Briefing Note
Medium-run wealth inequality following COVID-19

COVID-19 has led to a severe economic recession. We examine its potential medium-run effects on household-level wealth inequality in the UK. We use modelling analysis to study short and long recession scenarios. In the short recession scenario, there is a significant increase in wealth inequality characterised by a combination of a decrease in wealth accumulation for economically active households with lower income, an increase in wealth accumulation for households with higher incomes, and an increase in within-group inequality. In the long recession scenario, a worsening of the income and employment effects of the recession and a slower recovery lead to particularly severe wealth losses for economically active households with lower income, giving rise to a very large increase in inequality.

Overview

To study the wealth inequality implications of the recession resulting from COVID-19, we use a model with heterogeneous households who choose wealth accumulation subject to idiosyncratic shocks to their income. We focus on households whose head is of working age, variation in labour income post-policy (i.e. net of taxes and including benefits), and on wealth accumulation in terms of net worth (i.e. net financial plus net housing wealth). We examine inequality between and within four socioeconomic groups, generated by aggregating the NS-SEC categories (see Appendix): Professional, Intermediate, Routine, and Inactive (including unemployed). Households are allocated to a socioeconomic group based on the highest category within a couple. The model is calibrated to match key properties of post-policy labour income with respect to these socioeconomic groups in the pre-COVID-19 economy, and its predictions are consistent with key patterns of wealth inequality between and within these groups prior to the recession. It predicts that, following the COVID-19 induced recession, adverse changes in income and income risk, alongside reductions in consumption resulting from restrictions on economic activity, will increase wealth inequality, predominantly via a negative effect on households in routine and intermediate groups.

Income and wealth pre-COVID-19

We summarise in Table 1 important empirical properties of inequality in household labour income (post-policy) and wealth for the period 2009-2019 (details of data provided in the Appendix). Using data from Understanding Society (UnSoc) for the UK, we summarise mean labour income (post-policy) per group, and its distribution within each group. We also use data from the Wealth and Assets Survey (WAS) to calculate similar statistics for household net worth for Great Britain. Table 1 shows that socioeconomic groups with higher mean labour income (post-policy) also have higher mean wealth and lower variation in wealth.

Table 1: Income and wealth inequality in the UK pre-COVID-19

	Income		Wealth		
Socioeconomic group	Relative mean	Gini	Relative mean	Gini	% indebted
Professional	1.58	0.24	1.91	0.60	6.7
Intermediate	1.08	0.27	1.08	0.66	14.1
Routine	0.76	0.24	0.37	0.81	31.1
Inactive	0.46	0.30	0.24	1.00	47.5
All households combined	1	0.32	1	0.71	18.9

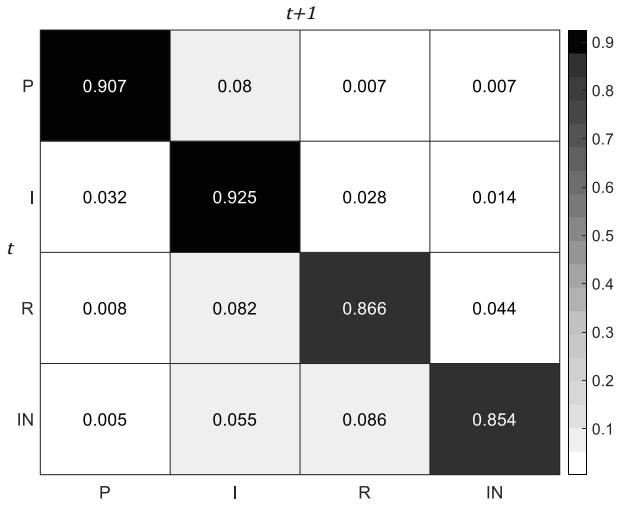
Source: Understanding Society (waves 1-9) UK, Wealth and Assets Survey (waves 1-5), Great Britain; own calculations. Income and wealth are measured at the household level. Income is labour income minus taxes plus transfers, and wealth is net worth. Means are relative to the average for all households. See Appendix for details.

Figure 1 shows the social mobility matrix, which demonstrates low rates of transition between groups. There is also persistence in households' relative income position within each group, as depicted in the more detailed transition matrix in Appendix Figure 1.[i]

Model

We employ a model in which households receive idiosyncratic shocks to their labour income so that wealth accumulation is a decision that reflects a household's experience of these shocks. This group of models, drawing on and extending the seminal contributions of Bewley (1986), Imrohoroglu (1989), Huggett (1993) and Aiyagari (1994), is the standard methodological tool to analyse wealth inequality quantitatively (e.g. Krueger *et al.* (2016) for a review, and Angelopoulos *et al.* (2019, 2020) for examples focusing on the UK).

Figure 1: Probability of changing socioeconomic group



Source: Understanding Society (waves 1-9), own calculations. P=Professional, I=Intermediate, R=Routine, IN=Inactive. Entries denote the proportion of households that remain in the same or move to another socioeconomic group from one year to the next.

In the version of the model employed here, household labour income (modelled post-policy) depends on the profession associated with household socioeconomic group, itself a stochastic process that follows the transition matrix in Figure 1, and on further group-dependent shocks. We calibrate the model so that household labour income in the pre-COVID-19 economy is determined by the stochastic process corresponding to the matrix in Appendix Figure 1. Total household income is comprised of labour income and income from assets minus debt repayments. Given the stochastic process for labour income, and the return to assets[ii], households allocate their income to consumption and savings, aiming to maximise their utility over time.[iii] The model generates a stationary[iv] distribution of wealth with properties for inequality between and within the socioeconomic groups (see Appendix Table 1) that are consistent with the patterns observed in Table 1.[v]

Recession scenarios

We obtain the dynamic path for the cross-sectional distribution of wealth, starting from the stationary equilibrium, as a result of changes due to the COVID-19 recession. These changes affect mean labour income and income risk per group, as well as the possibility for consumption.[vi] We consider two scenarios that differ in relation to the magnitude, form, and length of the changes.[vii]

In the first scenario, that of a short recession as a result of COVID-19, we incorporate the following effects compared with the pre-COVID-19 economy: (i) an increase in income risk approximated by a reduction in the job-finding rate for inactive households and an increase in the job separation rate for households in the intermediate and routine groups, reflected in the transition probability for households in these groups to the inactive group (which includes unemployed in the model), of 1.33%, in 2020, with a further reduction/increase to 3.99% in 2021[viii]; (ii) a drop in the mean level of labour income for 2020 and 2021[ix], of 3.75% for the professional group, 7.5% for the intermediate and 11.25% for routine; (iii) an upper bound in consumption, lasting for two years, reflecting restrictions in activity associated with lockdown measures and the resulting reduced possibility for consumption[x], set at the consumption of the 70th percentile of the pre-COVID-19 distribution of consumption.[xi] We further assume that post-2021, the economy will recover relatively quickly so that employment and labour income per group effectively return to their pre-COVID-19 values in three years.[xii]

In the second scenario, we consider the effects of a longer, deeper recession, which differs from the short recession scenario in two ways. First, the increase in employment risk and the reduction in mean labour income in 2021 are double those of the short recession scenario. Second, the recovery period, after 2022, lasts longer.[xiii] In particular, while job finding and separation probabilities return to the pre-COVID-19 levels in 2022, it takes longer for labour income and employment shares to return to pre-COVID-19 levels.[xiv]

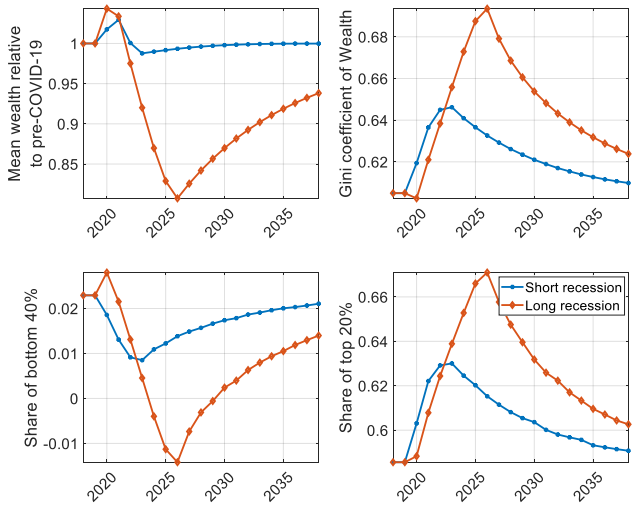
Findings: wealth inequality in the medium run

We plot in Figure 2 the time evolution of statistics describing the distribution of wealth for the whole economy, under the two recession scenarios. Regarding mean household wealth, we observe an initial increase, consistent with the increases in savings documented in empirical research for 2020 (e.g. Hacioglu *et al.* (2020) and ONS (2020)). However, this increase is short-lived, and followed by a large subsequent reduction in the long recession scenario. Comparison with Appendix Figure 2, showing results without consumption restrictions, reveals that the initial decrease is driven by the restrictions on consumption during 2020 and 2021.[xv]

Regarding wealth inequality, we observe large increases. There is an increase in the Gini index, which is substantial, even under the short recession scenario. To contextualise the scale of these increases – about 4 Gini points under the short recession and 9 points under the long recession scenario – we calculate that the Gini increased by 4.5 points following the 2008 recession (between 2007 and 2013).[xvi] Figure 2 shows that the increase in Gini is due to both a decrease in relative wealth among the lower quintiles, and an increase among

the upper quintile. The restrictions in consumption contribute to the increase in Gini in the short recession scenario (compare Figure 2 to Appendix Figure 2).

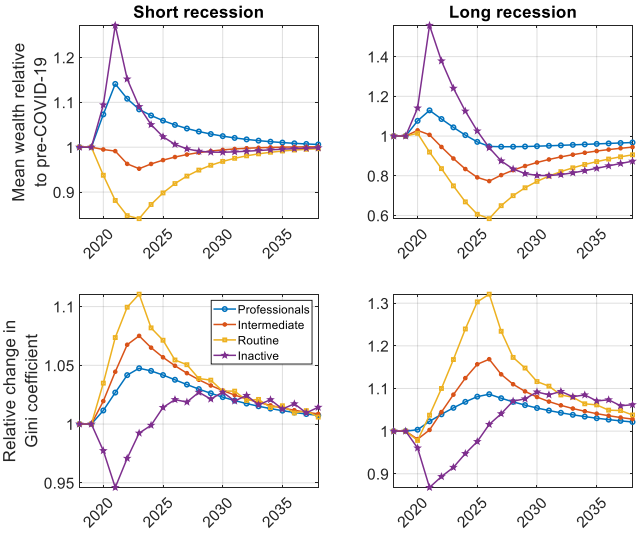
Figure 2: Model predictions for mean wealth and inequality post-COVID-19.



Note: The short recession scenario implies a drop in mean income and an increase in unemployment during 2020 and 2021, and growth in income after 2021 that takes income levels per group to pre-COVID-19 levels by 2024. The job finding rate is 50% above pre-COVID-19 levels in 2022-23. The long recession implies the same shock in 2020, but twice as large a drop in mean income and twice as large an increase in unemployment in 2021. In this scenario, incomes return to pre-COVID-19 levels by 2027. See 'Recession scenarios' in the text and the Appendix for more details.

We further show, in Figure 3, wealth inequality between and within socioeconomic groups. Focusing on the three groups of professional, intermediate and routine, we note that wealth inequality (Gini) increases within groups, reflecting the increase in risk and the reduction in mean labour income. Moreover, inequality between groups also increases, because on average the group of professional households increase their savings, and the groups that are more exposed to the shock (i.e. routine and intermediate) decrease their wealth. Under the short recession scenario, the increases in savings of the higher income group due to consumption restrictions contribute to the increase in inequality. This is confirmed by comparing Figure 3 with Appendix Figure 3, which plots the model predictions without imposing the upper bound in consumption, revealing that this is indeed driving the increase in wealth for the professional group. However, under the long recession scenario, the increase in between-group wealth inequality is driven by a reduction of average wealth for households in the intermediate and routine groups. Indeed, as Appendix Figure 3 confirms, the effect of the lockdown-induced restrictions on consumption on inequality is quantitatively smaller in this case.

Figure 3: Model predictions for wealth inequality post-COVID-19, between and within socioeconomic groups.



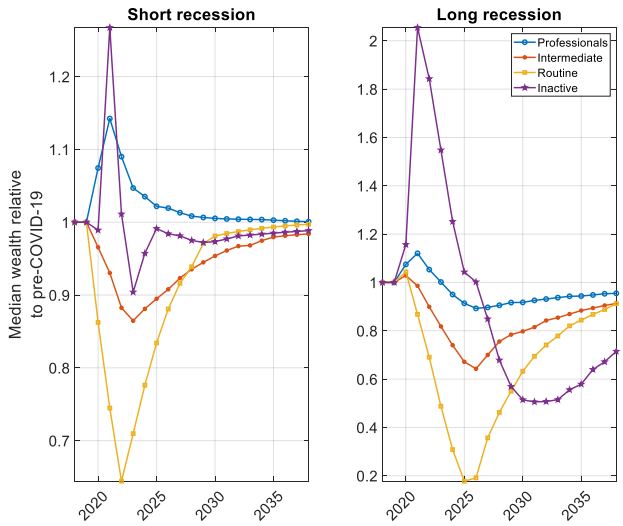
Note: See notes in Figure 2

For the intermediate and routine groups, the drop in mean wealth, combined with the increase in within-group inequality, imply significant wealth losses for a large proportion of households in these groups. To illustrate this, we first plot in Figure 4 the change in wealth for the median household in each group, relative to pre-COVID-19, and find substantial reductions, which are dramatic under the long recession. To show effects on the left tail of the wealth distribution, we also plot the proportion of households with negative assets (see Figure 5), demonstrating a substantial increase in the share of households without positive wealth.

Regarding the inactive group, we observe an increase in mean wealth, and a reduction in wealth inequality. This reflects a combination of assuming that there will be no reduction in the (non-market) income for this group, and of the positive wealth effects coming from those who join this group from the remaining groups, as they become unemployed due to the recession.

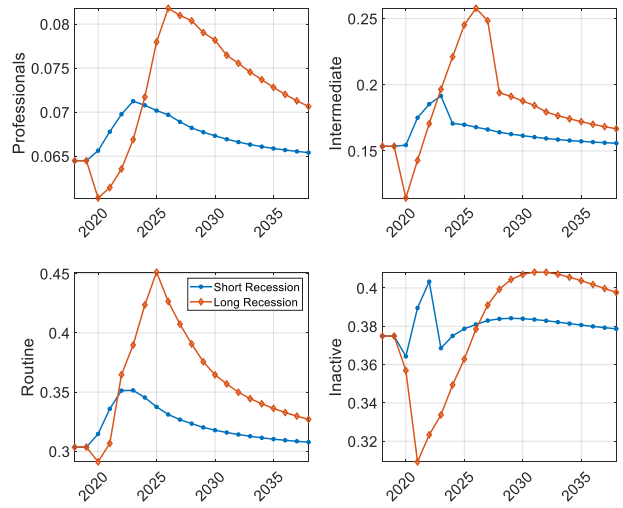
To demonstrate the changes excluding those who would have entered from other groups, we show in Appendix Figure 4 the effects for the inactive group relative to a counterfactual where the statistics are calculated using the population shares pre-COVID-19.[xvii] The positive effects are absent, demonstrating that there is limited change for households in this group when the better initial conditions of the new unemployed are eliminated.[xviii]

Figure 4: Model predictions for relative median wealth by socioeconomic group post-COVID-19.



Note: See notes in Figure 2

Figure 5: Model predictions for share of indebted households post-COVID-19 by socioeconomic group.



Note: Share of households in each group that have zero or below zero wealth. For further information, see note, Figure 2.

Discussion

Overall, we find large increases in wealth inequality, with substantial reductions in wealth for households in the intermediate and routine groups. Even in the short recession scenario, overall, the impact on the Gini for the whole population is of the same order of magnitude as after the 2008 recession. The short recession scenario, both in terms of magnitude of effects and duration, is likely to be optimistic, because the estimates we used to calibrate the changes were obtained prior to the deterioration at the end of 2020. Thus, the rise in wealth inequality predicted under this short recession scenario is probably conservative. Nonetheless, there are also factors that could prevent a large increase in inequality, including very strong income growth or redistributive policy in the next few years. Indeed, to fully account for changes in inequality following the recession, we need to add to the recessionary effects included in this analysis the effects of the expected rise in taxation. A rise in tax revenue is expected to be required to finance the government deficits, resulting in reductions in household income that can have important inequality implications, depending on the policy chosen. More generally, the magnitude, form and duration of effects in the medium run depend on conditions that are amenable to economic policy. The large wealth inequality effects we find here highlight the need to examine the distributional effects of policy in terms of wealth and income inequality, especially given their links with health inequality that has already worsened as a result of the pandemic and the societal response to contain it (Marmot *et al.* 2020).

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Disclaimer: Views expressed here are those of the authors.

Appendix

I. Data

Understanding Society

Understanding Society (ISER, 2020) is a large longitudinal survey which follows approximately 40,000 households (at Wave 1) in the UK. The survey covers a wide range of social, economic and behavioural factors making it relevant to a wide range of researchers and policymakers. Data collection for each wave takes place over a 24-month period and the first wave occurred between January 2009 and January 2011. Note that the periods of waves overlap, but the individual respondents are interviewed around the same time each year.

From each household, we retain the head of the household, and their partner (married or otherwise) if applicable. We drop all households where the household head is not of working age (25 to 60); the head is in full-time education such as university, apprenticeships or government training; those who are working unpaid in a family businesses; and households with missing or inconsistent information in key variables.

Household labour income post-policy is defined as net labour income (after taxes) plus miscellaneous income, and private and social benefit income. Monthly values are transformed into yearly figures. To obtain household-level income, we sum over the household head and their spouse.

In assigning a social group to a household we choose the highest social group between the household head and their spouse. Our social group variable is derived from the NS-SEC 8-digit classification. We group "Large Employers and higher Management" (NS-SEC-8 I) together with "Higher Professionals" (NS-SEC-8 II) to form our group of "Professionals". Then we group "Lower management & Professional" (NS-SEC III), "Intermediate" (NS-SEC IV) and "Small employers & own account workers" (NS-SEC V) into our group of "Intermediate". "Lower supervisory & technical occupations" (NS-SEC VI), "Semi-routine" (NS-SEC VII) and "Routine Occupations" (NS-SEC VIII) form our group of "Routine". Finally, we group households where neither head nor spouse has active labour market attachment into the group of "Inactive".

Wealth and Assets Survey

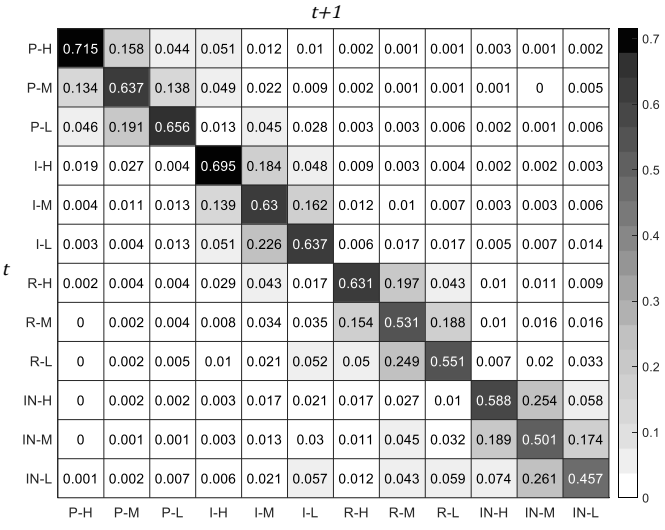
The Wealth and Assets Survey (ONS, 2018) is a longitudinal survey for Great Britain reporting information on asset ownership, savings and debt, over five waves between 2006 and 2016. We follow similar steps as in the sample selection for Understanding Society. We calculate household level net worth as the sum of net financial wealth plus net housing wealth. Net financial wealth is the total of financial assets minus total insecure debt or nonmortgage borrowing, while net housing wealth is the value of all property wealth minus the value of property debt.

II. Additional results

Appendix Table 1: Model predictions, income and wealth inequality pre-COVID-19.

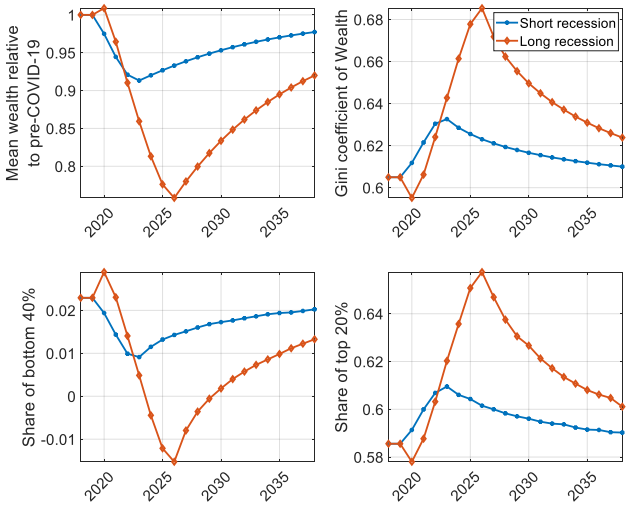
	Income		Wealth		
Socioeconomic group	Relative mean	Gini	Relative mean	Gini	% indebted
Professional	1.49	0.19	1.92	0.44	6.5
Intermediate	1.04	0.21	1.01	0.54	15.4
Routine	0.72	0.19	0.45	0.71	30.4
Inactive	0.48	0.22	0.29	0.87	37.5
All households combined	1	0.27	1	0.61	19.0

Appendix Figure 1: Social mobility matrix, socioeconomic groups and earnings subgroups.



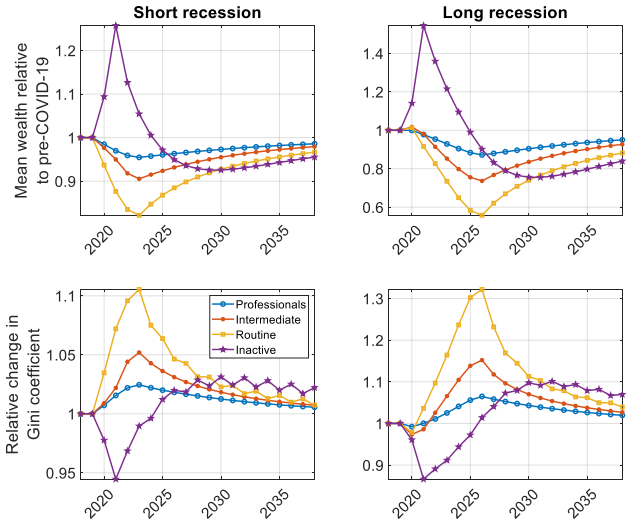
Note: Source: UnSoc (wave 1-9), own calculations. P=Professional, I=Intermediate, R=Routine, IN=Inactive, H-High, M=Medium, L=Low.

Appendix Figure 2: Model predictions for mean wealth and inequality post-COVID-19 without the restriction on consumption.



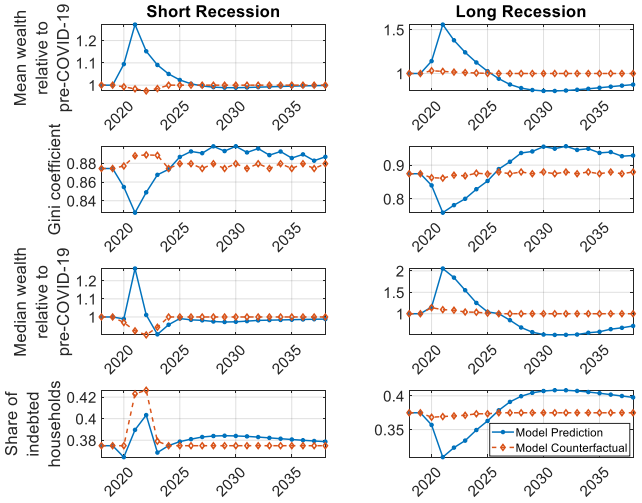
Note: See note, Figure 2.

Appendix Figure 3: Model predictions for mean wealth and inequality post-COVID-19 by socioeconomic group, without restriction on consumption.



Note: See note, Figure 2.

Appendix Figure 4: Counterfactual evaluation of wealth post-COVID-19 for the group of economically inactive.



Note: Model prediction denotes the evolution of mean wealth for the group of inactive as predicted by the model (see e.g. Figure 2 in the main text). In the counterfactual, the group level distribution is held constant in its pre-COVID-19 state, thereby removing the effect of changes in the composition of the group of inactive households and thereby neutralizing the effect of an increase of households with high wealth joining the group after the shock. For further information, see note, Figure 2.

References

Aiyagari, S.R., 1994. Uninsured idiosyncratic risk and aggregate saving. *The Quarterly Journal of Economics*, *109*, pp.659-684.

Angelopoulos, K., Lazarakis, S. and J. Malley (2020). The distributional implications of asymmetric income dynamics. *European Economic Review*, *128*, p.103502.

Angelopoulos, K., Lazarakis, S. and J. Malley (2019). Peer pressure and wealth inequality, *Working Paper No. 7838*, CESifo Group Munich.

Bank of England (2020): How has COVID affected household savings, https://www.bankofengland.co.uk/bank-overground/2020/how-has-covid-affected-household-savings

Bénassy, J.P., (2005). *The macroeconomics of imperfect competition and nonclearing markets: a dynamic general equilibrium approach*. MIT press.

Bewley, T., (1986). Stationary monetary equilibrium with a continuum of independently fluctuating consumers. *Contributions to mathematical economics in honor of Gérard Debreu*, *79*.

Boppart, T., Krusell, P. and K. Mitman (2018). Exploiting MIT shocks in heterogeneous-agent economies: the impulse response as a numerical derivative. *Journal of Economic Dynamics and Control*, *89*, pp.68-92.

Coulter, S., (2016). The UK labour market and the 'great recession', in Myant, M., Theodoropoulou, S, and Piasna, A., (eds.) Unemployment, Internal Devaluation and Labour Market Deregulation in Europe. European Trade Union Institute, Brussels, Belgium.

Faccini, R., Millard, S., and F. Zanetti (2013). Wage rigidities in an estimated dynamic, stochastic, general equilibrium model of the UK labour market, *The Manchester School,* 81, 66-99.

Hacioglu, S., Känzig, D. and P. Surico (2020). The distributional impact of the pandemic, *World Inequality Lab Working Papers*, halshs-03028702, HAL.

Huggett, M., (1997). The one-sector growth model with idiosyncratic shocks: Steady states and dynamics. *Journal of monetary economics*, *39*, pp.385-403.

Huggett, M., (1993). The risk-free rate in heterogeneous-agent incomplete-insurance economies. *Journal of economic Dynamics and Control*, *17*(5-6), pp.953-969.

Imrohoroğlu, A., (1989). Cost of business cycles with indivisibilities and liquidity constraints. *Journal of Political economy*, *97*(6), pp.1364-1383.

Institute for Social and Economic Research (2020). Understanding Society: Waves 1-10, 2009-2019 and Harmonised BHPS: Waves 1-18, 1991-2009, 13th Edition, UK Data Service. SN: 6614.

Jordà, Ò., Singh, S. R., and A. M. Taylor (2020). Longer-run economic consequences of pandemics, *National Bureau of Economic Research*, No. w26934.

Krueger, D., Mitman, K. and F. Perri (2016). Macroeconomics and household heterogeneity. In *Handbook of Macroeconomics* (Vol. 2, pp. 843-921). Elsevier.

Krueger, D., Mitman, K., and F. Perri (2016). On the distribution of the welfare losses of large recessions, *National Bureau of Economic Research*, No. w22458.

Marmot, M., Allen, J., Goldblatt, P., Herd, E., and J. Morrison (2020). Build Back Fairer: *The COVID-19 Marmot Review. The Pandemic, Socioeconomic and Health Inequalities in England.* London: Institute of Health Equity.

Nabarro B., (2020). UK economic outlook: the long road to recovery, chapter 2 in *IFS Green Budget 2020*, Institute for Fiscal Studies.

OBR (2020). *Economic and Fiscal Outlook*, Office for Budget Responsibility, November 2020.

Office for National Statistics (2018). Wealth and Assets Survey, Waves 1-5, 2006-2016. 6th Edition. UK Data Service. SN: 7215

Endnotes

[i] To approximate within group earnings risk, we work as follows. We first purge several observable characteristics from household-level labour income post-policy, by running a Mincerian regression of a set of demographic variables on the natural logarithm of income. Our regression specification includes the sex of the head of the household, a social group dummy, a third order polynomial of age, an indicator of the regional location of the household, and the natural logarithm of household size. We obtain the residuals and re-centre them around the group specific mean. We then split each social group into 3 subgroups along the 30th and 70th income percentile. Using these 3 sub-categories, together with the 4 socioeconomic groups, we obtain the 12-by-12 transition matrix, as well as the group-earnings state specific income levels.

ii The interest rate is set exogenously and maintained fixed in our analysis, at the very low pre-COVID-19 value of 0.56%, reflecting empirical evidence that interest rates have remained very low following pandemics (see e.g. Jordà *et al.* (2020)). As an ad-hoc risk premium, we double the interest rate, payable by households, who are in debt.

[iii] The objective function of the households is given by the discounted present value of the stream of utilities from consumption over time.

[iv] We choose the following functional form for the utility function: $u(c) = \frac{c^{1-\sigma}}{1-\sigma}$ with $\sigma = 1.5$. The model is calibrated at an annual frequency and hence the discount factor β is set to 0.96, which is in the range of common values for the UK (see e.g. Faccini *et al.* 2013). We set the borrowing limit to match the share of households with zero wealth from the WAS (19%) in the stationary equilibrium. We solve the household's problem with Value Function Iteration, on a grid with 500 points with more points close to the borrowing limit, using a 7th order polynomial approximation of the value function. Using a piecewise polynomial approximation method instead, gives qualitatively similar results at the cost of higher computation time. Due to the nonlinearities introduced by the consumption ceiling during the lockdown and the differential interest rate of borrowing, we do not rely on Euler based solution methods.

[v] Overall, the model under-predicts wealth inequality by an amount that is in line with the existing studies (see e.g. Krueger *et al.* (2016), and, for the UK, Angelopoulos *et al.* (2019, 2020)), because it misses quantitatively the extent of wealth inequality resulting from the upper tail, especially at the top 1% and 5% of wealth. We do not focus on the right tail, i.e. the super wealthy, in this analysis, but instead on income inequality along the remaining distribution, and on comparisons between social groups. The model is also good at capturing the variation in indebtedness between the socioeconomic groups, which is a useful measure of the left tail of the wealth distribution. Although we have calibrated the model to match the overall share of the households in debt (19%), the predictions of the model with respect to this proportion in each groups are free, and can be seen in Appendix Table 1. The stationary equilibrium predictions cohere with the between group variation we see in the data.

[vi] See e.g. Huggett (1997) and Boppart *et al.* 2018 on computational methods to obtain such dynamic paths.

[vii] In each of these cases, the households are given, in the period of the shock, i.e. in 2020, the time paths for the aggregate quantities, i.e. for the interest rate, group-level mean disposable income, and for the transition matrix. However, although they know the aggregate environment, they are uncertain about their own future disposable income, as this is subject to the idiosyncratic shocks that are determined by the conditional probabilities encoded in the transition matrix.

[viii] This is motivated by the analysis in Nabarro (2020) that estimates unemployment to be around 8% in early 2021, which implies an approximate doubling from the pre-crisis state. Since approximately 30% of inactive households are unemployed, we calibrate the transition matrices to match the 30% increase by year two, while assuming that 1/3 of this increase happens in the first year of the crisis. We exclude the professional group from the increased unemployment risk, since many of the typical occupations among this group are unlikely to be very affected by the crisis (for example, they can more easily work remotely).

[ix] The reduction in disposable income is based on data presented in Marmot (2020) Figure 5.12. The analysis therein suggests that real median household earnings have fallen around 15% for households in the lowest household income quintile, and about 5% for all other quintiles, between January and May 2020. Our estimates for the income reductions are thereby based on half-year figures. Assuming a partial recovery over the second half of 2020, we benchmark our labour income drops on ¾ of the drops described in Marmot (2020). This is likely an optimistic approach, as the worsening of conditions in the winter months of 2020 showed. The conservative estimate of income loss in effect implies that our results likely provide a lower bound on increase in wealth inequality (see also Discussion). Focusing only on those households with labour market attachment, we assign a 11.25% mean disposable income drop

to the group of Routine households, as they are most likely to be represented by the bottom quintile of working households. For the Professional group, we base a 3.75% reduction on the 5% reported drop. Since the group of Intermediate includes a number of small business owners, who are likely to have suffered during the COVID-19 restrictions, we locate them halfway between the other two groups (drop of 7.5%). The true income loss is likely to be higher, especially for self-employed, but also for salaried workers who may face decreased promotion prospects or bonuses.

[x] A significant reduction in consumption, implying an increase in savings, especially for the higher income groups due to lockdown measures has been observed in the data (see e.g. Hacioglu *et al.* (2020)). The upper bound in our analysis is motivated by evidence in Bank of England (2020) showing that roughly 30% of the households have reduced their consumption relative to pre-COVID-19.

[xi] See also e.g. Benassy (2005) for models with restrictions in consumption. Note that in the Appendix we show the model predictions without the upper bound in consumption.

[xii] The short recession scenario presupposes that growth starts at the beginning of year 3 (2022) after the shock and is linear ("V-shaped"), so that 1/3 of the distance between net earnings at the trough in year 2 (2021) and the full recovery is covered in each year 3 and 4 and full recovery is achieved in year 5 (2024). Additionally, the job finding rate is increased by 50% relative to its baseline value in years 3 & 4. See e.g. OBR (2020, chart 1.5) for estimates of a recovery of the economy by 2024-2025.

[xiii] Krueger *et al.* (2016) calculate a length of five years for a typical large recession in the US (see also Coulter (2016) for a treatment of the 2008 recession in the UK).

[xiv] The long recession scenario, supposes a slower ("U-shaped") recovery where disposable incomes after year 2 evolve according to the following dynamic equation: $y_{8\geq t>2} = y_2 + 0.5^{8-t} * (\bar{y}_0 - y_2)$ Accordingly, all earnings reach their pre COVID-19 values by year 8 after the shock (2027).

[xv] Some of the increase in mean wealth in Figure 2 reflects precautionary incentives, since households anticipate after 2020 the worsening of economic conditions in 2021, before the recovery starts. However, as Figure 2 in the Appendix shows, the impact of lockdown effects via consumption is predominant, and precautionary effects on their own only increase mean wealth under the long recession scenario, and by a small proportion. Similar precautionary behaviour is seen also in the analysis of savings by group under the long recession.

[xvi] The increase in Gini between 2007 and 2013 is based on the WAS data.

[xvii] In particular, we use the conditional distribution function for Inactive in the stationary equilibrium, which reflects the pre-COVID-19 proportions of households in each wealth outcome, and the policy functions for the inactive households post-COVID-19.

[xviii] The very small changes observed reflect the change in risk associated with the change in the job finding probability and the decreased returns associated with finding a job (due to the reduction in labour income for other groups).