Guideline for the Interactive Tool

Estimating the Impact of COVID-19 on Monetary and Multidimensional Poverty in St Lucia using a Microsimulation Model

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Background

This guideline is prepared for the users of the interactive tool which accompanies the report "Estimating the Impact of COVID-19 on Monetary and Multidimensional Poverty in St Lucia using a Microsimulation Model". This report was prepared by Development Analytics and Oxford Poverty & Human Development Initiative (OPHI) for the UNICEF Saint Lucia Country Office under the project titled: "Microsimulation Model for Estimating the Impact of COVID-19 on Child Poverty in Saint Lucia" in the period June-September 2020.

The study aims to provide estimates on the impact of COVID-19 on household and child monetary poverty as well as non-monetary poverty in Saint Lucia, through various channels. It provides inputs on the monetary and non-monetary poverty impact of the COVID crisis, as well as the poverty-reducing impact of several cash transfer scenarios targeting different groups in the population and at varying benefit levels building a microsimulation model. The model uses the SLC-HBS 2016 as the primary data source.

The interactive tool which accompanies the study can be viewed at this link: **https://developmentanalytics.shinyapps.io/saintlucia-covid19/**. The interactive tool is based on a microsimulation model and is developed using Shiny package in R software. The tool allows the users to explore the impact of different shock levels and the impact of the cash transfer scenarios at varying transfer levels after a total shock level. It allows the users to compare scenarios with each other presenting various outcomes including population poverty, child poverty, inequality, total costs and cost-effectiveness.

The model presented, and the results in this study are for illustrative purposes only and should not be taken as a definitive prediction on changes in poverty rates as a result of COVID-19 and the following cash transfers. Rather, the exercise is meant to serve as a facilitation tool for discussions around the distributional impact of COVID-19 on poverty and the compensation that can be provided to households using several cash transfer policy options. The study does not reflect the official views of UNICEF, and any errors in text remain that of the authors.

In the following sections, the guideline first provides the Data and Methodology for the microsimulation model. This section describes in detail the microsimulation model and how it was built. In the next section, the interactive tool is described in detail. This section provides descriptions of the panels and examples of how to read them and how to use the tool as well as definitions of outcome indicators.

Part I: Data & Methodology

Data

The Survey of Living Conditions and Household Budgetary Survey (SLC-HBS) was collected in St Lucia in 2016. The sample includes 1,493 households and is assumed to be representative at the national level. The survey provides crucial socio-economic and demographic information on the income, expenditure and living conditions of the population. The survey consists of two main modules, household and personal information, and 19 sub-modules including: Food and non-food expenditure, health, education, economic activity, shocks and coping strategies.

Methodology

In this section, we summarize the main steps taken in modelling the impact of COVID-19 on household monetary and non-monetary poverty in St Lucia and the cash transfers to alleviate the monetary poverty impact. For a more detailed methodology please see the Methodology section in the report "Estimating the Impact of COVID-19 on Monetary and Multidimensional Poverty in St Lucia using a Microsimulation Model".

1. Simulating the Poverty (Increasing) Impact of COVID-19

COVID-19 may affect communities through various channels ranging from health-related issues to economic instability. We focused on three main transmission mechanisms to show the monetary impact of COVID-19 on households. These are: (i) labour demand shock, (ii) labour supply shock, and (iii) health expenditure shock.

a. Labour Demand Shock

COVID-19 may result in economic instability for businesses and hence labour demand might shrink either through a decrease in number of hours of work demanded or through a decrease in number of jobs due to business closures or lay-offs. Some particular types of jobs/sectors may be more vulnerable than others to this shock. In this respect we construct a labour income loss coefficient which ranges between 0% (no loss) and 100% (total loss of income, i.e. unemployment). The labour income loss coefficient is constructed using sector of employment and employment status of employed individuals. Next, after-shock total household labour income is calculated by adding up the total labour income of each individual after they receive the shock. This is calculated separately for each of the shock levels. As a last step, decrease in household labour income is reflected on a decrease in household expenditures and the decrease in household expenditures is identified using income elasticities calculated using the baseline data. This is done due to the fact that loss in income is not equal to a one-to-one decline in expenditures. After shock household expenditure is then calculated by multiplying the before shock expenditure level with the proportion of household income lost after the shock adjusted by the income elasticity coefficient.

b. Labour Supply Shock

COVID-19 may result in the illness of household members, which will have implications on household income when the people who get sick are employed household members. In the

model, labour supply shock is applied to employed individuals with chronic illness. The individuals who get sick are chosen randomly using a uniform distribution. The individuals who get sick are assumed to lose half of their monthly labour income assuming they will not be able to work for two weeks. Number of people to be affected change by the shock level (mild or severe). In the occurrence of a mild shock half of labour income is taken away from a randomly selected 5% of the chronically ill and employed while in the occurrence of a severe shock this proportion is increased to 10%.

Following the same procedure of the labour demand shock, total household labour income is calculated by adding up the total labour income of each individual after they receive the shock. And then decrease in household labour income is reflected on a decrease in household expenditures. After shock household expenditure is then calculated by multiplying the before shock expenditure level with the proportion of household income lost after the shock adjusted by the income elasticity coefficient.

c. Increase in Health Expenditures

COVID-19 could also result in an increase in health expenditures of the household, if the members get sick and need to be hospitalized and their costs are not covered by a health insurance. In the model, a randomly selected group of individuals who are chronically ill (could be of all ages) and without health insurance are assumed to get COVID-19 and stay in hospital for 8 days. Number of people to be affected change by the shock level (mild or severe). In the occurrence of a mild shock a randomly selected 5% of the chronically ill and without a health insurance are assumed to get sick and hospitalized and in the occurrence of a severe shock this proportion is increased to 10%. The resulting increase in health expenditures result in a reduction of the overall consumption available to the household on other items – hence reduce the overall monetary welfare of the household and increase poverty rates.[1]

We also estimated the after-shock household expenditures and poverty when multiple shocks hit the households at the same time. In this case, the shocks occur in the order presented here. Hence for instance for labour supply shock occurring after labour demand shock, "baseline labour income" becomes "after labour demand shock income". And when the health expenditure shock is added, the total hospital costs is then subtracted from the household expenditure after the labour demand and labour supply shocks' effects are calculated. Hence the shocks build on each other by taking the after-shock values as the baseline.

2. Simulating the Multidimensional Poverty (Increasing) Impact of COVID-19

a. Measuring Multidimensional Poverty

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[1] Unit cost assumptions on health care costs during hospital stays are based on 'Estimates of Unit Costs for Patient Services for Saint Lucia' as reported by WHO (https://www.who.int/choice/country/lca/cost/en/). Cost per bed is reported as 103.48 ECD for primary level, 135.00 ECD for secondary level and 184.39 ECD for tertiary level at 2005 prices. These amounts are inflated to 2016 prices using inflation rate information as reported by The Central Statistical Office of Saint Lucia (https://www.stats.gov.lc/subjects/economy/prices-and-price-indices/) in the file "Inflation rate 1970 to 2019". The rates from year 2006 to 2016 are as follows: 3.6, 2.8, 7.2, -0.2, 3.3, 2.8, 4.2, 1.5, 3.5, -1.0, -3.1. After the amounts are inflated average of these (179.1 ECD) is taken as the cost per day in the simulations.

Since 2016, the St Lucia Report on Living Conditions includes a monetary assessment of poverty complemented with a multidimensional approach to this concept (Kairi Consultants, 2018). The present report is aligned with this vision, and multidimensional poverty is measured by means of a Multidimensional Poverty Index (MPI) calculated using the Alkire-Foster dual cut-off counting approach method (Alkire & Foster, 2011).

The MPI is estimated following the Alkire and Foster method (2011) as follows:
- All individuals are assigned binary indicators for each indicator (Education attainment, ICT, Financial literacy/numeracy, Assets, Housing, Toilet facility, Overcrowding, Feeling safe, Crime victim, Long term unemployment, Youth unemployment, Quality of employment, Access to official health facility, Full food security, Chronic illness, Health insurance coverage, Access to regular water supply, Home ownership insurance on dwelling unit, Experience climate event). A unity value signals deprivation, and zero denotes absence of deprivation. The proportion of people deprived in each indicator is termed the **uncensored headcount ratio.**
- Individual deprivations are added up, weighted by their relative importance in the MPI for St Lucia. This sum results in a **deprivation score** denoting the proportion of weighted deprivations suffered by each individual.
- A person is considered **multidimensionally poor** if she or he faces a proportion of weighted deprivation that is equal or greater than 20% of the possible deprivations. This poverty cut-off or multidimensional poverty line represents being deprived in the equivalent of one dimension or more in the structure of the MPI for St Lucia.
- Three aggregate measures are computed to gauge the amount of multidimensional poverty in the population:
  - The **incidence of multidimensional poverty** (H), denoting the proportion of people who are identified as being multidimensionally poor.
  - The **intensity of multidimensional poverty** (A), denoting the average deprivation score among the poor.
  - The value of **MPI**, which is the product of H and A.

Note that the poverty status reflects the existence of a critical number of weighted deprivations. It reflects the overlap (i.e. the simultaneous manifestation) of several deprivations, and how those deprivations are interlinked.

b. Simulating COVID-19-induced additional deprivations

The strategy to evaluate the possible effects of COVID-19 on multidimensional poverty consists of simulating a random increase in specific deprivations in selected indicators that are likely to be directly affected by i) the COVID-19 health emergency, and/or ii) the stringent policies aimed at containing the spread of the virus.

Given the state of the pandemic as of August 2020, and after discussion with policy makers in St Lucia and with UNICEF- St Lucia, four out of 19 indicators included in the MPI were selected for simulation:
- **Food security**, due to possible disruption of food supply chains (nationally and internationally).
- **Long term unemployment**, due to possible job destruction resulting from a severe economic downturn, which might last six months or more.
- **Youth unemployment**, due to possible job destruction concentrated among less experienced workers.

- **Job quality among all employees**, due to possible disruption in access to social and job-related benefits, even where jobs are not destroyed and **Job quality among self-employed only**, due to possible disruption and/or actively sought avoidance of costs related to social and job-related benefits, even where jobs are not destroyed.

In addition to the analysis of these four indicators, an extended MPI was computed including the indicator of **school attendance**, in order to account for the possible increase in the deprivation of this indicator. The deprivation cut-off is defined as: "A person is deprived in school attendance if she or he lives in a household where at least one school-aged child (5-15) does not have continued access to physical, remote or virtual formal education".[2] All the indicators in the Education dimension are reweighted following the inclusion of school attendance indicator in the extended MPI.

To sum up, a total of five transmission mechanisms are considered in this report. Four of them correspond to four indicators pertaining the official structure of the MPI and one –school attendance – is assessed by means of an extended version of the MPI for St Lucia.

The simulation procedure considers only one indicator at a time, thus isolating the effects on each one of them. This allows operationalizing the hypothesis of independence between possible effects, and effectively corresponds to a partial analysis where everything is held constant, except for changes in the indicator under scrutiny. This allows us to confidently uncover definitive lower bounds for each scenario. For each indicator in turn, the simulation procedure consists of the following steps:
1. The population subgroup prone to becoming deprived is selected..
2. Random additional deprivations in the indicator of interest are assigned among the reference population following a uniform distribution.
3. Two scenarios are considered, characterized by the proportion of reference population affected by the simulated increase in the specific deprivation: a mild scenario (25% of the reference population are deprived, in addition to the effectively observed deprivations), and a severe scenario (75% of the reference population are deprived in addition to the effectively observed deprivations).
4. The MPI and its component sub-indices are recomputed allowing simulated deprivations to naturally interact with those effectively observed across indicators.
5. The AF method is applied to compute four aggregate statistics: i) the uncensored headcount ratio for the simulated indicator, ii) the MPI, iii) the incidence (H), and iv) the intensity of multidimensional poverty (A).
6. The steps above are repeated a hundred times to generate an empirical distribution of each aggregate statistic.

3. Simulating the Poverty (Reducing) Impact under Various Cash Transfer Policy Scenarios

After the household level shocks occur and monetary poverty rates are re-estimated based on the model, various targeting cash transfer scenarios are applied to see their poverty alleviating impact. Such benefits are modelled targeting a range of beneficiary groups and for different benefit levels based on discussions with UNICEF.

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[2] Individuals living in households without children are considered as non-deprived.

We simulate 12 different cash transfer scenarios and these could be in different transfer levels in the interactive tool. The transfers can be per household or per child and the targeted groups change from being universal to targeting by sub-groups of households.

The newly updated social transfer targeting instrument of Saint Lucia, SL-NET 3.0 was also used in this analysis in identifying target groups. Saint Lucia's National Eligibility Test (SL-NET) was designed and implemented by Ministry of Equity, Social Justice, Empowerment, Youth Development, Sports and Local Government (MOESJ) and has been used as a targeting mechanism for social transfers. The instrument's latest version was SL-NET 2.0 and is currently being updated as SL-NET 3.0 by the World Bank. SL-NET 3.0 ranks the households from most deprived and poor to least deprived and non-poor by building a score composed of a multidimensional poverty and monetary poverty dimensions. For this analysis we also make use of this targeting mechanism since this will be the targeting tool for St Lucia in the very near future. In this respect, households in the priority group as defined in World Bank's report[3] - those with an SL-NET score lower than 68 – are assumed to be the eligible group (i.e. 30.2% of the overall population).

The full list of policy scenarios considered for the exercise are listed in Table 1:

Table 1 Cash transfer scenarios[4]

Scenario number	Scenario explanation
1	Per household transfer to households already receiving any kind of social protection programme (programmes asked in SLC HBS 2016)
1a	Per household transfer to households that are eligible for social assistance as calculated using SL-NET 3.0
2	Per household transfer to households in the bottom 25%[5]
2a	Per household transfer to households in the bottom 25% (that are not eligible under SL-NET 3.0)
3	Per household transfer to households in the bottom 25% with children
3a	Per household transfer to households in the bottom 25% with children (that are not eligible under SL-NET 3.0)
4	Per household transfer to households in the bottom 40%
4a	Per household transfer to households in the bottom 40% (that are not eligible under SL-NET 3.0)
5	Per household transfer to households in the bottom 40% with children
5a	Per household transfer to households in the bottom 40% with children (that are not eligible under SL-NET 3.0)
6	Per child transfer to all children (0-5 years old)
7	Per child transfer to all children (0-17 years old)

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[3] World Bank (2018).

[4] These cash transfer values are for the year 2019/2020. Since we use the 2016 SLC-HBS in our analysis, to see the poverty and inequality impact of the transfers we moved the cash transfer values from 2019/2020 to 2016 using inflation rates as reported by The Central Statistical Office of Saint Lucia (https://www.stats.gov.lc/subjects/economy/prices-and-price-indices/) in the file "Inflation rate 1970 to 2019":

$$the\ cash\ transfers\ valued\ at\ 2016$$
$$= cash\ transfers\ valued\ at\ 2019/(inflation\ rate\ for\ 2019 * inflation\ rate\ for\ 2018 * inflation\ rate\ for\ 2017)$$

to calculate their impact on poverty. The inflation rates for years 2019, 2018 and 2017 are reported as 0.5, 2.6 and 0.1 respectively. Totals costs or cost effectiveness measures are reported for 2020 values of the transfers.

[5] In the scenarios targeting the bottom 25 percent (or the bottom 40 percent), the population is ranked according to per capita monthly household expenditure in the baseline categories (i.e. before shocks) and divided into 4 (or 5) and the bottom 25 percent (or the bottom 40 percent) corresponds to the poorest 25 percent of the population (or the poorest 40 percent of the population). This categorization stays the same whether there is an income shock or there is a cash transfer to the household since it is based on the baseline expenditure levels.

Part II: The Interactive Tool

The interactive tool is based on a microsimulation model, as described in the previous section. The tool can be found at the following link: https://developmentanalytics.shinyapps.io/saintlucia-covid19/.
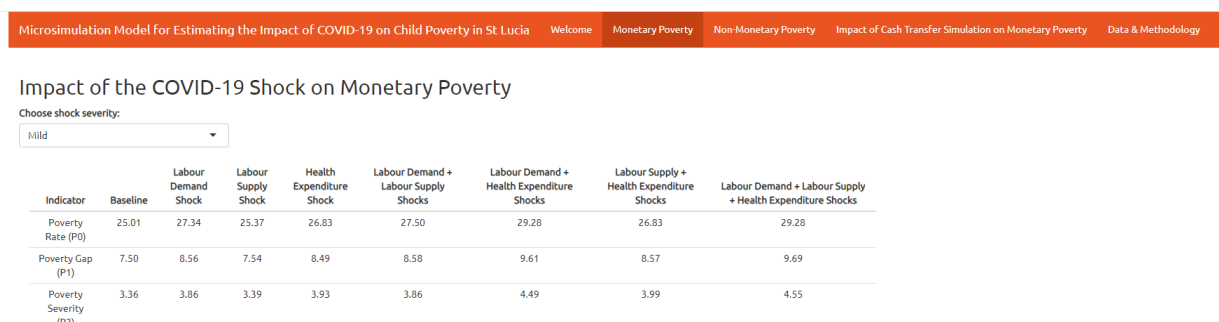
The tool gives the user flexibility over selecting a number of inputs such (i.e. selecting the shock level and the cash transfer levels for the scenarios) and given the inputs selected by the user, it recalculates the outcome indicators and shows the results to the user through the user interface.

The tool is composed of 5 separate tabs that can be clicked on. The first tab is the *Welcome* page which gives the background information on the study and on the interactive tool. Next, the second tab is the *Monetary Poverty* tab. Here the user can see the estimated rates and values for several outcome indicators such as poverty rate after the occurrence of shocks. Next, *Non-Monetary Poverty* tab shows non-monetary poverty outcome indicators according to the shock level selected. The fourth tab is the *Impact of Cash Transfer Simulation on Monetary Poverty*. This tab shows the estimated outcome indicators related to monetary poverty after cash transfers are distributed to the targeted households. The last tab currently only refers the user to the report for details. When the report is published, it will contain a link to the report.

The user can go in between these tabs by clicking on them and can see the results according to his/her topic of interest and his policy question on mind. For instance, in the below picture, Monetary Poverty tab is clicked on. Here the user can see how different outcome indicators such as poverty rate or poverty gap is affected from a mild or a severe COVID shock.

Picture 1 Tabs of the interactive tool.

In the sections below, the content of each tab, descriptions of how to use the tool in each tab, how to read the table and definitions of outcome indicators with examples from the output tables are provided in detail.

Monetary Poverty

1. How to read and use the panel?

In the panel for monetary poverty, the table presents the baseline and after-shock values for a number of indicators (i.e. poverty rate) depending on the shock transmission mechanism (i.e. labour supply) and shock level (mild or severe).

In the second column of the table, the baseline statistics are presented. These are calculated directly from the SLC-HBS 2016 dataset before any shock is introduced. The transmission mechanisms are as indicated in the methodology section. Hence there are three main transmission mechanisms (i) labour demand shock, (ii) labour supply shock and (iii) health expenditure shock.

In the columns of the table, all the combinations of these three transmission mechanisms are shown. In this respect the columns are:
1. Labour Demand Shock
2. Labour Supply Shock
3. Health Expenditure Shock
4. Labour Demand + Labour Supply Shocks
5. Labour Demand + Health Expenditure Shocks
6. Labour Supply + Health Expenditure Shocks
7. Labour Demand + Labour Supply + Health Expenditure Shocks

This presentation allows the user to see the impact of different types of shocks. For instance, the "Labour Demand Shock" column shows the after-shock values when the shock occurs **only** through this channel. On the other hand, Labour Demand + Labour Supply Shocks column shows the after-shock values when the shock occurs through **both** of these channels.

In the interactive tool, the shock level (mild or severe) can be chosen from the drop-down list on the left-hand side, as seen in **Picture 2**. The numbers presented in the table change depending on the selected shock level.

Picture 2 Shock severity can be changed from the drop-down menu on the left-hand side

Impact of the COVID-19 Shock on Monetary Poverty

Choose shock severity:
Mild

Indicator	Baseline	Labour Demand Shock	Labour Supply Shock	Health Expenditure Shock	Labour Demand + Labour Supply Shocks	Labour Demand + Health Expenditure Shocks	Labour Supply + Health Expenditure Shocks	Labour Demand + Labour Supply + Health Expenditure Shocks
Poverty Rate (P0)	25.01	27.34	25.37	26.83	27.50	29.28	26.83	29.28
Poverty Gap (P1)	7.50	8.56	7.54	8.49	8.58	9.61	8.57	9.69
Poverty Severity (P2)	3.36	3.86	3.39	3.93	3.86	4.49	3.99	4.55
Child Poverty	34.46	37.35	34.93	35.87	37.57	39.04	35.87	39.04
Gini	43.24	43.33	43.25	43.89	43.34	44.03	43.93	44.06
Per Capita Expenditure	1172.42	1107.41	1170.82	1157.91	1106.39	1093.38	1156.82	1092.41
Quintile 1	342.22	325.51	342.22	338.01	325.51	321.30	338.01	321.30
Quintile 2	592.09	560.11	591.14	574.26	559.31	542.28	573.31	541.48
Quintile 3	824.69	775.39	822.74	806.39	773.73	757.10	804.44	755.43
Quintile 4	1173.86	1102.25	1173.18	1154.99	1101.82	1083.62	1154.71	1083.48
Quintile 5	2931.46	2777.89	2929.18	2920.24	2775.67	2766.66	2917.96	2764.45

Examples of how to read the table

Selected shock level: Mild
   (From *choose shock severity* drop-down menu, "*Mild*" is selected)

1. In the occurrence of a **mild shock through labour demand + health expenditure shock transmission mechanisms**, the poverty rate becomes 29.28%, poverty gap

becomes 9.61% and poverty severity becomes 4.49%. These are increased to these levels from a baseline level of (second column) 25.01%, 7.50%, 3.36%, respectively.

2. In the occurrence of a **mild shock through labour demand + labour supply + health expenditure shock transmission mechanisms**, average household per capita expenditure for the population decreases to 1092.41 ECD and average per capita expenditure for the population in each quintile becomes 321.30 ECD, 541.48 ECD, 755.43 ECD, 1083.48 and 2764.45 ECD respectively for quintiles 1-5. The baseline level for average household per capita expenditure is (second column) 1172.42 ECD while it is 342.22 ECD, 592.09 ECD, 824.69 ECD, 1173.86 ECD, 2931.46 ECD on average for the population in each quintile respectively.

Selected shock level: Severe
(From *choose shock severity* drop-down menu, "*Severe*" is selected)

1. In the occurrence of a **severe shock through labour demand + labour supply shock transmission mechanisms**, child poverty rate becomes 44.00% from a baseline level of 34.54%.

2. In the occurrence of only a **severe shock through health expenditure transmission mechanism**, Gini coefficient increases to 43.34 from a baseline level of 43.24.

2. Definitions of outcome indicators

Below the definitions of all the outcome indicators that are presented as rows in the panel are described with an example from the panel itself.[6]

- **Poverty Rate (P0):** The percentage share of the population who is poor or in other words the share of the population who live in a household with a per capita expenditure that is lower than the annualized national poverty line of $6,443 EC Dollars.

  Using an equation, the poverty rate can be defined as follows:

  $$P_0 = \frac{1}{N} \sum_{i=1}^{N} I(y_i < z)$$

  Here N is the total population, and I(.) is an indicator function that takes a value of 1 if the household per capita expenditure for the individual y_i is below the poverty line z.

  Example: 35.08% of the population is estimated to be poor with a severe shock that occurs through all of the shock transmission mechanisms.

- **Poverty Gap (P1):** The poverty gap is a measure of how far below the poverty line the poor in a given country fall. Hence it shows the depth of poverty. Poverty gap is calculated by taking the average of the value *(poverty line – per capita expenditure)/poverty line* after summing it up for each individual among the poor. Hence for each individual i, poverty gap is defined as follows:

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[6] The definitions of poverty indicators and Gini coefficient are based on the definitions in Haughton, Jonathan; Khandker, Shahidur R.. 2009. Handbook on Poverty and Inequality. Washington, DC: World Bank. © World Bank. https://openknowledge.worldbank.org/handle/10986/11985

$$G_i = (z - y_i) \, x \, I(y_i < z)$$

And the poverty gap index is calculated as follows:

$$P_1 = \frac{1}{N} \sum_{i=1}^{N} \frac{G_i}{z}$$

Hence the poverty gap is high when the poor are far below the poverty line on average and it is low when they are closer to the poverty line.

Example: Poverty gap index is estimated as 12.45% with a severe shock that occurs through all of the shock transmission mechanisms.

- **Poverty Severity (P2):** Poverty severity is calculated as taking the square of individual poverty gaps, hence *((poverty line – per capita expenditure)/poverty line)²* and then summing them up and taking the average of it. In other words, poverty severity is a weighted sum of poverty gaps where the weights are poverty gaps themselves.

  Hence the poverty severity index is calculated as follows:

$$P_1 = \frac{1}{N} \sum_{i=1}^{N} \left(\frac{G_i}{z}\right)^2$$

  Example: Poverty severity index is estimated as 6.41% with a severe shock that occurs through all of the shock transmission mechanisms.

- **Child Poverty:** The percentage share of the children who live in a poor household. Hence in a household with a per capita expenditure that is lower than the annualized national poverty line of $6,443 EC Dollars.
 Using an equation, the child poverty rate can be defined as follows:

$$\text{Child Poverty} = \frac{1}{NC} \sum_{i=1}^{NC} I(y_i < z)$$

  Here NC is the total population of children (aged 0-17 years old), I(.) is an indicator function that takes a value of 1 if the household per capita expenditure for the child y_i is below the poverty line z.

  Example: Child poverty is estimated as 46.09% with a severe shock that occurs through all of the shock transmission mechanisms.

- **Gini:** Gini coefficient is the most widely used measure of inequality. It ranges between 0 (perfect equality) and 1 (perfect inequality), and it is calculated by comparing the Lorenz curve (dashed line in Figure 1) representing the cumulative distribution of per capita expenditure with the uniform cumulative distribution that represents equality (solid line in Figure 1). The Gini coefficient is calculated by dividing the area between the Lorenz curve and the diagonal line by the whole are below the diagonal line, hence *A/(A+B)* in Figure 1. When A is equal to 0, then the Gini coefficient becomes 0 as well, and this means perfect equality whereas when B is equal to 0 then the Gini coefficient becomes 1 and this means perfect inequality. The coefficient then could be presented by multiplying it with 100.

DEVELOPMENT ANALYTICS

Figure 1 Lorenz curve
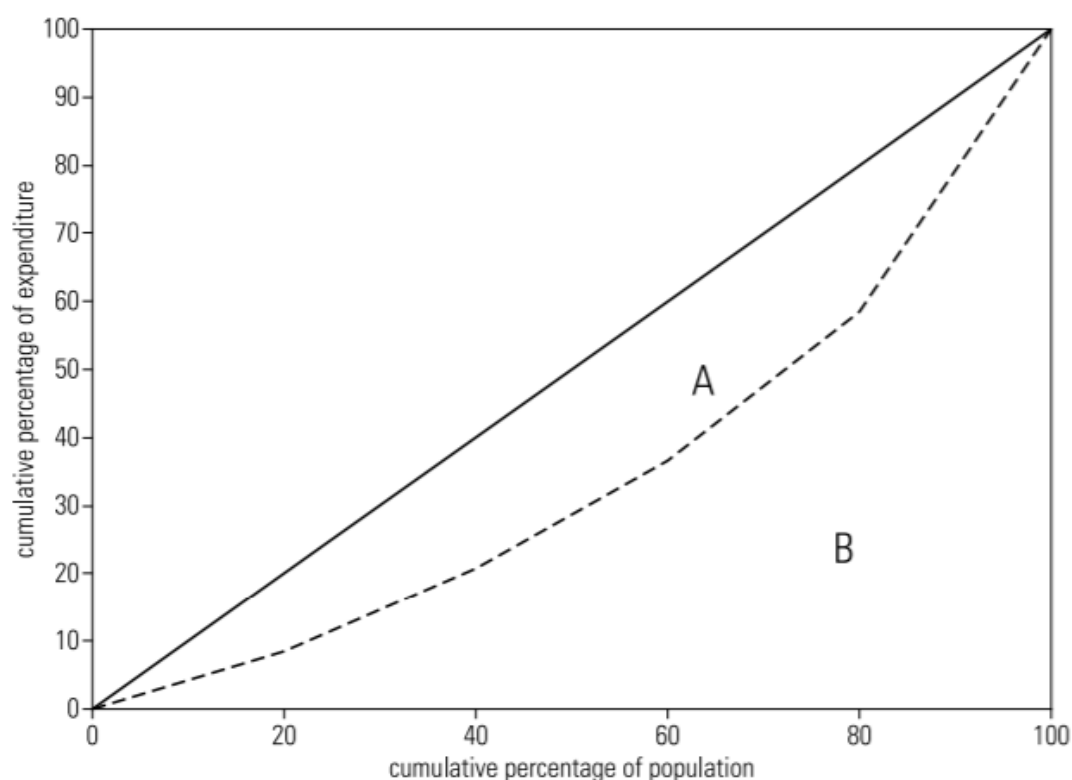
Source: Haughton and Khandker (2009)

Example: Gini coefficient is estimated as 43.33 after a mild labour demand shock.

- **Per capita expenditure:** Average household monthly per capita expenditure value (ECD) among all individuals in the population.

  Example: Average household monthly per capita expenditure for the population in St Lucia is estimated as 1107.41 ECD after a mild labour demand shock.

- **Quintile 1:** Average household monthly per capita expenditure value (ECD) of only the poorest 20% of the population.[7]

  Example: Average household monthly per capita expenditure for the poorest 20% of the population is estimated as 325.51 ECD after a mild labour demand shock.

- **Quintile 2:** Average household monthly per capita expenditure value (ECD) of only the population in quintile 2.

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[7] For identifying the quintile of the population, the population is ranked first according to per capita monthly household expenditure in the baseline (i.e. before shocks) and divided into 5 equal sized groups, hence quintile 1 is the population group with the lowest household per capita expenditure level and quintile 5 is the population group with highest household per capita expenditure level in the baseline.

Example: Average household monthly per capita expenditure for the population in quintile 2 is estimated as 560.11 ECD after a mild labour demand shock.

- **Quintile 3:** Average household monthly per capita expenditure value (ECD) of only the population in quintile 3.

  Example: Average household monthly per capita expenditure for the population in quintile 3 is estimated as 775.39 ECD after a mild labour demand shock.

- **Quintile 4:** Average household monthly per capita expenditure value (ECD) of only the population in quintile 4.

  Example: Average household monthly per capita expenditure for the population in quintile 4 is estimated as 1102.25 ECD after a mild labour demand shock.

- **Quintile 5:** Average household monthly per capita expenditure value (ECD) of only the population in quintile 5 or the richest 20 percent of the population.

  Example: Average household monthly per capita expenditure for the population in quintile 5 is estimated as 2777.89 ECD after a mild labour demand shock.

Non-Monetary Poverty

1. How to read and use the panel?

In the panel for non-monetary poverty, the table presents the baseline and after-shock values for four aggregate indicators related to non-monetary poverty depending on the MPI indicator that is hit by the shock (i.e. food security) and shock level (mild or severe).

The first column of the table provides the MPI indicator that is affected by the shock. These are (i) Food Security, (ii) Job quality (Employees), (iii) Job quality (Self-employed), (iv) Long term Unemployment, (v) School Attendance and (iv) Youth Unemployment. The second column provides the baseline values for the aggregate indicators as calculated directly from the SLC-HBS 2016 dataset before any shock is introduced.

In the rows for each MPI indicator, the aggregate indicators are uncensored headcount ratio, poverty incidence, poverty intensity and MPI.

This presentation allows the user to see the impact of the shock on each and every MPI indicator separately, and to make comparisons between each other.

In the interactive tool, the shock level (mild or severe) can be chosen from the drop-down list on the left-hand side, as seen in **Picture 3**. The numbers presented in the table vary depending on the selected shock level.

Picture 3 Shock severity can be changed from the drop-down menu on the left-hand side

Examples of how to read the table

Selected shock level: Mild
(From *choose shock severity* drop-down menu, "*Mild*" is selected)

- In the occurrence of a **mild shock on food security**, the uncensored headcount ratio becomes 29.40%, poverty incidence becomes 85.50%, and poverty intensity becomes 39.60%, and MPI stays at 0.34. These aggregate indicators increase to these levels from baseline levels of (third column) 24.70%, 85.30%, 40.10%, and 0.34, respectively.

Selected shock level: Severe
(From *choose shock severity* drop-down menu, "*Severe*" is selected)

- In the occurrence of a **severe shock on youth unemployment**, the uncensored headcount ratio becomes 55.90%, poverty incidence becomes 87.80%, and poverty intensity becomes 40.60% and MPI increases to 0.36. These aggregate indicators increase to these levels from baseline levels of (third column) 24.70%, 85.30%, 40.10%, and 0.34, respectively.
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2. Definitions of aggregate indicators

- **Uncensored headcount ratio:** The proportion of people deprived in the indicator is termed the uncensored headcount ratio.

  Example: 29.40% of the population is estimated to be deprived of food security after a mild shock.

- **Poverty incidence:** The incidence of multidimensional poverty (H) is equal to the proportion of people who are identified as being multidimensionally poor.

  Example: 85.50% of the population is estimated to be multidimensionally poor after a mild shock in food security.

- **Poverty intensity:** The intensity of multidimensional poverty is equal to the average deprivation score among the poor.

Example: The average multidimensional poverty score is estimated as 39.60% among the multidimensionally poor after a mild shock in food security.

- **MPI:** The value of the Multidimensional Poverty Index (MPI) is the product of H and A.

Example: Multidimensional Poverty Index is estimated as 0.34 after a mild shock in food security.

Impact of Cash Transfer Simulation on Monetary Poverty

1. How to read and use the panel?

In the panel for cash transfer simulations, the table presents the baseline (second column), after-shock (third column) and after cash transfer values for a number of outcome indicators (i.e. poverty rate) depending on the selected shock level (mild or severe) and cash transfer level that can be selected separately for each cash transfer scenario.

In the second column of the table, the baseline statistics are presented. These are calculated directly from the SLC-HBS 2016 dataset before any shock is introduced. In the third column of the table after-shock value of the outcome indicators are presented. The after-shock value is when the shock occurs through all three transmission channels. Hence the poverty rate value here is the same as the poverty rate in the last column of the panel in *Monetary Poverty* tab. The shock level (mild or severe) can be chosen by the user from the drop-down menu on the left-hand side in the very top, as indicated in **Picture 4**.

Picture 4 Shock severity can again be chosen from the drop-down list on the left-hand side (yellow arrow), and the cash transfer values for each scenario can be changed as well (red circle)

In the rest of the columns of the table the outcome indicators are presented after the distribution of cash for each cash transfer scenario, hence when the shock has occurred, and cash is

distributed to the identified group at a level chosen by the user (Note that these scenarios are mutually exclusive, hence when cash transfer value for Scenario 1 is changed the results can only be seen in the column for Scenario 1). On the left-hand side, the cash transfer level can be chosen separately for each scenario by the user.

The scenarios, hence the rest of the columns are as follows:

- **Sc1** Per household transfer to households already receiving any kind of social protection programme (programmes asked in SLC-HBS 2016)
- **Sc1a** Per household transfer to households that are eligible for social assistance as calculated using SL-NET 3.0
- **Sc2** Per household transfer to households in the bottom 25%
- **Sc2a** Per household transfer to households in the bottom 25% (that are not eligible under SL-NET 3.0)
- **Sc3** Per household transfer to households in the bottom 25% with children
- **Sc3a** Per household transfer to households in the bottom 25% with children (that are not eligible under SL-NET 3.0)
- **Sc4** Per household transfer to households in the bottom 40%
- **Sc4a** Per household transfer to households in the bottom 40% (that are not eligible under SL-NET 3.0)
- **Sc5** Per household transfer to households in the bottom 40% with children
- **Sc5a** Per household transfer to households in the bottom 40% with children (that are not eligible under SL-NET 3.0)
- **Sc6** Per child transfer to all children (0-5 years old)
- **Sc7** Per child transfer to all children (0-17 years old)

This presentation allows the user to compare and contrast the impact of different cash transfer scenarios. For instance, it is possible to see the poverty impact of a 200 ECD per child transfer to only 0-5 years old children (Sc6) and to all children 0-17 years old (Sc 7).

Examples of how to read the table

Selected shock level: Mild, Cash transfer value for Sc6 is changed to 100 ECD per child and for Sc7 is changed to 100 ECD per child.

- In the occurrence of a **mild shock that occurs through labour demand + labour supply + health expenditure shock transmission mechanisms**, poverty rate becomes 29.28% (third column) from a baseline level of (second column) 25.01%. Distributing 100 ECD per child to children aged 0-5 years old (Sc6) decreases the after-shock poverty rate to 28.66%.
  Distributing 100 ECD per child to children aged 0-17 years old (Sc7) decreases the after-shock poverty rate to 26.37%. Hence this scenario reduces poverty more than Sc6.
  However, the total additional cost of each scenario is quite different. For Sc6, the extra cost is 1.49 million ECD per month while for Sc7 it is 4.88 million ECD per month (See the last two columns of the row *Total additional cost (million EC$)*).

Selected shock level: Mild, Cash transfer value for Sc1 is changed to 300 ECD per household. The transfer levels for the rest of the scenarios are kept at their default levels.

- In the occurrence of a **mild shock that occurs through labour demand + labour supply + health expenditure shock transmission mechanisms**, poverty rate becomes 29.28% (third column) from a baseline level of (second column) 25.01%. Distributing 300 ECD per household to households already receiving any social protection benefits (programmes asked in SLC HBS 2016) (Sc1) decreases the after-shock poverty rate to 28.39%.
  The total additional cost of this scenario is 1.02 million ECD per month.
  Looking at the row for the poverty rate indicator, we can see that Sc4a with a cash transfer value of 100 ECD per household decreases after-shock poverty rate more than Sc1 with a cash transfer value of 300 ECD per household. The poverty rate is calculated as 28.03% after distributing 100 ECD per month to households in the bottom 40% (that are not eligible under SL-NET 3.0). This scenario also has a lower total cost than Sc1, with a total cost of 0.96 million ECD per month.

Selected shock level: Mild, Cash transfer value for Sc2 and Sc3 is changed to 400 ECD per household. The transfer level for the rest of the scenarios are kept at their default levels.

- Distributing 400 ECD decreases the child poverty rate from an after-shock value of 39.04% to 32.78% in both scenarios. This is because Sc2 and Sc3 both distribute cash transfers to the same groups of households with children in the bottom 25%, but Sc2 also distributes the transfer to households without children in the bottom 25% as well.

2. Definitions of outcome indicators

Definitions of poverty rate, poverty gap, poverty severity, child poverty and Gini coefficient are as provided in the section on Monetary Poverty.

Below examples are provided for the universal child grant cash transfer program in Scenario 7 when cash transfer value is 50 ECD per child after a mild shock.

- **Population coverage:** Percentage of the population living in Saint Lucia that is covered with the cash transfer program. All the people living in a household that receives the cash transfer (could be per household or per child) are assumed as covered by the transfer.

  Example: 67.19% of the population is covered with the universal child grant cash transfer program in Scenario 7 (i.e. 67.19% of the population lives in a household where there is at least one child receiving this cash transfer).

- **Coverage of children (0-17 years old):** Percentage of the children living in Saint Lucia that is covered with this cash transfer. All the children living in a household that receives the cash transfer (could be per household or per child) are assumed as covered by the transfer.

  Example: 100.00% of children is covered with the universal child grant cash transfer program in Scenario 7.

- **Coverage Q1:** Percentage of the population in the quintile 1 or bottom 20% (i.e. the poorest 20% of the population according to their household's monthly per capita expenditure level) who are living in a household covered with this cash transfer.

  Example: 81.93% of the population in quintile 1 is covered with the universal child grant cash transfer program in Scenario 7.

- **Coverage Q2:** Percentage of the population in quintile 2 who are living in a household covered with this cash transfer.

  Example: 79.44% of the population in quintile 2 is covered with the universal child grant cash transfer program in Scenario 7.

- **Coverage Q3:** Percentage of the population in quintile 3 who are living in a household covered with this cash transfer.

  Example: 69.97% of the population in quintile 3 is covered with the universal child grant cash transfer program in Scenario 7.

- **Coverage Q4:** Percentage of the population in quintile 4 who are living in a household covered with this cash transfer.

  Example: 62.96% of the population in quintile 4 is covered with the universal child grant cash transfer program in Scenario 7.

- **Coverage Q5:** Percentage of the population in quintile 5 or the richest 20% who are living in a household covered with this cash transfer.

  Example: 41.74% of the population in quintile 5 is covered with the universal child grant cash transfer program in Scenario 7.

- **Coverage Bottom 40%:** Percentage of the population in quintile 1 and quintile 2 or the bottom 40% (i.e. the poorest 40% of the population according to their household's monthly per capita expenditure level) who are living in a household covered with this cash transfer.

  Example: 80.68% of the population in the bottom 40% (i.e. quintile 1 and 2) is covered with the universal child grant cash transfer program in Scenario 7.

- **Benefit Incidence Q1:** Percentage of the total benefit, which is equal to the total cash transfer value or total monthly cost, that is allocated to the population in quintile 1 (i.e. the poorest 20% of the population).

  Example: 28.01% of the total cash transfer amount of the universal child grant cash transfer program in Scenario 7 is transferred to the population in quintile 1.

- **Benefit Incidence Q2:** Percentage of the total benefit that is allocated to the population in quintile 2.

Example: 24.30% of the total cash transfer amount of the universal child grant cash transfer program in Scenario 7 is transferred to the population in quintile 2.

- **Benefit Incidence Q3:** Percentage of the total benefit that is allocated to the population in quintile 3.

  Example: 20.19% of the total cash transfer amount of the universal child grant cash transfer program in Scenario 7 is transferred to the population in quintile 3.

- **Benefit Incidence Q4:** Percentage of the total benefit that is allocated to the population in quintile 4.

  Example: 16.12% of the total cash transfer amount of the universal child grant cash transfer program in Scenario 7 is transferred to the population in quintile 4.

- **Benefit Incidence Q5:** Percentage of the total benefit that is allocated to the population in quintile 5 (i.e. the richest 20% of the population).

  Example: 11.39% of the total cash transfer amount of the universal child grant cash transfer program in Scenario 7 is transferred to the population in quintile 5.

- **Benefit Incidence Bottom 40%:** Percentage of the total benefit that is allocated to the population in quintile 1 and 2 (i.e. the poorest 40% of the population).

  Example: 52.31% of the total cash transfer amount of the universal child grant cash transfer program in Scenario 7 is transferred to the population in the bottom 40% (i.e. in quintile 1 and 2).

- **Average hh transfer:** Total benefit level (i.e. total monthly cost) divided by the total number of beneficiary households.

  Example: On average, beneficiary households receive 95.16 ECD with the universal child grant cash transfer program in Scenario 7.

- **Cost per child reached (0-17 years old):** Total cash transfer (i.e. total monthly cost) divided by the total number of children living in beneficiary households.

  Example: Per child cost of the universal child grant cash transfer program in Scenario 7 is 50.00 ECD.

- **Cost per person reached:** Total cash transfer (i.e. total monthly cost) divided by the total number of people living in beneficiary households.

  Example: Per person cost of the universal child grant cash transfer program in Scenario 7 is 21.05 ECD.

- **Total additional cost (million ECD):** Total amount of cash distributed per month. Hence the per household monthly transfer value multiplied by the total number of

beneficiary households or per child transfer value multiplied by the total number of beneficiary children.

Example: The universal child grant cash transfer program in Scenario 7 costs 2.44 million ECD per month.

- **% Poverty reduced per 1 million ECD:** Difference between the after-shock poverty rate and after cash transfer poverty rate divided by total additional cost.

$$\% \text{ Poverty reduced per 1 million ECD} = \frac{After\ shock\ poverty\ rate - After\ cash\ transfer\ poverty\ rate}{Total\ additonal\ cost\ (million\ ECD)}$$

Example: The universal child grant cash transfer program in Scenario 7 reduces the poverty rate by 0.50 percentage points for each million ECD spent per month.

- **% Poverty gap reduced per 1 million ECD:** Difference between the after-shock poverty gap and after cash transfer poverty gap divided by total additional cost.

$$\% \text{ Poverty gap reduced per 1 million ECD} = \frac{After\ shock\ poverty\ gap\ rate - After\ cash\ transfer\ poverty\ gap\ rate}{Total\ additonal\ cost\ (million\ ECD)}$$

Example: The universal child grant cash transfer program in Scenario 7 reduces poverty gap rate by 0.40 percentage points for each million ECD spent per month.

- **% Poverty severity reduced per 1 million ECD:** Difference between the after-shock poverty severity and after cash transfer poverty severity divided by total additional cost.

$$\% \text{ Poverty severity reduced per 1 million ECD} = \frac{After\ shock\ poverty\ severity\ rate - After\ cash\ transfer\ poverty\ severity\ rate}{Total\ additonal\ cost\ (million\ ECD)}$$

Example: The universal child grant cash transfer program in Scenario 7 reduces poverty severity rate by 0.26 percentage points for each million ECD spent per month.