Reducing Bias in Phone Survey Samples

Effectiveness of Reweighting Techniques using Representative Frames

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Background

• Phone surveys are prone to bias
  • At best only representative of phone owning population
  • Difficulties contacting sample
  • Refusal/nonresponse rates are generally higher than face-to-face (F2F) interviews

• Inferences drawn from phone surveys may not fully reflect the conditions for all segments of the population
  • Often the poorest are not well-represented
  • Misinform policy design

• There are reweighting methods available to reduce this bias
  • Particularly when representative F2F surveys serve as the frame for phone survey
COVID-19 High Frequency Phone Surveys (HFPS)

• LSMS team collaborating with WB Poverty Global Practice to implement **HFPS on COVID-19** in 6 African countries
  • Burkina Faso, Ethiopia, Malawi, Mali, Nigeria, Uganda
  • Collected on monthly basis for a period of ~12 months, starting in April/May/June 2020
  • Primarily implemented by National Statistical Offices
  • Data available in the [Microdata-Library](https://www.worldbank.org) of the World Bank

• All use recent F2F rounds of **LSMS-ISA** longitudinal surveys as a frame
  • Living Standard Measurement Study – Integrated Surveys on Agriculture
COVID-19 High Frequency Phone Surveys (HFPS)

• LSMS-ISA
  • Nationally representative panel surveys
  • Collects detailed information on household demographics, welfare, consumption, economic activity, etc.
    • Also collected phone numbers for multiple household members and a reference person

• Advantage of using LSMS-ISA as a frame for phone surveys
  • Highly detailed information for all units in the frame including:
    1. “Ineligible” sample (without phone)
    2. Nonresponding sample
    3. Responding sample

• Having this information allows for implementation of robust bias reduction methods
  • Not readily available when using RDD or Telecom lists as frame
# HFPS Sample composition

<table>
<thead>
<tr>
<th>Survey Sample and Selection Process</th>
<th>Ethiopia</th>
<th>Malawi</th>
<th>Nigeria</th>
<th>Uganda</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>F2F Survey Sample Size</strong></td>
<td>ESS 2018/19 6,770 Households</td>
<td>IHPS 2019 3,181 Households</td>
<td>GHS 2019 4,976 households</td>
<td>UNPS 2018 3,308 households</td>
</tr>
<tr>
<td><strong>With Phone Contact Information</strong></td>
<td>5,372</td>
<td>2,337</td>
<td>4,934</td>
<td>2,421</td>
</tr>
<tr>
<td><strong>Coverage Rate</strong></td>
<td>79%</td>
<td>73%</td>
<td>99%</td>
<td>73%</td>
</tr>
<tr>
<td><strong>Initial HFPS Sample</strong></td>
<td>5,372</td>
<td>2,337</td>
<td>3,000</td>
<td>2,421</td>
</tr>
<tr>
<td><strong>Contacted</strong></td>
<td>3,350</td>
<td>1,743</td>
<td>2,057</td>
<td>2,274</td>
</tr>
<tr>
<td><strong>Interviewed</strong></td>
<td>3,249</td>
<td>1,729</td>
<td>1,950</td>
<td>2,259</td>
</tr>
<tr>
<td><strong>Response Rate</strong></td>
<td>60%</td>
<td>74%</td>
<td>65%</td>
<td>93%</td>
</tr>
</tbody>
</table>
Coverage vs Nonresponse Bias

% of HH from Poorest Consumption/Wealth Quintile

- Ethiopia
- Malawi
- Nigeria
- Uganda

LSMS-ISA  With contact  Contacted  Interviewed
Reweighting bias adjustment

• Reweighting techniques available to reduce bias in the interviewed sample
  • Harnessing information available in representative frame (LSMS-ISA) for interviewed, nonresponding, and ineligible households

• Response Propensity weighting approach
  • Model probability of a unit responding to the survey based on profile of characteristics (from LSMS-ISA)
    • Logit/Probit
  • Inverse of predicted probability of response serves as adjustment factor (to apply to existing survey weights).
    • Responding households that “look” more like nonresponding households will receive a higher weight
Effectiveness of bias adjustment in HFPS

- Estimates obtained using weights with adjustment align much more closely with benchmark representative survey estimates from the frame than those using weights without adjustments.

- However, adjustments do not completely eliminate bias.
Conclusions

• Phone surveys are prone to bias
  • In Ethiopia, Malawi, Nigeria, and Uganda HFPS poorer and more vulnerable households were underrepresented in the interviewed sample
  • A critical segment of the population for policy formulation

• Reweighting techniques available to reduce bias
  • Available techniques are particularly effective when using a representative F2F survey as a frame that has detailed information on all units
  • Reweighting substantially reduced bias in the HFPS but did not eliminate bias

• Effective bias correction is essential to obtain results from phone surveys that reflect the situation of all segments of the population
  • Using F2F surveys as phone survey frames have an advantage in this area over random digit dialing or phone surveys that use a telecom provider list.