



Simple Poverty Scorecard[®] Tool Uganda

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Ekiwandiiko kino ekirimu ebikunganyiziddwa aba scorocs.com kiri mu Luganda Waraka huu na zana ya kukusanya data ziko kwa lugha ya Kiswahili kwenye scorocs.com This document and a data-collection tool are in English at scorocs.com

The Scorocs Simple Poverty Scorecard-brand poverty-assessment tool is a low-cost, transparent way for pro-poor programs in Uganda to prove and improve their social performance by getting to know their participants better. Responses to the scorecard's 10 questions can be collected in about 10 minutes and then used to estimate participants' consumption-based poverty rates, to track changes in poverty rates, or to segment participants for differentiated treatment.

Version note

This new scorecard for Uganda is based on data from 2016/17. It replaces the old scorecards in Schreiner (2011 and 2015a) that are based on data from 2009/10 and 2012/13. Users are warned *not* to make hybrid estimates of changes in poverty rates over time with a baseline from an old scorecard and a follow-up from the new scorecard because such estimates will be very inaccurate. This warning does not apply to non-hybrid estimates that use the new scorecard for both baseline and follow-up.

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Scorocs[®] Simple Poverty Scorecard[®] Tool

Interview ID: _____	<u>Name</u>	<u>Identifier</u>
Interview date: _____	Participant: _____	_____
Country: <u>UGA</u>	Field agent: _____	_____
Scorecard: <u>003</u>	Service point: _____	_____
Sampling weight: _____	Number of household members: _____	

Question	Response	Points
1. In what sub-region does the household live?	A. Busoga, Bukedi, or Karamoja	0
	B. Central I, Central II, Elgon, or West Nile	5
	C. Acholi, Bunyoro, Kampala, Kigezi, or Teso	9
	D. Tooro	12
	E. Ankole, or Lango	16
2. How many members does the household have?	A. Seven or more	0
	B. Six	2
	C. Five	4
	D. Four	8
	E. Three	12
	F. Two	20
	G. One	30
3. Can the female head (or the eldest wife of the male head) read and write with understanding in any language?	A. No female head (nor wife of the male head)	0
	B. No	3
	C. Yes	5
4. Do any household members attend a private school or a school that is run by a religious organization, NGO, or any other non-government entity?	A. No	0
	B. Yes	7
5. During the last 12 months, did any member of the household receive income from crop farming or livestock?	A. Crop farming, but not livestock	0
	B. Neither crop farming nor livestock	4
	C. Livestock (regardless of crop farming)	5
6. Type of material mainly used for construction of the floor? (<i>as observed</i>)	A. Earth, rammed earth, wood, or other	0
	B. Cement screed, concrete, tiles, brick, or stone	9
7. What type of toilet facility does the household mainly use?	A. No facility/bush/polythene bags/bucket/etc., pit latrine (without a cover and without a slab), or other	0
	B. Pit latrine (with a cover and/or with a slab), Ecosan (compost toilet), VIP latrine, or flush toilet	4
8. How many functional mobile phones do members of the household own at present?	A. None	0
	B. One	5
	C. Two or more	11
9. Does every member of the household have at least one pair of shoes in good condition?	A. No	0
	B. Yes	6
10. What was the average number of meals taken by household members per day in the last seven days?	A. Two or fewer	0
	B. Three or more	7

Back-page Worksheet: Household Members

Fill out the scorecard header first. Include the interview’s unique identifier (if known), the interview date, and the sampling weight of the participant (if known). Then record the full name and the unique identification number of the participant (who may differ from the respondent), of the participant’s field agent (who may differ from you the enumerator), and of the service point that the participant uses (if any and if known). Circle the response to the first scorecard question based on the sub-region where the household lives. The “Interview Guide” lists districts by sub-region.

Then read to the respondent: *Please tell me the first names (or nicknames) of all the members of your household, starting with the head and his/her (eldest) spouse (if there is one). A household is a single person or a group of persons—regardless of blood or marital relationships—who for at least six of the 12 months before the interview have lived together in the same dwelling unit and have taken their meals together, who acknowledge one adult male or female as the head of the household, and who are considered as one unit.*

Write down the first name or nickname of each member, beginning with the head and the (eldest) spouse of the head (if there is one). Mark the head and his/her spouse (if there is one). Record the number of household members in the scorecard header next to “Number of household members:”. Then circle the response to the second scorecard question about the number of household members.

Read the remaining questions aloud (except for the sixth question about the type of floor), marking the respondent’s answers. Always keep in mind and apply the detailed instructions in the “Interview Guide”.

First name or nickname?	Head or spouse of head?
1.	Head (male) Head (female)
2.	Eldest wife of male head Husband of female head Other
3.	Other
4.	Other
5.	Other
6.	Other
7.	Other
8.	Other
9.	Other
10.	Other
11.	Other
12.	Other
13.	Other
Number of members:	—

Table 1: Conversion of scores to poverty likelihoods (all poverty lines)

Score	Poverty likelihood (%)																		
	National				Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines					
	Food	100%	150%	200%	\$1.25	\$2.00	\$2.50	\$5.00	\$8.44	\$1.90	\$3.20	\$5.50	\$21.70	10th	20th	40th	50th	60th	80th
0–16	39.7	70.8	93.8	98.6	90.3	99.5	99.6	99.8	99.9	92.8	99.5	99.8	100.0	45.7	68.8	91.9	95.5	99.2	99.7
17–21	26.4	58.8	88.6	96.8	80.9	96.9	98.9	99.6	99.7	85.9	98.4	99.6	100.0	33.9	56.5	84.0	92.3	95.8	99.2
22–25	15.3	43.9	82.5	95.2	71.9	95.3	98.1	99.5	99.7	80.8	97.6	99.2	100.0	18.1	39.8	76.1	87.5	93.0	98.8
26–29	13.5	35.2	76.0	88.7	64.5	90.2	96.3	99.4	99.7	71.8	93.6	99.0	100.0	15.5	33.4	68.0	81.2	89.0	98.2
30–32	9.3	29.7	67.8	82.4	53.6	85.1	92.9	99.3	99.6	62.1	90.1	98.2	100.0	11.0	28.4	59.1	71.4	83.0	95.3
33–35	4.7	18.9	57.0	78.4	44.1	79.5	90.1	99.3	99.6	51.6	87.0	97.2	100.0	5.3	17.0	47.9	62.6	76.3	93.9
36–38	4.5	17.6	54.6	77.6	41.1	76.5	88.4	98.9	99.3	49.1	84.6	96.3	100.0	4.8	13.7	43.8	61.3	73.6	92.3
39–40	3.8	16.1	46.6	70.7	33.2	70.8	82.8	98.3	98.8	39.1	79.7	95.0	100.0	4.2	12.6	37.2	50.3	64.8	90.2
41–43	2.8	11.1	38.3	63.6	23.7	66.5	80.3	98.0	98.8	32.1	75.6	94.8	99.8	2.3	9.6	27.5	44.9	59.1	87.4
44–45	1.3	7.0	31.7	58.4	17.5	58.8	79.0	97.4	98.3	25.2	73.4	94.4	99.6	1.3	6.0	21.3	36.2	52.5	86.8
46–48	0.8	5.2	27.5	54.6	16.8	54.6	74.7	95.7	97.2	23.3	69.2	92.3	99.6	0.8	5.3	20.9	31.8	47.8	81.7
49–50	0.7	4.4	26.6	50.9	14.1	49.2	63.8	91.8	94.8	18.5	59.7	87.7	99.6	0.6	3.8	17.3	29.7	42.3	74.8
51–53	0.7	2.3	16.0	39.5	8.8	38.9	60.8	91.0	93.0	13.6	53.3	85.7	98.9	0.6	1.7	12.3	21.4	33.3	72.0
54–56	0.5	2.0	14.2	33.5	7.4	32.3	48.5	88.9	92.2	11.4	42.3	80.2	98.6	0.5	1.4	9.9	17.3	28.6	62.6
57–58	0.4	1.6	7.9	29.1	3.9	28.7	41.7	83.8	86.4	5.9	37.0	71.6	98.4	0.1	0.7	5.3	10.6	23.9	53.5
59–61	0.4	0.9	4.7	17.8	2.7	18.9	31.6	77.7	81.0	4.4	27.7	65.0	98.2	0.0	0.6	3.8	7.1	15.1	43.0
62–64	0.0	0.4	3.5	14.7	1.7	13.7	26.7	74.4	79.5	2.7	22.9	61.9	98.2	0.0	0.1	2.4	5.5	10.6	36.7
65–68	0.0	0.4	1.2	8.4	1.0	7.1	15.3	62.8	68.6	1.2	11.5	47.3	97.6	0.0	0.0	1.1	2.5	4.9	28.5
69–72	0.0	0.4	1.2	5.9	1.0	4.0	10.3	52.3	58.5	1.1	6.8	31.6	97.3	0.0	0.0	1.1	1.6	2.7	16.2
73–100	0.0	0.0	0.0	4.3	0.0	2.9	7.4	40.5	46.5	0.0	4.7	24.3	94.4	0.0	0.0	0.0	0.6	2.4	10.6

Table 2: Errors in estimated poverty rates for a sample of a population of participants' households at a point in time, precision, and the α factor for precision

	Poverty lines																		
	National				Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines					
	Food	100%	150%	200%	\$1.25	\$2.00	\$2.50	\$5.00	\$8.44	\$1.90	\$3.20	\$5.50	\$21.70	10th	20th	40th	50th	60th	80th
Error (estimate minus observed value)	+0.1	+0.9	+1.1	+0.2	+1.5	+0.2	-0.1	+0.2	-1.5	+1.1	-0.6	-0.3	-0.5	+0.2	+0.8	+2.0	+0.9	+0.9	0.0
Precision of estimate of change	0.3	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.1	0.3	0.4	0.6	0.7	0.6	0.7
Alpha factor for precision	0.99	0.97	1.04	1.01	0.99	1.00	1.07	1.30	1.34	0.96	1.05	1.29	1.01	0.98	0.92	0.98	1.06	1.06	1.13

Scorecard applied to 1,000 bootstraps of $n = 16,384$ from the validation sample.

Errors (differences between estimates and observed values) are in units of percentage points.

Precision is measured as 90-percent confidence intervals in units of \pm percentage points.

Errors and precision estimated from 1,000 bootstraps with $n = 16,384$.

Alpha is based on 1,000 bootstrap samples of $n = 256, 512, 1,024, 2,048, 4,096, 8,192, \text{ and } 16,384$.

Scorocs[®] Simple Poverty Scorecard[®] Tool Uganda

1. Introduction

The Scorocs Simple Poverty Scorecard poverty-assessment tool for Uganda is a low-cost, transparent way for pro-poor programs to get know their participants better and so to prove and improve their social performance.

The scorecard can be used to estimate the likelihood that a participant has consumption below a given poverty line, to estimate participants' poverty rate at a point in time, to estimate the change in participants' poverty rate over time,¹ and to segment participants for differentiated treatment.

The direct approach to poverty assessment via consumption surveys is difficult and costly. A case in point is the 2016/17 Uganda National Household Survey (UNHS) by the Uganda Bureau of Statistics (UBOS). The 2016/17 UNHS runs about 60 pages and covers more than 700 top-level questions, many of which have several follow-up questions or are repeated several times (for example, for each household member or for each expenditure item).

¹ As explained in the Appendix and in the “Version Note” on the title page, users should avoid hybrid estimates of change based on a baseline from an old scorecard and a follow-up from the new scorecard because such estimates will be very inaccurate. This warning does not apply to non-hybrid estimates of change that use the new scorecard for both baseline and follow-up.

In comparison, the scorecard’s indirect approach is quick and low-cost. It uses 10 verifiable questions drawn from the 2016/17 UNHS such as “What type of toilet facility does the household mainly use?” and “Does every member of the household have at least one pair of shoes in good condition?”. Responses to the questions are used to get a score that is correlated with consumption-based poverty status as measured by the exhaustive UNHS survey.

The scorecard differs from “proxy-means tests” (Coady, Grosh, and Hoddinott, 2004) in that it is transparent, it is freely available,² and it is tailored to the capabilities and purposes not of national governments but rather of local pro-poor organizations in Uganda. The feasible poverty-assessment options for such organizations are typically blunt (such as rules based on land ownership or housing quality) or subjective and relative (such as participatory wealth ranking facilitated by skilled field workers). Poverty estimates from these approaches may be costly, their accuracy is unknown, and they are not comparable across places, programs, nor time.

The scorecard is a low-cost, consumption-based, quantitative way to estimate the share of a program’s participants who are below a given poverty line. Examples of such poverty lines include Uganda’s national line and the World Bank’s “international extreme poverty line” of \$1.90 per person per day 2011 PPP. The scorecard can also be used to estimate changes in poverty rates. While consumption surveys are costly even for governments, some pro-poor programs may be able to implement the low-cost

² Uganda’s scorecard is not in the public domain; it is copyright © 2019 Scorocs.

scorecard to help with monitoring poverty and (if desired) segmenting clients for differentiated treatment.

The scorecard’s technical approach aims to be understood by non-specialists. After all, if program managers are to adopt the scorecard on their own and apply it to inform their decisions, then they must first trust that it works. Transparency and straightforwardness build trust. Getting “buy-in” matters; proxy-means tests and regressions on the “determinants of poverty” have been around for decades, but they are rarely used to inform decisions by pro-poor organizations. This is not because these tools do not work, but because they are often presented (when they are presented at all) as tables of regression coefficients incomprehensible to non-specialists (with cryptic question names such as “LGHHSZ_2” and with points with negative values and many decimal places). Thanks to the predictive-modeling phenomenon known as the “flat maximum”, approaches that are straightforward and transparent are usually about as accurate as approaches that are complex and opaque (Schreiner, 2012a; Caire and Schreiner, 2012).

Beyond its low cost and transparency, the scorecard’s technical approach is innovative in how it associates scores with poverty likelihoods, in the extent of its accuracy tests, and in how it derives formulas for standard errors. Although the accuracy tests are straightforward and commonplace in statistical practice and in the for-profit field of credit-risk scoring, the tests are rarely applied to poverty-assessment tools.

The scorecard is based on data from Uganda's 2016/17 UNHS. Questions are selected to be:

- Inexpensive to collect, easy to answer quickly, and straightforward to verify
- Strongly correlated with socio-economic status
- Liable to change over time as socio-economic status changes
- Applicable in all sub-regions of Uganda

All points in the scorecard are non-negative integers, and total scores range from 0 (most likely below a poverty line) to 100 (least likely below a poverty line). Non-specialists can collect data and tally scores on paper or [on hand-held devices](#) in the field in about ten minutes.

The scorecard can be used to estimate three basic quantities. First, it can estimate the *poverty likelihood* of a particular participant's household. This is the probability that the household has per-capita or per-adult-equivalent consumption below a given poverty line.

Second, the scorecard can estimate the poverty rate of a population of participants' households at a point in time. This estimate is the average of the estimated poverty likelihoods among a representative sample of participants' households from the population. Person-level (head-count) poverty rates can also be easily estimated, and these in turn can provide estimates of the number of poor people in households that include participants in a program.

Third, the scorecard can estimate annual changes in poverty rates. With two independent samples of participants' households from the same population, this is the difference in the average estimated poverty likelihood in the baseline sample versus the

average estimated likelihood in the follow-up sample, divided by the difference (in years) between the average interview date in the baseline sample and the average interview date in the follow-up sample.

With one sample in which each participant's household is scored twice, the estimate of the annual change in a poverty rate is the sum of the changes in each household's estimated poverty likelihood from baseline to follow-up, divided by the sum of years between each household's pair of interviews (Schreiner, 2014a).

Estimates of the annual rate of change in person-level (head-count) poverty rates can also be easily estimated, and these in turn can provide estimates of the annual net number of poor people in households that include participants in a program who move from below a poverty line to above it.

The scorecard can also be used to segment participants for differentiated treatment. To help pro-poor programs choose appropriate targeting cut-offs for their purposes, targeting accuracy is reported here for a range of possible cut-offs.

This paper presents a single scorecard whose questions and points are based on 150% of the national poverty line and data from a random sample of about three-fifths of households in the 2016/17 UNHS. Scores from this one scorecard are calibrated with this same three-fifths of households from the UNHS to poverty likelihoods for 19 poverty lines. Data from the other two-fifths of households in the 2016/17 UNHS is used to validate the scorecard's accuracy for estimating households' poverty likelihoods,

for estimating poverty rates for a population of participant’s households at a point in time, and for segmenting participants.

Given their assumptions, all three scorecard-based estimators (the poverty likelihood of a participant’s household, the poverty rate at a point in time of a population of participants’ households, and the change in the poverty rate over time of a population of participants’ households) are *unbiased*. That is, the true value matches the average of estimates in repeated samples from a single, unchanging population in which the relationship between scorecard questions and consumption-based poverty is unchanging. Like all predictive models, the scorecard has estimation errors when applied (as in this paper) to a validation sample. Furthermore, it makes errors to some unknown extent when applied (in practice) to a different population or when applied after 2016/17 (because the relationships between questions and poverty change over time and across populations).³ As warned in the Appendix and in the “Version Note” on the title page, hybrid estimates of change over time for Uganda with a baseline from an old scorecard and a follow-up from the new scorecard should *not* be used.

Thus, while the indirect-scorecard approach is less costly than the direct-survey approach, the scorecard has estimation errors when applied in practice. (Observed values from the direct-survey approach are taken as correct, ignoring sampling variation.) There are errors because the scorecard incorrectly acts as if future

³ Examples include nationally representative samples at a later point in time and sub-populations that are not nationally representative (Diamond *et al.*, 2016; Tarozzi and Deaton, 2009).

relationships between questions and consumption-based poverty in all populations will be the same as in the construction data. Of course, this unavoidable assumption holds only partly.

The average error in the scorecard's estimated poverty rate at a point in time (that is, the average of differences between estimated and observed values across 1,000 bootstrap samples of $n = 16,384$ from the validation sample) for 150% of the national poverty line at the household level is +1.1 percentage points. The average across all 19 poverty lines of the absolute values of the average error is about 0.7 percentage points, and the maximum of the absolute values of the average error is 2.0 percentage points. These estimation errors are due to sampling variation, not bias; the average error would be zero if the whole 2016/17 UNHS were to be repeatedly re-fielded and re-divided into sub-samples before repeating the entire process of constructing and validating the resulting scorecards.

With $n = 16,384$, the 90-percent confidence intervals are ± 0.7 percentage points or smaller. For $n = 1,024$, the 90-percent intervals are ± 2.8 percentage points or smaller.

Section 2 below documents data and poverty lines. It also explains how to estimate person-level (head-count) poverty rates. Sections 3 and 4 describe scorecard construction and offer guidelines for implementation. Sections 5 and 6 tell how to estimate poverty likelihoods for individual households and poverty rates at a point in time for a population of participants' households. Section 7 discusses estimating changes in a poverty rate for a population of participants' households. Section 8 covers targeting. Section 9 places the scorecard here in the context of three related exercises for Uganda. The last section is a summary.

The “Interview Guide” (found after the “References”) tells how to ask questions—and how to interpret responses—so as to mimic practice in Uganda’s 2016/17 UNHS as closely as possible. The “Interview Guide” (and the “Back-page Worksheet”) are integral parts of the scorecard for Uganda.

2. Data and poverty lines

This section presents the data used to construct and validate the scorecard. It also describes how to estimate person-level (head-count) poverty rates, the definition of *poverty*, and the 19 poverty lines to which scores are calibrated.

2.1 Data

Questions and points for the scorecard are selected (*constructed*) based on data from a random three-fifths of the 15,636 households in the 2016/17 UNHS, Uganda's most-recent available national household consumption survey. These same three-fifths of households are also used to associate (*calibrate*) scores with poverty likelihoods for all poverty lines.

Data from the other two-fifths of households from the 2016/17 UNHS is used to test (*validate*) the scorecard's accuracy for point-in-time estimates of poverty rates *out-of-sample*, that is, with data that is not used in construction nor calibration. Data from those same two-fifths of households are also used for out-of-sample tests of targeting accuracy.

The 2016/17 UNHS was fielded from July 1, 2016 to 30 June, 2017. Consumption is in prices for Uganda as a whole on average during the 2016/17 UNHS fieldwork.⁴

⁴ This is a guess; documentation of the time-and-place units of prices has not been found.

2.2 Poverty rates at the household, person, and participant level

A *poverty rate* is the share of units in households in which total household consumption (divided by the number of household members or by the number of adult equivalents) is below a given poverty line. The unit of analysis is either the household itself or a person in the household. It is assumed that all members in a given household have the same poverty status and the same estimated poverty likelihood.

For most pro-poor programs, the most-relevant unit of analysis is the person. People suffer from poverty; households are not conscious entities, and households do not suffer except inasmuch as their human members do. As explained below, person-level estimates are a weighted average of households' poverty likelihoods, where each household's weight is the number of members in the household.

Point-in-time estimates of poverty rates are usually more relevant for newly-participating households that join a pro-poor program in the current time period than for on-going participants who joined in past periods. This is because a pro-poor mission implies serving a clientele with some desired minimum poverty rate among new participants. At the same time, a pro-poor mission also implies a desire to reduce poverty, for which estimates of changes in poverty rates for on-going participants are relevant.

While estimates of poverty rates (at a point in time for new participants, or for change over time for on-going participants) matter, estimates of the *number of poor people* (for new participants) and the *annual net number of people who exit poverty* (for on-going participants) matter even more. This is because—for given levels or changes in poverty rates—a larger pro-poor program does more good than a smaller pro-poor program. After all, the end goal of a pro-poor program is not to have a high poverty rate among new participants nor a high rate of exit from poverty among on-going participants but rather to have many new participants who are poor and then to reduce the poverty of many on-going participants who were poor when they joined. Schreiner (2014a) discusses how to report and analyze scorecard estimates in more detail.

To illustrate the calculation of scorecard estimates, suppose that a brand-new pro-poor program in its first year enrolls participants from 1,000 households that encompass a total of 5,000 household members. The program applies the scorecard to a simple random sample of two households from among the 1,000.⁵

The first sampled household has three members, one of whom is a program participant. For a given a scorecard and poverty line, suppose that the first household's estimated poverty likelihood is 60.0 percent.

⁵ Of course, such a small sample gives unreliable estimates, but it simplifies the math in the examples here.

The second sampled household has four members, two of whom are program participants. With the same scorecard and poverty line, suppose that the second household’s estimated poverty likelihood is 40.0 percent.

2.2.1 Household-level estimates

Poverty rates are in terms of either households or people. In the uncommon case that a program defines its *participants* as households, the household level is relevant.

The estimated household-level poverty rate is the weighted⁶ average of estimated poverty likelihoods across households with participants. In the example here, this is

$$\frac{1 \cdot 0.600 + 1 \cdot 0.400}{1 + 1} = \frac{1}{2} = 0.5 = 50 \text{ percent.}$$

In the “ $1 \cdot 0.600$ ” term in the numerator, 1 is the first household’s household-level sampling weight, and 0.600 is the first household’s estimated poverty likelihood from the scorecard of 60.0 percent.

In the “ $1 \cdot 0.400$ ” term in the numerator, 1 is the second household’s household-level sampling weight, and 0.400 is the second household’s poverty likelihood of 40.0 percent.

The “ $1 + 1$ ” in the denominator is the sum of the household-level sampling weights of the two households. Household-level sampling weights are used because the unit of analysis is the household.

⁶ The examples here assume simple random sampling at the household level. This means that each household has the same selection probability and thus the same household-level sampling weight, taken here to be one (1).

With an estimated household-level poverty rate of 50.0 percent and a population of 1,000 newly-participating households, the estimated number of newly-participating poor households is $0.500 \cdot 1,000 = 500$.

Suppose that another representative sample of the same population of formerly-new, now-on-going participants⁷ is scored exactly two years later and that the resulting household-level estimated poverty rate is 45.0 percent. Then the *annual net number of households who exit poverty* is $(0.500 - 0.450) \cdot 1,000 \div 2 = 25$ households per year. Here, $(0.500 - 0.450)$ is the reduction in the household-level poverty rate in the period from baseline (50.0 percent) to follow-up (45.0 percent), 1,000 is the number of on-going households in the population across the two periods, and 2 is the number of years between the periods.

2.2.2 Person-level estimates

Alternatively, a person-level (head-count) poverty rate is relevant if all members of a participating household are affected by any household member's participation. This is usually the relevant case.

⁷ This example assumes no attrition. In practice, some participants do leave the program, and this attrition does not happen at random. In general, there is no way to eliminate bias in scorecard estimates due to non-random attrition, but in some cases it can be mitigated.

In the example here, the person-level rate is the household-size-weighted⁸ average of estimated poverty likelihoods for households with participants, that is,

$$\frac{3 \cdot 0.600 + 4 \cdot 0.400}{3 + 4} = \frac{3.4}{7} = 0.486 = 48.6 \text{ percent.}$$

In the “3 · 0.600” term in the numerator, 3 is the first household’s person-level sampling weight because the first household has three members, and 0.600 is the first household’s estimated poverty likelihood from the scorecard.

In the “4 · 0.400” term in the numerator, 4 is the second household’s person-level sampling weight because the second household has four members, and “0.400” is the second household’s poverty likelihood. The “3 + 4” in the denominator is the sum of the person-level sampling weights of the two households. Person-level sampling weights are used because the unit of analysis is the household member.

With an estimated household-level poverty rate of 50.0 percent and a population of 5,000 people who are members newly-participating households, the estimated number of newly-participating poor people is $0.500 \cdot 5,000 = 2,500$.

If the scorecard is applied to a representative sample of the same population of formerly-new, now-on-going participants exactly two years later, and if the resulting person-level estimated poverty rate is 45.0 percent, then the *annual net number of people who exit poverty* is $(0.486 - 0.450) \cdot 5,000 \div 2 = 90$ people per year. Here, $(0.486 - 0.450)$ is the reduction in the person-level poverty rate in the period from baseline (48.6

⁸ Given simple random sampling at the household level, a household’s person-level weight is the number of people in the household.

percent) to follow-up (45.0 percent), 5,000 is the number of on-going people in the population across the two periods and 2 is the number of years between the two periods.

Because greater household size both causes poverty and is caused by poverty, person-level poverty rates in practice almost always exceed household-level poverty rates. And because people (not households) experience poverty, person-level estimates are almost always more relevant than household-level estimates.

2.2.3 Participant-level estimates

Finally, a pro-poor program might count as *participants* only those household members who directly participate in the program. In practice, this case is seldom relevant.

For the example here, this means that some—but not all—household members are counted. The estimated participant-level poverty rate is then the participant-weighted average⁹ of the estimated poverty likelihoods of households with participants,

that is, $\frac{1 \cdot 0.600 + 2 \cdot 0.400}{1 + 2} = \frac{1.4}{3} = 0.467 = 46.7$ percent.

The 1 in the “1 · 0.600” in the numerator is the first household’s participant-level sampling weight because the first household has one participant, and 0.600 is the first household’s poverty likelihood.

⁹ Given simple random sampling at the household level, a household’s participant-level weight is the number of participants in that household.

The 2 in the “ $2 \cdot 0.400$ ” in the numerator is the second household’s participant-level sampling weight because the second household has two participants, and 0.400 is the second household’s poverty likelihood from the scorecard.

The “ $1 + 2$ ” in the denominator is the sum of the participant-level sampling weights of the two households. Participant-level sampling weights are used because the unit of analysis is the participant.

In almost all cases, either only one household member participates (in which case the participant-level estimates are the same as the household-level estimates) or all household members participate (in which case the participant-level estimates are the same as the person-level estimates).

To sum up, estimated poverty rates from a scorecard are weighted averages of households’ estimated poverty likelihoods, where—assuming simple random sampling at the household level—the weights are the number of relevant units in the household. People matter more than households; estimates of the number of newly-participating poor units matters more than estimates of poverty rates at a point in time; and estimates of the annual reduction in the net number of on-going poor units matter more than estimates of changes in poverty rates.

When reporting scorecard-based estimates, pro-poor programs should clearly state the unit of analysis—whether households, household members, or participants—and explain why that unit is relevant. In most cases, the unit of analysis is household

members because participation in a pro-poor program by any member of the household usually affects all the people who are members of the household and because poverty is experienced by people, not households.

To help with benchmarking, Table 3 reports poverty lines and poverty rates for households and people in the 2016/17 UNHS. There is a version of Table 3 for Uganda as a whole and for each of Uganda's 15 sub-regions.

Household-level poverty rates are reported because—as shown above— sampling is almost always done at the level of households and because household-level poverty likelihoods can be straightforwardly converted into poverty rates for other units of analysis. This is also why the scorecard is constructed, calibrated, and validated with household weights. Person-level poverty rates are also included in Table 3 because these are the rates reported by the government of Uganda and because person-level rates are usually the most-relevant for pro-poor programs. Furthermore, popular discussions and policy discourse usually proceed in terms of person-level rates, and the goal of pro-poor programs is to help people (not households) to improve their well-being.

2.3 Definition of *poverty*, and poverty lines

A household's *poverty status* as poor or non-poor depends on whether its consumption (UGX per person per day or UGX per adult equivalent per day) is below a given poverty line. Thus, a definition of *poverty* is a poverty line together with a measure of consumption.

Appleton (2001) documents Uganda's definition of consumption.

Because pro-poor programs in Uganda may want to use different or various poverty lines, this paper calibrates scores from its single scorecard to poverty likelihoods for 19 lines:

- Food line
- 100% of the national line
- 150% of the national line
- 200% of the national line
- \$1.25/day 2005 PPP
- \$2.00/day 2005 PPP
- \$2.50/day 2005 PPP
- \$5.00/day 2005 PPP
- \$8.44/day 2005 PPP
- \$1.90/day 2011 PPP
- \$3.20/day 2011 PPP
- \$5.50/day 2011 PPP
- \$21.70/day 2011 PPP
- First-decile (10th-percentile) line
- First-quintile (20th-percentile) line
- Second-quintile (40th-percentile) line
- Median (50th-percentile) line
- Third-quintile (60th-percentile) line
- Fourth-quintile (80th-percentile) line

2.3.1 National poverty lines

Following Ravallion and Bidani's (1994) basic-needs approach, Appleton (2001) derives Uganda's national poverty line as the sum of minimum standards for food and non-food consumption. The food standard is the cost of 3,000 Calories from the food basket consumed by the poorest half of adult equivalents in Uganda's 1993/4 First

Monitoring Survey.¹⁰ This cost is then adjusted by the change in the national Consumer Price Index (CPI) between the 1993/4 MS–1 and the 2016/17 UNHS.¹¹ The cost is also adjusted for food-price differences for urban and rural areas in four regions using data from the 2016/17 UNHS.

Uganda’s food poverty line is defined as this minimum food standard. On average for Uganda as a whole in prices during fieldwork for the 2016/17 UNHS, the food line is UGX1,749 per adult equivalent per day (Table 3). Comparing the food line against total (food-plus-non-food) consumption gives an all-Uganda household-level poverty rate of 6.1 percent and person-level rate of 8.6 percent.

The minimum standard for non-food consumption is defined as the non-food consumption observed for households in the 2016/17 UNHS whose total (food-plus-non-food) consumption is close to the minimum food standard. The non-food standard is derived separately for urban and rural areas in four regions.

¹⁰ Van Campenhout, Sekabira, and Aduayom (2014, p. 35) argue that a single, now-25-year-old consumption bundle for all of Uganda leads to inaccurate poverty estimates because “Uganda consists of a diverse set of regions, each with their own diets. These diets are also exceptional in their difference in cost to obtain a certain level of Calories (or utility of that matter). Lumping all regions together and assuming they require the same amounts of each commodity disregards the cultural and agro-climatic diversity that typifies Uganda.” They show that utility-consistent poverty lines (Arndt and Tarp, 2017; Arndt and Simler, 2000) with food bundles derived separately for six regions leads to a lower poverty rate and a lower reduction in poverty rates over time.

¹¹ Daniels and Minot (2015) speculate that using the CPI—coupled with an unchanging food basket—has understated both poverty lines and poverty rates.

The national poverty line (usually called here “100% of the national line”) in an urban or rural area in a given region is the food standard plus the non-food standard. In average prices for all-Uganda during the 2016/17 UNHS fieldwork, this is UGX2,416 per adult-equivalent per day. The all-Uganda household-level poverty rate is then 16.1 percent, and the person-level poverty rate is 21.4 percent (Table 3).¹²

¹² This person-level poverty rate for 100% of the national line matches UBOS (2018, p. xv), suggesting that this paper uses the same data and calculations as the UBOS did.

2.3.2 International 2005 PPP poverty lines

International 2005 PPP lines are derived from:

- 2005 PPP exchange rate for Uganda for “individual consumption expenditure by households”:¹³ UGX744.618 per \$1.00
- Average all-Uganda Consumer Price Index¹⁴ (CPI) in calendar-year 2005: 102.02
- Average all-Uganda CPI in calendar-year 2010: 152.81
- Average all-Uganda CPI in calendar-year 2011: 179.59
- Average all-Uganda CPI during 2016/17 UNHS fieldwork: 257.36
- Average all-Uganda spatial price deflator: 1.00000
- Regional spatial price deflators:¹⁵
 - Rural Central: 1.00706
 - Urban Central: 1.09337
 - Rural Eastern: 0.97540
 - Urban Eastern: 1.04499
 - Rural Northern: 0.98580
 - Urban Northern: 1.02962
 - Rural Western: 0.95917
 - Urban Western: 1.02140

Given this, the \$1.25/day 2005 PPP line for an urban or rural area in a given

region is $\$1.25 \cdot 2005 \text{ PPI factor} \cdot \frac{\text{Deflator}_{\text{Region}}}{\text{Ave. deflator}} \cdot \frac{\text{CPI}_{2016/17}}{\text{CPI}_{2005}}$.

¹³ iresearch.worldbank.org/PovcalNetPPP2005/Detail.aspx?Format=Detail&C0=UGA_3&PPP0=744.62&PL0=1.25&Y0=2012.5&NumOfCountries=1, retrieved 21 November 2019.

¹⁴ ubos.org/onlinefiles/uploads/ubos/cpi/octcpi2008/octcpi08tab3%20.xls?phpMyAdmin=H6bEcyYwh0J1G%2CeJxHfxirnuyrc; ubos.org/onlinefiles/uploads/ubos/cpi/junecpi2011/June_2011_CPI.pdf, retrieved 4 December 2014; ubos.org/onlinefiles/uploads/ubos/cpi/cpiNov2014/FINAL%20CPI%20Release%20-NOVEMBER%202014.pdf, retrieved 4 December 2014; ubos.org/onlinefiles/uploads/ubos/cpi/cpiMarch2015/FINAL%20CPI%20Release%20-March%202015.pdf, retrieved 4 March 2015; and <https://www.ubos.org/wp-content/uploads/publications/CPI%20press%20Release%20June%202017.pdf>, retrieved 16 October 2018.

¹⁵ UBOS 2012, p. 30 lists the districts associated with the four regions.

For the example of the Rural Central region, the \$1.25/day 2005 PPP line is

$$\$1.25 \cdot 744.618 \cdot \frac{1.00706}{1.00000} \cdot \frac{257.36}{102.02} = \text{UGX}2,365.$$

For Uganda overall, the average \$1.25/day 2005 PPP line is UGX2,348 per person per day, giving a household-level poverty rate of 28.6 percent and a person-level poverty rate of 36.9 percent (Table 3).

The lines and rates for \$1.25/day here cannot be compared with those of the World Bank's PovcalNet¹⁶ because PovcalNet does not report \$1.25/day figures for the 2016/17 UNHS.

The 2005 PPP poverty lines for \$2.00/day, \$2.50/day, and \$5.00/day are multiples of the \$1.25/day line.

\$8.44/day is the 75th percentile of worldwide per-capita income (not consumption) as estimated by Hammond *et al.* (2007). The \$8.44/day 2005 PPP line is used by the International Finance Corporation as a benchmark for the “bottom of the pyramid”. While the “\$1.25” aspect of the \$1.25 2005 PPP standard is in prices in calendar-year 2005, the “\$8.44” aspect of the \$8.44 2005 PPP standard is in prices in calendar-year 2010.¹⁷ The average CPI for calendar-year 2010 is 152.81, and the average CPI for 2016/17 is 257.36, so the all-Uganda \$8.44/day 2005 PPP line is

¹⁶ iresearch.worldbank.org/PovcalNetPPP2005/, retrieved 12 November 2019.

¹⁷ datatopics.worldbank.org/consumption/detail#consumptionsegments and datatopics.worldbank.org/consumption/detail#datastandardization, both retrieved 13 November 2019.

$\$8.44 \cdot 744.618 \cdot \left(\frac{257.36}{152.81}\right) = \text{UGX}10,584$. This gives a household-level poverty rate of

90.1 percent and a person-level poverty rate of 94.2 percent.

2.3.3 International 2011 PPP poverty lines

International 2011 PPP lines are derived from the parameters listed above, along with the 2011 PPP exchange rate for Uganda for “individual consumption expenditure by households”¹⁸ of UGX946.89 per \$1.00.

Analogous to the \$1.25/day 2005 PPP line, the \$1.90/day 2011 PPP line for an urban or rural area in a given region in the 2016/17 UNHS is

$$\$1.90 \cdot 2011 \text{ PPI factor} \cdot \frac{\text{Deflator}_{\text{Region}}}{\text{Ave. deflator}} \cdot \frac{\text{CPI}_{2016/17}}{\text{CPI}_{2011}}$$

For the example of the Rural Central region, the \$1.90/day 2011 PPP line is

$$\$1.90 \cdot 946.89 \cdot \frac{1.00706}{1.00000} \cdot \frac{257.36}{179.59} = \text{UGX}2,596.$$

For Uganda overall, the average \$1.90/day 2005 PPP line is UGX2,578 per person per day, giving a household-level poverty rate of 33.4 percent and a person-level poverty rate of 42.6 percent (Table 3).

The World Bank’s PovcalNet¹⁹ reports a \$1.90/day line of UGX2,545 per person per day²⁰ (about UGX33 lower than here) and a person-level poverty rate of 41.7 percent (about 0.9 percentage points lower than here).

¹⁸ iresearch.worldbank.org/PovcalNet/Detail.aspx?Format=Detail&C0=IDN_1&PPP0=4091.94&PLO=1.90&Y0=2017&NumOfCountries=1, retrieved 21 November 2019.

¹⁹ iresearch.worldbank.org/PovcalNet/Detail.aspx?Format=Detail&C0=UGA_3&PPP0=946.89&PLO=1.90&Y0=2016&NumOfCountries=1, retrieved 12 November 2019.

Why is this? PovcalNet’s undocumented calculations may differ from those here in that PovcalNet may:

- Use a CPI based on 2015/16 (rather than 2016/17)²¹
- Not account for Uganda’s use of a 30-day month (rather than $365 \div 12 = 30.417$ days) in its measure of consumption
- Use different CPIs
- Not adjust for price differences across urban and rural areas in four regions

Which \$1.90/day 2011 PPP line is to be preferred? If it makes sense to adjust poverty lines for price differences across geographic regions at the level of countries (the purpose of international 2011 PPP lines in the first place), then it also makes sense to adjust for such differences within a given country.

As argued in Schreiner (2014b), the scorecard’s figures for PPP poverty lines are to be preferred over those of PovcalNet because the scorecard’s figures are documented more completely.

The 2011 PPP poverty lines for \$3.20/day, \$5.50/day, and \$21.70/day are multiples of the \$1.90/day line.²²

²⁰ This assumes that PovcalNet matches the 30-day month used in Uganda’s definition of consumption. PovcalNet usually defines a month as having $365 \div 12 = 30.417$ days, which would reduce the \$1.90/day line to UGX2,510.

²¹ iresearch.worldbank.org/PovcalNet/Docs/CountryDocs/UGA.htm#3 (retrieved 21 November 2019) lists the survey year as “2015.5”.

²² Jolliffe and Prydz (2016) discuss the World Bank’s choice of the four 2011 PPP lines.

2.3.4 Percentile-based poverty lines

The scorecard for Uganda also supports percentile-based poverty lines.²³ This facilitates a number of types of analyses. For example, the second-quintile (40th-percentile) line might be used to help track Uganda’s progress toward the World Bank’s (2013) goal of “shared prosperity/inclusive economic growth”, defined as income growth among the bottom 40 percent of the world’s people.

The four quintile lines, analyzed together, can also be used to look at the relationship of consumption with health outcomes (or anything else related with the distribution of consumption). The scorecard thus offers an alternative for health-equity analyses that typically have used an asset index such as that supplied with the data from the Demographic and Health Surveys to compare an estimate of socio-economic status with health outcomes (Rutstein and Johnson, 2004).

Of course, relative-wealth analyses were always possible (and still are possible) with scores from the scorecard. But support for relative consumption lines allows for a more straightforward use of a single tool to analyze any or all of:

- Relative wealth (via scores)
- Absolute consumption (via poverty likelihoods and absolute poverty lines)
- Relative consumption (via poverty likelihoods and percentile-based poverty lines)

²³ Following the asset index associated with the Demographic and Health Surveys, percentiles are defined in terms of people (not households) for Uganda as a whole. For example, the all-Uganda person-level poverty rate for the first-quintile (20th-percentile) poverty line is 20 percent (Table 3). The household-level poverty rate for that same line is not 20 percent but rather 14.7 percent.

Unlike the scorecard, asset indexes serve only to analyze relative wealth. Furthermore, the scorecard—unlike asset indexes based on Principal Component Analysis or similar approaches—uses a straightforward, well-understood standard for socio-economic status whose definition is external to the tool itself (consumption relative to a poverty line defined in monetary units).

In contrast, an asset index opaquely defines *poverty* in terms of its own questions and points, without reference to an external standard. This means that two asset indexes with different questions or different points—even if derived from the same data for a given country—imply two different definitions of *poverty*. In the same set-up, two scorecards would provide comparable estimates under a single definition of *poverty*.

3. Scorecard construction

For Uganda, about 70 candidate questions are initially prepared in the areas of:

- Household composition (such as the number of household members)
- Education (such as the literacy of the female head (or eldest wife of the male head))
- Housing (such as the main material of the floor)
- Ownership of consumer durables (such as shoes or mobile phones)
- Location of residence (such as sub-region)
- Agriculture (such as the presence of income from crop farming or livestock)

One possible application of the scorecard is to estimate changes in poverty rates over time. Thus, when selecting questions—and holding other considerations constant—preference is given to questions whose responses are more sensitive to changes in poverty. For example, the number of mobile phones owned is probably more likely to change in response to changes in socio-economic status than is the age of the male head (or husband of the female head).

The scorecard itself is built using 150% of the national poverty line and Logit regression on the construction sub-sample. Question selection is based on both judgment and statistics. The first step is to use Logit to build one scorecard for each candidate question. The power of each one-question scorecard to rank households by poverty status is assessed via the concentration index (Ravallion, 2009).

One of these one-question scorecards is then selected based on several factors (Schreiner *et al.*, 2014; Zeller, 2004). These include improvement in accuracy, likelihood of acceptance by users (determined by simplicity, cost of collection, and “face validity” in terms of experience, theory, and common sense), sensitivity to changes in

consumption, variety among types of questions, applicability across regions, tendency to have a slow-changing relationship with socio-economic status over time, relevance for distinguishing among households at the poorer end of the distribution of consumption, and verifiability.

A series of two-question scorecards are then built, each adding a second question to the one-question scorecard selected from the first stage. The best two-question scorecard is then selected, again using judgment to balance statistical accuracy with the non-statistical criteria. These steps are repeated until the scorecard has 10 questions that work well together.

The final step is to transform the Logit coefficients into non-negative integers such that total scores range from 0 (most likely below a poverty line) to 100 (least likely below a poverty line).

This algorithm is similar to common R^2 -based stepwise least-squares regression. It differs from naïve stepwise in that the selection of questions considers both statistical²⁴ and non-statistical criteria. The use of non-statistical criteria can improve robustness through time and across non-nationally representative groups. It also helps to ensure that questions are straightforward, common-sense, inexpensive-to-collect, and acceptable to users.

²⁴ The statistical criterion for selecting a question is not the p values of its coefficients but rather the question's contribution to the ranking of households by poverty status in the context of a scorecard with nine other questions.

The single scorecard here applies to all of Uganda. Segmenting poverty-assessment tools by urban/rural does not improve targeting accuracy much. This is reported for Uganda and eight other countries in Sub-Saharan Africa (Brown, Ravallion, and van de Walle, 2018)²⁵, Indonesia (World Bank, 2012), Bangladesh (Sharif, 2009), India and Mexico (Schreiner, 2006 and 2005a), Sri Lanka (Narayan and Yoshida, 2005), and Jamaica (Grosh and Baker, 1995). In general, segmenting poverty-assessment tools may improve the accuracy of estimates of poverty rates (Diamond *et al.*, 2016; Tarozzi and Deaton, 2009), but it may also increase the risk of overfitting (Haslett, 2012).

²⁵ Burkina Faso, Ethiopia, Ghana, Malawi, Mali, Niger, Nigeria, Tanzania. On average across these countries when targeting people in the lowest quintile or in the lowest two quintiles of scores and when 20 or 40 percent of people are poor, segmenting by urban/rural increases the number of poor people successfully targeted by about one per 200 or one per 400 poor people.

4. Practical guidelines for scorecard use

The main challenge of scorecard design is not to maximize statistical accuracy but rather to improve the chances that the scorecard is actually used and properly used (Schreiner, 2005b). When scorecard projects fail, the reason is not usually statistical inaccuracy but rather the failure of an organization to decide to do what is needed to integrate the scorecard in its processes and to train and convince its employees to use the scorecard properly (Schreiner, 2002). After all, most reasonable poverty-assessment tools have similar targeting accuracy, thanks to the empirical phenomenon known as the “flat maximum”.²⁶ The relevant bottleneck is less technical and more human, not statistics but organizational-change management. Accuracy is easier to achieve than adoption.

The scorecard for Uganda is designed to encourage understanding and trust so that users will want to adopt it on their own and use it properly. Of course, accuracy matters, but it must be balanced with cost, ease-of-use, and “face validity”. Programs are more likely to collect data, compute scores, and pay careful attention to the results if, in their view, the scorecard does not imply a lot of additional work and if the whole process generally make sense to them.

²⁶ Dupriez, 2018; Caire and Schreiner, 2012; Hand, 2006; Baesens *et al.*, 2003; Lovie and Lovie, 1986; Kolesar and Showers, 1985; Stillwell, Barron, and Edwards, 1983; Dawes, 1979; Wainer, 1976; Myers and Forgy, 1963.

To this end, Uganda’s scorecard fits on one page. The construction process, questions, and points are straightforward and transparent. Additional work is minimized; non-specialists can compute scores by hand in the field because the scorecard has:

- Ten questions
- Multiple-choice responses
- Simple points (non-negative integers, and no arithmetic beyond addition)

4.1 How to apply the scorecard in the field

The scorecard (and its “Back-page Worksheet”) is ready to be photocopied. A field worker using Uganda’s scorecard would:

- Record the interview identifier, interview date, country code (“UGA”), scorecard code (“003”) and the sampling weight assigned to the household of the participant by the program’s survey design (if known)
- Record the names and identifiers of the participant (who is not necessarily the same as the respondent), of the field agent (if there is one) who is the participant’s main point of contact with the program (and who is not necessarily the same as the enumerator), and of the program service point that is relevant for the participant (if there is such a service point)
- Mark the response to the first scorecard question (“In what sub-region does the household live?”) based on what is known about where the interviewed household lives
- Complete the “Back-page Worksheet” with each household member’s first name (or nickname), marking the female head (or eldest wife of the male head), if she exists
- Based on the “Back-page Worksheet”, record the number of household members in the scorecard header next to “Number of household members:”
- Based on the “Back-page Worksheet”, mark the response to the second scorecard question (“How many members does the household have?”)
- Read the third, fourth and fifth questions aloud one-by-one, marking the respondent’s answers

- Do not read aloud the sixth question (“Type of material mainly used for construction of the floor?”). Instead, observe the floor of the residence yourself, without asking the question directly of the respondent. If you are certain of the appropriate response, then mark it. If you are not certain, then ask the question directly of the respondent, and mark his/her response
- Read the remaining four questions aloud one-by-one, marking the respondent’s answers
- For all questions, write each point value in the far right-hand column, and circle the pre-printed response, the pre-printed points, and the hand-written points
- Add up the points to get a total score (if desired)
- Implement targeting policy (if any) based on the score
- Upload the data with a [mobile data-collection tool](#), or deliver the paper scorecard to a central office for data entry, reporting, and analysis

Of course, field workers must be trained. The quality of outputs depends on the quality of inputs. The training of field workers should be based solely on the “Interview Guide” found after the “References” in this document.

If organizations or field workers gather their own data and if they believe that they have an incentive to exaggerate poverty rates (for example, if managers or funders reward them for higher poverty rates), then it is wise to do on-going quality control via data review and random audits (Matul and Kline, 2003).²⁷ IRIS Center (2007) and Toohig (2008) are useful nuts-and-bolts guides for logistics, budgeting, training field workers and supervisors, sampling, interviewing, piloting, recording data, and

²⁷ If a program does not want field workers or respondents to know the points associated with responses, then it can use a [mobile data-collection tool](#) or provide a version of the paper scorecard that does not display the points and then apply the points and compute scores later at a central office. Even if points are hidden, however, field workers and respondents can use common sense to guess how answers are linked with socio-economic status. Schreiner (2012b) argues that hiding points in Colombia (Camacho and Conover, 2011) did little to deter cheating and that, in any case, cheating by the user’s central office was more damaging than cheating by field workers and respondents.

controlling quality. Schreiner (2014a) explains how to compute estimates, report them, and analyze them.

While collecting scorecard questions is relatively easier than alternative ways of assessing poverty, it is still absolutely difficult. Training and explicit definitions of the terms and concepts in the scorecard are essential, and field workers should scrupulously study and follow the “Interview Guide” found after the “References” section in this paper, as this “Interview Guide”—along with the “Back-page Worksheet”—is an integral part of the scorecard.²⁸

4.2 Survey-design choices

In terms of implementation and sampling design, a program must make choices about:

- Who will do the interviews
- Where interviews will be done
- How responses and scores will be recorded
- Which participants’ households will be interviewed
- How many participants’ households will be interviewed
- How frequently participants’ households will be interviewed
- Whether the scorecard will be applied at more than one point in time
- Whether the same participants’ households will be scored more than once

²⁸ The guidelines here are the only ones that organizations should give to enumerators. All other issues of interpretation should be left to the judgment of enumerators and respondents, as this seems to be what Uganda’s UBOS did in the 2016/17 UNHS.

In general, the sampling design should follow from the program’s goals for the survey, the business questions to be answered, and the budget. The broad goals are:

- To make sure that the sample is representative of a well-defined population
- To inform issues that matter to the program

The non-specialists who apply the scorecard in the field with the households of a program’s participants can be:

- Employees of the program
- Third parties

There is only one correct, recommended way to do interviews: in-person, at the sampled household’s residence, with an enumerator trained to follow the “Interview Guide”. This is how the UBOS did interviews in Uganda’s 2016/17 UNHS, and this provides the most-accurate and most-consistent data (and thus the best estimates).

Of course, it is possible to do interviews in other ways such as:

- Without an enumerator (for example, by asking respondents to fill out paper or web forms on their own or to answer questions sent via e-mail, text messaging, or automated voice-response systems)
- Away from the residence (for example, at an organizational service point or at a group-meeting place)
- Not in-person (for example, with an enumerator interviewing by phone)

While such non-recommended methods may reduce costs, they also affect responses (Schreiner, 2015c) and thus reduce the accuracy of scorecard estimates. This is why interviewing by a trained enumerator at the residence is recommended and why other methods are not recommended.

In some contexts—such as when a program’s field agents do not already visit participants periodically at home anyway as part of their normal work—a program might judge that the lower costs of a non-recommended approach compensate for less-accurate estimates. The business wisdom of non-recommended methods depends on context-specific factors that each program must judge for itself. To judge carefully, a program that is considering a non-recommended method should do a small test to see how responses differ with the non-recommended method versus with a trained enumerator at the residence. Furthermore, any reporting should highlight the use of the non-recommended method and discuss its possible consequences.

Responses, scores, and poverty likelihoods can be recorded by enumerators on:

- Paper in the field, and then filed at a central office
- Paper in the field, and then keyed into a database or spreadsheet at a central office
- [Mobile devices in the field](#), and then uploaded to a database²⁹

Given a population of participants relevant for a particular business question, the participants whose households will be interviewed can be:

- All relevant participants (a census)
- A representative sample of relevant participants
- All relevant participants in a representative sample of relevant field offices and/or in a representative sample of relevant field agents
- A representative sample of relevant participants in a representative sample of relevant field offices and/or in a representative sample of relevant field agents

²⁹ [Scorocs](#) can help set up a system to collect data with mobile devices or to capture data in a database at the office once paper forms come in. Support is also available for calculating estimates as well as for reporting and analysis.

If not determined by other factors, the number of participants whose households are to be interviewed can be derived from sample-size formulas (presented later) to achieve a desired confidence level and a desired confidence interval. To have the best chance to meaningfully inform questions that matter to the program, however, the focus should be less on having a sample size large enough to achieve some arbitrary level of statistical significance and more on having a representative sample from a well-defined population that is relevant for informing issues that matter to the program. In practice, errors due to implementation issues and due to interviewing a non-representative sample can easily swamp errors due to having a somewhat smaller sample size.

The frequency of application can be:

- As a once-off project (precluding estimating change)
- Every three years (or at any other fixed or variable time interval, allowing estimating change)
- Each time a field agent visits a participant at home (allowing estimating change)

If a scorecard is applied more than once in order to estimate changes in poverty rates over time, then it can be applied:

- With two independent samples of participants from the same population, with the first sample scored at baseline and the second sample scored at follow-up
- With a single sample of participants, all of whom are scored at both baseline and follow-up

An example set of choices is illustrated by BRAC and ASA, two microfinance organizations in Bangladesh who each have about 7 million participants and who declared their intention to apply the scorecard for Bangladesh (Schreiner, 2013a) with a sample of about 25,000 participants each. Their design is that all loan officers in a random sample of branches score all participants each time the loan officers visit a homestead (about once a year) as part of their standard due diligence prior to loan disbursement. The loan officers record responses on paper in the field before sending the forms to a central office to be entered into a database and converted to poverty likelihoods.

5. Estimates of a household's poverty likelihood

The sum of scorecard points for a household is called the *score*. For Uganda, scores range from 0 (most likely below a poverty line) to 100 (least likely below a poverty line). While higher scores indicate less likelihood of being poor, the scores themselves have only relative units. For example, doubling the score decreases the likelihood of being below a given poverty line, but it does not cut it in half.

To get absolute units, scores are converted to *poverty likelihoods*, that is, probabilities of being below a poverty line. This is done via easy-to-use look-up tables. For the example of 150% of the national poverty line, scores of 36–38 have a poverty likelihood of 54.6 percent, and scores of 39–40 have a poverty likelihood of 46.6 percent (Table 1).

The poverty likelihood associated with a score varies by poverty line. For example, scores of 36–38 are associated with a poverty likelihood of 54.6 percent for 150% of the national poverty line but of 49.1 percent for the \$1.90/day 2011 PPP line.

5.1 Calibrating scores with poverty likelihoods

A given score is associated (“calibrated”) with an estimated *poverty likelihood* that is defined as the share of households in the construction sub-sample who have the score and who have per-capita or per-adult-equivalent consumption below a given poverty line.

For the example of 150% of the national poverty line and a score of 36–38 (table on next page), there are 5,262 (normalized) households in the construction sample. Of these, 2,872 (normalized) are below the poverty line. The estimated poverty likelihood associated with a score of 36–38 is then 54.6 percent, because $2,872 \div 5,262 = 0.546 = 54.6$ percent.

To illustrate with 150% of the national poverty line and a score of 39–40, there are 3,856 (normalized) households in the construction sub-sample, of whom 1,795 (normalized) are below the line (see table below). The poverty likelihood for this score range is then $1,795 \div 3,856 = 0.466 = 46.6$ percent.

The same method is used to calibrate scores with estimated poverty likelihoods for all 19 poverty lines.³⁰

Even though the scorecard is constructed partly based on judgment related to non-statistical criteria, the calibration process produces poverty likelihoods that are objective, that is, derived from monetary poverty lines and from survey data on consumption. The calibrated poverty likelihoods would be objective even if the process of selecting questions and points did not use any data at all. In fact, objective scorecards of proven accuracy are often constructed using only expert judgment to

³⁰ To ensure that poverty likelihoods never increase as scores increase, likelihoods across pairs of adjacent scores may be iteratively averaged before grouping scores into ranges. This preserves unbiasedness while keeping users from balking when sampling variation in score ranges with few households would otherwise lead to higher scores being linked with higher poverty likelihoods.

Derivation of estimated poverty likelihoods (150% of national line)

Score	Households in range and < poverty line	÷	All households in range	=	Poverty likelihood (%)
0–16	4,610	÷	4,916	=	93.8
17–21	4,418	÷	4,984	=	88.6
22–25	4,089	÷	4,957	=	82.5
26–29	3,932	÷	5,173	=	76.0
30–32	3,089	÷	4,554	=	67.8
33–35	2,890	÷	5,068	=	57.0
36–38	2,872	÷	5,262	=	54.6
39–40	1,795	÷	3,856	=	46.6
41–43	2,372	÷	6,189	=	38.3
44–45	1,169	÷	3,686	=	31.7
46–48	1,618	÷	5,879	=	27.5
49–50	1,011	÷	3,806	=	26.6
51–53	859	÷	5,381	=	16.0
54–56	911	÷	6,412	=	14.2
57–58	297	÷	3,774	=	7.9
59–61	303	÷	6,434	=	4.7
62–64	203	÷	5,838	=	3.5
65–68	71	÷	5,659	=	1.2
69–72	46	÷	3,883	=	1.2
73–100	0	÷	4,287	=	0.0

Number of all households normalized to sum to 100,000.

select questions and points.³¹ Of course, the scorecard here is constructed with both data and judgment. The fact that this paper acknowledges that some choices in scorecard construction—as in any statistical analysis—are informed by judgment in no way impugns the objectivity of the poverty likelihoods, as their objectivity depends on using data in score calibration, not on using data (and nothing else) in scorecard construction.

³¹ Fuller, 2006; Caire, 2004; Schreiner *et al.*, 2014.

Even though the scorecard is constructed partly based on judgment related to non-statistical criteria, the calibration process produces poverty likelihoods that are objective, that is, derived from monetary poverty lines and from survey data on consumption. The calibrated poverty likelihoods would be objective even if the process of selecting questions and points did not use any data at all. In fact, objective scorecards of proven accuracy are often constructed using only expert judgment to select questions and points.³² Of course, the scorecard here is constructed with both data and judgment. The fact that this paper acknowledges that some choices in scorecard construction—as in any statistical analysis—are informed by judgment in no way impugns the objectivity of the poverty likelihoods, as their objectivity depends on using data in score calibration, not on using data (and nothing else) in scorecard construction.

Although the points in Uganda’s scorecard are transformed coefficients from a Logit regression, (untransformed) scores are not converted to poverty likelihoods via the Logit formula of $2.718281828^{\text{score}} \times (1 + 2.718281828^{\text{score}})^{-1}$. This is because the Logit formula is esoteric and difficult to compute by hand. It is more intuitive to define the poverty likelihood as the share of households with a given score in the construction sample who are below a poverty line. Going from scores to poverty likelihoods in this way requires no arithmetic at all, just a look-up table. This approach to calibration can also improve accuracy, especially with large samples.

³² Fuller, 2006; Caire, 2004; Schreiner *et al.*, 2014.

5.2 Accuracy of estimates of households' poverty likelihoods

As long as the relationships between questions and poverty do not change over time, and as long as the scorecard is applied to samples of households who are representative of the same population as that from which the scorecard was originally constructed, then this calibration process produces unbiased estimates of poverty likelihoods. *Unbiased* means that in repeated samples from the same population, the average of the estimates matches the population's true value. Given the assumptions above, the scorecard also produces unbiased estimates of poverty rates at a point in time and unbiased estimates of changes in poverty rates between two points in time.³³

Of course, the relationships between questions and poverty do change to some unknown extent over time, and they also vary across sub-national groups in Uganda's population. Thus, scorecard estimates will generally have errors when applied after 2016/17 (the period of field work for the 2016/17 UNHS) or when applied with sub-groups that are not nationally representative.

³³ This is because these estimates of populations' poverty rates are linear functions of the unbiased estimates of households' poverty likelihoods.

How accurate are estimates of households' poverty likelihoods, given the assumption of unchanging relationships between questions and poverty over time and the assumption of a sample that is representative of Uganda as a whole? To find out, the scorecard is applied to 1,000 bootstrap samples of size $n = 16,384$ from the validation sample. Bootstrapping means to:

- Score each household in the validation sample
- Draw a bootstrap sample *with replacement* from the validation sample, accounting for household-level sampling weights
- For each score range, compute the observed poverty likelihood in the bootstrap sample, that is, the share of households with the score and with consumption below a poverty line
- For each score range, record the difference between the estimated poverty likelihood (Table 1) and the observed poverty likelihood in the bootstrap sample
- Repeat the previous three steps 1,000 times
- For each score range, report the average difference between estimated and observed poverty likelihoods across the 1,000 bootstrap samples
- For each score range, report the intervals containing the central 900, 950, and 990 differences between estimated and observed poverty likelihoods

For each score range and for $n = 16,384$, Table 4³⁴ shows the errors in the estimates of poverty likelihoods, that is, the average of differences between estimates and observed values. It also shows confidence intervals for the errors.

For 150% of the national line and on average across bootstrap samples from the validation sample, the estimated poverty likelihood for scores of 36–38 (54.6 percent,

³⁴ From Table 4 on, many tables have 19 versions, one for each of the 19 supported poverty lines. To keep them straight, tables are grouped by line.

Table 1) is too high by 3.7 percentage points. For scores of 39–40, the estimate is too high by 8.6 percentage points.³⁵

The 90-percent confidence interval for the differences for scores of 36–38 is ± 3.5 percentage points (Table 4). This means that in 900 of 1,000 bootstraps, the average difference between the estimate and the observed value for households in this score range is between +0.0 and +7.0 percentage points (because $+3.5 - 3.5 = +0.0$, and $+3.5 + 3.5 = +7.0$). In 950 of 1,000 bootstraps (95 percent), the difference is $+3.7 \pm 4.2$ percentage points, and in 990 of 1,000 bootstraps (99 percent), the difference is $+3.7 \pm 5.8$ percentage points.

Some of the absolute errors between estimated and observed poverty likelihoods in Table 4 for 150% of the national line are large. The differences are at least partly due to the fact that the validation sample is a single sample that—thanks to sampling variation—differs in distribution from the construction sub-sample and from the population of Uganda. For targeting, however, what matters is less the difference in all score ranges and more the differences in the score ranges just above and just below the targeting cut-off. This mitigates the effects of error and sampling variation on targeting (Friedman, 1997). Section 8 below looks at targeting accuracy in detail.

³⁵ These differences are not zero, in spite of the estimator’s unbiasedness, because the scorecard is based on a single sample. The average difference by score would be zero if samples were repeatedly drawn from the population and split into sub-samples before repeating the entire process of scorecard construction/calibration and validation.

Of course, if estimates of populations' poverty rates are to be usefully accurate, then errors across individual households' poverty likelihoods must largely balance out. As discussed in the next section, this is generally the case for nationally representative samples in 2016/17 in Uganda, although it will hold less well for samples from sub-national populations and in other time periods.

Another possible source of errors between estimates and observed values is overfitting. The scorecard here is unbiased, but it may still be *overfit* when applied after the end of the UNHS field work in June 2017. That is, the scorecard may fit the construction data from 2016/17 so closely that it captures not only some real patterns that exist in the population of Uganda but also some random patterns that, due to sampling variation, show up only in the 2016/17 UNHS construction sample. Or the scorecard may be overfit in the sense that its accuracy decreases when relationships between questions and poverty change over time or when the scorecard is applied to sub-groups that are not nationally representative.

Overfitting can be mitigated by simplifying the scorecard and by not relying only on data but rather also considering theory, experience, and judgment. Of course, the scorecard does this. Combining multiple scorecards can also reduce overfitting, at the cost of greater complexity.

Most errors in individual households' likelihoods do balance out in the estimates of poverty rates for nationally representative samples (see the next two sections). Furthermore, at least some of the differences in change-over-time estimates come from non-scorecard sources such as changes in the relationships between questions and poverty, sampling variation, changes in poverty lines, inconsistencies in data quality over time, and imperfections in price adjustments over time and across geographic regions. These factors can be addressed only by improving the availability, frequency, quantity, and quality of data from national consumption surveys (which is beyond the scope of the scorecard) or by reducing overfitting (which likely has limited returns, given the scorecard's parsimony).

6. Estimates of a poverty rate at a point in time

A population’s estimated poverty rate at a point in time is the average of the estimated poverty likelihoods of the sampled households.

To illustrate, suppose a program samples three households on 1 January 2021 and that they have scores of 20, 30, and 40, corresponding to estimated poverty likelihoods of 88.6, 67.8, and 46.6 percent (150% of the national line, Table 1). The population’s estimated poverty rate is the households’ average poverty likelihood of $(88.6 + 67.8 + 46.6) \div 3 = 67.7$ percent.³⁶

Be careful; the population’s estimated poverty rate is *not* the poverty likelihood associated with the average score. Here, the average score is 30, which corresponds to an estimated poverty likelihood of 67.8 percent. This differs from the 67.7 percent found as the average of the three individual poverty likelihoods associated with each of the three scores. Unlike poverty likelihoods, scores are ordinal symbols, like letters in the alphabet, colors in the spectrum, or syllables in a solfège scale. Because scores are not cardinal numbers, they cannot meaningfully be added up or averaged across households. Only three operations are valid for scores: conversion to poverty likelihoods, analysis of distributions (Schreiner, 2012a), or comparison—if desired—with a cut-off for segmentation. There are a few contexts in which the analysis of scores is

³⁶ This example assumes simple random sampling (or a census) and analysis at the level of households so that each household’s household-level sampling weight is one (1). Weights would differ by household if there were stratified sampling or—as discussed in Section 2—if the analysis were at the level of the person or of the participant.

appropriate, but, in general, the safest rule to follow is: If you are not completely sure what to do, then use poverty likelihoods, not scores.

Scores from the scorecard are calibrated with data from the construction sample of the 2016/17 UNHS for all 19 poverty lines. The process of calibrating scores to poverty likelihoods and the approach to estimating poverty rates is exactly the same for all poverty lines. For users, the only difference in terms of what they do with one poverty line versus with another has to do with the values in the look-up table used to convert scores to poverty likelihoods.

6.1 Accuracy of estimated poverty rates at a point in time

For the scorecard applied to 1,000 bootstraps of $n = 16,384$ for 150% of the national line, the average error (average difference between the estimate and observed value in the validation sample) for a poverty rate at a point in time is +1.1 percentage points (Table 2, which summarizes Table 5 across all poverty lines). For the 19 poverty lines, the maximum of the absolute values of the error in the validation sample is 2.0 percentage points, and the average of the absolute values of the average errors is about 0.7 percentage points. At least part of these differences is due to sampling variation in the division of the 2016/17 UNHS into two sub-samples.

When estimating poverty rates at a point in time for a given poverty line, the error reported in Table 2 should be subtracted from the average poverty likelihood to give a corrected estimate. For the example of the scorecard and 150% of the national

line in the validation sample, the error is +1.1 percentage points, so the corrected estimate in the three-household example above is $67.7 - (+1.1) = 66.6$ percent.

In terms of precision, the 90-percent confidence interval for a population's estimated poverty rate at a point in time with $n = 16,384$ is ± 0.7 percentage points or smaller for all poverty lines (Table 2). Given the scorecard's standard assumptions, this means that in 900 of 1,000 bootstraps of this size, the estimate (after correcting for the known average error) is within 0.7 percentage points of the observed value.

For example, suppose that the (uncorrected) average poverty likelihood in a sample of $n = 16,384$ with the scorecard and 150% of the national line is 67.7 percent. Then estimates in 90 percent of such samples would be expected to fall in the range of $67.7 - (+1.1) - 0.6 = 66.0$ percent to $67.7 - (+1.1) + 0.6 = 67.2$ percent, with the most likely observed value being the corrected estimate in the middle of this range, that is, $67.7 - (+1.1) = 66.6$ percent. This is because the original (uncorrected) estimate is 67.7 percent, the average error is +1.1 percentage points, and the 90-percent confidence interval for 150% of the national line in the validation sample with this sample size is ± 0.6 percentage points (Table 2).

6.2 Formula for standard errors for estimates of poverty rates

How precise are the point-in-time estimates? Because these estimates are averages, they have (in “large” samples) a Normal distribution and can be characterized by their error (average difference vis-à-vis observed values), together with their standard error (precision, taken as the square root of the sum of the squared differences).

Schreiner (2008) proposes an approach to deriving a formula for the standard errors of estimated poverty rates at a point in time from indirect estimation via a scorecard. It starts with Cochran’s (1977) textbook formula of $\pm c = \pm z \cdot \sigma$ that relates confidence intervals with standard errors in the case of the direct measurement of ratios, where:

$\pm c$ is a confidence interval as a proportion (*e.g.*, ± 0.02 for ± 2 percentage points),

z is from the Normal distribution and is $\begin{cases} 1.04 \text{ for confidence levels of 70 percent} \\ 1.28 \text{ for confidence levels of 80 percent,} \\ 1.64 \text{ for confidence levels of 90 percent} \end{cases}$

σ is the standard error of the estimated poverty rate, that is, $\sqrt{\frac{\hat{p} \cdot (1 - \hat{p})}{n}} \cdot \phi$,

\hat{p} is the estimated proportion of households below the poverty line in the sample,

ϕ is the finite population correction factor $\sqrt{\frac{N - n}{N - 1}}$,

N is the population size, and

n is the sample size.

For example, Uganda’s 2016/17 UNHS gives a direct-measure household-level poverty rate for 150% of the national line of $\hat{p} = 36.5$ percent (Table 3).³⁷ If this measure came from a sample of $n = 16,384$ households from a population N of 3,344,118 (the number of households in Uganda in 2016/17 according to the UNHS sampling weights), then the finite population correction ϕ is $\sqrt{\frac{3,344,118 - 16,384}{3,344,118 - 1}} = 0.9975$, which

is very close to $\phi = 1$. If the desired confidence level is 90-percent ($z = 1.64$), then the confidence interval $\pm c$ is

$$\pm z \cdot \sqrt{\frac{\hat{p} \cdot (1 - \hat{p})}{n}} \cdot \sqrt{\frac{N - n}{N - 1}} = \pm 1.64 \cdot \sqrt{\frac{0.365 \cdot (1 - 0.365)}{16,384}} \cdot \sqrt{\frac{3,344,118 - 16,384}{3,344,118 - 1}} = \pm 0.615$$

percentage points. If ϕ were taken as 1, then the interval is ± 0.617 percentage points.

Unlike the 2016/17 UNHS, however, the scorecard does not measure poverty directly, so this formula is not applicable. To derive a formula for the scorecard, consider Table 5, which reports empirical confidence intervals $\pm c$ for the errors for the scorecard applied to 1,000 bootstrap samples of various sizes from the validation sample. For example, with $n = 16,384$ and 150% of the national line in the validation sample, the 90-percent confidence interval is ± 0.638 percentage points.³⁸

Thus, the scorecard’s 90-percent confidence interval with $n = 16,384$ is ± 0.638 percentage points, while the interval for direct measurement is ± 0.615 percentage points. The ratio of the two intervals is $0.638 \div 0.615 = 1.04$.

³⁷ This analysis ignores that poverty-rate estimates from the UNHS are themselves based on a sample and so have their own sampling distribution.

³⁸ Due to rounding, Table 5 displays 0.6, not 0.638.

Now consider the same exercise, but with $n = 8,192$. The confidence interval under direct measurement and 150% of the national line in the validation sample is

$$\pm 1.64 \cdot \sqrt{\frac{0.365 \cdot (1 - 0.365)}{8,192}} \cdot \sqrt{\frac{3,344,118 - 8,192}{3,344,118 - 1}} = \pm 0.871 \text{ percentage points.}$$

The empirical confidence interval with the scorecard (Table 5) is ± 0.887 percentage points.

Thus for $n = 8,192$, the ratio of the two intervals is $0.887 \div 0.871 = 1.02$.

This ratio of 1.02 for $n = 8,192$ is close to the ratio of 1.04 for $n = 16,384$. Across all sample sizes of 256 or more in Table 5, these ratios are generally close to each other, and the average of these ratios in the validation sample turns out to be 1.04. This implies that confidence intervals for indirect estimates of poverty rates via Uganda’s scorecard with 150% of the national line are—for a given sample size—about 4 percent wider than the confidence intervals for direct estimates via the 2016/17 UNHS. This 1.04 appears in Table 2 as the “ α factor for precision” because if $\alpha = 1.04$, then a formula for approximate confidence intervals $\pm c$ for the scorecard is $\pm c = \pm z \cdot \alpha \cdot \sigma$.

That is, a formula for the approximate standard error σ for point-in-time estimates of

poverty rates via the scorecard is $\alpha \cdot \sqrt{\frac{\hat{p} \cdot (1 - \hat{p})}{n}} \cdot \sqrt{\frac{N - n}{N - 1}}$.

In general, α can be greater than or less than 1.00. When α is greater than 1.00, it means that the scorecard has larger standard errors than direct measurement. It turns out that α is greater than or equal to 1.00 for 12 of the 19 poverty lines in Table 2, and its highest value is 1.34.

The formula relating confidence intervals with standard errors for the scorecard can be rearranged to give a formula for determining sample size before estimation. If \tilde{p} is the expected poverty rate before estimation, then the formula for sample size n from a population of size N that is based on the desired confidence level that corresponds to z

and the desired confidence interval $\pm c$ is $n = N \cdot \left(\frac{z^2 \cdot \alpha^2 \cdot \tilde{p} \cdot (1 - \tilde{p})}{z^2 \cdot \alpha^2 \cdot \tilde{p} \cdot (1 - \tilde{p}) + c^2 \cdot (N - 1)} \right)$. If

the population N is “large” relative to the sample size n , then the finite-population correction factor ϕ can be taken as one (1), and the formula becomes

$$n = \left(\frac{\alpha \cdot z}{c} \right)^2 \cdot \tilde{p} \cdot (1 - \tilde{p}).$$

To illustrate how to use this, suppose the population N is 3,344,118 (the number of households in Uganda in 2016/17), suppose $c = 0.05320$, $z = 1.64$ (90-percent confidence), and the relevant poverty line is 150% of the national line so that the most sensible expected poverty rate \tilde{p} is Uganda’s overall poverty rate for that line in 2016/17 (36.5 percent at the household level, Table 3). The α factor is 1.04 (Table 2).

Then the sample-size formula gives

$$n = 3,344,118 \cdot \left(\frac{1.64^2 \cdot 1.04^2 \cdot 0.365 \cdot (1 - 0.365)}{1.64^2 \cdot 1.04^2 \cdot 0.365 \cdot (1 - 0.365) + 0.05320^2 \cdot (3,344,118 - 1)} \right) = 239, \text{ which is}$$

not far from the sample size of 256 observed for these parameters in Table 5 for 150% of the national line. Taking the finite population correction factor ϕ as one (1) gives the

$$\text{same result, as } n = \left(\frac{1.04 \cdot 1.64}{0.05320} \right)^2 \cdot 0.365 \cdot (1 - 0.365) = 239.$$

Of course, the α factors in Table 2 are specific to Uganda, its poverty lines, its poverty rates, and this scorecard. The derivation of the formulas for approximate standard errors using the α factors, however, can be used for any poverty-assessment tool following the approach in this paper.

In practice after the end of field work for the UNHS in June 2017, a program would select a poverty line (say, 150% of the national line), note its participants' population size (for example, $N = 10,000$ households, each with one participant), select a desired confidence level (say, 90 percent, or $z = 1.64$), select a desired confidence interval (say, ± 2.0 percentage points, or $c = \pm 0.02$), make an assumption about \bar{p} (perhaps based on a previous estimate such as the household-level poverty rate for 150% of the national line for Uganda of 36.5 percent in the 2016/17 UNHS in Table 3, look up α (here, 1.04 in Table 2), assume that the scorecard will still work in the future and for sub-groups that are not nationally representative,³⁹ and then compute the required sample size. In this illustration,

$$n = 10,000 \cdot \left(\frac{1.64^2 \cdot 1.04^2 \cdot 0.365 \cdot (1 - 0.365)}{1.64^2 \cdot 1.04^2 \cdot 0.365 \cdot (1 - 0.365) + 0.02^2 \cdot (10,000 - 1)} \right) = 1,443.$$

³⁹ This paper reports accuracy for the scorecard applied to its validation sample, but it does not test accuracy for later years nor for sub-populations that are not nationally representative. Performance after June 2017 will resemble that in the 2016/17 UNHS with deterioration over time and across non-nationally representative sub-groups to the extent that the relationships between questions and poverty status change.

7. Estimates of changes in poverty rates over time

The change in a population's poverty rate between two points in time is estimated as the change in the average poverty likelihood of a sample of households from the population.

Tests of the accuracy of estimates of change over time in which both baseline and follow-up estimates are from the new Uganda scorecard are not done here. Therefore, this paper can only suggest approximate formulas for standard errors. Nonetheless, the relevant concepts are discussed because in practice pro-poor organizations in Uganda can apply the new scorecard to collect their own data and measure change over time.

7.1 Warning: *Change is not necessarily impact*

The scorecard can estimate change. Of course, poverty could get better or worse, and the scorecard does not indicate what caused change. This point is often forgotten or confused, so it bears repeating: the scorecard merely estimates change, and it does not, in and of itself, indicate the causes of change. In particular, estimating the impact on poverty of participation in a pro-poor program requires knowledge or assumptions about what would have happened to participants if they had not been participants. Making judgments or drawing conclusions about causality requires either strong assumptions or a control group that resembles participants in all ways except participation. To belabor the point, the scorecard can help estimate the impact of

participation on poverty only if there is some way to know—or explicit assumptions about—what would have happened in the absence of participation. And that must come from beyond the scorecard.

7.2 Estimating changes in poverty rates

Consider the illustration begun in the previous section. On 1 January 2021, a pro-poor program samples three households who score 20, 30, and 40 and so have poverty likelihoods of 88.6, 67.8, and 46.6 percent (150% of the national line, Table 1). Given the known average error for this line in the validation sample of +1.1 percentage points (Table 2), the corrected baseline estimated poverty rate is the households' average poverty likelihood of $[(88.6 + 67.8 + 46.6) \div 3] - (+1.1) = 66.6$ percent.

After baseline, two sampling approaches are possible for the follow-up round:

- *Two independent samples:* Score a new, independent sample from the same population that was sampled from at baseline
- *One sample scored twice:* Score the same sample that was scored at baseline

7.2.1 Estimating change with two independent samples

By way of illustration, suppose that three years later on 1 January 2024, the pro-poor program draws a new, independent sample of three additional households who are in the same population as the three original households and finds that their scores are 25, 35, and 45 (poverty likelihoods of 82.5, 57.0, and 31.7 percent, 150% of the national line, Table 1). Adjusting for the known average error, the average poverty likelihood at follow-up is $[(82.5 + 57.0 + 31.7) \div 3] - (+1.1) = 56.0$ percent. The three-year

reduction in the poverty rate is then $66.6 - 56.0 = 10.6$ percentage points.⁴⁰ If exactly three years passed between the average baseline interview and the average follow-up interview, then the estimated annual decrease in the poverty rate is $10.6 \div 3 = 3.5$ percentage points per year. That is, about one in 29 participants in this hypothetical example cross the poverty line each year.⁴¹ Among those who started below the line, about one in 10 ($3.5 \div 36.5 = 9.6$ percent) on net ended up above the line each year.⁴²

7.2.2 Estimating change with one sample scored twice

Alternatively, suppose that the same three original households who were scored at baseline are scored again on 1 January 2024. Given scores of 25, 35, and 45, their follow-up poverty likelihoods are 82.5, 57.0, and 31.7 percent. The average across households of the difference in each given household's baseline poverty likelihood and its follow-up poverty likelihood is $[(88.6 - 82.5) + (67.8 - 57.0) + (46.6 - 31.7)] \div 3 = 10.6$ percentage points.⁴³ If there are exactly three years between each household's interviews, then the estimated annual decrease in the poverty rate is (again) $10.6 \div 3 = 3.5$ percentage points per year.

⁴⁰ Of course, such a large reduction in poverty in three years is unlikely, but this is just an example to show how the scorecard can be used to estimate change.

⁴¹ This is a net figure; some start above the line and end below it, and vice versa.

⁴² The scorecard does not reveal the reasons for this change.

⁴³ With one sample scored twice, the error for this line from Table 2 should *not* be subtracted off.

Given the assumptions of the scorecard, both approaches give unbiased estimates of the annual change in poverty rates. In general and in practice, however, they will give different estimates due to differences in the timing of interviews, in the composition of samples, and in the nature of two independent samples (each scored once) versus the nature of one sample scored twice (Schreiner, 2014a).

7.3 Precision for estimated changes

7.3.1 Precision when scoring two independent samples

For two equal-sized independent samples, the same logic as in the previous section can be used to derive a formula relating the confidence interval $\pm c$ with the standard error σ of a poverty-assessment tool’s estimate of the change in poverty rates over time:

$$\pm c = \pm z \cdot \sigma = \pm z \cdot \alpha \cdot \sqrt{\frac{2 \cdot \hat{p} \cdot (1 - \hat{p})}{n}} \cdot \sqrt{\frac{N - n}{N - 1}}.$$

Here, z , c , \hat{p} and N are defined as above, n is the sample size at both baseline and follow-up,⁴⁴ and α is the average (across a range of bootstrapped sample sizes) of the ratio of the observed confidence interval from a scorecard divided by the theoretical confidence interval under direct measurement.

⁴⁴ This means that—for a given level of precision—estimating the change in a poverty rate between two points in time requires four times as many interviews (not twice as many) as does estimating a poverty rate at a point in time.

As before, the formula for standard errors can be rearranged to give a formula for sample sizes before indirect estimation via a scorecard, where \tilde{p} is based on previous estimates and is assumed equal at both baseline and follow-up:

$$n = 2 \cdot N \cdot \left(\frac{z^2 \cdot \alpha^2 \cdot \tilde{p} \cdot (1 - \tilde{p})}{z^2 \cdot \alpha^2 \cdot \tilde{p} \cdot (1 - \tilde{p}) + c^2 \cdot (N - 1)} \right). \text{ If } \phi \text{ can be taken as one (1), then the}$$

$$\text{formula becomes } n = 2 \cdot \left(\frac{\alpha \cdot z}{c} \right)^2 \cdot \tilde{p} \cdot (1 - \tilde{p}).$$

With two independent samples, α has been estimated for scorecards for 19 countries (Schreiner 2018, 2017a, 2017b, 2017c, 2016a, 2016b, 2016c, 2016d, 2015b, 2015d, 2015e, 2015f, 2013a, 2013b, 2012c, 2010, 2009a, 2009b, and Chen and Schreiner, 2009). The unweighted average of α across the 27 scorecards for these 19 countries—after averaging α across poverty lines and pairs of survey rounds for each scorecard—is 1.10.⁴⁵ This rough figure is as reasonable as any to use in Uganda from now on when both baseline and follow-up are from the new 2016/17 scorecard.

To illustrate the use of this formula to determine sample size for estimating changes in poverty rates with two independent samples, suppose the desired confidence level is 90 percent ($z = 1.64$), the desired confidence interval is ± 2 percentage points ($\pm c = \pm 0.02$), the poverty line is 150% of the national line, $\alpha = 1.10$, $\tilde{p} = 0.365$ (the household-level poverty rate in 2016/17 for 150% of the national line in Table 2), and the population N is large enough relative to the expected sample size n that the finite population correction ϕ can be taken as one (1). Then the baseline sample size is

⁴⁵ The average absolute error is 3.2 percentage points.

$n = 2 \cdot \left(\frac{1.10 \cdot 1.64}{0.02} \right)^2 \cdot 0.365 \cdot (1 - 0.365) \cdot 1 = 3,772$. The follow-up sample size is also 3,772.

7.3.2 Precision with one sample scored twice

Analogous to previous derivations, the general formula relating the confidence interval $\pm c$ to the standard error σ when using a scorecard to estimate change for one sample scored twice is:⁴⁶

$$\pm c = \pm z \cdot \sigma = \pm z \cdot \alpha \cdot \sqrt{\frac{\hat{p}_{12} \cdot (1 - \hat{p}_{12}) + \hat{p}_{21} \cdot (1 - \hat{p}_{21}) + 2 \cdot \hat{p}_{12} \cdot \hat{p}_{21}}{n}} \cdot \sqrt{\frac{N - n}{N - 1}},$$

where z , c , α , N , and n are defined as usual, \hat{p}_{12} is the share of all sampled households that move from below the poverty line to above it, and \hat{p}_{21} is the share of all sampled households that move from above the line to below it.

The formula for confidence intervals can be re-arranged to give a formula for sample size before estimation. This requires an estimate (based on information available before sampling) of the expected shares of all households who will cross the poverty line \tilde{p}_{12} and \tilde{p}_{21} . Before sampling, an agnostic assumption is that the change in the poverty rate will be zero, which implies $\tilde{p}_{12} = \tilde{p}_{21} = \tilde{p}_*$, giving:

$$n = 2 \cdot \left(\frac{\alpha \cdot z}{c} \right)^2 \cdot \tilde{p}_* \cdot \sqrt{\frac{N - n}{N - 1}}.$$

Because \tilde{p}_* could be anything between 0 and 0.5, more information is needed to apply this formula. The average observed relationship in Niger (Schreiner, 2018) and

⁴⁶ See McNemar (1947) and Johnson (2007). John Pezzullo helped identify this formula.

Peru (Schreiner, 2009c) between \tilde{p}_* , the number of years y between baseline and follow-up, and $p_{\text{pre-baseline}} \cdot (1 - p_{\text{pre-baseline}})$ is close to:

$$\tilde{p}_* = -0.01 + 0.016 \cdot y + 0.56 \cdot [p_{\text{pre-baseline}} \cdot (1 - p_{\text{pre-baseline}})].$$

Given this approximate result, a sample-size formula for a sample of households to whom the scorecard for Uganda is applied twice (once after June 2017 and then again later) is

$$n = 2 \cdot \left(\frac{\alpha \cdot z}{c} \right)^2 \cdot [-0.01 + 0.016 \cdot y + 0.56 \cdot p_{\text{pre-baseline}} \cdot (1 - p_{\text{pre-baseline}})] \cdot \sqrt{\frac{N - n}{N - 1}}.$$

The average α across poverty lines for Niger and Peru is about 1.14. This 1.14 figure for α is as reasonable as any other for the new Uganda scorecard (as well as for other scorecards in general).

To illustrate the use of this formula, suppose the desired confidence level is 90 percent ($z = 1.64$), the desired confidence interval is ± 2.0 percentage points ($\pm c = \pm 0.02$), the poverty line is 150% of the national line, the sample will first be scored in 2021 and then again in 2024 ($y = 3$), and the population N is so large relative to the expected sample size n that the finite population correction ϕ can be taken as one (1). The pre-baseline household-level poverty rate p_{2021} is taken as 36.5 percent (Table 3), and α is assumed to be 1.14. Then the baseline sample size is

$$n = 2 \cdot \left(\frac{1.14 \cdot 1.64}{0.02} \right)^2 \cdot \{-0.01 + 0.016 \cdot 3 + [0.56 \cdot 0.365 \cdot (1 - 0.365)]\} \cdot 1 = 2,933. \text{ The same}$$

group of 2,933 households is scored at follow-up as well.

8. Targeting

When a program uses the scorecard for segmenting participants for differentiated treatment (*targeting*), households with scores at or below a cut-off are labeled *targeted* and given one type of treatment by the program. Households with scores above a cut-off are labeled *non-targeted* and given another type of treatment.

There is a distinction between *targeting status* (having a score at or below a targeting cut-off) and *poverty status* (having consumption below a poverty line). Poverty status is a fact that is defined by whether consumption is below a poverty line as directly measured by a survey. In contrast, targeting status is a program's policy choice that depends on a cut-off and on an indirect estimate from a scorecard.

Households that score at or below a given cut-off should be labeled as *targeted*,⁴⁷ not as *poor*. After all, unless all targeted households have poverty likelihoods of 100 percent, it is likely that some of them are non-poor (their consumption is above a given poverty line). In the context of the scorecard, the terms *poor* and *non-poor* have specific definitions. Using these same terms for targeting status is incorrect and misleading.

Targeting is successful to the extent to which households truly below a poverty line are targeted (*inclusion*) or households truly above a poverty line are not targeted (*exclusion*). Of course, no poverty-assessment tool is perfect, and targeting is

⁴⁷ Other labels can be meaningful as long as they describe the segment and do not confuse targeting status (having a score below a program-selected cut-off) with poverty status (having consumption below an externally-defined poverty line). Examples include: *Groups A, B, and C*; *Households with scores of 29 or less, 30 to 69, or 70 or more*; and *Households that qualify for reduced fees, or that do not qualify*.

Possible targeting outcomes

		<u>Targeting segment</u>	
		<u>Targeted</u>	<u>Non-targeted</u>
<u>Observed poverty status</u>	<u>Poor</u>	<u>Inclusion</u> Poor correctly targeted	<u>Undercoverage</u> Poor mistakenly not targeted
	<u>Non-poor</u>	<u>Leakage</u> Non-poor mistakenly targeted	<u>Exclusion</u> Non-poor correctly not targeted

unsuccessful to the extent to which households truly below a poverty line are not targeted (*undercoverage*) or households truly above a poverty line are targeted (*leakage*).

The table just above depicts these four possible targeting outcomes. Targeting accuracy varies by the cut-off score. A higher cut-off has better inclusion and better undercoverage (but worse exclusion and worse leakage), while a lower cut-off has worse inclusion and worse undercoverage (but better exclusion and better leakage).

Programs should weigh these trade-offs when setting a cut-off. A formal way to do this is to assign net benefits—based on a program’s values and mission—to each of the four possible targeting outcomes and then to choose the cut-off that maximizes the sum of net benefits.⁴⁸

⁴⁸ Adams and Hand, 2000; Hoadley and Oliver, 1998.

Table 6 shows targeting outcomes by cut-off for households in Uganda. For an example cut-off of 38 or less, outcomes for 150% of the national line in the validation sample are:

- Inclusion: 25.4 percent are below the line and correctly targeted
- Undercoverage: 11.1 percent are below the line and mistakenly not targeted
- Leakage: 9.7 percent are above the line and mistakenly targeted
- Exclusion: 53.7 percent are above the line and correctly not targeted

Increasing the cut-off to 40 or less improves inclusion and undercoverage but worsens leakage and exclusion:

- Inclusion: 27.2 percent are below the line and correctly targeted
- Undercoverage: 9.3 percent are below the line and mistakenly not targeted
- Leakage: 12.1 percent are above the line and mistakenly targeted
- Exclusion: 51.4 percent are above the line and correctly not targeted

Which cut-off is preferred depends on the sum of net benefits. If each targeting outcome has a per-household benefit or cost, then total net benefit for a given cut-off is:

Benefit per household correctly included	x	Households correctly included	–
Cost per household mistakenly not covered	x	Households mistakenly not covered	–
Cost per household mistakenly leaked	x	Households mistakenly leaked	+
Benefit per household correctly excluded	x	Households correctly excluded.	

To set an optimal cut-off, a program would:

- Assign benefits and costs to possible outcomes, based on its values and mission
- Tally total net benefits for each cut-off using Table 6 for a chosen poverty line
- Select the cut-off with the highest total net benefit

The most difficult step is assigning benefits and costs to targeting outcomes. A program that uses targeting—with or without the scorecard—should thoughtfully consider how it values successful inclusion and exclusion versus errors of undercoverage

and leakage. It is healthy to go through a process of thinking explicitly and intentionally about how possible targeting outcomes are valued.

A common choice of benefits and costs is the “hit rate”, where total net benefit is the number of households correctly included or correctly excluded:

$$\begin{array}{rclcl}
 \text{Hit rate} = & 1 & \times & \text{Households correctly included} & - \\
 & 0 & \times & \text{Households mistakenly undercovered} & - \\
 & 0 & \times & \text{Households mistakenly leaked} & + \\
 & 1 & \times & \text{Households correctly excluded.} &
 \end{array}$$

Table 6 shows the hit rate for all cut-offs for the scorecard. For the example of 150% of the national line in the validation sample, total net benefit under the hit rate for a cut-off of 38 or less is 79.1, with about four in five households in Uganda correctly classified.

The hit rate weighs successful inclusion of households below the poverty line the same as successful exclusion of households above the line. If a program values inclusion more (say, twice as much) than exclusion, then it can reflect this by setting the benefit for inclusion to 2 and the benefit for exclusion to 1. Then the chosen cut-off will maximize $(2 \times \text{Households correctly included}) + (1 \times \text{Households correctly excluded})$.

As an alternative to assigning benefits and costs to targeting outcomes and then choosing a cut-off to maximize total net benefits, a program could set a cut-off to achieve a desired poverty rate among targeted households. The third column of Table 7 (“% targeted HHs who are poor”) shows, for the scorecard applied to the validation sample, the estimated poverty rate among households who score at or below a given cut-off. For the example of 150% of the national line, targeting households who score 38

or less would target 35.1 percent of all households (second column) and would be associated with an estimated poverty rate among targeted households of 72.3 percent (third column).

Table 7 also reports two other measures of targeting accuracy. The first is a version of coverage (“% poor HHs who are targeted”). For the example of 150% of the national line with the validation sample and a cut-off of 38 or less, 69.5 percent of all poor households are covered.

The final targeting measure in Table 7 is the number of successfully targeted poor households for each non-poor household mistakenly targeted (right-most column). For 150% of the national line with the validation sample and a cut-off of 38 or less, covering about 2.6 poor households means leaking to 1 non-poor household.

9. Context of poverty-assessment tools in Uganda

This section discusses three existing poverty-assessment tools for Uganda.

Schreiner (2015a) compares and contrasts the older 2009/10 and 2012/13 scorecards with 12 older poverty-assessment tools for Uganda.

9.1 Brown, Ravallion, and van de Walle

Brown *et al.* (2018 and 2016) study the targeting accuracy of poverty-assessment tools for nine countries in Sub-Saharan Africa, including Uganda. When the share of people who are targeted is the same as the share of people who are poor, average inclusion across the nine countries is highest for their “Basic PMT” set of questions with a quantile regression centered on the poverty line (the “Poverty-centered quantile tool”). For their Uganda tool, inclusion is highest for their “Extended PMT tool”. This tool regresses the logarithm of per-capita consumption on 37 low-cost, verifiable indicators that are commonly used in poverty-assessment tools:

- Household demographics:
 - Number of household members
 - Share of household members by age and sex:
 - Girls ages 5 or younger
 - Boys ages 5 or younger
 - Girls ages 6 to 14
 - Boys ages 6 to 14
 - Women ages 65 or older
 - Men ages 65 or older
 - Widows
 - Disabled women 15 or older
 - Disabled men 15 or older
 - Orphaned girls 14 or younger
 - Orphaned boys 14 or younger

- Characteristics of the head of the household:
 - Sex
 - Marital status
 - Highest level of education completed
 - Employment status
- Characteristics of residence:
 - Type of floor
 - Type of wall
 - Type of roof
 - Type of cooking fuel
 - Source of drinking water
 - Type of toilet arrangement
 - Type of kitchen
 - Presence of electricity
 - Number of household members per room
- Ownership of consumer durables:
 - Residence
 - Stove
 - Iron
 - Bicycle
 - Motorcycle
 - Car or truck
 - Mobile phone
 - Electrical generator
 - Television
 - Personal computer
- Location of residence: urban/rural
- Month in which the household is surveyed

For Uganda, Brown *et al.* construct and test tools at the level of people with data from all 2,650 households in the 2011/12 Uganda National Panel Survey (UNPS). With the first-quintile (20th-percentile) poverty line and when targeting 20 percent of people, inclusion for the extended PMT tool is 11.7 percent. For the second-quintile (40th-percentile) poverty line and when targeting 40 percent of people, inclusion is 29.0 percent.

How does this compare with the scorecard? The results in Tables 6 and 7 here for the relevant poverty lines (the first- and second-quintile line) are not comparable with those in Brown *et al.* because they are:

- Based on the 2016/17 UNHS, not the 2011/12 UNPS
- At the level of households, not people
- Out-of-sample, not in-sample

If the new 2016/17 scorecard’s points are re-derived at the person level (keeping the same 10 questions) using the entire 2016/17 UNHS, and if that scorecard is tested in-sample at the person-level, then its inclusion for the first-quintile and second-quintile poverty lines is 11.6 and 29.2 percent, which is essentially the same as that of Brown *et al.* (11.7 and 29.0 percent).

Of course, the results here for Uganda do not change Brown *et al.*’s main conclusion that a basic-income scheme or an extremely simple demographic tool with one or two indicators can do almost as well as a more-complex tool in terms of reducing the person-level poverty rate. It does show, however, that a 10-question scorecard can do as well as a 37-question tool (as was expected, due to the “flat maximum”).

The results are inconsistent with Brown *et al.*’s finding that accuracy is much lower for tools—such as the scorecard—that estimate poor/non-poor status (rather than the level of consumption).⁴⁹ Unusually low accuracy is also inconsistent with the “flat maximum”.

⁴⁹ The reasons for the unusually high errors found by Brown *et al.* are unknown. If one or more categorical response options are highly lop-sided, then a poor/non-poor tool may be barely estimable and might target everyone or no one. Or the probability

9.2 Sohnesen and Stender

Sohnesen and Stender (2017, p. 120) consider “alternative algorithm[s] for model selection and prediction of poverty status” for six countries, including Uganda.⁵⁰ In particular, they test accuracy for random forests and for stepwise multiple-imputation with least-squares with LASSO. Random forests and LASSO are of interest for three reasons:

- They are new
- They use machine learning to select questions without input from an analyst
- Some papers suggest that they may improve accuracy out-of-sample

As background, McBride and Nichols (2016, p. 18) test the targeting accuracy of the cross-validation and stochastic-ensemble approach of quantile random forests for Bolivia, Malawi, and Timor Leste. They find that it “produces a gain in [inclusion], a reduction in undercoverage,⁵¹ and an overall improvement in the Balanced Poverty Accuracy Criteria (BPAC) in comparison to traditional methods.”

Is the benefit of random forests clear-cut? When comparing approaches, McBride and Nichols do not hold constant the share of the population targeted, and random forests’ higher inclusion also comes with worse leakage. Thus, McBride and Nichols cannot judge whether random forests lead to a net improvement (unless leakage is costless) because the paper does not propose a way to value the trade-off between inclusion and leakage.

threshold for targeting may be too high or too low, or perhaps the share targeted is not held constant.

⁵⁰ The other five countries are Albania, Ethiopia, Malawi, Rwanda, and Tanzania.

⁵¹ Of course, a gain in inclusion necessarily implies a reduction in undercoverage.

Furthermore, BPAC is a flawed measure of targeting accuracy. IRIS Center (2005) introduced BPAC, and USAID adopted it as its criterion for approving poverty-assessment tools for use by its microenterprise partners. With everything in units of percentages, BPAC considers accuracy in terms of inclusion and in terms of the absolute difference between undercoverage and leakage which—under the IRIS Center’s approach of directly estimating consumption—is equal to the absolute error of the estimated poverty rate:

$$\text{BPAC} = \left(\frac{\text{Inclusion} - |\text{Undercoverage} - \text{Leakage}|}{\text{Inclusion} + \text{Undercoverage}} \right).$$

Because the error (in IRIS Center’s approach) is the difference between undercoverage and leakage, and because the normalization term $\frac{1}{\text{Inclusion} + \text{Undercoverage}}$ may be relevant only when comparing poverty-assessment tools across populations with different poverty rates (but irrelevant when comparing alternative tools for a given country in a given year for a given poverty line or when the poverty rate is otherwise held constant), a cleaner formula is

$\text{BPAC} = \text{Inclusion} - |\text{Error in estimated poverty rate}|$. This cleaner formula ranks poverty-assessment tools the same as the more complex formula.

Expressing BPAC as $\text{Inclusion} - |\text{Error in estimated poverty rate}|$ helps to show why BPAC is not useful for comparing targeting accuracy across poverty-assessment tools (Schreiner, 2014b). If a tool is used for targeting (or if a paper—such as McBride and Nichols—deals only with targeting), then only inclusion matters, and the error in

estimating poverty rates is irrelevant. But BPAC weighs a 1-percentage-point increase in inclusion the same as a 1-percentage-point decrease in estimation error. Furthermore, BPAC scales the combination of inclusion and estimation error up proportionately more for lower population poverty rates. Thus, it is not surprising that McBride and Nichols find larger relative improvements in BPAC for countries with lower poverty rates.

The fact that random forests increased inclusion and improved BPAC in McBride and Nichols need not imply that random forests are better than other approaches to making poverty-assessment tools. After all, if leakage does not matter (as implied by McBride and Nichols' conclusion), then inclusion is maximized (and undercoverage minimized) by “targeting” the entire population, something that does not require a poverty-assessment tool at all. Of course, it is the cost of leakage that motivates targeting in the first place. And if McBride and Nichols do not show that random forests improve targeting (because they assume leakage is costless, even though it does have a cost), then they also do not show that random forests improve BPAC (which in any case is based only partly on targeting accuracy).⁵²

Like random forests, the LASSO approach is of interest because it is a new, machine-learning approach that may—due to the use of cross-validation—improve accuracy out-of-sample.

⁵² Given the “flat maximum”, it may be that any improvement in BPAC due to quantile random forests over stepwise ordinary-least-squares comes from the “quantile” part, as that allows the targeting cut-off to differ from the poverty line.

But like random forests, LASSO has yet to be shown to be more accurate. For example, the so-called “new method” Poverty Probability Index[®] (PPI[®]) of Innovations for Poverty Action (IPA) is a poverty-assessment tool based on an elastic-net Logit regression that combines aspects of LASSO and ridge regression (Kshirsagar *et al.*, 2017). IPA calls the approach “new and improved”,⁵³ presumably relative to the scorecard approach, which was used to make PPI tools before September 2017. It is new, but is it also improved? As of this writing, there are PPI tools for seven countries (Burkina Faso, Côte d’Ivoire, Kenya, Mozambique, Senegal, Togo, and Zambia) for which, at the time of the PPI tools’ release, a scorecard had already been released that was based on the same data that which IPA later used to make the PPI tool. Yet IPA has not reported an apples-to-apples accuracy comparison for the two approaches.

Random forests and LASSO probably do improve accuracy, especially in sub-national samples. When there are large construction samples, cross-validation and ensembles—as well as combining more than one poverty-assessment tool—should help and are unlikely to hurt. At the same time, the improvement may be small, given the strength of the flat maximum (Hand, 2006). One data point comes from Dupriez (2018) who reports that a worldwide poverty-assessment-tool competition among about 500 machine-learning analysts working on data from Malawi improved the concentration index (the measure of ranking power used when making scorecards) by only about 1 percentage point vis-à-vis Logit regression (the method used with the scorecard).

⁵³ povertyindex.org/announcing-new-improved-ppi-construction-methodology, retrieved 22 November 2019.

Sohnesen and Stender (2017) provide another data point. They make poverty-assessment tools for Uganda based on the 2009/10 UNHS with random forests and with multiple-imputation with LASSO. They report out-of-sample errors for estimated poverty rates, but they do not report questions or points (which would be possible for LASSO but impossible for the 500 trees in the random forest).

There is no fully apples-to-apples way to compare the accuracy of Sohnesen and Stender's tool (applied with 2009/10 data) with that of the new scorecard here (applied with 2016/17 data). Therefore, the comparison here uses the new scorecard in-sample at the person-level with a poverty line set to match the 30-percent person-level poverty rate reported by Sohnesen and Stender⁵⁴.

Sohnesen and Stender report (p. 132) out-of-sample estimation errors for random forests of -3 percentage points (all-Uganda), +1 percentage point (urban), and +2 percentage points (rural). For multiple-imputation with LASSO, they report estimation errors of -2 percentage points (all-Uganda), -2 percentage points (urban), and -2 percentage points (rural).

When the scorecard is applied with the validation sample of the 2016/17 UNHS at the person-level with a poverty line that gives poverty rates that match those in Sohnesen and Stender, its errors are 0.0 percentage points (all-Uganda), -1.3 percentage points (urban), and -1.1 percentage points (rural).

⁵⁴ The official person-level poverty rate in the 2019/10 UNHS is 24.5 percent, not 30.0 percent, but Sohnesen and Stender do not explain nor note this discrepancy.

This imperfect comparison suggests that the shorter, simpler, and more transparent scorecard is probably no worse for estimating poverty rates at a point in time as the longer, more complex, and more opaque tools in Sohnesen and Stender.

9.3 Diamond *et al.*

Funded by the World Bank Group, Diamond *et al.* (2016) has an all-star team of authors whose affiliations include the World Bank, International Finance Corporation, Harvard, MIT, New York University, and Stanford. The paper compares the accuracy of poverty-rate estimates from the scorecard when applied with national and sub-national populations versus estimates from what the authors' call "established regression-based estimators" for nine countries, including Uganda.⁵⁵

The paper reaches three conclusions (p. i). First, "When the [tools] all adopt the same 'one-size-fits-all' training approach, there is no meaningful difference in performance and the Simple Poverty Scorecard [tool] is as good as any of the regression-based estimators". Second, "When the regression-based estimators are 'trained' on 'training sets' that more closely resemble potential sub-population test sets . . . [they] outperform the nationally calculated Simple Poverty Scorecard [tool] in terms of bias and variance. [Third], these findings highlight the fundamental trade-off between simplicity of use and accuracy."

⁵⁵ Bangladesh, Indonesia, Jordan, Nepal, Paraguay, Peru, Sierra Leone, and Thailand.

Diamond *et al.* (p. 30) recommend “the use of regression-based methods” and “estimating regression-based models separately for the geographic strata that the national survey is designed to be representative at”. The paper’s conclusion recommends the World Bank’s “SWIFT” tool (Survey of Well-Being via Instant and Frequent Tracking, Yoshida *et al.*, 2015) because it is “more flexible in the sense that a menu of options is available . . . and is equipped to estimate region-specific consumption models.” The World Bank SWIFT’s team is led by Yobuo Yoshida, whose “early inputs in this study” are acknowledged by Diamond *et al.*⁵⁶

What does Diamond *et al.* offer that is new, true, and useful? It is not a new idea that there is a fundamental trade-off between simplicity and accuracy when *simplicity* means having a single tool constructed with a nationally representative population, rather than multiple tools, each customized for a specific sub-national population.⁵⁷

It is not new—even though it is true and useful—that the scorecard’s approach (Logit regression predicting poverty status, versus least-squares or LASSO regression predicting the level of consumption) has no material effect on the accuracy of estimated

⁵⁶ Diamond *et al.* also thank the scorecard’s developer, Mark Schreiner, for “discussions and clarifications”. In emails on 26 and 27 July 2015, Diamond *et al.* co-author Miguel Robledo Dellepiane agreed—at Schreiner’s request—to remove the acknowledgement because it implies that the study has Schreiner’s imprimatur. But the acknowledgment was not removed.

⁵⁷ This is not inconsistent with the lack of a trade-off between simplicity and complexity when constructing a tool for a given population.

poverty rates.⁵⁸ For example, consider Diamond *et al.*'s tests with Uganda's 2009/10 UNPS and 100% of the national line at the person level for the national population. All five of their "regression-based" approaches—as well as the scorecard's (supposedly non-regression-based) approach—have absolute errors of less than 1.1 percentage points. The scorecard's error is half the next-smallest error.

Furthermore, it is false (and thus not useful) that the scorecard's not being an "established regression-based estimator" (p. 1) implies that Diamond *et al.*'s approach is superior. First, the scorecard is indeed regression-based, as Diamond *et al.* admit (pp. 1, 4, and their Appendix). Second, Logit regression has been a standard tool for decades. It is the estimator of choice of for-profit lenders who use credit-risk scorecards, and Diamond *et al.* themselves include it as one of the five "regression-based approaches" that they test. Third, whether the scorecard's tweaks on the application of the results of Logit regression are valid depends on whether they work, not on whether they have been done before.

Finally, Diamond *et al.*'s rediscovery that tools that are customized to fit the population to which they are applied are more accurate than non-customized tools is true and useful (but not new).

The problem is that Diamond *et al.* fail to mention that the above fact holds in general for any poverty-assessment tool, including the scorecard (see Schreiner, 2006

⁵⁸ See Schreiner (2015g), as well as the many country-specific documents that compare and contrast a scorecard with alternative tools for a given country, including the discussion of Sohnesen and Stender here for Uganda.

and 2016f) and all the the approaches that Diamond *et al.* test and favor. That is, Diamond *et al.* is rigged against the scorecard; it applies customized tools under their approach to non-national populations and compares the results with the non-customized scorecard applied to non-national populations. In this set-up, of course customized tools do better. But scorecards can also be customized.

Diamond *et al.* do not stop there; they illogically conclude that regression-based tools (like theirs, or like the World Bank’s SWIFT) are to be recommended. First, the scorecard is regression-based. Second, Diamond *et al.* only test customization with their approach, not also with the scorecard approach. Thus, their conclusion is like claiming, “People prefer Brand X ice cream over Brand Y when they can add their favorite toppings to Brand X but not to Brand Y; therefore, Brand X is better.”

If Diamond *et al.* had tested customized scorecards, then they would have found (like Schreiner, 2016e and 2019b, c, d, e, f, and g) that their errors (when applied to the sub-national populations for which they are customized) are similar to those of a national scorecard applied to a national population.⁵⁹ Diamond *et al.*’s all-star team surely were aware of this, calling into question the integrity of their conclusions.⁶⁰

⁵⁹ The “flat maximum” also predicts this.

⁶⁰ Schreiner (2017d and 2017e) pointed out these issues and others to Diamond *et al.* while the paper was still a draft.

To top it off, customized scorecards that keep the same questions as a national scorecard but that add a question that identifies a sub-national population (such as the province of residence or whether the household has a female head) reduces errors almost as much as does full customization, but for much less cost and complication (Schreiner, 2016f). This matters because there are many possible sub-populations of interest (not just the two types tested in Diamond *et al.*).

10. Summary

The scorecard helps pro-poor programs in Uganda to get to know their participants better so as to prove and improve social performance.

The scorecard can segment clients for differentiated treatment as well as estimate:

- The likelihood that a participant's household has consumption below a given poverty line
- The poverty rate of a population of participants' households at a point in time
- The change in the poverty rate of a population of participants' households

Household-level estimates can be straightforwardly converted into the person-level (head-count) estimates that are usually more relevant.

The scorecard is inexpensive to use and can be understood by non-specialists. It is designed to be practical for pro-poor programs in Uganda that want to monitor and manage their social performance.

The scorecard is constructed with data from about three-fifths of the households in Uganda's 2016/17 UNHS. Those households' scores are then calibrated to poverty likelihoods for 19 poverty lines. The scorecard's accuracy (errors and standard errors) is tested out-of-sample on data that was not used to make the scorecard.

When the scorecard is applied to 19 poverty lines in the validation sample, the maximum of the absolute values of the average error for point-in-time estimates of poverty rates is 2.0 percentage points, and the average of the absolute values of the average error across the 19 lines is about 0.7 percentage points. Corrected estimates may be found by subtracting the known error for a given poverty line from original, uncorrected estimates.

For $n = 16,384$ and 90-percent confidence, the confidence intervals for point-in-time estimates of poverty rates are ± 0.7 percentage points or narrower. With $n = 1,024$, the 90-percent confidence intervals are ± 2.8 percentage points or narrower.

If a program wants to use the scorecard for segmenting clients for differentiated treatment, then this paper provides useful information for selecting a targeting cut-off that fits the program's values and mission.

Although the statistical technique is innovative, and although technical accuracy is important, the design of the scorecard focuses on low-cost, transparency, and ease-of-use. After all, accuracy is irrelevant if a program's managers feel so daunted by a tool's complexity or by its cost that they do not even try to use it.

For this reason, the scorecard uses 10 questions that are straightforward, low-cost, and verifiable. Points are all zeros or positive integers, and scores range from 0 to 100. Scores are converted to poverty likelihoods via a look-up table, and targeting cut-offs are likewise straightforward to apply. The design attempts to facilitate voluntary adoption by helping program managers to understand and to trust the scorecard and by allowing non-specialists to add up scores quickly in the field.

In summary, the scorecard is a low-cost, practical, objective, transparent way for pro-poor programs in Uganda to estimate consumption-based poverty rates, track changes in poverty rates over time, and segment participants for differentiated treatment. A scorecard can be made for any country with similar data.

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Interview Guide

The excerpts quoted here are from:

Uganda Bureau of Statistics. (2016) “Interviewers Manual of Instructions for the UNHS 2016/17” [the *Manual*].

Basic interview instructions

The scorecard can be filled out on paper in the field, with responses entered later in a spreadsheet or in your own database. Alternatively, Scorocs’ cloud-based data-collection tool works in a web browser or as an Android phone app, allowing data entry in the field or in the office. If there is no connection, then data is stored locally until there is a connection. [Download](#) the data-collection tool, or [ask about a private account](#).

The scorecard should be administered by an enumerator trained to follow this Guide.

Fill out the scorecard header and the “Back-page Worksheet” first, following the directions on the “Back-page Worksheet”.

In the scorecard header, fill in the number of household members based on the list you the enumerator made as part of the “Back-page Worksheet”.

Do not directly ask the first scorecard question (“In what sub-region does the household live?”). Instead, fill in the answer based on your knowledge of the sub-region where the household lives. Below, this Guide lists the 112 districts in 2016/17 and their corresponding sub-regions.

In the same way, do not directly ask the second scorecard question (“How many members does the household have?”). Instead, mark the response based on the number of household members that you listed on the “Back-page Worksheet”.

Ask all of the remaining questions directly of the respondent, except for the sixth question (“Type of material mainly used for construction of the floor?”). For this one question, you the enumerator should try to observe and record the main construction material of the floor without asking the question directly of the respondent. If you are not completely certain of the appropriate response, then ask the question of the respondent.

General interviewing guidance

Study this Guide carefully, and carry it with you while you work. Follow the instructions in this Guide (including this one).

Remember that the respondent for the interview need not be the household member who is a participant with your program.

Likewise, the field agent to be recorded in the scorecard header is not necessarily the same as you the enumerator who does the interview. Rather, the field agent is the employee of the pro-poor program with whom the participant has an on-going relationship. If there is no such field agent, then leave those spaces in the scorecard header blank.

Read each question word-for-word, in the order presented in the scorecard (except for the sixth question, “Type of material mainly used for construction of the floor?”).

When you mark a response to a scorecard question, write the point value in the “Score” column and then circle the spelled-out response option, the pre-printed point value, and the hand-written points, like this:

3. Can the female head (or the eldest wife of the male head) read and write with understanding in any language?	A. No female head (nor wife of the male head)	0	
	B. No	3	3
	C. Yes	5	

To help to reduce errors, you should:

- Write the points that correspond to the response in the far right-hand column
- Circle the pre-printed response, the pre-printed points, and the hand-written points

When an issue comes up that is not addressed in this Guide, its resolution should be left to the unaided judgment of the enumerator and the respondent, as that apparently was the practice of Uganda’s UBOS in the 2016/17 UNHS. That is, a program that uses the scorecard should not promulgate any definitions or rules (other than those in this Guide) to be used by all its enumerators. Anything not explicitly addressed in this Guide is to be left to the unaided judgment of each individual enumerator and the respondent.

Do not read the response options to the respondent. Instead, read the question, and then stop; wait for a response. If the respondent asks for clarification or otherwise hesitates or seems confused, then read the question again or provide additional assistance based on this Guide or as you the enumerator deem appropriate.

In general, you should accept the responses given by the respondent. Nevertheless, if the respondent says something—or if you see or sense something—that suggests that the response may not be accurate, that the respondent is uncertain, or that the respondent desires assistance in figuring out how to respond, then you should read the question again and provide whatever help you deem appropriate based on this Guide.

While most responses to questions in the scorecard are verifiable, in most cases you do not need to verify responses. You should verify only if something suggests to you that a response may be inaccurate and thus that verification might improve data quality. For example, you might choose to verify if the respondent hesitates, seems nervous, or otherwise gives signals that he/she may be lying, confused, or uncertain. Likewise, verification is probably appropriate if a child in the interviewed household or if a neighbor says something that does not square with a respondent's answer. Verification is also a good idea if you can see something yourself that suggests that a response may be inaccurate, such as a consumer durable that the respondent claims not to possess, or a child eating in the room who has not been counted as a member of the household.

In general, the application of the scorecard should mimic as closely as possible the application of the 2016/17 UNHS by Uganda's UBOS. For example, interviews should be done in-person by a trained enumerator at the participant's residence because that is what the UBOS did in the 2016/17 UNHS.

Translation:

As of this writing, the scorecard itself, the "Back-page Worksheet", and this Guide are available only in English, Luganda, and Swahili. There are not yet official, professional translations to other languages spoken in Uganda. Users should check scorocs.com to see what translations have been done since this writing.

If there is not yet an official, professional translation to a desired language, then users should contact [Scorocs](http://scorocs.com) for help in creating such a translation.

Who should be the respondent?

Remember that the respondent does not need to be the household member who is a participant with your program (although the respondent may be that person).

According to p. 4 of the *Manual*, “Any capable adult member of the household is a suitable respondent for the household interview.”

According to p. 11 of the *Manual*, “The respondent should be the household head. You must ask a few questions to identify the head of the household. If the household head is absent, then the next person who is acting as household head should be interviewed. This respondent should be an adult member of the household and should be capable of providing all the necessary information about other members of the household. Note that other members can help by adding information or details in the questions concerning them.”

Who is the head of the household?

Note that the head of the household may or may not be the household member who is a participant with your program (although the head may be that person).

According to p. 12 of the *Manual*, “the *head of the household* is the person commonly regarded by the household members as their head. In most cases, the head of the household is the one who manages the income earned and expenses incurred by the household and who is the most knowledgeable about other members of the household. He/she will be the person named when you ask the question ‘Who is the head of this household?’ You should accept the decision of the household members as to who is their head.

“There must be one-and-only-one head in the household. If more than one individual in a household claims headship, or if individuals within a household give conflicting statements as to who is the head of household, then it is very likely that you are dealing with two or more households, rather than one. In such cases, apply the criteria provided to delimit membership in the interviewed household.”

General interview guidance from the UNHS *Manual*

According to pp. 2–7 of the *Manual*, “[Your organisation] depends on you to collect [data] diligently and accurately. Your job is to interview the sampled households, asking questions and recording the answers. You must make every effort to obtain complete and accurate answers and then record them correctly. The quality of the data greatly depends on you the enumerator. Thus, your job requires your commitment to ensure that all information you collect is correct, complete, and as discussed [in this Guide].

“Your work requires tact in approaching people, attention to the smallest detail, and a sense of responsibility to keep all the information that that you obtain strictly confidential. You are not permitted to discuss the information you receive, gossip about it, or show your records to anyone not employed by [your organization].

“You may only ask such questions as are necessary to enable you to complete the questionnaire. . . . Your basic duties as an enumerator are as follows:

- Introduce yourself and the survey to the respondent
- Gather correct and precise information according to the instructions [in this Guide]
- Completely and accurately fill out the questionnaire with the respondent
- Closely follow the instructions, concepts, and definitions [in this Guide]
- Check your work for completeness, consistency, and legibility
- Correct any omission or inconsistency
- Keep all information strictly confidential. Never show or talk about a respondent’s information with anyone other than authorized personnel [from your organisation]

How to approach a household to be interviewed

“Act as though you expect to receive friendly cooperation from the household to be interviewed, and behave as though you deserve it. . . . Start interviewing only when you have identified yourself and exchanged greetings, explained the purpose of the survey, and answered all the questions about the survey that the household to be interviewed may have.

“During interviews, let the respondent take his/her time. Do not suggest answers for him/her. Work steadily and make sure that answers are clear to you before you record them. Do not accept any statement you believe to be mistaken; instead, tactfully probe, asking further questions to obtain accurate answers.

“A household may refuse to be interviewed because of a misunderstanding. Remain courteous and stress the importance of the survey and that the questionnaire has nothing to do with taxation or any similar government activity. Further, point out that the information will be kept confidential and that the survey results will not reveal responses nor will it identify characteristics of individual people or households. You should be able to clear up any misunderstandings, but if you cannot persuade a person to respond, or if his/her refusal is not due to a misunderstanding, then [move on to the next household to be interviewed].

Tips for conducting an interview

“Successful interviewing is an art and should not be treated as a mechanical process. Make each interview interesting and pleasant. The art of interviewing develops with practice, but there are certain basic principles that every successful interviewer follows. The tips here will help you to build rapport with a respondent and conduct a successful interview.

“*Build rapport with the respondent.* Any capable adult member of the household is a suitable respondent for the household interview.

“Your first responsibility is to establish a good rapport with the respondent. At the beginning of an interview, you and the respondent do not know each other. The respondent’s first impression of you will influence his/her willingness to cooperate with the survey. You should ensure that your dress is acceptable within the community where you are working. Be sure that your manner is friendly as you introduce yourself.

“*Make a good first impression.* When you arrive at the household, do your best to make the respondent feel at ease. With a few well-chosen words, you can put the respondent in the right frame of mind for the interview. Open the interview with a smile and a greeting such as ‘good afternoon’, and then proceed with your introduction.

“*Always have a positive approach.* Never adopt an apologetic manner, and do not use words such as ‘Are you too busy?’ Such questions invite refusal before you start. Rather, tell the respondent, ‘I would like to ask you a few questions’ or ‘I would like to talk with you for a few moments.’

“*When necessary, remind the respondent that responses are confidential.* If the respondent is hesitant about responding to the interview or asks what the data will be used for, then explain that the data you collect will remain confidential, that no individual names will be used for any purpose, and that all data will be grouped together to write a report.

“Also, you should never mention other interviews or show completed questionnaires to anyone in front of a respondent or any other person.

“*Answer any questions from the respondent frankly.* Before agreeing to be interviewed, the respondent may ask you some questions about the survey or how he/she was selected to be interviewed. Be direct and pleasant when you answer.

“The respondent may also be concerned about the length of the interview. If he/she asks, tell him/her that the interview usually takes about [10 minutes]. Say that you are willing to return at another time if it is more convenient.

“The respondent may ask questions or want to talk further about the topics you bring up during the interview. It is important not to interrupt the flow of the interview, so tell him/her that you will be happy to answer his/her questions or to talk more after the interview.

“*Be neutral always.* Most people are polite and will tend to give the answers that they think you want to hear. It is therefore important that you remain absolutely neutral as you ask the questions. Never—whether by the expression on your face or by the tone of your voice—allow the respondent to think that he/she has given a ‘right’ or ‘wrong’ answer to a question. Never appear to approve or disapprove of any of the respondent’s replies.

“The questions are carefully worded to be neutral. They do not suggest that one answer is more likely or preferable than another. If you fail to read the complete question, you may destroy that neutrality. That is why you must read the whole question as it is written.

“If the respondent gives an ambiguous answer, try to probe in a neutral way, asking questions such as the following:

- ‘Can you explain a little more?’
- ‘I did not quite hear you; could you please tell me again?’
- ‘There is no hurry. Take a moment to think about it.’

“*Never suggest answers to the respondent.* If a respondent’s answer is not relevant for a question, then do not prompt her/him by saying something like ‘I suppose you mean that . . . Is that right?’ In many cases, she/he will agree with your interpretation of her/his answer, even if that is not what she/he meant. Rather, you should probe in such a manner that the respondent herself/himself comes up with the relevant answer. You should never read out the list of response options to the respondent, even if she/he has trouble answering.

“*Do not change the wording or sequence of questions.* The wording of the questions and their sequence in the questionnaire must be maintained. If the respondent has not understood the question, then you should repeat the question slowly and clearly. If there is still a problem, then you may rephrase the question, being careful not to alter the meaning of the original question. Provide only the minimum information required to get an appropriate response.

“*Handle hesitant respondents tactfully.* There will be situations where the respondent simply say, ‘I don’t know,’ gives an irrelevant answer, acts bored or detached, or contradicts something that he/she has already said. In these cases, you must try to re-interest him/her in the conversation. For example, if you sense that he/she are shy or afraid, try to remove his/her shyness or fear before asking the next

question. Spend a few moments talking about things unrelated to the interview (for example, his/her town or village, the weather, his/her daily activities, and so on).

“If the respondent is giving irrelevant or elaborate answers, then do not stop him/her abruptly or rudely, but listen to what he/she has to say. Then try to steer him/her gently back to the original question. A good atmosphere must be maintained throughout the interview. The best atmosphere for an interview is one in which the respondent sees the interviewer as a friendly, sympathetic, and responsive person who does not intimidate him/her and to whom he/she can say anything without feeling shy or embarrassed.

“If the respondent is reluctant or unwilling to answer a question, then explain once again that the same question is being asked [of many participants with your organisation] and that the answers will all be merged together. If the respondent is still reluctant, then simply write ‘REFUSED’ next to the question and proceed as if nothing had happened. Remember, the respondent cannot be forced to give an answer.

“*Do not form expectations.* You must not form expectations of the ability and knowledge of the respondent.

“*Do not hurry the interview.* Ask the questions slowly to ensure that the respondent understands what is being asked. After you have asked a question, pause and give the respondent time to think. If the respondent feels hurried or is not allowed to formulate his/her own opinion, then he/she may respond with ‘I don’t know’ or give an inaccurate answer. If you feel the respondent is answering without thinking just to speed up the interview, then say to the respondent, ‘There is no hurry. Your opinion is important, so consider your answers carefully.’”

According to p. 9 of the *Manual*, “Ask each question exactly as it is written in the questionnaire. When you are asking a question, speak slowly and clearly so that the respondent will have no difficulty hearing or understanding the question. At times, you may need to repeat the question to be sure that the respondent understands it. In those cases, do not change the wording of the question; rather, repeat it exactly as it is written.

“If, after you have repeated a question, the respondent still does not understand, then you may have to restate the question. Be careful when you change the wording, however, so that you do not alter the meaning of the original question.

“In some cases, you may have to probe, asking additional questions to obtain a complete answer from the respondent. If you do this, then you must be careful that your probes are neutral so that they do not suggest an answer. Probing requires both tact and skill, and it is one of the most challenging aspects of your work as an enumerator.”

Guidelines for each question in the scorecard

1. In what sub-region does the household live?
 - A. Busoga, Bukedi, or Karamoja
 - B. Central I, Central II, Elgon, or West Nile
 - C. Acholi, Bunyoro, Kampala, Kigezi, or Teso
 - D. Tooro
 - E. Ankole, or Lango

Unless you have to, do not directly ask this question of the respondent. Instead, fill in the answer based on your knowledge of the district (and thus of the sub-region) where the household lives.

Each of the 112 districts that Uganda had in 2016/17 corresponds with a sub-region (UBOS, 2018, p. 90). The table below presents an alphabetized list of districts and of their associated sub-regions.

District	Sub-region
Abim	Karamoja
Adjumani	West Nile
Agago	Acholi
Alebtong	Lango
Amolatar	Lango
Amudat	Karamoja
Amuria	Teso
Amuru	Acholi
Apac	Lango
Arua	West Nile
Budaka	Bukedi
Bududa	Elgon
Bugiri	Busoga
Buhweju	Ankole
Buikwe	Central II
Bukedea	Teso
Bukomansimbi	Central I
Bukwo	Elgon
Bulambuli	Elgon
Buliisa	Bunyoro

District	Sub-region
Bundibugyo	Tooro
Bushenyi	Ankole
Busia	Bukedi
Butaleja	Bukedi
Butambala	Central I
Buvuma	Central II
Buyende	Busoga
Dokolo	Lango
Gomba	Central I
Gulu	Acholi
Hoima	Bunyoro
Ibanda	Ankole
Iganga	Busoga
Isingiro	Ankole
Jinja	Busoga
Kaabong	Karamoja
Kabale	Kigezi
Kabarole	Tooro
Kaberamaido	Teso
Kalangala	Central I
Kaliro	Busoga
Kalungu	Central I
Kampala	Kampala
Kamuli	Busoga
Kamwenge	Tooro
Kanungu	Kigezi
Kapchorwa	Elgon
Kasese	Tooro
Katakwi	Teso
Kayunga	Central II
Kibaale	Bunyoro
Kiboga	Central II
Kibuku	Bukedi
Kiruhura	Ankole
Kiryandongo	Bunyoro
Kisoro	Kigezi
Kitgum	Acholi
Koboko	West Nile
Kole	Lango

District	Sub-region
Kotido	Karamoja
Kumi	Teso
Kween	Elgon
Kyankwanzi	Central II
Kyegegwa	Tooro
Kyenjojo	Tooro
Lamwo	Acholi
Lira	Lango
Luuka	Busoga
Luwero	Central II
Lwengo	Central I
Lyantonde	Central I
Manafwa	Elgon
Maracha	West Nile
Masaka	Central I
Masindi	Bunyoro
Mayuge	Busoga
Mbale	Elgon
Mbarara	Ankole
Mitooma	Ankole
Mityana	Central II
Moroto	Karamoja
Moyo	West Nile
Mpigi	Central I
Mubende	Central II
Mukono	Central II
Nakapiripirit	Karamoja
Nakaseke	Central II
Nakasongola	Central II
Namayingo	Busoga
Namutumba	Busoga
Napak	Karamoja
Nebbi	West Nile
Ngora	Teso
Ntoroko	Tooro
Ntungamo	Ankole
Nwoya	Acholi
Otuke	Lango

District	Sub-region
Oyam	Lango
Pader	Acholi
Pallisa	Bukedi
Rakai	Central I
Rubirizi	Ankole
Rukungiri	Kigezi
Sembabule	Central I
Serere	Teso
Sheema	Ankole
Sironko	Elgon
Soroti	Teso
Tororo	Bukedi
Wakiso	Central I
Yumbe	West Nile
Zombo	West Nile

2. How many members does the household have?
 - A. Seven or more
 - B. Six
 - C. Five
 - D. Four
 - E. Three
 - F. Two
 - G. One

Do not directly ask this question of the respondent. Instead, mark the response based on the number of household members that you listed on the “Back-page Worksheet”.

According to pp. 11–14 of the *Manual*, “A *household* is defined as a person or group of people who have been living and eating their meals together for at least six of the 12 months preceding the interview.

“Therefore, a member of the household is defined on the basis of the usual place of residence. There are some exceptions to this rule as described below:

- The following categories of people are considered as household members even though they have lived [and ate meals] with the interviewed household for less than six of the past 12 months:
 - Infants who are less than 6-months-old
 - Newly-weds who have been living together for less than six months
 - Students and seasonal workers who have not been living in, or as part of, another household
 - Other persons living [and eating] together for less than six months but who are expected to live in the household [for a total duration of at least six months]
- Servants, farm workers, and other such individuals who live and take meals with the interviewed household are to be identified as household members even though they may not have a blood [or marital] relationship with the household head

“People who have lived in the interviewed household for more than six of the past 12 months but who have permanently left the interviewed household (for example, due to divorce or death) are *not* considered as members of the interviewed household.

“People who live in the same dwelling but who do not share food expenses or eat meals together are *not* members of the interviewed household. For example, if a man has two or more wives who (with their children) live and eat together, then all of them together form one household. Alternatively, if each of the man’s wives and her children live and eat separately, then [each eating unit is a distinct household]. Similarly, if two brothers each have their own families living together in the same house but nevertheless maintain separate food budgets, then they would constitute two separate households.

“*Household members* are defined as those persons who have been living in the interviewed household for six or more of the past 12 months. However, people who have come to stay in the household permanently are to be counted as members, even if they have lived in the household for less than six months. Furthermore, children born to household members anytime in the last 12 months are to be counted as household members.

“Count as household members those persons who would have been members of the household but who have been away for more than six of the last 12 months due to schooling, job search, business, and so on and who are living in boarding schools, lodging houses, hostels and so on in Uganda. Similar people who are living abroad are not counted as members of the interviewed household.

“Record members of the household in the following order:

1. The first person must be the head of the household, even if he/she is not the respondent and even if he/she is temporarily absent
2. Members of the head’s immediate family (wives/husband and children) who sleep in the dwelling and who take their meals together. If there is more than one wife, then start with the first wife, followed by her children in order of age, then the second wife and her children in order of age, and so on
3. Other persons related to the head of the household and his/her husband/wife who sleep in the dwelling and take their meals together
4. Persons not present but who normally live and eat together with the household, that is, those who have been temporarily away for away for more than six of the last 12 months for reasons of schooling, job search, business, and so on and who are living in boarding schools, lodging houses, hostels and so on in Uganda
5. Unrelated persons who sleep in the dwelling and who take their meals with the household”

According to p. 8 of the *Manual*, “A *household* consists of a person or group of persons, related or unrelated, who live together in the same dwelling unit, who acknowledge one adult male or female as the head of the household, who share the same living arrangements, and who are considered as one unit.

“In some cases, you may find a group of people living together in the same house, but each person has separate eating arrangements. In such cases, each resident should be counted as a separate, one-person household.”

According to p. 211 of UBOS (2018), you the enumerator should “ask for a complete list of household members.” When you have made an initial list, you should say to the respondent: “Just to make sure that I have a complete listing:

- Are there any other persons such as small children or infants that we have not listed?
- Are there any other people who may not be members of your family (such as domestic servants, lodgers, or friends) who usually live [and eat] here?”

3. Can the female head (or the eldest wife of the male head) read and write with understanding in any language?
 - A. No female head (nor wife of the male head)
 - B. No
 - C. Yes

This question asks whether the female head (or the eldest wife of the male head) can both read *and* write in any language (for example, English, Luganda, Swahili, Runyoro, Runyankole, Rukiga, Luo, Lusoga, and so on).

Remember that you already know the name of the female head (or the eldest wife of the male head) from compiling the “Back-page Worksheet”. Thus, do not mechanically ask, “Can the female head (or the eldest wife of the male head) read and write with understanding in any language?”. Instead, use the actual first name or nickname of the female head (or the eldest wife of the male head), for example: “Can Harriet read and write with understanding in any language?”

If there is no female head (and no wife of the male head) in the interviewed household, then do not read the question at all. Instead, mark “A. No female head (or no wife of the male head)” and continue with the next question.

For the purposes of the scorecard, the *female head (or the eldest wife of the male head)* is defined as:

- The household head, if the head is female
- The eldest wife/conjugal partner of the household head, if the head is male
- Non-existent, if the head is male and if he does not have a wife/conjugal partner who is a member of his household

According to p. 12 of the *Manual*, “the *head of the household* is the person commonly regarded by the household members as their head. In most cases, the head of the household is the one who manages the income earned and expenses incurred by the household and who is the most knowledgeable about other members of the household. He/she will be the person named when you ask the question ‘Who is the head of this household?’ You should accept the decision of the household members as to who is their head.

“There must be one-and-only-one head in the household. If more than one individual in a household claims headship, or if individuals within a household give conflicting statements as to who is the head of household, then it is very likely that you are dealing with two or more households, rather than one. In such cases, apply the criteria provided to delimit membership in the interviewed household.”

Note that the head of the household may or may not be the household member who is a participant with your program (although the head may be that person).

4. Do any household members attend a private school or a school that is run by a religious organization, NGO, or any other non-government entity?
 - A. No
 - B. Yes

The *Manual* provides no additional information for this question.

5. During the last 12 months, did any member of the household receive income from crop farming or livestock?
 - A. Crop farming, but not livestock
 - B. Neither crop farming nor livestock
 - C. Livestock (regardless of crop farming)

The *Manual* provides no additional information for this question.

6. Type of material mainly used for construction of the floor? (*as observed*)
- A. Earth, rammed earth, wood, or other
 - B. Cement screed, concrete, tiles, brick, or stone

According to p. 36 of the *Manual*, you the enumerator should try to observe and record the main construction material of the floor without asking the question directly of the respondent. If you are not completely certain of the appropriate response, then ask the question of the respondent.

According to p. 37 of the *Manual*, this question refers to the floor of the main dwelling unit. “If more than one kind of material is used, then record the main type of material (that is, the material that covers the largest share of the floor). The quality of the material does not matter. . . . [Note the following definitions]:

- *Cement screed*: A thin layer on the floor made of sand and cement.
- *Concrete*: Is a thick layer of hard core stones mixed with gravel stone and cement
- *Rammed earth*: Earth mixed with water, rammed and left to dry”

According to p. 36, “A *dwelling unit* is the unit actually occupied by the household.”

7. What type of toilet facility does the household mainly use?
 - A. No facility/bush/polythene bags/bucket/etc., pit latrine (without a cover and without a slab), or other
 - B. Pit latrine (with a cover and/or with a slab), Ecosan (compost toilet), VIP latrine, or flush toilet

According to pp. 39–40 of the *Manual*, “This question seeks information about the type of toilet used by the household. It refers to *use* rather than *ownership*. . . . If a household uses different toilet facilities during the day versus at night, then consider the facility used during the day.

“Definitions:

- *No facility*: Going to the bush, or using polythene bags or buckets”
- *Pit latrine*: Excreta is deposited without flushing directly into a hole in the ground
- *Pit latrine with slab*: A latrine with a squatting slab, platform, or seat. A latrine has a slab if the floor of the latrine is made of a hard, smooth material that can easily be thoroughly cleaned. Examples of slab material are cement, very smooth wood with no gaps, or smooth stone. Latrines whose floors are made of dirt, mud-covered floors, or floors of mud and sticks do not count as having a slab. The slab does not have to be raised above ground level. Any platform or seat must be firmly supported on all sides and be raised above the surrounding ground level to prevent surface water from entering the pit and for ease of cleaning
- *Pit latrine without slab/open pit*: A latrine without a squatting slab, platform, or seat. An open pit is a rudimentary hole in the ground where excreta is collected
- *Covered pit latrine*: A latrine with a structure consisting of at least three walls with a roof over it. The cover on the pit latrine keeps rainwater from entering the latrine
- *Uncovered pit latrine*: A latrine that does not have a structure over it. A latrine with a structure that lacks a roof or that lacks walls is considered to be uncovered
- *Ecosan toilet*: A toilet where feces and urine is either composted or dehydrated (using ash or other materials) on-site before being released into the environment
- *Ventilated improved pit latrine (VIP)*: A latrine ventilated by a pipe extending above the latrine roof. The open end of the vent pipe is covered with gauze mesh or fly-proof netting, and the inside of the superstructure is kept dark
- *Flush/pour-flush toilet*: A flush toilet uses a cistern or holding tank for flushing water and has a water seal (a U-shaped pipe) below the seat or squatting pan that prevents the passage of flies and odors. A pour-flush toilet also has a water seal but, unlike a flush toilet, it uses water poured by hand for flushing (no cistern is used)”

8. How many functional mobile phones do members of the household own at present?
- A. None
 - B. One
 - C. Two or more

According to p. 42 of the *Manual*, “*Ownership* in this case refers to personal property, regardless of the purpose that the mobile phone serves. Any mobile phone purchased on credit shall be treated as owned.”

According to the Questionnaire for the 2016/17 UNHS, only functional mobile phones should be counted for the purposes of this question.

9. Does every member of the household have at least one pair of shoes in good condition?
- A. No
 - B. Yes

According to p. 45 of the *Manual*, this question aims to “find out whether every member of the household has a pair of shoes in good condition. Slippers, ‘tire’ shoes (*lugabire*), and gumboots are not considered as shoes for the purposes of this question.”

10. What was the average number of meals taken by household members per day in the last seven days?
- A. Two or fewer
 - B. Three or more

According to p. 45 of the *Manual*, “A *meal* is a substantial amount of food, eaten at one time. It can be of any of the usual occasions, for example breakfast, lunch, or dinner.”

Appendix A:

Warning against hybrid estimates of changes in poverty

This warning applies only for legacy users of old 2009/10 or 2012/13 scorecards (Schreiner, 2011 and 2015a) who adopt the new 2016/17 scorecard and who may derive hybrid estimates of changes in poverty over time with a baseline from an old scorecard and a follow-up from the new scorecard. All other users can ignore this warning. In particular, current users can estimate changes in poverty when both the baseline and the follow-up are from the new scorecard here and expect accuracy that is typical for a scorecard.

The UNHS has the same definition of *poverty* in 2009/10, 2012/13, and 2016/17, and the UBOS (2018) considers the resulting poverty-rate estimates to be comparable. In principle, this means that legacy scorecard users can derive hybrid estimates of change over time from a baseline from an old scorecard and a follow-up from the new scorecard.⁶¹ In practice, however, such hybrid estimates will be very inaccurate.

Why would this be the case for Uganda? In general, estimates of change (whether hybrid with two scorecards or non-hybrid with a single scorecard) are sometimes more inaccurate than desired or needed for a given purpose/context. Inaccuracy occurs when an assumption made by a scorecard does not hold in a given country or time period (Sahn and Stifel, 2003).

For example, scorecards assume unchanging populations. The sampling frame for the UNHS, however, changed between the 2012/13 and 2016/17 rounds, from the 2002 Census to the 2014 Census (UBOS, 2018).

Scorecards also assume unchanging relationships between questions and poverty. But the person-level poverty rate by 100% of the national line in Uganda increased from 19.7 percent in 2012/13 (Schreiner, 2015a) to 21.4 percent in 2016/17 (Table 3) while the distribution of responses to the new scorecard's questions mostly shifted from more-poor to less-poor (see table following this note). The incongruency between improving non-consumption indicators and worsening consumption-based poverty implies a strong shift in the relationships between questions and poverty and thus implies unusual inaccuracy for hybrid estimates of change.

⁶¹ This holds for absolute poverty lines (such as national lines and PPP lines) supported by both scorecards. Estimates of change over time are not meaningful for relative poverty lines (such as percentile-based lines).

The table following this note shows that from 2012/13 to 2016/17, the distributions of responses shifted from less-poor to more-poor for eight of 10 questions:⁶²

- Household size decreased on average from 4.8 to 4.7 members
- The literacy rate of the female head (or the eldest wife of the male head) increased
- The share of households with someone in private school increased
- The distribution of the quality of the floor improved
- The distribution of the quality of the toilet arrangement improved
- The number of cell phones per household increased
- The share of households in which all members have a pair of shoes increased
- The share of households who eat at least three meals per day increased

How can these responses improve even as consumption decreases? First, consumption-based poverty increased in large part due to drought in the second half of 2016. Second, households in Uganda reduced their consumption but nevertheless continued to accumulate non-consumption indicators (or failed to sell them off or otherwise divest themselves).

This can happen if there are off-setting changes in the prices, quality, and/or availability of assets, education, and residential amenities. It can also happen if households save more (perhaps by consuming less) and use their savings to accumulate assets. In particular, scorecard indicators of household size, education, basic features of the residence, and asset ownership do not seem to change quickly when consumption-based poverty worsens (unless it worsens a lot very quickly). Said another way, scorecard indicators are probably subject to ratchet effects, being more sensitive to increases in consumption than to decreases. That is, when consumption decreases, households are slower to sell off assets (or move to a lower-quality residence) than they are to acquire assets (or to improve their residence) when consumption increases. A household is not likely to dismantle the roof and walls of its latrine when food is scarce, pull up a concrete floor in its residence, nor sell, give away, or otherwise lose education that was acquired before a downturn.

⁶² The two exceptions are the sub-region of residence (for which the assignment of a few districts to sub-regions is uncertain for 2012/13) and the receipt of income from crop farming and livestock. For this second question, there are two opposing effects. The increase in the share of households who do not farm nor raise livestock—and the decrease in the share who farm (but do not raise livestock)—signals less poverty, but the decrease in the share who raise livestock signals greater poverty. Perhaps the 2016 drought increased the push of households out of agriculture and into urban areas.

There are other possible explanations. The 2016/17 round differs from the 2012/13 round (UBOS, 2018) not only in its sampling frame but also in that it adds a few food items, changes the recall period for some food items to seven days (rather than 30) and for some non-food items to 15 days (rather than 30), and adjusts poverty lines for price differences in 15 sub-regions (rather than 10). There are also myriad ways in which coverage or quality can vary across rounds, and it is also possible that the CPI adjustment used to adjust poverty lines from 2012/13 to 2016/17 is somehow off (as in Malawi, Schreiner 2019a).

To sum up, legacy scorecard users are warned *not* to use hybrid estimates of change with a baseline from an old scorecard and a follow-up from the new scorecard.

Nonetheless, it is reasonable to expect that *non-hybrid* estimates of change from now on in which both baseline and follow-up are from the new 2016/17 scorecard will be about as accurate as they are for the typical scorecard.

The distribution of responses to scorecard questions usually shifts from more-poor to less-poor from 2012/13 to 2016/17, inconsistent with worsening consumption-based poverty

Question	Response	Households (%)	
		'12/13	'16/17
1. In what sub-region does the household live?	A. Busoga, Bukedi, or Karamoja	17	17
	B. Central I, Central II, Elgon, or West Nile	39	39
	C. Acholi, Bunyoro, Kampala, Kigezi, or Teso	26	23
	D. Tooro	4	7
	E. Ankole, or Lango	14	14
2. How many members does the household have?	A. Seven or more	28	23
	B. Six	12	11
	C. Five	14	13
	D. Four	14	15
	E. Three	12	14
	F. Two	10	11
	G. One	10	13
3. Can the female head (or the eldest wife of the male head) read and write with understanding in any language?	A. No female head (nor wife of the male head)	12	13
	B. No	42	32
	C. Yes	47	55
4. Do any household members attend a private school or a school that is run by a religious organization, NGO, or other non-government entity?	A. No	70	58
	B. Yes	29	42
5. During the last 12 months, did any member of the household receive income from crop farming or livestock?	A. Crop farming, but not livestock	49	46
	B. Neither crop farming nor livestock	20	31
	C. Livestock (regardless of crop farming)	30	23
6. Type of material mainly used for construction of the floor? (<i>as observed</i>)	A. Earth, rammed earth, wood, or other	71	59
	B. Cement screed, concrete, tiles, brick, or stone	29	41
7. What type of toilet facility does the household mainly use?	A. No facility/bush/polythene bags/bucket/etc., pit latrine (without a cover and without a slab), or other	25	18
	B. Pit latrine (with a cover and/or with a slab), Ecosan (compost toilet), VIP latrine, or flush toilet	75	82
8. How many functional mobile phones do members of the household own at present?	A. None	41	27
	B. One	39	40
	C. Two or more	21	33
9. Does every member of the household have at least one pair of shoes in good condition?	A. No	44	35
	B. Yes	56	65
10. What was the average number of meals taken by household members per day in the last seven days?	A. Two or fewer	67	54
	B. Three or more	33	46

This informative table is not a scorecard. It accompanies the Appendix's warning against hybrid estimates of change. Source: 2012/13 and 2016/17 UNHS.

Table 3 (Uganda): Poverty lines and poverty rates for households and people by urban/rural/all in 2016/17

Area	Line or Rate	HHs or People	n	Poverty lines and poverty rates																		
				National				Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines					
				Food	100%	150%	200%	\$1.25	\$2.00	\$2.50	\$5.00	\$8.44	\$1.90	\$3.20	\$5.50	\$21.70	10th	20th	40th	50th	60th	80th
Urban	Line	People		1,860	2,569	3,854	5,139	2,497	3,996	4,995	9,990	11,258	2,742	4,618	7,938	31,319	1,436	1,839	2,639	3,132	3,714	5,859
	Rate	HHs	5,076	2.0	6.5	17.7	31.4	12.9	31.3	42.2	74.3	78.7	15.8	38.0	64.6	98.0	2.2	5.5	14.6	20.5	28.0	50.3
	Rate	People		2.9	9.4	24.5	40.3	18.5	41.5	52.9	82.2	85.7	22.3	48.8	73.9	98.9	3.4	8.2	20.6	28.4	37.7	61.3
Rural	Line	People		1,713	2,366	3,549	4,732	2,300	3,680	4,600	9,200	10,368	2,525	4,253	7,311	28,843	1,323	1,694	2,430	2,884	3,420	5,396
	Rate	HHs	10,560	7.8	19.9	43.9	61.5	34.7	61.5	72.6	92.8	94.5	40.2	69.2	88.0	99.5	9.0	18.3	37.7	47.7	57.7	79.1
	Rate	People		10.4	25.3	51.9	69.4	42.9	70.8	80.6	95.7	96.9	49.0	77.5	92.6	99.7	12.1	23.8	46.2	56.9	67.2	86.0
All	Line	People		1,749	2,416	3,623	4,831	2,348	3,757	4,696	9,392	10,584	2,578	4,342	7,463	29,445	1,351	1,729	2,481	2,944	3,491	5,508
	Rate	HHs	15,636	6.1	16.1	36.5	53.0	28.6	53.1	64.1	87.6	90.1	33.4	60.4	81.4	99.1	7.1	14.7	31.2	40.1	49.3	71.0
	Rate	People		8.6	21.4	45.2	62.3	36.9	63.7	73.9	92.4	94.2	42.6	70.6	88.1	99.5	10.0	20.0	40.0	50.0	60.0	80.0

Source: 2016/17 UHNS. Poverty rates are percentages. All poverty lines are UGX in average prices in Uganda as a whole during the 2016/17 UNHS fieldwork.

National poverty lines are UGX per-adult-equivalent per-day, and intl. 2005 and 2011 PPP poverty lines and percentile-based lines are UGX per-person per-day.

Table 3 (Acholi): Poverty lines and poverty rates for households and people by urban/rural/all in 2016/17

Area	Line or Rate	HHs or People	n	Poverty lines and poverty rates																		
				National				Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines					
				Food	100%	150%	200%	\$1.25	\$2.00	\$2.50	\$5.00	\$8.44	\$1.90	\$3.20	\$5.50	\$21.70	10th	20th	40th	50th	60th	80th
Urban	Line	People		1,801	2,487	3,731	4,974	2,418	3,868	4,835	9,670	10,898	2,655	4,471	7,684	30,318	1,391	1,780	2,555	3,032	3,595	5,671
	Rate	HHs	277	3.3	12.7	32.0	46.0	25.2	49.5	63.2	85.2	89.2	28.7	56.8	78.6	99.0	4.9	14.1	27.2	35.4	42.3	67.3
	Rate	People		3.9	13.6	37.3	51.5	29.9	59.7	73.4	91.6	95.1	33.6	65.6	86.4	99.8	4.9	14.8	31.5	42.7	49.8	76.9
Rural	Line	People		1,724	2,381	3,572	4,763	2,315	3,703	4,629	9,259	10,434	2,542	4,281	7,357	29,027	1,331	1,705	2,446	2,903	3,442	5,430
	Rate	HHs	547	14.9	29.1	61.3	76.2	46.0	76.8	82.9	95.2	96.2	55.2	80.2	93.4	100.0	15.3	26.1	51.7	65.4	73.4	87.2
	Rate	People		19.1	36.2	68.5	84.5	54.4	85.0	89.9	98.0	98.5	63.9	87.4	97.1	100.0	19.8	33.1	60.5	73.2	81.7	92.9
All	Line	People		1,733	2,395	3,592	4,789	2,328	3,724	4,655	9,310	10,492	2,556	4,304	7,398	29,189	1,339	1,714	2,460	2,919	3,461	5,460
	Rate	HHs	824	13.4	26.9	57.4	72.3	43.2	73.2	80.3	93.9	95.3	51.7	77.1	91.5	99.9	13.9	24.5	48.4	61.4	69.3	84.6
	Rate	People		17.2	33.4	64.6	80.4	51.4	81.8	87.9	97.2	98.0	60.1	84.7	95.7	100.0	17.9	30.8	56.9	69.4	77.7	90.9

Source: 2016/17 UHNS. Poverty rates are percentages. All poverty lines are UGX in average prices in Uganda as a whole during the 2016/17 UNHS fieldwork.

National poverty lines are UGX per-adult-equivalent per-day, and intl. 2005 and 2011 PPP poverty lines and percentile-based lines are UGX per-person per-day.

Table 3 (Ankole): Poverty lines and poverty rates for households and people by urban/rural/all in 2016/17

Area	Line or Rate	HHs or People	n	Poverty lines and poverty rates																		
				National				Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines					
				Food	100%	150%	200%	\$1.25	\$2.00	\$2.50	\$5.00	\$8.44	\$1.90	\$3.20	\$5.50	\$21.70	10th	20th	40th	50th	60th	80th
Urban	Line	People		1,786	2,467	3,701	4,935	2,398	3,837	4,796	9,593	10,811	2,633	4,435	7,623	30,075	1,379	1,766	2,534	3,007	3,566	5,626
	Rate	HHs	320	1.2	2.4	5.4	14.9	4.1	15.4	30.5	59.6	65.6	5.3	21.5	52.3	98.0	1.4	2.3	4.6	7.3	11.4	35.5
	Rate	People		1.2	2.7	7.5	19.4	5.4	21.2	37.8	67.6	75.7	7.1	28.0	60.0	98.6	1.5	3.3	6.1	10.0	17.5	43.5
Rural	Line	People		1,677	2,317	3,475	4,634	2,252	3,603	4,504	9,009	10,152	2,473	4,165	7,158	28,243	1,295	1,659	2,380	2,824	3,349	5,283
	Rate	HHs	771	2.0	6.3	20.9	39.3	15.1	40.2	53.1	85.7	88.9	19.9	49.3	76.7	99.3	2.4	6.1	18.5	26.7	35.6	64.1
	Rate	People		2.5	7.6	25.0	44.3	18.6	46.6	60.4	89.5	92.2	24.5	55.7	82.8	99.4	2.9	7.0	22.4	32.2	42.2	71.7
All	Line	People		1,695	2,341	3,511	4,682	2,275	3,640	4,551	9,101	10,257	2,498	4,208	7,232	28,534	1,309	1,676	2,404	2,853	3,383	5,338
	Rate	HHs	1,091	1.9	5.5	17.7	34.3	12.8	35.1	48.4	80.3	84.1	16.9	43.6	71.7	99.0	2.2	5.3	15.6	22.7	30.6	58.2
	Rate	People		2.3	6.8	22.2	40.4	16.5	42.6	56.9	86.0	89.6	21.7	51.3	79.2	99.3	2.7	6.4	19.8	28.7	38.2	67.2

Source: 2016/17 UHNS. Poverty rates are percentages. All poverty lines are UGX in average prices in Uganda as a whole during the 2016/17 UNHS fieldwork.

National poverty lines are UGX per-adult-equivalent per-day, and intl. 2005 and 2011 PPP poverty lines and percentile-based lines are UGX per-person per-day.

Table 3 (Bukedi): Poverty lines and poverty rates for households and people by urban/rural/all in 2016/17

Area	Line or Rate	HHs or People	n	Poverty lines and poverty rates																		
				National				Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines					
				Food	100%	150%	200%	\$1.25	\$2.00	\$2.50	\$5.00	\$8.44	\$1.90	\$3.20	\$5.50	\$21.70	10th	20th	40th	50th	60th	80th
Urban	Line	People		1,827	2,524	3,786	5,049	2,454	3,926	4,907	9,815	11,061	2,694	4,538	7,799	30,770	1,411	1,807	2,593	3,077	3,648	5,756
	Rate	HHs	231	10.5	22.2	43.5	60.2	35.6	59.4	68.7	89.3	92.4	41.8	63.3	84.3	99.2	11.2	19.1	38.9	45.8	55.5	77.7
	Rate	People		16.1	32.1	53.8	70.6	46.5	70.4	78.0	94.3	96.0	52.3	74.3	91.2	99.8	17.5	28.9	48.7	56.0	66.8	86.1
Rural	Line	People		1,706	2,356	3,534	4,712	2,290	3,664	4,580	9,161	10,324	2,515	4,235	7,280	28,721	1,317	1,687	2,420	2,872	3,406	5,373
	Rate	HHs	710	14.8	37.4	69.9	83.7	57.5	83.4	89.6	98.1	98.7	63.2	88.1	96.1	99.4	17.2	32.6	60.3	71.2	79.8	93.1
	Rate	People		19.0	45.4	77.1	87.9	66.0	88.8	93.6	99.2	99.5	71.9	92.4	98.1	99.7	22.3	41.4	68.9	78.3	86.2	96.2
All	Line	People		1,721	2,378	3,566	4,755	2,311	3,698	4,622	9,244	10,418	2,538	4,274	7,346	28,982	1,329	1,702	2,442	2,898	3,436	5,422
	Rate	HHs	941	14.1	35.1	65.8	80.0	54.0	79.7	86.3	96.7	97.7	59.9	84.3	94.3	99.4	16.3	30.5	57.0	67.2	76.0	90.7
	Rate	People		18.6	43.7	74.1	85.7	63.5	86.5	91.6	98.6	99.0	69.4	90.1	97.2	99.7	21.7	39.8	66.3	75.5	83.7	94.9

Source: 2016/17 UHNS. Poverty rates are percentages. All poverty lines are UGX in average prices in Uganda as a whole during the 2016/17 UNHS fieldwork.

National poverty lines are UGX per-adult-equivalent per-day, and intl. 2005 and 2011 PPP poverty lines and percentile-based lines are UGX per-person per-day.

Table 3 (Bunyoro): Poverty lines and poverty rates for households and people by urban/rural/all in 2016/17

Area	Line or Rate	HHs or People	n	Poverty lines and poverty rates																		
				National				Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines					
				Food	100%	150%	200%	\$1.25	\$2.00	\$2.50	\$5.00	\$8.44	\$1.90	\$3.20	\$5.50	\$21.70	10th	20th	40th	50th	60th	80th
Urban	Line	People		1,786	2,467	3,701	4,935	2,398	3,837	4,796	9,593	10,811	2,633	4,435	7,623	30,075	1,379	1,766	2,534	3,007	3,566	5,626
	Rate	HHs	302	2.1	5.2	17.2	32.3	12.6	35.0	45.2	75.5	80.4	15.4	41.7	65.3	98.2	1.8	3.4	14.7	21.3	30.1	51.6
	Rate	People		3.9	8.1	23.5	43.7	16.6	48.3	58.9	81.0	85.7	20.9	55.5	73.3	97.2	3.2	5.5	20.0	28.7	40.8	64.4
Rural	Line	People		1,677	2,317	3,475	4,634	2,252	3,603	4,504	9,009	10,152	2,473	4,165	7,158	28,243	1,295	1,659	2,380	2,824	3,349	5,283
	Rate	HHs	701	4.9	14.9	38.4	57.4	31.3	56.1	69.9	94.0	95.1	36.6	66.7	87.7	99.7	5.4	14.3	33.8	42.7	53.1	77.0
	Rate	People		6.2	19.3	46.0	65.8	38.4	65.7	78.7	96.8	97.3	45.1	75.5	93.4	99.6	6.9	19.2	41.2	51.8	62.6	85.4
All	Line	People		1,697	2,345	3,517	4,690	2,279	3,647	4,558	9,117	10,274	2,503	4,215	7,244	28,583	1,311	1,679	2,408	2,858	3,389	5,347
	Rate	HHs	1,003	4.3	12.9	34.0	52.2	27.4	51.7	64.8	90.2	92.1	32.2	61.5	83.0	99.4	4.6	12.0	29.8	38.2	48.3	71.7
	Rate	People		5.7	17.3	41.8	61.7	34.4	62.5	75.1	93.9	95.1	40.6	71.8	89.7	99.1	6.2	16.7	37.3	47.5	58.6	81.5

Source: 2016/17 UHNS. Poverty rates are percentages. All poverty lines are UGX in average prices in Uganda as a whole during the 2016/17 UNHS fieldwork.

National poverty lines are UGX per-adult-equivalent per-day, and intl. 2005 and 2011 PPP poverty lines and percentile-based lines are UGX per-person per-day.

Table 3 (Busoga): Poverty lines and poverty rates for households and people by urban/rural/all in 2016/17

Area	Line or Rate	HHs or People	n	Poverty lines and poverty rates																		
				National				Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines					
				Food	100%	150%	200%	\$1.25	\$2.00	\$2.50	\$5.00	\$8.44	\$1.90	\$3.20	\$5.50	\$21.70	10th	20th	40th	50th	60th	80th
Urban	Line	People		1,827	2,524	3,786	5,049	2,454	3,926	4,907	9,815	11,061	2,694	4,538	7,799	30,770	1,411	1,807	2,593	3,077	3,648	5,756
	Rate	HHs	376	4.8	17.0	36.6	54.0	30.2	50.2	63.3	89.0	89.8	33.4	55.7	85.1	98.8	5.2	14.3	31.8	39.3	47.3	70.9
	Rate	People		8.0	24.4	47.4	64.0	41.8	62.1	72.4	92.9	93.6	45.9	67.1	91.0	99.4	8.7	22.1	43.9	51.5	59.0	79.4
Rural	Line	People		1,706	2,356	3,534	4,712	2,290	3,664	4,580	9,161	10,324	2,515	4,235	7,280	28,721	1,317	1,687	2,420	2,872	3,406	5,373
	Rate	HHs	1,052	13.7	32.2	61.3	78.6	50.3	76.3	84.8	97.0	97.7	57.1	82.4	94.2	99.8	16.3	30.3	53.9	64.6	73.4	89.8
	Rate	People		17.8	39.6	70.8	86.6	61.6	86.5	91.9	98.2	98.6	67.9	90.2	97.1	99.8	20.9	37.9	65.3	75.4	84.0	94.8
All	Line	People		1,723	2,380	3,570	4,760	2,313	3,701	4,627	9,253	10,428	2,540	4,278	7,353	29,011	1,331	1,704	2,445	2,901	3,440	5,427
	Rate	HHs	1,428	12.2	29.6	57.1	74.5	46.9	71.9	81.2	95.7	96.4	53.2	77.9	92.6	99.6	14.4	27.6	50.1	60.4	69.0	86.6
	Rate	People		16.4	37.5	67.5	83.4	58.8	83.1	89.2	97.4	97.9	64.8	87.0	96.3	99.8	19.2	35.7	62.2	72.0	80.5	92.6

Source: 2016/17 UHNS. Poverty rates are percentages. All poverty lines are UGX in average prices in Uganda as a whole during the 2016/17 UNHS fieldwork.

National poverty lines are UGX per-adult-equivalent per-day, and intl. 2005 and 2011 PPP poverty lines and percentile-based lines are UGX per-person per-day.

Table 3 (Central I): Poverty lines and poverty rates for households and people by urban/rural/all in 2016/17

Area	Line or Rate	HHs or People	n	Poverty lines and poverty rates																		
				National				Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines					
				Food	100%	150%	200%	\$1.25	\$2.00	\$2.50	\$5.00	\$8.44	\$1.90	\$3.20	\$5.50	\$21.70	10th	20th	40th	50th	60th	80th
Urban	Line	People		1,912	2,641	3,962	5,282	2,567	4,108	5,134	10,269	11,573	2,819	4,748	8,160	32,195	1,477	1,891	2,713	3,219	3,817	6,023
	Rate	HHs	633	0.8	2.9	9.9	22.6	5.8	23.2	33.4	68.1	73.0	8.0	30.0	56.4	98.5	0.7	2.9	7.1	12.0	19.5	41.6
	Rate	People		1.2	4.4	14.5	29.9	8.6	32.9	44.1	76.0	79.3	11.9	40.3	65.4	99.1	1.3	4.5	10.4	18.0	28.3	52.4
Rural	Line	People		1,761	2,433	3,649	4,865	2,365	3,783	4,729	9,458	10,659	2,596	4,373	7,516	29,653	1,360	1,741	2,499	2,965	3,516	5,547
	Rate	HHs	893	3.5	10.4	26.1	43.1	19.3	43.3	56.7	86.1	89.2	23.6	52.8	79.0	98.0	3.9	10.3	21.9	28.4	38.9	63.4
	Rate	People		4.8	12.9	31.7	50.1	24.7	52.5	65.5	91.1	93.5	29.8	62.0	85.9	99.0	5.8	13.6	28.0	35.8	47.9	72.0
All	Line	People		1,831	2,529	3,794	5,058	2,458	3,933	4,916	9,833	11,081	2,699	4,546	7,813	30,828	1,414	1,810	2,598	3,083	3,655	5,767
	Rate	HHs	1,526	2.1	6.6	17.9	32.7	12.5	33.1	44.9	77.0	81.0	15.7	41.2	67.5	98.3	2.3	6.6	14.4	20.1	29.0	52.3
	Rate	People		3.1	9.0	23.7	40.8	17.3	43.4	55.6	84.1	86.9	21.5	52.0	76.4	99.1	3.7	9.4	19.9	27.6	38.9	62.9

Source: 2016/17 UHNS. Poverty rates are percentages. All poverty lines are UGX in average prices in Uganda as a whole during the 2016/17 UNHS fieldwork.

National poverty lines are UGX per-adult-equivalent per-day, and intl. 2005 and 2011 PPP poverty lines and percentile-based lines are UGX per-person per-day.

Table 3 (Central II): Poverty lines and poverty rates for households and people by urban/rural/all in 2016/17

Area	Line or Rate	HHs or People	n	Poverty lines and poverty rates																		
				National				Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines					
				Food	100%	150%	200%	\$1.25	\$2.00	\$2.50	\$5.00	\$8.44	\$1.90	\$3.20	\$5.50	\$21.70	10th	20th	40th	50th	60th	80th
Urban	Line	People		1,912	2,641	3,962	5,282	2,567	4,108	5,134	10,269	11,573	2,819	4,748	8,160	32,195	1,477	1,891	2,713	3,219	3,817	6,023
	Rate	HHs	507	1.4	7.0	23.8	41.3	16.4	42.1	53.9	86.2	88.7	20.4	50.0	74.8	98.8	1.9	5.7	19.0	30.0	39.3	60.2
	Rate	People		2.0	8.3	30.0	49.2	21.7	50.5	62.1	91.8	93.7	26.2	58.3	80.5	99.4	2.5	6.6	24.6	38.0	47.7	67.2
Rural	Line	People		1,761	2,433	3,649	4,865	2,365	3,783	4,729	9,458	10,659	2,596	4,373	7,516	29,653	1,360	1,741	2,499	2,965	3,516	5,547
	Rate	HHs	902	2.7	8.4	28.4	47.5	20.7	49.2	64.1	89.1	91.6	24.9	58.5	84.2	99.7	3.3	7.7	23.3	33.8	45.0	72.2
	Rate	People		4.2	12.0	35.7	57.7	27.4	60.6	75.0	94.3	96.6	33.0	69.2	90.6	99.9	5.3	11.2	30.8	43.7	56.9	81.8
All	Line	People		1,800	2,486	3,729	4,972	2,417	3,866	4,833	9,666	10,893	2,653	4,469	7,681	30,305	1,390	1,780	2,554	3,030	3,593	5,669
	Rate	HHs	1,409	2.3	8.0	27.1	45.8	19.5	47.3	61.4	88.3	90.8	23.7	56.2	81.7	99.4	2.9	7.1	22.1	32.7	43.4	68.9
	Rate	People		3.6	11.0	34.2	55.5	26.0	58.0	71.7	93.7	95.8	31.2	66.4	88.0	99.7	4.6	10.0	29.2	42.2	54.6	78.0

Source: 2016/17 UHNS. Poverty rates are percentages. All poverty lines are UGX in average prices in Uganda as a whole during the 2016/17 UNHS fieldwork. National poverty lines are UGX per-adult-equivalent per-day, and intl. 2005 and 2011 PPP poverty lines and percentile-based lines are UGX per-person per-day.

Table 3 (Elgon): Poverty lines and poverty rates for households and people by urban/rural/all in 2016/17

Area	Line or Rate	HHs or People	n	Poverty lines and poverty rates																		
				National				Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines					
				Food	100%	150%	200%	\$1.25	\$2.00	\$2.50	\$5.00	\$8.44	\$1.90	\$3.20	\$5.50	\$21.70	10th	20th	40th	50th	60th	80th
Urban	Line	People		1,827	2,524	3,786	5,049	2,454	3,926	4,907	9,815	11,061	2,694	4,538	7,799	30,770	1,411	1,807	2,593	3,077	3,648	5,756
	Rate	HHs	271	4.6	19.4	42.6	62.1	32.1	60.9	70.3	94.6	95.5	38.7	66.4	87.8	99.8	8.1	17.0	36.3	44.7	55.3	76.1
	Rate	People		7.1	27.2	51.2	68.2	42.5	68.4	76.3	96.9	98.3	47.8	72.9	94.6	99.9	11.2	23.9	46.0	54.3	64.1	82.9
Rural	Line	People		1,706	2,356	3,534	4,712	2,290	3,664	4,580	9,161	10,324	2,515	4,235	7,280	28,721	1,317	1,687	2,420	2,872	3,406	5,373
	Rate	HHs	716	9.7	27.0	62.3	76.8	50.2	73.9	83.2	97.3	97.8	55.5	80.6	94.2	99.7	12.1	25.9	53.5	62.6	71.5	87.4
	Rate	People		14.6	36.1	73.3	84.8	63.4	84.1	91.0	98.7	98.9	69.5	88.5	97.2	99.9	17.4	34.9	67.1	76.5	82.3	93.6
All	Line	People		1,727	2,386	3,578	4,771	2,319	3,710	4,638	9,275	10,453	2,546	4,288	7,370	29,080	1,334	1,708	2,450	2,908	3,448	5,440
	Rate	HHs	987	8.7	25.6	58.5	74.0	46.7	71.4	80.7	96.7	97.4	52.2	77.9	93.0	99.7	11.3	24.2	50.2	59.1	68.4	85.3
	Rate	People		13.3	34.5	69.4	81.9	59.8	81.3	88.5	98.4	98.8	65.7	85.8	96.8	99.9	16.3	33.0	63.4	72.6	79.1	91.7

Source: 2016/17 UHNS. Poverty rates are percentages. All poverty lines are UGX in average prices in Uganda as a whole during the 2016/17 UNHS fieldwork.

National poverty lines are UGX per-adult-equivalent per-day, and intl. 2005 and 2011 PPP poverty lines and percentile-based lines are UGX per-person per-day.

Table 3 (Kampala): Poverty lines and poverty rates for households and people by urban/rural/all in 2016/17

Area	Line or Rate	HHs or People	n	Poverty lines and poverty rates																		
				National				Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines					
				Food	100%	150%	200%	\$1.25	\$2.00	\$2.50	\$5.00	\$8.44	\$1.90	\$3.20	\$5.50	\$21.70	10th	20th	40th	50th	60th	80th
Urban	Line	People		1,912	2,641	3,962	5,282	2,567	4,108	5,134	10,269	11,573	2,819	4,748	8,160	32,195	1,477	1,891	2,713	3,219	3,817	6,023
	Rate	HHs	793	0.4	1.7	6.6	15.0	4.4	14.2	22.8	60.2	67.9	6.4	19.8	49.2	95.3	0.2	1.1	5.4	8.2	12.7	33.8
	Rate	People		0.6	2.6	9.4	20.8	6.5	19.9	30.3	68.9	76.4	9.1	27.3	58.8	96.9	0.4	1.8	8.1	11.6	17.7	44.0
Rural	Line	People		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Rate	HHs	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Rate	People		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
All	Line	People		1,912	2,641	3,962	5,282	2,567	4,108	5,134	10,269	11,573	2,819	4,748	8,160	32,195	1,477	1,891	2,713	3,219	3,817	6,023
	Rate	HHs	793	0.4	1.7	6.6	15.0	4.4	14.2	22.8	60.2	67.9	6.4	19.8	49.2	95.3	0.2	1.1	5.4	8.2	12.7	33.8
	Rate	People		0.6	2.6	9.4	20.8	6.5	19.9	30.3	68.9	76.4	9.1	27.3	58.8	96.9	0.4	1.8	8.1	11.6	17.7	44.0

Source: 2016/17 UHNS. Poverty rates are percentages. All poverty lines are UGX in average prices in Uganda as a whole during the 2016/17 UNHS fieldwork.

National poverty lines are UGX per-adult-equivalent per-day, and intl. 2005 and 2011 PPP poverty lines and percentile-based lines are UGX per-person per-day.

Table 3 (Karamoja): Poverty lines and poverty rates for households and people by urban/rural/all in 2016/17

Area	Line or Rate	HHs or People	n	Poverty lines and poverty rates																		
				National				Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines					
				Food	100%	150%	200%	\$1.25	\$2.00	\$2.50	\$5.00	\$8.44	\$1.90	\$3.20	\$5.50	\$21.70	10th	20th	40th	50th	60th	80th
Urban	Line	People		1,801	2,487	3,731	4,974	2,418	3,868	4,835	9,670	10,898	2,655	4,471	7,684	30,318	1,391	1,780	2,555	3,032	3,595	5,671
	Rate	HHs	122	7.7	14.3	32.4	53.5	31.6	50.9	62.1	89.2	89.8	34.3	61.2	83.4	99.6	8.0	14.0	32.1	40.1	49.7	65.4
	Rate	People		10.6	21.4	47.8	65.8	45.2	64.1	72.1	96.5	96.9	48.3	71.3	90.8	99.9	11.1	20.9	46.0	54.2	62.7	74.9
Rural	Line	People		1,724	2,381	3,572	4,763	2,315	3,703	4,629	9,259	10,434	2,542	4,281	7,357	29,027	1,331	1,705	2,446	2,903	3,442	5,430
	Rate	HHs	503	36.4	61.4	86.9	94.6	83.5	94.9	97.3	98.7	98.7	86.1	97.0	98.5	100.0	43.2	62.7	84.3	89.1	93.8	98.4
	Rate	People		39.8	65.4	88.9	96.0	86.6	96.6	98.4	99.4	99.4	88.2	98.2	99.3	100.0	46.6	65.9	87.1	91.5	95.9	99.3
All	Line	People		1,733	2,394	3,591	4,788	2,327	3,723	4,654	9,308	10,489	2,555	4,303	7,396	29,181	1,338	1,714	2,459	2,918	3,460	5,459
	Rate	HHs	625	31.9	54.0	78.4	88.1	75.4	88.0	91.8	97.3	97.3	78.0	91.4	96.1	99.9	37.7	55.1	76.1	81.5	86.9	93.3
	Rate	People		36.4	60.2	84.0	92.4	81.7	92.8	95.3	99.0	99.1	83.5	95.0	98.3	100.0	42.4	60.5	82.2	87.1	91.9	96.4

Source: 2016/17 UHNS. Poverty rates are percentages. All poverty lines are UGX in average prices in Uganda as a whole during the 2016/17 UNHS fieldwork.

National poverty lines are UGX per-adult-equivalent per-day, and intl. 2005 and 2011 PPP poverty lines and percentile-based lines are UGX per-person per-day.

Table 3 (Kigezi): Poverty lines and poverty rates for households and people by urban/rural/all in 2016/17

Area	Line or Rate	HHs or People	n	Poverty lines and poverty rates																		
				National				Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines					
				Food	100%	150%	200%	\$1.25	\$2.00	\$2.50	\$5.00	\$8.44	\$1.90	\$3.20	\$5.50	\$21.70	10th	20th	40th	50th	60th	80th
Urban	Line	People		1,786	2,467	3,701	4,935	2,398	3,837	4,796	9,593	10,811	2,633	4,435	7,623	30,075	1,379	1,766	2,534	3,007	3,566	5,626
	Rate	HHs	136	2.5	5.1	22.4	42.9	13.3	43.2	51.4	82.3	85.6	14.7	47.8	71.3	98.5	1.9	5.1	14.7	23.1	38.6	62.4
	Rate	People		1.6	7.0	29.3	55.1	16.8	55.5	63.1	90.7	92.8	19.4	59.9	81.6	99.3	1.2	7.0	19.4	30.0	51.2	73.8
Rural	Line	People		1,677	2,317	3,475	4,634	2,252	3,603	4,504	9,009	10,152	2,473	4,165	7,158	28,243	1,295	1,659	2,380	2,824	3,349	5,283
	Rate	HHs	520	3.8	11.2	33.0	52.5	24.0	52.0	64.9	92.1	94.3	28.4	59.9	84.7	99.1	3.8	9.1	26.4	38.1	48.8	73.6
	Rate	People		5.0	13.2	39.7	59.5	28.5	59.8	73.2	94.4	96.7	34.1	68.6	89.1	99.1	5.0	11.0	31.6	45.6	56.9	80.7
All	Line	People		1,695	2,342	3,513	4,683	2,276	3,642	4,552	9,105	10,261	2,499	4,209	7,235	28,545	1,309	1,676	2,405	2,854	3,385	5,340
	Rate	HHs	656	3.6	10.1	31.1	50.7	22.1	50.5	62.5	90.3	92.7	25.9	57.7	82.3	99.0	3.5	8.4	24.3	35.4	47.0	71.6
	Rate	People		4.4	12.2	38.0	58.8	26.6	59.1	71.6	93.8	96.0	31.7	67.1	87.8	99.2	4.4	10.3	29.6	43.0	56.0	79.6

Source: 2016/17 UHNS. Poverty rates are percentages. All poverty lines are UGX in average prices in Uganda as a whole during the 2016/17 UNHS fieldwork. National poverty lines are UGX per-adult-equivalent per-day, and intl. 2005 and 2011 PPP poverty lines and percentile-based lines are UGX per-person per-day.

Table 3 (Lango): Poverty lines and poverty rates for households and people by urban/rural/all in 2016/17

Area	Line or Rate	HHs or People	n	Poverty lines and poverty rates																		
				National				Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines					
				Food	100%	150%	200%	\$1.25	\$2.00	\$2.50	\$5.00	\$8.44	\$1.90	\$3.20	\$5.50	\$21.70	10th	20th	40th	50th	60th	80th
Urban	Line	People		1,801	2,487	3,731	4,974	2,418	3,868	4,835	9,670	10,898	2,655	4,471	7,684	30,318	1,391	1,780	2,555	3,032	3,595	5,671
	Rate	HHs	291	1.2	4.3	14.2	29.5	10.8	29.0	38.2	74.2	77.6	14.0	35.1	59.7	97.7	2.2	3.7	12.3	17.4	27.0	44.0
	Rate	People		1.6	6.3	21.1	38.6	15.5	39.0	48.0	80.2	82.7	20.6	44.5	68.5	99.3	3.0	5.2	17.9	25.0	36.5	54.0
Rural	Line	People		1,724	2,381	3,572	4,763	2,315	3,703	4,629	9,259	10,434	2,542	4,281	7,357	29,027	1,331	1,705	2,446	2,903	3,442	5,430
	Rate	HHs	929	5.2	14.3	35.2	52.9	26.7	56.4	67.4	91.9	93.8	32.3	64.5	84.5	99.6	5.3	11.6	30.0	39.7	51.2	74.6
	Rate	People		6.5	18.3	41.2	58.4	32.7	63.4	74.1	94.2	95.9	38.6	71.4	87.8	99.8	6.8	15.0	36.6	46.3	58.1	79.6
All	Line	People		1,741	2,405	3,607	4,809	2,337	3,740	4,675	9,350	10,537	2,567	4,323	7,429	29,313	1,344	1,721	2,470	2,931	3,476	5,483
	Rate	HHs	1,220	4.2	11.9	30.0	47.1	22.7	49.6	60.1	87.5	89.8	27.8	57.2	78.4	99.1	4.5	9.6	25.6	34.2	45.2	67.0
	Rate	People		5.4	15.6	36.8	54.0	28.9	58.0	68.3	91.1	93.0	34.6	65.4	83.5	99.7	5.9	12.8	32.4	41.6	53.3	74.0

Source: 2016/17 UHNS. Poverty rates are percentages. All poverty lines are UGX in average prices in Uganda as a whole during the 2016/17 UNHS fieldwork.

National poverty lines are UGX per-adult-equivalent per-day, and intl. 2005 and 2011 PPP poverty lines and percentile-based lines are UGX per-person per-day.

Table 3 (Teso): Poverty lines and poverty rates for households and people by urban/rural/all in 2016/17

Area	Line or Rate	HHs or People	n	Poverty lines and poverty rates																		
				National				Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines					
				Food	100%	150%	200%	\$1.25	\$2.00	\$2.50	\$5.00	\$8.44	\$1.90	\$3.20	\$5.50	\$21.70	10th	20th	40th	50th	60th	80th
Urban	Line	People		1,827	2,524	3,786	5,049	2,454	3,926	4,907	9,815	11,061	2,694	4,538	7,799	30,770	1,411	1,807	2,593	3,077	3,648	5,756
	Rate	HHs	193	2.9	13.3	32.1	47.2	23.8	44.5	54.8	84.8	90.1	31.0	49.0	77.3	99.6	4.0	11.3	27.5	36.6	39.4	57.5
	Rate	People		4.7	21.4	46.8	61.2	34.0	60.2	69.0	91.5	94.9	45.8	63.9	85.2	99.9	6.6	16.1	39.9	51.6	56.1	71.4
Rural	Line	People		1,706	2,356	3,534	4,712	2,290	3,664	4,580	9,161	10,324	2,515	4,235	7,280	28,721	1,317	1,687	2,420	2,872	3,406	5,373
	Rate	HHs	682	6.1	20.3	50.8	72.0	38.3	70.2	80.5	96.0	97.2	46.5	77.4	92.3	99.9	8.2	18.5	41.2	53.9	64.7	85.8
	Rate	People		7.4	25.4	59.6	80.2	45.8	79.8	88.7	98.0	98.4	55.6	86.2	96.9	99.8	10.7	23.8	48.8	63.2	73.2	93.0
All	Line	People		1,716	2,371	3,556	4,741	2,304	3,687	4,608	9,217	10,387	2,530	4,261	7,324	28,896	1,325	1,697	2,435	2,889	3,426	5,405
	Rate	HHs	875	5.8	19.6	48.9	69.5	36.8	67.6	77.9	94.9	96.5	44.9	74.6	90.8	99.9	7.8	17.8	39.8	52.2	62.2	83.0
	Rate	People		7.2	25.1	58.5	78.6	44.8	78.2	87.0	97.5	98.1	54.7	84.3	95.9	99.8	10.3	23.1	48.1	62.2	71.8	91.1

Source: 2016/17 UHNS. Poverty rates are percentages. All poverty lines are UGX in average prices in Uganda as a whole during the 2016/17 UNHS fieldwork.

National poverty lines are UGX per-adult-equivalent per-day, and intl. 2005 and 2011 PPP poverty lines and percentile-based lines are UGX per-person per-day.

Table 3 (Tooro): Poverty lines and poverty rates for households and people by urban/rural/all in 2016/17

Area	Line or Rate	HHs or People	n	Poverty lines and poverty rates																		
				National				Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines					
				Food	100%	150%	200%	\$1.25	\$2.00	\$2.50	\$5.00	\$8.44	\$1.90	\$3.20	\$5.50	\$21.70	10th	20th	40th	50th	60th	80th
Urban	Line	People		1,786	2,467	3,701	4,935	2,398	3,837	4,796	9,593	10,811	2,633	4,435	7,623	30,075	1,379	1,766	2,534	3,007	3,566	5,626
	Rate	HHs	327	2.3	6.8	26.4	39.9	19.1	40.9	54.1	82.8	86.2	23.4	51.2	77.1	99.5	2.3	4.6	21.0	28.4	36.3	65.2
	Rate	People		2.5	9.2	33.7	48.1	25.8	50.0	65.2	91.8	93.4	31.3	62.3	88.1	99.8	2.5	5.5	28.6	38.4	45.8	76.0
Rural	Line	People		1,677	2,317	3,475	4,634	2,252	3,603	4,504	9,009	10,152	2,473	4,165	7,158	28,243	1,295	1,659	2,380	2,824	3,349	5,283
	Rate	HHs	761	2.9	10.2	29.2	50.2	20.1	50.9	64.7	91.0	93.2	26.3	60.6	85.1	99.4	3.3	8.4	23.2	35.3	46.6	75.1
	Rate	People		3.2	11.7	34.1	56.4	25.0	58.8	71.6	94.2	95.7	31.8	67.9	89.7	99.2	3.8	10.5	28.3	41.6	54.0	81.5
All	Line	People		1,703	2,353	3,530	4,706	2,287	3,659	4,574	9,149	10,310	2,511	4,230	7,270	28,682	1,316	1,684	2,417	2,868	3,401	5,365
	Rate	HHs	1,088	2.7	9.3	28.5	47.6	19.9	48.4	62.0	88.9	91.4	25.6	58.2	83.1	99.4	3.1	7.4	22.6	33.6	43.9	72.6
	Rate	People		3.0	11.1	34.0	54.4	25.2	56.7	70.0	93.6	95.2	31.6	66.6	89.3	99.3	3.5	9.3	28.4	40.8	52.1	80.2

Source: 2016/17 UHNS. Poverty rates are percentages. All poverty lines are UGX in average prices in Uganda as a whole during the 2016/17 UNHS fieldwork.

National poverty lines are UGX per-adult-equivalent per-day, and intl. 2005 and 2011 PPP poverty lines and percentile-based lines are UGX per-person per-day.

Table 3 (West Nile): Poverty lines and poverty rates for households and people by urban/rural/all in 2016/17

Area	Line or Rate	HHs or People	n	Poverty lines and poverty rates																		
				National				Intl. 2005 PPP					Intl. 2011 PPP				Percentile-based lines					
				Food	100%	150%	200%	\$1.25	\$2.00	\$2.50	\$5.00	\$8.44	\$1.90	\$3.20	\$5.50	\$21.70	10th	20th	40th	50th	60th	80th
Urban	Line	People		1,801	2,487	3,731	4,974	2,418	3,868	4,835	9,670	10,898	2,655	4,471	7,684	30,318	1,391	1,780	2,555	3,032	3,595	5,671
	Rate	HHs	297	4.7	17.8	31.0	49.1	26.2	48.3	64.9	93.0	94.4	29.2	58.5	85.4	99.5	5.3	15.6	27.6	34.1	44.5	75.8
	Rate	People		5.4	20.4	36.1	55.2	30.4	55.6	72.2	96.2	97.0	33.9	66.0	90.6	99.9	6.3	19.2	32.3	39.6	51.2	83.3
Rural	Line	People		1,724	2,381	3,572	4,763	2,315	3,703	4,629	9,259	10,434	2,542	4,281	7,357	29,027	1,331	1,705	2,446	2,903	3,442	5,430
	Rate	HHs	873	9.2	27.9	55.9	73.3	45.8	74.4	85.0	97.1	97.8	51.0	81.3	94.9	100.0	10.8	25.3	48.4	59.1	70.5	87.6
	Rate	People		13.4	37.2	66.3	83.2	57.8	84.8	92.4	98.8	99.1	63.1	90.2	97.9	100.0	15.9	34.2	60.4	70.5	81.6	93.7
All	Line	People		1,734	2,396	3,593	4,791	2,328	3,726	4,657	9,314	10,496	2,557	4,306	7,401	29,201	1,339	1,715	2,461	2,920	3,462	5,462
	Rate	HHs	1,170	8.6	26.8	53.1	70.5	43.5	71.4	82.7	96.6	97.5	48.5	78.7	93.8	99.9	10.2	24.2	46.0	56.3	67.5	86.3
	Rate	People		12.3	34.9	62.3	79.5	54.1	80.9	89.6	98.4	98.8	59.2	87.0	96.9	100.0	14.6	32.2	56.6	66.4	77.5	92.3

Source: 2016/17 UHNS. Poverty rates are percentages. All poverty lines are UGX in average prices in Uganda as a whole during the 2016/17 UNHS fieldwork.

National poverty lines are UGX per-adult-equivalent per-day, and intl. 2005 and 2011 PPP poverty lines and percentile-based lines are UGX per-person per-day.

**Tables for
150% of the National Poverty Line**

Table 4 (150% of national line): Errors in poverty likelihoods for a participant’s household (average of differences between estimated and observed values) by score range, with confidence intervals

Score	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
0–16	-1.2	1.3	1.5	2.1
17–21	+7.4	3.0	3.7	4.6
22–25	+14.4	4.6	5.4	6.8
26–29	+3.7	2.9	3.5	4.5
30–32	-6.1	4.5	4.9	5.3
33–35	+2.1	3.2	3.8	5.3
36–38	+3.7	3.5	4.2	5.8
39–40	+8.6	3.8	4.4	6.0
41–43	-9.5	6.3	6.5	7.3
44–45	+11.0	3.2	3.7	5.4
46–48	+0.6	2.9	3.4	4.7
49–50	+3.0	3.4	4.0	5.0
51–53	+1.5	2.0	2.4	3.4
54–56	+3.2	1.9	2.2	2.7
57–58	-9.0	6.3	6.7	7.5
59–61	+1.7	0.8	1.0	1.4
62–64	+1.4	0.7	0.8	1.0
65–68	-0.3	0.6	0.7	1.0
69–72	-7.9	5.4	5.6	6.3
73–100	0.0	0.0	0.0	0.0

Scorecard applied to 1,000 bootstraps of n = 16,384 from the validation sample.

Table 5 (150% of national line): Errors in poverty rates for a sample of a population of participants' households at a point in time (average of differences between estimated and observed values), by sample size and with confidence intervals

Sample Size <i>n</i>	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
1	-0.6	64.8	80.0	92.6
4	+1.3	35.5	45.1	66.5
8	+1.6	26.6	33.1	48.9
16	+1.0	19.1	23.0	32.9
32	+1.2	13.5	16.8	23.5
64	+1.3	10.5	12.6	16.6
128	+1.2	7.3	8.7	12.2
256	+1.1	5.3	6.4	8.8
512	+1.0	3.6	4.3	5.8
1,024	+1.1	2.5	3.1	4.2
2,048	+1.1	1.8	2.1	2.9
4,096	+1.1	1.3	1.5	1.9
8,192	+1.1	0.9	1.1	1.4
16,384	+1.1	0.6	0.7	1.0

Scorecard applied to 1,000 bootstraps from the validation sample.

Table 6 (150% of national line): Percentages of participants' households by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=16	4.7	31.8	0.3	63.2	67.9
<=21	8.8	27.7	1.1	62.4	71.2
<=25	12.8	23.7	2.1	61.3	74.2
<=29	16.9	19.7	3.6	59.8	76.7
<=32	20.2	16.3	5.2	58.3	78.5
<=35	23.0	13.5	7.5	56.0	79.0
<=38	25.4	11.1	9.7	53.7	79.1
<=40	27.2	9.3	12.1	51.4	78.6
<=43	29.8	6.8	15.2	48.3	78.1
<=45	30.9	5.6	18.6	44.9	75.8
<=48	32.6	4.0	22.4	41.0	73.6
<=50	33.6	2.9	25.8	37.6	71.2
<=53	34.7	1.8	30.8	32.7	67.4
<=56	35.4	1.2	35.0	28.5	63.8
<=58	35.8	0.8	38.7	24.8	60.6
<=61	36.1	0.5	44.2	19.3	55.3
<=64	36.3	0.3	49.3	14.1	50.4
<=68	36.4	0.2	54.2	9.2	45.6
<=72	36.5	0.0	58.9	4.5	41.1
<=100	36.5	0.0	63.5	0.0	36.5

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Table 7 (150% of national line): Share of all participants' households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor, share of poor households who are targeted, and number of poor households successfully targeted per non-poor household mistakenly targeted

Targeting cut-off	% all HHs who are targeted	% targeted HHs who are poor	% poor HHs who are targeted	Poor HHs targeted per non-poor HH targeted
<=16	5.0	94.4	12.9	16.8:1
<=21	9.9	89.1	24.1	8.1:1
<=25	15.0	85.8	35.2	6.0:1
<=29	20.5	82.3	46.1	4.6:1
<=32	25.4	79.5	55.3	3.9:1
<=35	30.5	75.4	63.0	3.1:1
<=38	35.1	72.3	69.5	2.6:1
<=40	39.3	69.2	74.4	2.3:1
<=43	45.0	66.2	81.5	2.0:1
<=45	49.5	62.5	84.6	1.7:1
<=48	55.0	59.2	89.2	1.5:1
<=50	59.4	56.6	92.0	1.3:1
<=53	65.5	53.0	95.1	1.1:1
<=56	70.4	50.3	96.8	1.0:1
<=58	74.4	48.1	97.9	0.9:1
<=61	80.3	44.9	98.7	0.8:1
<=64	85.6	42.4	99.3	0.7:1
<=68	90.6	40.2	99.5	0.7:1
<=72	95.5	38.3	100.0	0.6:1
<=100	100.0	36.5	100.0	0.6:1

Scorecard applied to the validation sample.

**Tables for
The Food Poverty Line**

Table 4 (Food line): Errors in poverty likelihoods for a participant’s household (average of differences between estimated and observed values) by score range, with confidence intervals

Score	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
0–16	–2.0	3.5	4.2	5.6
17–21	+5.2	2.8	3.4	4.3
22–25	–1.3	2.5	3.1	4.1
26–29	+4.2	2.0	2.4	3.0
30–32	–7.4	5.3	5.6	6.8
33–35	–2.8	2.4	2.5	3.0
36–38	+1.7	1.0	1.1	1.6
39–40	+3.1	0.4	0.5	0.6
41–43	+0.6	0.7	0.8	1.0
44–45	+1.1	0.2	0.2	0.2
46–48	+0.1	0.4	0.5	0.6
49–50	+0.6	0.1	0.1	0.1
51–53	–0.1	0.4	0.5	0.7
54–56	–0.8	0.8	1.0	1.3
57–58	+0.4	0.0	0.0	0.0
59–61	+0.4	0.0	0.0	0.0
62–64	0.0	0.0	0.0	0.0
65–68	–0.6	0.5	0.5	0.6
69–72	0.0	0.0	0.0	0.0
73–100	0.0	0.0	0.0	0.0

Scorecard applied to 1,000 bootstraps of $n = 16,384$ from the validation sample.

Table 5 (Food line): Errors in poverty rates for a sample of a population of participants' households at a point in time (average of differences between estimated and observed values), by sample size and with confidence intervals

Sample Size <i>n</i>	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
1	-0.6	43.3	62.2	67.6
4	-0.2	19.8	25.5	38.4
8	-0.5	13.9	18.8	26.7
16	+0.1	9.4	11.9	16.9
32	0.0	7.0	8.5	11.9
64	+0.1	4.8	5.7	7.7
128	+0.1	3.5	4.2	5.4
256	+0.1	2.5	3.0	3.7
512	+0.1	1.7	2.0	2.8
1,024	+0.1	1.2	1.4	1.9
2,048	+0.1	0.9	1.0	1.3
4,096	+0.1	0.6	0.7	0.9
8,192	+0.1	0.4	0.5	0.6
16,384	+0.1	0.3	0.4	0.5

Scorecard applied to 1,000 bootstraps from the validation sample.

Table 6 (Food line): Percentages of participants' households by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=16	1.9	4.2	3.1	90.8	92.7
<=21	3.1	3.0	6.8	87.1	90.2
<=25	4.0	2.1	11.0	83.0	87.0
<=29	4.5	1.5	16.0	78.0	82.5
<=32	5.0	1.0	20.4	73.6	78.6
<=35	5.4	0.6	25.1	68.9	74.3
<=38	5.6	0.5	29.5	64.4	70.0
<=40	5.6	0.4	33.6	60.3	66.0
<=43	5.8	0.2	39.1	54.8	60.6
<=45	5.8	0.2	43.6	50.3	56.2
<=48	5.9	0.1	49.1	44.8	50.7
<=50	5.9	0.1	53.5	40.4	46.3
<=53	6.0	0.1	59.5	34.4	40.4
<=56	6.0	0.0	64.4	29.6	35.6
<=58	6.0	0.0	68.4	25.5	31.6
<=61	6.0	0.0	74.3	19.7	25.7
<=64	6.0	0.0	79.6	14.4	20.4
<=68	6.0	0.0	84.6	9.4	15.4
<=72	6.0	0.0	89.4	4.5	10.6
<=100	6.0	0.0	94.0	0.0	6.0

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Table 7 (Food line): Share of all participants' households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor, share of poor households who are targeted, and number of poor households successfully targeted per non-poor household mistakenly targeted

Targeting cut-off	% all HHs who are targeted	% targeted HHs who are poor	% poor HHs who are targeted	Poor HHs targeted per non-poor HH targeted
<=16	5.0	37.2	30.8	0.6:1
<=21	9.9	31.0	50.7	0.4:1
<=25	15.0	26.7	66.0	0.4:1
<=29	20.5	22.0	74.7	0.3:1
<=32	25.4	19.8	83.4	0.2:1
<=35	30.5	17.7	89.5	0.2:1
<=38	35.1	15.9	92.4	0.2:1
<=40	39.3	14.4	93.4	0.2:1
<=43	45.0	12.9	96.2	0.1:1
<=45	49.5	11.8	96.6	0.1:1
<=48	55.0	10.7	97.5	0.1:1
<=50	59.4	9.9	97.7	0.1:1
<=53	65.5	9.1	98.7	0.1:1
<=56	70.4	8.5	99.5	0.1:1
<=58	74.4	8.1	99.5	0.1:1
<=61	80.3	7.5	99.5	0.1:1
<=64	85.6	7.0	99.5	0.1:1
<=68	90.6	6.7	100.0	0.1:1
<=72	95.5	6.3	100.0	0.1:1
<=100	100.0	6.0	100.0	0.1:1

Scorecard applied to the validation sample.

**Tables for
100% of the National Poverty Line**

Table 4 (100% of national line): Errors in poverty likelihoods for a participant’s household (average of differences between estimated and observed values) by score range, with confidence intervals

Score	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
0–16	+1.3	3.2	3.8	5.0
17–21	+12.2	3.9	4.7	6.6
22–25	+5.0	3.7	4.4	5.8
26–29	+2.9	2.9	3.4	4.7
30–32	–9.1	6.4	6.9	7.6
33–35	–4.9	4.0	4.4	4.9
36–38	+4.6	2.2	2.5	3.3
39–40	+9.4	1.6	1.9	2.6
41–43	+2.9	1.5	1.8	2.6
44–45	+2.4	1.2	1.4	1.9
46–48	–1.6	1.6	1.8	2.4
49–50	–7.1	4.9	5.1	5.6
51–53	+0.6	0.6	0.7	0.9
54–56	–1.7	1.4	1.6	1.9
57–58	+1.5	0.1	0.1	0.1
59–61	+0.5	0.2	0.3	0.4
62–64	+0.3	0.1	0.1	0.2
65–68	–0.1	0.4	0.5	0.6
69–72	+0.4	0.0	0.0	0.0
73–100	0.0	0.0	0.0	0.0

Scorecard applied to 1,000 bootstraps of n = 16,384 from the validation sample.

Table 5 (100% of national line): Errors in poverty rates for a sample of a population of participants' households at a point in time (average of differences between estimated and observed values), by sample size and with confidence intervals

Sample Size <i>n</i>	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
1	0.0	57.1	71.3	84.3
4	+0.5	29.5	36.3	49.6
8	+0.4	19.4	24.6	31.7
16	+0.8	13.8	17.2	24.1
32	+0.7	9.5	11.7	16.8
64	+0.9	7.0	8.8	11.7
128	+0.9	5.3	6.4	8.4
256	+0.9	3.7	4.4	6.0
512	+0.8	2.6	3.2	4.2
1,024	+0.8	1.8	2.2	2.9
2,048	+0.8	1.2	1.5	2.0
4,096	+0.9	0.9	1.1	1.4
8,192	+0.9	0.7	0.8	1.1
16,384	+0.9	0.5	0.6	0.7

Scorecard applied to 1,000 bootstraps from the validation sample.

Table 6 (100% of national line): Percentages of participants' households by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=16	3.5	12.5	1.5	82.5	86.0
<=21	6.3	9.7	3.6	80.4	86.7
<=25	8.5	7.6	6.5	77.4	85.9
<=29	10.2	5.8	10.3	73.7	83.9
<=32	11.7	4.4	13.7	70.2	81.9
<=35	12.8	3.3	17.7	66.2	79.0
<=38	13.4	2.6	21.7	62.3	75.7
<=40	13.8	2.2	25.5	58.5	72.3
<=43	14.4	1.6	30.5	53.4	67.8
<=45	14.8	1.3	34.7	49.2	64.0
<=48	15.2	0.9	39.8	44.1	59.3
<=50	15.6	0.5	43.9	40.1	55.7
<=53	15.8	0.3	49.8	34.2	49.9
<=56	15.9	0.1	54.4	29.5	45.4
<=58	15.9	0.1	58.5	25.5	41.4
<=61	16.0	0.0	64.3	19.7	35.7
<=64	16.0	0.0	69.6	14.4	30.4
<=68	16.1	0.0	74.5	9.4	25.5
<=72	16.1	0.0	79.4	4.5	20.6
<=100	16.1	0.0	83.9	0.0	16.1

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Table 7 (100% of national line): Share of all participants' households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor, share of poor households who are targeted, and number of poor households successfully targeted per non-poor household mistakenly targeted

Targeting cut-off	% all HHs who are targeted	% targeted HHs who are poor	% poor HHs who are targeted	Poor HHs targeted per non-poor HH targeted
<=16	5.0	70.3	21.9	2.4:1
<=21	9.9	63.8	39.3	1.8:1
<=25	15.0	56.4	52.6	1.3:1
<=29	20.5	49.9	63.7	1.0:1
<=32	25.4	46.0	72.8	0.9:1
<=35	30.5	41.9	79.5	0.7:1
<=38	35.1	38.3	83.7	0.6:1
<=40	39.3	35.2	86.1	0.5:1
<=43	45.0	32.1	89.8	0.5:1
<=45	49.5	29.8	91.9	0.4:1
<=48	55.0	27.6	94.7	0.4:1
<=50	59.4	26.2	97.0	0.4:1
<=53	65.5	24.0	98.1	0.3:1
<=56	70.4	22.6	99.2	0.3:1
<=58	74.4	21.4	99.3	0.3:1
<=61	80.3	19.9	99.7	0.2:1
<=64	85.6	18.7	99.8	0.2:1
<=68	90.6	17.7	100.0	0.2:1
<=72	95.5	16.8	100.0	0.2:1
<=100	100.0	16.1	100.0	0.2:1

Scorecard applied to the validation sample.

**Tables for
200% of the National Poverty Line**

Table 4 (200% of national line): Errors in poverty likelihoods for a participant’s household (average of differences between estimated and observed values) by score range, with confidence intervals

Score	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
0–16	–0.4	0.5	0.6	0.8
17–21	–0.8	0.9	1.0	1.3
22–25	–1.2	1.0	1.1	1.4
26–29	–1.3	1.9	2.3	2.9
30–32	–10.5	5.9	6.1	6.3
33–35	+1.2	2.6	3.2	4.6
36–38	+0.5	3.0	3.3	4.6
39–40	+11.3	4.5	5.4	7.1
41–43	–0.8	3.1	3.7	4.9
44–45	–0.1	3.9	4.6	6.1
46–48	+0.4	3.7	4.4	5.8
49–50	–11.6	7.6	7.8	8.4
51–53	+3.7	3.1	3.7	5.0
54–56	+6.5	3.0	3.6	4.5
57–58	–2.6	4.2	5.1	6.5
59–61	+5.9	1.8	2.1	2.6
62–64	+5.8	1.5	1.7	2.2
65–68	+5.2	0.9	1.0	1.4
69–72	–5.7	4.3	4.6	5.1
73–100	–3.4	3.0	3.4	4.0

Scorecard applied to 1,000 bootstraps of n = 16,384 from the validation sample.

Table 5 (200% of national line): Errors in poverty rates for a sample of a population of participants' households at a point in time (average of differences between estimated and observed values), by sample size and with confidence intervals

Sample Size <i>n</i>	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
1	-1.1	68.6	81.9	94.7
4	-0.8	36.3	44.4	59.1
8	-0.3	26.9	32.8	43.6
16	-0.3	19.9	24.7	30.7
32	0.0	14.8	17.8	22.9
64	+0.2	10.6	13.0	15.8
128	+0.2	7.5	9.1	11.5
256	+0.2	5.0	6.1	8.2
512	+0.2	3.6	4.4	5.8
1,024	+0.2	2.6	3.1	4.0
2,048	+0.2	1.8	2.2	3.1
4,096	+0.2	1.3	1.6	2.0
8,192	+0.2	0.9	1.1	1.4
16,384	+0.2	0.6	0.8	1.0

Scorecard applied to 1,000 bootstraps from the validation sample.

Table 6 (200% of national line): Percentages of participants' households by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=16	4.9	48.1	0.1	46.9	51.9
<=21	9.7	43.3	0.2	46.8	56.4
<=25	14.5	38.5	0.5	46.5	60.9
<=29	19.4	33.6	1.1	45.9	65.3
<=32	23.9	29.1	1.6	45.4	69.3
<=35	27.8	25.2	2.7	44.3	72.1
<=38	31.3	21.7	3.8	43.2	74.5
<=40	34.2	18.8	5.1	41.9	76.0
<=43	37.9	15.1	7.0	40.0	77.9
<=45	40.4	12.6	9.1	37.9	78.2
<=48	43.1	9.9	11.9	35.1	78.2
<=50	45.5	7.5	13.9	33.1	78.6
<=53	48.0	5.0	17.5	29.5	77.4
<=56	49.4	3.6	21.0	26.0	75.4
<=58	50.4	2.6	24.0	23.0	73.5
<=61	51.4	1.6	28.9	18.1	69.6
<=64	52.1	0.9	33.5	13.5	65.7
<=68	52.4	0.6	38.2	8.8	61.3
<=72	52.8	0.2	42.7	4.3	57.2
<=100	53.0	0.0	47.0	0.0	53.0

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Table 7 (200% of national line): Share of all participants' households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor, share of poor households who are targeted, and number of poor households successfully targeted per non-poor household mistakenly targeted

Targeting cut-off	% all HHs who are targeted	% targeted HHs who are poor	% poor HHs who are targeted	Poor HHs targeted per non-poor HH targeted
<=16	5.0	98.8	9.3	81.8:1
<=21	9.9	97.8	18.2	43.5:1
<=25	15.0	96.5	27.3	27.8:1
<=29	20.5	94.8	36.6	18.1:1
<=32	25.4	93.8	45.0	15.2:1
<=35	30.5	91.1	52.4	10.2:1
<=38	35.1	89.1	59.0	8.2:1
<=40	39.3	87.0	64.5	6.7:1
<=43	45.0	84.3	71.5	5.4:1
<=45	49.5	81.6	76.1	4.4:1
<=48	55.0	78.4	81.4	3.6:1
<=50	59.4	76.5	85.8	3.3:1
<=53	65.5	73.2	90.5	2.7:1
<=56	70.4	70.2	93.2	2.4:1
<=58	74.4	67.8	95.2	2.1:1
<=61	80.3	64.1	97.0	1.8:1
<=64	85.6	60.9	98.4	1.6:1
<=68	90.6	57.9	98.9	1.4:1
<=72	95.5	55.3	99.7	1.2:1
<=100	100.0	53.0	100.0	1.1:1

Scorecard applied to the validation sample.

**Tables for
the \$1.25/day 2005 PPP Poverty Line**

Table 4 (\$1.25/day 2005 PPP): Errors in poverty likelihoods for a participant’s household (average of differences between estimated and observed values) by score range, with confidence intervals

Score	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
0–16	+2.3	2.1	2.5	3.2
17–21	+20.4	4.5	5.2	7.2
22–25	+9.6	4.4	5.2	6.9
26–29	+7.7	3.1	3.6	4.5
30–32	–6.0	4.8	5.1	5.6
33–35	–3.4	3.3	4.1	5.2
36–38	+5.1	3.4	3.9	5.4
39–40	+1.2	3.7	4.4	5.7
41–43	–5.5	4.2	4.4	4.9
44–45	+9.9	1.4	1.7	2.2
46–48	–4.2	3.4	3.8	4.3
49–50	–1.9	2.7	3.2	4.1
51–53	+0.7	1.4	1.7	2.2
54–56	+0.4	1.5	1.8	2.5
57–58	+3.7	0.1	0.1	0.2
59–61	+2.0	0.3	0.3	0.4
62–64	+0.7	0.4	0.5	0.6
65–68	0.0	0.6	0.7	0.8
69–72	–7.8	5.3	5.6	6.3
73–100	0.0	0.0	0.0	0.0

Scorecard applied to 1,000 bootstraps of $n = 16,384$ from the validation sample.

Table 5 (\$1.25/day 2005 PPP): Errors in poverty rates for a sample of a population of participants' households at a point in time (average of differences between estimated and observed values), by sample size and with confidence intervals

Sample Size <i>n</i>	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
1	-0.6	65.0	77.6	87.9
4	+0.3	34.3	42.7	61.1
8	+1.0	23.8	30.2	42.1
16	+1.1	18.9	22.6	33.0
32	+1.3	12.4	15.3	21.7
64	+1.5	9.3	11.2	14.8
128	+1.7	6.7	7.8	10.8
256	+1.6	4.6	5.6	8.0
512	+1.5	3.3	3.9	5.2
1,024	+1.5	2.3	2.7	3.7
2,048	+1.5	1.6	1.8	2.4
4,096	+1.5	1.1	1.3	1.8
8,192	+1.5	0.8	1.0	1.4
16,384	+1.5	0.6	0.7	0.9

Scorecard applied to 1,000 bootstraps from the validation sample.

Table 6 (\$1.25/day 2005 PPP): Percentages of participants' households by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=16	4.4	24.1	0.6	70.9	75.3
<=21	8.1	20.4	1.8	69.7	77.8
<=25	11.7	16.8	3.3	68.2	79.9
<=29	14.9	13.6	5.6	65.9	80.9
<=32	17.6	10.9	7.8	63.7	81.3
<=35	19.8	8.8	10.7	60.7	80.5
<=38	21.5	7.0	13.6	57.8	79.3
<=40	22.9	5.6	16.4	55.1	77.9
<=43	24.6	4.0	20.4	51.1	75.6
<=45	25.2	3.3	24.3	47.2	72.3
<=48	26.4	2.2	28.7	42.8	69.2
<=50	27.1	1.5	32.4	39.1	66.2
<=53	27.7	0.8	37.8	33.7	61.4
<=56	28.1	0.4	42.3	29.2	57.3
<=58	28.1	0.4	46.3	25.2	53.3
<=61	28.2	0.3	52.0	19.4	47.7
<=64	28.3	0.2	57.3	14.2	42.5
<=68	28.4	0.1	62.2	9.3	37.6
<=72	28.5	0.0	67.0	4.5	33.0
<=100	28.5	0.0	71.5	0.0	28.5

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Table 7 (\$1.25/day 2005 PPP): Share of all participants' households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor, share of poor households who are targeted, and number of poor households successfully targeted per non-poor household mistakenly targeted

Targeting cut-off	% all HHs who are targeted	% targeted HHs who are poor	% poor HHs who are targeted	Poor HHs targeted per non-poor HH targeted
<=16	5.0	88.3	15.5	7.5:1
<=21	9.9	81.7	28.3	4.5:1
<=25	15.0	78.1	41.0	3.6:1
<=29	20.5	72.9	52.4	2.7:1
<=32	25.4	69.2	61.7	2.2:1
<=35	30.5	64.8	69.3	1.8:1
<=38	35.1	61.2	75.3	1.6:1
<=40	39.3	58.2	80.2	1.4:1
<=43	45.0	54.6	86.1	1.2:1
<=45	49.5	50.9	88.3	1.0:1
<=48	55.0	47.9	92.4	0.9:1
<=50	59.4	45.5	94.9	0.8:1
<=53	65.5	42.3	97.1	0.7:1
<=56	70.4	39.9	98.5	0.7:1
<=58	74.4	37.8	98.6	0.6:1
<=61	80.3	35.2	99.0	0.5:1
<=64	85.6	33.1	99.3	0.5:1
<=68	90.6	31.3	99.5	0.5:1
<=72	95.5	29.9	100.0	0.4:1
<=100	100.0	28.5	100.0	0.4:1

Scorecard applied to the validation sample.

**Tables for
the \$2.00/day 2005 PPP Poverty Line**

Table 4 (\$2.00/day 2005 PPP): Errors in poverty likelihoods for a participant’s household (average of differences between estimated and observed values) by score range, with confidence intervals

Score	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
0–16	+0.9	0.7	0.8	1.0
17–21	+0.9	1.4	1.6	2.2
22–25	–1.7	1.3	1.4	1.5
26–29	–1.4	1.8	2.1	2.7
30–32	–7.5	4.4	4.6	4.9
33–35	–0.4	2.5	3.2	4.3
36–38	+0.3	3.0	3.6	4.6
39–40	+13.0	4.5	5.2	6.7
41–43	–4.3	3.5	3.7	4.4
44–45	+5.4	4.1	4.9	6.4
46–48	+1.4	3.9	4.5	5.9
49–50	–9.7	6.7	7.0	7.8
51–53	+2.7	2.9	3.5	4.5
54–56	+6.1	2.9	3.4	4.8
57–58	–2.4	4.2	5.0	6.5
59–61	+4.2	2.3	2.7	3.7
62–64	+4.6	1.5	1.7	2.4
65–68	+3.7	0.9	1.1	1.4
69–72	–7.0	5.0	5.2	6.0
73–100	–5.0	3.9	4.2	4.7

Scorecard applied to 1,000 bootstraps of $n = 16,384$ from the validation sample.

Table 5 (\$2.00/day 2005 PPP): Errors in poverty rates for a sample of a population of participants' households at a point in time (average of differences between estimated and observed values), by sample size and with confidence intervals

Sample Size <i>n</i>	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
1	-0.5	69.3	82.9	96.5
4	-0.6	36.8	42.8	57.2
8	+0.3	26.7	32.1	43.8
16	+0.1	19.1	24.5	30.7
32	+0.2	14.5	17.4	22.9
64	+0.2	10.7	13.1	16.7
128	+0.2	7.7	8.9	11.5
256	+0.2	5.2	6.0	7.9
512	+0.1	3.5	4.2	5.5
1,024	+0.1	2.6	3.1	4.0
2,048	+0.2	1.8	2.2	2.9
4,096	+0.1	1.2	1.5	2.1
8,192	+0.2	0.9	1.1	1.4
16,384	+0.2	0.6	0.8	1.0

Scorecard applied to 1,000 bootstraps from the validation sample.

Table 6 (\$2.00/day 2005 PPP): Percentages of participants' households by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=16	4.9	48.1	0.1	46.9	51.8
<=21	9.6	43.4	0.3	46.7	56.3
<=25	14.5	38.6	0.5	46.5	60.9
<=29	19.5	33.5	1.0	46.0	65.5
<=32	24.0	29.1	1.5	45.5	69.5
<=35	28.0	25.0	2.5	44.5	72.6
<=38	31.6	21.5	3.6	43.4	74.9
<=40	34.4	18.6	4.9	42.1	76.5
<=43	38.3	14.7	6.7	40.3	78.6
<=45	40.5	12.5	9.0	38.0	78.5
<=48	43.2	9.8	11.8	35.1	78.3
<=50	45.4	7.6	14.0	33.0	78.4
<=53	48.0	5.0	17.5	29.5	77.5
<=56	49.4	3.6	21.0	26.0	75.4
<=58	50.4	2.6	24.0	23.0	73.4
<=61	51.4	1.6	28.9	18.1	69.5
<=64	52.2	0.8	33.4	13.6	65.8
<=68	52.5	0.5	38.1	8.9	61.4
<=72	52.8	0.2	42.6	4.3	57.2
<=100	53.0	0.0	47.0	0.0	53.0

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Table 7 (\$2.00/day 2005 PPP): Share of all participants' households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor, share of poor households who are targeted, and number of poor households successfully targeted per non-poor household mistakenly targeted

Targeting cut-off	% all HHs who are targeted	% targeted HHs who are poor	% poor HHs who are targeted	Poor HHs targeted per non-poor HH targeted
<=16	5.0	98.2	9.3	53.4:1
<=21	9.9	97.3	18.1	36.3:1
<=25	15.0	96.6	27.3	28.1:1
<=29	20.5	95.3	36.8	20.5:1
<=32	25.4	94.3	45.2	16.5:1
<=35	30.5	91.9	52.9	11.4:1
<=38	35.1	89.8	59.5	8.8:1
<=40	39.3	87.5	64.8	7.0:1
<=43	45.0	85.2	72.2	5.8:1
<=45	49.5	81.9	76.4	4.5:1
<=48	55.0	78.5	81.5	3.7:1
<=50	59.4	76.5	85.7	3.2:1
<=53	65.5	73.3	90.5	2.7:1
<=56	70.4	70.2	93.2	2.4:1
<=58	74.4	67.7	95.1	2.1:1
<=61	80.3	64.1	97.0	1.8:1
<=64	85.6	61.0	98.5	1.6:1
<=68	90.6	58.0	99.0	1.4:1
<=72	95.5	55.3	99.7	1.2:1
<=100	100.0	53.0	100.0	1.1:1

Scorecard applied to the validation sample.

**Tables for
the \$2.50/day 2005 PPP Poverty Line**

Table 4 (\$2.50/day 2005 PPP): Errors in poverty likelihoods for a participant’s household (average of differences between estimated and observed values) by score range, with confidence intervals

Score	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
0–16	+0.2	0.5	0.5	0.7
17–21	+0.4	0.7	0.9	1.2
22–25	+0.4	0.8	0.9	1.2
26–29	+0.9	1.5	1.8	2.3
30–32	–3.9	2.4	2.4	2.6
33–35	+0.6	2.0	2.4	3.1
36–38	+1.5	2.4	2.8	3.8
39–40	–5.8	4.0	4.1	4.4
41–43	–1.8	2.3	2.9	3.7
44–45	+0.4	2.8	3.2	4.2
46–48	+6.7	3.2	3.9	4.9
49–50	–8.1	5.6	5.9	6.5
51–53	–9.3	5.9	6.2	6.8
54–56	+13.1	3.4	4.0	5.3
57–58	–3.2	4.2	5.1	6.7
59–61	+6.9	2.8	3.3	4.5
62–64	+10.9	2.0	2.3	2.9
65–68	+9.0	1.1	1.4	2.0
69–72	–12.4	8.0	8.4	9.1
73–100	–6.7	5.0	5.4	5.9

Scorecard applied to 1,000 bootstraps of $n = 16,384$ from the validation sample.

Table 5 (\$2.50/day 2005 PPP): Errors in poverty rates for a sample of a population of participants' households at a point in time (average of differences between estimated and observed values), by sample size and with confidence intervals

Sample Size <i>n</i>	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
1	-0.6	73.7	78.0	93.4
4	-0.5	35.8	42.7	59.4
8	-0.1	25.5	33.0	44.0
16	-0.3	20.3	24.9	30.6
32	-0.3	14.3	17.5	20.8
64	-0.2	10.6	12.7	16.6
128	-0.2	7.3	8.7	11.8
256	-0.2	5.3	6.2	7.9
512	-0.2	3.8	4.5	6.0
1,024	-0.2	2.8	3.2	4.1
2,048	-0.1	1.9	2.2	2.9
4,096	-0.2	1.3	1.5	1.9
8,192	-0.1	0.9	1.1	1.4
16,384	-0.1	0.6	0.7	1.0

Scorecard applied to 1,000 bootstraps from the validation sample.

Table 6 (\$2.50/day 2005 PPP): Percentages of participants' households by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=16	5.0	59.0	0.0	36.0	41.0
<=21	9.8	54.2	0.1	35.9	45.7
<=25	14.7	49.3	0.3	35.8	50.5
<=29	20.0	43.9	0.5	35.6	55.6
<=32	24.7	39.3	0.7	35.3	60.0
<=35	29.3	34.7	1.2	34.8	64.1
<=38	33.3	30.7	1.8	34.2	67.5
<=40	36.8	27.2	2.5	33.5	70.4
<=43	41.4	22.5	3.5	32.5	73.9
<=45	44.8	19.2	4.7	31.3	76.1
<=48	48.4	15.6	6.7	29.4	77.7
<=50	51.4	12.6	8.1	28.0	79.3
<=53	55.3	8.7	10.2	25.8	81.1
<=56	57.3	6.7	13.1	22.9	80.2
<=58	59.1	4.9	15.4	20.7	79.7
<=61	60.9	3.1	19.4	16.7	77.6
<=64	62.3	1.7	23.3	12.7	75.0
<=68	62.8	1.1	27.8	8.3	71.1
<=72	63.6	0.3	31.9	4.2	67.8
<=100	64.0	0.0	36.0	0.0	64.0

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Table 7 (\$2.50/day 2005 PPP): Share of all participants' households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor, share of poor households who are targeted, and number of poor households successfully targeted per non-poor household mistakenly targeted

Targeting cut-off	% all HHs who are targeted	% targeted HHs who are poor	% poor HHs who are targeted	Poor HHs targeted per non-poor HH targeted
<=16	5.0	99.4	7.8	178.2:1
<=21	9.9	98.9	15.3	93.2:1
<=25	15.0	98.2	23.0	54.6:1
<=29	20.5	97.7	31.3	43.3:1
<=32	25.4	97.2	38.6	35.0:1
<=35	30.5	96.1	45.8	24.4:1
<=38	35.1	94.8	52.1	18.3:1
<=40	39.3	93.7	57.5	14.8:1
<=43	45.0	92.2	64.8	11.8:1
<=45	49.5	90.5	70.0	9.5:1
<=48	55.0	87.9	75.6	7.3:1
<=50	59.4	86.4	80.3	6.4:1
<=53	65.5	84.4	86.5	5.4:1
<=56	70.4	81.4	89.5	4.4:1
<=58	74.4	79.3	92.3	3.8:1
<=61	80.3	75.9	95.2	3.1:1
<=64	85.6	72.7	97.3	2.7:1
<=68	90.6	69.4	98.2	2.3:1
<=72	95.5	66.6	99.5	2.0:1
<=100	100.0	64.0	100.0	1.8:1

Scorecard applied to the validation sample.

**Tables for
the \$5.00/day 2005 PPP Poverty Line**

Table 4 (\$5.00/day 2005 PPP): Errors in poverty likelihoods for a participant’s household (average of differences between estimated and observed values) by score range, with confidence intervals

Score	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
0–16	–0.2	0.1	0.1	0.1
17–21	–0.4	0.2	0.2	0.2
22–25	–0.5	0.2	0.2	0.2
26–29	–0.6	0.3	0.3	0.3
30–32	–0.7	0.4	0.4	0.4
33–35	+3.8	1.7	2.0	2.5
36–38	–0.4	0.4	0.5	0.7
39–40	+0.4	1.0	1.2	1.6
41–43	+0.2	1.0	1.1	1.6
44–45	–0.8	0.7	0.9	1.1
46–48	–1.6	1.2	1.3	1.4
49–50	–5.1	3.1	3.2	3.3
51–53	–2.8	2.0	2.1	2.3
54–56	–1.9	1.8	2.0	2.9
57–58	+8.5	3.6	4.2	5.6
59–61	–6.7	4.5	4.7	5.0
62–64	+16.8	3.6	4.5	5.8
65–68	+1.8	3.5	4.2	5.9
69–72	–4.5	4.2	4.6	5.8
73–100	+0.9	3.8	4.5	5.7

Scorecard applied to 1,000 bootstraps of $n = 16,384$ from the validation sample.

Table 5 (\$5.00/day 2005 PPP): Errors in poverty rates for a sample of a population of participants' households at a point in time (average of differences between estimated and observed values), by sample size and with confidence intervals

Sample Size <i>n</i>	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
1	-0.2	58.4	67.0	78.0
4	+0.3	29.3	37.3	47.5
8	+1.0	21.8	28.6	38.5
16	+0.4	16.7	21.3	25.8
32	+0.3	11.7	13.9	17.3
64	+0.2	8.6	10.4	12.7
128	+0.1	6.3	7.5	9.7
256	+0.1	4.3	5.1	6.9
512	+0.1	3.1	3.6	4.8
1,024	+0.2	2.2	2.5	3.3
2,048	+0.2	1.6	1.8	2.4
4,096	+0.2	1.1	1.3	1.7
8,192	+0.2	0.8	0.9	1.1
16,384	+0.2	0.6	0.6	0.9

Scorecard applied to 1,000 bootstraps from the validation sample.

Table 6 (\$5.00/day 2005 PPP): Percentages of participants' households by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=16	5.0	82.5	0.0	12.5	17.5
<=21	9.9	77.6	0.0	12.5	22.4
<=25	15.0	72.6	0.0	12.5	27.4
<=29	20.5	67.0	0.0	12.5	33.0
<=32	25.4	62.1	0.0	12.5	37.9
<=35	30.4	57.2	0.1	12.3	42.7
<=38	34.9	52.6	0.2	12.3	47.2
<=40	39.0	48.5	0.3	12.2	51.2
<=43	44.6	43.0	0.4	12.1	56.6
<=45	49.0	38.6	0.5	11.9	60.9
<=48	54.3	33.2	0.7	11.7	66.0
<=50	58.5	29.0	0.9	11.6	70.1
<=53	64.1	23.4	1.4	11.1	75.2
<=56	68.4	19.1	2.0	10.5	78.9
<=58	71.5	16.0	2.9	9.6	81.1
<=61	76.2	11.3	4.0	8.4	84.7
<=64	79.8	7.7	5.8	6.7	86.5
<=68	83.0	4.5	7.6	4.9	87.9
<=72	85.7	1.8	9.8	2.7	88.4
<=100	87.5	0.0	12.5	0.0	87.5

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Table 7 (\$5.00/day 2005 PPP): Share of all participants' households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor, share of poor households who are targeted, and number of poor households successfully targeted per non-poor household mistakenly targeted

Targeting cut-off	% all HHs who are targeted	% targeted HHs who are poor	% poor HHs who are targeted	Poor HHs targeted per non-poor HH targeted
<=16	5.0	100.0	5.7	Only poor targeted
<=21	9.9	100.0	11.3	Only poor targeted
<=25	15.0	100.0	17.1	Only poor targeted
<=29	20.5	100.0	23.4	Only poor targeted
<=32	25.4	100.0	29.0	3,600.6:1
<=35	30.5	99.5	34.7	219.4:1
<=38	35.1	99.5	39.9	186.0:1
<=40	39.3	99.3	44.6	139.7:1
<=43	45.0	99.1	50.9	116.3:1
<=45	49.5	98.9	55.9	92.8:1
<=48	55.0	98.7	62.0	74.2:1
<=50	59.4	98.5	66.9	64.1:1
<=53	65.5	97.9	73.3	46.1:1
<=56	70.4	97.2	78.1	34.6:1
<=58	74.4	96.1	81.7	24.8:1
<=61	80.3	95.0	87.1	19.0:1
<=64	85.6	93.3	91.2	13.9:1
<=68	90.6	91.7	94.9	11.0:1
<=72	95.5	89.8	97.9	8.8:1
<=100	100.0	87.5	100.0	7.0:1

Scorecard applied to the validation sample.

**Tables for
the \$8.44/day 2005 PPP Poverty Line**

Table 4 (\$8.44/day 2005 PPP): Errors in poverty likelihoods for a participant’s household (average of differences between estimated and observed values) by score range, with confidence intervals

Score	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
0–16	–0.1	0.1	0.1	0.1
17–21	–0.3	0.1	0.1	0.1
22–25	–0.3	0.1	0.1	0.1
26–29	–0.3	0.2	0.2	0.2
30–32	–0.4	0.2	0.2	0.2
33–35	+4.1	1.7	2.0	2.5
36–38	–0.3	0.3	0.4	0.5
39–40	+0.8	1.0	1.2	1.5
41–43	+0.3	0.8	1.0	1.3
44–45	–0.3	0.6	0.8	1.0
46–48	–1.1	0.9	0.9	1.1
49–50	–3.7	2.2	2.2	2.3
51–53	–2.0	1.6	1.7	1.9
54–56	+0.1	1.7	1.9	2.7
57–58	–0.5	2.4	2.9	3.8
59–61	–5.2	3.7	3.9	4.1
62–64	+14.4	3.6	4.1	5.4
65–68	–10.8	6.6	6.8	7.3
69–72	–12.0	7.6	7.8	8.5
73–100	–5.9	4.9	5.2	5.8

Scorecard applied to 1,000 bootstraps of $n = 16,384$ from the validation sample.

Table 5 (\$8.44/day 2005 PPP): Errors in poverty rates for a sample of a population of participants' households at a point in time (average of differences between estimated and observed values), by sample size and with confidence intervals

Sample Size <i>n</i>	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
1	-1.2	55.0	63.9	74.7
4	-2.1	28.0	34.2	48.3
8	-1.2	21.5	26.5	37.1
16	-1.5	15.3	18.7	25.8
32	-1.5	11.1	13.2	16.8
64	-1.5	7.7	9.2	12.5
128	-1.5	5.8	6.9	8.8
256	-1.5	4.1	4.8	6.3
512	-1.6	2.8	3.4	4.2
1,024	-1.5	2.0	2.4	3.0
2,048	-1.5	1.5	1.7	2.3
4,096	-1.4	1.0	1.2	1.6
8,192	-1.5	0.7	0.8	1.1
16,384	-1.5	0.5	0.6	0.8

Scorecard applied to 1,000 bootstraps from the validation sample.

Table 6 (\$8.44/day 2005 PPP): Percentages of participants' households by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=16	5.0	85.4	0.0	9.6	14.6
<=21	9.9	80.5	0.0	9.6	19.5
<=25	15.0	75.4	0.0	9.6	24.6
<=29	20.5	69.9	0.0	9.6	30.1
<=32	25.4	65.0	0.0	9.6	35.0
<=35	30.4	60.0	0.1	9.5	39.8
<=38	35.0	55.4	0.2	9.4	44.4
<=40	39.1	51.3	0.2	9.4	48.4
<=43	44.7	45.7	0.3	9.3	54.0
<=45	49.1	41.3	0.4	9.2	58.3
<=48	54.5	35.9	0.5	9.1	63.6
<=50	58.8	31.6	0.6	9.0	67.8
<=53	64.5	25.9	1.0	8.6	73.2
<=56	68.9	21.5	1.5	8.1	77.1
<=58	72.4	18.0	2.0	7.6	79.9
<=61	77.3	13.1	3.0	6.6	83.9
<=64	81.2	9.2	4.4	5.2	86.4
<=68	85.0	5.4	5.6	4.0	88.9
<=72	88.1	2.3	7.4	2.2	90.3
<=100	90.4	0.0	9.6	0.0	90.4

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Table 7 (\$8.44/day 2005 PPP): Share of all participants' households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor, share of poor households who are targeted, and number of poor households successfully targeted per non-poor household mistakenly targeted

Targeting cut-off	% all HHs who are targeted	% targeted HHs who are poor	% poor HHs who are targeted	Poor HHs targeted per non-poor HH targeted
<=16	5.0	100.0	5.5	Only poor targeted
<=21	9.9	100.0	10.9	Only poor targeted
<=25	15.0	100.0	16.6	Only poor targeted
<=29	20.5	100.0	22.7	Only poor targeted
<=32	25.4	100.0	28.1	3,600.6:1
<=35	30.5	99.6	33.6	225.3:1
<=38	35.1	99.5	38.7	218.1:1
<=40	39.3	99.4	43.2	169.5:1
<=43	45.0	99.3	49.4	151.3:1
<=45	49.5	99.2	54.3	124.7:1
<=48	55.0	99.0	60.3	104.2:1
<=50	59.4	98.9	65.0	93.0:1
<=53	65.5	98.5	71.4	66.4:1
<=56	70.4	97.9	76.2	47.5:1
<=58	74.4	97.3	80.1	35.5:1
<=61	80.3	96.3	85.5	25.9:1
<=64	85.6	94.9	89.8	18.4:1
<=68	90.6	93.8	94.0	15.1:1
<=72	95.5	92.3	97.4	11.9:1
<=100	100.0	90.4	100.0	9.4:1

Scorecard applied to the validation sample.

**Tables for
the \$1.90/day 2011 PPP Poverty Line**

Table 4 (\$1.90/day 2011 PPP): Errors in poverty likelihoods for a participant’s household (average of differences between estimated and observed values) by score range, with confidence intervals

Score	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
0–16	+1.3	1.9	2.3	3.0
17–21	+5.8	3.0	3.7	4.9
22–25	+12.7	4.6	5.5	6.9
26–29	+4.4	3.0	3.6	4.6
30–32	-7.7	5.3	5.6	6.0
33–35	-4.9	4.0	4.4	4.9
36–38	-1.3	3.5	4.2	5.8
39–40	+5.0	3.7	4.4	5.7
41–43	-5.4	4.3	4.6	5.4
44–45	+7.6	3.1	3.6	4.9
46–48	-0.6	2.7	3.3	4.4
49–50	+1.4	2.7	3.2	4.3
51–53	+4.5	1.5	1.8	2.3
54–56	+0.1	2.1	2.5	3.3
57–58	+4.8	0.6	0.7	0.8
59–61	+2.2	0.7	0.9	1.2
62–64	+1.2	0.5	0.6	0.8
65–68	-0.2	0.6	0.7	0.9
69–72	-7.8	5.3	5.6	6.3
73–100	-0.1	0.1	0.1	0.1

Scorecard applied to 1,000 bootstraps of n = 16,384 from the validation sample.

Table 5 (\$1.90/day 2011 PPP): Errors in poverty rates for a sample of a population of participants' households at a point in time (average of differences between estimated and observed values), by sample size and with confidence intervals

Sample Size <i>n</i>	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
1	-0.5	66.7	76.7	91.2
4	+1.1	34.2	42.2	62.4
8	+1.5	23.9	30.3	43.3
16	+1.2	17.8	22.1	32.8
32	+1.2	13.2	16.2	21.7
64	+1.3	9.3	11.3	15.0
128	+1.2	6.5	7.9	10.9
256	+1.2	4.7	5.7	7.6
512	+1.1	3.3	4.0	5.0
1,024	+1.1	2.4	2.8	3.6
2,048	+1.1	1.6	1.9	2.7
4,096	+1.1	1.1	1.4	1.8
8,192	+1.1	0.8	0.9	1.3
16,384	+1.1	0.6	0.7	0.9

Scorecard applied to 1,000 bootstraps from the validation sample.

Table 6 (\$1.90/day 2011 PPP): Percentages of participants' households by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=16	4.6	28.8	0.4	66.2	70.8
<=21	8.6	24.8	1.3	65.3	73.9
<=25	12.6	20.8	2.3	64.2	76.8
<=29	16.4	17.1	4.1	62.4	78.8
<=32	19.6	13.9	5.9	60.7	80.3
<=35	22.3	11.2	8.2	58.3	80.6
<=38	24.6	8.9	10.6	56.0	80.6
<=40	26.1	7.3	13.2	53.4	79.5
<=43	28.3	5.2	16.7	49.9	78.1
<=45	29.2	4.3	20.3	46.3	75.4
<=48	30.6	2.8	24.4	42.1	72.7
<=50	31.4	2.0	28.0	38.5	69.9
<=53	32.2	1.2	33.3	33.2	65.4
<=56	32.7	0.7	37.6	28.9	61.7
<=58	32.9	0.6	41.6	25.0	57.8
<=61	33.0	0.4	47.2	19.3	52.4
<=64	33.2	0.3	52.4	14.2	47.3
<=68	33.3	0.2	57.3	9.2	42.5
<=72	33.4	0.0	62.1	4.5	37.9
<=100	33.4	0.0	66.6	0.0	33.4

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Table 7 (\$1.90/day 2011 PPP): Share of all participants' households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor, share of poor households who are targeted, and number of poor households successfully targeted per non-poor household mistakenly targeted

Targeting cut-off	% all HHs who are targeted	% targeted HHs who are poor	% poor HHs who are targeted	Poor HHs targeted per non-poor HH targeted
<=16	5.0	92.2	13.8	11.9:1
<=21	9.9	87.3	25.8	6.9:1
<=25	15.0	84.3	37.8	5.4:1
<=29	20.5	79.8	48.9	4.0:1
<=32	25.4	76.9	58.5	3.3:1
<=35	30.5	73.0	66.6	2.7:1
<=38	35.1	69.9	73.5	2.3:1
<=40	39.3	66.5	78.2	2.0:1
<=43	45.0	62.9	84.5	1.7:1
<=45	49.5	59.0	87.2	1.4:1
<=48	55.0	55.6	91.5	1.3:1
<=50	59.4	52.8	93.9	1.1:1
<=53	65.5	49.1	96.3	1.0:1
<=56	70.4	46.5	97.9	0.9:1
<=58	74.4	44.1	98.2	0.8:1
<=61	80.3	41.2	98.8	0.7:1
<=64	85.6	38.8	99.2	0.6:1
<=68	90.6	36.7	99.5	0.6:1
<=72	95.5	35.0	100.0	0.5:1
<=100	100.0	33.4	100.0	0.5:1

Scorecard applied to the validation sample.

**Tables for
the \$3.20/day 2011 PPP Poverty Line**

Table 4 (\$3.20/day 2011 PPP): Errors in poverty likelihoods for a participant’s household (average of differences between estimated and observed values) by score range, with confidence intervals

Score	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
0–16	+0.5	0.5	0.6	0.8
17–21	0.0	0.8	0.9	1.2
22–25	+0.1	0.8	0.9	1.2
26–29	–0.7	1.6	1.9	2.5
30–32	–5.1	3.1	3.2	3.5
33–35	–0.8	2.1	2.5	3.2
36–38	–0.1	2.4	3.0	4.1
39–40	–4.7	3.6	3.8	4.3
41–43	–3.5	2.9	3.1	3.9
44–45	+2.8	3.4	4.0	5.3
46–48	+4.9	3.5	4.2	5.2
49–50	–7.6	5.4	5.7	6.3
51–53	–7.3	5.2	5.6	6.2
54–56	+11.5	3.2	3.7	4.8
57–58	+0.9	4.2	5.0	6.6
59–61	+6.2	2.6	3.1	4.1
62–64	+9.6	1.8	2.0	2.9
65–68	+7.2	1.0	1.2	1.7
69–72	–14.8	9.2	9.5	10.2
73–100	–9.1	6.2	6.6	7.1

Scorecard applied to 1,000 bootstraps of $n = 16,384$ from the validation sample.

Table 5 (\$3.20/day 2011 PPP): Errors in poverty rates for a sample of a population of participants' households at a point in time (average of differences between estimated and observed values), by sample size and with confidence intervals

Sample Size <i>n</i>	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
1	-0.2	69.3	80.9	95.4
4	-0.6	36.1	43.4	60.5
8	-0.2	26.7	33.7	44.0
16	-0.6	20.7	25.2	32.1
32	-0.7	14.6	17.6	22.1
64	-0.5	10.7	13.0	17.1
128	-0.6	7.7	9.3	11.6
256	-0.6	5.3	6.4	8.1
512	-0.6	3.9	4.6	6.2
1,024	-0.6	2.7	3.3	4.4
2,048	-0.6	1.9	2.3	2.8
4,096	-0.6	1.3	1.6	2.0
8,192	-0.6	0.9	1.1	1.5
16,384	-0.6	0.6	0.8	1.1

Scorecard applied to 1,000 bootstraps from the validation sample.

Table 6 (\$3.20/day 2011 PPP): Percentages of participants' households by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=16	4.9	55.5	0.1	39.5	44.4
<=21	9.7	50.7	0.2	39.4	49.1
<=25	14.6	45.8	0.4	39.2	53.8
<=29	19.9	40.6	0.6	38.9	58.8
<=32	24.5	36.0	1.0	38.6	63.1
<=35	28.9	31.5	1.6	38.0	66.9
<=38	32.8	27.6	2.3	37.2	70.0
<=40	36.1	24.3	3.1	36.4	72.6
<=43	40.6	19.9	4.4	35.2	75.7
<=45	43.6	16.8	5.9	33.7	77.3
<=48	47.0	13.4	8.0	31.5	78.6
<=50	49.8	10.7	9.7	29.9	79.7
<=53	53.4	7.1	12.2	27.4	80.8
<=56	55.1	5.4	15.3	24.2	79.3
<=58	56.5	4.0	18.0	21.6	78.0
<=61	58.0	2.5	22.3	17.3	75.3
<=64	59.1	1.3	26.5	13.1	72.2
<=68	59.5	0.9	31.1	8.5	68.0
<=72	60.2	0.3	35.3	4.2	64.4
<=100	60.5	0.0	39.5	0.0	60.5

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Table 7 (\$3.20/day 2011 PPP): Share of all participants' households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor, share of poor households who are targeted, and number of poor households successfully targeted per non-poor household mistakenly targeted

Targeting cut-off	% all HHs who are targeted	% targeted HHs who are poor	% poor HHs who are targeted	Poor HHs targeted per non-poor HH targeted
<=16	5.0	98.8	8.2	81.8:1
<=21	9.9	98.4	16.1	61.4:1
<=25	15.0	97.7	24.2	41.6:1
<=29	20.5	97.0	32.9	32.5:1
<=32	25.4	96.2	40.5	25.6:1
<=35	30.5	94.8	47.8	18.3:1
<=38	35.1	93.4	54.3	14.2:1
<=40	39.3	92.0	59.8	11.5:1
<=43	45.0	90.2	67.1	9.3:1
<=45	49.5	88.1	72.1	7.4:1
<=48	55.0	85.5	77.8	5.9:1
<=50	59.4	83.8	82.4	5.2:1
<=53	65.5	81.4	88.3	4.4:1
<=56	70.4	78.2	91.1	3.6:1
<=58	74.4	75.9	93.4	3.1:1
<=61	80.3	72.2	95.9	2.6:1
<=64	85.6	69.1	97.8	2.2:1
<=68	90.6	65.7	98.4	1.9:1
<=72	95.5	63.0	99.5	1.7:1
<=100	100.0	60.5	100.0	1.5:1

Scorecard applied to the validation sample.

**Tables for
the \$5.50/day 2011 PPP Poverty Line**

Table 4 (\$5.50/day 2011 PPP): Errors in poverty likelihoods for a participant’s household (average of differences between estimated and observed values) by score range, with confidence intervals

Score	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
0–16	–0.2	0.1	0.1	0.1
17–21	–0.4	0.2	0.2	0.2
22–25	–0.6	0.4	0.4	0.4
26–29	–1.0	0.5	0.5	0.5
30–32	–1.6	0.9	0.9	0.9
33–35	+2.0	1.7	2.0	2.5
36–38	–2.9	1.7	1.7	1.7
39–40	–2.3	1.7	1.7	2.0
41–43	–1.7	1.4	1.5	1.7
44–45	–1.0	1.1	1.4	1.8
46–48	+0.3	1.5	1.8	2.4
49–50	+3.6	2.7	3.3	4.2
51–53	–4.8	3.2	3.3	3.6
54–56	+9.3	3.4	4.3	5.5
57–58	+11.6	4.0	5.1	6.5
59–61	–2.6	3.1	3.7	4.8
62–64	+20.9	3.6	4.1	4.9
65–68	–4.9	4.3	4.7	5.6
69–72	–19.8	11.9	12.2	12.9
73–100	–3.1	3.5	4.3	5.7

Scorecard applied to 1,000 bootstraps of n = 16,384 from the validation sample.

Table 5 (\$5.50/day 2011 PPP): Errors in poverty rates for a sample of a population of participants' households at a point in time (average of differences between estimated and observed values), by sample size and with confidence intervals

Sample Size <i>n</i>	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
1	-0.9	62.2	77.0	85.3
4	-0.3	33.2	42.6	54.3
8	+0.6	26.1	32.1	41.2
16	0.0	19.4	22.7	29.7
32	+0.1	14.2	16.5	20.7
64	-0.1	10.3	12.2	15.0
128	-0.4	7.3	9.0	11.2
256	-0.4	5.3	5.9	8.0
512	-0.4	3.7	4.2	5.5
1,024	-0.3	2.6	3.0	3.9
2,048	-0.3	1.9	2.2	3.0
4,096	-0.3	1.2	1.5	2.1
8,192	-0.3	0.9	1.1	1.4
16,384	-0.3	0.6	0.8	1.0

Scorecard applied to 1,000 bootstraps from the validation sample.

Table 6 (\$5.50/day 2011 PPP): Percentages of participants' households by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=16	5.0	76.6	0.0	18.4	23.4
<=21	9.9	71.7	0.0	18.4	28.3
<=25	15.0	66.6	0.0	18.4	33.4
<=29	20.5	61.1	0.0	18.4	38.9
<=32	25.4	56.2	0.0	18.4	43.8
<=35	30.3	51.3	0.2	18.2	48.5
<=38	34.9	46.7	0.3	18.2	53.0
<=40	38.8	42.7	0.4	18.0	56.8
<=43	44.3	37.2	0.6	17.8	62.1
<=45	48.5	33.0	0.9	17.5	66.0
<=48	53.5	28.0	1.5	16.9	70.5
<=50	57.3	24.2	2.1	16.3	73.6
<=53	62.7	18.9	2.8	15.6	78.3
<=56	66.3	15.2	4.1	14.4	80.7
<=58	69.0	12.5	5.4	13.1	82.1
<=61	72.9	8.6	7.3	11.1	84.0
<=64	75.7	5.9	9.9	8.5	84.2
<=68	78.3	3.2	12.3	6.2	84.5
<=72	80.5	1.1	15.0	3.4	83.9
<=100	81.6	0.0	18.4	0.0	81.6

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Table 7 (\$5.50/day 2011 PPP): Share of all participants' households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor, share of poor households who are targeted, and number of poor households successfully targeted per non-poor household mistakenly targeted

Targeting cut-off	% all HHs who are targeted	% targeted HHs who are poor	% poor HHs who are targeted	Poor HHs targeted per non-poor HH targeted
<=16	5.0	100.0	6.1	Only poor targeted
<=21	9.9	100.0	12.1	Only poor targeted
<=25	15.0	99.9	18.3	900.0:1
<=29	20.5	99.9	25.1	719.2:1
<=32	25.4	99.8	31.1	527.1:1
<=35	30.5	99.3	37.1	146.6:1
<=38	35.1	99.2	42.7	127.3:1
<=40	39.3	98.9	47.6	88.2:1
<=43	45.0	98.6	54.3	70.7:1
<=45	49.5	98.1	59.5	51.4:1
<=48	55.0	97.3	65.6	36.0:1
<=50	59.4	96.4	70.3	27.2:1
<=53	65.5	95.6	76.8	22.0:1
<=56	70.4	94.2	81.3	16.4:1
<=58	74.4	92.8	84.7	12.8:1
<=61	80.3	90.9	89.4	10.0:1
<=64	85.6	88.4	92.8	7.6:1
<=68	90.6	86.5	96.0	6.4:1
<=72	95.5	84.3	98.7	5.4:1
<=100	100.0	81.6	100.0	4.4:1

Scorecard applied to the validation sample.

**Tables for
the \$21.70/day 2011 PPP Poverty Line**

Table 4 (\$21.70/day 2011 PPP): Errors in poverty likelihoods for a participant’s household (average of differences between estimated and observed values) by score range, with confidence intervals

Score	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
0–16	0.0	0.0	0.0	0.0
17–21	0.0	0.0	0.0	0.0
22–25	0.0	0.0	0.0	0.0
26–29	0.0	0.0	0.0	0.0
30–32	0.0	0.0	0.0	0.0
33–35	0.0	0.0	0.0	0.0
36–38	0.0	0.0	0.0	0.0
39–40	0.0	0.0	0.0	0.0
41–43	-0.2	0.1	0.1	0.1
44–45	-0.1	0.2	0.3	0.4
46–48	-0.4	0.2	0.2	0.2
49–50	-0.4	0.2	0.2	0.2
51–53	-1.0	0.5	0.5	0.5
54–56	0.0	0.8	1.0	1.3
57–58	+2.3	1.6	1.9	2.4
59–61	-1.5	0.8	0.9	0.9
62–64	-0.6	0.5	0.6	0.7
65–68	-0.1	0.9	1.0	1.3
69–72	-1.5	1.0	1.0	1.1
73–100	-4.0	2.3	2.3	2.4

Scorecard applied to 1,000 bootstraps of n = 16,384 from the validation sample.

Table 5 (\$21.70/day 2011 PPP): Errors in poverty rates for a sample of a population of participants' households at a point in time (average of differences between estimated and observed values), by sample size and with confidence intervals

Sample Size <i>n</i>	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
1	+0.1	1.3	2.8	51.5
4	-0.5	1.4	5.6	16.2
8	-0.3	3.5	6.9	12.5
16	-0.5	3.3	4.6	7.6
32	-0.5	2.3	3.3	4.4
64	-0.5	1.8	2.1	3.0
128	-0.4	1.3	1.6	2.2
256	-0.5	0.9	1.1	1.5
512	-0.5	0.7	0.8	1.1
1,024	-0.5	0.5	0.6	0.7
2,048	-0.5	0.3	0.4	0.5
4,096	-0.5	0.2	0.3	0.4
8,192	-0.5	0.2	0.2	0.3
16,384	-0.5	0.1	0.1	0.2

Scorecard applied to 1,000 bootstraps from the validation sample.

Table 6 (\$21.70/day 2011 PPP): Percentages of participants' households by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=16	5.0	94.2	0.0	0.8	5.8
<=21	9.9	89.3	0.0	0.8	10.7
<=25	15.0	84.2	0.0	0.8	15.8
<=29	20.5	78.7	0.0	0.8	21.3
<=32	25.4	73.8	0.0	0.8	26.2
<=35	30.5	68.7	0.0	0.8	31.3
<=38	35.1	64.1	0.0	0.8	35.9
<=40	39.3	59.9	0.0	0.8	40.1
<=43	45.0	54.3	0.0	0.8	45.7
<=45	49.5	49.8	0.0	0.8	50.2
<=48	55.0	44.2	0.0	0.8	55.8
<=50	59.4	39.8	0.0	0.8	60.2
<=53	65.5	33.7	0.0	0.7	66.2
<=56	70.3	28.9	0.1	0.7	71.0
<=58	74.2	25.0	0.2	0.6	74.8
<=61	80.0	19.2	0.3	0.5	80.5
<=64	85.2	14.0	0.4	0.4	85.6
<=68	90.1	9.1	0.5	0.3	90.4
<=72	94.8	4.4	0.6	0.2	95.0
<=100	99.2	0.0	0.8	0.0	99.2

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Table 7 (\$21.70/day 2011 PPP): Share of all participants' households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor, share of poor households who are targeted, and number of poor households successfully targeted per non-poor household mistakenly targeted

Targeting cut-off	% all HHs who are targeted	% targeted HHs who are poor	% poor HHs who are targeted	Poor HHs targeted per non-poor HH targeted
<=16	5.0	100.0	5.0	Only poor targeted
<=21	9.9	100.0	10.0	Only poor targeted
<=25	15.0	100.0	15.1	Only poor targeted
<=29	20.5	100.0	20.6	Only poor targeted
<=32	25.4	100.0	25.6	Only poor targeted
<=35	30.5	100.0	30.7	Only poor targeted
<=38	35.1	100.0	35.4	Only poor targeted
<=40	39.3	100.0	39.6	Only poor targeted
<=43	45.0	100.0	45.3	Only poor targeted
<=45	49.5	100.0	49.9	2,384.8:1
<=48	55.0	100.0	55.4	2,106.1:1
<=50	59.4	100.0	59.9	2,274.8:1
<=53	65.5	99.9	66.0	1,684.6:1
<=56	70.4	99.9	70.8	751.5:1
<=58	74.4	99.7	74.8	329.6:1
<=61	80.3	99.7	80.6	302.3:1
<=64	85.6	99.6	85.9	232.7:1
<=68	90.6	99.4	90.8	178.7:1
<=72	95.5	99.3	95.6	149.3:1
<=100	100.0	99.2	100.0	126.3:1

Scorecard applied to the validation sample.

**Tables for
the First-Decile (10th-Percentile) Poverty Line**

Table 4 (First-decile line): Errors in poverty likelihoods for a participant’s household (average of differences between estimated and observed values) by score range, with confidence intervals

Score	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
0–16	–2.7	3.5	4.2	5.8
17–21	+9.3	3.0	3.5	4.8
22–25	+2.8	2.4	2.9	3.7
26–29	+1.2	2.2	2.7	3.6
30–32	–6.8	5.0	5.4	6.5
33–35	–3.9	3.0	3.2	3.5
36–38	+0.5	1.4	1.7	2.2
39–40	+3.6	0.4	0.4	0.6
41–43	–0.2	0.8	0.9	1.1
44–45	+0.8	0.3	0.3	0.4
46–48	+0.5	0.2	0.3	0.3
49–50	+0.5	0.1	0.2	0.2
51–53	–0.3	0.4	0.5	0.7
54–56	–0.9	0.9	1.0	1.3
57–58	+0.1	0.0	0.0	0.0
59–61	0.0	0.0	0.0	0.0
62–64	0.0	0.0	0.0	0.0
65–68	–0.6	0.5	0.5	0.6
69–72	0.0	0.0	0.0	0.0
73–100	0.0	0.0	0.0	0.0

Scorecard applied to 1,000 bootstraps of $n = 16,384$ from the validation sample.

Table 5 (First-decile line): Errors in poverty rates for a sample of a population of participants' households at a point in time (average of differences between estimated and observed values), by sample size and with confidence intervals

Sample Size <i>n</i>	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
1	-1.4	42.1	59.2	71.1
4	-0.1	21.5	26.7	39.0
8	-0.3	15.0	18.6	27.2
16	+0.1	9.6	12.3	17.1
32	+0.1	7.2	8.9	12.1
64	+0.2	5.1	6.0	7.9
128	+0.2	3.5	4.3	5.6
256	+0.2	2.7	3.0	3.9
512	+0.2	1.8	2.2	3.1
1,024	+0.2	1.3	1.6	2.0
2,048	+0.2	0.9	1.1	1.4
4,096	+0.2	0.6	0.8	1.0
8,192	+0.2	0.4	0.5	0.7
16,384	+0.2	0.3	0.4	0.5

Scorecard applied to 1,000 bootstraps from the validation sample.

Table 6 (First-decile line): Percentages of participants' households by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=16	2.2	4.8	2.8	90.2	92.4
<=21	3.6	3.4	6.3	86.7	90.3
<=25	4.6	2.5	10.4	82.6	87.1
<=29	5.3	1.7	15.1	77.8	83.1
<=32	5.9	1.2	19.5	73.4	79.3
<=35	6.3	0.7	24.2	68.8	75.1
<=38	6.5	0.5	28.6	64.4	70.9
<=40	6.6	0.5	32.7	60.3	66.9
<=43	6.8	0.3	38.2	54.8	61.6
<=45	6.8	0.2	42.6	50.3	57.1
<=48	6.9	0.2	48.2	44.8	51.7
<=50	6.9	0.2	52.5	40.4	47.3
<=53	7.0	0.1	58.5	34.4	41.4
<=56	7.0	0.0	63.4	29.6	36.6
<=58	7.0	0.0	67.4	25.5	32.6
<=61	7.0	0.0	73.2	19.7	26.7
<=64	7.0	0.0	78.6	14.4	21.4
<=68	7.0	0.0	83.5	9.4	16.5
<=72	7.0	0.0	88.4	4.5	11.6
<=100	7.0	0.0	93.0	0.0	7.0

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Table 7 (First-decile line): Share of all participants' households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor, share of poor households who are targeted, and number of poor households successfully targeted per non-poor household mistakenly targeted

Targeting cut-off	% all HHs who are targeted	% targeted HHs who are poor	% poor HHs who are targeted	Poor HHs targeted per non-poor HH targeted
<=16	5.0	44.1	31.3	0.8:1
<=21	9.9	36.7	51.5	0.6:1
<=25	15.0	30.6	64.9	0.4:1
<=29	20.5	26.0	75.5	0.4:1
<=32	25.4	23.2	83.6	0.3:1
<=35	30.5	20.8	89.9	0.3:1
<=38	35.1	18.6	92.8	0.2:1
<=40	39.3	16.8	93.5	0.2:1
<=43	44.9	15.1	96.3	0.2:1
<=45	49.5	13.8	97.0	0.2:1
<=48	55.0	12.5	97.5	0.1:1
<=50	59.4	11.6	97.8	0.1:1
<=53	65.5	10.6	98.9	0.1:1
<=56	70.4	10.0	99.6	0.1:1
<=58	74.4	9.4	99.6	0.1:1
<=61	80.3	8.7	99.6	0.1:1
<=64	85.6	8.2	99.6	0.1:1
<=68	90.6	7.8	100.0	0.1:1
<=72	95.5	7.4	100.0	0.1:1
<=100	100.0	7.0	100.0	0.1:1

Scorecard applied to the validation sample.

**Tables for
the First-Quintile (20th-Percentile) Poverty Line**

Table 4 (First-quintile line): Errors in poverty likelihoods for a participant’s household (average of differences between estimated and observed values) by score range, with confidence intervals

Score	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
0–16	–3.6	3.2	3.5	4.4
17–21	+12.6	3.8	4.7	6.2
22–25	+1.9	3.6	4.4	5.6
26–29	+7.2	2.8	3.3	4.2
30–32	–1.4	3.4	4.0	5.3
33–35	–6.0	4.5	4.8	5.4
36–38	+0.6	2.4	2.8	3.8
39–40	+7.8	1.4	1.6	2.1
41–43	+1.6	1.5	1.9	2.4
44–45	+2.2	1.1	1.3	1.7
46–48	–0.7	1.5	1.8	2.4
49–50	–2.8	2.5	2.8	3.2
51–53	+0.1	0.6	0.7	0.9
54–56	–1.9	1.5	1.6	1.9
57–58	+0.7	0.0	0.0	0.0
59–61	+0.3	0.2	0.2	0.3
62–64	–0.2	0.2	0.2	0.3
65–68	–0.5	0.5	0.5	0.6
69–72	0.0	0.0	0.0	0.0
73–100	0.0	0.0	0.0	0.0

Scorecard applied to 1,000 bootstraps of n = 16,384 from the validation sample.

Table 5 (First-quintile line): Errors in poverty rates for a sample of a population of participants' households at a point in time (average of differences between estimated and observed values), by sample size and with confidence intervals

Sample Size <i>n</i>	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
1	-0.1	53.2	70.6	83.0
4	+0.7	26.2	33.6	45.6
8	+0.4	18.2	23.0	28.8
16	+0.8	12.4	15.7	23.2
32	+0.7	8.9	11.4	17.1
64	+0.8	6.3	7.7	10.3
128	+0.9	4.8	5.8	7.8
256	+0.9	3.3	4.1	5.2
512	+0.8	2.4	2.7	3.7
1,024	+0.8	1.7	1.9	2.6
2,048	+0.8	1.2	1.4	1.8
4,096	+0.8	0.8	1.0	1.3
8,192	+0.8	0.6	0.7	1.0
16,384	+0.8	0.4	0.5	0.6

Scorecard applied to 1,000 bootstraps from the validation sample.

Table 6 (First-quintile line): Percentages of participants' households by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=16	3.6	11.1	1.4	83.9	87.5
<=21	6.2	8.5	3.7	81.6	87.8
<=25	8.2	6.5	6.8	78.6	86.7
<=29	9.7	4.9	10.8	74.6	84.3
<=32	11.0	3.6	14.4	70.9	81.9
<=35	12.0	2.6	18.5	66.9	78.9
<=38	12.6	2.0	22.5	62.9	75.5
<=40	12.9	1.7	26.4	59.0	71.9
<=43	13.5	1.2	31.5	53.9	67.3
<=45	13.7	0.9	35.8	49.6	63.3
<=48	14.1	0.6	41.0	44.4	58.5
<=50	14.2	0.4	45.2	40.2	54.4
<=53	14.4	0.3	51.1	34.2	48.6
<=56	14.5	0.1	55.8	29.5	44.1
<=58	14.5	0.1	59.9	25.5	40.0
<=61	14.6	0.1	65.7	19.7	34.3
<=64	14.6	0.0	71.0	14.4	29.0
<=68	14.6	0.0	75.9	9.4	24.1
<=72	14.6	0.0	80.8	4.5	19.2
<=100	14.6	0.0	85.4	0.0	14.6

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Table 7 (First-quintile line): Share of all participants' households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor, share of poor households who are targeted, and number of poor households successfully targeted per non-poor household mistakenly targeted

Targeting cut-off	% all HHs who are targeted	% targeted HHs who are poor	% poor HHs who are targeted	Poor HHs targeted per non-poor HH targeted
<=16	5.0	71.2	24.3	2.5:1
<=21	9.9	62.3	42.1	1.7:1
<=25	15.0	54.6	55.8	1.2:1
<=29	20.5	47.5	66.5	0.9:1
<=32	25.4	43.3	75.1	0.8:1
<=35	30.5	39.4	82.0	0.7:1
<=38	35.1	36.0	86.3	0.6:1
<=40	39.3	32.9	88.3	0.5:1
<=43	44.9	29.9	91.8	0.4:1
<=45	49.5	27.7	93.5	0.4:1
<=48	55.0	25.6	96.0	0.3:1
<=50	59.4	24.0	97.2	0.3:1
<=53	65.5	22.0	98.3	0.3:1
<=56	70.4	20.7	99.2	0.3:1
<=58	74.4	19.5	99.2	0.2:1
<=61	80.3	18.2	99.6	0.2:1
<=64	85.6	17.1	99.8	0.2:1
<=68	90.6	16.2	100.0	0.2:1
<=72	95.5	15.3	100.0	0.2:1
<=100	100.0	14.6	100.0	0.2:1

Scorecard applied to the validation sample.

**Tables for
the Second-Quintile (40th-Percentile) Poverty Line**

Table 4 (Second-quintile line): Errors in poverty likelihoods for a participant’s household (average of differences between estimated and observed values) by score range, with confidence intervals

Score	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
0–16	+1.7	1.9	2.3	3.3
17–21	+22.4	4.4	5.3	7.1
22–25	+11.7	4.4	5.3	6.9
26–29	+3.2	3.1	3.5	4.4
30–32	–8.6	5.8	6.1	6.6
33–35	–5.1	4.2	4.5	5.2
36–38	+0.9	3.5	4.1	5.6
39–40	+3.8	3.7	4.4	5.7
41–43	–4.9	3.9	4.2	4.8
44–45	+12.5	1.5	1.8	2.3
46–48	–1.0	2.6	3.2	4.0
49–50	+0.5	2.7	3.1	4.2
51–53	+3.7	1.5	1.8	2.3
54–56	+2.9	1.5	1.8	2.6
57–58	+4.8	0.3	0.4	0.5
59–61	+1.7	0.7	0.9	1.1
62–64	+1.3	0.4	0.5	0.6
65–68	–0.3	0.6	0.7	0.9
69–72	–7.8	5.3	5.6	6.3
73–100	0.0	0.0	0.0	0.0

Scorecard applied to 1,000 bootstraps of n = 16,384 from the validation sample.

Table 5 (Second-quintile line): Errors in poverty rates for a sample of a population of participants' households at a point in time (average of differences between estimated and observed values), by sample size and with confidence intervals

Sample Size <i>n</i>	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
1	-0.4	65.8	78.5	88.6
4	+0.8	33.8	41.9	62.7
8	+1.4	23.6	30.6	43.5
16	+1.6	18.7	22.3	33.3
32	+1.8	12.7	16.6	22.1
64	+2.0	9.3	11.3	15.2
128	+2.1	6.6	8.0	11.0
256	+2.1	4.8	5.7	8.2
512	+2.0	3.3	4.1	5.4
1,024	+2.0	2.3	2.8	3.7
2,048	+2.0	1.6	1.9	2.4
4,096	+2.0	1.1	1.4	1.8
8,192	+2.0	0.8	1.0	1.4
16,384	+2.0	0.6	0.7	0.9

Scorecard applied to 1,000 bootstraps from the validation sample.

Table 6 (Second-quintile line): Percentages of participants' households by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=16	4.5	26.6	0.5	68.4	72.9
<=21	8.3	22.9	1.6	67.3	75.5
<=25	12.1	19.1	2.9	66.0	78.1
<=29	15.7	15.5	4.8	64.0	79.7
<=32	18.7	12.4	6.7	62.2	80.9
<=35	21.2	10.0	9.3	59.5	80.7
<=38	23.2	7.9	11.9	57.0	80.2
<=40	24.7	6.4	14.5	54.3	79.1
<=43	26.6	4.5	18.3	50.6	77.2
<=45	27.4	3.8	22.1	46.8	74.1
<=48	28.7	2.5	26.4	42.5	71.1
<=50	29.4	1.7	30.0	38.9	68.3
<=53	30.2	1.0	35.4	33.5	63.6
<=56	30.6	0.6	39.8	29.0	59.6
<=58	30.6	0.5	43.8	25.1	55.7
<=61	30.8	0.3	49.5	19.4	50.2
<=64	30.9	0.2	54.7	14.2	45.1
<=68	31.0	0.1	59.6	9.3	40.3
<=72	31.1	0.0	64.3	4.5	35.7
<=100	31.1	0.0	68.9	0.0	31.1

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Table 7 (Second-quintile line): Share of all participants' households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor, share of poor households who are targeted, and number of poor households successfully targeted per non-poor household mistakenly targeted

Targeting cut-off	% all HHs who are targeted	% targeted HHs who are poor	% poor HHs who are targeted	Poor HHs targeted per non-poor HH targeted
<=16	5.0	90.5	14.6	9.5:1
<=21	9.9	83.8	26.6	5.2:1
<=25	15.0	80.7	38.8	4.2:1
<=29	20.5	76.5	50.3	3.3:1
<=32	25.4	73.6	60.1	2.8:1
<=35	30.5	69.5	68.0	2.3:1
<=38	35.1	66.2	74.6	2.0:1
<=40	39.3	63.0	79.5	1.7:1
<=43	44.9	59.3	85.5	1.5:1
<=45	49.5	55.3	87.9	1.2:1
<=48	55.0	52.1	92.0	1.1:1
<=50	59.4	49.5	94.5	1.0:1
<=53	65.5	46.0	96.8	0.9:1
<=56	70.4	43.4	98.1	0.8:1
<=58	74.4	41.1	98.3	0.7:1
<=61	80.3	38.4	98.9	0.6:1
<=64	85.6	36.1	99.3	0.6:1
<=68	90.6	34.2	99.6	0.5:1
<=72	95.5	32.6	100.0	0.5:1
<=100	100.0	31.1	100.0	0.5:1

Scorecard applied to the validation sample.

**Tables for
the Median (50th-Percentile) Poverty Line**

Table 4 (Median line): Errors in poverty likelihoods for a participant’s household (average of differences between estimated and observed values) by score range, with confidence intervals

Score	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
0–16	+2.1	1.7	2.1	2.7
17–21	+9.0	2.9	3.6	4.6
22–25	+11.9	4.5	5.3	7.0
26–29	+1.9	2.6	3.1	4.2
30–32	–8.9	5.7	5.9	6.3
33–35	+1.7	3.1	3.7	4.8
36–38	–2.2	3.3	3.9	5.0
39–40	+10.5	3.9	4.5	5.7
41–43	–6.3	4.7	5.1	5.7
44–45	+1.0	4.2	5.0	6.5
46–48	+4.5	2.9	3.6	4.5
49–50	–7.8	5.8	6.4	7.4
51–53	+9.0	1.6	1.9	2.6
54–56	+0.2	2.6	3.0	3.6
57–58	–7.8	5.7	6.1	6.8
59–61	+4.4	0.8	0.9	1.3
62–64	+1.4	1.0	1.2	1.5
65–68	+1.0	0.6	0.7	0.9
69–72	–7.6	5.3	5.5	6.2
73–100	+0.5	0.1	0.1	0.1

Scorecard applied to 1,000 bootstraps of $n = 16,384$ from the validation sample.

Table 5 (Median line): Errors in poverty rates for a sample of a population of participants' households at a point in time (average of differences between estimated and observed values), by sample size and with confidence intervals

Sample Size <i>n</i>	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
1	-0.2	65.4	75.0	94.2
4	+1.3	35.6	45.8	65.0
8	+1.5	26.5	34.3	46.7
16	+1.2	19.1	24.4	33.6
32	+1.2	14.8	17.4	24.8
64	+1.2	11.0	13.5	17.1
128	+1.0	7.7	9.2	11.8
256	+0.9	5.4	6.3	8.1
512	+0.8	3.9	4.4	5.6
1,024	+0.9	2.7	3.2	4.0
2,048	+0.9	1.8	2.2	3.0
4,096	+0.9	1.3	1.5	2.0
8,192	+1.0	0.9	1.1	1.3
16,384	+0.9	0.7	0.8	1.0

Scorecard applied to 1,000 bootstraps from the validation sample.

Table 6 (Median line): Percentages of participants' households by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=16	4.7	35.1	0.3	59.9	64.6
<=21	9.0	30.9	0.9	59.2	68.2
<=25	13.3	26.5	1.7	58.5	71.8
<=29	17.7	22.2	2.8	57.3	75.0
<=32	21.4	18.4	4.0	56.2	77.6
<=35	24.5	15.4	6.0	54.1	78.6
<=38	27.3	12.6	7.9	52.3	79.6
<=40	29.2	10.7	10.1	50.0	79.2
<=43	32.0	7.9	13.0	47.2	79.2
<=45	33.3	6.5	16.1	44.0	77.4
<=48	35.1	4.8	20.0	40.2	75.3
<=50	36.3	3.5	23.1	37.1	73.4
<=53	37.5	2.3	28.0	32.2	69.7
<=56	38.4	1.4	32.0	28.2	66.6
<=58	38.9	0.9	35.5	24.6	63.5
<=61	39.2	0.6	41.1	19.1	58.3
<=64	39.5	0.3	46.1	14.1	53.6
<=68	39.6	0.2	51.0	9.2	48.8
<=72	39.8	0.0	55.7	4.5	44.3
<=100	39.8	0.0	60.2	0.0	39.8

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Table 7 (Median line): Share of all participants' households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor, share of poor households who are targeted, and number of poor households successfully targeted per non-poor household mistakenly targeted

Targeting cut-off	% all HHs who are targeted	% targeted HHs who are poor	% poor HHs who are targeted	Poor HHs targeted per non-poor HH targeted
<=16	5.0	94.5	11.9	17.3:1
<=21	9.9	90.6	22.5	9.6:1
<=25	15.0	88.8	33.4	7.9:1
<=29	20.5	86.2	44.3	6.2:1
<=32	25.4	84.2	53.8	5.3:1
<=35	30.5	80.2	61.4	4.0:1
<=38	35.1	77.6	68.5	3.5:1
<=40	39.3	74.2	73.2	2.9:1
<=43	45.0	71.1	80.3	2.5:1
<=45	49.5	67.4	83.7	2.1:1
<=48	55.0	63.7	88.0	1.8:1
<=50	59.4	61.2	91.2	1.6:1
<=53	65.5	57.3	94.2	1.3:1
<=56	70.4	54.6	96.4	1.2:1
<=58	74.4	52.3	97.6	1.1:1
<=61	80.3	48.8	98.4	1.0:1
<=64	85.6	46.2	99.2	0.9:1
<=68	90.6	43.7	99.5	0.8:1
<=72	95.5	41.7	100.0	0.7:1
<=100	100.0	39.8	100.0	0.7:1

Scorecard applied to the validation sample.

**Tables for
the Third-Quintile (60th-Percentile) Poverty Line**

Table 4 (Third-quintile line): Errors in poverty likelihoods for a participant’s household (average of differences between estimated and observed values) by score range, with confidence intervals

Score	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
0–16	+0.9	0.7	0.8	1.1
17–21	+2.9	1.8	2.2	2.9
22–25	+13.1	4.6	5.4	7.1
26–29	+1.2	2.0	2.5	3.3
30–32	-4.0	3.0	3.2	3.7
33–35	-0.7	2.6	3.2	4.1
36–38	+0.4	3.1	3.6	4.8
39–40	+12.0	4.4	5.1	6.0
41–43	-6.6	4.8	5.1	5.5
44–45	+4.4	4.2	5.0	6.7
46–48	-2.5	3.9	4.5	6.0
49–50	-5.3	4.6	5.1	5.9
51–53	+2.3	2.7	3.2	4.6
54–56	+8.8	2.7	3.1	4.0
57–58	-5.9	5.0	5.5	6.6
59–61	+1.8	2.3	2.7	3.5
62–64	+3.9	1.3	1.5	2.0
65–68	+1.8	0.9	1.0	1.4
69–72	-7.7	5.3	5.5	6.3
73–100	+2.3	0.1	0.1	0.2

Scorecard applied to 1,000 bootstraps of n = 16,384 from the validation sample.

Table 5 (Third-quintile line): Errors in poverty rates for a sample of a population of participants' households at a point in time (average of differences between estimated and observed values), by sample size and with confidence intervals

Sample Size <i>n</i>	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
1	-0.8	65.8	77.9	96.0
4	+0.2	38.0	46.1	64.0
8	+0.9	28.0	33.3	47.7
16	+0.8	20.5	24.3	34.7
32	+1.0	15.2	18.2	23.7
64	+1.0	11.9	13.2	17.7
128	+1.0	8.0	9.7	12.3
256	+0.9	5.5	6.5	8.0
512	+0.9	3.8	4.6	5.9
1,024	+0.9	2.7	3.2	4.0
2,048	+0.9	2.0	2.3	3.0
4,096	+0.9	1.4	1.6	2.1
8,192	+0.9	1.0	1.1	1.5
16,384	+0.9	0.6	0.8	1.1

Scorecard applied to 1,000 bootstraps from the validation sample.

Table 6 (Third-quintile line): Percentages of participants' households by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=16	4.9	44.2	0.1	50.8	55.7
<=21	9.5	39.6	0.4	50.5	60.0
<=25	14.1	35.0	0.9	50.0	64.2
<=29	19.0	30.1	1.5	49.4	68.3
<=32	23.1	26.0	2.3	48.6	71.7
<=35	27.0	22.1	3.5	47.4	74.4
<=38	30.3	18.8	4.8	46.1	76.5
<=40	32.9	16.2	6.4	44.5	77.5
<=43	36.6	12.5	8.4	42.5	79.1
<=45	38.6	10.5	10.9	40.0	78.7
<=48	41.1	8.0	14.0	36.9	78.0
<=50	42.9	6.2	16.5	34.4	77.3
<=53	45.1	4.0	20.4	30.5	75.6
<=56	46.2	2.9	24.2	26.7	72.9
<=58	47.1	2.0	27.3	23.6	70.7
<=61	48.0	1.1	32.3	18.6	66.5
<=64	48.5	0.6	37.1	13.9	62.4
<=68	48.8	0.3	41.8	9.1	57.9
<=72	49.1	0.0	46.4	4.5	53.6
<=100	49.1	0.0	50.9	0.0	49.1

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Table 7 (Third-quintile line): Share of all participants' households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor, share of poor households who are targeted, and number of poor households successfully targeted per non-poor household mistakenly targeted

Targeting cut-off	% all HHs who are targeted	% targeted HHs who are poor	% poor HHs who are targeted	Poor HHs targeted per non-poor HH targeted
<=16	5.0	97.8	10.0	44.1:1
<=21	9.9	95.8	19.3	22.9:1
<=25	15.0	94.3	28.8	16.6:1
<=29	20.5	92.6	38.6	12.4:1
<=32	25.4	90.9	47.1	10.0:1
<=35	30.5	88.5	55.0	7.7:1
<=38	35.1	86.4	61.8	6.3:1
<=40	39.3	83.8	67.1	5.2:1
<=43	45.0	81.4	74.5	4.4:1
<=45	49.5	78.1	78.7	3.6:1
<=48	55.0	74.6	83.6	2.9:1
<=50	59.4	72.2	87.4	2.6:1
<=53	65.5	68.9	91.9	2.2:1
<=56	70.4	65.7	94.1	1.9:1
<=58	74.4	63.3	95.9	1.7:1
<=61	80.3	59.7	97.7	1.5:1
<=64	85.6	56.7	98.9	1.3:1
<=68	90.6	53.9	99.4	1.2:1
<=72	95.5	51.4	100.0	1.1:1
<=100	100.0	49.1	100.0	1.0:1

Scorecard applied to the validation sample.

**Tables for
the Fourth-Quintile (80th-Percentile) Poverty Line**

Table 4 (Fourth-quintile line): Errors in poverty likelihoods for a participant’s household (average of differences between estimated and observed values) by score range, with confidence intervals

Score	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
0–16	–0.3	0.1	0.1	0.1
17–21	–0.2	0.5	0.5	0.7
22–25	–0.7	0.5	0.5	0.5
26–29	–1.2	0.8	0.8	0.9
30–32	–3.1	1.8	1.9	2.0
33–35	+2.0	2.0	2.3	2.8
36–38	–1.7	1.5	1.7	2.1
39–40	–2.8	2.2	2.3	2.7
41–43	–2.0	2.0	2.3	3.1
44–45	+4.9	2.5	3.1	4.2
46–48	+1.5	2.5	3.1	4.2
49–50	–3.5	3.2	3.6	4.9
51–53	–9.8	6.0	6.3	6.7
54–56	+14.0	3.7	4.4	5.7
57–58	+1.2	4.3	5.1	6.8
59–61	+8.2	3.2	3.7	5.0
62–64	+15.6	2.4	2.8	3.7
65–68	+7.9	2.9	3.5	4.3
69–72	–18.6	11.3	11.7	12.6
73–100	–7.6	5.4	5.9	6.5

Scorecard applied to 1,000 bootstraps of $n = 16,384$ from the validation sample.

Table 5 (Fourth-quintile line): Errors in poverty rates for a sample of a population of participants' households at a point in time (average of differences between estimated and observed values), by sample size and with confidence intervals

Sample Size <i>n</i>	Difference between estimate and observed value			
	Error	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
1	-1.9	67.7	79.7	91.6
4	-0.4	36.1	42.3	58.6
8	+0.3	27.1	32.6	43.0
16	+0.2	20.2	24.6	31.9
32	+0.2	14.3	16.8	22.4
64	-0.1	10.6	12.3	16.0
128	-0.2	7.3	8.6	11.3
256	-0.1	5.3	6.5	8.4
512	-0.1	3.7	4.4	5.4
1,024	0.0	2.7	3.0	4.0
2,048	0.0	1.8	2.1	2.7
4,096	0.0	1.3	1.5	2.0
8,192	0.0	0.9	1.1	1.4
16,384	0.0	0.7	0.8	1.1

Scorecard applied to 1,000 bootstraps from the validation sample.

Table 6 (Fourth-quintile line): Percentages of participants' households by cut-off score and targeting classification, along with the hit rate

Targeting cut-off	Inclusion: Poor correctly targeted	Undercoverage: Poor mistakenly not targeted	Leakage: Non-poor mistakenly targeted	Exclusion: Non-poor correctly not targeted	Hit rate Inclusion + Exclusion
<=16	5.0	65.9	0.0	29.1	34.1
<=21	9.9	61.1	0.0	29.0	38.9
<=25	14.9	56.0	0.1	29.0	43.9
<=29	20.4	50.6	0.1	28.9	49.3
<=32	25.2	45.8	0.3	28.8	54.0
<=35	29.9	41.0	0.6	28.5	58.3
<=38	34.2	36.8	1.0	28.1	62.3
<=40	37.9	33.0	1.4	27.7	65.6
<=43	43.0	27.9	2.0	27.1	70.1
<=45	46.6	24.4	2.9	26.2	72.7
<=48	50.9	20.1	4.2	24.9	75.8
<=50	54.2	16.7	5.2	23.9	78.1
<=53	58.9	12.0	6.6	22.5	81.4
<=56	61.5	9.5	8.9	20.2	81.6
<=58	63.6	7.3	10.8	18.3	81.9
<=61	66.2	4.8	14.1	15.0	81.1
<=64	67.8	3.1	17.8	11.3	79.2
<=68	69.0	1.9	21.6	7.5	76.5
<=72	70.4	0.6	25.1	4.0	74.3
<=100	70.9	0.0	29.1	0.0	70.9

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100. Scorecard applied to the validation sample.

Table 7 (Fourth-quintile line): Share of all participants' households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor, share of poor households who are targeted, and number of poor households successfully targeted per non-poor household mistakenly targeted

Targeting cut-off	% all HHs who are targeted	% targeted HHs who are poor	% poor HHs who are targeted	Poor HHs targeted per non-poor HH targeted
<=16	5.0	100.0	7.1	Only poor targeted
<=21	9.9	99.7	13.9	308.8:1
<=25	15.0	99.4	21.0	174.1:1
<=29	20.5	99.3	28.7	151.7:1
<=32	25.4	98.9	35.5	93.0:1
<=35	30.5	98.0	42.1	48.5:1
<=38	35.1	97.3	48.2	35.8:1
<=40	39.3	96.5	53.5	27.8:1
<=43	45.0	95.6	60.6	21.9:1
<=45	49.5	94.1	65.7	16.0:1
<=48	55.0	92.5	71.7	12.2:1
<=50	59.4	91.3	76.5	10.5:1
<=53	65.5	89.9	83.1	8.9:1
<=56	70.4	87.3	86.6	6.9:1
<=58	74.4	85.5	89.7	5.9:1
<=61	80.3	82.4	93.3	4.7:1
<=64	85.6	79.3	95.6	3.8:1
<=68	90.6	76.2	97.3	3.2:1
<=72	95.5	73.7	99.2	2.8:1
<=100	100.0	70.9	100.0	2.4:1

Scorecard applied to the validation sample.