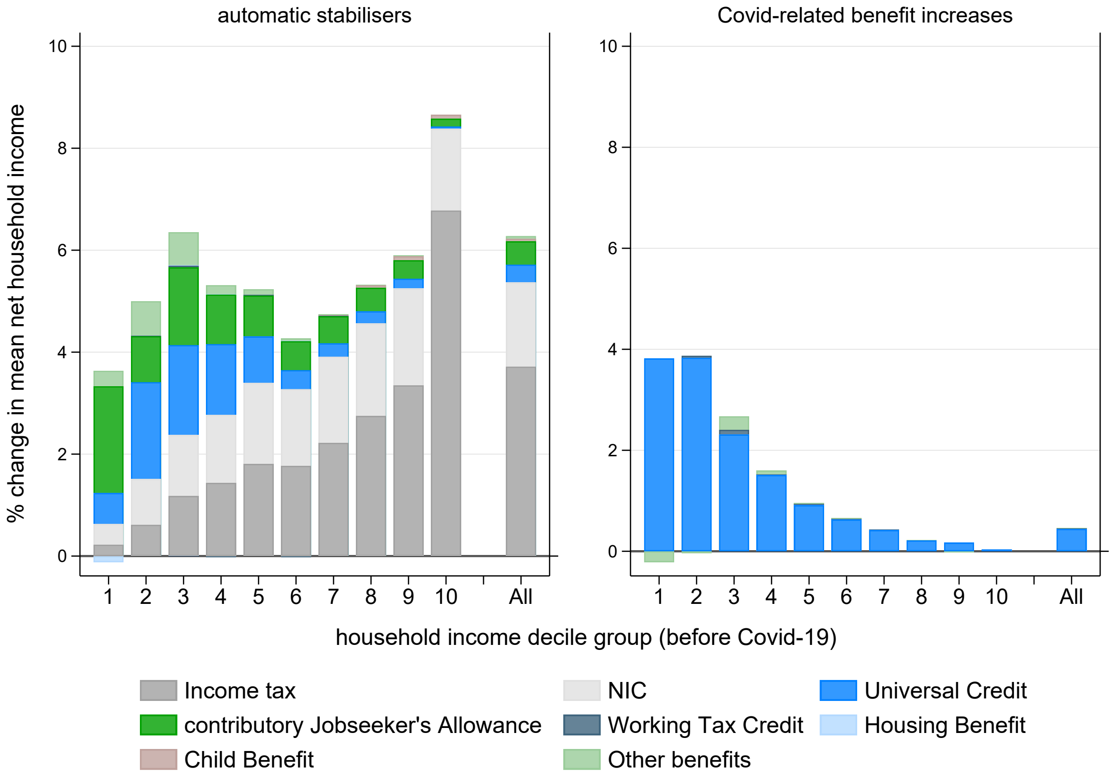
Notes: The figure shows the distributional impact of the employment and earnings shocks and the UK policy response, i.e. the *baseline* versus scenario *D*. Changes in income based on equivalised household net income. All-population deciles.
Source: Own calculations using UKMOD and FRS.

Figure B.3: Impact of the crisis and policy response to Covid-19 on mean net income by decile and tax-benefit policy: **households with 1 earner**



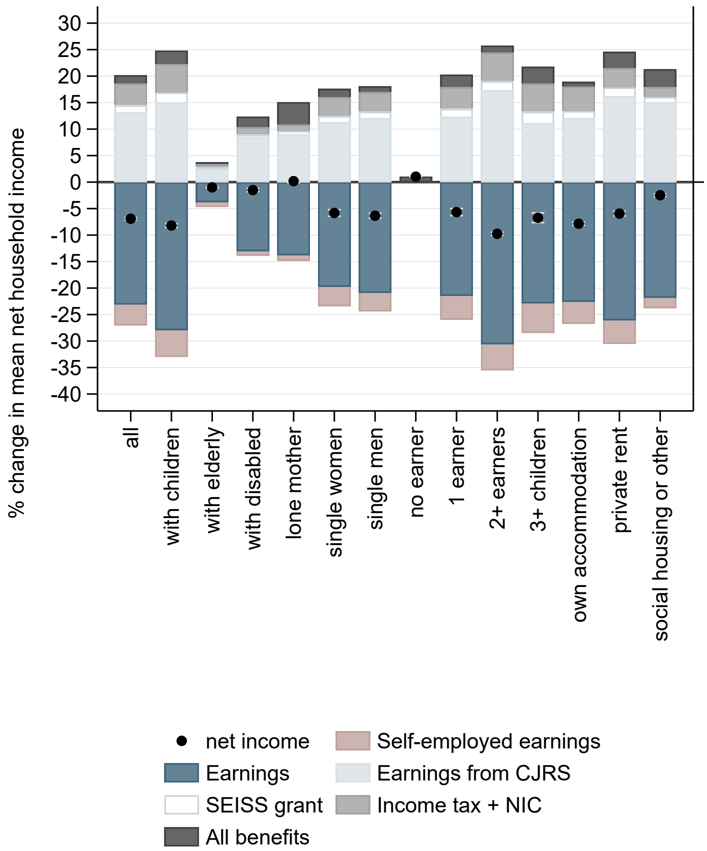
Notes: Left plot shows impact of automatic stabilisers, i.e. the *baseline* versus scenario C. Right plot shows impact of Covid-related benefit increases, i.e. scenario C versus D. Changes in total net income and the contribution of earnings changes, CJRS subsidies and SEISS grant are omitted. Changes in income based on equivalised household net income. Other benefits include the Council Tax Reduction, Child Tax Credit, Income support, income-related Employment and Support Allowance, income-based JSA, Pension Credit, Scottish benefits (Sure Start Maternity Grant and Best Start Grant). No simulations to Statutory Sickness Pay.
Source: Own calculations using UKMOD and FRS.

Figure B.4: Impact of the crisis and policy response to Covid-19 on mean net income by decile and tax-benefit policy: **households with 2+ earners**



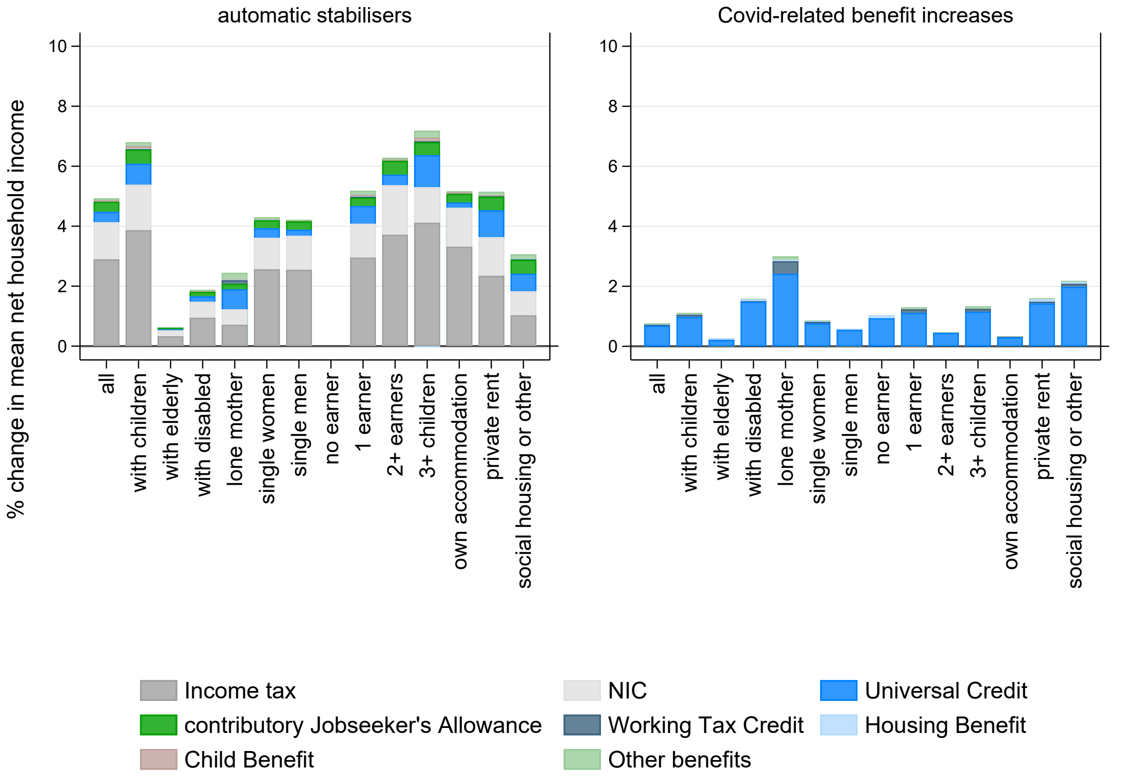
Notes: Left plot shows impact of automatic stabilisers, i.e. the *baseline* versus scenario C. Right plot shows impact of Covid-related benefit increases, i.e. scenario C versus D. Changes in total net income and the contribution of earnings changes, CJRS subsidies and SEISS grant are omitted. Changes in income based on equivalised household net income. Other benefits include the Council Tax Reduction, Child Tax Credit, Income support, income-related Employment and Support Allowance, income-based JSA, Pension Credit, Scottish benefits (Sure Start Maternity Grant and Best Start Grant). No simulations to Statutory Sickness Pay.
Source: Own calculations using UKMOD and FRS.

Figure B.5: Impact of the crisis and policy response to Covid-19 on mean net income by household type



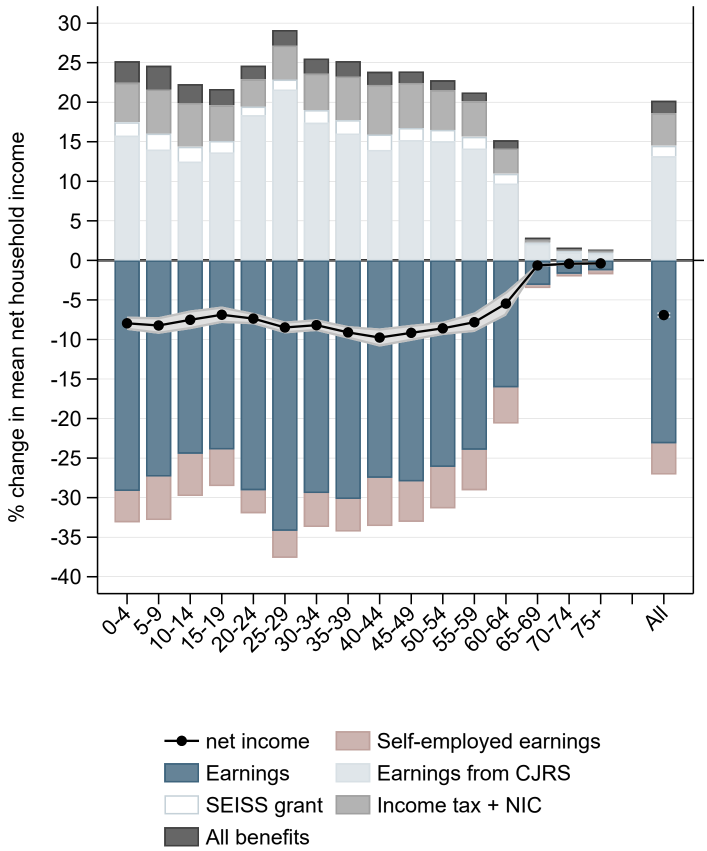
Notes: The figure shows the distributional impact of the employment and earnings shocks and the UK policy response, i.e. the *baseline* versus scenario *D*. Changes in income based on equivalised household net income. Household types for presence of earners are based on employment status before Covid-19.
Source: Own calculations using UKMOD and FRS.

Figure B.6: Impact of the crisis and policy response to Covid-19 on mean net income by household type and tax-benefit policy



Notes: Left plot shows impact of automatic stabilisers, i.e. the *baseline* versus scenario C. Right plot shows impact of Covid-related benefit increases, i.e. scenario C versus D. Changes in total net income and the contribution of earnings changes, CJRS subsidies and SEISS grant are omitted. Changes in income based on equivalised household net income. Household types for presence of earners are based on employment status before Covid-19. Other benefits include the Council Tax Reduction, Child Tax Credit, Income support, income-related Employment and Support Allowance, income-based JSA, Pension Credit, Scottish benefits (Sure Start Maternity Grant and Best Start Grant). No simulations to Statutory Sickness Pay.
Source: Own calculations using UKMOD and FRS.

Figure B.7: Impact of the crisis and policy response to Covid-19 on mean net income by age group



Notes: The figure shows the distributional impact of the employment and earnings shocks and the UK policy response, i.e. the *baseline* versus scenario *D*. Changes in income based on equivalised household net income.
Source: Own calculations using UKMOD and FRS.

C Benefit take-up

The calculations of means-tested benefits and tax credits in UKMOD account for non-take-up. Take-up rates are based on the 2017 mid-point estimates on a caseload basis by the Department for Work and Pensions and HM Revenue and Customs.[10] Households from the FRS sample are randomly selected to take-up their simulated entitlements so that the number of takers is in line with the official take-up rates. For UC, there is no evidence yet for the extent of non-take-up. However, due to the means-tested nature of the benefit, it is plausible that, like the benefits UC is replacing, UC does not reach all entitled families. A take-up rate of 87% is assumed

[10] DWP 2017/18 take-up estimates for income-related benefits available here: https://www.gov.uk/government/statistics/income-related-benefits-estimates-of-take-up-financial-year-2017-to-2018. HMRC 2017/18 take-up estimates for tax credits available here: https://www.gov.uk/government/statistics/child-benefit-child-tax-credit-ctc-and-working-tax-credit-wtc-take-up-rates-2017-to-2018

for UC (as the take-up rate estimated for the Income Support benefit for families without children). For more information on the take-up assumptions in UKMOD, see Reis and Tasseva (2020).

In scenarios C and D, we assume that families affected by the shocks do not take up UC if they were entitled to and did not take up UC prior to the shock. That is their take-up behaviour remains the same even after the change in their circumstances. In the case of affected families who become newly entitled to UC after the shock, the majority takes up UC but a small proportion of eligible families (as with Income Support) do not receive UC (e.g. due to errors in assessing their eligibility).