Fragile Progress?

Global Monetary Poverty, 1981-2030

Andy Sumner and Eduardo Ortiz-Juarez [1]

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Abstract: This paper reviews trends and patterns of global monetary poverty since 1981. We do the following: (i) discuss the limitations of the oft used extreme poverty line to assess global monetary poverty; (ii) examine trends in the level and composition of global poverty since 1981; and (iii) review studies of the impact of the COVID-19 pandemic on poverty. Our core arguments are that: (i) the extreme poverty line has some serious question marks over it; (ii) the narrative of dramatic poverty reduction since the 1980s is, as a result, fragile; and (iii) the on-going COVID-19 pandemic and its aftermath means greater attention is needed on (i) and (ii).

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[1] King's College London. Correspondence to andrew.sumner@kcl.ac.uk and eduardo.ortiz@kcl.ac.uk

1. INTRODUCTION

The first Sustainable Development Goal (SDG-1) is to end poverty 'in all its forms everywhere' by 2030 (see for details, UNDESA, 2020). Target 1.1 uses the poverty indicator as the international poverty line developed by the World Bank, referred to as the 'extreme poverty' line which has been revised from $1.25 a day in 2005 PPP to $1.90 in 2011 PPP (see Ravallion et al., 1991, 2009; Ferreira et al., 2016 for history, methodology, and revisions; and for critique see below as well as Reddy and Lahoti, 2015). Our paper reviews trends and patterns of global monetary poverty since 1981. Our core arguments are that: (i) the extreme poverty line has some serious question marks over it; (ii) the narrative of dramatic poverty reduction since the 1980s is, as a result, fragile; and (iii) the on-going COVID-19 pandemic and its aftermath means greater attention is needed on (i) and (ii).

Our paper is structured as follows: Section 2 discusses the limitations of the oft used extreme - $1.90 a day - poverty line to assess global monetary poverty. Section 3 then examines trends in the level and composition of global poverty since 1981. Section 4 assesses the impact of the COVID-19 pandemic. Section 5 concludes.

2. GLOBAL MONETARY POVERTY AND THE $1.90 POVERTY LINE

The $1.90 international poverty line is designed to be consistent with earlier iterations of the extreme poverty line notably the $1.25 in 2005PPP. What is concerning is that, first, the $1.90 is hyper-sensitive. The setting of the $1.90 line relies heavily on two decades worth of Consumer Price Index (CPI) data for some of the world's poorest countries and errors could change the overall value of the poverty line. This matters because every 10 cents in 2011 PPP that are added on top of the $1.90 poverty threshold, the global poverty headcount increases by

almost 70 million people, on average, for every dime added. Second, most of the world's $1.90 poor do not live in the countries used to construct the $1.90. Nor did they in 2008. And comparisons of multi-dimensional poverty and monetary poverty headcounts have strongest correlation around the $3.20 poverty line.

It is worth revisiting what the extreme poverty line is based on as part of any discussion on SDG-1 and ending poverty. Specifically, the $1.90 a day threshold is derived from 15 countries' national poverty lines, which differ substantially in 2011 PPP and the values of those national poverty lines largely date from the 1990s (see figure 1) meaning many years of CPI data is required to update them. The oldest threshold in the sub-set, that of Mali, is from 1988/9. In three countries (Ghana, Malawi, and Tajikistan), the CPI data was thought to be so questionable that World Bank used household survey data to construct a temporal deflator (see for a thoughtful and critical discussion, Jolliffe and Prydz, 2016).

A more convincing justification put forward for the use of the $1.90 poverty line is that is the median of the national poverty lines of low-income countries (LICs), or at least it was seven years ago in 2014 though the composition of countries in the LICs group has since changed (ten countries have moved into the lower-middle-income countries (LMICs) category and three moved from LMICs to LICs). Furthermore, the PPPs themselves have been through another round of revisions and are thus no longer the most recent PPP data.[2]

In short, poverty measurement across countries is a messy business. The chosen value matters because of the sensitivity of poverty headcounts. In 2019, 681 million people were living below the $1.90 poverty line, and for every 10 cents in 2011 PPP that are added on top of the $1.90 poverty threshold, the global poverty headcount increases by almost 70 million people, on average (see figure 2). Further, many populous countries have very sensitive

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[2] A new series of 2017 PPP exchange rates was published in May 2020 and thus these poverty lines will in due course be revised upwards to $2.10, $4.00, and $6.30 a day (in 2017PPP), respectively (see Atamanov et al., 2020).

headcounts around this level of daily consumption/income (see Edward and Sumner, 2019). Further, the average value of national poverty lines across all developing countries is approximately $2.50 per day and comparisons of national poverty headcounts by UNDP/OPHI multi-dimensional poverty and monetary poverty have strongest correlation around the $3.20 poverty line (See discussion in Hoy and Sumner, 2016).
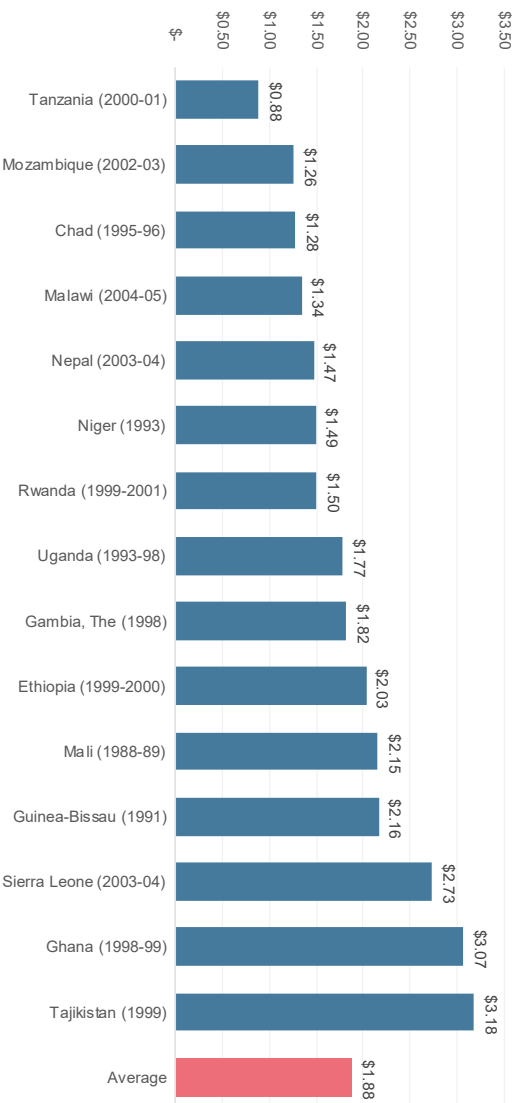
These issues are of significance as the poverty line chosen makes a substantial difference not only to the level of, and trends in global poverty but the actual location of global poverty, as well as the costs of ending poverty, and where income growth and/or changes in inequality may be needed to end poverty. As Deaton (2010) originally noted: lower poverty lines 'push' global poverty into sub-Saharan Africa, while very slightly higher lines 'Asianise' global poverty (see figure 3).

There are the higher poverty lines of $3.20 and $5.50 per day developed by the World Bank, which are important to use alongside the $1.90 per day. The $3.20 and $5.50 per day, are respectively the median averages of the national poverty lines of lower- and upper-middle income countries (LMICs and UMICs, respectively) in 2014 (see Jolliffe and Prydz, 2016). Finally, a substantially higher line of $13 per day (in 2011 PPP or approx. $10 in 2005PPP) is in longitudinal studies associated with permanent escape from poverty (see López-Calva and Ortiz-Juarez, 2014; Sumner et al., 2014; World Bank, 2018; Bussolo et al. 2018).[3] Importantly, given that most of the world's poor live in LMICs the $3.20 poverty line has a particular relevance. In sum, our argument is that the reduction of ending poverty to $1.90 poverty is problematic as it is not equivalent to ending poverty 'in all its forms'.
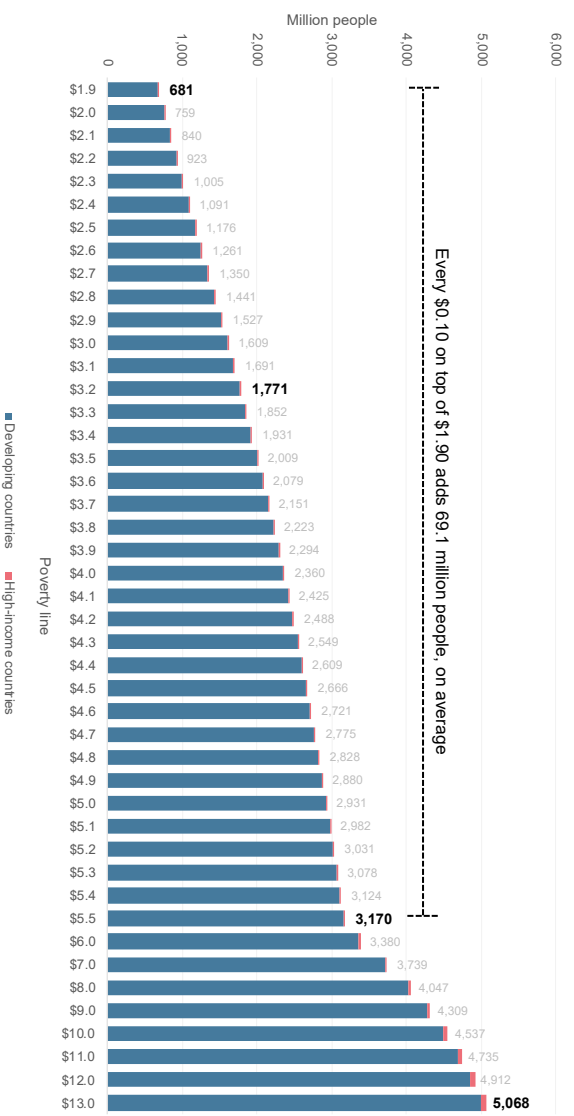
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[3] The ten per cent probability line is actually between $8.50 and $9.70 (2005 PPP) depending on whether Peru, Mexico, or Chile are used. Thus, the mean is $9.27. World Bank (2018) estimated the equivalent in 2011 PPP at $13 per day.

**Figure 1. National Poverty Lines used to construct $1.90 poverty line and value in 2011PP$**

Source: Ferreira (2019).

Country (year)	Poverty line (2011PP$)
Tanzania (2000-01)	$0.88
Mozambique (2002-03)	$1.26
Chad (1995-96)	$1.28
Malawi (2004-05)	$1.34
Nepal (2003-04)	$1.47
Niger (1993)	$1.49
Rwanda (1999-2001)	$1.50
Uganda (1993-98)	$1.77
Gambia, The (1998)	$1.82
Ethiopia (1999-2000)	$2.03
Mali (1988-89)	$2.15
Guinea-Bissau (1991)	$2.16
Sierra Leone (2003-04)	$2.73
Ghana (1998-99)	$3.07
Tajikistan (1999)	$3.18
Average	$1.88

Figure 2. Poverty headcounts (million people) by daily per capita income, $1.90-$13 (2019 for 166 countries, and 2017 for India)

Poverty line	Million people
$1.9	681
$2.0	759
$2.1	840
$2.2	923
$2.3	1,005
$2.4	1,091
$2.5	1,176
$2.6	1,261
$2.7	1,350
$2.8	1,441
$2.9	1,527
$3.0	1,609
$3.1	1,691
$3.2	1,771
$3.3	1,852
$3.4	1,931
$3.5	2,009
$3.6	2,079
$3.7	2,151
$3.8	2,223
$3.9	2,294
$4.0	2,360
$4.1	2,425
$4.2	2,488
$4.3	2,549
$4.4	2,609
$4.5	2,666
$4.6	2,721
$4.7	2,775
$4.8	2,828
$4.9	2,880
$5.0	2,931
$5.1	2,982
$5.2	3,031
$5.3	3,078
$5.4	3,124
$5.5	3,170
$6.0	3,380
$7.0	3,739
$8.0	4,047
$9.0	4,309
$10.0	4,537
$11.0	4,735
$12.0	4,912
$13.0	5,068

Developing countries
High-income countries

Every $0.10 on top of $1.90 adds 69.1 million people, on average

Source: Authors' estimates based on data from World Bank (March 2021 global poverty update).

Figure 3. Regional distribution of global poverty by daily per capita expenditure (excludes high-income countries), $0-$13; (2019 for 121 developing countries, and 2017 for India)
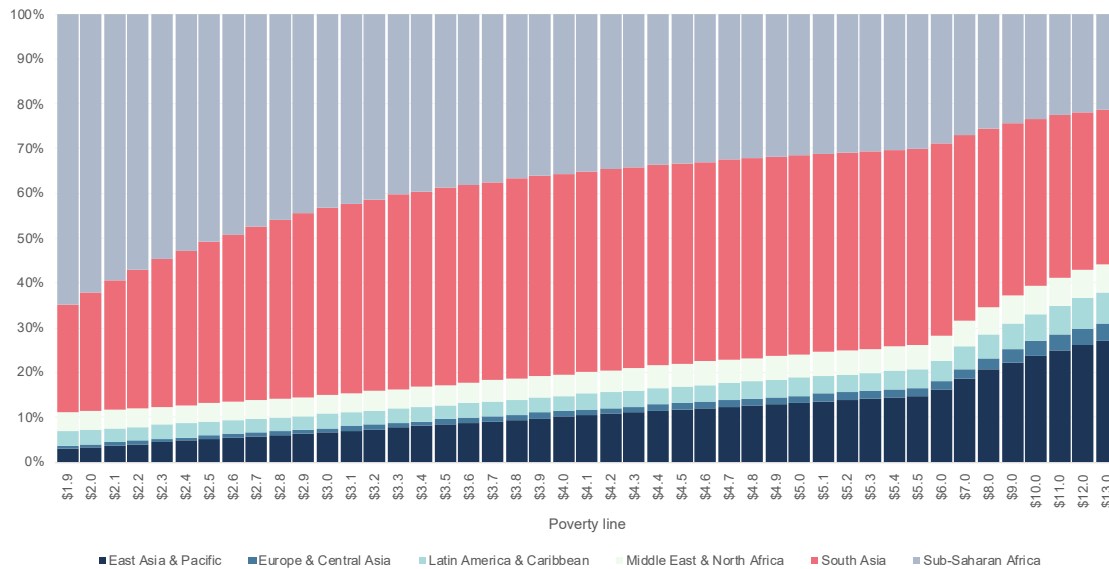
Source: Authors' estimates based on data from World Bank (March 2021 global poverty update).

3. GLOBAL MONETARY POVERTY AT VARIOUS LINES, 1981-2019

What are the poverty trends at different poverty lines? In this section we consider global monetary poverty from 1981 to 2019 (and thus immediately prior to the pandemic) at different poverty lines. First, we consider trends. Second, we examine where the world's poor live.

Why does a technical issue—how poverty is measured—matter so much? It matters because there is a dominant and widely held belief that global poverty has fallen dramatically since the early 1980s, and it is not without foundation: the data shows that global poverty has fallen since the 1980s when measured at both the extreme poverty line of $1.90 per day and moderate poverty line of $3.20 per day. However, many previously 'poor' people have simply

moved just above one of the World Bank's poverty lines. Thus, the oft-cited record of poverty reduction is fragile as the COVID-19 pandemic is likely to bring to the fore. Figures 4 and 5 show daily consumption per capita of the global population as well as of the population of developing countries with and without China.

At the lowest line, $1.90 per day, the absolute global monetary poverty headcount *has* fallen impressively from 1.9bn people to approximately 0.7bn (as noted above) or 43 per cent of the global population to just 9 per cent. However, four countries account for this decline in the absolute numbers in poverty (see below). Further, this has led to a burgeoning group of people not far above $1.90 per day. About a billion people now live between $1.90 per day and the next poverty line, $3.20. And if we take the $3.20 per day poverty line what we find is there is a large group living between $3.20 and $13 per day (see Figure 4, top). This group has grown from about 20 per cent of the world's population in 1981 than more than 40 per cent of the world population in 2019.

At a poverty line of $13 per day, the absolute global monetary poverty headcount has increased from 3.48 billion people in 1981 to 5.07 billion by 2019 in absolute terms. Of course, there has been much population growth. In relative terms, though it has only fallen from 79 per cent of the world's population in 1981 to about 68 percent in 2019. If we focus on the world excluding China, less has changed since the early 1980s: in fact, in the world excluding China (see Figure 4, bottom) and in developing countries excluding China (see Figure 5, bottom), there is not so much change in the level of poverty at $13 per day as a proportion of the world's population or developing countries population in almost 40 years.

To be clear, in this section we are not arguing that the income growth among the poorest people in the world has not been positive in general. Rather, global poverty reduction since the Cold War has been mostly about moving people from below to somewhat above a low poverty line. Highlighting this trend often ignites heated debates but one cannot overlook the fact that

absolute poverty has not fallen more at reasonable poverty lines, even with the good economic growth across many developing countries during the past two decades. Much of the fall in extreme poverty, in fact 97.8 per cent is accounted for by 4 countries (see Table 1a and 1b). Table 2 shows the remaining poor at $1.90 are now split between LICs, India and other LMICs and Table 3 shows the countries that account for most poverty at each poverty line. Twenty countries at any of the poverty lines account for approximately 80 per cent of global poverty.

To understand why this all matters we need to look at the consequences of poverty measurement. Specifically, what has been the consequence of the use of low poverty lines? And what has been the consequence of the dominant belief that poverty has been dramatically reduced? What would be the impact of using higher poverty lines? Estimates at higher lines suggest many, many hundreds of years before the end of all poverty or a completely new global economic model is required based on enormous global and national redistribution. In sum, setting and using very low poverty lines and communicating the trends based on these lines may lead to a narrative that absolute poverty is virtually eradicated or soon will be without any real changes to the global economy or the contemporary model of economic development. Pointing out this trend might be unpopular, but we should not shy away from asking uncomfortable questions.

Figure 4. Population (%) of the world (top) and the world excluding China (bottom) by daily income or consumption per capita group, 1981–2019.
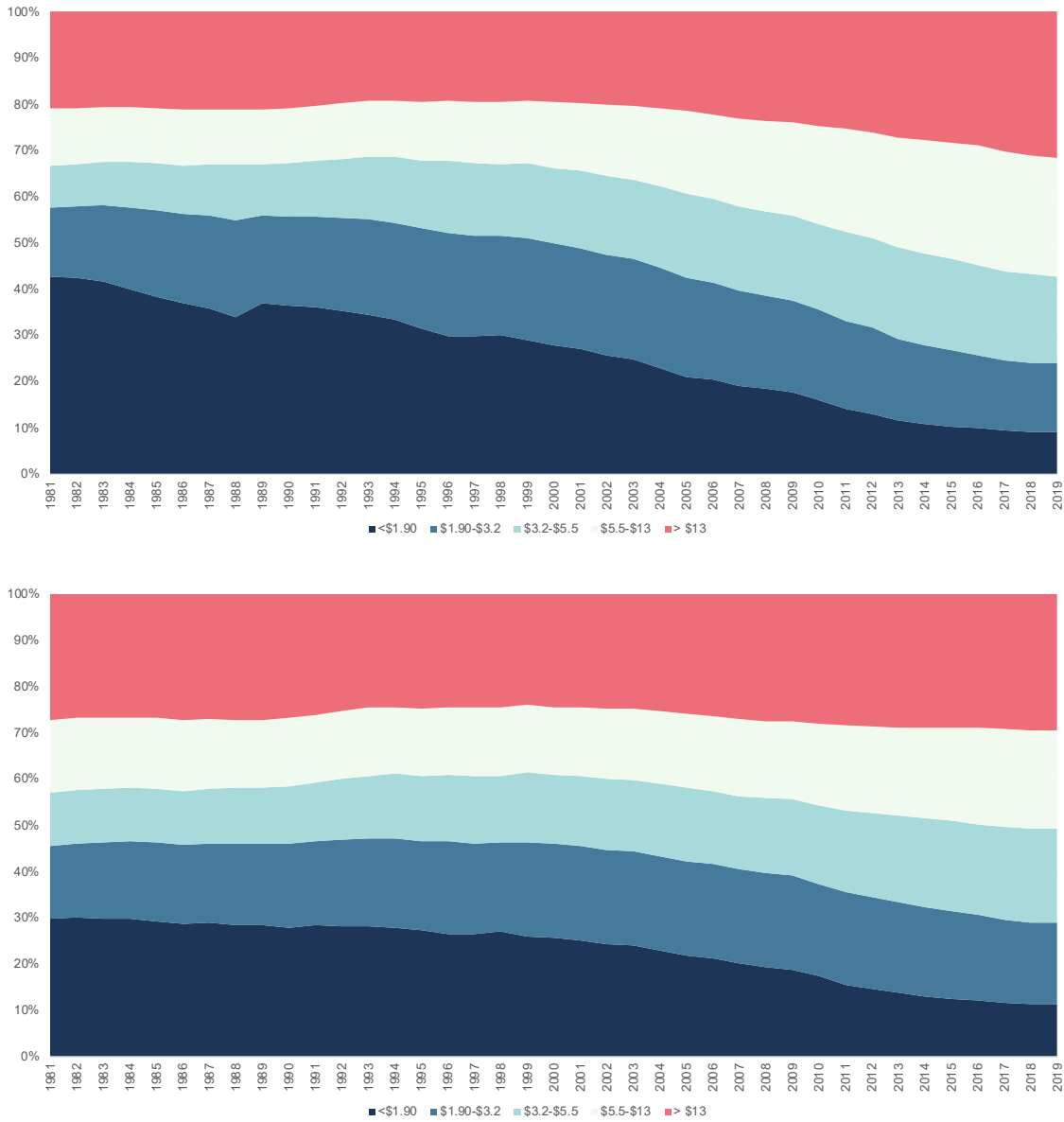
Source: Authors' estimates based on World Bank (March 2021 global poverty update). The figures for India in 2018 and 2019 are assumed to remain unchanged at the level observed in 2017.

Figure 5. Population (%) of developing countries (top) and developing countries excluding China (bottom) by daily income or consumption per capita group, 1981–2019.
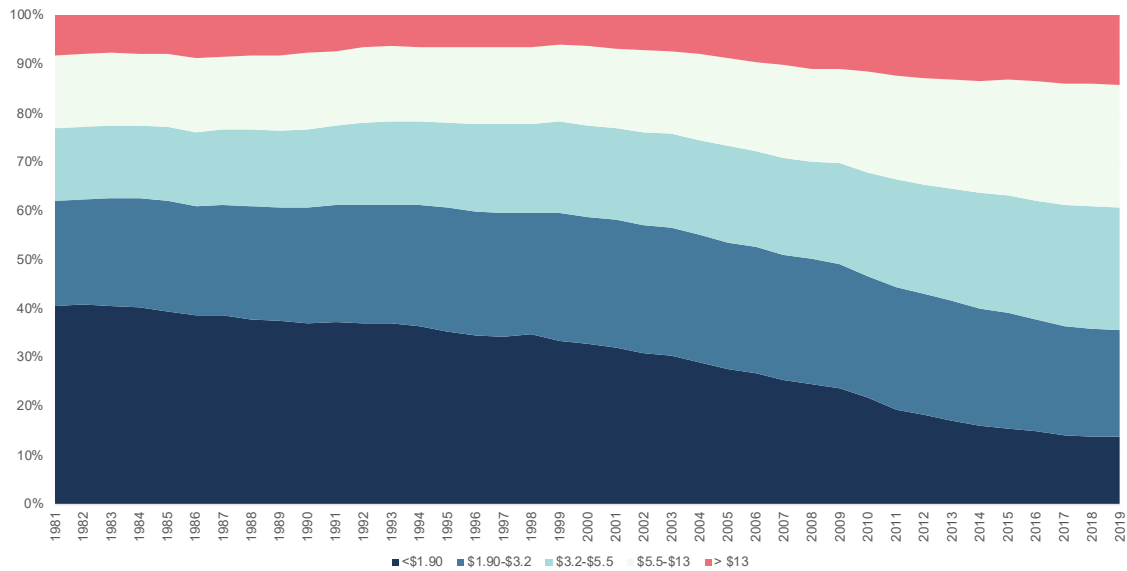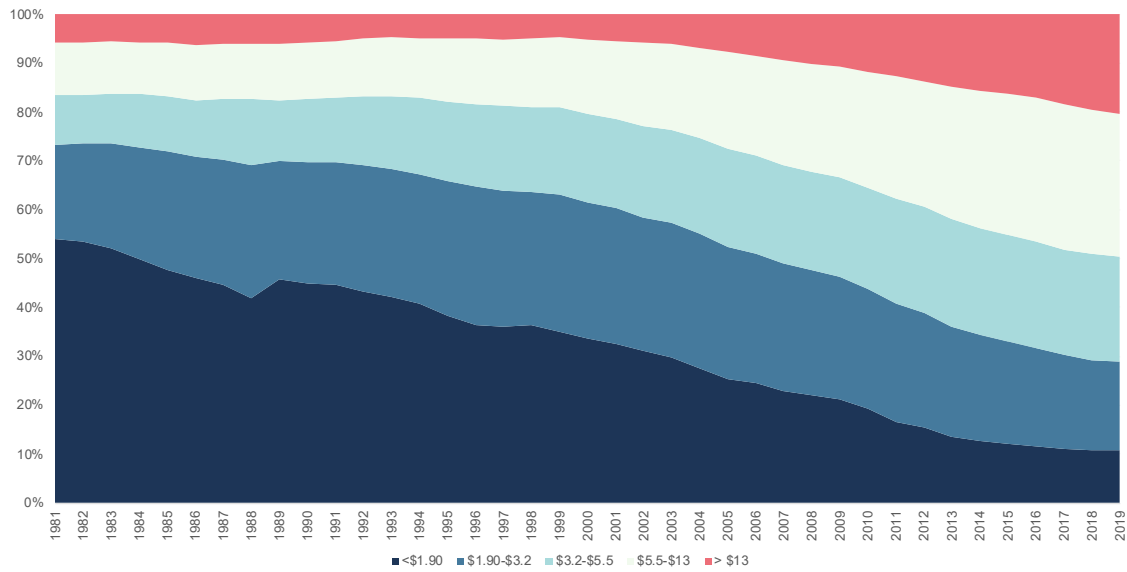
Source: Authors' estimates based on World Bank (March 2021 global poverty update). The figures for India in 2018 and 2019 are assumed to remain unchanged at the level observed in 2017.

Table 1. To what extent are China, India, Indonesia and Vietnam responsible for the fall in global poverty since 1990?

a. Developing countries only

	1990	2019	Change	Contrib.
Developing world's population	4,172.2	6,274.1		
Share of poor at $1.90 (%)	*44.8*	*10.8*	*-34.1*	
Total poor at $1.90	**1,870.5**	**674.5**	**-1,196.0**	
Total poor at $1.90 excluding China	1,118.2	671.7	-446.5	37.3%
Poverty at $1.90 in China	752.3	2.8	-749.5	62.7%
Total poor at $1.90 excluding China+India	689.6	530.5	-159.1	13.3%
Poverty at $1.90 in China+India	1,180.9	144.0	-1,036.9	86.7%
Total poor at $1.90 excluding China+India+Indonesia	590.0	522.7	-67.3	5.6%
Poverty at $1.90 in China+India+Indonesia	1,280.5	151.8	-1,128.7	94.4%
Total poor at $1.90 excluding China+India+Indonesia+Vietnam	547.9	521.4	-26.5	2.2%
Poverty at $1.90 in China+India+Indonesia+Vietnam	1,322.6	153.1	-1,169.5	97.8%
Share of poor at $3.20	*68.5*	*28.1*	*-40.5*	
Total poor at $3.20	**2,859.8**	**1,761.2**	**-1,098.7**	
Total poor at $3.20 excluding China	1,837.8	1,732.1	-105.7	9.6%
Poverty at $3.20 in China	1,022.0	29.1	-992.9	90.4%
Total poor at $3.20 excluding China+India	1115.3	1,127.4	12.2	
Poverty at $3.20 in China+India	1,744.6	633.7	-1,110.8	
Total poor at $3.20 excluding China+India+Indonesia	960.4	1,071.9	111.6	
Poverty at $3.20 in China+India+Indonesia	1,899.4	689.2	-1,210.2	
Total poor at $3.20 excluding China+India+Indonesia+Vietnam	902.7	1,066.5	163.7	
Poverty at $3.20 in China+India+Indonesia+Vietnam	1,957.1	694.7	-1,262.4	
Share of poor at $5.50	*82.6*	*50.2*	*-32.4*	
Total poor at $5.50	**3,445.2**	**3,152.3**	**-292.8**	
Total poor at $5.50 excluding China	2,329.2	2,955.2	626.1	
Poverty at $5.50 in China	1,116.0	197.1	-918.9	
Total poor at $5.50 excluding China+India	1494.6	1,890.7	396.2	
Poverty at $5.50 in China+India	1,950.6	1,261.6	-689.0	
Total poor at $5.50 excluding China+India+Indonesia	1319.9	1,747.7	427.9	
Poverty at $5.50 in China+India+Indonesia	2,125.3	1,404.6	-720.7	
Total poor at $5.50 excluding China+India+Indonesia+Vietnam	1254.5	1,728.6	474.0	
Poverty at $5.50 in China+India+Indonesia+Vietnam	2,190.6	1,423.7	-766.9	
Share of poor+vulnerable at $13	*94.3*	*79.6*	*-14.7*	
Total poor+vulnerable at $13	**3,932.6**	**4,991.1**	**1,058.5**	
Total poor+vulnerable at $13 excluding China	2,799.1	4,176.9	1,377.8	
Poverty+vulnerability at $13 in China	1,133.5	814.2	-319.3	
Total poor+vulnerable at $13 excluding China+India	1929.9	2,877.3	947.4	89.5%
Poverty+vulnerability at $13 in China+India	2,002.7	2,113.7	111.1	10.5%
Total poor+vulnerable at $13 excluding China+India+Indonesia	1749.1	2,630.8	881.7	83.3%
Poverty+vulnerability at $13 in China+India+Indonesia	2,183.5	2,360.3	176.8	16.7%
Total poor+vulnerable at $13 excluding China+India+Indonesia+Vietnam	1681.3	2,561.8	880.4	83.2%
Poverty+vulnerability at $13 in China+India+Indonesia+Vietnam	2,251.2	2,429.3	178.1	16.8%

Source: Authors' estimates based on World Bank (March 2021 global poverty update). The figure used for India corresponds to that observed in 2017.

b. World

	1990	2019	Change	Contrib.
World's population	5,161.2	7,436.7		
Share of poor at $1.90 (%)	*36.4*	*9.2*	*-27.2*	
Total poor at $1.90	**1,876.4**	**681.3**	**-1,195.0**	
Total poor at $1.90 excluding China	1,124.1	678.5	-445.5	37.3%
Poverty at $1.90 in China	752.3	2.8	-749.5	62.7%
Total poor at $1.90 excluding China+India	695.5	537.3	-158.2	13.2%
Poverty at $1.90 in China+India	1,180.9	144.0	-1,036.9	86.8%
Total poor at $1.90 excluding China+India+Indonesia	595.8	529.5	-66.3	5.5%
Poverty at $1.90 in China+India+Indonesia	1,280.5	151.8	-1,128.7	94.5%
Total poor at $1.90 excluding China+India+Indonesia+Vietnam	553.8	528.2	-25.6	2.1%
Poverty at $1.90 in China+India+Indonesia+Vietnam	1,322.6	153.1	-1,169.5	97.9%
Share of poor at $3.20	*55.6*	*23.8*	*-31.8*	
Total poor at $3.20	**2,871.6**	**1,771.0**	**-1,100.5**	
Total poor at $3.20 excluding China	1,849.6	1,742.0	-107.6	9.8%
Poverty at $3.20 in China	1,022.0	29.1	-992.9	90.2%
Total poor at $3.20 excluding China+India	1127.0	1,137.3	10.3	
Poverty at $3.20 in China+India	1,744.6	633.7	-1,110.8	
Total poor at $3.20 excluding China+India+Indonesia	972.1	1,081.8	109.7	
Poverty at $3.20 in China+India+Indonesia	1,899.4	689.2	-1,210.2	
Total poor at $3.20 excluding China+India+Indonesia+Vietnam	914.5	1,076.3	161.8	
Poverty at $3.20 in China+India+Indonesia+Vietnam	1,957.1	694.7	-1,262.4	
Share of poor at $5.50	*67.3*	*42.6*	*-24.7*	
Total poor at $5.50	**3,472.4**	**3,170.0**	**-302.4**	
Total poor at $5.50 excluding China	2,356.4	2,972.9	616.5	
Poverty at $5.50 in China	1,116.0	197.1	-918.9	
Total poor at $5.50 excluding China+India	1,521.8	1,908.4	386.6	
Poverty at $5.50 in China+India	1,950.6	1,261.6	-689.0	
Total poor at $5.50 excluding China+India+Indonesia	1347.1	1,765.4	418.3	
Poverty at $5.50 in China+India+Indonesia	2,125.3	1,404.6	-720.7	
Total poor at $5.50 excluding China+India+Indonesia+Vietnam	1281.8	1,746.3	464.5	
Poverty at $5.50 in China+India+Indonesia+Vietnam	2,190.6	1,423.7	-766.9	
Share of poor+vulnerable at $13	*79.1*	*68.1*	*-10.9*	
Total poor+vulnerable at $13	**4,080.0**	**5,067.5**	**987.5**	
Total poor+vulnerable at $13 excluding China	2,946.5	4,253.4	1,306.8	
Poverty+vulnerability at $13 in China	1,133.5	814.2	-319.3	
Total poor+vulnerable at $13 excluding China+India	2,077.4	2,953.8	876.4	88.8%
Poverty+vulnerability at $13 in China+India	2,002.7	2,113.7	111.1	11.2%
Total poor+vulnerable at $13 excluding China+India+Indonesia	1896.6	2,707.2	810.7	82.1%
Poverty+vulnerability at $13 in China+India+Indonesia	2,183.5	2,360.3	176.8	17.9%
Total poor+vulnerable at $13 excluding China+India+Indonesia+Vietnam	1828.8	2,638.2	809.4	82.0%
Poverty+vulnerability at $13 in China+India+Indonesia+Vietnam	2,251.2	2,429.3	178.1	18.0%

Source: Authors' estimates based on World Bank (March 2021 global poverty update). The figure used for India corresponds to that observed in 2017.

Table 2. Distribution of global poverty by country type, 2019

Income group/poverty line	$1.90	$3.20	$5.50	$13
Low-income countries (LICs)	38.9%	23.9%	17.0%	11.7%
Lower-middle-income (LMICS)	53.8%	66.2%	65.1%	53.3%
LMICs minus India	*33.1%*	*32.0%*	*31.5%*	*27.7%*
Upper-middle-income (UMICs)	6.3%	9.4%	17.4%	33.4%
UMICs minus China	*5.9%*	*7.8%*	*11.2%*	*17.4%*
All LICs and MICs	**99.0%**	**99.4%**	**99.4%**	**98.5%**
High-income countries (HICs)	**1.0%**	**0.6%**	**0.6%**	**1.5%**

Source: Authors' estimates based on World Bank (March 2021 global poverty update). The figure used for India corresponds to that observed in 2017.

Table 3. Top 20 countries that are home to global poverty for each poverty line (million poor), 2019

$1.90		$3.20		$5.50		$13	
India	141.23	India	604.67	India	1064.50	India	1299.57
Nigeria	78.78	Nigeria	142.80	China	197.08	China	814.17
Congo, Dem. Rep.	61.61	Congo, Dem. Rep.	76.64	Nigeria	184.96	Indonesia	246.54
Tanzania	27.68	Pakistan	76.56	Pakistan	164.51	Pakistan	210.70
Ethiopia	21.90	Bangladesh	61.05	Indonesia	143.00	Nigeria	200.02
Madagascar	20.65	Ethiopia	59.20	Bangladesh	123.93	Bangladesh	159.01
Mozambique	18.92	Indonesia	55.48	Ethiopia	96.02	Ethiopia	110.02
Uganda	16.83	Tanzania	43.91	Congo, Dem. Rep.	84.00	Brazil	107.34
Kenya	16.43	Kenya	32.08	Egypt, Arab Rep.	73.72	Philippines	98.69
Angola	16.36	Egypt, Arab Rep.	30.05	Philippines	60.68	Egypt, Arab Rep.	97.24
Yemen, Rep.	15.95	Uganda	29.85	Tanzania	53.02	Mexico	88.48
Malawi	12.58	China	29.07	Kenya	44.06	Congo, Dem. Rep.	86.57
South Africa	11.52	Philippines	24.93	Brazil	41.41	Vietnam	69.02
Bangladesh	10.79	Mozambique	24.72	Uganda	38.28	Tanzania	57.23
Somalia	10.60	Madagascar	24.37	Sudan	34.54	Russian Federation	55.48
Zambia	10.45	Yemen, Rep.	23.91	South Africa	33.88	Kenya	51.45
Brazil	9.73	Angola	23.17	Mexico	29.29	Iran, Islamic Rep.	51.17
Pakistan	9.29	South Africa	22.54	Angola	28.37	Myanmar	50.41
Burundi	9.17	Sudan	19.78	Mozambique	27.87	South Africa	46.19
Niger	9.16	Brazil	19.25	Yemen, Rep.	27.57	Uganda	43.24
Total in top-20	**529.63**		**1424.04**		**2550.69**		**3942.54**
Total globally	**681.34**		**1771.04**		**3170.01**		**5067.53**
Share in top-20	**77.7%**		**80.4%**		**80.5%**		**77.8%**

Source: Authors' estimates based on World Bank (March 2021 global poverty update). The figure used for India corresponds to that observed in 2017.

4. GLOBAL MONETARY POVERTY AT VARIOUS LINES, 2019-2030

4a. Estimates to date of the poverty impact of the COVID-19 pandemic

What has been the poverty impact of the pandemic? There are various estimates of the poverty impact of the COVID-19 pandemic. One early question was whether the economic impact will be as significant for poverty effects as the health-related aspects of the pandemic. Developing countries generally have a lower proportion of people at higher risk in terms of old age. That said, health systems in developing countries tend to be much weaker than those in advanced countries. Furthermore, higher COVID-19 morbidity and mortality rates have been linked to hypertension and diabetes as well as to poverty, pollution, and malnutrition, which could make

populations of developing countries more vulnerable (see, for discussion, Schellekens and Sourrouille, 2020). There are also unclear links between COVID-19 and other illnesses such as TB, HIV/AIDS, chronic malaria, and respiratory problems due to indoor cooking. It has been estimated that approximately 470m people globally are at high risk of contracting COVID-19 as a result of pre-existing conditions of poverty—notably malnutrition, lack of access to safe drinking water, and indoor air pollution through the use of noxious cooking fuel (Alkire et al., 2020).

Lockdowns of various kinds have often been a primary policy to contain the virus but usually entail an income loss (in the absence of sufficient social assistance) for those who cannot work from home. Dingel and Neiman (2020) estimate that the share of jobs that could be performed at home is less than 25 per cent for many developing countries. The mean for HICs in 37 per cent of jobs can be done at home. In contrast, the mean for LICs is 11 per cent (see Table 4). Consequently, there is a clear need for a range of social safety net policies, which already exist in many developing countries but whose coverage and funding need to be expanded substantially as part of 'pay-to-stay home' or 'pay-to-test' schemes (see for discussion of the expansion of social policies in response to the pandemic, Gentilini et al., 2021).

Table 4. Proportion of jobs that can be done from home by country group

	Countries	Mean	Median	Min	Max	Std. Dev.
Low-income countries	9	0.11	0.11	0.05	0.17	0.04
Lower-middle Income	18	0.18	0.18	0.10	0.28	0.05
Upper-middle Income	21	0.24	0.23	0.14	0.37	0.06
High-income countries	35	0.37	0.37	0.25	0.53	0.06

Source: Aggregates built from data in Dingel and Neiman (2020).

Estimates of the income poverty impact of the pandemic thus, not surprisingly, remain tentative since they have been based either on GDP growth forecasts—the IMF World Economic Outlook (April or October 2020) or the World Bank's Global Economic Prospects

(June 2020) and Macro Poverty Outlook (October 2020)—which are all tentative themselves, or on estimates of the number of people close to the poverty line and different income shocks.

Table 5 below shows various studies of the impact of the pandemic on $1.90 poverty. Early 2020 (April) World Bank estimates projected 61.9 additional people living in extreme poverty (under $1.90 per day) based on growth forecasts at that time. Later estimates in 2020 (October) were double earlier estimates at 125m-131m additional people in extreme poverty.

Sumner, Ortiz-Juarez and Hoy (2020) present precarity-based estimates. Starting with extreme poverty, meaning $1.90 a day, the data show that a five, ten, and 20 per cent shock would push the relative incidence of global poverty upwards from 9.9 per cent of the world's population pre-pandemic to 11, 12.2, and 15.3 per cent, respectively. In absolute terms, these changes are equivalent to between 80m and almost 400m people falling into poverty at $1.90 a day (Table 5 and 6). Using the $3.20 a day poverty line, the estimates suggest an increase from 24.7 per cent pre-pandemic to 26.5 per cent under a five per cent shock and up to 32.6 per cent in the worst-case scenario. This implies that the number of people considered poor at the $3.20 a day poverty line would expand by between 133m and 576m. Finally, when using the $5.50 a day poverty line, the relative incidence could rise for the first time since 1993, from 43.4 per cent pre-pandemic up to just above half of the world's population (50.6 per cent) under a 20 per cent contraction. At this poverty line, the additional number of poor in comparison to the pre-pandemic level could reach 124m to 527 million, depending on the contraction scenario (Table 6).

A further issue, less discussed, is that the worsening in people's livelihoods as a consequence of the crisis could not only result in a higher incidence of poverty but also exacerbate both poverty intensity and severity. The poverty gap—defined in per capita terms to indicate the average shortfall in the income/consumption measure as a percentage of the poverty line—could register a 30 to 60 per cent increase under a 20 per cent contraction,

depending on the poverty line. For instance, looking at the figures for the $1.90 a day poverty line (Table 7), the average pre-pandemic shortfall in income/consumption is 3.2 per cent of the poverty line, or $0.06 a day. Given a world population of 7.36 billion, the resources needed to raise the poor's incomes would amount to a total of $445.8 million a day or $164 billion per year (2011 PPP). The squared average per capita poverty gap—typically interpreted as a measure of inequality among the poor—could increase in comparison to the pre-pandemic level by as much as 60 per cent among the extremely poor under the worst-case scenario, and between 30 and 40 per cent for the higher poverty lines.

When comparing the incidence and absolute changes in studies, one should note differences in methodology and baselines. For instance, Lea's (2020) baseline is 670m people that was projected to be the total number of poor by end-2020 in the absence of the pandemic—according to a model based on the partial growth elasticity of poverty and the IMF's pre-crisis per capita growth forecast. In contrast, Mahler et al. (2020); Lakner, Yonzan et al. (2020); and Yonzan et al. (2020) use a baseline of 603.1m rising to 615.0m (because the PovcalNet dataset itself was updated with more surveys during the pandemic period). Sumner et al. (2020) use a higher baseline of 727.3m because this was the last published, official World Bank poverty headcount (for 2018) at the time their study was conducted.

Table 5. Estimates of the impact of COVID-19 on global extreme poverty ($1.90 poverty line)

	Growth forecast-based						Precarity-based		
Study	Lea (2020)	Valensisi (2020)	Mahler et al. (2020)	Lakner, Yonzan et al. (2020)	Yonzan et al. (2020)		Sumner et al. (2020)		
Shock assumed	IMF growth forecasts, April 2020	IMF growth forecasts, April 2020	IMF growth forecasts, April 2020	World Bank baseline growth forecasts, June 2020	World Bank growth forecasts, October 2020	IMF growth forecasts, October 2020	5% income shock	10% income shock	20% income shock
Methodology	Growth elasticity of poverty change	Augmented poverty line	Extrapolation of welfare aggregates	Extrapolation of welfare aggregates	Extrapolation of welfare aggregates		Augmented poverty line		
Baseline (pre-crisis)									
Headcount rate	8.6%	8.2%	7.8%	7.9%	7.9%	7.9%	9.9%	9.9%	9.9%
Millions	670.0	642.3	603.1	615.0	615.0	615.0	727.3	727.3	727.3
Forecasts taking COVID-19 into account									
Headcount rate	9.6%	9.1%	8.6%	9.1%	9.5%	9.6%	11.0%	12.2%	15.3%
Millions	742.0	710.8	665.0	703.0	739.9	745.6	807.5	898.8	1,122.3
Changes relative to status quo									
in millions of poor	72.0	68.6	61.9	88.0	124.9	130.6	80.1	171.5	395.0
in headcount rate (percentage points)	1.0	0.9	0.8	1.2	1.6	1.7	1.1	2.3	5.4

Source: Authors' based on references listed.

Table 6. Absolute poverty incidence at \$1.90, \$3.20, and \$5.50 a day and changes under a five, ten, and 20 per cent per capita income/consumption contraction (millions of people)

	People living below			Additional people living below		
	\$1.90	**\$3.20**	**\$5.50**	**\$1.90**	**\$3.20**	**\$5.50**
Pre-COVID	727.3	1,819.5	3,193.0			
5% hit	807.5	1,925.5	3,317.5	80.1	133.0	124.4
10% hit	898.8	2,094.1	3,443.7	171.5	274.5	250.7
20% hit	1,122.3	2,395.5	3,720.3	395.0	576.0	527.2

Source: Sumner, Ortiz-Juarez and Hoy (2020) based on PovcalNet.

Table 7. Intensity and severity of poverty at \$1.90, \$3.20, and \$5.50 a day under a five, 10, and 20 per cent per capita income/consumption contraction (percentages)

	Intensity (poverty gap)			Severity (squared poverty gap)		
	\$1.90	**\$3.20**	**\$5.50**	**\$1.90**	**\$3.20**	**\$5.50**
Pre-pandemic	3.2	8.9	19.8	1.6	4.5	11.5
5% hit	3.5	9.8	21.0	1.7	5.0	12.3
10% hit	4.0	10.7	22.3	1.9	5.6	13.3
20% hit	5.1	12.9	25.3	2.5	6.9	15.5

Source: Sumner, Ortiz-Juarez and Hoy (2020) based on PovcalNet. *Notes*: The intensity of poverty is measured by the per capita poverty gap, defined as the average shortfall in income/consumption (counting the non-poor as having zero shortfall) and expressed as a percentage of the poverty line. The severity of poverty is measured by the squared per capita poverty gap and can be interpreted as a measure of inequality among the poor, with a value of 100 indicating the maximum level of inequality. See Foster et al. (1984) for further details on these measures.

The plausibility of any of the estimates based on GDP growth forecasts used by many of the studies is open to question given that historically, the accuracy of IMF and World Bank growth estimates has been mixed and furthermore tends to be weaker during crises (see the formal assessment of forecasts versus actual growth data by the IMF's evaluation unit (see Genberg and Martinez, 2014) and others (see for example, Heinisch and Lindner, 2019). Moreover, there is no global model or underlying methodology for the growth forecasts. The estimates are typically made by desk staff in country offices. Sandefur and Subramanian (2020, pp. 3-4) put it thus with reference to IMF estimates, 'growth forecasts are a black box… forecasts are an aggregation of subjective judgements made by the various area units… subject to consistency checks by the research department'. In short, instead of a global model accounting for interdependency between countries or multiple concurrent recessions in advanced economies, country-level forecasts are made on an individual basis and with methodologies that vary from country to country and series to series. These features could also lead to inconsistencies when country-level forecasts are compared. For instance, the IMF (2020 [April]) forecasts a GDP per capita contraction of 2.9 and 0.5 per cent in Malaysia and Indonesia in 2020, respectively, whereas the World Bank's (2020) projection (made at around the same time as the IMF's April 2020 forecasts) for the countries of East Asia and the Pacific forecasts deeper declines: contractions of 4.6 and 3.5 per cent, respectively. The time delay for actual GDP data to reach global databases is typically two years, meaning real, comparable data for 2020 will be available in 2022.

Moreover, there is also the question of how closely GDP per capita declines are correlated to a household per capita welfare contraction; and the issue that the 'pass-through' is unlikely to act symmetrically during positive and negative GDP growth (see discussion in Valensisi, 2020). It is also worth noting that although financial market crises tend to hit GDP figures worse than household welfare, economy-wide shutdowns may actually impact

household welfare more. In contrast, the use of a set of universal income contractions across all developing countries (as used by Sumner et al., 2020) is best viewed as a set of 'what if' scenarios rather than an estimate of the poverty impact of the crisis per se.

In sum, it is important to note that all the above estimates are a range of potential outcomes. In reality none take account of policy interventions and consequentially of depth and severity of the crisis. The final poverty outcome will be determined by what governments do; the duration of the crisis; as well as the precise income shock in each country and how it distributes across the different sectors, regions, and sub-groups of the population. All estimates are indications of magnitude and should not be read as predictions but as a range of potential outcomes. There are good reasons—e.g., the working from home estimates noted above—to believe that the poor and near poor in developing countries will be disproportionally affected since their share among those working in the informal sector, which is particularly impacted by lockdowns, is significant and interacts with absent or deficient social protection systems. Lakner, Yonzan et al. (2020) do present further scenarios based on if each country's Gini Index were to rise one, two, five or ten per cent and/or GDP growth rates were weaker, though there is no way to know which of these scenarios is more likely.

Finally, there are crucial non-monetary poverty impacts in the dimensions of health, education, and living conditions that are *not* captured in any income poverty estimates. There are pernicious impacts of the crisis beyond changes in welfare levels that could have long-lasting effects on human development and capabilities, chiefly health, education, and nutrition. For instance, UNDP (2020) estimates a global decline in a COVID-19-adjusted version of the Human Development Index mostly driven by the education dimension, which could mark the first decline since the inception of the index in 1990. Those impacts on human development and capabilities are *not* captured in any estimates. Neither do any estimates include the policy changes to social protection programmes that governments of many developing countries have

or are planning to introduce, adapt, and/or expand in response to the pandemic. Such programmes are extensive across middle-income developing countries, where most of global poverty is concentrated (see Gentilini et al., 2021).

In sum, estimates of the poverty impact of the pandemic remain tentative and will do so until actual GDP growth data and new household survey data become available for a large set of developing countries (especially the 20 countries where most of the world's poor live noted above) in two to three years or more. In is clear that whatever the precise impact the COVID-19 pandemic, it will bring to the fore the fragility of global poverty reduction to date.

4b. What would it take to meet SDG 1 given an on-going pandemic or its aftermath?

What will determine whether SDG 1 is met? Projections of poverty levels at the extreme poverty line in 2030 were, prior to the COVID-19 pandemic, generally positive about the plausibility of reducing extreme poverty (see in 2005 PPP, Chandy et al., 2013; Dercon and Lea, 2012; Ncube et al., 2014; Ravallion, 2012, 2013 and in 2011 PPP, Lakner, Mahler et al., 2020). Previous studies have though tended to project future levels of poverty based on a set of assumptions about inequality that have limited reference to developing countries' empirical experience. For example, Lakner, Mahler et al. (2020) simulate a set of scenarios for global poverty in 2030 with differing assumptions on growth and its distribution for each scenario. Using IMF GDP growth projections, they find that if within-country inequality remains constant, above 500m or 6.5 per cent of the global population would still be living in poverty (at the $1.90 a day line) in 2030. However, a one per cent per year decrease in the Gini Index would reduce poverty by a further 100m people. Furthermore, many, though not all, studies have focused on the lowest—extreme—poverty line, whereas the debates about the value of international poverty lines noted earlier have indicated that a reduction of education, health,

and nutrition poverty is more evident at higher income poverty lines (see Hoy and Sumner, 2016; Reddy and Lahoti, 2015).

Projections of poverty in 2030 are simply a set of 'what if' scenarios that are as good as assumptions. As such, the former is best understood as a set of tools demonstrating how much growth or change in inequality is required to achieve low levels of poverty and – hopefully - to trigger policy action as a result of illustrating what is possible. This is even more so the case now, as it is very unclear how poverty (and growth and inequality) will evolve over the next decade.

What we can say is there is a set of factors that will determine to a considerable extent what will happen to poverty over the next decade. Specifically, poverty levels up to 2030 will be influenced by the on-going pandemic and its aftermath in developing countries. First, and perhaps foremost, in determining poverty, inequality and growth will be the coverage and efficacy of vaccination programmes in developing countries. Such programmes may need to be annual and are vulnerable to the emergence of variants in terms of both severity of symptoms and infection rates. If vaccines are not widespread, a stop/start economic growth seems likely since infections proceed in waves. This implies cyclical poverty or regular transient poverty (or worse permanent fall backs) due to disrupted economic activity. Individuals may be pushed (deeper) into poverty due to additional health costs or lost income during ill-health. COVAX will—hopefully—reach at least twenty per cent of the population of developing countries in 2022, depending on disruption to production and export bans which place a question mark over the programme's timeline. Another approach raised is to waive the WTO intellectual property (IP) provisions. This is supported by a large number of countries though it seems unlikely, as presumably the IP holders will not be supportive and even if there was an IP waiver there will be a time lag until production is ramped up. In the absence of widespread vaccination programmes with high coverage and high efficacy, it seems likely that vaccine/immunity

passports are used to control infection levels alongside sporadic national and local lockdowns. This is likely to curtail the mobility and thus employment opportunities of those who are un-vaccinated, which may disproportionately be the poorer parts of society.

In short, the poverty impacts of the pandemic and its aftermath are closely related to how widespread vaccination becomes, how effective the specific vaccines used are, who gets the vaccine and who does not (eventually perhaps culminating in the question of who pays for annual vaccination programmes), and the time needed to roll out the vaccines if they are available to all. These factors will play a role in determining levels of growth. There are signs of a commodity boom, but its occurrence is not guaranteed nor is its impact on extreme poverty. Without widespread vaccine coverage, stop/start growth seems likely, which in turn is associated with rising/falling poverty and people moving out of the latter, falling back, moving out again, falling back in a repetitive pattern.

It is thus clear that in absence of widespread vaccination, the pandemic could shape the next ten or more years for many developing countries to some degree through multiple and on-going waves of infection. There are also the questions of morbidity and poverty related to long COVID and its impact.

There is cause for some optimism on social policy. Responses to the crisis look promising, though the question remains whether they will be enough to reduce the on-going waves of poverty, especially so given most people work in the informal sector so likely heavily hit by lockdowns as well as health costs of the pandemic falling on governments and households. Gentilini et al. (2021 [May]) note the very dramatic—exponential—growth of the number of countries enacting social protection measures (see Figures 6), amounting to some 3,333 measures in 222 countries.

Social assistance and insurance measures have risen by over 100 per cent and active labour market interventions by over 300 per cent. Social assistance in the form of cash transfers

(not pension programmes) is the most dominant policy measure (now there are 734 such programmes in 186 countries). Almost 70 per cent of the cash transfer schemes are new programmes. The estimated number of beneficiaries of cash transfers is 1.3bn or 17 per cent of the world's population. However, spending on social protection per capita varies enormously from almost $850 in HICs (data for 53 countries) to $160 in UMICs (46 countries) and just $30 and $4 respectively in LMICs (35 countries) and LICs (17 countries) (ibid., p. 16).

In sum, any projections of poverty in 2030 are speculative and especially so now. The availability, coverage, and efficacy of vaccination programmes (and emergence of variants) is likely to play a central role in economic growth and poverty and inequality trends over the next decade. Expansion of social protection looks encouraging, though it is unclear as of yet whether it will be sufficient to cover the poverty impact as well as the end pre-pandemic poverty. It does illustrate what governments can do.

Figure 6. Evolution of social protection measures, March 2020 to present.
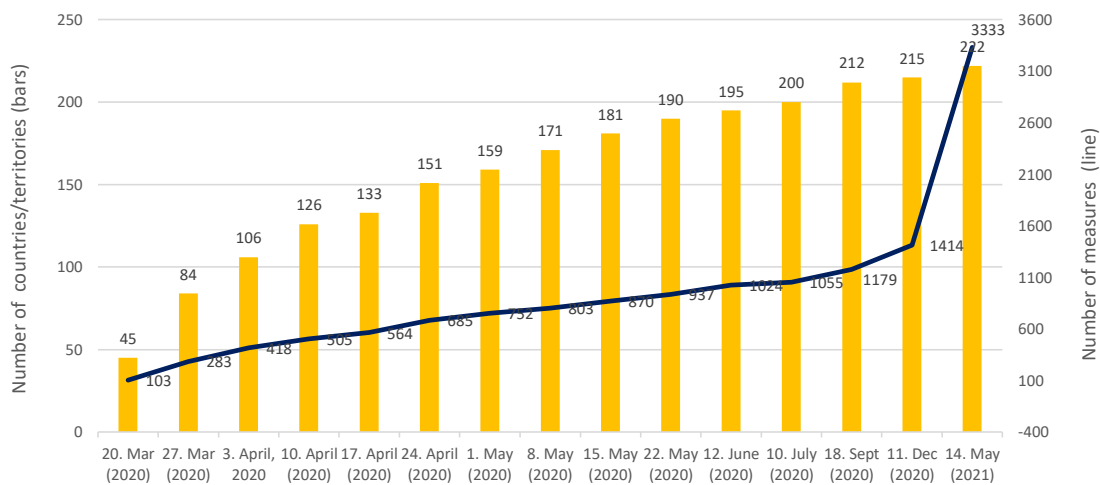
Source: Gentilini et al. (2021 [May], p. 4).

5. CONCLUSIONS

In sum, we have first shown that using the $1.90 poverty line as indicator to measuring poverty faces important limitations. Specifically, it bears the risk of excluding millions of people from the poverty headcount who might well be poor given the methodological questions or who might have just a few cents more than $1.90 a day. This has implications on the level, trends, and location of global poverty. The higher poverty line of $3.20 is more closely correlated to multi-dimensional poverty headcounts and the $3.20 is also the average of national poverty lines where most of the world's poor live.

Second, we have illustrated that progress in poverty reduction is evident but fragile. While $1.90 and $3.20 a day poverty has decreased, the majority of previously poor people and nearly forty per cent of the world's population is not that far out of poverty.

Finally, we have argued that the pandemic will bring to light the fragility of poverty reduction in the sense that millions of people are not far above the poverty line. It is important to keep in mind that estimates of the impact of the COVID-19 pandemic on monetary poverty are tentative and furthermore depend on government action as well as the duration of the crisis and vaccine availability, efficacy and rollout.

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