COVID-19 IMPACTS ON DESTITUTION IN THE UK

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We use microsimulation combined with a model of the COVID-19 impacts on individuals and households to obtain projections of households in destitution in the United Kingdom. The projections are estimated at two levels: aggregate quarterly for the UK, for all quarters of 2020; and annual for 2020 differentiated by region, sector and household demographics. At the aggregate level, destitution is projected to be about three times higher than the non-COVID counterfactual level in 2020Q2, as well as substantially higher than the non-COVID case for the remainder of the year. This increased destitution is initially largely due to the effect on the self-employed, and as the Furlough scheme is drawn down, also on the unemployed. Impacts upon different regions and sectors vary widely, and so do variations across different household types. The sectors particularly affected are construction and manufacturing, while London and its closely connected regions (South East and the Midlands) are most severely affected. Single adult households suffer the most, and the adverse effects increase with number of children in the household. That the effects upon youth remain high is a particularly worrying sign, and very high increases in destitution are also projected for 25–54 year olds and the elderly (75 years and older). Further, severe adverse effects are projected for sections of society and the economy where multiple impacts are coincident. Robust and sustained mitigation measures are therefore required.

Keywords: COVID-19 crisis, destitution, unemployment, self-employed, regions, sectors.

JEL codes: E24; I32; C553; J82; L00; R11.

1. Introduction

The COVID-19 crisis is a classic example of an unforeseen shock that is now expected to cause a deep recession, the adverse consequences of which are only beginning to be felt in the UK's economy and society. With businesses closing down and thousands of people losing their jobs, once the Coronavirus Job Retention (Furlough) Scheme ends in October, the economy will suffer greater consequences than back in 2008 during the Global Financial Crisis. Different regions, sectors, and socio-economic groups are affected to varying extents (Rincón-Aznar *et al*., 2020). Moreover, the impacts will likely be exacerbated by the impending effects of Brexit.

Against this backdrop, this article aims to look at the issue of destitution among different groups in the economy and the projected increase in the number of people living below the living wage threshold due to the COVID-19 crisis. Following the Joseph Rowntree Foundation benchmarks, we take this threshold as the destitution level of income (Fitzpatrick *et al*., 2018). Here, 'destitution' is defined as income that is so low that a household is likely to lack essential provision of shelter, food, heating, lighting, clothing/footwear and basic toiletries in the immediate future.[1] We start with a broader picture of where the economy is and where it is likely going in the next few quarters. We then turn to more detailed analysis of destitution, both at an aggregate level and various cross-sectional effects of COVID-19.

The NIESR *Review* of May 2020 (NIESR, 2020) published a likely scenario of COVID-19 impact, where real GDP declined by 6.5 per cent and 16.5 per cent in 2020Q1 and 2020Q2, respectively, relative to the corresponding levels in 2019. Further large falls in GDP are projected until the end of this year. The contraction of the economy in turn leads to substantial increases in the unemployment rate, where it is expected to reach

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DOI: 10.1017/nie.2020.31

above 10 per cent by the end of the year. By comparison, the highest unemployment rate during the Global Financial Crisis was 8.5 per cent. However, we need to be very cautious when drawing upon experiences from previous recessions. Unlike the recession in 2008, this time the economy is hit not through credit market shock, but rather through production stoppages that potentially affect lower paid sectors and poorer regions more adversely. Through decreasing income, even those in jobs and the self-employed may suffer. Therefore, it is important to collect evidence on rising destitution and to help support targeted policies. This is the central object of this article.

2. Methodology and modelling assumptions

In order to quantify the consequences of COVID-19 on the levels of destitution, we need a benchmark level of earnings below which we consider a person (or household) as destitute. As discussed above, we define 'destitution' following Fitzpatrick *et al*. (2018) and the corresponding Joseph Rowntree Foundation benchmark. Specifically, we consider a single person household as having less than enough provision for food and basic necessities when their income falls below £70 per week. Any additional adult requires another £30 per week and an additional child needs £20 per week.

Aggregate projections at the UK level

We begin with macroeconomic (aggregate) projections where our index individual is a person aged 16 or above, and since we cannot distinguish between household types for this part of the analysis, the benchmark destitution income level is £3,640 per annum. Then, it is assumed that the COVID-19 impact on food banks arises from three sources: (a) people losing their livelihood (via unemployment), where this impact is moderated by the government's Furlough scheme; (b) those employed in jobs suffering reduced hours (and income) and thereby pushed into food poverty; and (c) self-employed workers moved to food poverty either because of income loss or because their businesses are not covered sufficiently by the government's small business schemes. More explicit modelling of households based on social, demographic heterogeneities by a microsimulation exercise is discussed later.

We start from the likely scenario of quarterly growth published in NIESR (2020) to obtain projections of destitution in the UK, quarterly, from 2020Q1 to 2021Q1. This is done by taking estimates from the NiGEM (National Institute Global Econometric Model) (NIESR, 2018) model projections from the May 2020 Review (NIESR, 2020) and comparing these against the non-COVID counterfactual based on projections from February 2020. In doing so, we make some departures from the NiGEM output to model the government's Furlough scheme.

First, we project quarterly output based on the NIESR likely scenario, that is, fall in real output by 6.5 per cent in 2020Q1, followed by further GDP declines in the subsequent three quarters (16.5 per cent, 14.0 per cent, and 12.0 per cent for 2020Q2, 2020Q3 and 2020Q4, respectively), before starting to recover with a growth of 1.9 per cent in 2021Q1. Next, for 2020Q2 and 2020Q3, we retain productivity projections as obtained from NiGEM, but account for the Furlough scheme by keeping employment at the non-COVID counterfactual level. Then, earnings (at 2016 prices) are backed out by assuming 80 per cent is paid at the non-COVID wages (by the government) and the remaining 20 per cent at the wage rate corresponding to the productivity levels.

Second, in order to model different impacts upon unemployed persons, those in jobs and self-employed, we obtained a decomposition of self-employed workers within the employed population; see also Bell and Blanchflower (2020). Wage losses are expected to have different effects on employees and self-employed workers as the latter group usually earn lower wages and is therefore more susceptible to income shocks pushing them into food poverty. In addition, some self-employed workers may not receive small business support from the government either because they pay lower taxes relative to their incomes, or they largely pay themselves in dividends. We assume that there will be less job creation in the organised sector; hence, some people made jobless may become self-employed. We place this projection at the period of worst job creation in recent times, which was December 2009 during the Global Financial Crisis.[2] Self-employment rates were historically the highest in 2019Q4 at 15.3 per cent of the employed population and, under our projection, this rate increases to 20.3 per cent by 2020Q3 and then falls slowly.

Finally, we compute projections of destitution separately by composition of the labour force. For the unemployed, we use a time-series model relating growth in Trussell Trust food bank use[3] (Trussell Trust, 2020) to unemployment rates and changes in wages. For employed persons, we draw upon Round 6 of the UK Wealth and Assets Survey (WAS6) (2019), a representative sample for individuals from all regions of the UK except Northern Ireland. We project earnings by the fall in wages (as computed

https://doi.org/10.1017/nie.2020.31 Published online by Cambridge University Press

above) and then compute the proportion of 16 and over population whose earnings would then fall below the destitution threshold. For the self-employed, we also include workers who do not make a tax return (in WAS6, either pay very low taxes or pay themselves largely from dividends).

Cross-sectional impacts using microsimulation

In this section, we outline how we develop cross-sectional analysis of the COVID-19 crisis on UK households in 2020, based on the output of a microsimulation exercise using the Lifetime INcome Distributional Analysis (LINDA) model (NIESR, 2016; van de Ven, 2017). LINDA takes as its base the nationally representative UK Wealth and Assets Survey Round 6 (WAS6) data for 2017, together with our modelling of the effects of the COVID-19 crisis on destitution levels in 2020. WAS6 does not cover Northern Ireland, hence we add to the sample a pseudo-sample representative of the region, accounting for differences in age distribution and drawing from a truncated WAS6 sample that accounts for differences in household earnings.[4]

The LINDA microsimulation model takes the above sample of individuals and, in each following year, until their eventual death at some random point in the future, applies to each individual: (a) random outcomes of education, household formation and dissolution, fertility, migration and mortality according to a pre-specified menu of rates and transition probabilities; and (b) dynamic optimisation decisions on savings/consumption and work/leisure according to a well-specified micro-founded economic model. Then, this generates simulated panel data on a pseudo-population representative of the UK population for each year from 2017 onwards. We consider this simulated population for 2020 as our non-COVID counterfactual (*base*) population.

Following previous work on LINDA, one would then apply mortality rates, unemployment rates and wage declines for the year 2020 and run the model again to generate a COVID-19 pseudo-population for 2020 (*covid*), and finally proceed to comparison between the two populations.[5] We develop an alternate approach. In this alternative, we started from the LINDA pseudo-population for 2017. In terms of distribution by regions and household composition (number of adults and number of children), this matched the initial WAS6 data quite accurately. Then, we created a 1–1 mapping between the two by matching households, within each region and household composition cohort, by quantiles of wealth within the same cohort. This household matching exercise allowed us to track each household (and its constituent individuals) through time to 2020. We applied our COVID-19 modelling to this pseudo-population for 2020 to obtain a *covid* population for comparison.

To model the economy under the effects of COVID-19, we consider three main effects over the specific year under analysis, that is 2020. The most obvious one is the *mortality rate*, which we take from the official ONS statistics for March-April 2020 in England and Wales (ONS 2020; Miles *et al*., 2020, this issue) and make adjustments to reflect additional months and differential effects for Scotland and Northern Ireland. The mortality rates differ by age groups, with greatest impact on the population of elderly people. The second parameter that we model in order to reflect the impact of the COVID-19 crisis is *unemployment rate*, which is expected to increase rapidly to over 10 per cent by the end of the year (NIESR, 2020) as the extended Furlough scheme is drawn down, with larger effects especially on young people and older workers, and varying effects across different sectors. Finally, we model the change in *household income* due to fall in wages, unemployment, and businesses closing down temporarily or even permanently, taking into account Furlough scheme and support for self-employed workers. We model income change by sector explicitly, considering direct and indirect effects (Lenoël and Young, 2020). Implied growth rates and unemployment rates are computed by sector, and corresponding wage declines are computed using the macroeconomic approach as outlined above.

Given the nature of the underlying data, the results are reported at an annual frequency, specifically for the year 2020. We then contrast the base period for WAS6, the year 2017, against the year 2020, with and without the COVID-19 crisis. In order to analyse the impacts that the crisis brought to households' well-being, we first look at the change in destitution from 2017 to 2020 assuming there were no crisis and then introduce the COVID-19 scenario to compare the base levels with the COVID-19 crisis.

3. Quarterly projections at the aggregate UK macroeconomic level

Following quarterly projections of the likely economic growth from NIESR (2020) and the insights about working age population from the Wealth and Assets Survey (WAS6), we estimate the likely increase in destitution levels in the economy. Table 1 summarises the results.

https://doi.org/10.1017/nie.2020.31 Published online by Cambridge University Press

The central takeaway here is the very large increase in destitution continuing over the year 2020 and beyond. Half of the increase in 2020Q1 and two-thirds in 2020Q2 arise from self-employed workers, and the importance of this channel drops thereafter as the lockdown eases. Further, increased destitution through the unemployment channel gains prominence in 2020Q2 even if the Furlough scheme is under operation. As the Furlough scheme ends in 2020Q4, unemployment is pushed up and this remains the predominant channel through 2021Q1. There will be loss of many lives and the joblessness of those who survive will have long-term consequences (Fasih *et al*., 2020; Miles *et al*., 2020). Long-term unemployment leads to lower levels of human capital, lower earnings in the future, increases in income inequality and poverty levels. Policies to mitigate against these adverse impacts are the order of the day.

4. Cross-sectional effects of COVID-19 on destitution

With these insights from the aggregate view in place, we now proceed to a microsimulation analysis by region, sector and household types. Results of our analysis show that across all regions and sectors, the UK is facing a 250.4 per cent increase in destitution levels in 2020 in comparison to 2017, which is 133.4 per cent higher than would have been in case if there had been no COVID-19 crisis. In order to target the most vulnerable parts of the economy, we need to explore further which areas are affected the most. In this section, we provide projections at the sectoral and regional levels in the UK, taking into account explicitly heterogeneity in the conditions facing different households, in terms of their demographic composition.

Table 1. Projections of the increase in destitution levels in the UK (working age population, 16+)

	Channels of impact upon destitution			Total number of adults (% above non-COVID)	Destitution increase, per cent of working-age population
	Unemployed	Lower income in jobs	Self-employed		
2020Q1	582,830	44,502	44,219	671,551 (117.3%)	0.19%
2020Q2	585,355	41,675	269,753	896,784 (194.3%)	0.81%
2020Q3	696,423	40,393	108,296	845,111 (166.1%)	0.63%
2020Q4	956,534	34,405	83,854	1,074,794 (165.6%)	0.79%
2021Q1	1,139,189	39,963	38,662	1,217,813 (142.0%)	0.67%

Source: Own calculations based on NiGEM output from May 2020, and our COVID model.

Table 2. Distribution of destitution by region (adults, 18+)

	Non-COVID destitution		Non-COVID change 2017–20	COVID destitution 2020	COVID change 2017–20	Relative to Non-COVID 2020
	2017	2020				
North East	19,589	67,812	246.2%	162,891	731.6%	140.2%
North West	176,614	233,537	32.2%	477,783	170.5%	104.6%
Yorkshire & Humber	92,699	187,823	102.6%	413,392	346.0%	120.1%
East Midlands	47,960	89,702	87.0%	294,066	513.2%	227.8%
West Midlands	95,672	134,431	40.5%	405,732	324.1%	201.8%
East of England	180,056	169,393	–5.9%	395,679	119.8%	133.6%
London	148,945	335,625	125.3%	844,378	466.9%	151.6%
South East	203,045	189,088	–6.9%	534,513	163.2%	182.7%
South West	89,863	168,219	87.2%	415,786	362.7%	147.2%
Wales	125,199	160,901	28.5%	272,044	117.3%	69.1%
Scotland	129,783	183,035	41.0%	379,521	192.4%	107.3%
N. Ireland	55,063	128,829	134.0%	185,871	237.6%	44.3%
Total	1,364,488	2,048,395	50.1%	4,781,658	250.4%	133.4%

Source: Microsimulation (LINDA) modelling based on 2017 nationally representative WAS6 data, and our COVID model.

https://doi.org/10.1017/nie.2020.31 Published online by Cambridge University Press

Regional impacts

Table 2 presents the change in destitution levels for different UK regions. London and its economically (and spatially) connected regions are the most affected. The highest increase is observed in the Midlands (East and West) with over 200 per cent difference in destitution levels from what they would have been had the crisis not happened. This result closely relates to sectoral effects as the hardest hit sectors are construction and manufacturing, and employment in these sectors in East and West Midlands was as high as 17 per cent of the entire regional employment (House of Commons, 2019).

The smallest difference between non-COVID and COVID situations is observed in Wales and Northern Ireland. However, destitution in Wales, as reflected in the WAS6 data, was already high in 2017 in comparison to most other regions. Beyond sectoral composition, the differences in destitution can also be related to variation in household composition, age profile and different incomes (poorer regions have higher destitution levels). Another region that is highly impacted by the COVID-19 crisis is the South East, with 182.7 per cent higher destitution in comparison to the non-COVID situation; this region has a high employment rate in public sector and trading and is also affected by its connections to London, the epicentre of the crisis.

Spatial dependence is not explicitly modelled in our COVID-19 analysis, and neither are interdependent agents and externalities.[6] Remarkably, it arises out of regional and sectoral patterns inherent in the WAS6 data. In fact, a statistical test (Bhattacharjee and Jensen-Butler, 2013; Angulo *et al.*, 2018) fails to reject the hypothesis that spatial dependence in destitution incidence arises from a hot-spot epidemic diffusion weights matrix centred on London, with decreasing influence as one goes further away from the centre. This highlights an important feature of our microsimulation approach.

Impacts by household composition

Table 3 presents the distribution of destitution among different types of households in terms of composition (numbers of adults and children). As expected, single adult households (about one third of the population) are more likely to face a higher increase in destitution levels. There is also a higher increase in poverty among those with children, where the numbers are increasing with the number of children in the household. Then, the most significant increase is among single adults with two or more children. Beyond single parents and couples with up to two children, there are 'other' household types either with more than two children or children with foster carers; they face 304.8 per cent higher destitution, but the number of such households is lower. This provides important evidence for benefit systems and targeted welfare.

Sectoral impacts

As is evident in regional patterns, a significant proportion of the COVID-19 effects can be explained by regionally differing composition of economic activity in terms of sectors. The biggest impacts of COVID-19 relative to a counterfactual situation without the crisis are observed on the construction and manufacturing sectors (table 4), both heavily affected by the lockdown, with 567.8 per cent and 279.4 per cent differences between destitution levels with and without the COVID-19 crisis, respectively. This is followed by mining, which is spatially located within long-run marginalised localities and communities.

Table 3. Distribution of destitution by household composition

	Non-COVID destitution		Non-COVID change	COVID destitution	COVID change	Relative to Non-COVID
	2017	2020	2017–20	2020	2017–20	2020
Single adult						
no children	622,414	749,848	20.5%	1,396,485	124.4%	86.2%
1 child	207,471	682,181	228.8%	1,918,432	824.7%	181.2%
2 children	140,989	519,970	268.8%	1,882,885	1235.5%	262.1%
Couple						
no children	767,010	799,877	4.3%	1,255,975	63.7%	57.0%
1 child	256,069	295,458	15.4%	591,148	130.9%	100.1%
2 children	102,427	118,183	15.4%	257,981	151.9%	118.3%
Others	45,866	50,462	10.0%	204,295	345.4%	304.8%
Total	2,142,246	3,215,980	50.1%	7,507,202	250.4%	133.4%

Source: Microsimulation (LINDA) modelling based on 2017 nationally representative WAS6 data, and our COVID model.

https://doi.org/10.1017/nie.2020.31 Published online by Cambridge University Press

Table 4. Distribution of destitution by industry (adults, 18+)

	Non-COVID destitution		Non-COVID change	COVID destitution	COVID change	Relative to Non-COVID
	2017	2020	2017–20	2020	2017–20	2020
Public	465,320	430,269	–7.5%	1,315,069	182.6%	205.6%
Pvt non–traded services	235,589	733,740	211.4%	1,340,750	469.1%	82.7%
Real Estate	25,719	30,449	18.4%	49,368	91.9%	62.1%
Construction	36,212	62,677	73.1%	418,534	1055.8%	567.8%
Manufacturing	107,041	128,146	19.7%	486,211	354.2%	279.4%
Mining	6,987	15,014	114.9%	47,123	574.4%	213.9%
Private traded	263,050	287,256	9.2%	534,083	103.0%	85.9%
Finance	78,136	77,567	–0.7%	75,289	–3.6%	–2.9%
Utilities	41,597	49,077	18.0%	83,475	100.7%	70.1%
Inactive/No sector	104,837	234,201	123.4%	431,757	311.8%	84.4%
Total	1,364,488	2,048,395	50.1%	4,781,658	250.4%	133.4%

Source: Microsimulation (LINDA) modelling based on (a) 2017 nationally representative WAS6 data, and (b) our COVID model.
Notes: Definitions of sector groupings: Public (Public administration, Education, Health, Collection/Sewerage); Private traded (Transport, ICT, Professional services); Real Estate; Finance; Construction; Private non-traded services (Wholesale/Retail, Accommodation/Food, Other services); Utilities (Agriculture, Electricity, Water); Mining; and Manufacturing.

Table 5. Distribution of destitution by age group

	Non-COVID destitution		Non-COVID change	COVID destitution	COVID change	Relative to Non-COVID
	2017	2020	2017–20	2020	2017–20	2020
<18 years	777,758	1,167,585	50.1%	2,725,545	250.4%	133.4%
18–24 years	25,332	418,679	1552.8%	503,305	1886.9%	20.2%
25–54 years	257,591	1,062,501	312.5%	2,785,790	981.5%	162.2%
55–74 years	1,021,955	283,968	–72.2%	849,731	–16.9%	199.2%
75+ years	59,611	283,246	375.2%	642,832	978.4%	127.0%
Total	2,142,246	3,215,980	50.1%	7,507,202	250.4%	133.4%

Source: Microsimulation (LINDA) modelling based on 2017 nationally representative WAS6 data, and our COVID model.

Public sector workers also face a higher increase in destitution. However, this is against a lower base in case of no COVID-19, where expected destitution in the sector would have decreased by 7.5 per cent in 2020 relative to 2017. Together with the public sector, the private non-traded sector also shows high projected destitution levels. By contrast, the impact upon the finance sector is negligible, and the effects on real estate, private traded and utilities are also moderate. This highlights one of the fundamental differences between the COVID-19 crisis and the 2008 Financial Crisis. In order to respond to the current situation, it is necessary to understand where the economy is hit most and who are the most vulnerable people. It becomes evident that the crisis has affected poorer people, lower paid industries and regions disproportionately, increasing destitution levels to extreme highs.

The close connection between sectoral and regional patterns is quite remarkable (figure 1), and here we also observe the high destitution levels for the economically inactive population. Sectoral patterns are often modelled using input-output matrices, and the direct and indirect effects in Lenoël and Young (2020) fall along the same tradition; a popular alternate approach is based on supply chains. In the recent literature, regional patterns have also been modelled by regional variations in sectoral composition (Elhorst *et al.*, 2017; Rokicki and Hewings, 2019), which is very similar to our approach here. In the current context, where trade is falling and

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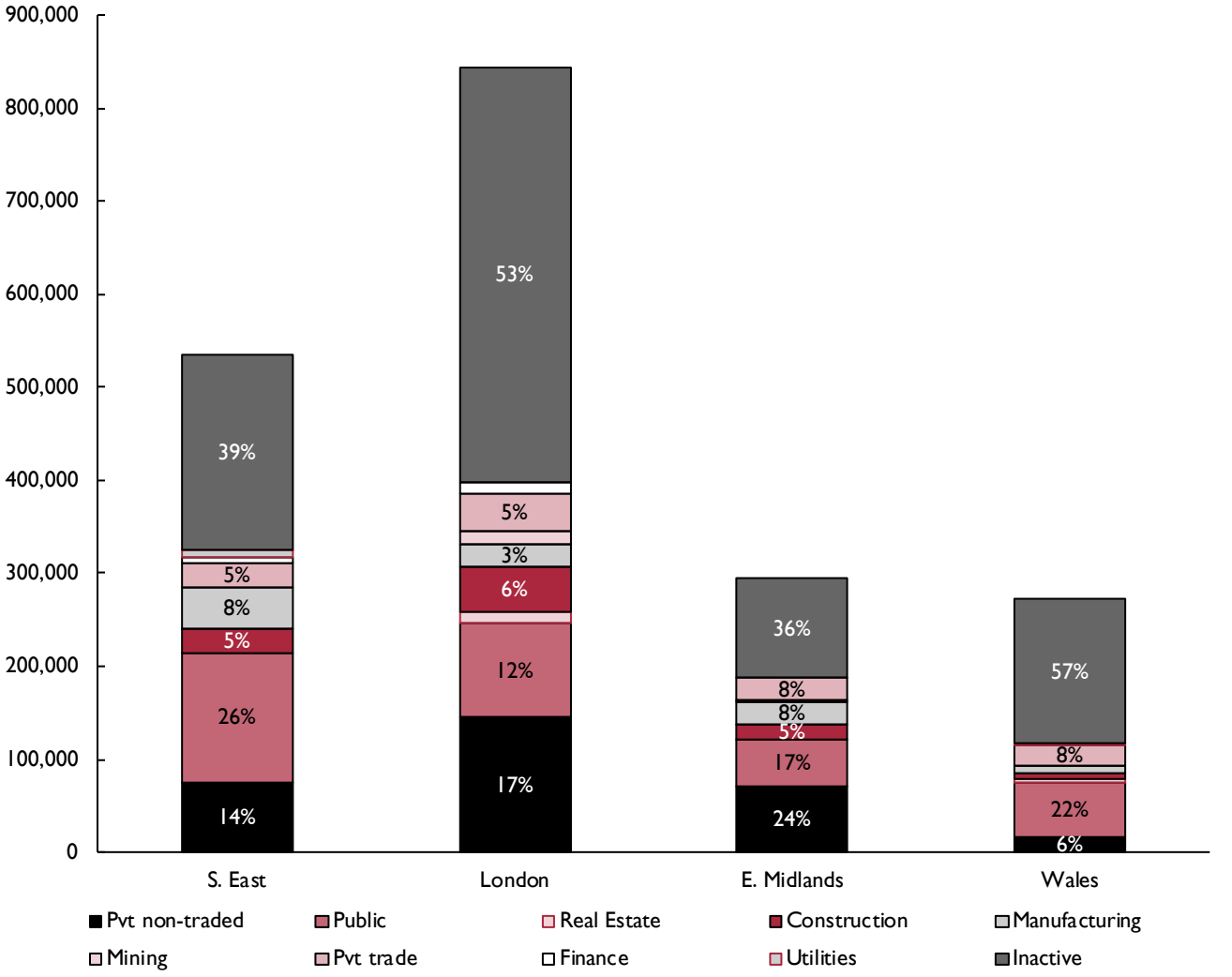
Figure 1. Sectoral composition of destitution in selected regions (adults, 18+)



traditional supply chains are under stress (Gasiorek *et al.*, 2020; Rincón-Aznar *et al.*, 2020), the microsimulation approach taken here seems particularly potent.

Impacts by age

Finally, we analyse the effects of the COVID-19 crisis on different age groups. Table 5 shows that young people (18–24 years) are facing extremely high increases (16 to 20 times) in destitution in both COVID and non-COVID scenarios. Possible reasons are high youth unemployment and financial distress.[7] Foley *et al.* (2020) showed that among the most vulnerable are the young (18–24) as almost a quarter of workers from closed down businesses are below 25 years old. Those in education are also affected. New school leavers and graduates will likely be excluded from the market or moved to low-paying jobs, which in turn will damage future employment prospects. This is extremely worrying as these figures, together with persistent increases in youth unemployment, raise a number of questions about the future of our economy and society.

Very high increases in destitution levels are also projected for age groups of 25–54 and the elderly (75 years and older). In the non-COVID scenario the increase in destitution for 25–54 year olds was projected to be well over 300 per cent even before COVID-19; however, it is close to 1,000 per cent after considering the impact of the COVID-19 crisis. Therefore, comparing the economy under the two scenarios, people above 25 years old are

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projected to face much higher poverty after COVID-19 effects are taken into account.

5. Conclusion

The COVID-19 crisis has led the UK, as well as other economies, into a deep and persistent recession. We explore cross-sectional patterns of the impact using projections of destitution by region, sector, labour market categories, household composition and age. The analysis was based on a combination of macroeconomic forecasts from NiGEM (NIESR, 2018) and the LINDA (NIESR, 2016) microsimulation model. WAS6 data from 2017, which is the latest nationally representative database on household employment, income, and demographics, provided the base. This was complemented by our modelling of changes to mortality, unemployment and household incomes as a result of the COVID-19 crisis. Then, LINDA generated a simulated population of the UK running annually through time. The analysis above presented results from the 2020 simulated population from LINDA.

Overall, the impacts of the COVID-19 crisis, in terms of destitution, are devastating. More disconcertingly, the distributional impacts are highly asymmetric, affecting different regions, sectors and segments of society in disproportionately diverse ways. It is apparent that those from disadvantaged areas and background, such as those from poorer families, most affected industrial sectors and low-paid employees are suffering greatly. Important and sustained mitigation measures are therefore necessary. Beyond the Furlough scheme and assistance to small businesses, and beyond the recent changes to Universal Credit, the government must also continue to provide enhanced welfare support to the vulnerable, both directly to households and also through charitable organisations, and channels into employment for the young. While the insights are revealing, like other projection exercises, the figures themselves must be treated with caution, not least because of higher uncertainty on the downside.[8]

NOTES

1 It may be noted that the Joseph Rowntree Foundation uses the income benchmark (adjusted by savings) in addition to a material deprivation criterion. We use only the income component of this definition as a benchmark to evaluate the impact of the COVID-19 crisis upon the poorest in society. An alternate criterion would be 'severe poverty' based on 40 per cent of median income (after housing costs) (see, for example, Brewer *et al.*, 2010), which would be about £5,200 for a single adult, £8,684 for a couple, £7,800 for a lone parent with one child, and £13,884 for a couple with two children. Or, one can consider the Universal Credit scale rates as recently temporarily enhanced, of £4,955 for a single adult or £7,181 for a couple, and so on. We consider the 'severe poverty' benchmark as defined above as an alternate benchmark and verify that our findings are qualitatively comparable.

2 During the three months to January 2010, employment loss was about 500,000 and 61,000 more persons became self-employed. We made projections for all quarters from 2020Q1 using the above take-up rate for self-employment.

3 The Trussell Trust is the UK's largest provider network of food banks. Here we use Trussell Trust food bank use as a proxy for destitution with data available at quarterly frequency. Trussell Trust food bank use has been sharply rising over time, and we model this secular increase, as well as the effect of unemployment and wages, using a time series model.

4 Comparable data from the Family Resources Survey shows that, in 2014/15, average weekly household income in Northern Ireland was £420 compared with £473 for the UK as a whole (ONS, 2017). Therefore, we draw the pseudo-sample for Northern Ireland from a truncated sample of the WAS6 data, where higher earnings are omitted to the extent that average household earnings are reduced to 89 per cent of the original.

5 We attempted this approach; however, it was not adequate in this specific context. On average, across the pseudo-population, the COVID-19 modelling reflected the expected outcomes reasonably well, but not in the tail of the distribution where destitution is prominent. This is likely because of averaging shocks over time, inherent within the rational expectations' framework, together with the fact that credit constraints are not explicitly modelled in LINDA. Hence, we developed an alternate microsimulation approach which is unique to this context. In future developments with LINDA, we plan to incorporate temporary changes to the discount rate and risk aversion.

6 Modelling interdependence between agents is the domain of agent-based modelling, which is an alternative to the microsimulation approach taken here.

7 Evidence from the Understanding Society COVID-19 Study (Crossley *et al.*, 2020), for example, show that on all considered measures of employment changes (whether employed, positive hours, hours worked and earnings), 20–29 year olds score worst of all age-groups, both before and during the COVID-19 crisis (February and April 2020, respectively). Similarly, the British Chambers of Commerce economics forecasts in 2019Q4 and 2018Q4 reflect that the rate of reduction in youth unemployment has progressively weakened since 2017: 59,000 over the year to 2017Q4, by 42,000 and 5,000 in the following two years, before being projected to rise by 19,000 in the year 2020; these projections were obtained before the COVID-19 crisis (BCC, 2019). Likewise, English student maintenance loans increased very rapidly in recent years before the scheme was abolished (Bolton, 2019). Twenty-four per cent of 18–24 year old destitute sample are students (2020 base), therefore the above point is likely to have a big impact in the extremely high overall destitution levels among the young. These evidences explain why non-COVID increases in destitution in 2020 would have been so high in any case. Nevertheless, COVID impacts are potentially somewhat moderated by risk sharing within the household.

8 Chadha (2017) called for more disaggregated analysis of macroeconomic shocks in his Gresham Lecture, *Macroeconomics, Capitalism and Inequality*. This paper continues that process.

https://doi.org/10.1017/nie.2020.31 Published online by Cambridge University Press

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https://doi.org/10.1017/nie.2020.31 Published online by Cambridge University Press