Jamaica

SAE motivation

The Cabinet of the Government of Jamaica made a request for the Statistical Institute of Jamaica to use small-area estimation for poverty mapping, to produce poverty data for smaller geographical areas within the country. SAE was a request from their cabinet but STATIN did not receive any additional funding.

Jamaica has been using poverty maps since 1992 with different approaches that have evolved over the years. The model and methods are re-evaluate every 10 years following the censuses. The following is a list of revisions

- 2002: UBN approach, consumption based approach and the 2001 Census
- 2012: consumption approach and the 2011 Census

Input data

Two data sources allowed the creation of the model: the population and household census and the Jamaica Survey for Living Condition (JSLC). The JSLC is a Living Standards Measurement Study (LSMS) type of survey. The 2012 JSLC was representative at the parish level. As for the census, it was providing data at the Enumeration District (ED) level. This level is on average a 100 households in rural area and 150 households in urban area.

For 2012 JSLC, 20,532 individuals from 6,579 households are covered and the 2011 census covered around 2.68 million individuals from 881,037 households.

Collaboration with other stakeholders

For the 2012 poverty mapping the Statistical Institute of Jamaica (STATIN) worked with stakeholder workshops in order to define the model parameters, including geographical areas for each model, variables that are reasonably comparable between censuses/survey data, and data needed for policymaking.

Another workshop was carried out to validate the results after the modelling was completed.

SAE work within the organization

Throughout this whole process a STATIN team formed of methodologist, survey statisticians, policy specialists, GIS professionals, programme managers in various government department and other key stakeholders including academia. The team collaborated with exterior entities such as the social development commission at the community level and academia in west indies. The STATIN team itself is rather small with about five people. Therefore, the work is treated as a project, people are assigned to work on it as a group.

Model building

Stage 1: comparison

- Identifying variables that are comparable across the two input data sources: the Census and the JSLC, for both collected and derived variables.

Stage 2: modeling

- Determining consumption models, i.e. defining geographic regions with similar consumption patterns. Seven geographical groupings were created after consultation with stakeholders. Different models were then created at that level.
- Determining variables to include in each model if the variables have significant linear correlation with consumption level

A total of 77 variables at the household level were identified and tested for 7 of the geographical groups for equality, i.e., if the average of the variable from the census is within 95% confidence interval of the mean from JSLC. Equivalent variables are included in the modeling. Then it was determined whether or not this variable was a significant predictor.

Control variables at the parish and community level were obtained from the census and other administrative data sources to control for differences between communities in terms of population, climate, housing characteristics, public transfers and public services.

- Using the general least square regression approach and use the log linear model to try and estimate the level of household consumption (+error term). The objective of this process is to analyse the power of each model to predict consumption based on two conditions:
  - all the variables included in the model are statistically significant
  - the adjusted coefficient of determination is around 0.50 and no less than 0.30

Stage 3: simulation
In this stage, 200 simulations are done to compare the imputed consumptions with the survey results. To make sure that the model is robust a couple of iterations are needed. Afterwards the statisticians evaluate the reliability of the found estimates. To do so they look at the magnitude of the estimation error and the ratio of the variance of that error relative to the total variance of errors. This indicates what proportion of the variance of error is due to the unexplained differences at the community level. As that ratio moves away from zero, the reliability of those estimates decrease. As it reduces the accuracy of capturing the fact that households living in the same community are more similar among each other than their peers living in other communities. The team decided to set as a threshold that this ratio should be less than 10%. This was achieved for all the seven modelling groups.

Future work on SAE

STATIN plans to do another round of poverty mapping in Jamaica following the 2022 population and housing census and the 2023 JSLC. Policy makers from the planning institute of Jamaica are partners in the publication of the poverty mapping estimates.

They are also planning on trying the SAE method for the labor market indicators.

Capacity building

The 2012 poverty mapping was assisted by the World Bank. Poverty mapping requires a team of experts and technical expertise. There is a need for capacity building.

Source: Ms. Leesha Delatie-Budair, Deputy Director General, Statistical Institute of Jamaica, through discussion and Ms. Delatie-Budair’s presentation at the ECLAC-ISWGHS Joint webinar on poverty mapping, 1 July, 2021.