Mode Effects in a Mobile Phone Survey on COVID-19 in Papua New Guinea

ISSUES & MITIGATION STRATEGIES
Context & Survey Methodology

Context
- Primarily rural population of around 8 million spread across varied and remote terrain.
- Very limited development data – most recent survey was 2016-2018 Demographic & Health Survey.
- Poverty last measured at 40% in 2009.
- Mobile phone ownership around 35%, below low-income country average of 55%.

Fieldwork
- Implemented by Digicel PNG
- Round 1 between June 18 and July 3, 2020
- Round 2 between December 9 and 30, 2020

Sample size
- Round 1: 3,115 respondents
- Round 2: 2,820 respondents (1,016 overlap from round 1)
- Coverage across all 89 districts, urban/rural.

Implementation
- CATI survey from Port Moresby call center.
- Random Digit Dialing with geographic targeting based on tower.
- Respondents received text message advertising the survey and received a small monetary incentive for participation.
Representativeness Issues

Respondent characteristics

- Even with perfect response rates, mobile phone surveys are at best representative only of mobile phone owners – which can differ substantially from the overall population in poor countries.
- Comparing to the 2016-2018 Demographic and Health Survey, there are substantial differences in the respondent characteristics.

![Chart showing respondent characteristics, including sex, age, education, comparing DHS and HFPS data.](chart.png)
Wealth index

- Particularly concerning for our analysis was the heavy bias towards the top of the wealth distribution (as measured using 2016-2018 DHS wealth index methodology).
Re-weighting to Address Non-Representativeness

Approach

Combination of re-weighting strategies used to mitigate the impacts of non-representativeness (all based on the information from the 2016-2018 DHS):

- Propensity score re-weighting with wealth index (includes square and cube to address both mean and distribution).
- Trimming to mitigate variance inflation from outlier weights.
- Calibration (using Stata’s maxentropy command) to equalize the distribution of key demographic characteristics and geographic distribution.
Distribution

- Much improved but still not perfect.

**unweighted cdf**

**rewighted cdf**
**Adjustments for Round 2**

**Original Plan**
- Re-interview all 3,115 round 1 respondents.
- Ultimately only able to interview 1,016 of original respondents.
- Main problem: According to national regulations, SIM cards in PNG must be registered with official ID document or they will become inactive after 6 months. Switching of phone numbers is common, particularly among poor or rural populations.

**Challenge becomes opportunity?**
- Instead of using just RDD for round 2 replacements, targeted poorer households using subscriber information.
- Households that do not send or receive text messages more likely to be illiterate, which is correlated with poverty.
- Respondents that do not purchase own credit more likely to be poor.

**Solution**
- Add new households to the sample with replacements.
Better targeting improves representative

- Round 1: Unweighted wealth index score in mobile phone survey was 0.33 compared to weighted DHS score of 0.08.
- Round 2: Re-interviewed households had mean wealth index of 0.34. Newly targeted households had mean wealth index of 0.22.
- Share in bottom 4 deciles improved from 10% to 15%, while share in top 2 deciles declined from 48% to 39%.
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Main takeaways

- Mobile phone surveys can be implemented quickly and successfully even in the most challenging contexts.
- Complex re-weighting strategies that include an economic welfare measure are necessary to generalize results, particularly if impacts on poor households are part of analysis plan.
- Partnerships with teleco companies to leverage subscriber information can yield improved targeting. Potential in the future to use machine learning techniques to better understand which characteristics are most effective.