Maintains

Research supporting social services to adapt to shocks

Towards shock-responsive social protection: estimates from the COVID-19 microsimulation in Pakistan

Research Report

Marta Marzi

March 2021

UKaid from the British people

Oxford Policy Management

About Maintains

This five-year (2018–2023) operational research programme is building a strong evidence base on how health, education, nutrition, and social protection systems can respond more quickly, reliably, and effectively to changing needs during and after shocks, whilst also maintaining existing services. Maintains is working in six focal countries—Bangladesh, Ethiopia, Kenya, Pakistan, Sierra Leone, and Uganda—undertaking research to build evidence and providing technical assistance to support practical implementation. Lessons from this work will be used to inform policy and practice at both national and global levels.

Maintains is funded with UK aid from the UK government; however, the views expressed in this material do not necessarily reflect the UK government's official policies.

Acknowledgements

This case study is part of a larger study looking across the six Maintains countries. We warmly appreciate the time and insights shared by all our respondents, including national governments, as well as development partners, non-governmental organisations, private sector organisations, and research firms. We extend our thanks to the Foreign, Commonwealth and Development Office (FCDO) for the inputs it has provided into the research design and outputs, including Chris Berry, Roger Bellers, Heidi Carrubba, and Tim Conway, as well as the FCDO focal points for Maintains, including Anowarul Haq (Bangladesh), Nicoliene Oudwater (Ethiopia), Martin Gichuru (Kenya), Catriona Clunas (Pakistan), Penny Walker-Robertson (Sierra Leone), and David Musisi (Uganda). The research design and its outputs have benefited from internal review by Ludovico Carraro and Rodolfo Beazley, and inputs from colleagues at Social Protection Approaches to COVID-19 – Expert Advice Helpline (SPACE), including Valentina Barca, Lara Quarterman, and Amber Peterman, and external peer review by Edward Archibald and Emily Wylde, for whose advice we are most grateful.

The team leader for this assignment is Rodolfo Beazley. The key contact point at Oxford Policy Management is Alexandra Doyle (alexandra.doyle@opml.co.uk). The key client contact point is Ciara Silke (Ciara.silke@fcdo.gov.uk).

Citation

Marzi, M. (2021) 'Towards shock-responsive social protection: Estimates from the COVID-19 microsimulation in Pakistan', Shock-responsive social protection responses during COVID-19. Oxford Policy Management, Oxford.

Contacts

✉ maintains@opml.co.uk

www.maintainsprogramme.org

@MaintainsProg

www.linkedin.com/company/maintains/

Executive Summary

This report presents the methodology and results of a microsimulation based on a partial equilibrium modelling framework using nationally representative household-level data for Pakistan. The findings include an estimate of the potential impact of COVID-19 on poverty in the country, based on a model that assumes heterogeneity of impact across individuals and households depending on the type and sector of employment. Moreover, the model is used to assess the effectiveness, coverage, and adequacy of the social protection response to COVID-19. The microsimulation results complement a larger Pakistan country case study, and a policy brief setting out the key findings.

Table of contents

List of tables and figures

List of abbreviations

BISP	Benazir Income Support Programme
CPI	Consumer Price Index
EESP	Ehsaas Emergency Cash Programme
GDP	Gross domestic product
HIICS	Household Integrated Income and Consumption Survey
ISIC	International Standard Industrial Classification
KP	Khyber Pakhtunkhwa
Maintains	Maintaining Essential Services After Natural Disasters
PMT	Proxy means test

1 Introduction

1.1 COVID-19 in Pakistan

The first case of COVID-19 in Pakistan was confirmed on 26 February 2020 and by 18 March 2020 all the provinces and territories of the country had registered at least one case. As at 6 December 2020, a total of 416,499 cases had been reported in the country, with a death rate of 2% (6,416). Currently, 53,126 cases are active, spread across all regions of the country. The highest number of new cases reported in a single day was 6,825, on 13 June 2020, and since then the caseload has experienced a gradual downward trend.[1] A second wave started at the end of October and health experts suspect that the severity of the virus causing the disease is considerably greater in this wave compared to the first wave (Khan, S., 2020).

From 22 March 2020 onwards, all provinces and territories began to enter lockdowns. This response was initially not supported by the Federal Government, due to fear of economic slowdown and potential loss of income for poor people. However, by the end of March the entire country was under various forms of lockdown, the strictness of which varied across different regions depending on the provincial and local authorities. This complete lockdown continued until 9 May 2020, after which a revised lockdown strategy was introduced, whereby only areas with high caseloads face heavy restrictions. The responsibility for following social distancing guidelines was placed on citizens. Currently, the government is implementing a 'micro-smart lockdown' strategy, which limits restrictions to building- or street-level localities with high levels of positive cases, rather than targeting a wider area.

As has occurred across the world, Pakistan has experienced economic impacts of the measures associated with the pandemic. The country recorded a 0.4% decline in the real gross domestic product (GDP) growth rate during the 2019/20 financial year, against the previously projected growth of 3.3%. Industries and services were the sectors that were hardest hit. The Finance Ministry estimates that around 56.6% of the population has become socioeconomically vulnerable, with informal sector workers, migrants, and women at the highest risk of losing employment (Ministry of Finance, GoP, 2020a). The disruption of essential facilities during COVID-19 lockdowns has also led to other groups becoming vulnerable, including students without access to internet/TV for remote learning, or at risk of dropping out due to financial constraints; children and pregnant women without access to timely healthcare; and increasing numbers of families who have become food insecure (GoP, 2020).

A multi-sectoral fiscal stimulus package of PKR 1.2 trillion (£5.5 billion) was approved by the Economic Coordination Committee of the Cabinet on 29 March 2020 (Ministry of Finance, GoP, 2020b). This relief package was aimed at supporting vulnerable households and those sectors of the economy which were likely to be hit the hardest due to the economic slowdown. The package included cash assistance for poor households and daily wage earners in the industrial sector; food and fuel subsidies; deferral of interest payments for

[1] http://covid.gov.pk/stats/pakistan?locale=en

export and agricultural sectors; staggered utility bill payment options; and procurement of medical equipment or protective gear (The News, 2020).

1.2 This report

This report presents the results of a microsimulation for Pakistan that was implemented based on a partial equilibrium modelling framework using nationally representative household-level data. The findings from the microsimulation include: an estimate of the potential impact of COVID-19 on poverty in Pakistan, based on a model that assumes heterogeneity of impact across individuals and households, depending on the type and sector of employment; and an assessment, based on the model, of the effectiveness, coverage, and adequacy of the social protection response to COVID-19.

2 Methodology

2.1 Data sources

Table 1 summarises the key data sources used to parameterise and estimate the microsimulation model. The 2015/16 HIICS provides the household-level data on which the simulation is based. Data on population growth by area of residence are used to update household-level weights to reflect the 2020 situation. All the other data sources are used to define parameters related to the impact of the pandemic on each main economic sector and on inflation.

It should be noted that the 2015/16 HIICS data are representative only of the population living in the provinces of Punjab, Islamabad, Sindh, KP, and Balochistan. This means that our results do not consider the impact of COVID-19 on the population living in the Federally Administered Tribal Areas, Azad Jammu and Kashmir, and Gilgit-Baltistan. According to the 2017 Census, the population in these areas represents around 5% of the total population of Pakistan.[2]

It should be noted that the 2015/2016 HIICS data is representative only of the population living in the provinces of Punjab, Islamabad, Sindh, KP, and Balochistan. This means that our results do not consider the impact of COVID-19 on the population living in the Federally Administered Tribal Area, Azad Jammu and Kashmir, and Gilgit-Baltistan. According to the 2017 Census population in these areas represent around 5% of total population in Pakistan[3].

Table 1: Data sources for the microsimulation

Data	Source	Year
HIICS	Pakistan Bureau of Statistics	2015–16
Urban and rural population data	World Development Indicators (World Bank)	2015–20
Actual and projected GDP by sector	Pakistan Bureau of Statistics	2015–20
CPI	Pakistan Bureau of Statistics	2015–20
Sectoral impact of COVID-19	PIDE	2020
Impact of COVID-19 on remittances	UNDP(UNDP, 2020) and PIDE	2020

2.2 Channels of impact

Economic hardship experienced by families because of the global pandemic and resulting economic downturn is expected to increase poverty, especially among more vulnerable groups like children. In the short term, households will be affected by the shock through multiple channels: income from labour is likely to decrease because of reduced economic

[2] The official population figures for Gilgit-Baltistan have not been released yet. Our estimates for this territory is therefore based on its population as reported in the 1998 Census.
[3] The official population figures for Gilgit-Baltistan have not been released yet. Our estimates for this territory is therefore based on its population as reported in the 1998 Census.

activity due to quarantine measures and the global recession. Furthermore, non-labour income in the form of remittances and public transfers is likely to change, consumption expenditure will be affected not only by the reduced income, but also by price changes and possibly shortages of some goods as well as by a rise in health out-of-pocket expenditure, service disruptions (e.g. suspension of education services, reduction of public transportation, saturation of the health system, etc.) are likely to negatively affect monetary welfare dimensions.[4] Moreover, the pandemic can also have direct health consequences for individuals and households that are infected.

Our approach considers two main impact channels on household welfare – income and prices – and allows for a full accounting of the heterogeneous nature of COVID-19 economic shocks. Employment income can be completely lost due to loss of employment, or wages can be reduced due to lower economic activity.[5] Both the probability of employment loss and the percentage of wage reduction depend on the sector and on the nature of employment, taking into account differences between casual and more permanent types of employment.[6] The impact on income from self-employment depends on the sector of activity.

The change in economic activity may alter the supply and demand of different goods or services, leading to price changes. The impact of inflation, especially food inflation, on consumption expenditure is therefore modelled.

2.3 Approach

To assess the adequacy, coverage, and comprehensiveness of the response, we conducted a microsimulation based on a partial equilibrium modelling framework using nationally representative household-level data. To do this, we simulated the impact of the pandemic on poverty and inequality, as well as the effect of social protection policies that can mitigate negative effects on people's wellbeing. The post-COVID and post-social protection measures scenarios are compared to a pre-COVID baseline scenario, which estimates the expected poverty and consumption level in the absence of the pandemic.

2.3.1 Baseline scenario

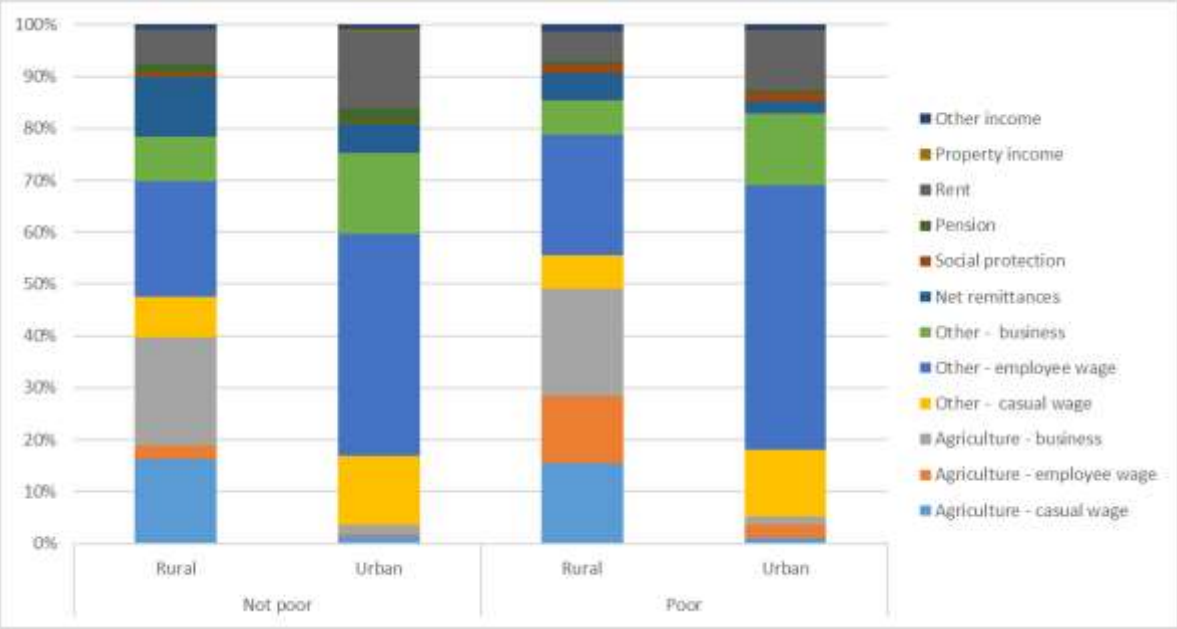
To obtain income and consumption estimates that reflect the situation in Pakistan in 2020 before the impact of COVID-19, the 2015/16 Since Household Integrated Income and Consumption Survey data are adjusted in two ways. First, sampling weights are adjusted to reflect the growth in population and urbanisation between 2015 and 2020, based on population growth projections by area of residence (see Table 16 in **Error! Reference source not found.**). Having a dataset that reflects population size in 2020 will allow us to provide absolute figures on the expected number of newly poor, and to directly simulate implemented policy interventions based on actual or expected number of beneficiaries.

[4] World Bank, 2020. Poverty and Distributional Impacts of COVID-19: Potential Channels of Impact and Mitigating Policies.
[5] The direct negative impact of the pandemic on employment income through illness is not considered. Similarly, the impact of higher out-of-pocket expenditure because of illness is not modelled.
[6] Since Household Integrated Income and Consumption Survey (HIICS) data do not distinguish between casual and permanent employment, we have assumed that casual employees are those engaged in elementary occupations.

Second, household-level employment and business income by sector is increased assuming an elasticity of household income and GDP *per capita* of 0.25[7] based on estimated real *per capita* GDP growth by sector between 2015 and 2020, where for 2020 we used pre-COVID growth projections (see Table 17 in **Error! Reference source not found.**). Real income growth is then fully passed on to the share of real consumption expenditure that does not come from own production, while consumption from own production is assumed to be constant.

In terms of understanding the possible impact of COVID-19, it is useful to assess what are the main income sources of the poor at baseline. This information is provided in Figure 1.

Figure 1: Income sources across geographical areas and levels of poverty, 2020



2.3.2 COVID-19 impact scenarios

Given the level of uncertainty surrounding the actual impact of COVID-19 on employment income and remittances, we have modelled three impact scenarios with different levels of impact. The 'short term' impact scenario adopts the most dramatic assumption on the impact of the pandemic based on the expected impact of lockdown and restriction measures and on the likely impact on the most affected sectors of the economy. The 'transition' scenario mitigates the impact parameters, assuming that over time some of the negative effect of the pandemic will fade. Finally, the 'recovery' scenario adopts the most optimistic set of assumptions to model a situation where the impact of the pandemic has almost faded away.

Assumptions on the level of price and income changes were based on available sector-level GDP projections, estimates of sectoral-level impact by type of containment measures (i.e. stringency of lockdowns), estimates of the impact on remittances, and available information on changes in prices.

[7] Based on pass-through estimates from World Bank, 2019. South Asia Economic Focus: Rethinking Decentralization. Washington, DC: World Bank. https://doi.org/10.1596/978-1-4648-1515-7

Income impact channel

Household income is impacted through a decrease in the level of remittances received and through a shock to employment and/or business income received by each household member. The latter is the result of an unemployment effect for a certain percentage of individuals who lose all their income, and a reduced income effect for all the workers who do not become unemployed and for those who are self-employed or own a business. The size of the employment and business loss depends on the sub-sector of employment (for which we use ISIC codes, Rev.4) and on the nature of the employment, i.e. casual, permanent,[8] or self-employment/household business.

Shock on employment of employees:

- U_C% of casual wage workers and U_p% of permanent wage workers in sector of employment *s* become unemployed and suffer a 100% wage income loss during a period *t*. Typically $U_p > U_c$.
- The unemployment shock is randomly assigned across permanent and casual waged workers within sector *s*. Results are obtained from repeating the random selection process 100 times and obtaining the average estimate. This is done to ensure that the results are robust and more representative.

Shock on wage incomes of employees and self-employed:

- All remaining (1- U_c)% casual workers and (1- U_p)% permanent workers lose W_c% and W_p% of their pre-crisis wage incomes, as a result of the COVID-19 crisis during a period *t*.
- To capture heterogeneity the percentage of wage income loss is modelled as a normal distribution.

Shock on household's business income:

- Business income in sector s is reduced by Δ_B%.
- While business income from agricultural production can be affected by the pandemic, agricultural production used for own consumption is assumed not to be impacted by the crisis.

The resulting drop in member-level income translates into a drop in household-level employment and business income.

Table 2 and Table 3 list the parameters used for the microsimulations for the employment income drop and business income drop, respectively. The selected probabilities for the three scenarios of unemployment by sector are based largely on an analysis of job vulnerability by the Pakistan Institute of Development Economics (PIDE)[9] and on impact estimates

[8] Since HIICS data does not distinguish casual and permanent employment, we have assumed that casual employees are those engaged in elementary occupations.
[9] PIDE, 2020a. Sectoral analysis of the vulnerably employed (PIDE COVID-19 Bulletin). Pakistan Institute of Development Economics.

developed by the Government of Pakistan together and UNDP[10]. The sectors expected to be most affected by job losses are 'construction', 'accommodation and food services', 'arts, entertainment, and recreation', and 'other services'. Most of the other sectors are also impacted to a large extent, at least in the worst-case scenario, with the exception only of the 'human health and social work activities' sector. Assumptions on the impact of the pandemic on businesses' income are based on the findings of a study looking at the COVID-19 impact on micro, small, and medium-sized enterprises in Pakistan[11]. The same assumptions are then used to estimate the wage drop for casual workers not losing their jobs.

[10] UNDP, 2020. COVID-19 – PAKISTAN SOCIOECONOMIC IMPACT ASSESSMENT & RESPONSE PLAN.
[11] Shafi, M., Liu, J., Ren, W., 2020. Impact of COVID-19 pandemic on micro, small, and medium-sized Enterprises operating in Pakistan. Research in Globalization 2, 100018. https://doi.org/10.1016/j.resglo.2020.100018.

Table 2: Assumptions regarding percentage drops in casual and permanent employment income

Sector	Short term				Transition				Recovery			
	U_P	U_C	W_P	W_C	U_P	U_C	W_P	W_C	U_P	U_C	W_P	W_C
Agriculture, forestry, fishing	20	40	-15%	-25%	10	20	-10%	-15%	5	10	-5%	-10%
Mining and quarrying	40	80	-25%	-45%	30	60	-15%	-25%	15	30	-10%	-15%
Manufacturing	40	80	-25%	-45%	30	60	-15%	-25%	15	30	-10%	-15%
Electricity, gas, steam, and conditioning	5	10	-5%	-10%	0	10	0%	-5%	0	0	0%	0%
Water supply, sewerage, waste management	5	10	-5%	-10%	0	10	0%	-5%	0	0	0%	0%
Construction	45	90	-25%	-45%	40	80	-15%	-25%	20	40	-10%	-15%
Wholesale and retail trade; repair of motor vehicles, motorcycles, and personal and household goods	40	80	-25%	-45%	30	60	-15%	-25%	15	30	-10%	-15%
Transportation and storage	40	80	-25%	-45%	30	60	-15%	-25%	15	30	-10%	-15%
Accommodation and food services activities	45	90	-25%	-45%	40	80	-15%	-25%	20	40	-10%	-15%
Information and communication	30	60	-5%	-10%	20	45	0%	-5%	10	20	0%	0%
Financial and insurance activities	30	60	-5%	-10%	20	45	0%	-5%	10	20	0%	0%
Real estate activities	30	60	-5%	-10%	20	45	0%	-5%	10	20	0%	0%
Professional, scientific, and technical	30	60	-5%	-10%	20	45	0%	-5%	10	20	0%	0%
Administration and support	30	60	-15%	-25%	20	45	-10%	-15%	10	20	-5%	-10%
Public administration and defence	30	60	-5%	-10%	20	45	0%	-5%	10	20	0%	0%
Education	40	80	-5%	-10%	30	60	0%	-5%	15	30	0%	0%
Human health and social work activities	0	5	-5%	-10%	0	0	0%	-5%	0	0	0%	0%
Arts, entertainment, and recreation	45	90	-25%	-45%	40	80	-15%	-25%	20	40	-10%	-15%
Other service activities	45	90	-15%	-25%	40	80	-10%	-15%	20	40	-5%	-10%
Activities of households as employers	30	60	-15%	-25%	20	45	-10%	-15%	10	20	-5%	-10%
Activities of extra-territorial organisations	30	60	-15%	-25%	20	45	-10%	-15%	0	20	-5%	-10%

Table 3: Assumptions regarding percentage drops in business income (Δ_B)

Sector	Short term	Transition	Recovery
Agriculture, forestry, fishing	-25%	-15%	-10%
Mining and quarrying			
Manufacturing	-45%	-25%	-15%
Electricity, gas, steam, and conditioning			
Water supply, sewerage, waste management			
Construction	-45%	-25%	-15%
Wholesale and retail trade; repair of motor vehicles, motorcycles, and personal and household goods	-45%	-25%	-15%
Transportation and storage	-45%	-25%	-15%
Accommodation and food services activities	-45%	-25%	-15%
Information and communication	-10%	-5%	0%
Financial and insurance activities			
Real estate activities	-10%	-5%	0%
Professional, scientific, and technical	-10%	-5%	0%
Administration and support	-25%	-15%	-10%
Public administration and defence			
Education	-10%	-5%	0%
Human health and social work activities	-10%	-5%	0%
Arts, entertainment, and recreation	-45%	-25%	-15%
Other service activities	-25%	-15%	-10%

Shock on remittances:

- Remittances received in kind and/or in cash are reduced by R%.
- Remittances sent are assumed to be a constant share of household income.

Table 4 summarises our assumptions on the drop in remittances under the three modelled scenarios. Remittances accounted for more than 6% of the country's GDP in 2019 and it is expected that they will be adversely impacted by COVID-19[12]. The short term impact scenario assumes a decline of 30% in remittances received, in line with Asian Development Bank estimates[13]. In the transition scenario we assumed a recovery in remittances received to 85% of the baseline level. Finally, under the recovery scenario remittances are assumed to be at 95% of their original level.

Table 4: Assumption on percentage drop in remittances, by scenario

Type	Short term	Transition	Recovery
Received remittances	-30%	-15%	-5%

Shock on other income sources:

- Other income sources (pension, public transfers, etc.) are assumed to stay constant.

Employment and other income shocks are compiled to obtain a revised household-level income estimate[14] and percentage income drop estimate. Given that income data do not correspond perfectly to consumption, the assumption here is that income shocks translate into consumption linearly for the part of consumption that does not come from own production, while consumption expenditure from own production is assumed to be constant.

Price impact channel

A household-specific food and non-food items price index that captures inflation due to COVID-19 is used to estimate the differential impact of the projected price increases on the purchasing power of households, depending on household-specific consumption patterns. For instance, poor households tend to have a larger share of food consumption and are therefore proportionally more affected by changes in food prices. Consumption expenditure from own production is not deflated as it is assumed to be immune to the impact of price changes. In addition, we used disaggregated Consumer Price Index (CPI) data for rural and urban areas to account for the differential impacts of the crisis across areas.

To construct the baseline scenario, we deflated household-level consumption by multiplying household-level consumption within each category by the ratio between CPI inflation 2015–2020 pre-COVID and CPI inflation 2015–2020 post-COVID. CPI inflation post-COVID is

[12] PIDE, 2020b. COVID 19 and remittances (PIDE COVID-19 Bulletin No. 20). Pakistan Institute of Development Economics.
[13] Asian Development Bank, Kikkawa Takenaka, A., Villafuerte, J., Asian Development Bank, Gaspar, R., Asian Development Bank, Narayanan, B., Asian Development Bank, 2020. COVID-19 Impact on International Migration, Remittances, and Recipient Households in Developing Asia. Asian Development Bank. https://doi.org/10.22617/BRF200219-2
[14] The estimated revised household-level income does not include income from own production.

computed assuming that prices change linearly with respect to the observed CPI between January and May 2020 (see Table 5). CPI inflation in the absence of the pandemic shock is computed assuming that CPI inflation between 2019 and 2020 would have been the same as CPI inflation between 2018 and 2019. As we can see from Table 5, the pandemic is having an inflationary impact on both food and non-food prices, with a stronger impact on the former.

Table 5: Assumption on the ratio of CPI inflation without and with COVID-19 impact, by area type of good (2015–2020)

Type	Baseline [a]	Short term/transition [b]	Recovery [c]
Rural – all	0.967	0.967	0.983
Rural - food	0.902	0.902	0.951
Rural – non-food	0.969	0.969	0.984
Urban – all	0.979	0.979	0.989
Urban – food	0.909	0.909	0.955
Urban – non-food	0.932	0.932	0.966
Rural – all	0.967	0.967	0.983

Source: Authors, based on CPI data from International Monetary Fund and Pakistan Bureau of Statistics. Notes: [a] Observed CPI inflation trend between 2015 and 2020 and assumed linear trend between 2018/19 and 2019/20. [b] Observed CPI inflation up to May 2020. [c] Average between baseline and short term/transition inflation trends.

Poverty estimation

Based on the estimated post-COVID consumption expenditure, the revised headcount poverty rate and poverty gaps are estimated using as poverty lines:

- the annual national absolute poverty line per adult equivalent (Pakistani rupees (PKR) 3,250 in 2015);
- the middle-income class poverty line of US$ 3.20 (2011 PPI) *per capita* per day; and
- the lower middle-income class poverty line of US$ 1.90 (2011 PPI) *per capita* per day.[15]

Headcount poverty and poverty gaps ex-post COVID-19 are compared with the equivalent estimates at baseline, i.e. pre-COVID. Focusing on the national absolute poverty line only, we also compute headcount poverty by rural/urban location and by province, as well as looking at the expected increase in poverty by a set of household characteristics (i.e. household size, presence of members with a disability, sex and age of household head, head employment status and sector of employment).

In addition, we conduct some analysis of households that fall into poverty because of COVID-19. For those we estimate:

[15] The 2015 value in PKR of the per capita US$ 1.90 and US$ 3.20 poverty lines would be PKR 1,944 and PKR 3,273, respectively.

- the number of individuals that become poor because of COVID-19, i.e. they lived in households that were above the national poverty line at baseline and are below it post-shock;
- the average amount and percentage loss of consumption because of COVID-19; and
- the average shortfall from the poverty line for households that fall into poverty because of COVID-19 and for those that become poorer because of COVID-19.

2.3.3 Social protection impact scenarios

We used the three post-COVID-19 scenarios to further simulate the mitigating effects of the most relevant cash-based social protection measures that have been or are going to be implemented in 2020, based on information on expected coverage, target group, amount, and duration of benefits. Table 6 gives an overview of the six variations of the Ehsaas Emergency Cash Programme (EESP) we simulated using our model.

Table 6: Social protection measures simulated

Measure	Coverage (HH)[a]	Total annual value (PKR)	Geographic targeting[b]	Eligibility
EESP – Cat I (Cat I)	5,034,469	4,000	National	All Kafaalat beneficiaries (PMT 0 – 16.17) [c]
EESP – Cat II (Cat II)	4,000,000	12,000	Provincial share	PMT 16.18 – 38 [c] and clearing wealth criteria [d]
EESP – Cat III (Cat I)	3,500,000	12,000	Provincial share	Either Cat II criteria or six monthly phone bills below PKR 100 [e] and clearing wealth criteria [d]
EESP – Cat IIIa (Cat IIIa)	700,000	12,000	Punjab only	
EESP – Cat IV (Cat IV)	1,263,924	12,000	National	
EESP – Cat V (Cat V)	2,451,976	12,000	National	

Notes: PMT = Proxy means test. HH = household. [a]Coverage of the EESP programmes across Punjab, Islamabad, Khyber Pakhtunkhwa (KP), Sindh, and Balochistan only. These are the only provinces covered by the 2015/16 HIICS. [b] Geographic targeting was replicated by using the actual number of beneficiaries enrolled in each programme under each of the programmes (see

Table 18 in Annex A). [c] We assume that all Benazir Income Support Programme (BISP) beneficiaries in the 2015/16 data are still Kafaalat beneficiaries. Moreover, given that the number of households reporting receiving the BISP is only 3.8 million, approximately (presumably due to underreporting since the coverage has not substantially changed between 2015 and 2020), we identified the additional BISP beneficiaries using the PMT cut-off and assigned to them the additional transfer of PKR 4,000. We estimated a PMT formula as similar as possible to the one used by BISP and set the eligibility cut-off based on the expected population coverage.

[d] The EESP used a long list of exclusion criteria that are only in part replicable using HIICS data. We excluded households that fulfil one or more of the following exclusion criteria: they report *per capita* phone bills exceeding PKR 1,000; they report annual expenditure on car-related items; they have an income in the form of a proper wage and/or from a business (we excluded casual and agricultural income, because they are less likely to be part of declared income) above the eligibility threshold; they have one member in government employment.[e] Households are considered eligible if their PMT is below the selected threshold or if they report *per capita* phone bills below PKR 100.

Determining eligibility for the programmes is not straightforward in the data, due to the lack of access to exact information on the PMT formula used, and on household-specific information on phone bills. Moreover, the EESP used government-level databases to extract information on household-level wealth, which was then used to exclude households presumed to be better off. Nonetheless, the use of a PMT methodology close to the original one, and of province-level information on the distribution of beneficiary households, should make our replication of the targeting of the programmes credible. Given that the size of the eligible population for each programme is larger than the expected programme coverage, we randomly allocate benefits across eligible households. The random allocation is repeated 100 times.

At each round of random selection, the amount of the transfer is added to selected beneficiary households' income to generate an expected average impact on income.[16] The expected impact on income is then translated into consumption based on the same assumption used for the overall COVID-19 impact. Finally, revised poverty headcount estimates and statistics on the impoverished population are produced.

[16] The transfer value amount is deflated to 2015 prices using food CPI inflation, rather than overall CPI inflation. This is to account for the fact that most of the transfer is likely to be spent by the target beneficiary population on food.

3 COVID-19 impact on poverty and consumption

Our estimates suggest a significant increase in headcount poverty in Pakistan because of COVID-19. In the highest impact scenario, the number of individuals below the national poverty line is predicted to increase from around 42 million to 101 million, approximately.

Table 7: Official, baseline, and post-COVID headcount poverty by scenario (% of population)

Scenario	National poverty line	Extreme poor (US$ 1.90)	Poor (US$ 3.20)
Official (2015)	24.3	3.9	34.7
Baseline (2020)	23.9	4.2	33.9
Post-COVID: Short term	57.3	29.7	64.0
Post-COVID: Transition	48.5	22.0	56.1
Post-COVID: Recovery	38.1	12.9	46.7

Source: Authors, based on the microsimulation results using 2015/16 HIICS data.

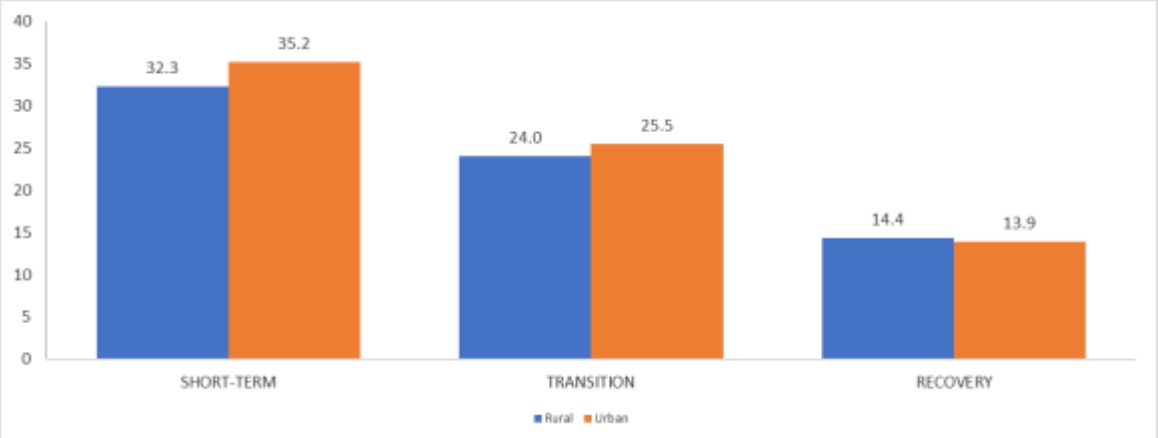
Table 8: Number of newly poor

	Nationally	Rural	Urban
Post-COVID: Short term	59,435,336	37,100,408	22,334,924
Post-COVID: Transition	43,787,740	27,606,708	16,181,031
Post-COVID: Recovery	25,350,488	16,526,390	8,824,096

Source: Authors, based on the microsimulation results using 2015/16 HIICS data.

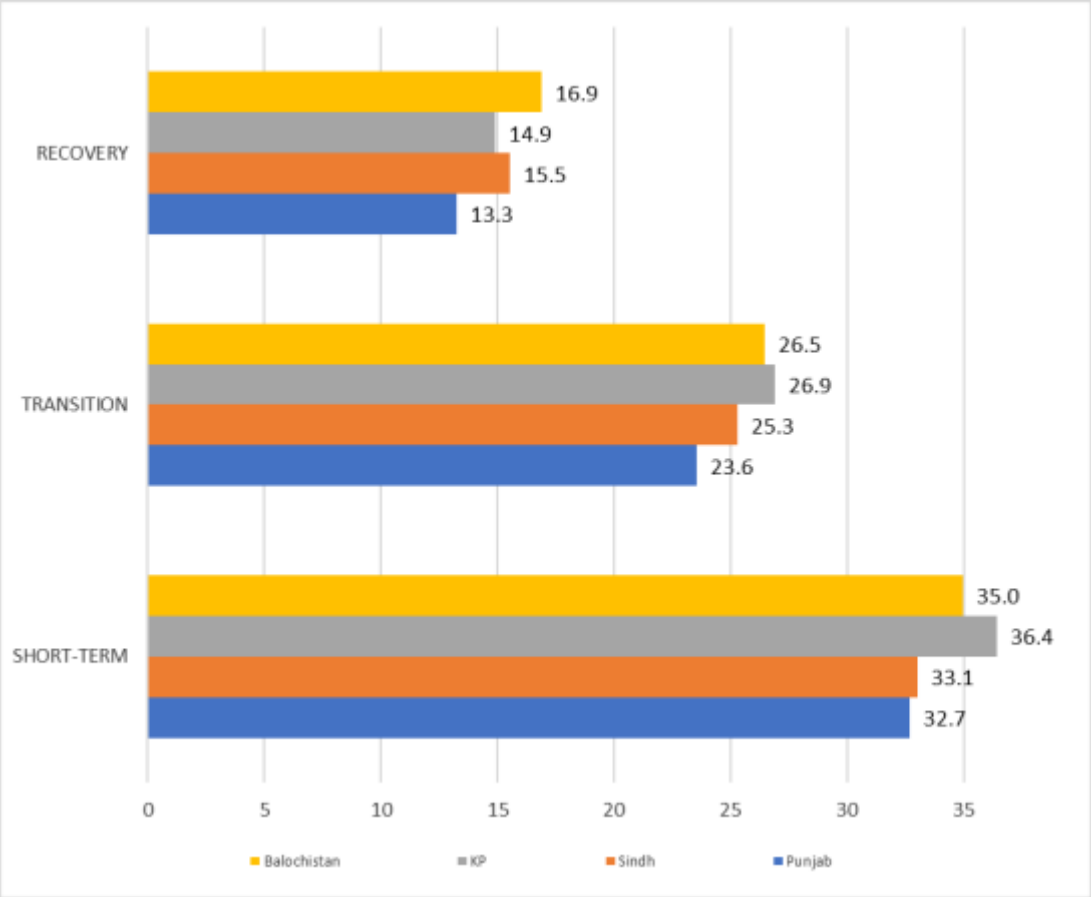
Figure 2 shows the increase in the poverty rate by area of residence. In all scenarios, the urban poverty rate increases more than the rural one. In the short term, we estimated an increase of almost 35 percentage points in urban areas, and of 32 points in rural ones.

Figure 2: Absolute percentage point increase in headcount poverty at national poverty line, by area of residence, by scenario



Source: Authors, based on the microsimulation results using 2015/16 HIICS data.

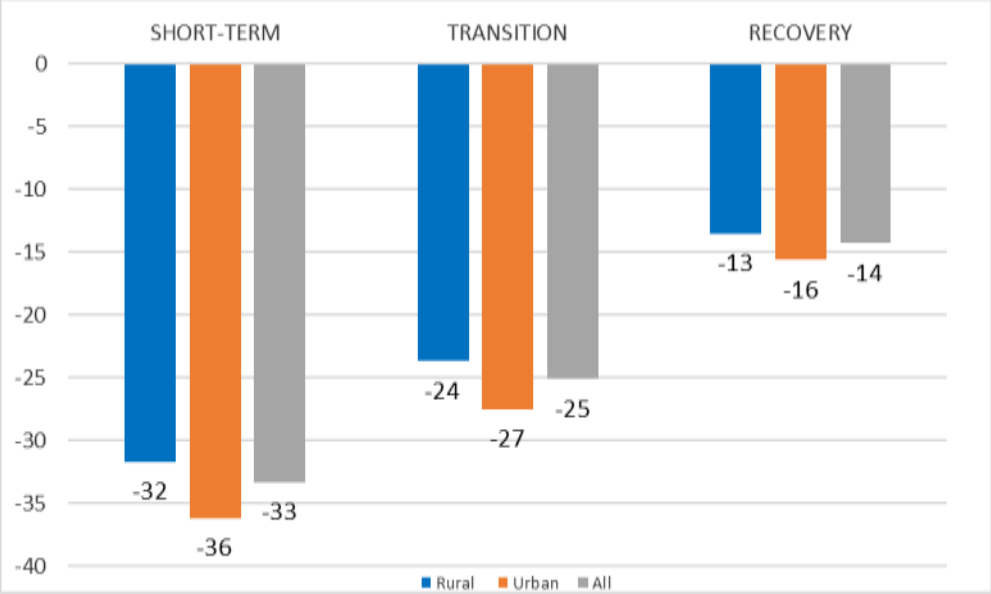
Figure 3: Absolute percentage point increase in headcount poverty at national poverty line, by province



Source: Authors, based on the microsimulation results using 2015/16 HIICS data.

As seen in other countries, we find that COVID-19 has been more disruptive in urban settings. Indeed, the crisis is found to cause a reduction in urban consumption expenditure from 36% in the short term scenario to 16% in the recovery scenario, compared to baseline.

Figure 4: Average percentage loss of per adult equivalent consumption, by area of residence



Source: Authors, based on the microsimulation results using 2015/16 HIICS data.

Table 9: Change in poverty gap with respect to national poverty line and Gini coefficient

Scenario	Poverty gap	Gini
Baseline (2020)	0.044	31.2%
Post-COVID: Short term	0.216	38.0%
Post-COVID: Transition	0.167	36.7%
Post-COVID: Recovery	0.106	34.1%

Source: Authors, based on the microsimulation results using 2015/16 HIICS data.

Table 10 below compares demographic and employment traits of household poor at baseline and poor post-COVID-19. As might be expected, households falling into poverty because of the pandemic are more likely to live in urban areas and to be employed in non-agricultural businesses.

Table 10: Characteristics of households that fall into poverty with respect to households already in poverty at baseline

	Baseline poor	Newly poor		
		Short term	Transition	Recovery
Household size	7.9	6.6	6.6	6.7
% with head 65+	7.9	9.8	9.6	9.4
% with female head	6.4	7.7	6.6	5.4
% head is a casual worker	35.9	23.9	27.4	31.3
% head is a formal worker	18.6	33.1	34.2	31.5
% households with non-agricultural business	15.4	21.6	18.2	17.8
% households with agricultural business	33.3	23.1	22.7	23.3
% head is unemployed	0.6	0.3	0.3	0.2
% head is out of labour force	13.2	13.9	12.7	11.8
% head works in agriculture	40.9	20.1	19.7	20.6
% head works in services	22.0	37.2	35.8	33.7
% head works in industry	22.8	27.9	31.0	33.0
% living in urban areas	17.6	37.5	37.1	34.5

Source: Authors, based on the microsimulation results using 2015/16 HIICS data.

4 Social protection measures effect

4.1 Coverage

In Table 11 we look at the estimated coverage of eligible households and the coverage of the overall household population of the various programmes. Altogether, the EESP interventions cover 60% of households in the provinces covered by 2015/16 HIICS data and 72% of the households eligible for one or more programme[17].

The Cat I top-up transfer covers all of the eligible population, which is constituted by households already receiving the EESP programmes. Cat I households represent 18% of households in the provinces covered by 2015/16 HIICS data. All of the other programmes are mutually exclusive but cover a partially overlapping population of households due to similarity of eligibility criteria. Overall, EESP Cat II to Cat V cover 64% of the households eligible for any of them, and a percentage of households in the provinces covered by 2015/16 HIICS that goes from 2% for the Punjab limited programme (Cat IIIa) to 14% for Cat II.

Table 11: Proposed caseload and estimated coverage of eligible and overall population (% of households)

Programme	Coverage of eligible [a]	Coverage of overall households[b]
EESP – Cat I (Cat I)	100%	18%
EESP – Cat II (Cat II)	64%	14%
EESP – Cat III (Cat I)		12%
EESP – Cat IIIa (Cat IIIa)		2%
EESP – Cat IV (Cat IV)		4%
EESP – Cat V (Cat V)		9%
All EESP programmes	**72%**	**60%**

Source: Authors, based on the microsimulation results using 2015/16 HIICS data with population size updated based on population growth. Note: [a] Coverage is computed as caseload over the number of households identified as eligible according to the programme targeting criteria as replicated in the data.[b] Population-level coverage includes only individuals living in Punjab, Islamabad, KP, Sindh, and Balochistan, because only these provinces are covered by the 2015/16 HIICS.

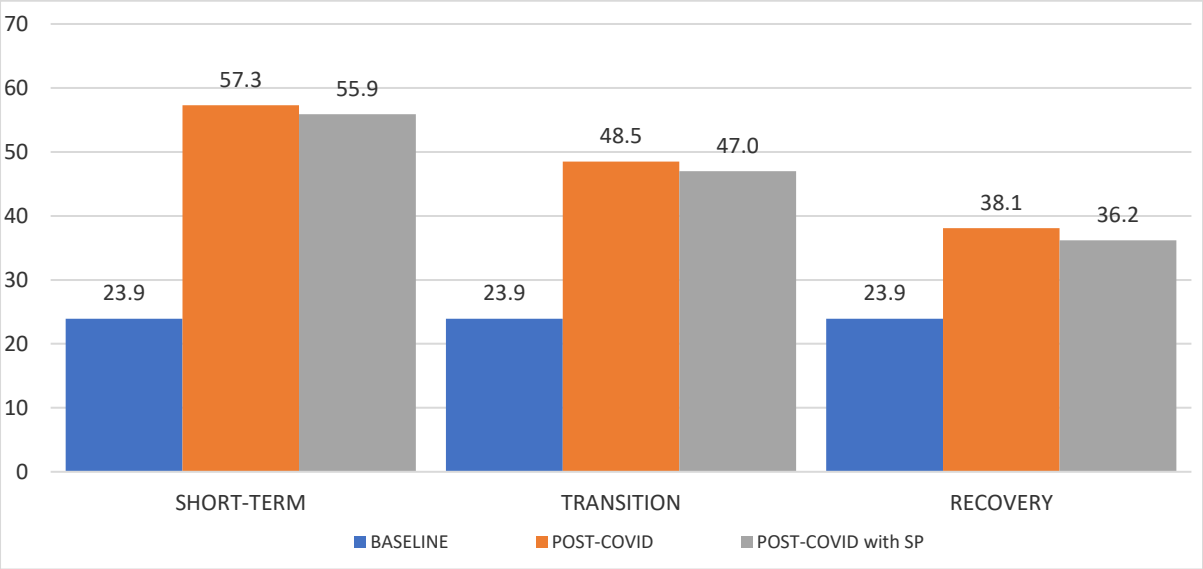
4.2 Poverty impact

Figure 5 highlights the headcount poverty at the national poverty line at the baseline and post-COVID-10, with and without social protection interventions. The orange bar shows the estimated poverty levels following COVID-19 without the social assistance transfers discussed above, the grey bar shows the impact of COVID-19 with the transfers. The blue bar indicates a situation without COVID-19. It shows that the programmes combined are likely to reduce the national poverty level by slightly more than 1 percentage point. The

[17] Population coverage of the programme would be 47% using total population figures from the 2017 Population Census and average household size of 6.6 as estimated in the 2017/2018 Pakistan Demographic health survey.

marginal contribution to poverty reduction can be explained by the one-off nature and the level of transfers, as well as by the fact that the transfers are not perfectly targeted to the poor (see the next section on adequacy).

Figure 5: Headcount poverty at national poverty line (% of population) at baseline and post-COVID (with and without social protection interventions)



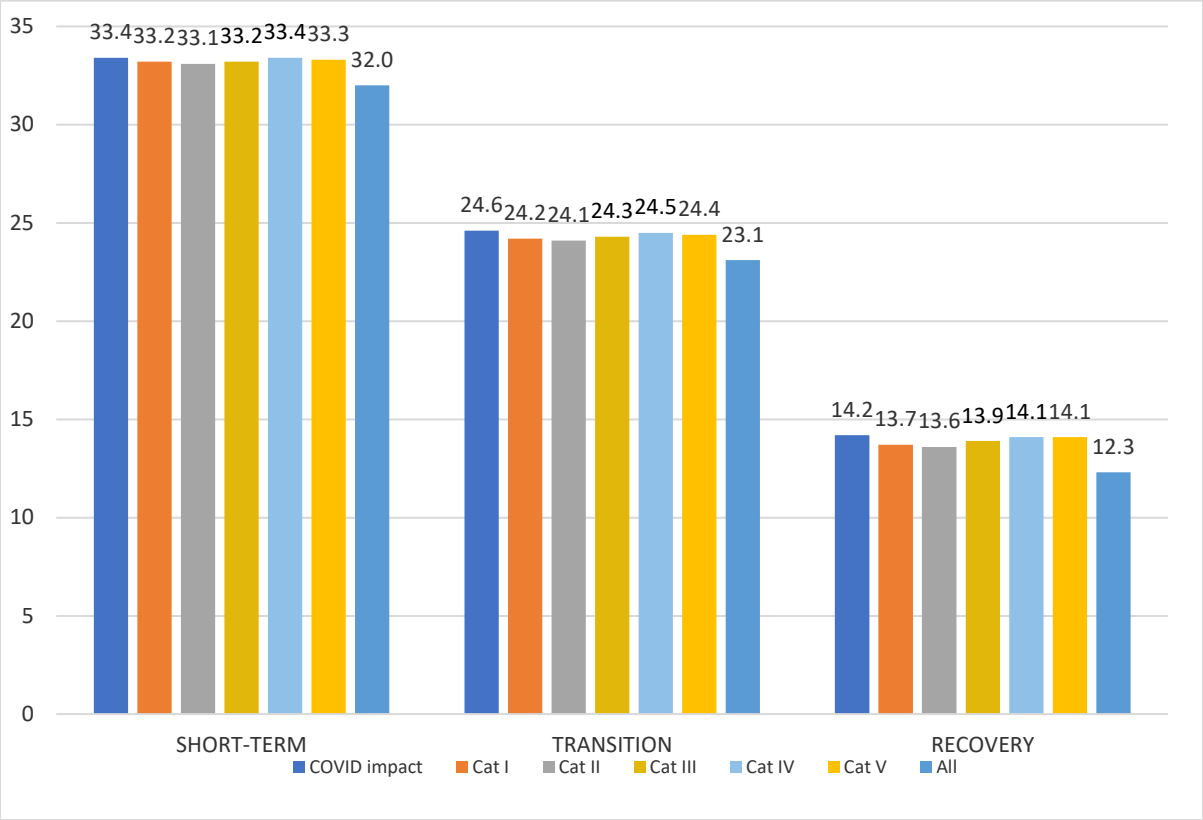
Source: Authors, based on the microsimulation results using 2015/16 HIICS data.

Table 12: Percentage point reduction in headcount poverty with social protection measures

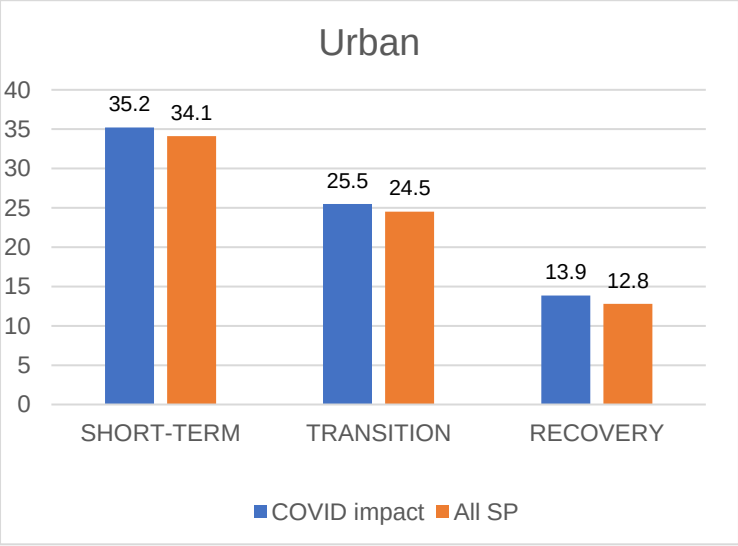
	National poverty line	Extreme poor (US$ 1.90)	Poor (US$ 3.20)
Post-COVID: Short term	57.3	29.7	64.0
Percentage point decrease with social protection	-1.4	-1.8	-1.2
Post-COVID: Transition	48.5	22.0	56.1
Percentage point decrease with social protection	-1.5	-1.3	-1.3
Post-COVID: Recovery	38.1	12.9	46.7
Percentage point decrease with social protection	-1.9	-1.0	-1.4

Source: Authors, based on the microsimulation results using 2015/16 HIICS data.

Figure 6: Percentage point increase in poverty headcount at national poverty line with and without social protection measures

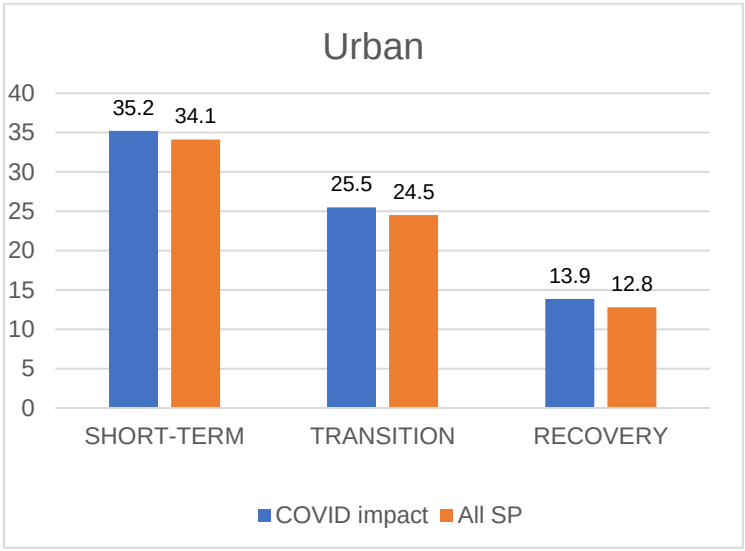


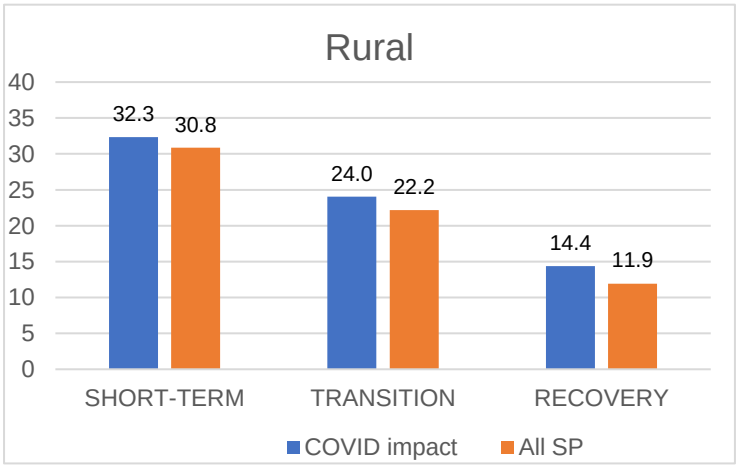
Source: Authors, based on the microsimulation results using 2015/16 HIICS data.



shows that poverty is reduced by the social protection interventions proportionally more in rural areas than in urban areas. This is partially due to the fact that households eligible for the emergency programmes are more likely to reside in rural areas.

Figure 7: Percentage point increase in poverty headcount at national poverty line with and without social protection measures, by area of residence





Source: Authors, based on the microsimulation results using 2015/16 HIICS data.

4.3 Adequacy

Table 13 compares the annual value of the four social protection interventions we modelled with the national poverty line and with the average consumption of the bottom 25% of households in Pakistan. It shows that when their value is annualised, the transfers only cover a small percentage of the consumption needs of poor households.

Table 13: Social protection measures simulated

Measure	Total annual value (PKR)	% of annual national poverty line (household level)	% of annual consumption expenditure of bottom 25% households at baseline	
			Rural	Urban
EESP – Cat I (Cat I)	4,000	1%	2%	1%
EESP – Cat II (Cat II)	12,000	3%	5%	4%
EESP – Cat III (Cat I)				
EESP – Cat IIIa (Cat IIIa)				
EESP – Cat IV (Cat IV)				
EESP – Cat V (Cat V)				

Source: Authors, based on the microsimulation results using 2015/16 HIICS data.

To assess the adequacy of the proposed interventions we looked at the predicted additional needs of households falling into poverty and of those already poor at baseline that fall deeper into poverty. Specifically, we computed the average shortfall from the national poverty line for households falling into poverty because of the shock and the additional shortfall from the poverty line for households that were already poor at baseline but fell deeper into poverty because of the shock. Table 14 shows that the poverty gap among the newly poor goes from 30% in the short term scenario to 21% in the recovery one, while among households that were already poor at baseline the poverty gap widens by 30% in the short term scenario and 14% in the recovery scenarios. In the short term scenario we find that the increase in the poverty gap for baseline poor is not significantly lower than the poverty gap among the new poor (in urban areas it is actually higher), indicating that households that were close to the poverty line at baseline have been affected similarly to households that were already poor.

Table 14: Average shortfall from the poverty line for individuals falling into poverty because of COVID-19 and additional shortfall for those falling deeper into poverty

Scenario	Newly poor			Baseline poor		
	All	Rural	Urban	All	Rural	Urban
Short term	30%	28%	33%	30%	28%	37%
Transition	28%	26%	31%	23%	22%	30%
Recovery	21%	19%	25%	14%	13%	17%

Source: Authors, based on the microsimulation results using 2015/16 HIICS data.

Next, we compare the annual monetary value of the average shortfall from the poverty line with the total annual value of the various programmes. The percentage of the annual

shortfall covered by the transfers gives a measure of the generosity of each transfer and an estimate of the additional household needs due to the COVID-19 shock that are not met by social protection interventions.

looks at the worst impact scenario and shows that the EESP Cat II to Cat V cover approximately 11% of the amount needed to bring households' consumption to its pre-shock level for both households that were not poor at baseline and for those that were already poor at baseline. The additional amount received by Cat I beneficiaries only covers 4% of the amount needed to restore the pre-shock consumption level for newly poor and baseline poor.

Table 15 looks at the worst impact scenario and shows that the EESP Cat II to Cat V cover approximately 11% of the amount needed to bring households' consumption to its pre-shock level for both households that were not poor at baseline and for those that were already poor at baseline. The additional amount received by Cat I beneficiaries only covers 4% of the amount needed to restore the pre-shock consumption level for newly poor and baseline poor.

Table 15: % of shortfall (additional shortfall) from the national poverty line for individuals falling into poverty (falling deeper into poverty) because of COVID-19 covered by each programme

Measure	% of shortfall covered for newly poor	% of additional shortfall covered for baseline poor
EESP – Cat I (Cat I)	4%	4%
EESP – Cat II (Cat II)	11%	11%
EESP – Cat III (Cat I)		
EESP – Cat IIIa (Cat IIIa)		
EESP – Cat IV (Cat IV)		
EESP – Cat V (Cat V)		

Source: Authors, based on the microsimulation results using 2015/16 HIICS data.

The limited adequacy of the transfers with respect to the expected consumption loss of affected households partially explains why the measures put in place by the Government of Pakistan have only a limited mitigation effect. A complementary reason is the likely limited effectiveness of the targeting mechanisms.

5 Limitations

Our proposed approach is intended to provide a rapid way to assess the impact of the current and potential social protection responses to COVID-19 on poverty. There are some key limitations:

- Our model relies heavily on exogenous parameters that provide an indication of the expected short- and longer-term effects of the crisis on the various sectors of the economy. Although informed as much as possible by existing data, the assumptions used in the microsimulation models are inevitably somewhat arbitrary given how much uncertainty exists about how lockdown experiences will ultimately translate into experiences during COVID-induced recessions. The predictive power of the model will therefore depend on the goodness and accuracy of these parameters.
- Our model assumes that the coverage of social protection programmes has not changed since 2016/17.
- Our model does not account for substitution effects across goods and for changes in consumption patterns due to the crisis, nor for the role of savings that could reduce the impact on consumption.
- Our model does not capture mobility in the labour market, where workers will switch to more profitable sectors.
- Our model does not account for behavioural effects, in particular those related to the adoption of negative coping strategies that could lead in the medium to long term to a decrease in consumption level and wellbeing.
- Our model does not account for the income and employment loss due to the impact of COVID-19 on individuals' health. Likewise we do not consider the increased health expenditures incurred by households with one or more member affected by the disease.

Annex A Simulation parameters

Table 16: Projected population by area of residence from the year of the survey

	2015	2016	2017	2018	2019[a]	2020[a]	Growth[b]
Urban	71,845,560	73,782,312	75,761,713	77,810,764	79,927,762	81,524,736	1.105
Rural	127,581,404	129,844,972	132,134,973	134,404,266	136,637,556	139,367,604	1.073
Total	199,426,964	203,627,284	207,896,686	212,215,030	216,565,318	220,892,340	1.085

Notes: [a]Overall population size projections based on https://worldpopulationreview.com/countries/pakistan-population/; population projection by area estimated by keeping urban share constant from 2018. [b] Growth of population between 2015 and 2020.

Table 17: Real GDP *per capita* growth by sector

Sector	2015/19	2019/20 (forecasted pre-COVID)
Agriculture	1.02	0.89
Industrial sector	1.02	1.07
Mining and quarrying	0.99	1.01
Manufacturing	1.05	1.02
Electricity generation and distribution and gas distribution	0.88	1.28
Construction	0.96	1.34
Service sector	1.12	1.16
Wholesale and retail	1.10	1.04
Transport storage and communication	1.06	1.22
Finance and insurance	1.19	1.52
Housing services	1.07	1.31
General government services	1.18	1.12
Other private sector services	1.18	1.20
Overall	1.13	1.08

Source: Authors' calculations based on real GDP growth forecast and on official real GDP figures from Pakistan Bureau of Statistics.

Table 18: EESP beneficiary households by province and category

Province	Cat I	Cat II	Cat III	Cat IIIa	Cat IV	Cat V
KP	965,584	666,158	582,001		198,343	497,446
Punjab	1,804,907	2,062,926	1,794,907	699,964	452,059	890,206
Sindh	1,885,409	897,950	784,963		535,323	950,734
Balochistan	253,209	231,476	200,215		48,175	66,372

Source: www.pass.gov.pk/ecs/uct_all.html

Annex B Additional simulation results

Table 19: Headcount poverty impact of the various impact channels

Scenario	National poverty line	Extreme poor (US$ 1.90)	Poor (US$ 3.20)
Baseline	23.9	4.2	33.9
Short term			
Employment income	51.5	25.8	58.4
Overall income	53.4	26.5	60.6
Inflation	28.8	5.7	38.7
Inflation and employment income	55.1	28.6	61.8
Overall	57.3	29.7	64.0
Transition			
Employment income	43.7	19.2	51.3
Overall income	44.5	19.5	52.2
Inflation	28.8	5.7	38.7
Inflation and employment income	47.7	21.8	55.2
Overall	48.5	22.0	56.1
Recovery			
Employment income	35.6	12.0	44.3
Overall income	35.8	12.0	44.6
Inflation	26.4	4.9	36.4
Inflation and employment income	37.9	12.9	46.5
Overall	38.1	12.9	46.7

Source: Authors, based on the microsimulation results using 2015/16 HIICS data.