POVERTY MAP - COLOMBIA 2018 - 2019

PROSPERIDAD SOCIAL

April 2021
OUTLINE

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CONTEXT AND SOURCE OF INFORMATION
The National Administrative Department of Statistics is the entity in charge of providing official information on poverty and living conditions in Colombia.

**Integrated Household Survey – Gran Encuesta Integrada de Hogares (GEIH):**
- Official source of the labor market report, monetary poverty, extreme poverty and inequality.
- Approximately 230,000 surveyed households and 438 selected municipalities.
- Monthly information surveys.
- Disaggregation at the national level, urban / rural area, 13 metropolitan areas, 24 main cities and states.

**National Population and Housing Census (CNPV):**
- Official source for the Multidimensional Poverty report at the municipal level.
- Approximately 15 million households registered and coverage of 1,122 municipalities.
- Decennial update, last update 2018
These graphs represent the most up-to-date data on monetary poverty and extreme poverty published by DANE. It is important to highlight that in 2019, Colombia performed a methodological update (definition of the basic food basket, Orshansky's coefficient and levels of disaggregation of the PL and LI).

At the aggregate level, it is possible to identify important gaps between urban areas, rural areas and main cities. Therefore, having information with greater disaggregation will allow taking actions to reduce gaps in poverty.
Currently, the 2018 National Housing Population Census allows to have an estimate of multidimensional poverty at the municipal level, which is useful to know the household deprivations.

However, there are programs and policies where it is required to know the details of monetary poverty and extreme poverty in order to define targeting processes, coverage, target population, budgets, and others.

In Colombia, Prosperidad Social is the government entity in charge of the operation of the 5 Cash Transfer programs in the country:

1. Familias en Acción
2. Jóvenes en Acción
3. Colombia Mayor
4. Ingreso Solidario
5. Esquema de devolución del IVA
POVERTY MAPS USING SMALL AREA ESTIMATION
WHY IT IS IMPORTANT TO BUILD A POVERTY MAP?

A poverty map is the monetary poverty estimation at a lower level of geographical disaggregation than the ones presented by the surveys, in Colombia at the municipal level. This would be a public policy instrument that will allow to:

1. Comprehend in a deeper way the poverty of the country.

2. Generate a crucial change in the dialogue on poverty, including motivation for new strategies and approaches.

3. Provide the guidelines to structure the operational details of specific programs and the redistribution of resources.

4. Create the concern and interest in evidence-based policy making.

1 https://openknowledge.worldbank.org/bitstream/handle/10986/6800/414470PAPER0Pr101Official0Use0Only1.pdf?sequence=1&isAllowed=y
WHAT PRODUCTS COULD BE OBTAINED FROM A POVERTY MAP?

These products allow an efficient resource management and will facilitate the fulfillment of goals to reduce gaps and to decrease the incidence of monetary and extreme poverty.
MODEL APPLIED TO THE POVERTY MAP IN COLOMBIA
Small area models explain the variation in the area beyond what auxiliary variables included in the model could explain. There are two approaches to small area models:

**Area-level models**
- These models are used when unit (or element) level data is not available.

**Unit-level models**
- These models relate the unit values of a study variable to unit-specific covariates.

Approach used by Prosperidad Social
For the estimation of Monetary Poverty and Extreme Poverty, we use the Empirical Bayes (best) Method, based on a Nested Error Model, proposed by Molina and Rao (2010). At the very beginning that model was applied for the estimation of Monetary Poverty in the Spain province.

The advantages of the model are:

1. The data is analyzed at a unit level in our specific case: households. The households contain detailed information about the social and economic conditions of the municipalities.

2. The model allows to estimate the poverty indicators in function of an objective variable, in our case, the per capita income. For example: Monetary Poverty, Extreme Poverty, Gini Coefficient, Poverty Gaps, etc.

3. The model allows to estimate other areas or domains different from municipalities, with the restriction of the variability measurement such as coefficient of variation. For example: people with disability, regions or gender.

STEP BY STEP

1. Analyze of available variables within the source of information: Census and households survey (GEIH)

2. Create the indicators and define the covariates in order to predict households per capita income

3. Per capita income model prediction by implementing the Mixed-effects model.

4. Put into practice the estimation per capita income simulation and square error median by implementing Montecarlo and Bootstrap

5. Benchmark and geographic validity
1. The objective variable is the logarithm of per capita income plus a constant of COP $123,618, this constant minimizes the Fisher’s coefficient of skewness for the model errors.

2. The dataset (household survey) in 2018 and 2019 has some zeros in the per capita income variable, we didn’t make transformations to this variable.

3. The fixed effects were defined by municipalities and urban/rural area.

4. For each model 2018 and 2019, we used the poverty line according to the official methodology for each year as presented by DANE (The National Administrative Department of Statistics). In Colombia, DANE defined new poverty lines and basic food basket for the monetary poverty measurement 2019.
The model can predict the household per capita income for each register in the census using the input variables (census and household survey) and objective variable (household survey). Taking into account household per capita income and FGT (Foster-Greer-Thorbecke) expression we need to define different indicators as: poverty, gaps, inequality, etc.

\[ P_a^B(\theta) = \frac{1}{N_d} \left( \sum_{i \in s_d} F_{a,di} + \sum_{i \in r_d} F_{a,di}^B(\theta) \right) \]
POVERTY MAP RESULTS - 2019
According to our estimation for the poverty map, Colombia has a monetary poverty incidence of 35.7% using a benchmark to differences levels:

1. National
2. Urban
3. Principal Cities
4. States

The Benchmark allows to correct skewness and having the same estimations with the household survey (official measurement)
MONETARY POVERTY MAP 2019 – COMPARISON OTHER VARIABLES
There are 35 municipalities without estimation because the coefficient of variation greater than 30%.

According to our estimation for the poverty map, Colombia has an extreme poverty incidence of 9.6% using a benchmark to different levels:

1. National
2. Urban
3. Principal Cities
4. States

The Benchmark allows to correct skewness and having the same estimations with the household survey (official measurement)
EXTREME POVERTY MAP 2019 – COMPARISON OTHER VARIABLES
USES AND APPLICATIONS OF POVERTY MAPS IN PROSPERIDAD SOCIAL
According with the municipalities poverty estimation, there is a correlation of 70% between Familias en Acción and monetary poverty, with the assumption that Familias en Acción attends to only poor households.
Top 10 municipalities with coverage greater than the number of poor:

<table>
<thead>
<tr>
<th>Municipality Code</th>
<th>Departament</th>
<th>Municipality</th>
<th>Familias en Acción coverage/poor households</th>
</tr>
</thead>
<tbody>
<tr>
<td>91405</td>
<td>Amazonas</td>
<td>La chorrera (CD)</td>
<td>1,98</td>
</tr>
<tr>
<td>88564</td>
<td>San Andrés y Providencia</td>
<td>Providencia</td>
<td>1,92</td>
</tr>
<tr>
<td>5480</td>
<td>Antioquia</td>
<td>Mutatá</td>
<td>1,92</td>
</tr>
<tr>
<td>85279</td>
<td>Casanare</td>
<td>Recetor</td>
<td>1,86</td>
</tr>
<tr>
<td>86755</td>
<td>Putumayo</td>
<td>San Francisco</td>
<td>1,87</td>
</tr>
<tr>
<td>68773</td>
<td>Santander</td>
<td>Sucre</td>
<td>1,74</td>
</tr>
<tr>
<td>85015</td>
<td>Casanare</td>
<td>Chameza</td>
<td>1,68</td>
</tr>
<tr>
<td>86757</td>
<td>Putumayo</td>
<td>San Miguel</td>
<td>1,67</td>
</tr>
<tr>
<td>86885</td>
<td>Putumayo</td>
<td>Villagrazón</td>
<td>1,66</td>
</tr>
<tr>
<td>85400</td>
<td>Casanare</td>
<td>Támaras</td>
<td>1,66</td>
</tr>
</tbody>
</table>

Top 10 municipalities with the lowest coverage in relation to the number of poor:

<table>
<thead>
<tr>
<th>Municipality Code</th>
<th>Departament</th>
<th>Municipality</th>
<th>Familias en Acción coverage/poor households</th>
</tr>
</thead>
<tbody>
<tr>
<td>99773</td>
<td>Vichada</td>
<td>Cumaribo</td>
<td>0,06</td>
</tr>
<tr>
<td>5631</td>
<td>Antioquia</td>
<td>Sabaneta</td>
<td>0,12</td>
</tr>
<tr>
<td>5212</td>
<td>Antioquia</td>
<td>Copacabana</td>
<td>0,13</td>
</tr>
<tr>
<td>11001</td>
<td>Cundinamarca</td>
<td>Bogotá D.C.</td>
<td>0,14</td>
</tr>
<tr>
<td>5266</td>
<td>Antioquia</td>
<td>Envigado</td>
<td>0,14</td>
</tr>
<tr>
<td>54347</td>
<td>Norte De Santander</td>
<td>Herrán</td>
<td>0,16</td>
</tr>
<tr>
<td>15001</td>
<td>Boyaca</td>
<td>Tunja</td>
<td>0,18</td>
</tr>
<tr>
<td>68276</td>
<td>Santander</td>
<td>Floridablanca</td>
<td>0,19</td>
</tr>
<tr>
<td>5129</td>
<td>Antioquia</td>
<td>Caldas</td>
<td>0,19</td>
</tr>
<tr>
<td>5360</td>
<td>Antioquia</td>
<td>Itagui</td>
<td>0,19</td>
</tr>
</tbody>
</table>

1 Using census population total
APPLICATIONS

1. The poverty map is an input for a GIS system that allows analyze variables related to poverty, as well as, generate conclusions about the causes of poverty in the country.

2. The poverty map is an input for targeting the territorial strategies to overcome poverty. For example:
   a. PDET (Municipalities of armed conflict)
   b. Caribbean (Priority Region in the National Development Plan)
   c. Pacific (Priority Region in the National Development Plan)

3. The poverty map is an input for the definition of territorial coverage of Cash Transfers programs in Colombia.
CONCLUSIONS

• The methodology used by Prosperidad Social is based on the unit models that have been approved by the World Bank and The ECLAC in the generation of poverty maps at the sub-national level and the models used by EUROSTAT and OECD in other statistical fields.

• The estimated model allows the production of the data disaggregated to other non-geographic domains (individual or household characteristics), which are of interest to public policies and allow “leaving no one behind”

• The poverty map allows defining strategies and coverage for cash transfer programs, according to the number of poor households in each municipality and increase impact on reduce poverty.
¡Gracias!