Simple Poverty Scorecard® Poverty-Assessment Tool Zambia

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Abstract

The Simple Poverty Scorecard®-brand poverty-assessment tool uses 10 low-cost indicators from Zambia's 2015 Living Conditions Monitoring Survey to estimate the likelihood that a household has consumption below a given poverty line. Field workers can collect responses in about ten minutes. The scorecard's accuracy is reported for a range of poverty lines. The scorecard is a practical way for pro-poor programs in Zambia to measure poverty rates, to track changes in poverty rates over time (subject to the caveats in the text), and to segment clients for targeted services.

Version note

Zambia changed its definition of *poverty* between 2010 and 2015. This paper calibrates the scorecard in Schreiner (2013a) to new-definition poverty lines with 2015 data. All users from now on can estimate changes over time for new-definition lines supported here as well as for old-definition lines supported in Schreiner (2013a). But estimates of change based on data collected before 2015 are not very accurate. Thus, estimates of changes in consumption-based poverty should use only new-definition lines only with data from 2015 or after. Pre-2015 data can be used to estimate changes in the distribution of scores (not changes in the averages of poverty likelihoods) for an asset-based (not consumption-based) definition of *poverty*.

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Simple Poverty Scorecard® Poverty-Assessment Tool

			Name	Identifier
Interview ID:				
Interview date:		Participant:		
Country:	ZMB	Field agent:		
Scorecard:	001	Service point:		
Sampling wgt.:		Number of household members:		

Indicator	Response	Points Score
1. How many members does the household have?	A. Eight or more	0
	B. Seven	7
	C. Six	9
	D. Five	11
	E. Four	15
	F. Three	21
	G. One or two	29
2. Are all household members ages 7 to 16 currently attending school?	A. No	0
	B. Yes	3
	C. No one 7 to 16	6
3. What is the highest grade that the (oldest) female head/spouse has attained?	A. None, or first to fifth grade	0
	B. Sixth grade	2
	C. Seventh to ninth grade	4
	D. No female head/spouse	5
	E. Tenth grade or higher	9
4. What kind of building material is the floor of this dwelling made of? (If possible, observe without asking)	A. Mud, wood only, or other	0
	B. Concrete only, or covered concrete	2
5. What kind of building material is the roof of this dwelling made of? (If possible, observe without asking)	A. Grass/straw/thatch, or other	0
	B. Iron sheets, or other non-asbestos tiles	3
	C. Concrete, asbestos sheets, or asbestos tiles	5
6. What is the main type of energy that your household uses for cooking?	A. Firewood (collected or purchased), coal, crop/livestock residues, or other	0
	B. Charcoal (own-produced or purchased)	4
	C. Gas, electricity, solar, or kerosene/paraffin	15
7. Does your household own any televisions, DVDs/VCRs, home theatres, satellite dish/decoders (free to air, or DSTV) or other pay-TV arrangements?	A. No TV (regardless of others)	0
	B. TV, but nothing else	6
	C. TV, and something else (DVD, dish, and so on)	10
8. Does your household own any non-electric or electric irons?	A. None	0
	B. Only non-electric	4
	C. Electric, or both electric and non-electric	11
9. Does your household own any cellular phones?	A. No	0
	B. Yes	6
10. How many beds and mattresses does your household own?	A. None	0
	B. One or more beds, but no mattresses	2
	C. One mattress (regardless of beds)	4
	D. Two or more mattresses (regardless of beds)	7

Back-page Worksheet:
Household Members, Age, and School Attendance

In the scorecard header, write the interview's unique identifier (if known), the interview date, and the sampling weight of the participant (if known). Then record the names and the unique identification numbers of the participant, of yourself as the field agent, and of the service point that the participant uses. The respondent does not need to be a participant with your organization.

Then read to the respondent: *Please give me the first name or nickname of all persons who* usually *live with this household. Start with the head of the household and include visitors who have lived with the household for* six months or more*. Include usual members who are away visiting, in a hospital, at boarding schools, college, or university, and so on. Also, please tell me the age of each member. For each member ages 7 to 16, please tell me whether he or she is currently attending school.*

Record each household member's name and age. You do not need to know the precise age of a member unless the true age may be close to 6 or 17. For your own future use, note which member is the female head/spouse (if she exists). Record the total number of members in the scorecard header next to "Number of household members:". Then mark the response for the first indicator. For members ages 7 to 16, ask about school attendance, and mark the second indicator accordingly. If "No" is *ever* circled, then mark "A. No". If "Not 7 to 16" is circled for *all* household members, then mark "C. No one 7 to 16". Otherwise, mark "B. Yes".

Keep in mind the full definitions in the "Guidelines for the Interpretation of Scorecard Indicators" for *household*, *household member*, and *school attendance*.

First name or nickname	Age	If <NAME> is 7- to 16-years-old, is he or she currently attend school?		
1. (Head)		Not 7 to 16	No	Yes
2.		Not 7 to 16	No	Yes
3.		Not 7 to 16	No	Yes
4.		Not 7 to 16	No	Yes
5.		Not 7 to 16	No	Yes
6.		Not 7 to 16	No	Yes
7.		Not 7 to 16	No	Yes
8.		Not 7 to 16	No	Yes
9.		Not 7 to 16	No	Yes
10.		Not 7 to 16	No	Yes
11.		Not 7 to 16	No	Yes
12.		Not 7 to 16	No	Yes
13.		Not 7 to 16	No	Yes
14.		Not 7 to 16	No	Yes
15.		Not 7 to 16	No	Yes
16.		Not 7 to 16	No	Yes
Number of household members:	—	—		

Look-up table to convert scores to poverty likelihoods: New-definition national poverty lines

	Poverty likelihood (%)			
		National lines		
Score	**Food**	**100%**	**150%**	**200%**
0–4	95.9	99.8	100.0	100.0
5–9	89.9	97.3	99.9	100.0
10–14	88.0	97.2	99.7	100.0
15–19	82.4	95.1	99.6	100.0
20–24	70.8	86.7	97.6	99.6
25–29	57.2	79.0	93.9	98.4
30–34	46.0	69.2	89.6	96.2
35–39	31.4	55.0	78.4	90.3
40–44	19.7	40.0	69.3	85.3
45–49	6.9	23.6	52.7	76.1
50–54	4.5	16.1	45.2	68.9
55–59	2.8	4.8	25.5	46.9
60–64	1.0	3.2	16.6	33.6
65–69	0.4	2.6	10.2	27.1
70–74	0.1	1.2	6.1	21.7
75–79	0.0	0.2	2.0	9.4
80–84	0.0	0.0	0.0	5.5
85–89	0.0	0.0	0.0	5.4
90–94	0.0	0.0	0.0	0.0
95–100	0.0	0.0	0.0	0.0

Look-up table to convert scores to poverty likelihoods: New-definition international 2005 and 2011 PPP lines

	Poverty likelihood (%)					
	Intl. 2005 PPP lines				Intl. 2011 PPP lines	
Score	**$1.25**	**$2.00**	**$2.50**	**$5.00**	**$1.90**	**$3.10**
0–4	100.0	100.0	100.0	100.0	99.8	100.0
5–9	99.9	100.0	100.0	100.0	98.3	100.0
10–14	99.7	100.0	100.0	100.0	98.3	100.0
15–19	99.1	100.0	100.0	100.0	95.9	99.9
20–24	96.7	99.8	100.0	100.0	90.0	99.2
25–29	93.4	99.4	99.9	100.0	81.4	96.7
30–34	85.9	98.2	99.2	100.0	72.2	93.6
35–39	76.0	92.6	97.5	100.0	56.7	86.0
40–44	62.9	88.9	95.4	100.0	43.3	74.8
45–49	44.2	80.4	88.8	99.5	25.6	61.1
50–54	37.2	73.7	85.2	98.1	16.1	50.9
55–59	17.6	55.8	73.9	96.7	6.0	32.9
60–64	13.4	37.7	59.0	91.0	3.3	20.7
65–69	7.9	32.2	43.4	85.8	3.3	18.0
70–74	4.3	27.0	39.7	79.3	2.4	16.0
75–79	0.9	10.1	25.0	68.2	0.5	6.0
80–84	0.0	6.4	16.1	54.9	0.0	0.8
85–89	0.0	6.4	9.9	39.0	0.0	0.0
90–94	0.0	1.5	7.3	34.9	0.0	0.0
95–100	0.0	0.0	0.0	15.5	0.0	0.0

Look-up table to convert scores to poverty likelihoods: New-definition relative- and percentile-based poverty lines

	Poverty likelihood (%)					
	Poorest half of people	Percentile-based lines				
Score	below 100% Natl. line	20th	40th	50th	60th	80th
0–4	83.9	75.5	95.9	98.8	99.8	100.0
5–9	75.2	61.7	90.0	96.4	99.3	100.0
10–14	66.8	51.4	88.2	96.3	99.2	100.0
15–19	59.9	46.2	82.3	93.1	98.1	100.0
20–24	46.6	31.1	70.4	83.5	92.7	99.8
25–29	32.0	18.8	56.7	72.7	87.9	99.4
30–34	23.3	14.3	43.3	61.8	79.3	98.1
35–39	14.8	9.2	29.7	44.1	62.9	92.6
40–44	5.8	3.1	16.3	30.9	49.6	88.9
45–49	0.9	0.7	5.4	14.0	30.8	79.3
50–54	0.7	0.3	2.4	10.3	21.9	73.4
55–59	0.2	0.1	1.2	3.1	8.5	54.0
60–64	0.0	0.0	0.9	1.9	5.5	37.1
65–69	0.0	0.0	0.2	1.9	4.6	30.0
70–74	0.0	0.0	0.0	0.3	3.1	26.9
75–79	0.0	0.0	0.0	0.0	0.5	10.1
80–84	0.0	0.0	0.0	0.0	0.0	6.4
85–89	0.0	0.0	0.0	0.0	0.0	6.4
90–94	0.0	0.0	0.0	0.0	0.0	1.5
95–100	0.0	0.0	0.0	0.0	0.0	0.0

Note on estimating changes in poverty rates over time

Between 2010 and 2015, the definition of consumption-based poverty in Zambia changed. The 2015 Living Conditions Monitoring Survey (LCMS, conducted by the Central Statistical Office, CSO) supports only the new definition, not the old "Göttingen" definition nor the old "CSO" definition that were supported for data from the 2010 LCMS used with the scorecard in Schreiner (2013a).

The scorecard in Schreiner (2013a) is calibrated to old-definition poverty lines with data from the 2010 LCMS, and that same scorecard is calibrated here to new-definition lines with data from the 2015 LCMS. Because the scorecard here has exactly the same indicators, response options, and points as in Schreiner (2013a), first-time and legacy users can—at least in principle—estimate changes in poverty rates over time with old- or new-definition lines.

Unfortunately, the scorecard's estimates of changes in consumption-based poverty rates for data collected between 2010 and 2015 are not very accurate for any definition and in particular for the most policy-relevant line (100% of the new-definition national line). This is because the scorecard's two fundamental assumptions did not hold in this time period. That is, the relationships between indicators and poverty changed from 2010 to 2015, and/or Zambia's observed population changed. While new-definition poverty rates changed only a little, responses to scorecard indicators in the LCMS shifted disproportionately toward less-poor values. This suggests large changes in indicator/poverty relationships. Second, the sampling frame changed between the 2010 and

2015 LCMS.[1] This could lead to the detection (or creation) of differences in the observed population between the two rounds.

This means that users should not estimate changes in consumption-based poverty rates with pre-2015 data. Instead, any user can estimate changes in new-definition consumption-based poverty with both a baseline and a follow-up from 2015 or after (assuming that the population and the relationships between indicators and poverty do not change much after 2015). Given these assumptions, Zambia's scorecard should be about as accurate as the typical scorecard when used from now on for most common purposes.

In addition, legacy users can use pre-2015 data to estimate changes in an asset-based (not consumption-based) definition of *poverty* by looking at changes in the distribution of scores (not changes in average poverty likelihoods). An asset-based estimate of change conveys direction, whereas a consumption-based estimate of change conveys both direction and magnitude.

To sum up, Zambia's single scorecard now supports both old- and new-definition consumption-based poverty lines. But because the scorecard's basic assumptions do not hold between 2010 and 2015, users who want to estimate both the sign and the size of changes in consumption-based poverty should apply only new-definition lines and only with data from 2015 or after. Legacy users can use pre-2015 data to estimate the sign of change in asset-based poverty.

[1] In addition, stratification was at the level of the then-72 districts in the 2010 LCMS but at the level of the 10 provinces in the 2015 LCMS.

Simple Poverty Scorecard® Poverty-Assessment Tool Zambia

1. Introduction

Pro-poor programs in Zambia can use the Simple Poverty Scorecard poverty-assessment tool to estimate the likelihood that a household has consumption below a given poverty line, to estimate a population's poverty rate at a point in time, to estimate changes in a population's poverty rate over time (subject to the caveats discussed here), and to segment participants for differentiated treatment.

1.1 Estimating change over time in Zambia, with caveat

As explained in the introductory note, the scorecard here is identical to the one in Schreiner (2013a). In principle, users can estimate consumption-based poverty rates (including estimates of changes over time) for both the old-definition poverty lines supported in Schreiner (2013a) that are based on data from the 2010 Living Conditions Monitoring Survey (LCMS) as well as for the new-definition lines supported here that are based on data from the 2015 LCMS.

In practice, the scorecard's basic assumptions—that the relationship between indicators and poverty is constant, and that the observed population of Zambia is constant—did not hold well between 2010 and 2015. Thus, users are warned against estimating changes in consumption-based poverty rates with pre-2015 data or with old-

definition poverty lines. Estimates of changes in consumption-based poverty should be based only on data from 2015 or after and only on new-definition lines. Legacy users with pre-2015 data can estimate the direction of changes in asset-based poverty based on changes in the distribution of households' scores (instead of the direction and magnitude of changes in consumption-based poverty based on changes in the averages of households' poverty likelihooods).

The scorecard's accuracy in 2015 and after for new-definition lines depends on its assumptions of a constant relationship between indicators and poverty and of a constant population. If these hold and if consumption-based poverty decreases at a decent rate, then estimates from now on can be expected to have accuracy similar to that of most other scorecards (that is, better than that observed in Zambia between 2010 and 2015).

1.2 Why use the scorecard?

The direct approach to poverty assessment via consumption surveys is difficult and costly. A case in point is the 2015 LCMS by Zambia's Central Statistical Office (CSO). Its runs 63 pages and includes about 600 questions, many of which have a series of sub-questions and/or may be asked multiple times (for example, for each household member, each crop, each consumption item, or each vaccination).

In comparison, the indirect approach of the scorecard is quick and low-cost. It uses 10 verifiable indicators drawn from the LCMS (such as "What kind of building

material is the floor of this dwelling made of?" and "Does your household own any cellular phones?") to get a score that is correlated with consumption-based poverty status as measured by the exhaustive LCMS 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 programs. The feasible poverty-assessment options for these local programs 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 assessments with these approaches may be costly, their accuracy is unknown, and they are not comparable across places, programs, nor periods of time.

The scorecard can be used to measure the share of a program's participants who are below a given poverty line (for example, Zambia's new-definition national line). USAID microenterprise partners in Zambia can use the scorecard with the new-definition $1.90/day 2011 PPP line to report how many of their participants are "very poor".[3] The scorecard can also be used to measure net movement across a poverty line over time. In all these applications, the scorecard provides a consumption-based,

[2] The Simple Poverty Scorecard tool for Zambia is not, however, in the public domain. Copyright is held by Microfinance Risk Management, L.L.C.

[3] USAID defines a household as *very poor* if its daily per-capita consumption is less than the highest of the new-definition $1.90/day 2011 PPP line in 2015 (ZMW6.21, Table 1) or the new-definition line that marks the poorest half of people below 100% of the new-definition national line (ZMW2.92).

objective tool with accuracy that has been tested to the extent possible. While consumption surveys are costly even for governments, some local pro-poor programs may be able to implement a low-cost poverty-assessment tool to help with monitoring poverty and (if desired) with segmenting clients for differentiated treatment.

The statistical approach here aims to be understood by non-specialists. After all, if 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 builds 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 local, pro-poor programs. This is not because they do not work, but because they are often presented (when they are presented at all) only in English and only as tables of regression coefficients incomprehensible to non-specialists (with cryptic indicator 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", straighforward, transparent approaches are usually about as accurate as complex, opaque ones (Schreiner, 2012a; Caire and Schreiner, 2012).

Beyond its low cost and transparency, the technical approach of the scorecard 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 common sense and commonplace in statistical practice and in the for-

profit field of credit-risk scoring, they have rarely been applied to poverty-assessment tools.

The scorecard is based on data from the LCMS by Zambia's CSO. Indicators are selected to be:

- Inexpensive to collect, easy to answer quickly, and straightforward to verify
- Strongly correlated with poverty
- Liable to change over time as poverty status changes
- Applicable in all regions in Zambia

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 in the field in about ten minutes.

The scorecard can be used to estimate three basic quantities. First, it can estimate a particular household's *poverty likelihood*, that 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 households at a point in time. This estimate is the average of poverty likelihoods among a representative sample of households from the population.

Third, the scorecard can estimate the annual rate of change in the poverty rate of a population (Schreiner, 2014a). With two independent samples that are representative of the same population, this is the difference in the average poverty likelihood in the baseline sample versus the average 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 household is scored twice, the estimate of the annual rate of change is the sum (across all households) of the changes in each household's poverty likelihoods from baseline to follow-up, divided by the sum (across all households) of the years between each household's pair of interviews.

The scorecard can also be used to segment participants for differentiated treatment. To help managers choose appropriate targeting cut-offs for their purposes, the paper reports several measures of targeting accuracy for a range of possible cut-offs.

This paper presents a single scorecard whose indicators and points were derived by Schreiner (2013a) for Zambia's old Göttingen-definition national poverty line with data for half of the households in the 2010 (not 2015) LCMS. Schreiner (2013a) calibrated scores from this scorecard to data from this same half of households in the 2010 LCMS to poverty likelihoods for 16 poverty lines, eight under the old Göttingen definition and eight under the old CSO definition.

This same scorecard is calibrated here to 16 new-definition poverty lines using data from half of the households in the 2015 (not the 2010) LCMS. Data from the other half of households from the 2015 LCMS is used to validate the scorecard's accuracy with new-definition lines for estimating households' poverty likelihoods, for estimating populations' poverty rates at a point in time, and for segmenting participants.

Furthermore, the accuracy of estimates of changes in new-definition poverty rates over time is tested using the 2015 validation sample (baseline) and the 2010 validation sample (follow-up).

Given the scorecard's standard assumptions, all three scorecard-based estimators (a household's poverty likelihood, a population's poverty rate at a point in time, and a population's annual rate of change in its poverty rate) are *unbiased*. That is, they match the population's true value on average in repeated samples when constructed from (and applied to) a single, unchanging population in which the relationship between scorecard indicators and poverty is unchanging. Like all predictive models, the scorecard is constructed from a single sample and so misses the mark when applied (as in this paper) to a validation sample. Furthermore, it makes errors when applied (in practice) to a different population or when applied before or after 2015 (because the relationships between indicators and poverty change over time).[4] As noted above, the scorecard's basic assumptions do not hold well between 2010 and 2015, so users should not estimate changes in consumption-based poverty with pre-2015 data. The failure of the scorecard's basic assumptions damages pre-2015 accuracy for both old- and new-definition lines. Assuming that the scorecard's basic assumptions hold in 2015 and after, users can estimate changes in consumption-based poverty for new-definition lines with data from 2015 or after and expect better accuracy (that is, accuracy similar to that

[4] Important cases include nationally representative samples at a later point in time or sub-national populations that are not nationally representative (Schreiner, forthcoming; Diamond *et al.*, 2016; Tarozzi and Deaton, 2007).

observed for the scorecard in other countries where the scorecard's basic assumptions hold better). Alternatively, data from any time period can be used to estimate the sign of an asset-based definition of *poverty* (not the sign and size of a consumption-based definition) based on changes in the distributions of scores (not on changes in averages of poverty likelihoods).

Thus, while the indirect-scorecard approach is less costly than the direct-survey approach, it makes errors when applied in practice.[5] The scorecard makes errors because it assumes that future relationships between indicators and poverty in all populations will be the same as in the construction data. Of course, this assumption—inevitable in predictive modeling—holds only partly.

On average across 1,000 bootstraps of $n = 16{,}384$ from the 2015 validation sample, the average error (that is, the average difference between the scorecard's estimate of a poverty rate versus the observed rate in the 2015 LCMS) at a point in time for 100% of the new-definition national poverty line is +1.0 percentage points. Across all 16 poverty lines, the average of the average absolute errors is about 1.2 percentage points, and the maximum average absolute error is 2.3 percentage points. These estimation errors are due to sampling variation, not bias; the average difference would be zero if the whole 2015 LCMS were to be repeatedly re-fielded and divided into

[5] Observed values from the direct-survey approach are taken as-is, ignoring sampling variation and any other sources of error.

sub-samples before repeating the entire process of scorecard construction and validation.

With n = 16,384, the 90-percent confidence intervals are ±0.5 percentage points or less. For n = 1,024, the 90-percent intervals are ±2.2 percentage points or less.

To check the accuracy of estimates of changes in consumption-based poverty rates over time, the scorecard is applied to data from the 2015 validation sample (as a baseline) and to data from the 2010 validation sample (as a follow-up).

With 1,000 bootstraps with n = 16,384 and across the 10 estimates of change associated with the 10 absolute poverty lines, the average of the average absolute errors is about 2.1 percentage points. For comparison, the average absolute observed change is about 1.7 percentage points. Thus, the average of the average absolute errors is exceeds the average of the average absolute observed changes.

The second-largest error is for 100% of the new-definition national line (in practice, the most policy-relevant line). The scorecard's estimate of the change in the household-level poverty rate is +3.5 percentage points (about +0.7 percentage points per year for five years). That is, the household-level poverty rate is estimated to have increased from 49.0 percent in 2015 (Table 1) to 49.0 + (+3.5) = 52.5 percent in 2010. But the observed change in the LCMS in the 2015 and 2010 validation samples is 48.3 – 49.0 = –0.7 percentage points; that is, the observed poverty rate decreased from 2015 to 2010. The scorecard's error is then +3.5 – (–0.7) = +4.2 percentage points. The

scorecard gets the five-year direction of change wrong, and the error is six times the magnitude of (small) observed change.[6]

The standard errors of estimated changes are about ±3.2 percentage points or less (n = 1,024). The 90-percent confidence intervals (with n = 1,024) of the estimated changes include the observed changes in seven of ten cases). Among the three worst cases is 100% of the new-definition national line. The estimated direction of change matches the observed direction and is "statistically significant" (the confidence interval of the estimate does not include zero) for seven in 10 lines.

Overall, the scorecard's estimates of consumption-based change for Zambia are not very accurate, and accuracy is particularly low for the most policy-relevant line (100% of the new-definition national line).

Why is this? Of course, scorecards are always inaccurate to some extent. As noted above, the scorecard assumes both a constant population and a constant relationship between scorecard indicators and poverty. In general, neither assumption holds perfectly, and while the two assumptions may sometimes hold well enough to permit usefully accurate estimates, these assumptions seem to hold less well in Zambia from 2010 to 2015 than they usually seem to do in other countries.

In particular, poverty rates in Zambia changed little in these five years; for most lines, rates decreased by about one or two percentage points, and rates increased for the

[6] This is the second-worst case, and it is for the most-important line, but the scorecard does get the direction of change right for eight of the nine other lines.

food line and 100% of the national line.[7] For the scorecard to reflect these small changes, the distribution of responses to the scorecard's indicators would have to remain mostly unchanged. There are four classes of indicators: household size, education, basic features of the residence, and asset ownership. Responses are indeed mostly unchanged for household size, school attendance of children, and the education of the female head/spouse. But the quality of floors improved, and the quality of roofs and of cooking fuels improved in some ways and got worse in others.[8] Asset ownership as captured in the scorecard consistently increased (televisions and video playback/satellite connections, irons, cellular phones, and beds and mattresses). On net, the changes in responses lead to estimated decreases in consumption-based poverty that are consistently larger (or in the other direction) than the observed changes in the LCMS. In turn, this means that the relationships between indicators and consumption-based poverty must have changed between 2010 and 2015. The scorecard, however, ignores this, and so it incorrectly estimates a too-large decrease in consumption-based poverty from 2010 to 2015 (or equivalently, a too-large increase from 2015 going back to 2010).

In general, the scorecard seems to overestimate decreases in consumption-based poverty (and to completely miss increases). Two factors are behind this. First,

[7] These are household-level rates. Person-level rates decreased for all absolute lines except the food line. For 100% of the national line, the five-year person-level decrease was 0.3 percentage points, or less than 0.1 percentage points per year.
[8] The odd patterns for roofs and cooking fuels could also stem from some data issue for these indicators in one of the LCMS rounds or in the data preparation.

scorecard indicators may improve—as they mostly do in Zambia from 2010 to 2015—even as consumption-based poverty stagnates. This can happen if the prices, quality, and/or availability of assets, education, and housing features change or if households save more (perhaps by consuming less) and use their savings to accumulate assets. Second, scorecard indicators of household size, education, basic features of the residence, and asset ownership seem to be unlikely to change quickly when consumption-based poverty worsens.[9]

Said another way, the growth in per-capita or per-adult-equivalent consumption in Zambia from 2010 to 2015 was slower than the improvement in other, non-consumption aspects of well-being. Most scorecard indicators probably have 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 less-expensive and smaller/lower-quality residence) than they are to acquire assets or to improve their residence when consumption increases. Likewise, education (once acquired) cannot be sold off, given away, nor lost. The scorecard estimates reductions in consumption-based poverty after 2010 because non-consumption indicators of consumption improved disproportionately more than did consumption. The relationship between poverty and scorecard indicators in 2010 is not the same as in 2015, even though the scorecard must act as if it is.

[9] Harttgen, Klasen, and Vollmer (2013) discuss why asset-based indicators—such as those in the scorecard—may not track changes in consumption closely, with an illustration with data from Zambia's LCMS of 1996, 1998, 2004, and 2006.

Some of the scorecard's inaccuracy may be due to the LCMS's measure of consumption-based poverty being off or due to issues with the data on scorecard indicators. The scorecard assumes that data is collected consistently across rounds, that samples are representative, and that poverty lines are perfectly adjusted for changes in prices.

In any case, scorecard users in Zambia should not estimate consumption-based change with pre-2015 data. Such estimates would not be very accurate because the indicator/poverty relationships represented in the scorecard differ greatly from those in 2015.

Assuming that the relationships between indicators and poverty do not change much from 2015 onward and also assuming that Zambia's population does not change much, estimates of consumption-based change with data from 2015 or after and with new-definition poverty lines can be expected to have accuracy closer to that which has been typical in other countries (that is, better than it is for Zambia from 2010 to 2015).

Legacy users who want to salvage pre-2015 data should use an alternate approach to estimate the *sign* of change (whether poverty increased or decreased) under an asset-based definition of *poverty* by looking at changes in the distributions of scores.[10] This contrasts with the scorecard's standard approach of estimating the direction and magnitude of change under a consumption-based definition of *poverty* by looking at changes in the averages of poverty likelihoods. The alternate approach is less

[10] Schreiner (2012a) discusses how to analyze distributions of scores.

satisfactory than the standard approach, but it the best alternative available given the inaccuracy of the pre-2015 consumption-based estimates of change and the on-going inaccuracy of estimates of change for old-definition consumption-based lines.

Are scorecard estimates in Zambia from now on likely to be unusually inaccurate? Yes, if poverty continues to decrease very slowly (or if it increases); No, if poverty starts to decrease more rapidly. Out-of-sample/in-time tests of the scorecard applied to 2015 data that was not used to construct the scorecard show errors whose magnitudes are typical of the scorecard in similar tests for other countries. While errors will grow as time passes, extreme inaccuracy will reappear only if Zambia's scorecard is not updated for a long time or if—as will be the case if poverty worsens or even if it continues decrease only slowly—features of the residence and asset ownership continue to move out-of-step with consumption-based poverty. Scorecard accuracy is—on average—a lot better in the other 17 countries that have similar backward-looking tests for change over time during periods of decreasing poverty, and that should be a good predictor of the accuracy of the scorecard from now on in Zambia as long as poverty starts to decrease more rapidly.

Section 2 below documents data and poverty lines. Sections 3 and 4 describe scorecard construction and offer guidelines for implementation. Sections 5 and 6 tell how to estimate households' poverty likelihoods and populations' poverty rates at a point in time. Section 7 discusses estimating changes in poverty rates over time. Section 8 covers targeting. Section 9 places the scorecard here in the context of related exercises for Zambia. The last section is a summary.

The "Guidelines for the Interpretation of Scorecard Indicators" (found after the "References") tells how to ask questions—and how to interpret responses—so as to mimic CSO's practice in Zambia's LCMS as closely as possible. These "Guidelines" (and the "Back-page Worksheet") are integral parts of the Simple Poverty Scorecard tool.

2. Data, definitions of *poverty*, and poverty lines

This section presents the data used to construct and validate the scorecard. It also documents the 16 new-definition poverty lines to which scores are newly calibrated.

2.1 Data

Schreiner (2013a) constructed Zambia's scorecard, selecting indicators and points based on data from a random half of the 19,373 households in the 2010 (not 2015) LCMS. The 2010 data that was used to construct the scorecard was also used to associate (*calibrate*) scores with poverty likelihoods for all old-definition (Göttingen and CSO) poverty lines.

In the present paper, data from a random half of the 12,145 households in the 2015 (not 2010) LCMS are used to calibrate scores from the scorecard in Schreiner (2013a) with poverty likelihoods for all new-definition poverty lines.

This paper also uses data from the other half of households in the 2015 (not 2010) LCMS to test (*validate*) scorecard accuracy for point-in-time estimates of new-definition poverty rates *out-of-sample* (that is, with data that is not used in construction/calibration). In addition, this paper tests scorecard accuracy for estimates of changes in new-definition consumption-based poverty rates from 2015 to 2010 with the 2015 validation sample (baseline) and all households in the 2010 LCMS (follow-up). These tests are *out-of-sample* and *out-of-time* because they use data not used in the

calibration of new-definition poverty likelihoods that also come from a different time period than does the calibration data for new-definition lines.

Even though Zambia's single scorecard was constructed with data from the 2010 LCMS, it can still be applied with data from the 2015 LCMS because the two rounds use the same survey instrument (assuming that the CSO collected data in the same way).[11]

Fieldwork for the 2010 LCMS ran from February 1 to March 31; the 2015 LCMS ran from April 3 to May 29.

Consumption is in units of ZMW per person or per adult equivalent per day in average prices for Zambia as a whole during the fieldwork for a given LCMS round.[12]

2.2 Poverty rates at the household, person, or 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. By assumption, each member of a given household has the same poverty status (or estimated poverty likelihood) as the other members in that household.

[11] The 2010 LCMS used paper forms, while the 2015 LCMS used computer-based forms (CSO and World Bank, 2017). Also, the sampling frame for the 2010 LCMS is from the 2000 Census, while the sampling frame for the 2015 LCMS is from the 2010 Census.
[12] ZMW replaced ZMK in 2012. The figures in ZMK in Schreiner (2013a) can be converted to ZMW by dividing by 1,000.

To illustrate, suppose that a program serves two households. The first household is poor (its per-capita or per-adult-equivalent consumption is less than a given poverty line), and it has three members, one of whom is a program participant. The second household is non-poor and has four members, two of whom are program participants.

Poverty rates are in terms of either households or people. If the program defines its *participants* as households, then the household level is relevant. The estimated household-level poverty rate is the weighted[13] average of poverty statuses (or estimated poverty likelihoods) across households with participants. This is $\frac{1 \cdot 1 + 1 \cdot 0}{1 + 1} = \frac{1}{2} = 0.5 = 50$ percent. In the "$1 \cdot 1$" term in the numerator, the first "1" is the first household's weight, and the second "1" represents the first household's poverty status (poor) or its estimated poverty likelihood. In the "$1 \cdot 0$" term in the numerator, the "1" is the second household's weight, and the "0" represents the second household's poverty status (non-poor) or its estimated poverty likelihood. The "$1 + 1$" in the denominator is the sum of the weights of the two households. Household-level weights are used because the unit of analysis is the household.

Alternatively, a person-level rate is relevant if a program defines all people in households that benefit from its services as *participants*. In the example here, the

[13] The examples assume simple random sampling at the household level. This means that each household has the same household-level weight, taken here to be one (1).

person-level rate is the household-size-weighted[14] average of poverty statuses (or estimated poverty likelihoods) for households with participants, or $\frac{3 \cdot 1 + 4 \cdot 0}{3 + 4} = \frac{3}{7} = 0.43 = 43$ percent. In the "$3 \cdot 1$" term in the numerator, the "3" is the first household's weight because it has three members, and the "1" represents its poverty status (poor) or its estimated poverty likelihood. In the "$4 \cdot 0$" term in the numerator, the "4" is the second household's weight because it has four members, and the zero represents its poverty status (non-poor) or its estimated poverty likelihood. The "$3 + 4$" in the denominator is the sum of the weights of the two households. A household's weight is its number of members because the unit of analysis is the household member.

As a final example, a program might count as *participants* only those household members who directly participate in the program. For the example here, this means that some—but not all—household members are counted. The person-level rate is now the participant-weighted average[15] of the poverty statuses (or estimated poverty likelihoods) of households with participants, or $\frac{1 \cdot 1 + 2 \cdot 0}{1 + 2} = \frac{1}{3} = 0.33 = 33$ percent. The first "1" in the "$1 \cdot 1$" in the numerator is the first household's weight because it has one participant, and the second "1" represents its poverty status (poor) or its estimated poverty likelihood. In the "$2 \cdot 0$" term in the numerator, the "2" is the second

[14] Given simple random sampling at the household level, a household's person-level weight is the number of people in the household.
[15] Given simple random sampling at the household level, a household's participant-level weight is the number of participants in the household.

household's weight because it has two participants, and the zero represents its poverty status (non-poor) or its estimated poverty likelihood. The "1 + 2 " in the denominator is the sum of the weights of the two households. Each household's weight is its number of participants because the unit of analysis is the participant.

To sum up, estimated poverty rates are weighted averages of households' poverty statuses (or estimated poverty likelihoods), where—assuming simple random sampling at the household level—the weights are the number of relevant units in the household. When reporting, programs should clearly state the unit of analysis (household, household member, or participant) as well as explain why that unit is relevant.

Table 1 reports new-definition poverty lines and poverty rates for households and people in the 2010 and 2015 LCMS for Zambia as a whole, for the 2015 calibration sample, and for the 2010 and 2015 validation samples.

For all of Zambia and for each of Zambia's 10 provinces, Table 2 reports new-definition poverty lines and poverty rates for households and for people by urban/rural/all.

Household-level poverty rates are reported because—as shown above—household-level poverty likelihoods can be straightforwardly converted into poverty rates for other units of analysis and because sampling is almost always done at the level of households. This is also why the scorecard is constructed, calibrated, and validated with household weights. Person-level poverty rates are also included in Tables 1 and 2 because these are the rates reported by the government of Zambia. 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 Definitions of *poverty* in Zambia

A household's *poverty status* as poor or non-poor depends on whether a measure of its well-being is below a given cut-off. Thus, a definition of *poverty* is a cut-off together with a measure of well-being.

For the case of consumption-based poverty, the measure of well-being is aggregate household per-capita or per-adult-equivalent consumption, and the cut-off is in terms of a level of consumption.

For the case of asset-based poverty, the measure of well-being is a household-level index that aggregates and values access/rights to a selection of assets writ large (including physical, human, financial, and social assets), and the cut-off is in terms of a level of the index. Definitions of asset-based poverty include the DHS asset index (Gwatkin *et al.*, 2007), the Multi-dimensional Poverty Index (Alkire and Santos, 2010), the asset indexes in Sahn and Stifle (2003 and 2000), and the scorecard (when its indicators are recognized as assets and when considering a household's score rather than its poverty likelihood in terms of a consumption-based poverty line).

Two differences between consumption- and asset-based definitions are highlighted here. First, consumption-based estimates have "ratio" units that can be added up or averaged and that "have the same space" between each unit. For example,

estimated poverty likelihoods can be averaged to estimate a group's poverty rate, and a household with a poverty likelihood of 40 percent is twice as likely to be consumption-poor than if it had a poverty likelihood of 20 percent. In contrast, asset-based estimates have ordinal units that cannot be added up or averaged because the "space between units" is not consistent or is undefined. Thus, a household with an asset-based score of 40 is not half as asset-poor as if it had a score of 20. Because asset-based estimates are ordinal, they can be analyzed only in terms of their distributions. This means that while consumption-based definitions can estimate both the direction and the magnitude of change, asset-based definitions can only estimate the direction of change.

The second highlighted difference is that a consumption-based definition is independent from an estimator of consumption-based poverty, while an asset-based definition is completely characterized by how it is estimated.[16] For example, a household's consumption (to be compared with an externally defined poverty line such as the $1.90/day 2011 PPP line) can be estimated via an exhaustive survey, a short scorecard, or a respondent's best guess. Each approach has different accuracy, but they all estimate the same definition of *poverty*, they all use the same cut-off (a given poverty line), and all their estimates can be compared. In contrast, each asset index defines *poverty* in terms of its own indicators, response options, and points, so its estimates are not comparable with those of other asset-based indexes. As a case in

[16] This means that an asset-based estimate is not really an estimate at all; it is itself the exact measure. By definition, asset-based indexes have zero estimation error.

point, Gwatkin *et al.* (2007), Alkire and Santos (2010), Sahn and Stifle (2000), and Filmer and Scott (2011) all estimate asset-based poverty in Zambia, but their results cannot be compared because their indexes are not identical.

These distinctions can be seen in the four definitions of *poverty*—three consumption-based and one asset-based—supported for Zambia's scorecard:

- Old-definition Göttingen: consumption-based, from Schreiner (2013a)
- Old-definition CSO: consumption-based, from Schreiner (2013a)
- New-definition: consumption-based, in the present paper
- Asset-based: asset-based, discussed in the present paper

The two old consumption-based definitions (Göttingen and CSO) are not discussed further here. They are not supported in the data for the 2015 LCMS provided by the CSO, and estimates based on their poverty likelihoods and pre-2015 data would not be very accurate due to the same factors that make new-definition consumption-based estimates not very accurate with pre-2015 data. These two old definitions of *poverty* are no longer relevant in Zambia.

This paper focuses on new-definition consumption-based poverty based on data from 2015 or after. The new definition is the most relevant from now on because it is based on sounder economic principles than the two old definitions, it is derived from more recent data, and it should be more accurate from now on than the two old definitions.

The asset-based definition is relevant only for legacy users of the Zambia scorecard who want to estimate change over time with pre-2015 data. They can do this by taking scores from the scorecard as estimates of an asset-based definition of *poverty*.

This allows legacy users to estimate the direction (but not the magnitude) of changes in asset-based poverty as shown by changes in the distribution of scores with pre-2015 data for the baseline and with follow-up data from any period (Schreiner, 2012a; Rutstein and Johnson, 2004).

2.4 New-definition consumption-based poverty

CSO and World Bank (2017) document the new-definition measure of consumption. It follows international good practice (Deaton and Zaidi, 2002) and corrects some errors in old-definition CSO consumption. In particular, the new definition treats months as having $365/12 = 30.42$ days (not 28) and allocates education expenses over 12 months (not nine). The new definition also includes the use-value of durable goods as well as the value of pirated water and electricity. Finally, the new definition excludes non-consumption expenditure such as loan payments, donations, insurance premia, remittances, and hospitalization costs. It also excludes large, one-time costs such as those for funerals or weddings.

Because pro-poor programs in Zambia may want to use different or various poverty lines, this paper calibrates scores from its single scorecard to poverty likelihoods for 16 new-definition lines:

- National lines:
  - Food
  - 100% of national
  - 150% of national
  - 200% of national
- International 2005 PPP lines:

  - $1.25/day
  - $2.00/day
  - $2.50/day
  - $5.00/day
- International 2011 PPP lines:
  - $1.90/day
  - $3.10/day
- Relative- and percentile-based lines:
  - Line marking the poorest half of people below 100% of the new-definition national line
  - First-quintile (20^{th}-percentile) line
  - Second-quintile (40^{th}-percentile) line
  - Median (50^{th}-percentile) line
  - Third-quintile (60^{th}-percentile) line
  - Fourth-quintile (80^{th}-percentile) line

2.4.1 New-definition national lines

Zambia's new-definition national lines are derived with Ravallion's (1998) cost-of-basic-needs method. The derivation begins with a food line (also known in Zambia as the "extreme poverty" line). According to CSO and World Bank (2017, p. 8), "The food poverty line represents the cost of a food bundle that provides 12,450 Calories per day, which are the necessary energy requirements for a family of six people or 4.52 adult equivalents. [That is, 2,754 Calories per adult equivalent.] The National Food and Nutrition Commission and the Price and Income Commission constructed the food basket in 1991 [based on data from the Social Dimensions of Adjustment Priority Survey]. The current cost of the food basket is obtained by updating the prices of each food item in the basket using median national CPI prices over the fieldwork period." The new-definition food line is the same as the old-definition CSO food line, updated for changes in the prices of food items between 2010 and 2015. The poverty rates associated

with the two food lines in the 2010 LCMS differ because the measure of consumption differs between the old CSO definition and the new definition.

Like all poverty lines in this paper (but unlike the old CSO definition of *poverty*), the new-definition food line is adjusted for price differences across provinces and across the two months of LCMS fieldwork. Its units are ZMW per person per day or per adult equivalent per day. In average prices for Zambia as a whole during the 2015 LCMS fieldwork, the new-definition food line is ZMW4.93 per adult equivalent per day (Table 1). The corresponding poverty rates are 35.8 percent for households and 40.9 percent for people. From 2010 to 2015, the food (extreme) poverty rate increased (that is, worsened) by 35.8 – 32.2 = 3.6 percentage points at the household level and by 40.9 – 37.9 = 3.0 percentage points at the person level.

Zambia's new-definition national poverty line (usually called here "100% of the new-definition national line") is the food line, plus the value of a minimum standard of non-food consumption. According to CSO and World Bank (2017, p. 8), the non-food standard is "the average non-food consumption of the population whose total consumption is close to the food poverty line. The procedure starts by estimating the average non-food consumption of the population whose total consumption lies within ±1 percent of the food line. The same exercise is then repeated for those within ±2 percent, ±3 percent, and so on, up to ±10 percent. The [non-food standard] is then the average of these ten mean non-food consumption figures."

The new-definition national line is then the sum of the food line and the non-food standard. In the parlance of Ravallion (1998), this is the "lower" food-plus-non-food (national) line. As pointed out by CSO and World Bank (2017, pp. 8, 12, and 13), the old-definition CSO national line was also meant to correspond to Ravallion's lower food-plus-non-food line, but it was mistakenly derived with an incorrect formula.

The new-definition national line for Zambia as a whole in 2015 is ZMW6.95 per adult equivalent per day, giving a household-level poverty rate of 49.0 percent and a person-level poverty rate of 54.4 percent (Table 1).[17] From 2010 to 2015, the poverty rate by 100% of the new-definition national line increased (that is, worsened) by 49.0 – 48.3 = 0.7 percentage points at the household level and decreased (that is, improved) by 54.4 – 54.7 = –0.3 percentage points at the person level.

For the worst-off half of households from 2010 to 2015, poverty generally worsened or stayed the same. For the best-off half of households, the higher poverty lines in Table 1 show that poverty rates decreased by about 1 or 2 percentage points.

The lines for 150% and 200% of the new-definition national line are multiples of 100% of the new-definition national line.

2.4.2 New-definition international 2005 PPP lines

[17] The person-level poverty rates for the new-definition food ("extreme") line and for the new-definition national line in Table 1 match those in CSO and World Bank (2017, pp. 1 and 15–17) except for 40.9 percent for the food line in 2015 here versus 40.8 percent in CSO and World Bank. This suggests that this paper uses the same data and has calculated poverty correctly.

The new-definition $1.25/day PPP line is derived from:

- 2005 PPP exchange rate for "individual consumption expenditure by households" in Zambia:[18] ZMW2.83033 per USD
- Average all-Zambia Consumer Price Index (CPI):[19]
  - 2005 calendar-year: 1199.621
  - 2010 February/March: 1957.025
  - 2011 calendar-year: 2172.000
  - 2015 April/May: 2834.900
- Person-weighted price deflators by province during LCMS fieldwork:

Province	**2010**	**2015**
Central	0.923584	0.973941
Copperbelt	1.037588	1.011786
Eastern	0.911794	0.938743
Luapula	0.965127	0.947384
Lusaka	1.110816	1.094248
Northern	0.917918	0.912590
North-Western	1.039832	1.021862
Southern	0.993521	0.970739
Western	0.943581	0.937605
Copperbelt	0.916643	0.912219
All-Zambia:	0.989297	0.986410

[18] World Bank, 2008.

[19] The CPI has a base of 100 on average in calendar-year 1996. It is from the Bank of Zambia's Annual Reports for 2005, 2010, 2011, and 2012 as well as `boz.zm/CSOInflation.xlsx` (retrieved 16 June 2017).

A province's new-definition \$1.25/day 2005 PPP line in average prices in all of Zambia in during the fieldwork of a given LCMS round is

$$\frac{\text{ZMW2.83033} \cdot 1.25 \cdot \left(\frac{\text{CPI}_{\text{LCMS}}}{\text{CPI}_{2005}} \right) \cdot \text{Provincial deflator in LCMS round}}{\text{Average of provincial deflators in LCMS round}}.$$

For the example of the Central province in 2015, the new-definition \$1.25/day 2005 PPP line is

$$\frac{\text{ZMW2.83033} \cdot 1.25 \cdot \left(\frac{2834.900}{1199.621} \right) \cdot 0.973941}{0.986410} = \text{ZMW8.25 (Table 2)}.$$

In a given province, the \$2.00/day, \$2.50/day, and \$5.00/day 2005 PPP lines are multiples of the \$1.25/day line. The all-Zambia new-definition \$1.25/day 2005 PPP line for an LCMS round in Table 1 is the person-weighted average of the provincial lines. For 2015, this is ZMW8.36 per person per day, with a household-level poverty rate of 60.8 percent and a person-level poverty rate of 66.3 percent.

The World Bank's PovcalNet[20] does not report 2005 PPP figures for Zambia for 2015. For 2010, PovcalNet's $1.25/day poverty rate is 74.3 percent.[21] This is higher than the 69.6 percent for 2010 here (Table 1). One factor in the difference is that PovcalNet uses grouped data (not household-level data). The influence of other possible factors cannot be checked because PovcalNet does not report:

- The definition of consumption-based poverty that it uses
- The value of its $1.25/day 2005 PPP line in ZMW
- How (or whether) it adjusts for regional differences
- The time and place of its price units
- How it deflates PPP factors over time

This paper provides better documentation and also adjusts for provincial price differences, so its $1.25/day 2005 PPP figures (and its $1.90/day 2011 PPP figures below) are to be preferred (Schreiner, 2014b).

[20] iresearch.worldbank.org/PovcalNetPPP2005/, retrieved 16 June 2017.

[21] iresearch.worldbank.org/PovcalNetPPP2005/Detail.aspx?Format=Detail&C0=ZMB_3&PPP0=2830.33&PL0=1.25&Y0=2010&NumOfCountries=1, retrieved 16 June 2017.

2.4.3 New-definition international 2011 PPP lines

New-definition 2011 PPP lines are derived like new-definition 2005 PPP lines except that the 2005 PPP conversion factor (ZMW2.83033 per USD) is replaced with a 2011 PPP conversion factor (ZMW2.50534 per USD).[22]

A province's new-definition \$1.90/day 2011 PPP line in average prices in all of Zambia during the fieldwork for an LCMS round is

$$\frac{\text{ZMW2.50534} \cdot 1.90 \cdot \left(\frac{\text{CPI}_{\text{LCMS}}}{\text{CPI}_{2011}} \right) \cdot \text{Provincial deflator in LCMS round}}{\text{Average of provincial deflators in LCMS round}}.$$

For the example of the Central province in 2015, the new-definition \$1.90/day 2011 PPP line is

$$\frac{\text{ZMW2.50534} \cdot 1.90 \cdot \left(\frac{2834.900}{2172.000} \right) \cdot 0.973941}{0.986410} = \text{ZMW6.13 (Table 2).}$$

The \$3.10/day 2011 PPP line is a multiple of the \$1.90/day line. The all-Zambia new-definition \$1.90/day 2011 PPP line for an LCMS round is the person-weighted average of the provincial lines. For 2015, this is ZMW6.21 per person per day, with a household-level poverty rate of 50.5 percent and a person-level poverty rate of 56.1 percent (Table 1).

[22] `iresearch.worldbank.org/PovcalNet/Detail.aspx?Format=Detail&C0=ZMB_3&PPP0=2505.34&PL0=1.90&Y0=2010&NumOfCountries=1`, retrieved 16 June 2017.

PovcalNet does not report 2011 PPP figures for Zambia in 2015. For 2010, PovcalNet's $1.90/day 2011 line is ZMW4.47, giving a person-level poverty rate of 64.4 percent.[23] These are higher than the figures here (ZMW4.29 and 58.8 percent, Table 1). As discussed above, PovcalNet's documentation does not shed light on the reasons for the differences, so the figures here to be preferred.

2.4.4 USAID "very poor" line

The line that marks the poorest half of people below 100% of the new-definition national line is defined as the median of the aggregate household per-capita (not per-adult-equivalent) consumption of people (not households) below 100% of the new-definition national line (U.S. Congress, 2004). Unlike all the previous (non-relative) lines, this line (and the percentile-based lines below) is derived by:

- Applying provincial price adjustments to consumption rather than to the poverty line
- Deriving a single line for all of Zambia rather than province-specific lines
- Taking the provincial price adjustments out of consumption and putting them back in the poverty line

[23] `iresearch.worldbank.org/PovcalNet/Detail.aspx?Format=Detail&C0=ZMB_3&PPP0=2505.34&PL0=1.90&Y0=2010&NumOfCountries=1`, retrieved 16 June 2017.

Microenterprise programs in Zambia who use the scorecard to report the number of their participants who are "very poor" to USAID should use the new-definition $1.90/day 2011 PPP line. This is because USAID defines the "very poor" as those people in households whose daily per-capita consumption is below the highest of the following two poverty lines:

- The line that marks the poorest half of people below 100% of the new-definition national line (ZMW2.92 in 2015, with a person-level poverty rate of 27.2 percent, Table 1)
- The new-definition $1.90/day 2011 PPP line (ZMW6.21 in 2015, with a person-level poverty rate of 56.1 percent)

2.4.5 New-definition percentile-based poverty lines

The scorecard also supports new-definition percentile-based poverty lines for Zambia (Table 1).[24] This facilitates a number of types of analyses. For example, the second-quintile (40th-percentile) line might be used to help track Zambia's progress towards 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, could also be used to look at the relationship of consumption with health outcomes (or anything else that varies across the distribution of consumption). The scorecard thus offers an alternative for health-equity analyses that have typically used an asset-based index such as that supplied

[24] Following DHS asset indexes, percentile-based lines here use person-level quintiles. For example, the new-definition first-quintile (20th-percentile) line is set so that the all-Zambia person-level (not household-level) poverty rate is 20 percent (Table 1).

with the data from the Demographic and Health Surveys (Rutstein and Johnson, 2004) to compare an asset-based definition of *poverty* with health outcomes.

Of course, analysts could always do (and can still do) asset-based relative analyses with scores from the scorecard. But support for relative consumption lines allows a more straightforward use of a single tool (the scorecard) to analyze any or all of:

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

Unlike the scorecard, asset-based definitions of *poverty* only serve to analyze relative poverty. Furthermore, the scorecard—unlike asset-based indexes based on Principal Component Analysis or similar statistical approaches—uses a straightforward, well-understood standard whose definition is external to the scorecard itself (consumption related to a poverty line defined in monetary terms).

In contrast, an asset-based index opaquely defines *poverty* in terms of its own indicators and points, without reference to an external standard (Ravaillon, 2012). This means that two asset-based indexes with different indicators, different response options, 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 both apply a single definition of consumption-based poverty.

3. Scorecard construction

For Zambia, about 75 candidate indicators are initially prepared in the areas of:

- Household composition (such as the number of household members)
- Education (such as the highest grade attained by the (oldest) female head/spouse)
- Housing (such as the building material of the floor or roof)
- Ownership of durable assets (such as irons or cellular phones)

Table 3 lists the candidate indicators, ordered by the entropy-based "uncertainty coefficient" (Goodman and Kruskal, 1979) that measures how well a given indicator predicts poverty status on its own.[25]

One possible application of the scorecard is to measure *changes* in poverty through time. Thus, when selecting indicators—and holding other considerations constant—preference is given to more sensitive indicators. For example, the ownership of a non-electric or electric iron is probably more likely to change in response to changes in poverty than is the age of the male head/spouse.

The scorecard itself is constructed using 100% of the old-definition Göttingen national poverty line and Logit regression on the construction sub-sample from the 2010 LCMS in Schreiner (2013a). Indicator selection uses both judgment and statistics. The first step is to use Logit to build one scorecard for each candidate indicator. The power of each one-indicator scorecard to rank households by poverty status is measured as "c" (SAS Institute Inc., 2004).

[25] The uncertainty coefficient is *not* used when selecting scorecard indicators. It is just a way to order the candidate indicators listed in Table 3.

One of these one-indicator 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 poverty, variety among indicators, applicability across regions, tendency to have a slow-changing relationship with poverty, relevance for distinguishing among households at the poorer end of the distribution of consumption, and verifiability.

A series of two-indicator scorecards are then built, each adding a second indicator to the one-indicator scorecard selected from the first round. The best two-indicator 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 indicators 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 indicators considers both statistical[26] and non-statistical criteria. The use of non-statistical criteria can improve robustness through time and across non-nationally representative groups. It also helps ensure that indicators are simple, common-sense, and acceptable to users.

The single scorecard applies to all of Zambia. Segmenting poverty-assessment tools by urban/rural does not improve targeting accuracy much as shown for nine countries in Sub-Saharan Africa (Brown, Ravaillon, and van de Walle, 2016)[27], Indonesia (World Bank, 2012a), Bangladesh (Sharif, 2009), India and Mexico (Schreiner, 2006 and 2005a), Sri Lanka (Narayan and Yoshida, 2005), and Jamaica (Grosh and Baker, 1995). In general, segmentation may improve the accuracy of estimates of poverty rates (Schreiner, forthcoming; Diamond *et al.*, 2016; Tarozzi and Deaton, 2009), but it may also increase the risk of overfitting (Haslett, 2012).

[26] The statistical criterion for selecting an indicator is not the p values of its coefficients but rather the indicator's contribution to the ranking of households by poverty status.
[27] The nine countries are Burkina Faso, Ethiopia, Ghana, Malawi, Mali, Niger, Nigeria, Tanzania, and Uganda. 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 increased the number of poor people correctly targeted by one per 200 or 400 poor people.

4. Guidelines for scorecard use in practice

The main challenge of scorecard design is not to maximize statistical accuracy but rather to improve the chances that the scorecard is actually 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 scorecards have similar targeting accuracy, thanks to the empirical phenomenon known as the "flat maximum" (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). The bottleneck is less technical and more human, not statistics but organizational-change management. Accuracy is easier to achieve than adoption.

The scorecard 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 simplicity, ease-of-use, and "face validity". Programs are more likely to collect data, compute scores, and pay attention to the results if, in their view, the scorecard does not imply a lot of additional work and if the whole process generally seems to them to make sense.

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

- Only 10 indicators
- Only "multiple-choice" indicators
- Only simple points (non-negative integers, and no arithmetic beyond addition)

The scorecard (and its "Back-page Worksheet") is ready to be photocopied. A field worker using the scorecard in Zambia would:

- Record the interview identifier, interview date, country code ("ZMB"), scorecard code ("001"), and the sampling weight assigned by the program's survey design to the household of the participant (if known)
- Record the names and identifiers of the participant (who need not be the same as the respondent), of the field agent, and of the relevant program service point
- Complete the "Back-page Worksheet" with each household member's first name or nickname, age, and whether each member who is 6- to 17-years-old currently attends school
- Based on what has already been recorded on the "Back-page Worksheet", record the number of household members in the scorecard header next to the heading "Number of household members:"
- Based on what has already been recorded on the "Back-page Worksheet", mark the response to the first scorecard indicator ("How many members does the household have?")
- Based on what has already been recorded on the "Back-page Worksheet", mark the response to the second scorecard indicator ("Are all household members ages 7 to 16 currently attending school?")
- Read the rest of the scorecard indicators to the respondent one-by-one. For the fourth indicator ("What kind of building material is the floor of this dwelling made of?") and fifth indicator ("What kind of building material is the roof of this dwelling made of?"), try to observe (rather than ask about) the answer. If you cannot identify the answer with certainty via your own observation, then ask the respondent
- Draw circles around the relevant responses and their points. Then write each point value in the far right-hand column
- Add up the points to get a total score
- Implement targeting policy (if any)
- Deliver the paper scorecard to a central office for data entry and filing

Of course, field workers must be trained. The quality of outputs depends on the quality of inputs. If programs or field workers gather their own data and 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).[28] IRIS Center (2007a) and Toohig (2008) are useful nuts-and-bolts guides for budgeting, training field workers and supervisors, logistics, sampling, interviewing, piloting, recording data, and controlling quality. Schreiner (2014a) explains how to compute estimates and analyze them.

In particular, while collecting indicators for a scorecard is relatively easier than alternative ways of assessing poverty, it is still absolutely difficult. Training and explicit definitions of terms and concepts in the scorecard are essential, and field workers should scrupulously study and follow the "Guidelines for the Interpretation of Scorecard Indicators" found after the "References" section in this paper, as these "Guidelines"—

[28] If a program does not want field workers and respondents to know the points associated with responses, then it can give them a version of the 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 response options are linked with poverty. 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.

along with the "Back-page Worksheet"—are integral parts of the Simple Poverty Scorecard tool.[29]

For the example of Nigeria, one study (Onwujekwe, Hanson, and Fox-Rushby, 2006) found distressingly low inter-rater and test-retest correlations for indicators as seemingly straightforward as whether a household owns an automobile. At the same time, Grosh and Baker (1995) suggest that gross underreporting of assets does not affect targeting. For household's self-reported responses to indicators in a poverty-assessment tool in the first stage of targeting in Mexico's conditional cash-transfer program *Oportunidades*, Martinelli and Parker (2007, pp. 24–25) find that "underreporting [of asset ownership] is widespread but not overwhelming, except for a few goods . . . [and] overreporting is common for a few goods". Still—as Mexico does in the second stage of its targeting process—most false self-reports can be corrected (or avoided in the first place) by field workers who make a home visit. This is also the recommended procedure for programs who use the scorecard for targeting in Zambia.

[29] The guidelines here are the only ones that organizations should give to field workers. All other issues of interpretation should be left to the judgment of field workers and respondents, as this seems to be what Zambia's CSO did in the LCMS.

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

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

In general, the sampling design should follow from the program's goals for the exercise, the questions to be answered, and the budget. The main goal should be to make sure that the sample is representative of a well-defined population and that the scorecard will inform an issue that matters to the organization.

The non-specialists who apply the scorecard with participants in the field can be:

- Employees of the program
- Third parties

There is only one correct, on-label way to do interviews. They should be done in-person at the sampled household's residence with an enumerator trained to follow the "Guidelines for the Interpretation of Scorecard Indicators". This is how Zambia's CSO did interviews in the LCMS, and this provides the most-accurate data and thus the best poverty-rate estimates. Of course, it is possible to do interviews in other ways such as:

- Without an enumerator (for example, respondents fill out paper or web forms on their own or answer questions sent via e-mail, text messaging, or automated interactive 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, an enumerator interviewing by phone)

While such off-label methods may reduce costs, they also affect responses (Schreiner, 2015a) and thus reduce the accuracy of scorecard estimates. Thus, interviewing by a trained enumerator at the residence is recommended; off-label methods are not recommended.

In some contexts—such as when field agents do not already visit participants periodically at home anyway—an organization might judge that the lower costs an off-label approach are enough to compensate for less-accurate estimates. The business wisdom of off-label methods depends on context-specific factors that organizations must judge for themselves. To judge carefully, organizations who are considering off-label methods should do a test to check how much responses differ with an off-label method versus with a trained enumerator at the residence.

Responses, scores, and poverty likelihoods can be recorded 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
- Portable electronic devices in the field, and then uploaded to a database[30]

[30] The author of this paper can help organizations set up a system to collect data with portable electronic devices in the field or to capture data in a database at the office once paper forms come in from the field.

Given a population of participants relevant for a particular business question, the participants to be scored 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

If not determined by other factors, the number of participants to be scored 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 issues that matter to the program.

The frequency of application can be:

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

When a scorecard is applied more than once in order to measure changes in poverty rates, it can be applied:

- With a different set of participants from the same population
- With the same set of participants

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 Simple Poverty Scorecard tool for Bangladesh (Schreiner, 2013b) with a sample of about 25,000. Their design is that all loan officers in a random sample of branches will score all participants each time they visit a homestead (about once a year) as part of their standard due diligence prior to loan disbursement. They 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 Zambia, 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 reduce it by half.

To get absolute units, scores are converted to *poverty likelihoods*, that is, probabilities of being below a poverty line. This is done via straightforward look-up tables. For the example of 100% of the new-definition national line, scores of 35–39 have a poverty likelihood of 55.0 percent, and scores of 40–44 have a poverty likelihood of 40.0 percent (Table 4).

The poverty likelihood associated with a score varies by poverty line. For example, scores of 35–39 are associated with a poverty likelihood of 55.0 percent for 100% of the new-definition national line but 56.7 percent for the new-definition $1.90/day 2011 PPP line.[31]

[31] From Table 4 on, many tables have 16 versions, one for each of the 16 new-definition poverty lines. To keep them straight, they are grouped by line. Single tables pertaining to all new-definition lines appear with the first group of tables for 100% of the new-definition national line.

5.1 Calibrating scores with poverty likelihoods

A given score is associated ("calibrated") with a poverty likelihood by defining the poverty likelihood as the share of households in the calibration 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 100% of the new-definition national line (Table 5), there are 9,148 (normalized) households in the 2015 calibration sub-sample with a score of 35–39. Of these, 5,035 (normalized) are below the poverty line. The estimated poverty likelihood associated with a score of 35–39 is then 55.0 percent, because 5,035 ÷ 9,148 = 55.0 percent.

To illustrate with 100% of the new-definition national line and a score of 40–44, there are 7,751 (normalized) households in the 2015 calibration sub-sample, of whom 3,102 (normalized) are below the line (Table 5). The poverty likelihood for this score range is then 3,102 ÷ 7,751 = 40.0 percent.

The same method is used to calibrate scores with estimated poverty likelihoods for all 16 new-definition poverty lines.[32]

[32] To ensure that poverty likelihoods never increase as scores increase, likelihoods across series of adjacent scores may sometimes 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.

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 quantitative poverty lines and from survey data on consumption. The calibrated poverty likelihoods would be objective even if the process of selecting indicators 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 indicators and points (Fuller, 2006; Caire, 2004; Schreiner *et al.*, 2014). 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 the Zambia scorecard are transformed coefficients from a Logit regression, (untransformed) scores are not converted to poverty likelihoods via the Logit formula of 2.718281828^{score} x $(1 + 2.718281828^{score})^{-1}$. This is because the Logit formula is esoteric and difficult to compute by hand. Non-specialists find it more intuitive to define the poverty likelihood as the share of households with a given score in the calibration 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.

5.2 Accuracy of estimates of households' poverty likelihoods

As long as the relationships between indicators and poverty do not change over time, and as long as the scorecard is applied to households who are representative of the same population 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 estimate matches the 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 indicators and poverty do change to some unknown extent over time, and they also vary across sub-national groups in Zambia's population. Thus, the scorecard will generally be biased when applied after May 2015 (the last month of fieldwork for the 2015 LCMS) 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 indicators and poverty over time and the assumption of a sample that is representative of Zambia as a whole? To find out, the scorecard is applied to 1,000 bootstrap samples of size $n = 16{,}384$ with the 2015 validation sample. Bootstrapping means to:

- Score each household in a validation sample
- Draw a bootstrap sample *with replacement* from a validation sample
- 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 4) and the poverty likelihood observed 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 two-sided 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 6 shows the average errors, that is, the average differences between estimated and observed poverty likelihoods. It also shows confidence intervals for the differences.

For 100% of the new-definition national line, the average poverty likelihood across bootstrap samples for scores of 35–39 in the 2015 validation sample is too high by 4.0 percentage points. For scores of 40–44, the estimate is too high by 6.9 percentage points.

The 90-percent confidence interval for the differences for scores of 35–39 is ±2.4 percentage points (Table 6). 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 +1.6 and +5.6 percentage points (because +4.0 – 2.4 = +1.6, and +4.0 + 1.6 = +5.6). In 950 of 1,000 bootstraps (95 percent), the difference is +4.0 ± 3.1 percentage points, and in 990 of 1,000 bootstraps (99 percent), the difference is +4.0 ± 4.3 percentage points.

Several of the absolute differences between estimated poverty likelihoods and observed values in Table 6 for 100% of the new-definition national line are large. There are differences because the 2015 validation sample is a single sample that—thanks to sampling variation—differs in distribution from the construction and calibration samples and from Zambia's population. For targeting, however, what matters is less the difference in all score ranges and more the difference in the score ranges just above and below the targeting cut-off. This mitigates the effects of bias and sampling variation on targeting (Friedman, 1997). Section 8 below looks at targeting accuracy in detail.

In addition, if estimates of groups' poverty rates are to be usefully accurate, then errors for individual households' poverty likelihoods must largely balance out. As discussed in the next section, this is generally the case for nationally representative samples in 2015, although it holds less well for samples from sub-national populations or in other time periods.

Another possible source of differences 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 LCMS fieldwork in May 2015. That is, the scorecard may fit the calibration data so closely that it captures not only some real patterns but also some

random patterns that, due to sampling variation, show up only in the 2015 LCMS calibration data but not in the overall population of Zambia. Or the scorecard may be overfit in the sense that it is not robust when relationships between indicators and poverty change over time or when the scorecard is applied to samples 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 here does this. Combining 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 indicators and poverty, sampling variation, changes in poverty lines, inconsistencies in data quality, and imperfections in price adjustments. 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 households in a representative sample from the population.

To illustrate, suppose a program samples three households on 1 January 2018 and that they have scores of 20, 30, and 40, corresponding to poverty likelihoods of 86.7, 69.2, and 40.0 percent (100% of the new-definition national line, Table 4). The group's estimated poverty rate is the households' average poverty likelihood of (86.7 + 69.2 + 40.0) ÷ 3 = 65.3 percent.

Be careful; the group's poverty rate is *not* the poverty likelihood associated with the average score. Here, the average score is 30, which corresponds to a poverty likelihood of 69.2 percent. This differs from the 65.3 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 or colors in the spectrum. Because scores are not numbers on a "ratio" scale, 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 targeting. There are a few contexts

in which the analysis of scores is appropriate,[34] 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 2015 LCMS for the 16 new-definition 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 is the specific 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 $n = 16{,}384$ from the 2015 validation sample and 100% of the new-definition national poverty line, the average error (difference between estimates and observed values in the 2015 validation sample) for a poverty rate at a point in time is +1.0 percentage points (Table 8, summarizing Table 7 across all poverty lines). Across all 16 new-definition poverty lines in the 2015 validation sample, the maximum average absolute error is 2.3 percentage points, and the average of the average absolute errors is about 1.2 percentage points. At least part of these differences is due to sampling variation in the division of the 2015 LCMS into sub-samples.

[34] As discussed elsewhere in this paper, the analysis of scores is appropriate when estimating the direction of change over time with a pre-2015 baseline or follow-up.

When estimating poverty rates at a point in time for a given poverty line, the average error reported in Table 8 should be subtracted from the average poverty likelihood to give a corrected estimate. For the example of the scorecard and 100% of the new-definition national line in the 2015 validation sample, the error is +1.0 percentage points, so the corrected estimate in the three-household example above is 65.3 – (+1.0) = 64.3 percent.

In terms of precision, the 90-percent confidence interval for a group's estimated poverty rate at a point in time with $n = 16{,}384$ is ±0.5 percentage points or better for all new-definition poverty lines (Table 8). This means that in 900 of 1,000 bootstraps of this size with the scorecard's standard assumptions, the estimate (after correcting for the known average error) is within 0.5 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 100% of the new-definition national line is 65.3 percent. Then estimates in 90 percent of such samples would be expected to fall in the range of 65.3 – (+1.0) – 0.5 = 63.8 percent to 65.3 – (+1.0) + 0.5 = 64.8 percent, with the most likely observed value being the corrected estimate in the middle of this range, that is, 65.3 – (+1.0) = 64.3 percent. This is because the original (uncorrected) estimate is 65.3 percent, the average error is +1.0 percentage points, and the 90-percent confidence interval for 100% of the new-definition national line in the 2015 validation sample with this sample size is ±0.5 percentage points (Table 8).

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).

Schreiner (2008) proposes an approach to deriving a formula for the standard errors of estimated poverty rates at a point in time from indirect measurement via poverty-assessment tools. 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, Zambia's 2015 LCMS gives a direct-measurement estimate of the household-level poverty rate for 100% of the new-definition national line in the 2015 validation sample of $\hat{p} = 49.0$ percent (Table 1).[35] If this estimate came from a sample of $n = 16{,}384$ households from a population N of 2,999,088 (the number of households in Zambia in 2015 according to the sampling weights from the 2010 Census used with Zambia's new definition of *poverty*), then the finite population correction ϕ is $\sqrt{\frac{2{,}999{,}088 - 16{,}384}{2{,}999{,}088 - 1}} = 0.9973$, which close to $\phi = 1$. If the desired confidence level is 90-percent ($z = 1.64$), then the confidence interval $\pm c$ is

$$\pm\, z \cdot \sqrt{\frac{\hat{p} \cdot (1 - \hat{p})}{n}} \cdot \sqrt{\frac{N - n}{N - 1}} = \pm 1.64 \cdot \sqrt{\frac{0.490 \cdot (1 - 0.490)}{16{,}384}} \cdot \sqrt{\frac{2{,}999{,}088 - 16{,}384}{2{,}999{,}088 - 1}} = \pm 0.639$$

percentage points. If ϕ were taken as 1, then the interval is ± 0.640 percentage points.

Unlike the 2015 LCMS, however, the scorecard does not measure poverty directly, so this formula is not applicable. To derive a formula for the scorecard, consider Table 7, which reports empirical confidence intervals $\pm c$ for the estimates for the scorecard applied to 1,000 bootstrap samples of various sizes from the 2015 validation sample. For example, with $n = 16{,}384$ and 100% of the new-definition national line in the 2015 validation sample, the 90-percent confidence interval is ± 0.501 percentage points.[36]

[35] The analysis here ignores that poverty-rate estimates from the LCMS are themselves based on samples and so have their own sampling distribution.
[36] Due to rounding, Table 7 displays 0.5, not 0.501.

Thus, the 90-percent confidence interval with $n = 16{,}384$ is ± 0.501 percentage points for the new 2015 scorecard and ± 0.639 percentage points for direct measurement. The ratio of the two intervals is $0.501 \div 0.639 = 0.78$.

Now repeat with exercise with $n = 8{,}192$. The confidence interval under direct measurement and 100% of the new-definition national line in the 2015 validation sample is $\pm 1.64 \cdot \sqrt{\frac{0.490 \cdot (1 - 0.490)}{8{,}192}} \cdot \sqrt{\frac{2{,}999{,}088 - 8{,}192}{2{,}999{,}088 - 1}} = \pm 0.905$ percentage points. The empirical confidence interval with the scorecard (Table 7) is ± 0.720 percentage points. Thus for $n = 8{,}192$, the ratio of the two intervals is $0.720 \div 0.905 = 0.80$.

This ratio of 0.80 for $n = 8{,}192$ is close to the ratio of 0.78 for $n = 16{,}384$. Across all sample sizes of 256 or more in Table 7, these ratios are generally close to each other, and the unweighted average of these ratios in the 2015 validation sample turns out to be 0.80, implying that confidence intervals for indirect estimates of poverty rates via Zambia's scorecard and 100% of the new-definition national line are—for a given sample size—about 20-percent narrower than confidence intervals for direct estimates via the 2015 LCMS. This 0.80 appears in Table 7 as the "α factor for precision" because if $\alpha = 0.80$, then the formula for confidence intervals c for the scorecard is $\pm c = \pm z \cdot \alpha \cdot \sigma$. That is, the formula for the 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 more or less than 1.00. When α is less than 1.00, it means that the scorecard is has smaller standard errors than direct measurement. It turns out that α is less than 1.00 for all of the 16 new-definition poverty lines in Table 8, with a range from 0.75 to 0.98.

The formula relating confidence intervals with standard errors for the scorecard can be rearranged to give a formula for determining sample size before measurement. If $\widetilde{p}$ is the expected poverty rate before measurement, 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 $n = N \cdot \left(\frac{z^2 \cdot \alpha^2 \cdot \widetilde{p} \cdot (1 - \widetilde{p})}{z^2 \cdot \alpha^2 \cdot \widetilde{p} \cdot (1 - \widetilde{p}) + c^2 \cdot (N - 1)} \right)$. 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 $n = \left(\frac{\alpha \cdot z}{c} \right)^2 \cdot \widetilde{p} \cdot (1 - \widetilde{p})$.

To illustrate how to use this, suppose the population N is 2,999,088 (the number of households in Zambia in 2015), suppose $c = 0.04120$, $z = 1.64$ (90-percent confidence), and the relevant poverty line is 100% of the new-definition national line so that the most sensible expected poverty rate $\widetilde{p}$ is Zambia's overall poverty rate for that line in 2015 (49.0 percent at the household level, Table 1). The α factor is 0.80 (Table 8). Then the sample-size formula gives $n = 2{,}999{,}088 \cdot \left(\frac{1.64^2 \cdot 0.80^2 \cdot 0.490 \cdot (1 - 0.490)}{1.64^2 \cdot 0.80^2 \cdot 0.490 \cdot (1 - 0.490) + 0.04120^2 \cdot (2{,}999{,}088 - 1)} \right) = 254$, which

is very close to the sample size of 256 observed for these parameters in Table 7 for 100% of the new-definition national line. Taking the finite population correction factor ϕ as one (1) gives almost the same result, as $n = \left(\frac{0.80 \cdot 1.64}{0.04120}\right)^2 \cdot 0.490 \cdot (1 - 0.490) = 254$.[37]

Of course, the α factors in Table 8 are specific to Zambia, its poverty lines, its poverty rates, and the scorecard. The derivation of the formulas for standard errors using the α factors, however, is valid for any poverty-assessment tool following the approach in this paper.

[37] Although USAID has not specified confidence levels nor intervals, IRIS Center (2007a and 2007b) says that a sample size of $n = 300$ is sufficient for USAID reporting. USAID's microenterprise partners in Zambia should report using the new-definition $1.90/day 2011 PPP line. Given the α factor of 0.79 for this line (Table 8), an expected before-measurement household-level poverty rate of 50.5 percent (the all-Zambia rate for this line in 2015, Table 1), and a confidence level of 90 percent ($z = 1.64$), then $n = 300$ implies a confidence interval of $\pm 1.64 \cdot 0.79 \cdot \sqrt{\frac{0.505 \cdot (1 - 0.505)}{300}} = \pm 3.7$ percentage points.

In practice after the end of LCMS fieldwork in May 2015, a program would select a poverty line (say, 100% of the new-definition national line), note its participants' population size (for example, $N = 10{,}000$ participants), 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 $\widetilde{p}$ (perhaps based on a previous measurement such as the household-level poverty rate for 100% of the new-definition national line for Zambia of 49.0 percent in the 2015 LCMS in Table 1), look up α (here, 0.80 in Table 8), assume that the scorecard will still work in the future and for sub-groups that are not nationally representative,[38] and then compute the required sample size. In this illustration,

$$n = 10{,}000 \cdot \left(\frac{1.64^2 \cdot 0.80^2 \cdot 0.490 \cdot (1 - 0.490)}{1.64^2 \cdot 0.80^2 \cdot 0.490 \cdot (1 - 0.490) + 0.02^2 \cdot (10{,}000 - 1)} \right) = 972.$$

[38] This paper reports accuracy for the scorecard applied to its validation samples, but it does not test accuracy for later years nor for sub-populations that are not nationally representative. Performance after May 2015 will resemble that in the 2015 LCMS with deterioration over time to the extent that the relationships between indicators and poverty status change and to the extent that the population of Zambia changes.

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.

To give an idea of how accurate the scorecard might be when used to measure changes in poverty rates over time from now on, this section looks at how accurate the scorecard would have been if it had been applied with a baseline from the 2015 validation sample and a follow-up from the entire 2010 LCMS.[39]

The tests here are stringent because:

- They compare scorecard estimates with observed values from the LCMS
- The tests are *out-of-sample* in that they use—in both baseline and follow-up—only LCMS data from households that is not used in the calibration of new-definition poverty lines here nor in scorecard construction in Schreiner (2013a)
- The tests are *out-of-time* in that the baseline data is from a different time (2015) than the data used to construct the scorecard (2010)

Of course, these necessarily backward-looking tests can only give—at best—a rough idea of how accurate the scorecard might be when used from now on. After all, the factors that mattered in the past will differ in type and degree from the factors that will matter in the future. This is the unfortunate-but-inevitable nature of scorecards. The expected accuracy of the scorecard after 2015 is discussed more below.

[39] In actual use, of course, the baseline data is collected before the follow-up data. The 2015 data is used as the baseline here (with data from 2010 as the follow-up) because there is no post-2015 data to use as a follow-up. Reversing baseline and follow-up would not change anything. In any case, the tests are merely indicative—not definitive—as there is no way to know for certain how well the scorecard will work in, say, 2018.

Because estimates from the scorecard are unbiased when applied to an unchanging population in which there are unchanging relationships between indicators and poverty, inaccuracies in estimates of change between the 2010 and 2015 LCMS rounds must be due to some combination of:

- Changes in the relationships between indicators and poverty
- Changes in the composition of Zambia's population
- Sampling variation
- Differences in how scorecard indicators were asked across LCMS rounds
- Inconsistent data quality
- Inconstant definitions of *poverty*
- Imperfections in how well a definition of *poverty* captures a household's consumption-based poverty

Of course, the more resistent a scorecard's estimates are to deviations from its assumptions, the better. If a scorecard's real-world inaccuracies render it useless for measuring change in a given context for a given purpose, then it can take no consolation in how well it would work in a (non-existent) world in which all of its assumptions hold.

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 of participation 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 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 Warning: Estimate changes over time in consumption-based poverty only with data from 2015 or after and only for new-definition lines; otherwise, only estimate changes in an asset-based definition of *poverty*

There are large errors in scorecard estimates of changes in consumption-based poverty from 2010 and 2015. The errors probably stem from changes in the relationships between indicators and poverty, and perhaps also from changes in the observed population of Zambia. Thus, the scorecard's assumptions do not hold well across the 2010 and 2015 LCMS. This sub-section discusses the implications.

For new-definition lines from 2010 to 2015, the consumption-based poverty rates for households observed in the LCMS worsened (increased) for the food line and for 100% of the national line. For the other eight new-definition absolute lines (all but one of which are higher than the food line and 100% of the national line), consumption-based poverty rates at the household level improved (decreased) by about 1 or 2 percentage points. Yet the distribution of responses to the 10 scorecard indicators in the LCMS generally improved, signalling improved (decreased) poverty (Table 13):

- Three indicators stayed about the same (number of household members, school attendance of children, and education of the oldest female head/spouse)
- Five improved (quality of floor, and ownership of televisions and video-playback/satellite connections, irons, cellular phones, and beds and mattresses)
- One improved for the most-poor and worsened for the least-poor (quality of roof)
- One worsened for the least-poor (cooking fuel)

On net, the scorecard estimates that poverty increased (worsened) for all lines from 2015 to 2010.[40] The estimated increases exceed the eight observed increases as well as the two observed decreases.

The second-biggest error is for 100% of the new-definition national line. In particular, the scorecard estimates an increase in the household-level poverty rate from 2015 (baseline) to 2010 (follow-up) of 3.5 percentage points, but the LCMS shows a decrease of 0.7 percentage points. The error is then +3.5 – (–0.7) = +4.2 percentage points. It follows that the relationship between indicators and consumption-based poverty must have changed a lot from 2010 to 2014, and perhaps also that the observed population of Zambia changed.

If the scorecard's assumptions do not hold for new-definition lines going back from 2015 to 2010, then it must be that they also do not hold for old-definition lines going forward from 2010 to 2015. Thus, users should not estimate changes in consumption-based poverty rates with pre-2015 data in either the baseline or the follow-up. Furthermore, because the new-definition lines have better economic foundations than the old-definition lines and because the new-definition lines are derived from more-recent data, all estimates of change from now on should use only data from 2015 or after for both baseline and follow-up and only new-definition lines.

[40] This is equivalent to estimating that poverty decreased (improved) from 2010 to 2015.

Legacy users can estimate the direction of change with pre-2015 data that they have already collected as a baseline (or as both a baseline and a follow-up). This approach views scores as an asset-based definition of *poverty* (not as a consumption-based definition), and it addresses only the direction of change (not both the direction and magnitude). The approach is based on changes in the distribution of scores (not changes in the averages of poverty likelihoods). It is completely accurate by definition, as *poverty* is defined in terms of the scorecard's own indicators and points.

What about the scorecard's accuracy for estimating changes in consumption-based poverty from now on? If poverty in Zambia decreases after 2015 and if the scorecard is used to estimate change over short periods, then the scorecard should be about as accurate from now on as is typical among the other 17 countries for which there are similar tests. Assuming that the relationships between indicators and poverty remain close to what they were in 2015 and that the population of Zambia is similar to what it was in 2015, then users from now on can estimate consumption-based changes over time with both a baseline and a follow-up with data from 2015 or after and with new-definition lines without expecting unusual inaccuracy.

7.3 Estimating changes in poverty rates over time

The rest of this section explains how to estimate changes over time. It also reports out-of-sample/out-of-time tests of the accuracy of scorecard estimates of change.

Consider the illustration begun in the previous section. On 1 January 2018, a program samples three households who score 20, 30, and 40 and so have poverty likelihoods of 86.7, 69.2, and 40.0 percent (100% of the new-definition national line, Table 4). Correcting for the known average error for this line in the 2015 validation sample of +1.0 percentage points (Table 8), the corrected baseline estimated poverty rate is the households' average poverty likelihood of [(86.7 + 69.2 + 40.0) ÷ 3] – (+1.0) = 64.3 percent.

After baseline, two sampling approaches are possible at follow-up:

- Score a new, independent sample from the same population
- Score the same sample that was scored at baseline

By way of illustration, suppose that three years later on 1 January 2021, the program samples 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 79.0, 55.0, and 23.6 percent, 100% of the new-definition national line, Table 4). Adjusting for the known average error, the average poverty likelihood at follow-up is [(79.0 + 55.0 + 23.6) ÷ 3] – (+1.0) = 51.5 percent, an improvement of 64.3

– 51.5 = 12.8 percentage points.[41] Supposing that exactly three years passed between the average baseline interview and the average follow-up interview, the estimated annual rate of decrease in poverty is 12.8 ÷ 3 = 4.3 percentage points per year. About one in eight participants in this hypothetical example cross the poverty line between 2018 and 2021.[42] Among those who start below the line, about one in five (12.8 ÷ 64.3 = 19.9 percent) on net end up above the line.[43]

Alternatively, suppose that the same three original households who were scored at baseline are scored again on 1 January 2021. Given scores of 25, 35, and 45, their follow-up poverty likelihoods are 79.0, 55.0, and 23.6 percent. The average across households of the difference in each given household's baseline poverty likelihood and its follow-up poverty likelihood is [(86.7 – 79.0) + (69.2 – 55.0) + (40.0 – 23.6)] ÷ 3 = 12.8 percentage points.[44] Assuming in this example that there are exactly three years between each household's interviews, the estimated annual decrease in poverty is again 12.8 ÷ 3 = 4.3 percentage points per year.

[41] Of course, such a huge 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.
[42] This is a net figure; some start above the line and end below it, and vice versa.
[43] The scorecard does not reveal the reasons for this change.
[44] In this second approach, the error for this line in Table 8 should *not* be subtracted off.

Given the assumptions of the scorecard, both approaches to estimating change through time are unbiased. In general, however, they will give different estimates due to differences in the timing of interviews, in the composition of the samples, and in the nature of two samples being scored once versus one sample being scored twice (Schreiner, 2014a).

7.4 Accuracy for estimated change in two independent samples

The accuracy of the scorecard's estimates of changes in poverty rates over time is checked using data from the 2010 and 2015 LCMS.[45] While one cannot "drive by looking in the rear-view mirror", historical accuracy is the best-available—but inevitably imperfect—indicator of future accuracy.

Change between 2015 (baseline) and 2010 (follow-up) can be estimated for the 10 absolute (non-relative) new-definition poverty lines supported for the scorecard.[46] The average of the average absolute errors across the 10 estimates of change is about 2.2 percentage points (Table 9), while the average of the average absolute changes observed

[45] World Bank (2012b) makes a poverty-assessment tool with data from the 2010 LCMS and uses it to estimate change between the 2006 LCMS and the 2010 LCMS for the definition of *poverty* developed by MacDonald (2012). But the World Bank cannot—unlike this paper for 2010 to 2015—check the accuracy of its tool for estimating change.

[46] Change cannot be estimated for old-definition lines because the CSO does not provide old-definition consumption nor old-definition lines with the 2015 LCMS data. Change cannot be estimated for relative lines because their value is not constant over time. The relative lines are the five new-definition percentile-based lines and the line that marks the poorest half of people below 100% of the new-definition national line.

in the LCMS is about 1.7 percentage points. Thus, the average of the average absolute error is exceeds the average of the average absolute observed change.

The second-worst error is for the most policy-relevant line (100% of the new-definition national line). The observed change looking back from 2015 to 2010 was –0.7 percentage points (the household-level poverty rate decreased from 49.0 percent in 2015 to 48.3 percent in 2010, that is, a decrease of 0.7 percentage points, Table 1). The scorecard, however, estimates that poverty increased by 3.5 percentage points (from 49.0 percent in 2015 to 52.5 percent in 2010). The error is thus the estimated change minus the observed change, that is +3.5 – (–0.7) = +4.2 percentage points (Table 9).[47]

For seven of the 10 estimates, the observed value is in the estimate's 90-percent confidence interval (given $n = 1{,}024$). If the scorecard's assumptions held, of course, then the 90-percent confidence intervals would contain the observed value in more or less nine of the 10 cases.

The estimated direction of change (that is, whether poverty increased or decreased) matches the observed direction of change for eight of 10 cases. The exceptions are the food line and 100% of the national line, two of the three lowest absolute poverty lines.

[47] When pro-poor programs estimate change over time for their participants, they must estimate poverty rates for both for the baseline and the follow-up. In contrast, when a government or the World Bank estimates change for a country's population between a baseline year with a national consumption survey and a follow-up year without a national consumption survey, they observe the baseline poverty rate and need to estimate only the follow-up poverty rate.

Seven of the 10 estimates of the direction of change are "statistically significant" in that the estimated direction matches the observed direction and in that zero is not in the estimate's 90-percent confidence interval (given $n = 1{,}024$). For this low hurdle, accuracy for Zambia is a little worse than in most of the other 17 countries for which such tests have been done (Schreiner 2017a, 2017b, 2016a, 2016b, 2016c, 2016d, 2015b, 2015c, 2015d, 2015e, 2013b, 2013c, 2012c, 2010, 2009a, 2009b; and Chen and Schreiner, 2009).

These results do not encourage the hope that the scorecard can usefully estimate change over time in Zambia, at least when the baseline or follow-up estimate is taken prior to 2015. Of course, accuracy might be better (or worse) from now on.

In sum, the scorecard for Zambia is not recommended for estimating changes in consumption-based poverty with pre-2015 data. From now on and given the scorecard's standard assumptions, estimates of change that use data from 2015 or after and new-definition lines will be about as accurate as is typical in other countries as long as poverty is decreasing in Zambia.

7.5 Precision for estimates of change in two samples

For two equal-sized independent samples (and maintaining the standard assumptions of the scorecard), 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,[48] and α is the average (across a range of bootstrapped sample sizes) of the ratio of the observed confidence interval from a scorecard and the theoretical confidence interval under direct measurement.

For Zambia, the average α across the 10 cases of estimated change with historical data in Table 9 is about 0.83. For $n = 16{,}384$, the 90-percent confidence intervals are about ± 0.8 percentage points or better.

[48] 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 total 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 measurement via a poverty-assessment tool, where $\tilde{p}$ is based on previous measurements and is assumed equal at both baseline and follow-up: $n = 2 \cdot N \cdot \left(\frac{z^2 \cdot \alpha^2 \cdot \tilde{p} \cdot (1 - \tilde{p})}{z^2 \cdot \alpha^2 \cdot \tilde{p} \cdot (1 - \tilde{p}) + c^2 \cdot (N - 1)} \right)$. If ϕ can be taken as one, then the formula becomes $n = 2 \cdot \left(\frac{\alpha \cdot z}{c} \right)^2 \cdot \tilde{p} \cdot (1 - \tilde{p})$.

To illustrate the use of this formula to determine sample size for estimating changes in poverty rates across 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 100% of the new-definition national line, $\alpha = 0.86$ (Table 9), $\hat{p} = 0.490$ (the household-level poverty rate in 2015 for 100% of the new-definition national line in Table 1), 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 $n = 2 \cdot \left(\frac{0.86 \cdot 1.64}{0.02} \right)^2 \cdot 0.490 \cdot (1 - 0.490) \cdot 1 = 2{,}486$, and the follow-up sample size is also 2,486.

7.6 Precision for estimated change for 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 a single group of households, all of whom are scored at two points in time, is:[49]

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

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. With the available data for Zambia, it is not possible to estimate values of α here.

The formula for confidence intervals can be rearranged to give a formula for sample size before measurement. This requires an estimate (based on information available before measurement) of the expected shares of all households who cross the poverty line $\tilde{p}_{12}$ and $\tilde{p}_{21}$. Before measurement, 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:

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

[49] See McNemar (1947) and Johnson (2007). John Pezzullo helped find this formula.

Because $\widetilde{p}_*$ could be anything between 0 and 0.5, more information is needed to apply this formula. Suppose that the observed relationship between $\widetilde{p}_*$, the number of years y between baseline and follow-up, and $p_{\text{pre-baseline}} \cdot \left(1 - p_{\text{pre-baseline}}\right)$ is—as in Peru (Schreiner, 2009c)—close to:

$$\widetilde{p}_* = -0.02 + 0.016 \cdot y + 0.47 \cdot \left[p_{\text{pre-baseline}} \cdot \left(1 - p_{\text{pre-baseline}}\right)\right].$$

Given this, a sample-size formula for a group of households to whom the scorecard is applied twice (once after May 2015 and then again later) is

$$n = 2 \cdot \left(\frac{\alpha \cdot z}{c}\right)^2 \cdot \left[-0.02 + 0.016 \cdot y + 0.47 \cdot p_{\text{pre-baseline}} \cdot \left(1 - p_{\text{pre-baseline}}\right)\right] \cdot \sqrt{\frac{N - n}{n - 1}}.$$

In Peru (the only source of a data-based estimate, Schreiner, 2009c), the unweighted average of α across years and poverty lines is about 1.30.

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 100% of the new-definition national line, the sample will first be scored in 2018 and then again in 2021 ($y = 3$), 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 poverty rate p_{2018} is taken as 49.0 percent (Table 1), and α is assumed to be 1.30. Then the baseline sample size is

$n = 2 \cdot \left(\frac{1.30 \cdot 1.64}{0.02}\right)^2 \cdot \left[-0.02 + 0.016 \cdot 3 + 0.47 \cdot 0.490 \cdot \left(1 - 0.490\right)\right] \cdot 1 = 3{,}306$. The same group of 3,306 households is scored at follow-up as well.

8. Targeting

When a program uses the scorecard for segmenting clients 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 poverty-assessment tool.

Households who score at or below a given cut-off should be labeled as *targeted*,[50] not as *poor*. After all, unless all targeted households have poverty likelihoods of 100 percent, some of them are non-poor (their consumption is above a given poverty line). With 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 when households truly below a poverty line are targeted (*inclusion*) and when households truly above a poverty line are not targeted (*exclusion*).

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

Of course, no poverty-assessment tool is perfect, and targeting is unsuccessful when households truly below a poverty line are not targeted (*undercoverage*) or when households truly above a poverty line are targeted (*leakage*).

Table 10 depicts these four possible targeting outcomes. Targeting accuracy varies by the cut-off score; a higher cut-off has better inclusion (but worse leakage), while a lower cut-off has better exclusion (but worse undercoverage).

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 total net benefits (Adams and Hand, 2000; Hoadley and Oliver, 1998).

Table 11 shows the distribution of households by targeting outcome for Zambia. For an example cut-off of 39 or less, outcomes for 100% of the new-definition national line in the 2015 validation sample are:

- Inclusion: 43.1 percent are below the line and correctly targeted
- Undercoverage: 5.9 percent are below the line and mistakenly not targeted
- Leakage: 10.8 percent are above the line and mistakenly targeted
- Exclusion: 40.2 percent are above the line and correctly not targeted

Increasing the cut-off to 44 or less improves inclusion and undercoverage but worsens leakage and exclusion:

- Inclusion: 46.0 percent are below the line and correctly targeted
- Undercoverage: 3.0 percent are below the line and mistakenly not targeted
- Leakage: 15.6 percent are above the line and mistakenly targeted
- Exclusion: 35.3 percent are above the line and correctly not targeted

Which cut-off is preferred depends on total net benefit. 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 11 for a given 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 a 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:

Hit rate =	1	x	Households correctly included	–
	0	x	Households mistakenly undercovered	–
	0	x	Households mistakenly leaked	+
	1	x	Households correctly excluded.	

Table 11 shows the hit rate for all cut-offs for the scorecard. For 100% of the new-definition national line in the 2015 validation sample, total net benefit—under the hit rate—is greatest (83.3) for a cut-off of 39 or less, with about five in six households in Zambia correctly classified.

The hit rate weighs successful inclusion of households below the 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 x Households correctly included) + (1 x Households correctly excluded).[51]

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 12 ("% targeted HHs who are poor") shows, for the scorecard applied to the 2015 validation sample, the expected poverty rate among households who score at or below a given cut-off. For the example of 100% of the new-definition national line, targeting households in the 2015 validation sample who score 39 or less would target 53.9 percent of all households (second column) and would be associated with an expected poverty rate among targeted households of 80.0 percent (third column).

[51] Table 11 also reports BPAC, the Balanced Poverty Accuracy Criteria adopted by USAID for certifying poverty-assessment tools. IRIS Center (2005) made BPAC to consider accuracy in terms of estimated poverty rates and in terms of targeting inclusion. BPAC = (Inclusion – |Undercoverage – Leakage|) x [100 ÷ (Inclusion + Undercoverage)]. Schreiner (2014b) explains why BPAC does not add any useful information beyond that provided by the other, more-standard measures here.

Table 12 also reports two other measures of targeting accuracy. The first is a version of coverage ("% poor HHs who are targeted"). For the example of 100% of the new-definition national line with the 2015 validation sample and a cut-off of 39 or less, 87.9 percent of all poor households are covered.

The final targeting measure in Table 12 is the number of successfully targeted poor households for each non-poor household mistakenly targeted (right-most column). For 100% of the new-definition national line with the 2015 validation sample and a cut-off of 39 or less, covering 4.0 poor households means leaking to 1 non-poor household.

9. Context of poverty-assessment tools in Zambia

This section discusses four existing poverty-assessment tools for Zambia in terms of their goals, methods, definitions of *poverty*, data, indicators, errors, standard errors, and cost. In general, the advantages of the scorecard are its:

- Using data from the most-recent nationally representative consumption survey
- Having fewer and lower-cost indicators than most other tools
- Using a consumption-based definition of *poverty* that is widely understood and that is used by the government of Zambia
- Reporting errors and precision for estimates of poverty rates at a point in time from out-of-sample tests, including formulas for standard errors
- Reporting of errors and precision for out-of-sample/out-of-time estimates of changes in poverty rates over time, including formulas for standard errors
- Reporting targeting accuracy from out-of-sample tests
- Being feasible for pro-poor programs in Zambia, due to its low cost and transparency

9.1 Gwatkin *et al.*

Gwatkin *et al.* (2007) construct a poverty-assessment tool for Zambia with an approach that they use in 56 countries with Demographic and Health Surveys (Rutstein and Johnson, 2004). They use Principal Component Analysis to make an asset index from low-cost indicators available for the 7,126 households in Zambia's 2001/2 DHS.[52] The PCA index is like the scorecard here except that—because the DHS does not collect data on consumption—the index uses a different (asset-based) definition of *poverty* and that its accuracy vis-à-vis consumption-based poverty is unknown.[53] Well-known examples of the PCA asset-index approach include Stifel and Christiaensen (2007), Zeller *et al.* (2006), Sahn and Stifel (2003 and 2000), Henry *et al.* (2003), and Filmer and Pritchett (2001).

[52] DHS data for Zambia since 1996 include each household's asset-index value (`dhsprogram.com/topics/wealth-index/Wealth-Index-Construction.cfm`, retrieved 14 June 2017).

[53] Nevertheless, the "flat maximum" and the similarity of the indicators is important, so carefully built PCA indexes and consumption-based poverty-assessment tools rank households much the same and may pick up the same underlying construct (perhaps "permanent income", see Bollen, Glanville, and Stecklov, 2007). Comparisons of rankings of households by PCA indexes, directly-measured consumption, and consumption-based poverty-assessment tools include Filmer and Scott (2012), Howe *et al.* (2009), Lindelow (2006), Sahn and Stifel (2003), Wagstaff and Watanabe (2003), and Montgomery *et al.* (2000).

The 14 indicators in Gwatkin *et al.* are similar to those in the scorecard here in terms of their simplicity, low cost, and verifiability:

- Characteristics of the residence:
  - — Presence of electricity
  - — Use of solar power
  - — Type of floor
  - — Type of cooking fuel
  - — Source of drinking water
  - — Type of toilet arrangement
- Whether the household has a domestic worker not related to the head
- Ownership of consumer durables:
  - — Radio
  - — Television
  - — Refrigerator
  - — Telephone
  - — Bicycle
  - — Motorcycle/scooter
  - — Car/truck

Gwatkin *et al.* suggest three possible uses for their index:

- Segmenting households by the quintile of their index value to see how health varies with socio-economic status under an asset-based definition
- Monitoring (via exit surveys) how well local health-service posts reach the poor
- Measuring local coverage of health services via small-scale surveys

The first goal is segmentation, and the last two goals involve performance monitoring, so the asset index would be used much like the scorecard. In particular, the scorecard's support for relative (percentile-based) poverty lines allows the segmentation of households by quintile of consumption to see how health (or other things) vary with consumption. Of course, it is also possible to segment households by quintiles based on scores from the scorecard to see how health (or other things) vary with an asset-based definition of *poverty*.

The Gwatkin *et al.* index is more costly and difficult-to-use than the scorecard. The index has 14 indicators (versus 10), and while the scorecard requires adding up 10 integers (some of them usually zeroes), Gwatkin *et al.*'s index requires adding up 46 numbers, each with five decimal places and about half with negative signs.

A strength of asset indexes is that, because they do not require consumption data, they can be constructed with data from a wide array of "light" surveys such as censuses, Demographic and Health Surveys, Welfare Monitoring Surveys, and Core Welfare Indicator Questionnaires. In comparison, the scorecard is linked directly to a consumption-based poverty line. Thus, while both approaches can rank households, only the scorecard can estimate consumption-based poverty status. Like an already-constructed asset index, an already-constructed scorecard can be applied to data from a "light" survey that does not collect consumption as long as the "light" survey collects indicators that match those in the scorecard (Schreiner, 2011).

In essence, Gwatkin *et al.*—like all asset indexes—define *poverty* in terms of the indicators and points in the index itself. Thus, the index is not a proxy standing in for something else (such as consumption). Rather, it is a direct measure of an asset-based (non-consumption-based) definition of *poverty*. There is nothing wrong—and a lot right—about defining *poverty* in this way, but it is not as common as a consumption-based definition. It also means that results are not comparable across different asset indexes because the definition of *poverty* varies with a given index's indicators and

points. And an asset index can estimate only the direction of change in its definition of *poverty* over time, not the magnitude of change.

In general, the asset-based approach defines people as *poor* if their assets (physical, human, financial, or social) fall below a threshold. Arguments for an asset-based view of development and well-being include Carter and Barrett (2006), Schreiner and Sherraden (2006), Sahn and Stifel (2003), and Sherraden (1991). The main advantages of the asset-based view are that:

- Assets are easier to measure accurately than consumption
- Access to resources in the long term—and thus capacity to produce income and to consume—depends on the control of assets
- Assets get at specific capabilities more directly, the difference between, say, "Can you afford adequate sanitation on your income?" versus "Do you have a flush toilet?"

While the asset view and the income/consumption view are distinct, they are also tightly linked. After all, income and consumption are flows of resources received/consumed from the use of stocks of assets. Both views are low-dimensional simplifications—due to practical limits on definitions and measurement—of a higher-dimensional and more-complete conception of the production of human well-being.

9.2 Filmer and Scott

Filmer and Scott (2012) test (on 11 countries, including Zambia) how well ranks from several types of asset indexes correlate with ranks from:

- Other asset indexes
- Consumption as directly measured by a survey
- Consumption as estimated by a poverty-assessment tool

They find that different approaches to constructing asset indexes generally lead to similar rankings vis-à-vis the benchmarks of directly measured consumption and of poverty-assessment tools. This result is strongest for countries where regression works well for predicting consumption and weakest for less-poor countries with larger shares of non-food consumption. Among the 11 countries tested by Filmer and Scott, correlations are consistently weakest for Zambia.

For their Zambia indexes, Filmer and Scott use data on the 19,247 households in the 2004 LCMS to select 34 indicators that—as in Gwatkin *et al.* and in this paper—are simple, low-cost, and verifiable:

- Characteristics of the residence:
  - Type of residence
  - Type of floor
  - Type of walls
  - Type of roof
  - Type of cooking device
  - Source of drinking water
  - Source of energy for lighting
  - Source of energy for cooking
  - Type of toilet arrangement

- Ownership of consumer durables:
  - — Radio
  - — Television
  - — Video player
  - — Satellite dish/decoder
  - — Refrigerator
  - — Deep freezer
  - — Land-line telephone
  - — Cellular telephone
  - — Internet connection
  - — Bicycle
  - — Motorcycle
  - — Motor vehicle
  - — Tractor
  - — Brazier
  - — Electric stove
  - — Gas stove
  - — Hammer/grinding mill
  - — Non-electric iron
  - — Electric iron
  - — Sewing machine
  - — Knitting machine
  - — Dining table
  - — Sofa
  - — Bed
  - — Mattress

Filmer and Scott's goal is to establish the general properties of approaches to constructing asset indexes (rather than to provide asset indexes that local, pro-poor organizations can use), so they do not report the tool's points or standard errors, so their tools cannot actually be used by pro-poor organizations in Zambia.

9.3 Sahn and Stifel (2000)

Sahn and Stifel (2000) use factor analysis (a close relative of PCA that gives similar results) to construct an asset index for Zambia meant to measure poverty in terms of long-term wealth. Their purpose relates to assessment (to inform governments and donors about the broad progress of poverty reduction in Africa) rather than management and accountability (to provide a tool to help pro-poor organizations to prove and improve their poverty-alleviation efforts).

Sahn and Stifel construct their index by pooling data from Zambia's 1992 and 1996 DHS. Defining poverty status according to lines set at the 25^{th} and 40^{th} percentiles of their index, they then compare the distribution of the index and poverty rates over time (within Zambia) and across countries (Zambia and 10 other sub-Saharan countries).

For the cross-country analysis, Sahn and Stifel construct a single cross-country index from pooled DHS data for the 11 countries with multiple DHS rounds (plus five others for which only a single DHS round is available). This is possible because the DHS generally uses a common set of indicators across countries.

The eight indicators in Sahn and Stifel are similar to those in Gwatkin *et al.* and in the scorecard here in terms of their ease-of-collection and verifiability:

- Education of the head
- Characteristics of the residence:
  - — Type of floor
  - — Source of drinking water
  - — Type of toilet arrangement
- Ownership of consumer durables:
  - — Radio
  - — Television
  - — Refrigerator
  - — Motorized transport

Like Gwatkin *et al.*, Sahn and Stifel share many of the strengths of the approach here in that it can be used for targeting and in that it is flexible, low-cost, and adaptable to diverse contexts. Sahn and Stifel point out that because an asset index does not require price adjustments over time or between countries—and because it does not require consumption data at all—it has lower data requirements than consumption-based poverty-assessment tools.

Sahn and Stifel also share with Gwatkin *et al.* the disadvantages of using a less-common definition of *poverty* and of not reporting standard errors.

Sahn and Stifle find that poverty in Zambia improved (decreased) from 1992 to 1996. Among the 15 countries studied,[54] Zambia had the eight- or ninth-highest asset-based poverty rate.

[54] Besides Zambia, these are Benin, Cameroon, Central African Republic, Comoros, Côte d'Ivoire, Ghana, Kenya, Mali, Mozambique, Senegal, Tanzania, Togo, Uganda, and Zimbabwe.

Booysen *et al.* (2008) closely follow Sahn and Stifel (2000). For Zambia, Booysen *et al.* construct asset indexes from the same two DHS rounds as Sahn and Stifel (and additionally the 2001 DHS). They use seven of the same eight indicators, and they also find that asset-based poverty increased (worsened) from 1992 to 1996 (and also from 1996 to 2001). Zambia was the only one of the seven countries with two estimates of change that implied more poverty over time, and it was the only country to show an unambiguous increase in inequality.[55] Booysen *et al.* differ from Sahn and Stifle (2000) mostly in their use Multiple Correspondence Analysis instead of factor analysis. MCA is PCA, relaxing the assumption that indicators have Normal distributions. In principle, this makes MCA better suited for categorical indicators, although Booysen *et al.* do not show that this changes any results vis-à-vis PCA.

[55] For Booysen *et al.*, the seven countries are Zambia and Ghana, Kenya, Mali, Senegal, Tanzania, Zambia, and Zimbabwe.

9.4 de la Fuente, Murr, and Rascón

de la Fuente, Murr, and Rascón (2105) use data from the 2010 LCMS to construct a poverty-assessment tool that they then apply to data from the 2010 Census to estimate consumption-based, person-level poverty rates for the old-definition (CSO) food and national lines for Zambia's 10 provinces, 74 districts, 150 constituencies, and 1,421 wards. The results are displayed in tables and in "poverty maps" (Elbers, Lanjouw, and Lanjouw, 2003) that show at a glance how poverty rates vary across small areas. The goal is to help "policymakers to prioritize the use of scarce resources in the areas that need them the most" (p. 48). This is a practical and relevant goal, as the equal-sized grants from Zambia's Community Development Fund to constituencies "are under the control of the local member of parliament who is a member of the Constituency Development Committee" (p. 36). Zambia also may ramp up its Social Cash Transfer Scheme, targeted to households under the old-definition (CSO) food line who also have three or more children or elderly people per working adult.

de la Fuente, Murr, and Rascón build a single[56] all-Zambia poverty-assessment tool using least-squares regression on the logarithm of per-adult-equivalent consumption for households in the 2010 LCMS. The tool uses only indicators whose questions and

[56] de la Fuente, Murr, and Rascón are unlike almost all other poverty maps in building a single, all-country tool. The choice reduces overfitting (Haslett, 2012), and it also follows Mahadevan, Yoshida, and Praslova (2013, pp. 6–7) who say that "the latest recommendation from poverty-map experts in the World Bank Research Department is not to use multiple [tools] to predict household consumption." Multiple tools can be "problematic since the number of observations for each area becomes small and, as a result, the regression coefficients become less stable."

response options are identical in the LCMS and in the 2010 Census and whose response distributions are not very different.

Once constructed, the tool is applied to estimate consumption for each household in the 2010 Census. The poverty map's estimate of the poverty rate in a given province, district, constituency, or ward is the share of people in households whose estimated consumption is less than the old-definition (CSO) food or national line. The poverty-map estimates have smaller standard errors than direct estimates based solely on LCMS data,[57] and pro-poor policies can be targeted to the areas with the highest estimated poverty rates and/or with the largest numbers of poor people.

Poverty mapping in de la Fuente, Murr, and Rascón is similar to the scorecard in this paper in that they both:

- Build poverty-assessment tools with data that are representative of a population and then apply the tools to other data on sub-groups that are not, in general, representative of the same population
- Build a single scorecard that applies to all of Zambia
- Use simple, verifiable indicators that are quick and inexpensive to collect
- Provide unbiased estimates when their assumptions hold
- Seek to be useful in practice and so aim to be understood by non-specialists

Strengths of poverty mapping include that it:

[57] de la Fuente, Murr, and Rascón report standard errors for their estimates as well as the poverty map's province-level errors (differences between the map's poverty-rate estimates and observed rates in the 2010 LCMS). The poverty rates for Zambia's districts, constituencies, and wards are measured imprecisely or not at all in the 2010 LCMS (which is why the poverty map is useful in the first place), so the map's errors below the level of provinces are unknown. As highlighted by Tarozzi and Deaton (2007), standard errors are only one aspect of the accuracy of a poverty-assessment tool. As a source of inaccuracy in poverty maps and in the scorecard, the unknown estimation errors probably swamp sampling variation (summarized by the known standard errors).

- Has formally established theoretical properties
- Can be applied straightforwardly to measures of well-being (such as the poverty gap) beyond head-count poverty rates
- Accounts for uncertainty in the estimation of a given tool's points when estimating the standard errors of its poverty-rate estimates
- Requires data on fewer households for construction
- Uses only indicators that are in a census
- Reports standard errors (and complex formula for standard errors)

Strengths of the scorecard include that it:

- Is more transparent and understandable in terms of construction and application
- Associates poverty likelihoods with scores non-parametrically
- Reduces overfitting by selecting indicators with statistical and non-statistical criteria
- Surfaces estimates of poverty likelihoods for individual households
- Reports errors and standard errors (and straightforward formulas for standard errors)

In terms of goals, the two approaches differ in that poverty mapping seeks to help governments to target pro-poor policies to the poorest regions, while the scorecard seeks to help local, pro-poor programs to prove and improve their social performance. These different goals lead directly to their differences in cost, complexity, and transparency.

In terms of their technical approaches, poverty mapping estimates consumption, while the scorecard estimates poverty likelihoods. Poverty maps—unlike the scorecard—report standard errors that account for survey design and for uncertainty in the estimates of a tool's point values.

In terms of targeting, the developers of poverty mapping say that their poverty-assessment tools are too inaccurate for targeting individual households (Elbers, Lanjouw, and Lanjouw, 2003; Demombynes *et al.*, 2004). In contrast, Schreiner (2015e)

supports targeting as a legitimate, potentially useful application of the scorecard. In Elbers *et al.* (2007), the developers of poverty mapping seem to take a small step away from their original opposition to targeting individual households with poverty-assessment tools.

From a pool of candidate indicators matched between the 2010 LCMS and the 2010 Census, de la Fuente, Murr, and Rascón select 19 that are verifiable, inexpensive to collect, and correlated with consumption:

- Number of household members (and its square)
- Characteristics of the head of the household:
  - Age (and its square)
  - Whether he/she is an employee
- Maximum level of education attained by a household member
- Characteristics of the residence:
  - Type of floor
  - Type of wall
  - Type of roof
  - Source of energy used for lighting
  - Source of energy used for cooking
  - Main method of disposal of garbage
- Ownership of consumer durables:
  - Computer
  - Automobile
  - Plough
- Location of residence:
  - Urban/rural
  - District
- Combinations of two indicators:
  - District, and the age of the head
  - Province, and the age of the head
  - Province, and the number of household members
  - Maximum level of education attained by a household member, and the number of household members

The out-of-sample, point-in-time estimation errors reported by de la Fuente, Murr, and Rascón (p. 26) at the level of provinces can be compared with those of the scorecard here (Table 14). For the comparison, the scorecard is unchanged, but its household-level estimates are weighted by household size to give person-level estimates. Errors are found by applying the scorecard in 100 bootstraps of $n = 1{,}024$ for households in a given province in the 2010 validation sample. The unweighted average of the errors across the 10 provinces is higher for the scorecard (3.6 versus 2.1 percentage points) than for the poverty map (Table 14). The scorecard is especially inaccurate in Southern province, with an error of +8.9 percentage points.

10. Conclusion

Pro-poor programs in Zambia can use the scorecard to segment clients for differentiated treatment as well as to estimate:

- The likelihood that a household has consumption below a given poverty line
- A population's poverty rate at a point in time
- The change in a population's consumption-based poverty rate over time (subject to the caveats discussed in this paper)

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

Schreiner (2013a) constructed the scorecard with data from half of the households in Zambia's 2010 LCMS, using that same data to calibrate scores to poverty likelihoods for old-definition (Göttingen and CSO) poverty lines. The present paper uses half of the data from the 2015 LCMS to calibrate scores to poverty likelihoods for 16 new-definition poverty lines. The scorecard's accuracy (errors and standard errors) is tested out-of-sample on data that is not used in scorecard construction/calibration for targeting, for estimates of household's poverty likelihoods at a point in time, and for estimates of a population's poverty rates a point in time.

When the scorecard is applied to the 16 new-definition poverty lines in the 2015 validation sample, the maximum average absolute error for point-in-time estimates of poverty rates is 2.3 percentage points, and the average of the average absolute errors across poverty lines is about 1.2 percentage points. Corrected estimates may be had by

subtracting the known error for a given poverty line from the original, uncorrected estimates.

For $n = 16{,}384$ and 90-percent confidence, the precision of point-in-time estimates of poverty rates is ± 0.5 percentage points or better. With $n = 1{,}024$, the 90-percent confidence intervals are ± 2.2 percentage points or better.

The accuracy of estimates for changes in consumption-based poverty rates over time is tested out-of-sample and out-of-time. Of course, the scorecard's estimates of change are not necessarily the same as estimates of program impact. It turns out that the errors of estimates of change for the scorecard applied with the 2015 validation sample (baseline) and with the 2010 validation sample (follow-up) are large, especially for the most policy-relevant line and for the two other lowest lines. The factors driving these errors also affect the accuracy of estimates of change over time based on old-definition lines from 2010 onwards.

Users can deal with this in two ways. First, they can estimate changes in consumption-based poverty rates using only data from 2015 and after (for both baseline and follow-up) and only with new-definition lines. As long as the improvement in consumption in Zambia from 2015 onwards is in step with the improvement in the scorecard indicators (that is, as long as the relationships between indicators and poverty does not change much), as long as the observed population of Zambia does not change much, as long as the scorecard is like those in the other 17 countries for which the accuracy of change over time has been tested, and as long as the scorecard is

updated in a reasonable time frame, then the scorecard should not be expected to suffer from unusually large inaccuracies.

Second, legacy users with pre-2015 data can estimate change over time for an asset-based definition of *poverty*. This approach estimates the direction of change based on changes in the distribution of asset-based scores (rather than estimating the direction and magnitude of change based on changes in the averages of consumption-based poverty likelihoods). Such an asset-based approach is perfectly valid—and it has some advantages over a consumption-based approach—but asset-based estimates of poverty can be more difficult to communicate, and they are not comparable with consumption-based estimates nor with asset-based estimates from other poverty-assessment tools. But the asset-based approach does let legacy users salvage pre-2015 data that they already have.

If a program wants to use the scorecard for segmenting clients for differentiated treatment, then the results here provide useful information for selecting a targeting cut-off that fits its values and mission.

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

For this reason, the scorecard uses 10 indicators that are straightforward, low-cost, and verifiable. Points are all zeros or positive integers, and scores range from 0 (most likely below a poverty line) to 100 (least likely below a poverty line). Scores are converted to poverty likelihoods via look-up tables, and targeting cut-offs are likewise straightforward to apply. The design attempts to facilitate voluntary adoption by helping 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 poverty-assessment tool is a practical, objective way for pro-poor programs in Zambia to estimate consumption-based poverty rates, to track changes in poverty rates over time, and to segment participants for differentiated treatment. The same approach can be applied to any country with similar data.

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Guidelines for the Interpretation of Scorecard Indicators

The excerpts quoted below come from:

Central Statistical Office. (2009) "Enumerator's Instruction Manual: Living Conditions Monitoring Survey VI—2010", `catalog.ihsn.org/index.php/catalog/2597/download/38844`, retrieved 15 June 2017. [the *Manual*]

Only train enumerators and promulgate rules from these "Guidelines"

When an issue comes up that is not addressed here, its resolution should be left to the unaided judgment of the enumerator, as that seems to have been what Zambia's CSO did in the 2015 LCMS. That is, an organization using the scorecard should not promulgate any definitions or rules (other than those in these "Guidelines") to be used by all its field agents. Anything not explicitly addressed in these "Guidelines" is to be left to the unaided judgment of each individual enumerator. This is meant to mimic the practice in the 2015 LCMS.

Guidelines for asking scorecard questions

Study these "Guidelines" carefully, and carry them with you while you work.

In an interview, the first thing you as the enumerator should do is fill out the scorecard header and the "Back-page Worksheet", following the directions on the "Back-page Worksheet".

Do not ask the first scorecard indicator directly ("How many members does the household have?"). Instead, use the information recorded on the "Back-page Worksheet" to determine the response to mark. You must also record the number of household members in the scorecard header next to "Number of household members:".

Likewise, do not ask the second scorecard indicator directly ("Are all household members ages 7 to 16 currently attending school?"). Instead, use the information recorded on the "Back-page Worksheet" to determine the response to mark. In particular, if "No" is *ever* circled on the "Back-page Worksheet", then mark response "A. No" for the second indicator. If "Not 7 to 16" is circled for *all* household members, then mark "C. No one 7 to 16". Otherwise, mark "B. Yes".

Do not read the response options to the respondent. Just 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 these "Guidelines" or as you, the enumerator, deem appropriate.

Read the questions word-for-word exactly as they are written (except when directed otherwise in these "Guidelines") and in the order in which they appear on the scorecard.

According to p. 73 of the *Manual*, you should try to observe (rather than ask about) the fourth scorecard indicator ("What kind of building material is the floor of this dwelling made of?") and the fifth scorecard indicator ("What kind of building material is the roof of this dwelling made of?"). You should "be observant and mark the answers yourself if you can clearly identify the material of the dwelling's floor [or roof]. If you cannot clearly identify it, then ask the respondent." You should ask all of the other eight scorecard questions directly of the respondent (except as directed above for the two indicators whose responses are based on information gathered on the "Back-page Worksheet").

When you mark a response to a scorecard indicator, circle the spelled-out response option and its point value, and write the point value in the "Score" column, like this:

2. Are all household members ages 7 to 16 currently attending school?	A. No	0	
	B. Yes	3	3
	C. No one 7 to 16	6	

In general, you should accept the responses given by the respondent. Still, 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 these "Guidelines".

While most indicators in the scorecard are verifiable, usually you do not need to verify responses. You should verify a response only if something suggests to you that the response may not be accurate 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 or be confused. Likewise, verification is probably appropriate if a child in the household or a neighbor says something that does not square with the respondent's answer.

Verification is also a good idea if you happen to see something yourself—such as a consumer durable that the respondent avers not to possess, or a child eating in the room who has not been counted as a member of the household—that suggests that a response may not be accurate.

In general, your application of the scorecard should mimic as closely as possible the application of the 2015 LCMS by Zambia's CSO. For example, scoring interviews should take place in respondents' homesteads because the 2015 LCMS took place in respondents' homesteads.

Questionnaire Translation

These "Guidelines"—and this document in general—currently exist in only in English and Bemba. There is not yet an official, standard translation of the scorecard, "Back-page Worksheet", poverty-likelihood look-up tables, and these "Guidelines" to other languages spoken by many people in Zambia such as Tonga. Please check `SimplePovertyScorecard.com` to see if other translations have been done since this writing.

If there is no official, standard translation to a given language, users should contact the author for help in creating such a translation.

Additional general guidelines

Enumerator Conduct:
According to p. 4 of the *Manual*, "As an enumerator, be polite and try to establish good relationships with all households you are dealing with, including local authorities within the area assigned to you. You should stimulate interest in the survey so that the best information possible is obtained from the respondents.

"Do not argue with respondents, rebuke them, or discuss politics with them. If a respondent leads you into a conversation outside your work, then politely decline. If a respondent is hostile or not very cooperative with you, then consult your supervisor who will solicit the respondent's cooperation.

"Dress appropriately when collecting data from households. You should always be clean and dressed in a manner accepted by the community where you are operating."

Confidentiality:
According to p. 5 of the *Manual*, do not "show, give, discuss, or disclose any information you have received from the respondents to/with anybody who is not directly involved in the survey, not even a family member or a friend. . . . Do not leave the questionnaires issued to you in any place where an unauthorised person may see them. As an enumerator, you must ensure the safety and confidentiality of the questionnaires and data that you collect by always keeping them in a safe place."

Introduction to the community:
According to p. 7 of the *Manual*, the cooperation and good will of the people in the community where you are working is essential for the success of the survey. Thus, try to introduce yourself to the traditional local leaders and to other influential persons in the area to solicit their cooperation.

"Before interviewing a household, politely introduce yourself and announce the purpose of your visit. After every interview, thank the respondent(s)."

Preferred respondent:
The respondent does not need to be the same person as the household member who is a participant with your organization.

According to p. 8 of the *Manual*, "The most-preferred respondent is the head of the household. The next-preferred respondent is the spouse of the head of the household. In the absence of these two persons, find out who is the most knowledgeable member of the household. [That person should] be the main respondent. In some cases, the head of the household is available but will refer you to another knowledgeable household member. This will become your main respondent."

Head of the household:
According to p. 15 and pp. 31–32 of the *Manual*, the *head of the household* is "the person whom all members of the household regard as the head. He/she is the one who normally makes day-to-day decisions governing the running of the household. In most cases (but not all), this is the husband/father in the household. For one-member households, that one member is the head of the household. The head of the household can either be male or female.

"The main respondent will not necessarily be the head of the household. In many of the households you will visit, the head of household will also be the main respondent, that is, the one giving most of the information. But any knowledgeable member of the household can be a respondent. A respondent who is not the head of the household can answer the questions on behalf of the head of household if the head of the household is not there at the time of interview.

"Remember, a person does not become the head of a household simply because he/she is the main respondent.

"Take the oldest person as the head if the household members themselves cannot identify one person as being the head."

Beginning the interview
According to p. 8–9 of the *Manual*, "The ultimate success of an interview depends on many factors, [some of which occur] before you begin the interview. It is therefore important for you as an enumerator to understand some of these factors to ensure the highest level of survey participation. . . .

"Keep in mind at all times that respondents' time is precious, that they are used to (or expect to) deal with professional people, and that they are generally reluctant to provide information about their household unless they are completely sure that the information will be treated with the strictest confidentiality. This means that you must dress and conduct yourself professionally and be respectful of the time that the respondent gives by conducting the interview as efficiently as possible.

"The first thing the respondent will want to know is who you are and what the objective of your visit is. . . . You are expected from the onset to identify yourself by name and to explain the purpose of your visit.

"Your first words may be along these lines: 'Good morning Sir [Madam]. My name is [name] from [your organization]. I am here to help [my organization learn more about how its participants live].'

"Some respondents will also want to be reassured that their answers will not be leaked to a third party (that is, any person not directly involved in the exercise). In such cases, state unambiguously and immediately—after having stressed the importance of the respondent's participation—that [your organization] enforces the strictest confidentiality in regards to the information obtained from the respondents. Under no circumstances will any third party be able to identify the source of a particular answer.

"Despite all your efforts, there will always be respondents who will have no desire whatsoever to be interviewed and who cannot be swayed otherwise. But keep in mind that, sometimes, what may be perceived as a flat refusal could just be a veiled request for additional assurance. Assessing when each case applies requires considerable judgment on your part. If the respondent sincerely does not want to be interviewed, then politely leave without making any threats."

How to ask questions:

According to pp. 9–10 of the *Manual*, "Maintain a neutral attitude with respondents. Be careful that nothing in your words or manner implies criticism, surprise, approval, or disapproval of either the questions asked or the answers given. Put respondents at ease with a relaxed approach and gain their confidence. The respondents' answers to the questions should be obtained with as little influence as possible from you. Do not volunteer any personal information, and never share your opinions with the respondent. The questions are carefully worded to be neutral; they do not suggest that any one answer is preferable to another. When the respondent gives an ambiguous answer, never assume what the respondent means by saying something like 'Oh, I see, I suppose you mean . . . is that right?' If you do this, very often the respondent will agree with your interpretation, even though it may not be correct. Let the respondent give the answer.

"Ask questions in the order presented; never change the order of the questions in the questionnaire. The questions follow one another in a logical sequence. Changing that sequence could alter the intention of the questionnaire. Asking a question out of sequence can affect the answers that you receive.

"Ask the questions as worded; do not change them. If the respondent does not seem to understand the question, simply repeat it. In order for the information from the survey [to be consistent], each question must be asked in exactly the same way for each respondent. In some cases, the respondent may simply not be able to understand a question. If it is apparent that the respondent does not understand a question after you have repeated it using the original language, then you can rephrase it in simpler language or explain what is meant. But be careful not to alter the question's intent.

"Do not show the questions to the respondent. Respondents can be influenced by knowing what questions are coming next or by seeing the answer categories (which are not asked with the questions)."

Detailed guidelines for specific scorecard indicators

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

Do not ask this question directly. Instead, use the information recorded on the "Back-page Worksheet" to determine the response to mark. Also, make sure that you have recorded the number of household members in the scorecard header next to "Number of household members:".

According to p. 14 and p. 29 of the *Manual*, "a *household* is a group of persons who normally cook, eat, and live together. These people may or may not be related by blood, but they make common provision for food or other essentials for living, and they have only one person whom they all regard as the head of household. These people are called *members of the household*.

"A *household* includes servants and farm-hands who normally live and eat with other members of the household. There are also situations where people eat together and even sleep under one roof, but they have different persons whom they regard as head. These people should be considered as belonging to separate households. There are also one-member households in which a person makes provisions for his/her own food and other essentials for living. Such a person is the head of his/her own household."

According to p. 15 of the *Manual*, "If two or more persons/families share accomodation—such as sharing one apartment or house or even non-residential accomodation such as a classroom—and if the persons/families share the cost of food and/or other items, then they are to be considered as one single household. But if they do not make common provision for food, then they count as separate households."

According to p. 15 and p. 31 of the *Manual*, polygamous households should be handled as illustrated in the following two examples:

"A man is married to several wives, and each lives with her children in separate houses or groups of houses. They should be regarded as separate households if each wife cooks and eats meals separately. In this case, even if the wives sometimes eat together, the fact remains that the wives are running separate households. Therefore, treat them as different households. Assign the husband as head to only one wife (the most senior).

"A man is married to several wives, each of whom lives with her children in a separate house or group of houses. They should be regarded as one household if all those wives cook and eat together."

According to pp. 16–17 and p. 32 of the *Manual*, "a *usual household member* is one who has been continuously living with a household for at least six months. He/she may or may not be related to the other household members by blood or marriage, and he/she may be a house helper or labourer. A *usual household member* normally lives together with other household members in one house or closely related premises and takes his/her meals from the same kitchen.

"Newly married couples are to be regarded as *usual members* of a household even if one or both of them has been in the household for less than six months.

"Newborn babies who are born to a usual member of a household should be included as usual members of that household.

"Members of the household who are at boarding schools, colleges, and universities within Zambia—or any other persons temporarily away from the household who normally live and eat there (such as persons temporarily away for seasonal work, because of illness, attending funerals, giving birth, or visiting relatives or friends)—should be included in the list of usual members of the household. Any other persons who have spent at least six months with the household should also be included as usual members of the household. Other persons such as servants and lodgers who are part of this household must be taken as *usual members*.

"Usual members of the household who have been continously living outside the household for more than six months (for example, someone abroad for studies for more than six months) should *not* be included as a member of the household.

"Be certain to include the head of the household, the aged, and babies. These tend to be left out."

According to p. 37 of the *Manual*, "Ensure that only usual members of the household are recorded. Do not record children of the head who are no longer members of the household. In particular, old people have a tendency to regard grown-up children who have their own households as part of their households because they are their children. But this is not the type of household membership that the survey is looking for."

2. Are all household members ages 7 to 16 currently attending school?
    A. No
    B. Yes
    C. No one 7 to 16

Do not ask this question directly. Instead, use the information recorded on the "Back-page Worksheet" to determine the response to mark. If no one in the household is 7- to 16-years-old, then mark "C. No one 7 to 16". If anyone in the household is 7- to 16-years-old and is not currently attending school, then mark "A. No". Otherwise, mark "B. Yes".

According to pp. 43–44 of the *Manual*, "Be cautious when asking this question to persons who seem obviously not to be attending school.

"*Attending school* is taken to mean that the person attends school as a full-time or part-time student, that is, the person is in the formal school system. For example, all of the following are considered to be attending school:

- Students attending vocational training (including teacher training)
- Students at colleges and universities
- Persons attending night school
- Students/pupils at primary and secondary schools
- People on unpaid or paid study leave to a formal educational institution
- People engaged in correspondence studies with a correspondence school"

Note that the question asks about *household members* and that a household member may be either male or female. Thus, the question is asking about the school attendance of not only boys but rather of both boys and girls.

3. What is the highest grade that the (oldest) female head/spouse has attained?
    A. None, or first to fifth grade
    B. Sixth grade
    C. Seventh to ninth grade
    D. No female head/spouse
    E. Tenth grade or higher

Remember that you already know the name of the (oldest) female head/spouse (and whether she exists) from the notes you took for your own use while compiling the "Back-page Worksheet". Thus, if there is a female head/spouse, do not mechanically ask, "What is the highest grade that the (oldest) female head/spouse has attained?". Instead, use the actual name of the (oldest) female head/spouse, for example: "What is the highest grade that Betty has attained?"

If there is no female head/spouse, then do not read the question at all; just mark "D. No female head/spouse" and go to the next question.

For the purposes of the scorecard, the *(oldest) female head/spouse* is defined as:

- The household head, if the head is female
- The (oldest) spouse/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 spouse/conjugal partner who is a member of the interviewed household

According to p. 15 and pp. 31–32 of the *Manual*, the *head of the household* is "the person whom all members of the household regard as the head. He/she is the one who normally makes day-to-day decisions governing the running of the household. In most cases (but not all), this will be the husband/father in the household. In cases of one-member households, the member will be the head of the household. The head of the household can either be male or female.

"Note that the main respondent will not necessarily be the head of the household. In many of the households you will visit, the head of household will also be the main respondent, that is, the one giving most of the information. But any knowledgeable member of the household can be a respondent. A respondent who is not the head of the household can answer the questions on behalf of the head of household if the head of the household is not there at the time of interview.

"Remember, a person does not become the head of a household simply because he/she is the main respondent.

"Take the oldest person as the head if the household members themselves cannot identify one person as being the head."

According to pp. 45–46 of the *Manual*, "The level attained is the qualification (i.e. degree, diploma, certificate, etc.) that an individual has acquired, whether by full-time study, part-time study, or private study, whether conferred in the home country or abroad, and whether conferred by educational authorities, special examining bodies, or professional bodies.

"The system of school standards, grades, and forms [in Zambia] has changed about three times. Convert all previous standards of education to the current education level using the table below. For persons who were educated outside Zambia, give the appropriate Zambian equivalent of the level reached.

Before 1956	1956–65	1966–80	1981 to present
Sub-standard A	Sub-standard	Grade 1	Grade 1
Sub-standard B	Sub-standard	Grade 1	Grade 1
Standard 1	Standard 1	Grade 2	Grade 2
Standard 2	Standard 2	Grade 3	Grade 3
Standard 3	Standard 3	Grade 4	Grade 4
Standard 4	Standard 4	Grade 5	Grade 5
Standard 5	Standard 5	Grade 6	Grade 6
Standard 6	Lower standard 5	Grade 6	Grade 6
Standard 6	Upper standard 6	Grade 7	Grade 7
Form 1	Form 1	Form 1	Grade 8
Form 2	Form 2	Form 2	Grade 9
Form 3	Form 3	Form 3	Grade 10
Form 4			Grade 11
Form 4 (GCE)	Form 4 (GCE)	Form 5 GCE (O)	Grade 12 GCE (O)
Form 6 lower	Form 6 lower	Form 5 GCE (O)	Grade 12 GCE (O)
Form 6 upper	Form 6 upper	Form 5 GCE (A)	Grade 12 GCE (A)
Diploma/certificate			
Undergraduate university			
Bachelor's degree			
Post-graduate certificate/diploma			
Master's degree			
Doctoral degree and above			

For example:

- "If someone passed standard 5 before 1956, count it as grade 6
- Suppose a person completed form 5 GCE (O) Level in 1980. In 1981, she went to study at the University of Zambia. After two years, she left before completing the program. Count it as 'Diploma/certificate'[58]
- If someone completed (not just attended) grade 7 but is now repeating grade 6, then the highest grade attained is grade 7
- If someone is repeating grade 7, then the highest grade attained is grade 7
- If someone is currently attending grade 7 but has never completed grade 7 before, then highest grade attained is grade 6
- If someone has completed Natech, ZDA, AAT, or equivalent, then count it as 'Diploma/certificate'
- If someone has completed ACCA, CIMA, or equivalent, but has no higher qualification such as a Master's degree, then count it as 'Bachelor's degree'"

[58] This bullet point and the next two do not seem to make sense.

4. What kind of building material is the floor of this dwelling made of? (If possible, observe without asking)
    A. Mud, wood only, or other
    B. Concrete only, or covered concrete

According to p. 73 of the *Manual*, you should "be observant and mark the answers yourself if you can clearly identify the material of the dwelling's floor. If you cannot clearly identify it, then ask the respondent."

"If wall-to-wall carpets cover the floor, or if other coverings cover the floor, make sure to find out what is underneath the covering."

According to p. 74 of the *Manual*:

- *Concrete only* is a concrete floor that is not covered with carpets and so on
- *Covered concrete* is a concrete floor covered by wall-to-wall carpets or other coverings

5. What kind of building material is the roof of this dwelling made of? (If possible, observe without asking)
    A. Grass/straw/thatch, or other
    B. Iron sheets, or other non-asbestos tiles
    C. Concrete, asbestos sheets, or asbestos tiles

According to p. 73 of the *Manual*, you should "be observant and mark the answers yourself if you can clearly identify the material of the dwelling's roof. If you cannot clearly identify it, then ask the respondent."

Page 73 of the *Manual* describes the types of roofing materials as follows:

- "*Grass/straw/thatch* is a traditional roofing material. It works well at angles of 35 degrees or more with a thatch thickness of 12 to 15 centimetres. The thatch thickness increases with the decline in angle
- *Iron sheets* are usually galvanized in sheets, or they can be corrugated. They are the lightest roofing material and come in lengths from 1.2–3.6 metres. Larger lengths can be obtained on specific order. They can also be used on walls when flat
- *Other non-asbestos tiles* are tiles made from different types of roofing materials. They are usually smaller than roofing sheets. When made into solid tiles, they provide good protection or insulation against fire and heat. They are commonly used as a roofing material in building structures
- *Asbestos sheets* are roofing sheets made from a soft, grey mineral. When made into solid sheets, they provide good protection or insulation against fire and heat
- *Asbestos tiles* are tiles made from a soft, grey mineral. When made into solid tiles, they provide good protection or insulation against fire and heat. They are commonly used as a roofing material in building structures"

6. What is the main type of energy that your household uses for cooking?
    A. Firewood (collected or purchased), coal, crop/livestock residues, or other
    B. Charcoal (own-produced or purchased)
    C. Gas, electricity, solar, or kerosene/paraffin

According to p. 76 of the *Manual*, "Record the main type of energy used for cooking by the household. Note that most households use more than one type of energy for cooking. You should probe to ensure that what you are given is the main type."

According to p. 69 of the *Manual*, the *main type of energy* is "the one mostly commonly used."

Page 77 of the *Manual* describes the types of energy for cooking as follows:

- "*Collected firewood*: Firewood collected from the bush at no cost
- *Purchased firewood*: Firewood bought from other people
- *Crop/livestock residues*: For example, cow dung, or the remains of a cob of maize
- *Charcoal own-produced*: Charcoal produced by the household itself
- *Charcoal purchased*: Charcoal bought from other people
- *Electricity*: A form of energy observable in positive and negative forms that occurs naturally (as in lightning) or is produced (as in a generator) and that is expressed in terms of the movement electric current or power
- *Solar*: This is energy from the sun that is converted into electrical energy. A *solar panel* is the device used to trap or harness the energy from the sun
- *Coal*: A natural dark brown-to-black graphite-like material used as a fuel, formed from fossilized plants
- *Kerosene/paraffin*: Kerosene (also known as paraffin) is a combustible hydrocarbon liquid used as a fuel for heating, cooking and lighting"

According to p. 69 of the *Manual*, "If the question asked is for the main source/type of something and if a household uses more than one source/type, then only record the main one, that is, the one that is most commonly used. In some cases, you may have to probe further in order to ascertain the main source."

7. Does your household own any televisions, DVDs/VCRs, home theatres, satellite dish/decoders (free to air, or DSTV), or other pay-TV arrangements?
    A. No TV (regardless of others)
    B. TV, but nothing else
    C. TV, and something else (DVD, dish, and so on)

Ask this indicator in two parts:

- Does your household own any televisions?
- Does your household own any DVDs/VCRs, home theatres, satellite dish/decoders (free to air, or DSTV), or other pay-TV arrangements?

Mark the response according to the combination the two responses to these two questions as follows:

Television?	**DVDs/VCRs, home theatres, satellite dish/decoders (free to air, or DSTV), or other pay-TV arrangements?**	**Response**
No	No	A
Yes	No	B
No	Yes	A
Yes	Yes	C

According to p. 67 of the *Manual*, "a *home theatre* is an audio/video entertainment centre that has a television and hi-fi system with three speakers in the front (left, right and center) and left and right speakers in the rear.

"A *satellite dish/decoder* is a type of parabolic antenna designed to receive and transmit signals relayed by satellite. Those who own satellite dishes and decoders subscribe to one or more pay TV providers. *Satellite pay TV* is a broadcasting service which allows subscribers to receive television signals through a dish-shaped receiver. Those who pay a subscription fee for satellite TV service are able to watch. Examples of pay-TV providers are GTV (now closed) and Multichoice. A satellite dish and decoder can also be used to watch non-pay TV channels such as those popularly known as 'free to air'."

According to pp. 64–65 of the *Manual*, "This refers to televisions, DVDs/VCRs, home theatres, satellite dish/decoders (free to air, or DSTV), or other pay-TV arrangements that are owned by the household and that are in good working condition or are just temporarily out-of-order but usable. Do not count if permanently broken.

"If a household is keeping a television, DVD/VCR, home theatre, satellite dish/decoder (free to air, or DSTV), or other pay-TV arrangement for somebody else and using it, then do not record it no matter how long the household has kept it.

"Inherited televisions, DVDs/VCRs, home theatres, satellite dish/decoders (free to air, or DSTV), or other pay-TV arrangements should be included among assets owned as long as they are in working condition.

"A television, DVD/VCR, home theatre, satellite dish/decoder (free to air, or DSTV), or other pay-TV arrangement jointly owned by two or more households should not be considered to be owned by any of the households. Only televisions, DVDs/VCRs, home theatres, satellite dish/decoders (free to air, or DSTV), or other pay-TV arrangements exclusively owned by the household should be considered."

8. Does your household own any non-electric or electric irons?
    A. None
    B. Only non-electric
    C. Electric, or both electric and non-electric

Ask this indicator in two parts:

- Does your household own any non-electric irons?
- Does your household own any electric irons?

Mark the response according to the combination the two responses to these two questions as follows:

Non-electric irons?	**Electric irons?**	**Response**
No	No	A
Yes	No	B
No	Yes	C
Yes	Yes	C

According to p. 67 of the *Manual*, "a *non-electric iron* does not use electric power to heat. A common example in Zambia is an iron that uses charcoal."

According to pp. 64–65 of the *Manual*, "This refers to non-electric or electric irons that are owned by the household and that are in good working condition or are just temporarily out-of-order but usable. Do not count if permanently broken.

"If a household is keeping a non-electric or electric iron for somebody else and using it, then do not record it no matter how long the household has kept it.

"Inherited non-electric or electric irons should be included among assets owned as long as they are in working condition.

"A non-electric or electric iron jointly owned by two or more households should not be considered to be owned by any of the households. Only non-electric or electric irons exclusively owned by the household should be considered."

9. Does your household own any cellular phones?
    A. No
    B. Yes

According to pp. 64–65 of the *Manual*, "This refers to cellular phones that are owned by the household and that are in good working condition or are just temporarily out-of-order but usable. Do not count if permanently broken.

"If the household is keeping a cellular phone for somebody else and using it, then do not record it no matter how long the household has kept it.

"Inherited cellular phones should be included among assets owned as long as they are in working condition.

"A cellular phone jointly owned by two or more households should not be considered to be owned by any of the households. Only cellular phones exclusively owned by the household should be considered."

10. How many beds and mattresses does your household own?
    A. None
    B. One or more beds, but no mattresses
    C. One mattress (regardless of beds)
    D. Two or more mattresses (regardless of beds)

Ask this indicator in two parts:

- How many beds does your household own?
- How many mattresses does your household own?

Mark the response according to the combination the two responses to these two questions as follows:

Number of beds?	**Number of mattresses?**	**Response**
None	None	A
One or more	One	C
None	Two or more	D
One or more	None	B
None	One	C
One or more	Two or more	D

According to pp. 64–65 of the *Manual*, "This refers to beds and mattresses that are owned by the household and that are in good working condition or are just temporarily out-of-order but usable. Do not count if permanently broken.

"If the household is keeping a bed or mattress for somebody else and using it, then do not record it no matter how long the household has kept it.

"Inherited beds or mattresses should be included among assets owned as long as they are in working condition.

"A bed or mattress jointly owned by two or more households should not be considered to be owned by any of the households. Only beds or mattresses exclusively owned by the household should be considered."

Table 1: New-definition national poverty lines and poverty rates (for households and people) in all of Zambia and in the construction and validation samples for 2010 and 2015

Year	Line or Rate	HHs or People	n	Poverty lines and poverty rates (%)			
				National			
				Food	100%	150%	200%
All of Zambia							
2010	Line	People		3.28	4.67	7.00	9.34
	Rate	HHs	19,373	32.2	48.3	65.0	74.5
	Rate	People		37.9	54.7	70.9	79.7
2015	Line	People		4.93	6.95	10.42	13.90
	Rate	HHs	12,145	35.8	49.0	63.8	73.7
	Rate	People		40.9	54.4	68.7	77.9
Construction and calibration:							
(Selecting indicators and points, and associating scores with poverty likelihoods)							
2015	Rate	HHs	6,079	35.9	48.9	63.7	73.8
Validation:							
(Measuring accuracy)							
2010	Rate	HHs	9,612	32.1	48.4	65.2	74.6
2015	Rate	HHs	6,066	35.8	49.1	63.9	73.7

Source: 2015 Living Conditions Monitoring Survey

Poverty lines are ZMW per day per adult-equivalent in ave. prices in all of Zambia in Feb./Mar. 2010 and Apr./May 2015.

Table 1: New-definition international 2005 and 2011 PPP poverty lines and poverty rates (for households and people) in all of Zambia and in the construction and validation samples for 2010 and 2015

	Line or	HHs or		Poverty lines and poverty rates (%)					
				Intl. 2005 PPP				Intl. 2011 PPP	
Year	**Rate**	**People**	n	**$1.25**	**$2.00**	**$2.50**	**$5.00**	**$1.90**	**$3.10**
All of Zambia									
2010	Line	People		5.77	9.23	11.54	23.09	4.29	7.00
	Rate	HHs	19,373	63.3	78.2	83.6	94.2	52.0	69.9
	Rate	People		69.6	83.4	88.1	96.2	58.8	75.8
2015	Line	People		8.36	13.38	16.72	33.44	6.21	10.14
	Rate	HHs	12,145	60.8	76.2	82.0	93.4	50.5	67.9
	Rate	People		66.3	80.3	85.5	95.4	56.1	72.9
Construction and calibration:									
(Selecting indicators and points, and associating scores with poverty likelihoods)									
2015	Rate	HHs	6,079	60.8	76.2	82.2	93.5	50.5	67.9
Validation:									
(Measuring accuracy)									
2010	Rate	HHs	9,612	63.5	78.1	83.4	94.2	51.8	69.8
2015	Rate	HHs	6,066	60.9	76.2	81.7	93.2	50.4	67.8

Source: 2015 Living Conditions Monitoring Survey

Poverty lines are ZMW per day per person in ave. prices in all of Zambia in Feb./Mar. 2010 and Apr./May 2015.

Table 1: New-definition relative- and percentile-based poverty lines and poverty rates (for households and people) in all of Zambia and in the construction and validation samples for 2010 and 2015

Year	Line or Rate	HHs or People	n	Poverty lines and poverty rates (%)					
				Poorest half of people below 100% Natl. line	Percentile-based lines				
					20th	40th	50th	60th	80th
All of Zambia									
2010	Line	People		2.18	1.82	2.91	3.59	4.47	8.23
	Rate	HHs	19,373	22.5	16.1	33.9	43.3	53.3	74.5
	Rate	People		27.4	20.0	40.0	50.0	60.0	80.0
2015	Line	People		2.92	2.34	4.11	5.40	7.03	13.38
	Rate	HHs	12,145	22.8	16.5	34.6	44.4	54.3	75.8
	Rate	People		27.2	20.0	40.0	50.0	60.0	80.0
Construction and calibration:									
(Selecting indicators and points, and associating scores with poverty likelihoods)									
2015	Rate	HHs	6,079	22.6	16.1	34.8	44.2	54.2	75.9
Validation:									
(Measuring accuracy)									
2010	Rate	HHs	9,612	22.8	16.5	34.0	43.1	53.0	74.8
2015	Rate	HHs	6,066	23.0	16.9	34.4	44.5	54.3	75.7

Source: 2015 Living Conditions Monitoring Survey

Poverty lines are ZMW per day per person in ave. prices in all of Zambia in Feb./Mar. 2010 and Apr./May 2015.

Table 2 (All of Zambia): New-definition national poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	n	Poverty lines and poverty rates (%)			
				National lines			
				Food	100%	150%	200%
Urban	2010	Line	10,915	3.44	4.89	7.33	9.78
		Rate (HHs)		10.3	21.1	37.5	50.5
		Rate (people)		13.2	25.8	43.8	57.3
Rural	2010	Line	8,458	3.18	4.52	6.79	9.05
		Rate (HHs)		47.3	67.0	83.9	91.0
		Rate (people)		54.1	73.6	88.5	94.2
All	2010	Line	19,373	3.28	4.67	7.00	9.34
		Rate (HHs)		32.2	48.3	65.0	74.5
		Rate (people)		37.9	54.7	70.9	79.7
Urban	2015	Line	5,621	5.11	7.21	10.82	14.43
		Rate (HHs)		10.0	19.2	34.7	49.5
		Rate (people)		12.8	23.2	40.2	55.2
Rural	2015	Line	6,524	4.79	6.76	10.14	13.52
		Rate (HHs)		55.2	71.3	85.6	91.9
		Rate (people)		61.1	76.6	89.2	94.1
All	2015	Line	12,145	4.93	6.95	10.42	13.90
		Rate (HHs)		35.8	49.0	63.8	73.7
		Rate (people)		40.9	54.4	68.7	77.9

Source and definitions: See Table 1 and text.

Table 2 (All of Zambia): New-definition international 2005 and 2011 PPP poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	n	Poverty lines and poverty rates (%)					
				Intl. 2005 PPP lines				Intl. 2011 PPP lines	
				$1.25	**$2.00**	**$2.50**	**$5.00**	**$1.90**	**$3.10**
Urban	2010	Line	10,915	6.05	9.67	12.09	24.18	4.49	7.33
		Rate (HHs)		35.6	56.9	66.6	87.2	23.9	43.6
		Rate (people)		41.8	64.3	73.5	91.0	29.1	50.6
Rural	2010	Line	8,458	5.59	8.95	11.19	22.37	4.16	6.78
		Rate (HHs)		82.3	92.7	95.3	99.0	71.2	87.9
		Rate (people)		87.8	95.9	97.7	99.6	78.2	92.2
All	2010	Line	19,373	5.77	9.23	11.54	23.09	4.29	7.00
		Rate (HHs)		63.3	78.2	83.6	94.2	52.0	69.9
		Rate (people)		69.6	83.4	88.1	96.2	58.8	75.8
Urban	2015	Line	5,621	8.68	13.89	17.36	34.72	6.45	10.52
		Rate (HHs)		31.1	53.8	63.9	85.8	20.8	40.9
		Rate (people)		36.3	59.4	69.4	89.7	25.1	46.8
Rural	2015	Line	6,524	8.13	13.01	16.27	32.53	6.04	9.86
		Rate (HHs)		83.2	93.0	95.5	99.0	72.6	88.0
		Rate (people)		87.7	95.3	97.1	99.5	78.4	91.5
All	2015	Line	12,145	8.36	13.38	16.72	33.44	6.21	10.14
		Rate (HHs)		60.8	76.2	82.0	93.4	50.5	67.9
		Rate (people)		66.3	80.3	85.5	95.4	56.1	72.9

Source and definitions: See Table 1 and text.

Table 2 (All of Zambia): New-definition relative- and percentile-based poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	n	Poverty lines and poverty rates (%)					
				Poorest half of people below 100% Natl. line	Percentile-based lines				
					20th	40th	50th	60th	80th
Urban	2010	Line	10,915	2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)		6.0	3.6	11.2	16.9	25.1	50.7
		Rate (people)		7.9	5.0	14.3	21.0	30.3	58.0
Rural	2010	Line	8,458	2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)		33.8	24.6	49.4	61.4	72.6	90.9
		Rate (people)		40.1	29.8	56.8	68.9	79.4	94.4
All	2010	Line	19,373	2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)		22.5	16.1	33.9	43.3	53.3	74.5
		Rate (people)		27.4	20.0	40.0	50.0	60.0	80.0
Urban	2015	Line	5,621	3.04	2.43	4.27	5.61	7.30	13.89
		Rate (HHs)		5.2	3.2	9.4	15.2	23.9	53.3
		Rate (people)		7.2	4.7	12.1	18.6	28.8	59.0
Rural	2015	Line	6,524	2.84	2.28	4.00	5.25	6.84	13.01
		Rate (HHs)		36.0	26.5	53.5	66.2	77.0	92.7
		Rate (people)		41.4	31.0	60.0	72.4	82.3	95.0
All	2015	Line	12,145	2.92	2.34	4.11	5.40	7.03	13.38
		Rate (HHs)		22.8	16.5	34.6	44.4	54.3	75.8
		Rate (people)		27.2	20.0	40.0	50.0	60.0	80.0

Source and definitions: See Table 1 and text.

Table 2 (Central): New-definition national poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	*n*	Poverty lines and poverty rates (%)			
				National lines			
				Food	100%	150%	200%
Urban	2010	Line	1,022	3.06	4.35	6.53	8.70
		Rate (HHs)		11.4	22.8	40.4	54.1
		Rate (people)		14.1	26.0	44.3	58.7
Rural	2010	Line	836	3.06	4.36	6.54	8.72
		Rate (HHs)		30.6	51.3	76.5	85.1
		Rate (people)		36.4	58.8	82.8	90.2
All	2010	Line	1,858	3.06	4.36	6.54	8.72
		Rate (HHs)		25.4	43.7	66.8	76.8
		Rate (people)		30.9	50.6	73.2	82.3
Urban	2015	Line	540	4.85	6.85	10.27	13.69
		Rate (HHs)		16.2	28.4	41.9	54.2
		Rate (people)		20.9	33.8	48.2	60.6
Rural	2015	Line	657	4.87	6.87	10.30	13.73
		Rate (HHs)		39.7	56.8	77.7	87.6
		Rate (people)		47.0	63.9	83.2	91.4
All	2015	Line	1,197	4.86	6.86	10.29	13.72
		Rate (HHs)		33.5	49.3	68.3	78.8
		Rate (people)		40.4	56.3	74.4	83.6

Source and definitions: See Table 1 and text.

Table 2 (Central): New-definition international 2005 and 2011 PPP poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	n	Poverty lines and poverty rates (%)					
				Intl. 2005 PPP lines				Intl. 2011 PPP lines	
				$1.25	**$2.00**	**$2.50**	**$5.00**	**$1.90**	**$3.10**
Urban	2010	Line	1,022	5.38	8.61	10.76	21.52	4.00	6.52
		Rate (HHs)		38.2	58.9	68.6	91.3	25.2	47.0
		Rate (people)		42.6	64.1	74.5	94.6	29.0	51.2
Rural	2010	Line	836	5.39	8.63	10.78	21.56	4.01	6.54
		Rate (HHs)		73.5	87.3	91.9	98.7	57.5	80.8
		Rate (people)		80.4	92.4	95.4	99.5	65.9	86.6
All	2010	Line	1,858	5.39	8.62	10.78	21.55	4.00	6.53
		Rate (HHs)		64.1	79.7	85.7	96.8	48.8	71.8
		Rate (people)		70.9	85.3	90.1	98.3	56.7	77.8
Urban	2015	Line	540	8.24	13.18	16.48	32.95	6.12	9.99
		Rate (HHs)		38.4	57.3	65.8	85.9	29.2	46.0
		Rate (people)		45.1	63.3	72.7	91.3	34.5	52.9
Rural	2015	Line	657	8.26	13.22	16.52	33.04	6.14	10.02
		Rate (HHs)		75.2	90.3	93.6	98.3	58.8	80.4
		Rate (people)		81.9	94.1	96.4	99.5	66.4	86.4
All	2015	Line	1,197	8.25	13.21	16.51	33.02	6.13	10.01
		Rate (HHs)		65.5	81.6	86.3	95.1	51.0	71.3
		Rate (people)		72.6	86.3	90.4	97.4	58.3	77.9

Source and definitions: See Table 1 and text.

Table 2 (Central): New-definition relative- and percentile-based poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	n	Poverty lines and poverty rates (%)					
				Poorest half of people below 100% Natl. line	Percentile-based lines				
					20th	40th	50th	60th	80th
Urban	2010	Line		2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)	1,022	5.9	3.8	12.2	18.0	26.1	54.0
		Rate (people)		7.6	5.4	14.7	21.2	30.2	58.9
Rural	2010	Line		2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)	836	18.9	12.4	31.2	44.5	58.8	84.9
		Rate (people)		22.8	15.1	37.5	52.7	67.0	90.4
All	2010	Line		2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)	1,858	15.4	10.1	26.1	37.4	50.0	76.6
		Rate (people)		19.0	12.7	31.8	44.8	57.8	82.5
Urban	2015	Line		2.88	2.31	4.05	5.32	6.93	13.18
		Rate (HHs)	540	8.8	5.3	13.9	23.0	32.5	56.8
		Rate (people)		13.0	7.9	19.7	28.8	38.2	62.9
Rural	2015	Line		2.89	2.31	4.06	5.34	6.95	13.22
		Rate (HHs)	657	23.1	16.3	37.1	51.8	64.1	89.6
		Rate (people)		29.1	20.8	44.4	59.5	71.1	93.6
All	2015	Line		2.89	2.31	4.06	5.33	6.94	13.21
		Rate (HHs)	1,197	19.3	13.4	31.0	44.2	55.8	80.9
		Rate (people)		25.0	17.6	38.2	51.7	62.8	85.9

Source and definitions: See Table 1 and text.

Table 2 (Copperbelt): New-definition national poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	*n*	Poverty lines and poverty rates (%)			
					National lines		
				Food	100%	150%	200%
Urban	2010	Line	2,744	3.44	4.90	7.34	9.79
		Rate (HHs)		10.5	21.2	37.5	51.3
		Rate (people)		13.2	25.5	42.8	57.5
Rural	2010	Line	795	3.44	4.90	7.35	9.80
		Rate (HHs)		32.6	49.4	73.5	83.8
		Rate (people)		42.4	59.5	81.8	90.1
All	2010	Line	3,539	3.44	4.90	7.34	9.79
		Rate (HHs)		14.8	26.7	44.5	57.6
		Rate (people)		18.8	32.0	50.3	63.7
Urban	2015	Line	791	5.05	7.13	10.69	14.26
		Rate (HHs)		11.0	20.2	35.9	46.6
		Rate (people)		13.1	23.9	40.5	52.4
Rural	2015	Line	600	5.05	7.12	10.69	14.25
		Rate (HHs)		33.2	52.7	77.4	87.9
		Rate (people)		43.0	64.0	85.7	93.0
All	2015	Line	1,391	5.05	7.13	10.69	14.25
		Rate (HHs)		15.0	26.1	43.4	54.1
		Rate (people)		18.2	30.7	48.2	59.3

Source and definitions: See Table 1 and text.

Table 2 (Copperbelt): New-definition international 2005 and 2011 PPP poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	n	Poverty lines and poverty rates (%)					
				Intl. 2005 PPP lines				Intl. 2011 PPP lines	
				$1.25	**$2.00**	**$2.50**	**$5.00**	**$1.90**	**$3.10**
Urban	2010	Line	2,744	6.05	9.68	12.11	24.21	4.50	7.34
		Rate (HHs)		34.9	57.1	66.3	88.9	23.3	44.1
		Rate (people)		40.4	64.1	72.9	92.7	28.0	50.3
Rural	2010	Line	795	6.06	9.69	12.11	24.22	4.50	7.34
		Rate (HHs)		71.4	86.2	90.2	97.9	55.3	79.8
		Rate (people)		80.7	92.3	95.0	99.4	66.3	88.1
All	2010	Line	3,539	6.05	9.69	12.11	24.21	4.50	7.34
		Rate (HHs)		42.1	62.8	70.9	90.6	29.5	51.1
		Rate (people)		48.1	69.5	77.1	94.0	35.4	57.5
Urban	2015	Line	791	8.58	13.72	17.15	34.31	6.37	10.40
		Rate (HHs)		30.8	51.1	61.4	86.4	21.3	40.4
		Rate (people)		35.0	56.6	67.4	89.6	24.8	45.7
Rural	2015	Line	600	8.57	13.71	17.14	34.29	6.37	10.39
		Rate (HHs)		69.3	88.7	92.5	98.6	54.3	81.0
		Rate (people)		80.6	94.0	96.0	99.4	66.5	89.2
All	2015	Line	1,391	8.58	13.72	17.15	34.30	6.37	10.40
		Rate (HHs)		37.8	57.9	67.0	88.6	27.3	47.8
		Rate (people)		42.7	62.9	72.3	91.2	31.9	53.1

Source and definitions: See Table 1 and text.

Table 2 (Copperbelt): New-definition relative- and percentile-based poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	n	Poverty lines and poverty rates (%)					
				Poorest half of people below 100% Natl. line	Percentile-based lines				
					20th	40th	50th	60th	80th
Urban	2010	Line	2,744	2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)		5.1	2.9	10.7	16.9	24.3	50.8
		Rate (people)		6.8	4.1	13.6	20.7	29.1	57.1
Rural	2010	Line	795	2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)		21.3	15.7	34.3	44.4	57.1	83.2
		Rate (people)		28.7	21.5	44.3	55.7	67.7	90.3
All	2010	Line	3,539	2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)		8.3	5.4	15.3	22.3	30.7	57.2
		Rate (people)		11.0	7.4	19.5	27.4	36.4	63.5
Urban	2015	Line	791	3.00	2.40	4.21	5.54	7.21	13.72
		Rate (HHs)		5.5	3.6	10.2	16.3	24.7	50.6
		Rate (people)		7.2	5.1	12.2	19.1	28.6	56.2
Rural	2015	Line	600	3.00	2.40	4.21	5.54	7.21	13.71
		Rate (HHs)		13.7	6.5	29.7	47.1	59.4	88.7
		Rate (people)		19.5	9.8	39.8	58.8	72.6	94.0
All	2015	Line	1,391	3.00	2.40	4.21	5.54	7.21	13.72
		Rate (HHs)		7.0	4.1	13.7	21.9	31.0	57.5
		Rate (people)		9.3	5.9	16.9	25.9	36.1	62.6

Source and definitions: See Table 1 and text.

Table 2 (Eastern): New-definition national poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	*n*	Poverty lines and poverty rates (%)			
					National lines		
				Food	100%	150%	200%
Urban	2010	Line	598	3.04	4.32	6.48	8.64
		Rate (HHs)		10.0	23.6	43.5	57.2
		Rate (people)		12.3	27.6	48.9	63.6
Rural	2010	Line	1,051	3.02	4.30	6.45	8.60
		Rate (HHs)		51.6	71.0	86.7	94.8
		Rate (people)		57.3	76.1	89.9	96.7
All	2010	Line	1,649	3.02	4.30	6.45	8.61
		Rate (HHs)		46.1	64.7	81.0	89.9
		Rate (people)		51.6	70.0	84.8	92.5
Urban	2015	Line	538	4.68	6.60	9.90	13.21
		Rate (HHs)		13.7	22.2	42.7	55.1
		Rate (people)		17.2	25.9	46.3	59.1
Rural	2015	Line	751	4.69	6.61	9.92	13.23
		Rate (HHs)		55.3	71.5	86.5	93.7
		Rate (people)		61.5	76.0	89.4	95.0
All	2015	Line	1,289	4.69	6.61	9.92	13.23
		Rate (HHs)		50.3	65.5	81.2	89.0
		Rate (people)		56.2	70.0	84.3	90.7

Source and definitions: See Table 1 and text.

Table 2 (Eastern): New-definition international 2005 and 2011 PPP poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	*n*	Poverty lines and poverty rates (%)					
				Intl. 2005 PPP lines				Intl. 2011 PPP lines	
				$1.25	**$2.00**	**$2.50**	**$5.00**	**$1.90**	**$3.10**
Urban	2010	Line	598	5.34	8.54	10.68	21.36	3.97	6.47
		Rate (HHs)		43.0	62.9	72.1	90.3	28.2	49.2
		Rate (people)		48.3	70.6	78.7	95.2	32.3	55.3
Rural	2010	Line	1,051	5.32	8.51	10.63	21.27	3.95	6.45
		Rate (HHs)		86.4	96.0	97.2	99.4	76.7	91.9
		Rate (people)		90.2	97.8	98.6	99.7	82.1	94.6
All	2010	Line	1,649	5.32	8.51	10.64	21.28	3.95	6.45
		Rate (HHs)		80.7	91.6	93.9	98.2	70.3	86.2
		Rate (people)		84.9	94.4	96.1	99.2	75.8	89.7
Urban	2015	Line	538	7.94	12.71	15.89	31.78	5.90	9.63
		Rate (HHs)		39.5	57.5	65.5	86.9	25.7	46.5
		Rate (people)		43.0	61.5	69.9	90.9	29.0	50.1
Rural	2015	Line	751	7.96	12.73	15.92	31.83	5.91	9.65
		Rate (HHs)		84.2	94.0	96.6	99.8	73.7	89.1
		Rate (people)		87.7	95.6	97.4	99.9	78.6	91.9
All	2015	Line	1,289	7.96	12.73	15.91	31.83	5.91	9.65
		Rate (HHs)		78.8	89.6	92.9	98.2	67.8	84.0
		Rate (people)		82.3	91.5	94.1	98.8	72.6	86.9

Source and definitions: See Table 1 and text.

Table 2 (Eastern): New-definition relative- and percentile-based poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	n	Poverty lines and poverty rates (%)					
				Poorest half of people below 100% Natl. line	Percentile-based lines				
					20th	40th	50th	60th	80th
Urban	2010	Line	598	2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)		5.8	3.6	12.8	20.2	30.4	57.6
		Rate (people)		7.0	4.0	15.3	24.1	34.4	64.6
Rural	2010	Line	1,051	2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)		35.4	25.5	54.1	66.1	77.6	94.6
		Rate (people)		41.2	30.4	60.6	72.1	82.7	96.6
All	2010	Line	1,649	2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)		31.5	22.6	48.7	60.0	71.4	89.7
		Rate (people)		36.9	27.0	54.9	66.1	76.6	92.6
Urban	2015	Line	538	2.78	2.23	3.90	5.13	6.68	12.71
		Rate (HHs)		4.9	2.6	13.4	19.9	30.7	57.1
		Rate (people)		6.5	3.6	15.8	23.2	34.6	61.0
Rural	2015	Line	751	2.78	2.23	3.91	5.14	6.69	12.73
		Rate (HHs)		34.0	22.6	54.7	67.8	78.4	93.5
		Rate (people)		38.8	26.5	61.5	72.9	83.0	95.0
All	2015	Line	1,289	2.78	2.23	3.91	5.14	6.69	12.73
		Rate (HHs)		30.5	20.2	49.7	62.0	72.6	89.1
		Rate (people)		34.9	23.8	56.0	66.9	77.2	90.9

Source and definitions: See Table 1 and text.

Table 2 (Luapula): New-definition national poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	*n*	Poverty lines and poverty rates (%)			
					National lines		
				Food	100%	150%	200%
Urban	2010	Line	573	3.20	4.55	6.83	9.11
		Rate (HHs)		29.3	49.7	66.1	75.7
		Rate (people)		35.4	55.4	72.5	81.2
Rural	2010	Line	793	3.20	4.55	6.83	9.11
		Rate (HHs)		61.7	78.6	89.6	95.2
		Rate (people)		67.7	83.2	92.3	97.2
All	2010	Line	1,366	3.20	4.55	6.83	9.11
		Rate (HHs)		55.3	72.9	85.0	91.4
		Rate (people)		61.3	77.7	88.4	94.1
Urban	2015	Line	491	4.74	6.68	10.02	13.36
		Rate (HHs)		29.6	45.5	63.1	73.7
		Rate (people)		34.5	50.0	67.0	77.7
Rural	2015	Line	629	4.73	6.67	10.01	13.34
		Rate (HHs)		71.9	85.5	94.0	96.0
		Rate (people)		77.1	89.3	95.5	97.0
All	2015	Line	1,120	4.73	6.67	10.01	13.35
		Rate (HHs)		63.9	78.0	88.2	91.8
		Rate (people)		68.3	81.2	89.6	93.0

Source and definitions: See Table 1 and text.

Table 2 (Luapula): New-definition international 2005 and 2011 PPP poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	*n*	Poverty lines and poverty rates (%)					
				Intl. 2005 PPP lines				Intl. 2011 PPP lines	
				$1.25	$2.00	$2.50	$5.00	$1.90	$3.10
Urban	2010	Line	573	5.63	9.01	11.26	22.52	4.18	6.83
		Rate (HHs)		64.7	80.0	85.2	96.5	56.1	71.2
		Rate (people)		71.6	85.6	90.3	98.1	62.4	76.7
Rural	2010	Line	793	5.63	9.01	11.26	22.52	4.18	6.83
		Rate (HHs)		90.1	96.1	98.0	99.6	81.7	93.1
		Rate (people)		93.2	98.0	99.0	99.9	86.2	95.6
All	2010	Line	1,366	5.63	9.01	11.26	22.52	4.18	6.83
		Rate (HHs)		85.1	92.9	95.5	99.0	76.7	88.8
		Rate (people)		89.0	95.6	97.3	99.6	81.6	91.9
Urban	2015	Line	491	8.04	12.86	16.08	32.15	5.97	9.75
		Rate (HHs)		60.8	77.4	84.2	96.5	46.5	66.1
		Rate (people)		65.2	81.4	86.8	97.8	51.7	69.8
Rural	2015	Line	629	8.03	12.84	16.06	32.11	5.97	9.73
		Rate (HHs)		93.1	97.0	98.1	99.6	87.1	94.7
		Rate (people)		94.8	98.2	99.0	99.8	90.9	96.0
All	2015	Line	1,120	8.03	12.85	16.06	32.12	5.97	9.74
		Rate (HHs)		87.0	93.3	95.5	99.0	79.5	89.3
		Rate (people)		88.7	94.7	96.5	99.4	82.8	90.6

Source and definitions: See Table 1 and text.

Table 2 (Luapula): New-definition relative- and percentile-based poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	*n*	Poverty lines and poverty rates (%)					
				Poorest half of people	Percentile-based lines				
				below 100% Natl. line	20th	40th	50th	60th	80th
Urban	2010	Line	573	2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)		18.9	13.8	32.2	46.4	57.3	75.3
		Rate (people)		23.6	17.6	38.0	52.3	63.9	81.5
Rural	2010	Line	793	2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)		46.8	33.2	63.8	75.7	83.0	95.3
		Rate (people)		53.7	39.2	70.2	80.7	87.1	97.1
All	2010	Line	1,366	2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)		41.3	29.4	57.6	69.9	77.9	91.4
		Rate (people)		47.8	35.0	63.9	75.1	82.6	94.1
Urban	2015	Line	491	2.81	2.25	3.95	5.19	6.76	12.86
		Rate (HHs)		18.3	12.6	29.2	41.6	53.2	76.7
		Rate (people)		23.0	15.6	33.5	47.1	58.2	80.6
Rural	2015	Line	629	2.81	2.25	3.95	5.18	6.75	12.84
		Rate (HHs)		51.8	41.5	71.4	81.2	90.3	96.9
		Rate (people)		56.9	46.1	77.4	86.6	93.0	98.2
All	2015	Line	1,120	2.81	2.25	3.95	5.19	6.75	12.85
		Rate (HHs)		45.5	36.0	63.5	73.7	83.3	93.1
		Rate (people)		49.9	39.8	68.3	78.4	85.8	94.6

Source and definitions: See Table 1 and text.

Table 2 (Lusaka): New-definition national poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	*n*	Poverty lines and poverty rates (%)			
					National lines		
				Food	100%	150%	200%
Urban	2010	Line	2,120	3.68	5.24	7.86	10.48
		Rate (HHs)		5.9	14.8	30.3	42.4
		Rate (people)		7.8	19.0	36.7	49.3
Rural	2010	Line	465	3.70	5.26	7.89	10.52
		Rate (HHs)		34.2	52.7	71.3	82.5
		Rate (people)		44.3	63.7	80.1	88.8
All	2010	Line	2,585	3.68	5.24	7.86	10.48
		Rate (HHs)		10.3	20.7	36.7	48.6
		Rate (people)		13.4	25.9	43.3	55.3
Urban	2015	Line	883	5.46	7.71	11.56	15.41
		Rate (HHs)		4.4	11.5	27.0	46.7
		Rate (people)		5.9	14.2	32.1	52.2
Rural	2015	Line	646	5.47	7.71	11.57	15.42
		Rate (HHs)		34.0	46.8	63.2	73.2
		Rate (people)		41.7	54.0	69.7	78.4
All	2015	Line	1,529	5.46	7.71	11.56	15.42
		Rate (HHs)		8.6	16.5	32.1	50.5
		Rate (people)		11.0	19.9	37.5	56.0

Source and definitions: See Table 1 and text.

Table 2 (Lusaka): New-definition international 2005 and 2011 PPP poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	n	Poverty lines and poverty rates (%)					
				Intl. 2005 PPP lines				Intl. 2011 PPP lines	
				$1.25	**$2.00**	**$2.50**	**$5.00**	**$1.90**	**$3.10**
Urban	2010	Line	2,120	6.48	10.36	12.95	25.91	4.81	7.85
		Rate (HHs)		28.4	50.6	60.9	81.5	17.5	35.5
		Rate (people)		34.6	58.0	67.8	85.3	22.0	42.7
Rural	2010	Line	465	6.50	10.40	13.01	26.01	4.83	7.88
		Rate (HHs)		67.4	83.2	86.6	96.0	54.4	77.4
		Rate (people)		78.3	89.4	92.4	97.4	66.0	85.8
All	2010	Line	2,585	6.48	10.37	12.96	25.92	4.82	7.86
		Rate (HHs)		34.4	55.6	64.9	83.7	23.2	42.0
		Rate (people)		41.3	62.8	71.6	87.1	28.8	49.3
Urban	2015	Line	883	9.27	14.84	18.55	37.10	6.89	11.24
		Rate (HHs)		23.9	51.9	62.7	83.6	14.2	35.7
		Rate (people)		28.7	57.1	67.8	87.5	17.6	41.3
Rural	2015	Line	646	9.28	14.85	18.56	37.12	6.90	11.25
		Rate (HHs)		59.2	73.7	81.1	92.6	47.6	66.2
		Rate (people)		66.9	79.4	85.7	94.8	55.9	72.8
All	2015	Line	1,529	9.27	14.84	18.55	37.10	6.89	11.25
		Rate (HHs)		28.9	55.0	65.3	84.8	18.9	40.0
		Rate (people)		34.2	60.3	70.3	88.5	23.1	45.8

Source and definitions: See Table 1 and text.

Table 2 (Lusaka): New-definition relative- and percentile-based poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	n	Poverty lines and poverty rates (%)					
				Poorest half of people below 100% Natl. line	Percentile-based lines				
					20th	40th	50th	60th	80th
Urban	2010	Line	2,120	2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)		3.8	2.1	6.9	10.3	18.6	43.6
		Rate (people)		5.2	3.0	9.0	13.4	23.1	51.1
Rural	2010	Line	465	2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)		20.7	16.2	35.1	45.5	55.4	81.2
		Rate (people)		28.1	23.1	45.7	56.9	67.1	88.9
All	2010	Line	2,585	2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)		6.4	4.3	11.2	15.7	24.3	49.4
		Rate (people)		8.7	6.1	14.7	20.1	29.9	56.9
Urban	2015	Line	883	3.24	2.60	4.56	5.99	7.80	14.84
		Rate (HHs)		1.9	0.9	4.0	7.7	16.2	51.3
		Rate (people)		2.7	1.4	5.4	9.5	20.3	56.7
Rural	2015	Line	646	3.25	2.60	4.56	5.99	7.80	14.85
		Rate (HHs)		18.6	11.8	31.6	41.4	51.6	73.7
		Rate (people)		24.2	16.1	39.3	49.7	58.9	79.4
All	2015	Line	1,529	3.24	2.60	4.56	5.99	7.80	14.84
		Rate (HHs)		4.2	2.5	7.9	12.5	21.2	54.4
		Rate (people)		5.8	3.5	10.2	15.2	25.8	60.0

Source and definitions: See Table 1 and text.

Table 2 (Northern): New-definition national poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	*n*	Poverty lines and poverty rates (%)			
					National lines		
				Food	100%	150%	200%
Urban	2010	Line	771	3.05	4.33	6.50	8.67
		Rate (HHs)		14.3	27.6	48.7	63.6
		Rate (people)		16.8	31.7	52.2	67.6
Rural	2010	Line	856	3.04	4.33	6.50	8.66
		Rate (HHs)		48.1	70.2	86.3	92.6
		Rate (people)		55.1	76.4	90.1	94.7
All	2010	Line	1,627	3.04	4.33	6.50	8.66
		Rate (HHs)		42.1	62.6	79.6	87.5
		Rate (people)		48.0	68.2	83.1	89.7
Urban	2015	Line	479	4.56	6.43	9.64	12.86
		Rate (HHs)		27.6	39.3	57.5	69.9
		Rate (people)		31.7	44.7	62.0	72.6
Rural	2015	Line	662	4.56	6.43	9.64	12.86
		Rate (HHs)		70.3	83.6	92.0	95.2
		Rate (people)		75.7	87.6	94.1	96.2
All	2015	Line	1,141	4.56	6.43	9.64	12.86
		Rate (HHs)		62.5	75.6	85.8	90.6
		Rate (people)		67.6	79.7	88.2	91.9

Source and definitions: See Table 1 and text.

Table 2 (Northern): New-definition international 2005 and 2011 PPP poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	*n*	Poverty lines and poverty rates (%)					
				Intl. 2005 PPP lines				Intl. 2011 PPP lines	
				$1.25	**$2.00**	**$2.50**	**$5.00**	**$1.90**	**$3.10**
Urban	2010	Line	771	5.36	8.57	10.72	21.43	3.98	6.50
		Rate (HHs)		49.4	69.2	79.0	95.4	33.4	58.3
		Rate (people)		52.7	73.3	82.4	97.5	37.0	62.2
Rural	2010	Line	856	5.35	8.57	10.71	21.42	3.98	6.49
		Rate (HHs)		82.7	95.6	97.4	99.7	73.7	89.5
		Rate (people)		87.4	97.6	98.6	99.9	79.4	92.8
All	2010	Line	1,627	5.36	8.57	10.71	21.42	3.98	6.49
		Rate (HHs)		76.8	90.9	94.1	99.0	66.6	84.0
		Rate (people)		81.0	93.1	95.7	99.5	71.7	87.1
Urban	2015	Line	479	7.74	12.38	15.47	30.94	5.75	9.38
		Rate (HHs)		54.0	71.4	79.9	93.6	40.2	63.4
		Rate (people)		59.8	75.1	82.2	94.7	45.8	67.4
Rural	2015	Line	662	7.73	12.38	15.47	30.94	5.75	9.38
		Rate (HHs)		90.6	95.7	97.5	99.1	83.2	93.8
		Rate (people)		93.6	96.6	98.2	99.6	88.3	95.4
All	2015	Line	1,141	7.73	12.38	15.47	30.94	5.75	9.38
		Rate (HHs)		84.0	91.3	94.3	98.1	75.4	88.3
		Rate (people)		87.4	92.6	95.3	98.7	80.5	90.2

Source and definitions: See Table 1 and text.

Table 2 (Northern): New-definition relative- and percentile-based poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	*n*	Poverty lines and poverty rates (%)					
				Poorest half of people	Percentile-based lines				
				below 100% Natl. line	20th	40th	50th	60th	80th
Urban	2010	Line	771	2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)		9.1	5.0	15.7	26.4	35.5	64.2
		Rate (people)		10.9	6.6	18.5	29.9	39.3	68.5
Rural	2010	Line	856	2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)		35.5	25.4	52.6	64.2	74.7	92.9
		Rate (people)		42.6	30.9	59.8	71.2	80.3	95.1
All	2010	Line	1,627	2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)		30.8	21.8	46.1	57.5	67.7	87.8
		Rate (people)		36.8	26.5	52.2	63.6	72.8	90.3
Urban	2015	Line	479	2.71	2.17	3.80	5.00	6.51	12.38
		Rate (HHs)		17.7	11.8	27.3	35.1	44.4	71.2
		Rate (people)		21.4	14.7	31.3	39.3	50.8	74.9
Rural	2015	Line	662	2.71	2.17	3.80	5.00	6.51	12.37
		Rate (HHs)		51.5	40.5	69.2	78.3	87.3	95.4
		Rate (people)		57.8	46.6	75.0	83.9	91.8	96.5
All	2015	Line	1,141	2.71	2.17	3.80	5.00	6.51	12.37
		Rate (HHs)		45.3	35.3	61.6	70.4	79.5	91.0
		Rate (people)		51.1	40.7	67.0	75.7	84.2	92.5

Source and definitions: See Table 1 and text.

Table 2 (North Western): New-definition national poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	*n*	Poverty lines and poverty rates (%)			
				National lines			
				Food	100%	150%	200%
Urban	2010	Line	744	3.45	4.90	7.35	9.80
		Rate (HHs)		8.8	18.4	34.8	47.7
		Rate (people)		11.4	24.0	42.7	57.1
Rural	2010	Line	896	3.45	4.91	7.36	9.82
		Rate (HHs)		52.5	69.8	84.2	90.4
		Rate (people)		59.2	76.2	89.9	94.3
All	2010	Line	1,640	3.45	4.91	7.36	9.81
		Rate (HHs)		42.3	57.8	72.7	80.5
		Rate (people)		48.5	64.4	79.2	85.9
Urban	2015	Line	489	5.11	7.21	10.81	14.41
		Rate (HHs)		14.6	26.4	44.8	56.6
		Rate (people)		17.8	31.9	52.3	64.4
Rural	2015	Line	600	5.10	7.20	10.79	14.39
		Rate (HHs)		53.1	75.4	88.7	94.3
		Rate (people)		59.3	80.1	92.1	95.6
All	2015	Line	1,089	5.10	7.20	10.80	14.40
		Rate (HHs)		42.8	62.2	76.9	84.2
		Rate (people)		48.2	67.1	81.4	87.2

Source and definitions: See Table 1 and text.

Table 2 (North Western): New-definition international 2005 and 2011 PPP poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	*n*	Poverty lines and poverty rates (%)					
				Intl. 2005 PPP lines				Intl. 2011 PPP lines	
				$1.25	**$2.00**	**$2.50**	**$5.00**	**$1.90**	**$3.10**
Urban	2010	Line	744	6.06	9.70	12.12	24.24	4.50	7.35
		Rate (HHs)		32.1	53.4	64.8	89.6	20.5	41.5
		Rate (people)		40.1	63.1	73.8	94.4	26.8	50.8
Rural	2010	Line	896	6.07	9.71	12.14	24.27	4.51	7.36
		Rate (HHs)		81.9	92.7	94.9	98.9	73.2	87.9
		Rate (people)		88.4	96.3	98.0	99.8	80.4	93.3
All	2010	Line	1,640	6.07	9.71	12.13	24.27	4.51	7.36
		Rate (HHs)		70.3	83.5	87.9	96.7	60.9	77.1
		Rate (people)		77.5	88.8	92.6	98.6	68.3	83.7
Urban	2015	Line	489	8.67	13.87	17.34	34.68	6.44	10.51
		Rate (HHs)		38.5	60.6	68.6	89.1	27.4	49.5
		Rate (people)		45.4	68.5	75.9	93.4	32.5	57.2
Rural	2015	Line	600	8.66	13.85	17.32	34.63	6.43	10.50
		Rate (HHs)		86.9	96.0	98.6	99.9	75.8	92.7
		Rate (people)		90.3	96.9	98.9	100.0	80.7	95.1
All	2015	Line	1,089	8.66	13.86	17.32	34.64	6.44	10.50
		Rate (HHs)		73.8	86.5	90.5	97.0	62.8	81.1
		Rate (people)		78.3	89.3	92.7	98.2	67.7	84.9

Source and definitions: See Table 1 and text.

Table 2 (North Western): New-definition relative- and percentile-based poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	*n*	Poverty lines and poverty rates (%)					
				Poorest half of people	Percentile-based lines				
				below 100% Natl. line	20th	40th	50th	60th	80th
Urban	2010	Line	744	2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)		5.9	3.6	10.0	14.6	21.0	45.9
		Rate (people)		7.8	4.8	13.5	19.7	27.5	56.5
Rural	2010	Line	896	2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)		39.7	30.9	54.0	65.2	75.1	90.6
		Rate (people)		45.3	36.1	61.1	73.1	82.3	94.8
All	2010	Line	1,640	2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)		31.8	24.5	43.7	53.4	62.5	80.2
		Rate (people)		36.9	29.0	50.4	61.0	69.9	86.2
Urban	2015	Line	489	3.03	2.43	4.26	5.60	7.29	13.87
		Rate (HHs)		7.8	4.4	14.6	22.0	29.7	60.1
		Rate (people)		10.5	5.6	17.9	26.2	35.4	67.9
Rural	2015	Line	600	3.03	2.43	4.25	5.59	7.28	13.85
		Rate (HHs)		31.9	23.1	50.1	65.6	80.1	95.9
		Rate (people)		38.0	28.0	56.0	72.6	85.3	96.8
All	2015	Line	1,089	3.03	2.43	4.26	5.59	7.28	13.86
		Rate (HHs)		25.4	18.1	40.6	53.9	66.5	86.3
		Rate (people)		30.6	22.0	45.8	60.2	71.9	89.1

Source and definitions: See Table 1 and text.

Table 2 (Southern): New-definition national poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	*n*	Poverty lines and poverty rates (%)			
				National lines			
				Food	100%	150%	200%
Urban	2010	Line	1,373	3.30	4.69	7.04	9.38
		Rate (HHs)		13.0	23.8	40.1	54.1
		Rate (people)		17.7	31.1	49.3	62.8
Rural	2010	Line	1,376	3.29	4.69	7.03	9.38
		Rate (HHs)		46.4	68.2	84.0	89.9
		Rate (people)		53.6	74.8	88.6	93.7
All	2010	Line	2,749	3.30	4.69	7.03	9.38
		Rate (HHs)		37.1	55.9	71.8	80.0
		Rate (people)		44.8	64.0	78.9	86.1
Urban	2015	Line	545	4.85	6.84	10.26	13.67
		Rate (HHs)		5.3	15.1	27.4	41.3
		Rate (people)		7.0	18.6	32.3	46.6
Rural	2015	Line	729	4.85	6.84	10.26	13.68
		Rate (HHs)		44.2	64.8	83.7	90.7
		Rate (people)		49.2	70.9	87.7	93.9
All	2015	Line	1,274	4.85	6.84	10.26	13.68
		Rate (HHs)		32.6	50.0	66.9	76.0
		Rate (people)		38.3	57.4	73.4	81.7

Source and definitions: See Table 1 and text.

Table 2 (Southern): New-definition international 2005 and 2011 PPP poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	*n*	Poverty lines and poverty rates (%)					
				Intl. 2005 PPP lines				Intl. 2011 PPP lines	
				$1.25	**$2.00**	**$2.50**	**$5.00**	**$1.90**	**$3.10**
Urban	2010	Line	1,373	5.80	9.28	11.60	23.20	4.31	7.03
		Rate (HHs)		38.3	59.4	70.6	89.7	27.0	46.7
		Rate (people)		47.5	68.2	79.2	94.0	34.8	56.5
Rural	2010	Line	1,376	5.80	9.27	11.59	23.18	4.31	7.03
		Rate (HHs)		83.4	92.2	95.4	98.7	73.3	87.4
		Rate (people)		88.6	95.9	98.1	99.6	80.1	91.4
All	2010	Line	2,749	5.80	9.27	11.59	23.19	4.31	7.03
		Rate (HHs)		70.9	83.1	88.5	96.2	60.5	76.1
		Rate (people)		78.4	89.0	93.5	98.2	68.9	82.8
Urban	2015	Line	545	8.23	13.16	16.45	32.91	6.11	9.98
		Rate (HHs)		25.2	44.6	56.6	83.4	15.0	33.3
		Rate (people)		29.9	50.9	62.0	89.0	18.3	39.2
Rural	2015	Line	729	8.23	13.16	16.46	32.91	6.11	9.98
		Rate (HHs)		81.5	92.2	95.1	99.4	66.5	87.5
		Rate (people)		86.9	95.1	97.1	99.7	72.7	91.5
All	2015	Line	1,274	8.23	13.16	16.46	32.91	6.11	9.98
		Rate (HHs)		64.8	78.0	83.6	94.6	51.2	71.3
		Rate (people)		72.2	83.7	88.1	96.9	58.7	78.0

Source and definitions: See Table 1 and text.

Table 2 (Southern): New-definition relative- and percentile-based poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	n	Poverty lines and poverty rates (%)					
				Poorest half of people below 100% Natl. line	Percentile-based lines				
					20th	40th	50th	60th	80th
Urban	2010	Line		2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)	1,373	7.0	4.1	13.7	19.9	28.3	54.1
		Rate (people)		9.7	6.4	18.5	25.9	36.3	63.3
Rural	2010	Line		2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)	1,376	33.8	25.4	49.0	62.9	74.6	89.9
		Rate (people)		40.4	31.1	56.7	70.4	81.1	94.0
All	2010	Line		2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)	2,749	26.4	19.5	39.2	50.9	61.7	80.0
		Rate (people)		32.8	25.0	47.3	59.4	70.0	86.4
Urban	2015	Line		2.88	2.30	4.04	5.31	6.92	13.16
		Rate (HHs)	545	2.4	1.6	5.4	10.3	18.9	44.2
		Rate (people)		3.6	2.4	7.0	13.2	23.9	50.4
Rural	2015	Line		2.88	2.30	4.04	5.31	6.92	13.16
		Rate (HHs)	729	25.0	18.4	43.0	58.9	72.7	92.0
		Rate (people)		28.9	21.3	48.4	64.8	78.5	94.9
All	2015	Line		2.88	2.30	4.04	5.31	6.92	13.16
		Rate (HHs)	1,274	18.3	13.4	31.8	44.4	56.7	77.7
		Rate (people)		22.4	16.4	37.7	51.5	64.4	83.4

Source and definitions: See Table 1 and text.

Table 2 (Western): New-definition national poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	*n*	Poverty lines and poverty rates (%)			
				National lines			
				Food	100%	150%	200%
Urban	2010	Line	548	3.17	4.51	6.77	9.02
		Rate (HHs)		22.7	35.2	53.3	66.0
		Rate (people)		27.4	40.5	61.3	74.1
Rural	2010	Line	720	3.12	4.44	6.67	8.89
		Rate (HHs)		56.0	74.0	89.7	94.3
		Rate (people)		64.5	81.2	93.4	96.2
All	2010	Line	1,268	3.13	4.45	6.68	8.91
		Rate (HHs)		51.7	69.0	85.0	90.6
		Rate (people)		59.6	75.8	89.2	93.3
Urban	2015	Line	429	4.68	6.61	9.91	13.21
		Rate (HHs)		22.6	30.1	43.8	53.2
		Rate (people)		28.5	36.0	50.6	60.7
Rural	2015	Line	658	4.68	6.60	9.91	13.21
		Rate (HHs)		74.3	84.4	93.0	96.5
		Rate (people)		79.1	88.7	94.6	97.1
All	2015	Line	1,087	4.68	6.60	9.91	13.21
		Rate (HHs)		68.3	78.1	87.2	91.5
		Rate (people)		72.9	82.2	89.2	92.6

Source and definitions: See Table 1 and text.

Table 2 (Western): New-definition international 2005 and 2011 PPP poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	*n*	Poverty lines and poverty rates (%)					
				Intl. 2005 PPP lines				Intl. 2011 PPP lines	
				$1.25	$2.00	$2.50	$5.00	$1.90	$3.10
Urban	2010	Line	548	5.58	8.92	11.16	22.31	4.15	6.76
		Rate (HHs)		50.2	68.9	77.9	93.2	37.6	60.6
		Rate (people)		58.3	76.7	84.9	96.1	44.8	67.9
Rural	2010	Line	720	5.49	8.79	10.99	21.97	4.08	6.66
		Rate (HHs)		87.6	95.2	98.0	99.6	76.1	92.0
		Rate (people)		92.3	97.2	99.1	99.8	84.1	95.1
All	2010	Line	1,268	5.50	8.81	11.01	22.02	4.09	6.67
		Rate (HHs)		82.8	91.8	95.4	98.8	71.1	88.0
		Rate (people)		87.7	94.5	97.2	99.3	78.9	91.4
Urban	2015	Line	429	7.95	12.72	15.90	31.79	5.91	9.64
		Rate (HHs)		41.1	55.2	62.4	87.4	32.2	48.8
		Rate (people)		47.8	62.7	70.4	92.5	38.3	57.0
Rural	2015	Line	658	7.95	12.71	15.89	31.79	5.91	9.64
		Rate (HHs)		90.7	97.7	98.8	99.7	85.7	93.5
		Rate (people)		93.7	98.5	99.2	99.8	90.0	95.4
All	2015	Line	1,087	7.95	12.72	15.89	31.79	5.91	9.64
		Rate (HHs)		84.9	92.7	94.5	98.2	79.4	88.3
		Rate (people)		88.1	94.1	95.6	98.9	83.6	90.7

Source and definitions: See Table 1 and text.

Table 2 (Western): New-definition relative- and percentile-based poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	n	Poverty lines and poverty rates (%)					
				Poorest half of people below 100% Natl. line	Percentile-based lines				
					20th	40th	50th	60th	80th
Urban	2010	Line		2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)	548	14.5	10.2	24.7	31.7	39.0	64.9
		Rate (people)		17.8	12.7	29.4	38.7	46.7	72.9
Rural	2010	Line		2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)	720	42.5	31.8	57.2	66.9	78.5	94.4
		Rate (people)		50.9	38.1	66.5	75.9	86.0	96.6
All	2010	Line		2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)	1,268	38.8	29.0	53.0	62.4	73.3	90.5
		Rate (people)		46.5	34.7	61.5	70.9	80.8	93.4
Urban	2015	Line		2.78	2.23	3.91	5.13	6.69	12.72
		Rate (HHs)	429	11.5	7.0	18.8	28.6	35.6	55.1
		Rate (people)		16.9	12.0	25.5	34.6	41.5	62.5
Rural	2015	Line		2.78	2.23	3.91	5.13	6.68	12.71
		Rate (HHs)	658	53.0	40.8	70.4	80.1	87.5	97.7
		Rate (people)		60.3	48.1	76.9	85.8	91.3	98.5
All	2015	Line		2.78	2.23	3.91	5.13	6.68	12.71
		Rate (HHs)	1,087	48.1	36.9	64.4	74.0	81.4	92.7
		Rate (people)		55.0	43.7	70.6	79.5	85.2	94.1

Source and definitions: See Table 1 and text.

Table 2 (Muchinga): New-definition national poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	*n*	Poverty lines and poverty rates (%)			
				National lines			
				Food	100%	150%	200%
Urban	2010	Line	422	3.04	4.33	6.49	8.65
		Rate (HHs)		22.9	39.2	55.4	68.7
		Rate (people)		27.2	44.3	61.9	73.9
Rural	2010	Line	670	3.04	4.33	6.49	8.65
		Rate (HHs)		45.0	67.1	82.7	91.2
		Rate (people)		51.3	74.2	88.7	94.8
All	2010	Line	1,092	3.04	4.33	6.49	8.65
		Rate (HHs)		41.2	62.3	78.0	87.3
		Rate (people)		47.2	69.1	84.1	91.2
Urban	2015	Line	436	4.56	6.43	9.64	12.86
		Rate (HHs)		17.0	32.9	47.3	59.6
		Rate (people)		22.2	37.2	51.7	63.8
Rural	2015	Line	592	4.56	6.43	9.64	12.85
		Rate (HHs)		58.5	74.7	85.8	92.2
		Rate (people)		64.2	79.0	89.0	94.2
All	2015	Line	1,028	4.56	6.43	9.64	12.85
		Rate (HHs)		48.6	64.7	76.6	84.4
		Rate (people)		54.4	69.3	80.3	87.1

Source and definitions: See Table 1 and text.

Table 2 (Muchinga): New-definition international 2005 and 2011 PPP poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	*n*	Poverty lines and poverty rates (%)					
				Intl. 2005 PPP lines				Intl. 2011 PPP lines	
				$1.25	$2.00	$2.50	$5.00	$1.90	$3.10
Urban	2010	Line	422	5.35	8.56	10.70	21.40	3.98	6.49
		Rate (HHs)		54.8	73.7	78.4	96.5	43.3	62.4
		Rate (people)		60.2	80.3	85.5	98.5	48.2	68.3
Rural	2010	Line	670	5.35	8.56	10.69	21.39	3.97	6.48
		Rate (HHs)		82.4	92.5	94.8	99.2	69.7	87.6
		Rate (people)		89.2	95.8	97.4	99.8	77.6	92.9
All	2010	Line	1,092	5.35	8.56	10.70	21.39	3.97	6.48
		Rate (HHs)		77.7	89.3	92.0	98.8	65.2	83.3
		Rate (people)		84.2	93.2	95.4	99.6	72.6	88.7
Urban	2015	Line	436	7.73	12.37	15.47	30.94	5.75	9.38
		Rate (HHs)		46.3	62.8	70.9	90.6	33.1	51.0
		Rate (people)		50.1	68.0	76.2	94.3	37.3	55.3
Rural	2015	Line	592	7.73	12.37	15.46	30.92	5.75	9.37
		Rate (HHs)		82.9	92.8	94.4	99.2	75.9	88.3
		Rate (people)		87.0	95.0	96.1	99.6	80.4	91.2
All	2015	Line	1,028	7.73	12.37	15.46	30.93	5.75	9.37
		Rate (HHs)		74.2	85.6	88.8	97.2	65.7	79.4
		Rate (people)		78.4	88.7	91.5	98.4	70.4	82.9

Source and definitions: See Table 1 and text.

Table 2 (Muchinga): New-definition relative- and percentile-based poverty lines and poverty rates (for households and people) by urban/rural/all in 2010 and 2015

Area	Year	Line/rate	n	Poverty lines and poverty rates (%)					
				Poorest half of people below 100% Natl. line	Percentile-based lines				
					20th	40th	50th	60th	80th
Urban	2010	Line	422	2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)		16.1	10.2	23.2	33.8	44.6	68.6
		Rate (people)		19.3	13.8	28.1	38.8	50.1	74.3
Rural	2010	Line	670	2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)		31.5	22.8	47.6	60.6	71.8	90.3
		Rate (people)		37.5	27.7	54.7	68.2	79.8	94.3
All	2010	Line	1,092	2.18	1.82	2.91	3.59	4.47	8.23
		Rate (HHs)		28.8	20.6	43.4	56.0	67.2	86.5
		Rate (people)		34.4	25.3	50.2	63.2	74.7	90.9
Urban	2015	Line	436	2.70	2.17	3.80	5.00	6.50	12.37
		Rate (HHs)		10.1	5.8	16.3	28.4	38.2	62.8
		Rate (people)		14.0	8.9	21.5	32.5	42.3	68.0
Rural	2015	Line	592	2.70	2.17	3.80	4.99	6.50	12.37
		Rate (HHs)		43.2	31.0	58.9	70.5	79.9	92.5
		Rate (people)		49.4	35.8	65.1	75.7	84.0	94.8
All	2015	Line	1,028	2.70	2.17	3.80	4.99	6.50	12.37
		Rate (HHs)		35.3	25.0	48.7	60.4	69.9	85.4
		Rate (people)		41.2	29.6	55.0	65.7	74.3	88.6

Source and definitions: See Table 1 and text.

Table 3: Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (Responses ordered starting with those most strongly linked with higher poverty likelihoods)
2,562	What is the main type of energy that your household uses for cooking? (Firewood (collected or purchased), coal, crop/livestock residues, or other; Charcoal (own-produced or purchased); Gas, electricity, solar, or kerosene/paraffin)
2,512	What is the main type of cooking device used by your household? (Brick/stone stand on an open fire, or other; Metal stand on an open fire; Brazier (*mbaula*), clay stove (*mbaula*), or vehicle-type rim; Stove/cooker, hot plate without stand, or hot plate on welded stand)
2,241	How many braziers (*mbaula*) and electric stoves does your household own? (None; One brazier, but no electric stoves; Two or more braziers, but no electric stoves; One or more electric stoves (regardless of braziers)
2,143	What is the main source of drinking water for this household, and do you treat it by boiling or adding chlorine? (Does not treat water that comes directly from river/lake/stream/dam, rainwater, well, borehold, or spring; Boils or adds chlorine to water that comes directly from river/lake/stream/dam, rainwater, well, borehold, or spring; Does not treat water that comes from public tap, other tap (e.g., from nearby building), or water kiosk; Adds chlorine to water that comes from public tap, other tap (e.g., from nearby building), or water kiosk; Does not treat water that comes from own tap, bottled water, or bought from other vendor; Boils water that comes from public tap, other tap (e.g., from nearby building), or water kiosk; Boils or adds chlorine to water that comes from own tap, bottled water, or bought from other vendor)
2,001	What is the main type of energy used for lighting in your household? (None, open fire, candle, diesel, kerosene/paraffin, or other; Torch; Solar panel; Electricity)
1,998	Is your house connected to electricity? (No; Yes)
1,988	What kind of building material is the roof of this dwelling made of? (If possible, observe without asking) (Grass/straw/thatch, or other; Iron sheets, or other non-asbestos tiles; Concrete, asbestos sheets, or asbestos tiles)
1,972	What is the main source of drinking water for this household? (Directly from river/lake/stream/dam, or rainwater; Unprotected well or spring; Borehole; Protected well or spring; Public tap, other tap (e.g., from nearby building), or water kiosk; Own tap, bought from other vendor, bottled water, or other)

Table 3 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (Responses ordered starting with those most strongly linked with higher poverty likelihoods)
1,905	Does your household own any electric stoves? (No; Yes)
1,863	What kind of building material is the floor of this dwelling made of? (If possible, observe without asking) (Mud, wood only, or other; Concrete only, or covered concrete)
1,846	What is the main type of toilet facility for this household? (None, pit latrine without slab, aqua privy, bucket/other container, or other; Neighbor's/another household's pit latrine with slab; Own pit latrine with slab; Communal pit latrine with slab; Own flush toilet outside the house; Own flush toilet inside the house)
1,839	What kind of dwelling does your household live in? (Traditional hut; Improved traditional house; Detached house, flat/apartment/multi-unit, semi-detached house, servants' quarters, guest wing, cottage, house attached to shop, on top of shop, etc., hostel, non-residential building (e.g., school, classroom, etc.), unconventional (e.g., *kantemba*, storage container, etc.), or other)
1,813	What kind of building material is the outer walls of this dwelling made of? (Pole, pole and *dagga*, mud, grass/straw, hardboard, mixture of hardboard, tin sheets, plastic, etc., or other; Mud brick; Burnt brick; Pan brick; Concrete brick, iron sheets, or steel)
1,783	Does your household own any non-electric or electric irons? (None; Only non-electric; Electric, or both electric and non-electric)
1,747	In their main current economic activity, how many household members are skilled agricultural and fishery workers? (Two or more; One; None)
1,733	Does your household own any televisions, DVDs/VCRs, home theatres, satellite dish/decoders (free to air, or DSTV) or other pay-TV arrangements? (No TV (regardless of others); TV, but nothing else; TV, and something else (DVD, dish, and so on))
1,727	In their main current economic activity, how many household members are skilled agricultural and fishery workers or in elementary occupations? (Two or more; One; None)

Table 3 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (Responses ordered starting with those most strongly linked with higher poverty likelihoods)
1,714	What is the main current economic activity status of the female head/spouse? (None, farming, fishing, forestry, piecework, unpaid family worker, too old or too young to work, or other; Running a business/self-employed but not farming; Not working but looking for work, no means to do business but available or wishing to do so, full-time student, home maker, or retired; No female head/spouse; In wage employment)
1,683	Does your household own any electric irons? (No; Yes)
1,674	How many household members have as their main current economic activity status farming, fishing, or forestry? (Two or more; One; None)
1,662	Does any household member work in an establishment/business in agriculture, forestry, or fishing in their main current economic activity, and if so, does any member of the household own any livestock (cattle, oxen, goats, pigs, sheep, chickens, ducks, geese, guinea fowls, or other poultry (e.g., turkeys, rabbits, pigeons, quails))? (Someone works in agriculture, but no livestock; Someone works in agriculture, and they have livestock; No one works in agriculture)
1,660	Does any household member work in an establishment/business in agriculture, forestry, or fishing in their main current economic activity, and if so, does any member of the household own any chickens, ducks, geese, guinea fowls, or other poultry (e.g., turkeys, rabbits, pigeons, quails)? (Someone works in agriculture, but no poultry; Someone works in agriculture, and they have poultry; No one works in agriculture)
1,653	Does any household member work in an establishment/business in agriculture, forestry, or fishing in their main current economic activity, and if so, does any member of the household own any cattle, oxen, goats, pigs, or sheep? (Someone works in agriculture, but no cattle, oxen, goats, pigs, or sheep; Someone works in agriculture, and they have cattle, oxen, goats, pigs, or sheep; No one works in agriculture)

Table 3 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (Responses ordered starting with those most strongly linked with higher poverty likelihoods)
1,653	Does any household member work in an establishment/business in agriculture, forestry, or fishing in their main current economic activity, and if so, does any member of the household own any goats or pigs? (Someone works in agriculture, but no goats or pigs; Someone works in agriculture, and they have goats or pigs; No one works in agriculture)
1,653	Does any household member work in an establishment/business in agriculture, forestry, or fishing in their main current economic activity, and if so, does any member of the household own any pigs? (Someone works in agriculture, but no pigs; Someone works in agriculture, and they have pigs; No one works in agriculture)
1,650	Does any household member work in an establishment/business in agriculture, forestry, or fishing in their main current economic activity, and if so, does any member of the household own any sheep? (Someone works in agriculture, but no sheep; Someone works in agriculture, and they have sheep; No one works in agriculture)
1,649	Does any household member work in an establishment/business in agriculture, forestry, or fishing in their main current economic activity, and if so, does any member of the household own any goats? (Someone works in agriculture, but no goats; Someone works in agriculture, and they have goats; No one works in agriculture)
1,648	Does any household member work in an establishment/business in agriculture, forestry, or fishing in their main current economic activity, and if so, does any member of the household own any goats or sheep? (Someone works in agriculture, but no goats or sheep; Someone works in agriculture, and they have goats or sheep; No one works in agriculture)
1,647	Does any household member work in an establishment/business in agriculture, forestry, or fishing in their main current economic activity, and if so, does any member of the household own any cattle, oxen, or pigs? (Someone works in agriculture, but no cattle, oxen, or pigs; Someone works in agriculture, and they have cattle, oxen, or pigs; No one works in agriculture)

Table 3 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (Responses ordered starting with those most strongly linked with higher poverty likelihoods)
1,646	Does any household member work in an establishment/business in agriculture, forestry, or fishing in their main current economic activity, and if so, does any member of the household own any cattle or oxen? (Someone works in agriculture, but no cattle or oxen; Someone works in agriculture, and they have cattle or oxen; No one works in agriculture)
1,646	Does any household member work in an establishment/business in agriculture, forestry, or fishing in their main current economic activity, and if so, does any member of the household own any cattle, oxen, or sheep? (Someone works in agriculture, but no cattle, oxen, or sheep; Someone works in agriculture, and they have cattle, oxen, or sheep; No one works in agriculture)
1,646	In their main current economic activity, how many household members work in an establishment/business in agriculture, forestry, or fishing? (Two or more; One; None)
1,608	What sort of business/service is carried out by the employer/establishment/business of the female head/spouse? (Agriculture, forestry and fishing; Does not work; Wholesale and retail trade, and repair of motor vehicles and motorcycles; No female head/spouse; Other)
1,591	Does your household own any DVDs/VCRs or home theatres? (No; Yes)
1,581	What type of job/business is the female head/spouse doing? (Skilled agricultural and fishery workers; Elementary occupations; Craft and related trade workers, or plant and machine operators and assemblers; None; No female head/spouse; Armed forces, legislators, senior officials, and managers, professionals, technicians and associated professionals, clerks, service workers and shop and market sales workers)
1,567	Does the household reside in a rural area? (Yes; No)
1,548	Does your household own any refrigerators or deep freezers? (No; Yes)
1,542	What is the highest grade that the (oldest) female head/spouse has attained? (None, or first to fifth grade; Sixth grade; Seventh to ninth grade; No female head/spouse; Tenth grade or higher)

Table 3 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (Responses ordered starting with those most strongly linked with higher poverty likelihoods)
1,478	What type of job/business is the male head/spouse doing? (Skilled agricultural and fishery workers; No male head/spouse; None; Elementary occupations; Craft and related trade workers; Armed forces, legislators, senior officials, and managers, professionals, technicians and associated professionals, clerks, service workers and shop and market sales workers; Plant and machine operators and assemblers)
1,467	Does your household own any cellular phones? (No; Yes)
1,398	Does your household own any lounge suites/sofas? (No; Yes)
1,398	Does your household own any television? (No; Yes)
1,381	Did any member of this household grow (or did anyone grow on their behalf) any food crops in the last agricultural season? (Yes; No)
1,337	What was the highest grade that the male head/spouse has attained? (None, or first to sixth grade; Seventh grade; Eighth grade; Ninth grade; No male head/spouse; Tenth or eleventh grade; GCE (O level); A level, or higher)
1,321	What is the employment status of the female head/spouse? (Unpaid family worker, piece worker, or other; Self-employed; Does not work; No female head/spouse; Private-sector employee, NGO employee, international organisation/embassy employee, employer/partner, or household employee; Central-government employee, local government/council employee, or parastatal/quasi-government employee)
1,268	What sort of business/service is carried out by the employer/establishment/business of the male head/spouse? (Agriculture, forestry and fishing; No male head/spouse; Does not work; Wholesale and retail trade, and repair of motor vehicles and motorcycles; Other)
1,262	How many beds and mattresses does your household own? (None; One or more beds, but no mattresses; One mattress (regardless of beds); Two or more mattresses (regardless of beds))
1,255	How many mattresses does your household own? (None; One; Two)

Table 3 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (Responses ordered starting with those most strongly linked with higher poverty likelihoods)
1,230	What is the main current economic activity status of the male head/spouse? (None, farming, fishing, forestry, piecework, unpaid family worker, not working but looking for work, no means to do business but available or wishing to do so, full-time student, homemaker, retired, too old or too young to work, or other; No male head/spouse; Running a business/self-employed but not farming; In wage employment)
1,223	In their main current economic activity, are any household members employers? (No; Yes)
1,197	Do any household members have as their main current economic activity status wage employment? (No; Yes)
1,129	On what basis does your household occupy the dwelling you live in? Is it . . .? (Owner-occupied; Other)
1,044	How many beds does your household own? (None; One; Two; Three or more)
1,028	What is the employment status of the male head/spouse? (Self-employed, unpaid family worker, piece workers, or other; No male head/spouse; Does not work; NGO employee, international organisation/embassy employee, employer/partner, or household employee; Private-sector employee; Central-government employee, or local government/council employee, parastatal/quasi-government employee)
988	Does your household own any satellite dish/decoders (free to air, or DSTV) or other pay-TV arrangements? (No; Yes)
929	In their main current economic activity, how many household members are self-employed? (Two or more; One; None)
881	In their main current economic activity, are any household members legislators, senior officials, managers, professionals, technicians and associated professionals, or clerks? (No; Yes)
855	How many hoes does your household own? (Five or more; Four; Three; Two; One; None)
746	How many meals (excluding snacks) do you normally have in a day? (One; Two; Three or more)
740	Does your household own any axes? (Yes; No)

Table 3 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (Responses ordered starting with those most strongly linked with higher poverty likelihoods)
697	How many household members are 15-years-old or younger? (Five or more; Four; Three; Two; One; None)
680	How many household members are 14-years-old or younger? (Five or more; Four; Three; Two; One; None)
670	Do you consider your household to be non-poor, moderately poor, or very poor? (Very poor; Moderately poor; Non-poor)
669	Are all household members ages 7 to 16 currently attending school? (No; Yes; No one 7 to 16)
668	Do you treat your drinking water by boiling, adding chlorine, or in some other way? (Does not treat in any way, or other; Add chlorine; Boil)
665	How many household members are 13-years-old or younger? (Five or more; Four; Three; Two; One; None)
659	How many household members are 17-years-old or younger? (Six or more; Five; Four; Three; Two; One; None)
648	In their main current economic activity, do any household members work in an establishment/business in information and communication, finance or insurance, real estate, professional, scientific and technical activities, administrative and support service activities, public administration and defence, compulsory social security, education, human health and social work, arts, entertainment, or recreation? (No; Yes)
646	How many household members are 16-years-old or younger? (Six or more; Five; Four; Three; Two; One; None)
646	How many household members are 18-years-old or younger? (Six or more; Five; Four; Three; Two; One; None)
646	Does your household own any watches or clocks? (No; Yes)
642	Are all household members ages 7 to 15 currently attending school? (No; Yes; No one 7 to 15)
639	How many household members are 12-years-old or younger? (Five or more; Four; Three; Two; One; None)
638	Are all household members ages 7 to 14 currently attending school? (No; Yes; No one 7 to 14)

Table 3 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (Responses ordered starting with those most strongly linked with higher poverty likelihoods)
623	How many household members have as their main current economic activity status wage employment, running a business/self-employed but not farming, farming, fishing, forestry, piecework, or unpaid family worker? (Three or more; Two; One; None)
623	How many braziers (*mbaula*) does your household own? (None; One; Two or more)
617	Are all household members ages 7 to 13 currently attending school? (No; Yes; No one 7 to 13)
613	Are all household members ages 7 to 12 currently attending school? (No; Yes; No one 7 to 12)
611	Are all household members ages 7 to 17 currently attending school? (No; Yes; No one 7 to 17)
602	Are all household members ages 7 to 11 currently attending school? (No; Yes; No one 7 to 11)
596	How many household members are 11-years-old or younger? (Five or more; Four; Three; Two; One; None)
575	In their main current economic activity, are any household members employers or employees in the private sector? (No; Yes)
561	How many members does the household have? (Eight or more; Seven; Six; Five; Four; Three; One or two)
545	Are all household members ages 7 to 18 currently attending school? (No; Yes; No one 7 to 18)
539	In their main current economic activity, are any household members government employees (central, local/council, parastatal/quasi-government)? (No; Yes)
515	Does your household own any wheel barrows or Scotch carts, bicycles, or motorcycles, large trucks, small/pick-up trucks, vans/mini-buses, or cars? (None; Only bicycle; Only wheel barrow or Scotch cart; Only bicyle, and wheel barrow or Scotch cart; Motorcycles, large trucks, small/pick-up trucks, vans/mini-buses, or cars (regardless of others))
449	What is the main method of garbage disposal that this household uses? (Dumping, burning, or other; Pit; Refuse collection)
442	Does your household own any tables (dining)? (No; Yes)
390	In their main current economic activity, are any household members service workers, shop and market sales workers, or craft and related trade workers? (No; Yes)

Table 3 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (Responses ordered starting with those most strongly linked with higher poverty likelihoods)
367	Does your household own any motorcycles, large trucks, small/pick-up trucks, vans/mini-buses, or cars? (No; Yes)
341	Does your household own any radios? (No; Yes)
325	How many household members are 6-years-old or younger? (Three or more; Two; One; None)
298	In their main current economic activity, do any household members work in an establishment/business in manufacturing, construction, wholesale and retail trade, or repair of motor vehicles and motorcycles? (No; Yes)
297	How many rooms are occupied by this household, excluding bathrooms and toilets? (One; Two; Three; Four or more)
280	Does your household own any computers? (No; Yes)
274	What is the marital status of the female head/spouse? (Married, or co-habiting; Divorced, or widowed; Separated; Single, never-married, not cohabiting; No female head/spouse)
208	Do any household members have as their main current economic activity status running a business/self-employed but not farming? (No; Yes)
178	What is the marital status of the male head/spouse? (Married, or co-habiting; No male head/spouse; Single, never-married, not cohabiting, separated, divorced, or widowed)
157	Does your household own any shovels/spades? (No; Yes)
154	In their main current economic activity, do any household members work in an establishment/business in mining and quarrying? (No; Yes)
152	Does your household own any wheel barrows? (No; Yes)
103	Does your household own any bicycles? (No; Yes)
55	Does your household own any dish washers? (No; Yes)
25	How many mosquito nets does your household own? (None; One; Two; Three; Four or more)

Table 3 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (Responses ordered starting with those most strongly linked with higher poverty likelihoods)
24	Does your household own any hammers? (No; Yes)
14	Does your household own any non-electric irons? (No; Yes)
9	Does your household own any Scotch carts? (No; Yes)
8	Does your household own any picks? (No; Yes)
2	Does your household own any crop sprayers? (No; Yes)
1	In their main current economic activity, how many household members are in elementary occupations? (None; One or more)

Source: 2010 LCMS and 100% of the old-definition Göttingen national poverty line

Tables for
100% of the New-Definition National Poverty Line

(and Tables Pertaining
to All New-Definition Lines)

Table 4 (100% of the new-definition national line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	99.8
5–9	97.3
10–14	97.2
15–19	95.1
20–24	86.7
25–29	79.0
30–34	69.2
35–39	55.0
40–44	40.0
45–49	23.6
50–54	16.1
55–59	4.8
60–64	3.2
65–69	2.6
70–74	1.2
75–79	0.2
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Table 5 (100% of the new-definition national line): Derivation of estimated poverty likelihoods associated with scores

Score	Households in range and < poverty line		All households in range		Poverty likelihood (%)
0–4	1,565	÷	1,568	=	99.8
5–9	2,733	÷	2,808	=	97.3
10–14	5,296	÷	5,448	=	97.2
15–19	8,113	÷	8,530	=	95.1
20–24	8,092	÷	9,330	=	86.7
25–29	7,146	÷	9,045	=	79.0
30–34	5,545	÷	8,008	=	69.2
35–39	5,035	÷	9,148	=	55.0
40–44	3,102	÷	7,751	=	40.0
45–49	1,460	÷	6,189	=	23.6
50–54	789	÷	4,908	=	16.1
55–59	253	÷	5,232	=	4.8
60–64	138	÷	4,259	=	3.2
65–69	117	÷	4,573	=	2.6
70–74	50	÷	4,294	=	1.2
75–79	8	÷	3,611	=	0.2
80–84	0	÷	2,306	=	0.0
85–89	0	÷	1,061	=	0.0
90–94	0	÷	1,306	=	0.0
95–100	0	÷	627	=	0.0

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

Table 6 (100% of the new-definition national line): Average errors (estimates minus observed values) for poverty likelihoods for households by score range, with confidence intervals from 1,000 bootstraps of n = 16,384, scorecard applied to the 2015 validation sample

	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	–0.1	0.1	0.2	0.2
5–9	+5.9	2.9	3.4	4.3
10–14	+7.5	2.0	2.4	3.0
15–19	+1.5	1.1	1.3	1.8
20–24	–5.3	3.3	3.4	3.7
25–29	0.0	2.0	2.3	3.1
30–34	+3.0	2.6	3.2	4.0
35–39	+4.0	2.4	3.1	4.3
40–44	+6.9	2.6	3.1	3.8
45–49	+0.5	2.8	3.2	4.2
50–54	+1.0	2.5	2.9	4.0
55–59	–7.3	4.9	5.3	5.6
60–64	–2.5	2.2	2.5	3.0
65–69	+2.2	0.2	0.3	0.4
70–74	+1.1	0.0	0.0	0.0
75–79	+0.2	0.0	0.0	0.0
80–84	0.0	0.0	0.0	0.0
85–89	0.0	0.0	0.0	0.0
90–94	0.0	0.0	0.0	0.0
95–100	0.0	0.0	0.0	0.0

Table 7 (100% of the new-definition national line): Average errors (estimates minus observed values) for poverty rates at a point in time by sample size, with confidence intervals for 1,000 bootstraps of various sample sizes, scorecard applied to the 2015 validation sample

Sample Size	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	–0.1	64.6	77.7	89.5
4	+1.4	34.1	42.0	59.6
8	+1.3	24.1	29.4	40.4
16	+1.6	17.1	21.4	29.8
32	+1.5	12.2	14.1	19.4
64	+0.9	8.1	9.7	12.4
128	+0.9	6.0	7.0	9.0
256	+1.0	4.1	4.9	6.6
512	+0.9	3.0	3.5	4.7
1,024	+1.0	2.2	2.7	3.6
2,048	+1.0	1.5	1.8	2.4
4,096	+1.0	1.1	1.4	1.7
8,192	+1.0	0.7	0.9	1.1
16,384	+1.0	0.5	0.6	0.8

Table 8 (New-definition national lines): Average errors (estimates minus observed values) for poverty rates of a group of households at a point in time, precision, and the α factor for precision, scorecard applied to the 2015 validation sample

	Poverty lines			
		National		
	Food	**100%**	**150%**	**200%**
Error (estimate minus observed value)	+1.4	+1.0	+0.4	–1.4
Precision of difference	0.5	0.5	0.5	0.5
Alpha factor for precision	0.78	0.80	0.80	0.92

Results pertain to the scorecard applied to the 2015 validation sample.

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

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

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

Alpha is estimated from 1,000 bootstrap samples of n = 256, 512, 1,024, 2,048, 4,096, 8,192, and 16,384.

Table 8 (New-definition international 2005 and 2011 PPP lines): Average errors (estimates minus observed values) for poverty rates of a group of households at a point in time, precision, and the α factor for precision, scorecard applied to the 2015 validation sample

	Poverty lines					
	Intl. 2005 PPP				Intl. 2011 PPP	
	$1.25	**$2.00**	**$2.50**	**$5.00**	**$1.90**	**$3.10**
Error (estimate minus observed value)	+0.4	–2.2	–1.8	–2.3	+0.8	–0.6
Precision of difference	0.5	0.5	0.5	0.3	0.5	0.5
Alpha factor for precision	0.79	0.92	0.98	0.91	0.79	0.85

Results pertain to the scorecard applied to the 2015 validation sample.

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

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

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

Alpha is estimated from 1,000 bootstrap samples of n = 256, 512, 1,024, 2,048, 4,096, 8,192, and 16,384.

Table 8 (New-definition relative- and percentile-based lines): Average errors (estimates minus observed values) for poverty rates of a group of households at a point in time, precision, and the α factor for precision, scorecard applied to the 2015 validation sample

	Poverty lines					
	Poorest half of people below 100% Natl. line	Percentile-based lines				
		20th	40th	50th	60th	80th
Error (estimate minus observed value)	+0.7	–0.3	+1.8	+1.4	+0.6	–2.2
Precision of difference	0.4	0.4	0.5	0.5	0.5	0.5
Alpha factor for precision	0.78	0.85	0.75	0.78	0.80	0.92

Results pertain to the scorecard applied to the 2015 validation sample.

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

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

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

Alpha is estimated from 1,000 bootstrap samples of n = 256, 512, 1,024, 2,048, 4,096, 8,192, and 16,384.

Table 9 (New-definition national lines): Average errors (estimates minus observed values) for changes in poverty rates for two independent samples between two points in time, precision, and the α factor for precision, scorecard applied to the 2015 validation sample (baseline) and to all of the 2010 data (follow-up)

	Poverty lines			
		National		
	Food	**100%**	**150%**	**200%**
Error (estimate minus observed value)	+6.8	+4.2	+0.7	+1.6
Precision of difference	0.7	0.8	0.7	0.6
Alpha factor for precision	0.88	0.86	0.81	0.80

Scorecard applied to the 2015 validation sample (baseline) and 2010 validation sample (follow-up).
Errors (differences between estimates and observed values) are displayed in units of percentage points.
Precision is measured as 90-percent confidence intervals in units of ± percentage points.
Errors and precision estimated from 1,000 bootstraps with n = 16,384.
Alpha is estimated from 1,000 bootstrap samples of n = 256, 512, 1,024, 2,048, 4,096, 8,192, and 16,384.

Table 9 (New-definition international 2005 and 2011 PPP lines): Average errors (estimates minus observed values) for changes in poverty rates for two independent samples between two points in time, precision, and the α factor for precision, scorecard applied to the 2015 validation sample (baseline) and to all of the 2010 data (follow-up)

	Poverty lines					
	Intl. 2005 PPP				Intl. 2011 PPP	
	$1.25	**$2.00**	**$2.50**	**$5.00**	**$1.90**	**$3.10**
Error (estimate minus observed value)	+0.4	+1.3	+1.3	+1.7	+2.5	+1.0
Precision of difference	0.7	0.6	0.6	0.4	0.7	0.7
Alpha factor for precision	0.78	0.82	0.86	0.87	0.82	0.79

Scorecard applied to the 2015 validation sample (baseline) and 2010 validation sample (follow-up).
Errors (differences between estimates and observed values) are displayed in units of percentage points.
Precision is measured as 90-percent confidence intervals in units of ± percentage points.
Errors and precision estimated from 1,000 bootstraps with n = 16,384.
Alpha is estimated from 1,000 bootstrap samples of n = 256, 512, 1,024, 2,048, 4,096, 8,192, and 16,384.

Table 10 (All poverty lines): Possible targeting outcomes

Observed poverty status		Targeting segment: Targeted	Targeting segment: Non-targeted
		Inclusion	**Undercoverage**
Poor		Poor correctly targeted	Poor mistakenly not targeted
		Leakage	**Exclusion**
Non-poor		Non-poor mistakenly targeted	Non-poor correctly not targeted

Table 11 (100% of the new-definition national line): Percentages of households by cut-off score and targeting classification, along with the hit rate and BPAC, scorecard applied to the 2015 validation sample

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	BPAC See text
<=4	1.6	47.5	0.0	50.9	52.5	–93.6
<=9	4.2	44.9	0.2	50.8	55.0	–82.5
<=14	9.3	39.8	0.6	50.4	59.6	–61.1
<=19	17.2	31.9	1.1	49.8	67.0	–27.5
<=24	25.8	23.3	1.9	49.0	74.8	+9.0
<=29	32.9	16.2	3.8	47.1	80.0	+41.9
<=34	38.2	10.9	6.5	44.4	82.6	+69.0
<=39	43.1	5.9	10.8	40.2	83.3	+78.1
<=44	46.0	3.0	15.6	35.3	81.4	+68.2
<=49	47.5	1.5	20.3	30.6	78.2	+58.7
<=54	48.3	0.7	24.4	26.5	74.8	+50.3
<=59	48.8	0.3	29.2	21.7	70.5	+40.5
<=64	49.0	0.0	33.2	17.7	66.8	+32.3
<=69	49.1	0.0	37.7	13.2	62.3	+23.1
<=74	49.1	0.0	42.0	8.9	58.0	+14.4
<=79	49.1	0.0	45.6	5.3	54.4	+7.0
<=84	49.1	0.0	47.9	3.0	52.1	+2.3
<=89	49.1	0.0	49.0	1.9	51.0	+0.1
<=94	49.1	0.0	50.3	0.6	49.7	–2.5
<=100	49.1	0.0	50.9	0.0	49.1	–3.8

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Table 12 (100% of the new-definition national line): Share of all households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor (that is, have consumption below the poverty line), share of poor households who are targeted, and number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the 2015 validation sample

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
<=4	1.6	99.4	3.2	171.7:1
<=9	4.4	96.0	8.6	23.7:1
<=14	9.8	94.2	18.9	16.3:1
<=19	18.4	93.8	35.1	15.1:1
<=24	27.7	93.1	52.5	13.6:1
<=29	36.7	89.6	67.1	8.6:1
<=34	44.7	85.4	77.8	5.8:1
<=39	53.9	80.0	87.9	4.0:1
<=44	61.6	74.7	93.8	3.0:1
<=49	67.8	70.1	96.9	2.3:1
<=54	72.7	66.4	98.5	2.0:1
<=59	78.0	62.6	99.4	1.7:1
<=64	82.2	59.6	99.9	1.5:1
<=69	86.8	56.5	100.0	1.3:1
<=74	91.1	53.9	100.0	1.2:1
<=79	94.7	51.8	100.0	1.1:1
<=84	97.0	50.6	100.0	1.0:1
<=89	98.1	50.0	100.0	1.0:1
<=94	99.4	49.4	100.0	1.0:1
<=100	100.0	49.1	100.0	1.0:1

Table 13: Distribution of responses in the 2010 and 2015 LCMS

Indicator	Response	2010	2015
1. How many members does the household have?	A. Eight or more	17	16
	B. Seven	11	10
	C. Six	13	15
	D. Five	16	16
	E. Four	16	16
	F. Three	13	14
	G. One or two	14	13
2. Are all household members ages 7 to 16 currently attending school?	A. No	29	28
	B. Yes	43	44
	C. No one 7 to 16	28	28
3. What is the highest grade that the (oldest) female head/spouse has attained?	A. None, or first to fifth grade	35	35
	B. Sixth grade	6	7
	C. Seventh to ninth grade	35	35
	D. No female head/spouse	8	7
	E. Tenth grade or higher	16	16
4. What kind of building material is the floor of this dwelling made of? (If possible, observe without asking)	A. Mud, wood only, or other	54	50
	B. Concrete only, or covered concrete	46	50
5. What kind of building material is the roof of this dwelling made of? (If possible, observe without asking)	A. Grass/straw/thatch, or other	46	38
	B. Iron sheets, or other non-asbestos tiles	31	48
	C. Concrete, asbestos sheets, or asbestos tiles	23	14
6. What is the main type of energy that your household uses for cooking?	A. Firewood (collected or purchased), coal, crop/livestock residues, or other	51	51
	B. Charcoal (own-produced or purchased)	30	33
	C. Gas, electricity, solar, or kerosene/paraffin	19	16
7. Does your household own any televisions, DVDs/VCRs, home theatres, satellite dish/decoders (free to air, or DSTV) or other pay-TV arrangements?	A. No TV (regardless of others)	68	62
	B. TV, but nothing else	11	10
	C. TV, and something else (DVD, dish, and so on)	21	27
8. Does your household own any non-electric or electric irons?	A. None	61	62
	B. Only non-electric	19	14
	C. Electric, or both electric and non-electric	19	24
9. Does your household own any cellular phones?	A. No	49	39
	B. Yes	51	61
10. How many beds and mattresses does your household own?	A. None	20	19
	B. One or more beds, but no mattresses	6	4
	C. One mattress (regardless of beds)	39	35
	D. Two or more mattresses (regardless of beds)	35	42

All figures are rounded percentages. Weighted in both years with new-definition weights.

Table 14: Province-level estimation errors for head-count poverty rates by 100% of the old-definition (CSO) national line in the 2010 Census (poverty map) and the 2010 validation sample (scorecard)

Province	% poor in 2010 LCMS	Poverty map Errors	Scorecard Errors
Central	60.8	+4.2	–3.3
Copperbelt	34.3	+2.7	+1.3
Eastern	78.5	+1.5	+3.1
Luapula	80.4	–1.4	–4.7
Lusaka	24.4	+0.6	+0.8
Northern	74.2	+1.8	–4.3
North Western	66.9	–2.9	+3.4
Southern	67.9	+0.1	+8.9
Western	80.3	+3.7	–3.5
Muchinga	75.1	+1.9	–2.5
Average absolute error:		2.1	3.6

Poverty rates are percentages at the level of people.

Errors are in percentage points.

The poverty map is tested out-of-sample with the 2010 Census.

The scorecard is tested out-of-sample with the 2010 LCMS validation sample.

Both tools use 100% of the old-definition (CSO) national poverty line.

Tables for
the New-Definition Food Poverty Line

Table 4 (Food line (new-definition)): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	95.9
5–9	89.9
10–14	88.0
15–19	82.4
20–24	70.8
25–29	57.2
30–34	46.0
35–39	31.4
40–44	19.7
45–49	6.9
50–54	4.5
55–59	2.8
60–64	1.0
65–69	0.4
70–74	0.1
75–79	0.0
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Table 6 (Food line (new-definition)): Average errors (estimates minus observed values) for poverty likelihoods for households by score range with confidence intervals from 1,000 bootstraps of n = 16,384, scorecard applied to the 2015 validation sample

	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	–1.5	1.6	1.9	2.6
5–9	+2.2	3.1	3.6	4.8
10–14	+5.9	2.3	2.8	3.5
15–19	+0.3	1.8	2.1	2.7
20–24	+0.7	2.1	2.5	3.3
25–29	–0.3	2.4	2.9	3.9
30–34	+3.3	2.7	3.1	4.1
35–39	+6.6	2.0	2.4	3.2
40–44	+2.5	2.1	2.5	3.0
45–49	+0.6	1.3	1.5	2.1
50–54	+3.7	0.3	0.4	0.5
55–59	–4.7	3.5	3.8	4.1
60–64	+0.8	0.2	0.2	0.2
65–69	+0.4	0.0	0.0	0.0
70–74	+0.1	0.0	0.0	0.0
75–79	0.0	0.0	0.0	0.0
80–84	0.0	0.0	0.0	0.0
85–89	0.0	0.0	0.0	0.0
90–94	0.0	0.0	0.0	0.0
95–100	0.0	0.0	0.0	0.0

Table 7 (Food line (new-definition)): Average errors (estimates minus observed values) for poverty rates at a point in time by sample size, with confidence intervals for 1,000 bootstraps of various sample sizes, scorecard applied to the 2015 validation sample

Sample Size	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	–0.1	62.9	75.6	90.6
4	+1.4	33.0	40.2	55.7
8	+1.3	23.4	28.4	37.9
16	+1.5	15.5	18.8	24.2
32	+1.4	11.0	13.1	17.2
64	+1.3	7.6	9.1	11.0
128	+1.4	5.5	6.5	8.4
256	+1.5	3.8	4.5	5.6
512	+1.4	2.6	3.1	4.2
1,024	+1.4	2.0	2.3	3.0
2,048	+1.4	1.4	1.7	2.2
4,096	+1.4	0.9	1.1	1.5
8,192	+1.4	0.7	0.8	1.0
16,384	+1.4	0.5	0.6	0.7

Table 11 (Food line (new-definition)): Percentages of households by cut-off score and targeting classification, along with the hit rate and BPAC, scorecard applied to the 2015 validation sample

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	BPAC See text
<=4	1.5	34.3	0.0	64.1	65.7	–91.4
<=9	4.0	31.8	0.3	63.8	67.9	–76.5
<=14	8.6	27.2	1.2	63.0	71.6	–48.5
<=19	15.5	20.3	2.9	61.3	76.8	–5.5
<=24	22.2	13.6	5.5	58.7	80.8	+39.2
<=29	27.3	8.5	9.5	54.7	82.0	+73.6
<=34	30.8	5.0	14.0	50.2	81.0	+61.0
<=39	33.5	2.3	20.4	43.8	77.2	+43.0
<=44	35.0	0.9	26.7	37.5	72.5	+25.5
<=49	35.5	0.4	32.4	31.8	67.3	+9.6
<=54	35.6	0.3	37.2	27.0	62.6	–3.8
<=59	35.8	0.0	42.2	22.0	57.8	–17.7
<=64	35.8	0.0	46.4	17.8	53.6	–29.6
<=69	35.8	0.0	51.0	13.2	49.0	–42.3
<=74	35.8	0.0	55.3	8.9	44.7	–54.3
<=79	35.8	0.0	58.9	5.3	41.1	–64.4
<=84	35.8	0.0	61.2	3.0	38.8	–70.8
<=89	35.8	0.0	62.2	1.9	37.8	–73.8
<=94	35.8	0.0	63.6	0.6	36.4	–77.4
<=100	35.8	0.0	64.2	0.0	35.8	–79.2

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Table 12 (Food line (new-definition)): Share of all households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor (that is, have consumption below the poverty line), share of poor households who are targeted, and number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the 2015 validation sample

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
<=4	1.6	97.0	4.2	32.1:1
<=9	4.4	92.2	11.3	11.8:1
<=14	9.8	87.7	24.1	7.1:1
<=19	18.4	84.4	43.3	5.4:1
<=24	27.7	80.1	61.9	4.0:1
<=29	36.7	74.3	76.1	2.9:1
<=34	44.7	68.8	85.9	2.2:1
<=39	53.9	62.1	93.5	1.6:1
<=44	61.6	56.7	97.6	1.3:1
<=49	67.8	52.3	99.0	1.1:1
<=54	72.7	48.9	99.3	1.0:1
<=59	78.0	45.9	99.9	0.8:1
<=64	82.2	43.6	100.0	0.8:1
<=69	86.8	41.3	100.0	0.7:1
<=74	91.1	39.3	100.0	0.6:1
<=79	94.7	37.8	100.0	0.6:1
<=84	97.0	36.9	100.0	0.6:1
<=89	98.1	36.5	100.0	0.6:1
<=94	99.4	36.0	100.0	0.6:1
<=100	100.0	35.8	100.0	0.6:1

Tables for
150% of the New-Definition National Poverty Line

Table 4 (150% of the national line (new-definition)): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	100.0
5–9	99.9
10–14	99.7
15–19	99.6
20–24	97.6
25–29	93.9
30–34	89.6
35–39	78.4
40–44	69.3
45–49	52.7
50–54	45.2
55–59	25.5
60–64	16.6
65–69	10.2
70–74	6.1
75–79	2.0
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Table 6 (150% of the national line (new-definition)): Average errors (estimates minus observed values) for poverty likelihoods for households by score range with confidence intervals from 1,000 bootstraps of n = 16,384, scorecard applied to the 2015 validation sample

	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	0.0	0.0	0.0	0.0
5–9	+0.7	0.6	0.7	0.9
10–14	+1.1	0.8	0.9	1.3
15–19	+1.2	0.6	0.7	1.1
20–24	–1.9	1.1	1.1	1.1
25–29	–0.1	1.3	1.5	1.9
30–34	+1.7	1.7	2.1	2.8
35–39	–8.9	5.2	5.3	5.7
40–44	+4.1	2.9	3.4	4.3
45–49	–3.1	3.1	3.7	4.9
50–54	+11.2	3.3	3.9	5.0
55–59	+0.5	2.9	3.4	4.3
60–64	+4.3	2.6	3.3	4.0
65–69	+1.3	2.1	2.5	3.2
70–74	+1.6	1.6	1.9	2.5
75–79	–1.3	1.4	1.7	2.3
80–84	0.0	0.0	0.0	0.0
85–89	0.0	0.0	0.0	0.0
90–94	0.0	0.0	0.0	0.0
95–100	0.0	0.0	0.0	0.0

Table 7 (150% of the national line (new-definition)): Average errors (estimates minus observed values) for poverty rates at a point in time by sample size, with confidence intervals for 1,000 bootstraps of various sample sizes, scorecard applied to the 2015 validation sample

Sample Size	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	+0.2	58.3	66.6	91.8
4	+0.1	30.4	37.7	51.6
8	–0.1	22.6	27.7	35.3
16	+0.3	15.3	19.7	26.1
32	+0.3	11.7	13.9	19.2
64	+0.3	7.8	9.5	13.0
128	+0.4	5.7	6.8	8.6
256	+0.4	3.9	4.6	6.3
512	+0.4	2.7	3.2	4.2
1,024	+0.4	2.0	2.3	3.3
2,048	+0.4	1.5	1.8	2.4
4,096	+0.4	1.0	1.2	1.6
8,192	+0.4	0.8	0.9	1.2
16,384	+0.4	0.5	0.6	0.8

Table 11 (150% of the national line (new-definition)): Percentages of households by cut-off score and targeting classification, along with the hit rate and BPAC, scorecard applied to the 2015 validation sample

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	BPAC See text
<=4	1.6	62.3	0.0	36.1	37.7	–95.1
<=9	4.3	59.5	0.0	36.1	40.4	–86.4
<=14	9.7	54.1	0.1	36.0	45.8	–69.4
<=19	18.1	45.7	0.2	35.9	54.0	–42.9
<=24	27.4	36.5	0.3	35.8	63.2	–13.8
<=29	36.0	27.9	0.8	35.3	71.3	+13.8
<=34	43.0	20.8	1.7	34.4	77.5	+37.4
<=39	50.8	13.1	3.1	33.0	83.8	+63.8
<=44	56.0	7.8	5.6	30.5	86.5	+84.2
<=49	59.5	4.4	8.3	27.8	87.3	+87.0
<=54	61.3	2.5	11.4	24.7	86.1	+82.2
<=59	62.6	1.3	15.3	20.8	83.4	+76.0
<=64	63.2	0.7	19.0	17.1	80.3	+70.2
<=69	63.6	0.3	23.2	12.9	76.5	+63.6
<=74	63.8	0.1	27.3	8.8	72.6	+57.2
<=79	63.9	0.0	30.8	5.3	69.2	+51.7
<=84	63.9	0.0	33.1	3.0	66.9	+48.1
<=89	63.9	0.0	34.2	1.9	65.8	+46.5
<=94	63.9	0.0	35.5	0.6	64.5	+44.4
<=100	63.9	0.0	36.1	0.0	63.9	+43.4

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Table 12 (150% of the national line (new-definition)): Share of all households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor (that is, have consumption below the poverty line), share of poor households who are targeted, and number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the 2015 validation sample

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
<=4	1.6	100.0	2.5	Only poor targeted
<=9	4.4	99.2	6.8	124.6:1
<=14	9.8	99.2	15.3	122.4:1
<=19	18.4	98.8	28.4	81.2:1
<=24	27.7	98.9	42.9	89.7:1
<=29	36.7	97.9	56.3	46.3:1
<=34	44.7	96.2	67.4	25.3:1
<=39	53.9	94.2	79.5	16.2:1
<=44	61.6	90.9	87.7	10.0:1
<=49	67.8	87.7	93.2	7.2:1
<=54	72.7	84.3	96.0	5.4:1
<=59	78.0	80.3	98.0	4.1:1
<=64	82.2	76.8	98.9	3.3:1
<=69	86.8	73.2	99.5	2.7:1
<=74	91.1	70.0	99.8	2.3:1
<=79	94.7	67.5	100.0	2.1:1
<=84	97.0	65.8	100.0	1.9:1
<=89	98.1	65.1	100.0	1.9:1
<=94	99.4	64.3	100.0	1.8:1
<=100	100.0	63.9	100.0	1.8:1

Tables for
200% of the New-Definition National Poverty Line

Table 4 (200% of the national line (new-definition)): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	100.0
5–9	100.0
10–14	100.0
15–19	100.0
20–24	99.6
25–29	98.4
30–34	96.2
35–39	90.3
40–44	85.3
45–49	76.1
50–54	68.9
55–59	46.9
60–64	33.6
65–69	27.1
70–74	21.7
75–79	9.4
80–84	5.5
85–89	5.4
90–94	0.0
95–100	0.0

Table 6 (200% of the national line (new-definition)): Average errors (estimates minus observed values) for poverty likelihoods for households by score range with confidence intervals from 1,000 bootstraps of n = 16,384, scorecard applied to the 2015 validation sample

	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	0.0	0.0	0.0	0.0
5–9	+0.8	0.6	0.7	0.9
10–14	0.0	0.0	0.0	0.0
15–19	+0.1	0.1	0.1	0.1
20–24	–0.4	0.2	0.2	0.2
25–29	+0.4	0.6	0.7	0.9
30–34	+1.5	1.2	1.5	2.1
35–39	–6.6	3.6	3.7	3.9
40–44	–0.5	2.1	2.3	3.2
45–49	–4.4	3.4	3.5	3.9
50–54	+10.5	3.4	4.1	5.3
55–59	–13.2	8.3	8.6	9.3
60–64	–2.4	4.0	4.5	6.0
65–69	+0.1	3.3	3.9	5.0
70–74	+11.6	2.3	2.7	3.5
75–79	–18.4	11.3	11.7	12.9
80–84	–4.1	3.9	4.3	5.7
85–89	+5.1	0.3	0.4	0.5
90–94	–1.0	1.0	1.2	1.3
95–100	0.0	0.0	0.0	0.0

Table 7 (200% of the national line (new-definition)): Average errors (estimates minus observed values) for poverty rates at a point in time by sample size, with confidence intervals for 1,000 bootstraps of various sample sizes, scorecard applied to the 2015 validation sample

Sample Size	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	+1.1	61.0	79.1	93.4
4	–0.1	32.9	40.4	51.5
8	–1.0	23.2	26.9	37.1
16	–0.9	17.2	20.3	27.4
32	–1.2	11.8	14.1	19.3
64	–1.4	8.0	9.8	14.5
128	–1.2	5.7	6.9	9.7
256	–1.3	4.0	5.0	6.5
512	–1.3	2.9	3.5	4.6
1,024	–1.4	2.2	2.6	3.5
2,048	–1.3	1.5	1.8	2.4
4,096	–1.4	1.1	1.4	1.8
8,192	–1.4	0.8	0.9	1.2
16,384	–1.4	0.5	0.6	0.8

Table 11 (200% of the national line (new-definition)): Percentages of households by cut-off score and targeting classification, along with the hit rate and BPAC, scorecard applied to the 2015 validation sample

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	BPAC See text
<=4	1.6	72.1	0.0	26.3	27.9	–95.7
<=9	4.3	69.3	0.0	26.3	30.6	–88.2
<=14	9.8	63.9	0.0	26.3	36.1	–73.4
<=19	18.3	55.4	0.0	26.3	44.6	–50.2
<=24	27.6	46.0	0.0	26.3	53.9	–24.9
<=29	36.5	37.2	0.2	26.1	62.6	–0.6
<=34	44.1	29.5	0.6	25.7	69.9	+20.6
<=39	52.8	20.8	1.0	25.3	78.1	+44.9
<=44	59.5	14.1	2.1	24.2	83.7	+64.5
<=49	64.4	9.3	3.4	22.9	87.3	+79.5
<=54	67.3	6.4	5.4	20.9	88.2	+90.1
<=59	70.0	3.7	7.9	18.4	88.4	+89.2
<=64	71.4	2.3	10.8	15.5	86.9	+85.3
<=69	72.4	1.3	14.4	11.9	84.3	+80.5
<=74	72.9	0.8	18.2	8.1	81.0	+75.3
<=79	73.5	0.2	21.2	5.1	78.6	+71.2
<=84	73.6	0.0	23.4	3.0	76.6	+68.3
<=89	73.7	0.0	24.4	1.9	75.6	+66.9
<=94	73.7	0.0	25.7	0.6	74.3	+65.1
<=100	73.7	0.0	26.3	0.0	73.7	+64.3

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Table 12 (200% of the national line (new-definition)): Share of all households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor (that is, have consumption below the poverty line), share of poor households who are targeted, and number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the 2015 validation sample

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
<=4	1.6	100.0	2.1	Only poor targeted
<=9	4.4	99.2	5.9	124.6:1
<=14	9.8	99.6	13.3	280.9:1
<=19	18.4	99.7	24.8	375.2:1
<=24	27.7	99.8	37.5	557.4:1
<=29	36.7	99.3	49.5	147.5:1
<=34	44.7	98.7	59.9	73.8:1
<=39	53.9	98.1	71.7	50.8:1
<=44	61.6	96.6	80.8	28.2:1
<=49	67.8	95.0	87.4	18.8:1
<=54	72.7	92.5	91.4	12.4:1
<=59	78.0	89.8	95.0	8.8:1
<=64	82.2	86.8	96.9	6.6:1
<=69	86.8	83.4	98.3	5.0:1
<=74	91.1	80.0	98.9	4.0:1
<=79	94.7	77.6	99.7	3.5:1
<=84	97.0	75.9	100.0	3.2:1
<=89	98.1	75.1	100.0	3.0:1
<=94	99.4	74.1	100.0	2.9:1
<=100	100.0	73.7	100.0	2.8:1

Tables for
the New-Definition $1.25/day 2005 PPP Poverty Line

Table 4 ($1.25/day 2005 PPP line (new-definition)): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	100.0
5–9	99.9
10–14	99.7
15–19	99.1
20–24	96.7
25–29	93.4
30–34	85.9
35–39	76.0
40–44	62.9
45–49	44.2
50–54	37.2
55–59	17.6
60–64	13.4
65–69	7.9
70–74	4.3
75–79	0.9
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Table 6 ($1.25/day 2005 PPP line (new-definition)): Average errors (estimates minus observed values) for poverty likelihoods for households by score range with confidence intervals from 1,000 bootstraps of n = 16,384, scorecard applied to the 2015 validation sample

	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	0.0	0.0	0.0	0.0
5–9	+0.7	0.6	0.7	0.9
10–14	+1.0	0.8	0.9	1.3
15–19	+0.5	0.6	0.7	0.9
20–24	–2.5	1.4	1.5	1.5
25–29	+0.9	1.4	1.6	2.1
30–34	–0.6	1.8	2.1	3.0
35–39	–8.6	5.1	5.3	5.6
40–44	+8.6	2.9	3.5	4.3
45–49	0.0	3.1	3.7	4.9
50–54	+6.1	3.2	3.8	5.3
55–59	–6.0	4.6	4.8	5.3
60–64	+7.1	1.8	2.2	3.1
65–69	+4.3	1.2	1.4	1.8
70–74	–0.3	1.6	1.9	2.4
75–79	+0.3	0.4	0.5	0.7
80–84	0.0	0.0	0.0	0.0
85–89	0.0	0.0	0.0	0.0
90–94	0.0	0.0	0.0	0.0
95–100	0.0	0.0	0.0	0.0

Table 7 ($1.25/day 2005 PPP line (new-definition)): Average errors (estimates minus observed values) for poverty rates at a point in time by sample size, with confidence intervals for 1,000 bootstraps of various sample sizes, scorecard applied to the 2015 validation sample

Sample Size	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	+0.1	59.3	69.4	92.8
4	+0.6	30.8	38.1	50.8
8	+0.3	22.0	27.7	36.3
16	+0.6	16.4	20.1	27.0
32	+0.5	11.6	13.9	20.4
64	+0.3	7.8	9.3	12.1
128	+0.4	5.2	6.5	8.3
256	+0.4	3.8	4.5	5.9
512	+0.4	2.8	3.3	4.1
1,024	+0.4	2.0	2.3	2.9
2,048	+0.4	1.5	1.8	2.3
4,096	+0.4	1.0	1.2	1.6
8,192	+0.4	0.7	0.9	1.2
16,384	+0.4	0.5	0.6	0.8

Table 11 ($1.25/day 2005 PPP line (new-definition)): Percentages of households by cut-off score and targeting classification, along with the hit rate and BPAC, scorecard applied to the 2015 validation sample

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	BPAC See text
<=4	1.6	59.3	0.0	39.1	40.7	–94.9
<=9	4.3	56.6	0.0	39.1	43.4	–85.7
<=14	9.7	51.1	0.1	39.0	48.8	–67.9
<=19	18.1	42.8	0.2	38.9	57.0	–40.1
<=24	27.4	33.5	0.3	38.8	66.1	–9.6
<=29	35.7	25.1	1.0	38.1	73.9	+19.0
<=34	42.7	18.2	2.1	37.0	79.7	+43.5
<=39	50.1	10.8	3.8	35.3	85.5	+70.8
<=44	54.7	6.2	6.9	32.2	86.9	+88.6
<=49	57.4	3.4	10.4	28.7	86.2	+83.0
<=54	59.1	1.8	13.7	25.4	84.5	+77.6
<=59	60.1	0.8	17.9	21.2	81.4	+70.7
<=64	60.5	0.4	21.8	17.3	77.8	+64.3
<=69	60.7	0.2	26.1	13.0	73.7	+57.1
<=74	60.9	0.0	30.2	8.9	69.7	+50.3
<=79	60.9	0.0	33.8	5.3	66.2	+44.5
<=84	60.9	0.0	36.1	3.0	63.9	+40.7
<=89	60.9	0.0	37.2	1.9	62.8	+39.0
<=94	60.9	0.0	38.5	0.6	61.5	+36.8
<=100	60.9	0.0	39.1	0.0	60.9	+35.8

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Table 12 ($1.25/day 2005 PPP line (new-definition)): Share of all households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor (that is, have consumption below the poverty line), share of poor households who are targeted, and number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the 2015 validation sample

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
<=4	1.6	100.0	2.6	Only poor targeted
<=9	4.4	99.2	7.1	124.6:1
<=14	9.8	99.2	16.0	122.4:1
<=19	18.4	98.8	29.8	80.8:1
<=24	27.7	98.8	44.9	82.4:1
<=29	36.7	97.3	58.7	36.6:1
<=34	44.7	95.4	70.1	20.5:1
<=39	53.9	93.0	82.3	13.3:1
<=44	61.6	88.7	89.8	7.9:1
<=49	67.8	84.7	94.3	5.5:1
<=54	72.7	81.2	97.0	4.3:1
<=59	78.0	77.1	98.7	3.4:1
<=64	82.2	73.5	99.3	2.8:1
<=69	86.8	69.9	99.6	2.3:1
<=74	91.1	66.8	99.9	2.0:1
<=79	94.7	64.3	100.0	1.8:1
<=84	97.0	62.8	100.0	1.7:1
<=89	98.1	62.1	100.0	1.6:1
<=94	99.4	61.3	100.0	1.6:1
<=100	100.0	60.9	100.0	1.6:1

Tables for
the New-Definition $2.00/day 2005 PPP Poverty Line

Table 4 ($2.00/day 2005 PPP line (new-definition)): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	100.0
5–9	100.0
10–14	100.0
15–19	100.0
20–24	99.8
25–29	99.4
30–34	98.2
35–39	92.6
40–44	88.9
45–49	80.4
50–54	73.7
55–59	55.8
60–64	37.7
65–69	32.2
70–74	27.0
75–79	10.1
80–84	6.4
85–89	6.4
90–94	1.5
95–100	0.0

Table 6 ($2.00/day 2005 PPP line (new-definition)): Average errors (estimates minus observed values) for poverty likelihoods for households by score range with confidence intervals from 1,000 bootstraps of n = 16,384, scorecard applied to the 2015 validation sample

	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	0.0	0.0	0.0	0.0
5–9	+0.8	0.6	0.7	0.9
10–14	0.0	0.0	0.0	0.0
15–19	+0.1	0.1	0.1	0.1
20–24	–0.2	0.1	0.1	0.1
25–29	0.0	0.3	0.4	0.5
30–34	+1.9	1.1	1.2	1.6
35–39	–4.5	2.6	2.6	2.8
40–44	–6.5	3.7	3.7	3.9
45–49	–2.4	2.4	2.7	3.5
50–54	+8.6	3.2	3.8	5.2
55–59	–10.8	6.9	7.2	7.8
60–64	–9.9	6.9	7.5	8.1
65–69	–3.0	3.6	4.3	5.6
70–74	+9.4	3.0	3.6	4.6
75–79	–20.8	12.5	12.9	14.0
80–84	–5.2	4.6	4.9	5.8
85–89	+6.4	0.0	0.1	0.1
90–94	+1.5	0.0	0.0	0.0
95–100	0.0	0.0	0.0	0.0

Table 7 ($2.00/day 2005 PPP line (new-definition)): Average errors (estimates minus observed values) for poverty rates at a point in time by sample size, with confidence intervals for 1,000 bootstraps of various sample sizes, scorecard applied to the 2015 validation sample

Sample Size	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	+0.1	59.1	74.1	94.0
4	–1.4	31.6	38.3	51.0
8	–2.3	22.3	27.2	35.5
16	–1.9	15.9	19.1	26.3
32	–2.2	11.7	13.4	18.3
64	–2.4	8.2	9.7	13.0
128	–2.2	5.7	6.8	9.6
256	–2.2	4.1	4.9	6.5
512	–2.2	3.0	3.5	4.7
1,024	–2.2	2.1	2.4	3.3
2,048	–2.2	1.5	1.8	2.3
4,096	–2.2	1.1	1.3	1.6
8,192	–2.2	0.8	0.9	1.1
16,384	–2.2	0.5	0.6	0.8

Table 11 ($2.00/day 2005 PPP line (new-definition)): Percentages of households by cut-off score and targeting classification, along with the hit rate and BPAC, scorecard applied to the 2015 validation sample

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	BPAC See text
<=4	1.6	74.6	0.0	23.8	25.4	–95.9
<=9	4.3	71.9	0.0	23.8	28.1	–88.6
<=14	9.8	66.4	0.0	23.8	33.6	–74.3
<=19	18.3	57.9	0.0	23.8	42.1	–51.9
<=24	27.6	48.6	0.0	23.8	51.4	–27.4
<=29	36.6	39.6	0.1	23.7	60.3	–3.8
<=34	44.4	31.8	0.4	23.4	67.8	+17.0
<=39	53.1	23.1	0.8	23.0	76.2	+40.4
<=44	60.3	15.9	1.3	22.5	82.7	+60.0
<=49	65.4	10.8	2.4	21.4	86.8	+74.8
<=54	68.5	7.7	4.2	19.6	88.1	+85.4
<=59	71.5	4.7	6.4	17.4	88.9	+91.6
<=64	73.2	3.0	9.0	14.8	88.0	+88.2
<=69	74.5	1.7	12.3	11.5	86.0	+83.9
<=74	75.2	1.0	15.9	7.9	83.1	+79.1
<=79	75.9	0.3	18.8	5.0	81.0	+75.4
<=84	76.2	0.0	20.8	3.0	79.2	+72.7
<=89	76.2	0.0	21.9	1.9	78.1	+71.3
<=94	76.2	0.0	23.2	0.6	76.8	+69.6
<=100	76.2	0.0	23.8	0.0	76.2	+68.8

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Table 12 ($2.00/day 2005 PPP line (new-definition)): Share of all households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor (that is, have consumption below the poverty line), share of poor households who are targeted, and number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the 2015 validation sample

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
<=4	1.6	100.0	2.1	Only poor targeted
<=9	4.4	99.2	5.7	124.6:1
<=14	9.8	99.6	12.8	280.9:1
<=19	18.4	99.7	24.0	375.2:1
<=24	27.7	99.8	36.3	566.4:1
<=29	36.7	99.7	48.0	295.7:1
<=34	44.7	99.2	58.2	122.5:1
<=39	53.9	98.6	69.7	69.0:1
<=44	61.6	97.8	79.1	44.8:1
<=49	67.8	96.4	85.8	26.8:1
<=54	72.7	94.2	89.9	16.2:1
<=59	78.0	91.8	93.9	11.1:1
<=64	82.2	89.1	96.1	8.1:1
<=69	86.8	85.8	97.8	6.1:1
<=74	91.1	82.6	98.7	4.7:1
<=79	94.7	80.2	99.7	4.0:1
<=84	97.0	78.5	100.0	3.7:1
<=89	98.1	77.7	100.0	3.5:1
<=94	99.4	76.7	100.0	3.3:1
<=100	100.0	76.2	100.0	3.2:1

Tables for
the New-Definition $2.50/day 2005 PPP Poverty Line

Table 4 ($2.50/day 2005 PPP line (new-definition)): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	100.0
5–9	100.0
10–14	100.0
15–19	100.0
20–24	100.0
25–29	99.9
30–34	99.2
35–39	97.5
40–44	95.4
45–49	88.8
50–54	85.2
55–59	73.9
60–64	59.0
65–69	43.4
70–74	39.7
75–79	25.0
80–84	16.1
85–89	9.9
90–94	7.3
95–100	0.0

Table 6 ($2.50/day 2005 PPP line (new-definition)): Average errors (estimates minus observed values) for poverty likelihoods for households by score range with confidence intervals from 1,000 bootstraps of n = 16,384, scorecard applied to the 2015 validation sample

	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	0.0	0.0	0.0	0.0
5–9	+0.5	0.5	0.6	0.7
10–14	0.0	0.0	0.0	0.0
15–19	0.0	0.0	0.0	0.0
20–24	0.0	0.0	0.0	0.0
25–29	+0.2	0.2	0.3	0.4
30–34	+0.4	0.6	0.7	0.9
35–39	–0.8	0.7	0.7	0.8
40–44	–1.6	1.1	1.2	1.3
45–49	–0.9	2.0	2.4	3.1
50–54	+5.4	2.6	3.2	4.2
55–59	–7.1	4.7	4.9	5.2
60–64	–8.5	6.1	6.5	7.1
65–69	–7.5	5.5	5.9	6.4
70–74	+5.6	3.6	4.4	6.0
75–79	–24.1	14.3	14.6	15.6
80–84	–4.8	4.7	5.4	7.5
85–89	+9.6	0.3	0.4	0.5
90–94	+6.3	0.9	1.2	1.3
95–100	0.0	0.0	0.0	0.0

Table 7 ($2.50/day 2005 PPP line (new-definition)): Average errors (estimates minus observed values) for poverty rates at a point in time by sample size, with confidence intervals for 1,000 bootstraps of various sample sizes, scorecard applied to the 2015 validation sample

Sample Size	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	+1.2	57.8	72.8	86.2
4	–0.1	31.9	38.4	49.6
8	–1.1	21.8	26.3	36.2
16	–1.3	15.1	18.1	24.3
32	–1.6	11.3	13.6	17.8
64	–1.9	7.7	9.2	11.8
128	–1.9	5.6	6.5	8.5
256	–1.9	3.9	4.6	6.0
512	–1.8	2.8	3.3	4.3
1,024	–1.8	2.0	2.5	3.2
2,048	–1.8	1.5	1.7	2.3
4,096	–1.8	1.0	1.2	1.6
8,192	–1.8	0.7	0.9	1.1
16,384	–1.8	0.5	0.6	0.8

Table 11 ($2.50/day 2005 PPP line (new-definition)): Percentages of households by cut-off score and targeting classification, along with the hit rate and BPAC, scorecard applied to the 2015 validation sample

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	BPAC See text
<=4	1.6	80.1	0.0	18.3	19.9	–96.2
<=9	4.4	77.3	0.0	18.3	22.7	–89.3
<=14	9.8	71.9	0.0	18.3	28.1	–76.0
<=19	18.3	63.3	0.0	18.3	36.6	–55.1
<=24	27.7	54.0	0.0	18.3	46.0	–32.2
<=29	36.7	45.0	0.0	18.3	55.0	–10.1
<=34	44.6	37.1	0.1	18.2	62.8	+9.4
<=39	53.5	28.1	0.4	18.0	71.5	+31.5
<=44	60.9	20.7	0.7	17.6	78.5	+50.1
<=49	66.5	15.1	1.3	17.0	83.6	+64.5
<=54	70.4	11.3	2.4	16.0	86.3	+75.2
<=59	74.2	7.4	3.7	14.6	88.9	+86.4
<=64	76.8	4.9	5.5	12.9	89.6	+93.3
<=69	78.7	3.0	8.1	10.2	88.9	+90.1
<=74	80.0	1.7	11.1	7.3	87.3	+86.4
<=79	81.2	0.4	13.5	4.9	86.1	+83.5
<=84	81.6	0.0	15.4	3.0	84.6	+81.2
<=89	81.7	0.0	16.4	1.9	83.6	+79.9
<=94	81.7	0.0	17.7	0.6	82.3	+78.3
<=100	81.7	0.0	18.3	0.0	81.7	+77.6

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Table 12 ($2.50/day 2005 PPP line (new-definition)): Share of all households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor (that is, have consumption below the poverty line), share of poor households who are targeted, and number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the 2015 validation sample

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
<=4	1.6	100.0	1.9	Only poor targeted
<=9	4.4	99.5	5.3	213.6:1
<=14	9.8	99.8	12.0	480.8:1
<=19	18.4	99.9	22.4	899.2:1
<=24	27.7	99.9	33.9	1,356.7:1
<=29	36.7	99.9	44.9	755.9:1
<=34	44.7	99.7	54.6	330.6:1
<=39	53.9	99.3	65.5	150.9:1
<=44	61.6	98.8	74.6	85.7:1
<=49	67.8	98.1	81.5	51.1:1
<=54	72.7	96.8	86.2	29.8:1
<=59	78.0	95.2	90.9	20.0:1
<=64	82.2	93.4	94.0	14.0:1
<=69	86.8	90.7	96.4	9.7:1
<=74	91.1	87.8	98.0	7.2:1
<=79	94.7	85.8	99.5	6.0:1
<=84	97.0	84.2	100.0	5.3:1
<=89	98.1	83.3	100.0	5.0:1
<=94	99.4	82.2	100.0	4.6:1
<=100	100.0	81.7	100.0	4.5:1

Tables for
the New-Definition $5.00/day 2005 PPP Poverty Line

Table 4 ($5.00/day 2005 PPP line (new-definition)): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	100.0
5–9	100.0
10–14	100.0
15–19	100.0
20–24	100.0
25–29	100.0
30–34	100.0
35–39	100.0
40–44	100.0
45–49	99.5
50–54	98.1
55–59	96.7
60–64	91.0
65–69	85.8
70–74	79.3
75–79	68.2
80–84	54.9
85–89	39.0
90–94	34.9
95–100	15.5

Table 6 ($5.00/day 2005 PPP line (new-definition)): Average errors (estimates minus observed values) for poverty likelihoods for households by score range with confidence intervals from 1,000 bootstraps of n = 16,384, scorecard applied to the 2015 validation sample

	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	0.0	0.0	0.0	0.0
5–9	0.0	0.0	0.0	0.0
10–14	0.0	0.0	0.0	0.0
15–19	0.0	0.0	0.0	0.0
20–24	0.0	0.0	0.0	0.0
25–29	0.0	0.0	0.0	0.0
30–34	0.0	0.0	0.0	0.0
35–39	+0.4	0.2	0.3	0.3
40–44	0.0	0.1	0.1	0.1
45–49	–0.1	0.3	0.3	0.4
50–54	–0.5	0.5	0.7	0.9
55–59	–0.2	0.9	1.1	1.4
60–64	–6.4	3.5	3.6	3.7
65–69	–4.9	3.3	3.5	3.7
70–74	–2.2	2.8	3.3	4.3
75–79	–19.5	10.9	11.2	11.6
80–84	–21.7	12.6	13.0	13.7
85–89	–23.8	15.8	16.4	17.4
90–94	–6.6	7.5	8.8	11.1
95–100	+10.0	3.3	4.0	5.4

Table 7 ($5.00/day 2005 PPP line (new-definition)): Average errors (estimates minus observed values) for poverty rates at a point in time by sample size, with confidence intervals for 1,000 bootstraps of various sample sizes, scorecard applied to the 2015 validation sample

Sample Size	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	+1.5	44.5	55.5	81.6
4	–1.5	17.4	23.8	37.7
8	–1.8	12.5	16.2	24.2
16	–2.0	8.9	10.8	15.4
32	–2.1	6.4	8.0	10.8
64	–2.3	4.3	5.4	7.4
128	–2.3	3.4	4.1	5.1
256	–2.3	2.5	2.9	3.9
512	–2.3	1.7	2.0	2.7
1,024	–2.3	1.1	1.3	1.8
2,048	–2.3	0.8	1.0	1.3
4,096	–2.3	0.6	0.7	0.9
8,192	–2.3	0.4	0.5	0.6
16,384	–2.3	0.3	0.3	0.4

Table 11 ($5.00/day 2005 PPP line (new-definition)): Percentages of households by cut-off score and targeting classification, along with the hit rate and BPAC, scorecard applied to the 2015 validation sample

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	BPAC See text
<=4	1.6	91.7	0.0	6.8	8.3	–96.6
<=9	4.4	88.9	0.0	6.8	11.1	–90.6
<=14	9.8	83.4	0.0	6.8	16.6	–78.9
<=19	18.4	74.9	0.0	6.8	25.1	–60.6
<=24	27.7	65.6	0.0	6.8	34.4	–40.6
<=29	36.7	56.5	0.0	6.8	43.5	–21.2
<=34	44.7	48.5	0.0	6.8	51.5	–4.1
<=39	53.8	39.4	0.0	6.7	60.5	+15.5
<=44	61.6	31.7	0.1	6.7	68.2	+32.1
<=49	67.7	25.5	0.1	6.6	74.3	+45.3
<=54	72.5	20.8	0.2	6.5	79.0	+55.7
<=59	77.4	15.8	0.5	6.2	83.7	+66.7
<=64	81.4	11.9	0.9	5.9	87.2	+75.4
<=69	85.1	8.1	1.7	5.1	90.2	+84.4
<=74	88.4	4.9	2.7	4.0	92.4	+92.5
<=79	91.1	2.1	3.6	3.2	94.3	+96.2
<=84	92.4	0.8	4.6	2.2	94.6	+95.1
<=89	92.8	0.4	5.3	1.5	94.3	+94.4
<=94	93.2	0.1	6.2	0.6	93.8	+93.4
<=100	93.2	0.0	6.8	0.0	93.2	+92.8

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Table 12 ($5.00/day 2005 PPP line (new-definition)): Share of all households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor (that is, have consumption below the poverty line), share of poor households who are targeted, and number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the 2015 validation sample

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
<=4	1.6	100.0	1.7	Only poor targeted
<=9	4.4	100.0	4.7	Only poor targeted
<=14	9.8	100.0	10.5	Only poor targeted
<=19	18.4	100.0	19.7	Only poor targeted
<=24	27.7	100.0	29.7	Only poor targeted
<=29	36.7	100.0	39.4	Only poor targeted
<=34	44.7	100.0	48.0	Only poor targeted
<=39	53.9	99.9	57.7	1,168.5:1
<=44	61.6	99.9	66.0	900.5:1
<=49	67.8	99.8	72.6	575.4:1
<=54	72.7	99.7	77.7	293.4:1
<=59	78.0	99.3	83.0	148.1:1
<=64	82.2	99.0	87.2	94.3:1
<=69	86.8	98.1	91.3	51.5:1
<=74	91.1	97.0	94.8	32.5:1
<=79	94.7	96.2	97.7	25.4:1
<=84	97.0	95.3	99.1	20.1:1
<=89	98.1	94.6	99.5	17.7:1
<=94	99.4	93.8	99.9	15.1:1
<=100	100.0	93.2	100.0	13.8:1

Tables for
the New-Definition $1.90/day 2011 PPP Poverty Line

Table 4 ($1.90/day 2011 PPP line (new-definition)): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	99.8
5–9	98.3
10–14	98.3
15–19	95.9
20–24	90.0
25–29	81.4
30–34	72.2
35–39	56.7
40–44	43.3
45–49	25.6
50–54	16.1
55–59	6.0
60–64	3.3
65–69	3.3
70–74	2.4
75–79	0.5
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Table 6 ($1.90/day 2011 PPP line (new-definition)): Average errors (estimates minus observed values) for poverty likelihoods for households by score range with confidence intervals from 1,000 bootstraps of n = 16,384, scorecard applied to the 2015 validation sample

	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	–0.1	0.1	0.1	0.1
5–9	+6.9	2.9	3.4	4.3
10–14	+2.4	1.3	1.6	2.2
15–19	+1.0	1.0	1.2	1.6
20–24	–4.2	2.6	2.7	2.9
25–29	0.0	1.9	2.3	3.1
30–34	–2.6	2.5	2.8	3.6
35–39	+3.6	2.5	3.2	4.1
40–44	+8.5	2.7	3.1	3.9
45–49	–0.5	2.8	3.2	4.3
50–54	+8.0	1.7	2.0	2.6
55–59	–6.0	4.2	4.7	5.0
60–64	–2.4	2.2	2.4	3.0
65–69	+1.9	0.7	0.9	1.2
70–74	–1.2	1.6	1.9	2.4
75–79	+0.5	0.0	0.0	0.0
80–84	0.0	0.0	0.0	0.0
85–89	0.0	0.0	0.0	0.0
90–94	0.0	0.0	0.0	0.0
95–100	0.0	0.0	0.0	0.0

Table 7 ($1.90/day 2011 PPP line (new-definition)): Average errors (estimates minus observed values) for poverty rates at a point in time by sample size, with confidence intervals for 1,000 bootstraps of various sample sizes, scorecard applied to the 2015 validation sample

Sample Size	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	0.0	56.7	77.9	95.6
4	+0.9	31.4	39.7	54.2
8	+0.9	23.4	28.8	38.0
16	+1.1	16.3	19.8	28.2
32	+1.1	11.8	14.8	19.8
64	+0.8	7.7	9.5	12.8
128	+0.7	5.7	6.8	8.8
256	+0.9	4.1	5.0	6.4
512	+0.8	3.0	3.5	4.6
1,024	+0.8	2.1	2.5	3.2
2,048	+0.8	1.4	1.7	2.2
4,096	+0.8	1.0	1.2	1.7
8,192	+0.8	0.7	0.9	1.0
16,384	+0.8	0.5	0.6	0.8

Table 11 ($1.90/day 2011 PPP line (new-definition)): Percentages of households by cut-off score and targeting classification, along with the hit rate and BPAC, scorecard applied to the 2015 validation sample

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	BPAC See text
<=4	1.6	48.9	0.0	49.6	51.1	–93.8
<=9	4.2	46.2	0.2	49.4	53.6	–83.0
<=14	9.5	40.9	0.3	49.2	58.7	–61.7
<=19	17.5	32.9	0.8	48.7	66.3	–28.8
<=24	26.2	24.2	1.5	48.1	74.3	+6.9
<=29	33.6	16.8	3.1	46.4	80.1	+39.5
<=34	39.5	11.0	5.3	44.3	83.8	+67.0
<=39	44.4	6.0	9.5	40.1	84.5	+81.3
<=44	47.4	3.0	14.2	35.4	82.8	+71.9
<=49	49.0	1.4	18.8	30.8	79.8	+62.8
<=54	49.6	0.8	23.1	26.4	76.0	+54.1
<=59	50.0	0.4	27.9	21.6	71.6	+44.6
<=64	50.3	0.2	32.0	17.6	67.9	+36.6
<=69	50.4	0.1	36.4	13.1	63.5	+27.7
<=74	50.4	0.0	40.7	8.9	59.3	+19.4
<=79	50.4	0.0	44.3	5.3	55.7	+12.2
<=84	50.4	0.0	46.6	3.0	53.4	+7.7
<=89	50.4	0.0	47.6	1.9	52.4	+5.6
<=94	50.4	0.0	48.9	0.6	51.1	+3.0
<=100	50.4	0.0	49.6	0.0	50.4	+1.7

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Table 12 ($1.90/day 2011 PPP line (new-definition)): Share of all households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor (that is, have consumption below the poverty line), share of poor households who are targeted, and number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the 2015 validation sample

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
<=4	1.6	99.8	3.1	522.4:1
<=9	4.4	96.1	8.3	24.6:1
<=14	9.8	96.6	18.8	28.4:1
<=19	18.4	95.5	34.8	21.4:1
<=24	27.7	94.7	52.0	18.0:1
<=29	36.7	91.5	66.6	10.8:1
<=34	44.7	88.2	78.3	7.5:1
<=39	53.9	82.5	88.1	4.7:1
<=44	61.6	77.0	94.1	3.3:1
<=49	67.8	72.3	97.2	2.6:1
<=54	72.7	68.2	98.3	2.1:1
<=59	78.0	64.2	99.2	1.8:1
<=64	82.2	61.1	99.7	1.6:1
<=69	86.8	58.0	99.8	1.4:1
<=74	91.1	55.4	100.0	1.2:1
<=79	94.7	53.3	100.0	1.1:1
<=84	97.0	52.0	100.0	1.1:1
<=89	98.1	51.4	100.0	1.1:1
<=94	99.4	50.8	100.0	1.0:1
<=100	100.0	50.4	100.0	1.0:1

Tables for
the New-Definition $3.10/day 2011 PPP Poverty Line

Table 4 ($3.10/day 2011 PPP line (new-definition)): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	100.0
5–9	100.0
10–14	100.0
15–19	99.9
20–24	99.2
25–29	96.7
30–34	93.6
35–39	86.0
40–44	74.8
45–49	61.1
50–54	50.9
55–59	32.9
60–64	20.7
65–69	18.0
70–74	16.0
75–79	6.0
80–84	0.8
85–89	0.0
90–94	0.0
95–100	0.0

Table 6 ($3.10/day 2011 PPP line (new-definition)): Average errors (estimates minus observed values) for poverty likelihoods for households by score range with confidence intervals from 1,000 bootstraps of n = 16,384, scorecard applied to the 2015 validation sample

	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	0.0	0.0	0.0	0.0
5–9	+0.8	0.6	0.7	0.9
10–14	+1.4	0.8	0.9	1.3
15–19	+0.1	0.1	0.1	0.2
20–24	–0.8	0.4	0.4	0.4
25–29	–1.6	1.1	1.1	1.2
30–34	+2.2	1.5	1.9	2.4
35–39	–5.6	3.4	3.5	3.7
40–44	–1.3	2.4	2.9	3.8
45–49	–4.9	3.8	4.0	4.4
50–54	+9.9	3.4	4.1	5.5
55–59	–12.3	7.9	8.2	8.8
60–64	+2.6	3.1	3.6	4.8
65–69	+0.4	2.9	3.4	4.8
70–74	+10.9	1.6	1.9	2.5
75–79	–2.0	2.4	2.9	3.7
80–84	–7.3	5.5	5.9	6.7
85–89	0.0	0.0	0.0	0.0
90–94	0.0	0.0	0.0	0.0
95–100	0.0	0.0	0.0	0.0

Table 7 ($3.10/day 2011 PPP line (new-definition)): Average errors (estimates minus observed values) for poverty rates at a point in time by sample size, with confidence intervals for 1,000 bootstraps of various sample sizes, scorecard applied to the 2015 validation sample

Sample Size	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	0.0	55.1	70.9	88.8
4	–0.4	31.3	38.3	49.8
8	–0.9	21.9	26.8	34.5
16	–0.5	16.4	19.3	25.7
32	–0.7	12.2	14.4	19.4
64	–0.5	8.2	10.0	13.1
128	–0.5	5.5	6.5	8.8
256	–0.5	3.9	4.7	6.0
512	–0.6	2.7	3.3	4.4
1,024	–0.6	2.0	2.4	2.9
2,048	–0.6	1.5	1.7	2.4
4,096	–0.6	1.1	1.3	1.7
8,192	–0.6	0.8	0.9	1.2
16,384	–0.6	0.5	0.6	0.8

Table 11 ($3.10/day 2011 PPP line (new-definition)): Percentages of households by cut-off score and targeting classification, along with the hit rate and BPAC, scorecard applied to the 2015 validation sample

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	BPAC See text
<=4	1.6	66.2	0.0	32.2	33.8	–95.4
<=9	4.3	63.4	0.0	32.2	36.5	–87.1
<=14	9.7	58.0	0.1	32.1	41.9	–71.1
<=19	18.2	49.5	0.1	32.1	50.3	–46.0
<=24	27.6	40.2	0.1	32.1	59.6	–18.5
<=29	36.4	31.4	0.3	31.9	68.3	+7.9
<=34	43.8	24.0	1.0	31.2	75.0	+30.5
<=39	52.0	15.8	1.9	30.3	82.3	+56.1
<=44	57.8	10.0	3.8	28.4	86.2	+76.2
<=49	61.7	6.1	6.1	26.1	87.8	+90.9
<=54	63.8	3.9	8.9	23.3	87.2	+86.9
<=59	65.8	2.0	12.1	20.1	85.9	+82.1
<=64	66.6	1.2	15.6	16.6	83.2	+76.9
<=69	67.2	0.6	19.6	12.7	79.9	+71.1
<=74	67.5	0.3	23.6	8.6	76.1	+65.2
<=79	67.7	0.1	27.0	5.2	72.9	+60.2
<=84	67.8	0.0	29.2	3.0	70.8	+56.9
<=89	67.8	0.0	30.3	1.9	69.7	+55.3
<=94	67.8	0.0	31.6	0.6	68.4	+53.4
<=100	67.8	0.0	32.2	0.0	67.8	+52.5

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Table 12 ($3.10/day 2011 PPP line (new-definition)): Share of all households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor (that is, have consumption below the poverty line), share of poor households who are targeted, and number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the 2015 validation sample

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
<=4	1.6	100.0	2.3	Only poor targeted
<=9	4.4	99.2	6.4	124.6:1
<=14	9.8	99.2	14.4	122.4:1
<=19	18.4	99.4	26.9	164.5:1
<=24	27.7	99.5	40.6	210.8:1
<=29	36.7	99.1	53.7	108.4:1
<=34	44.7	97.8	64.5	44.6:1
<=39	53.9	96.4	76.7	27.1:1
<=44	61.6	93.8	85.3	15.0:1
<=49	67.8	90.9	91.0	10.0:1
<=54	72.7	87.8	94.2	7.2:1
<=59	78.0	84.4	97.1	5.4:1
<=64	82.2	81.0	98.2	4.3:1
<=69	86.8	77.5	99.2	3.4:1
<=74	91.1	74.1	99.6	2.9:1
<=79	94.7	71.5	99.9	2.5:1
<=84	97.0	69.9	100.0	2.3:1
<=89	98.1	69.1	100.0	2.2:1
<=94	99.4	68.2	100.0	2.1:1
<=100	100.0	67.8	100.0	2.1:1

Tables for
the New-Definition Poverty Line
Marking the Poorest Half of People
below 100% of the New-Definition National Poverty Line

Table 4 (Line marking the poorest half of people below 100% of the new-definition national line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	83.9
5–9	75.2
10–14	66.8
15–19	59.9
20–24	46.6
25–29	32.0
30–34	23.3
35–39	14.8
40–44	5.8
45–49	0.9
50–54	0.7
55–59	0.2
60–64	0.0
65–69	0.0
70–74	0.0
75–79	0.0
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Table 6 (Line marking the poorest half of people below 100% of the new-definition national line): Average errors (estimates minus observed values) for poverty likelihoods for households by score range with confidence intervals from 1,000 bootstraps of n = 16,384, scorecard applied to the 2015 validation sample

	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	+4.5	4.3	5.0	6.7
5–9	–3.5	3.5	4.2	5.2
10–14	–1.5	2.8	3.4	4.2
15–19	+1.9	2.5	2.9	3.8
20–24	+4.0	2.2	2.7	3.6
25–29	–5.0	3.8	4.0	4.4
30–34	+5.0	2.0	2.4	3.2
35–39	+4.5	1.3	1.6	2.0
40–44	+0.3	1.2	1.5	1.9
45–49	–0.2	0.4	0.5	0.6
50–54	+0.7	0.0	0.0	0.0
55–59	–1.2	1.0	1.1	1.3
60–64	–0.1	0.1	0.1	0.2
65–69	0.0	0.0	0.0	0.0
70–74	0.0	0.0	0.0	0.0
75–79	0.0	0.0	0.0	0.0
80–84	0.0	0.0	0.0	0.0
85–89	0.0	0.0	0.0	0.0
90–94	0.0	0.0	0.0	0.0
95–100	0.0	0.0	0.0	0.0

Table 7 (Line marking the poorest half of people below 100% of the new-definition national line): Average errors (estimates minus observed values) for poverty rates at a point in time by sample size, with confidence intervals for 1,000 bootstraps of various sample sizes, scorecard applied to the 2015 validation sample

Sample Size	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	−2.0	57.3	68.3	82.6
4	+0.1	30.2	37.5	50.2
8	0.0	21.7	26.1	34.8
16	+0.3	13.6	16.6	21.0
32	+0.5	9.8	11.8	16.3
64	+0.6	7.0	8.2	11.6
128	+0.6	4.5	5.7	7.4
256	+0.6	3.3	3.9	5.1
512	+0.7	2.4	2.9	3.9
1,024	+0.7	1.7	2.1	2.7
2,048	+0.7	1.2	1.5	2.0
4,096	+0.7	0.9	1.0	1.4
8,192	+0.7	0.6	0.7	1.0
16,384	+0.7	0.4	0.5	0.6

Table 11 (Line marking the poorest half of people below 100% of the new-definition national line): Percentages of households by cut-off score and targeting classification, along with the hit rate and BPAC, scorecard applied to the 2015 validation sample

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	BPAC See text
<=4	1.2	21.7	0.3	76.6	77.9	–87.8
<=9	3.5	19.5	0.9	76.0	79.5	–65.9
<=14	7.3	15.7	2.6	74.4	81.7	–25.7
<=19	12.3	10.7	6.1	70.9	83.1	+33.2
<=24	16.4	6.6	11.3	65.7	82.0	+50.9
<=29	19.5	3.5	17.2	59.8	79.3	+25.3
<=34	21.2	1.8	23.5	53.4	74.6	–2.3
<=39	22.3	0.7	31.5	45.4	67.8	–37.0
<=44	22.8	0.2	38.8	38.1	60.9	–68.8
<=49	22.9	0.1	44.9	32.1	55.0	–95.1
<=54	22.9	0.1	49.8	27.2	50.1	–116.4
<=59	23.0	0.0	54.9	22.0	45.0	–138.9
<=64	23.0	0.0	59.2	17.8	40.8	–157.3
<=69	23.0	0.0	63.7	13.2	36.2	–177.2
<=74	23.0	0.0	68.0	8.9	31.9	–195.9
<=79	23.0	0.0	71.7	5.3	28.3	–211.6
<=84	23.0	0.0	74.0	3.0	26.0	–221.6
<=89	23.0	0.0	75.0	1.9	24.9	–226.3
<=94	23.0	0.0	76.3	0.6	23.6	–231.9
<=100	23.0	0.0	77.0	0.0	23.0	–234.7

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Table 12 (Line marking the poorest half of people below 100% of the new-definition national line): Share of all households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor (that is, have consumption below the poverty line), share of poor households who are targeted, and number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the 2015 validation sample

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
<=4	1.6	79.4	5.4	3.9:1
<=9	4.4	79.0	15.0	3.8:1
<=14	9.8	73.9	31.6	2.8:1
<=19	18.4	66.8	53.3	2.0:1
<=24	27.7	59.2	71.2	1.4:1
<=29	36.7	53.1	84.8	1.1:1
<=34	44.7	47.3	92.1	0.9:1
<=39	53.9	41.4	97.1	0.7:1
<=44	61.6	36.9	99.0	0.6:1
<=49	67.8	33.8	99.6	0.5:1
<=54	72.7	31.5	99.6	0.5:1
<=59	78.0	29.5	99.9	0.4:1
<=64	82.2	28.0	100.0	0.4:1
<=69	86.8	26.5	100.0	0.4:1
<=74	91.1	25.2	100.0	0.3:1
<=79	94.7	24.3	100.0	0.3:1
<=84	97.0	23.7	100.0	0.3:1
<=89	98.1	23.4	100.0	0.3:1
<=94	99.4	23.1	100.0	0.3:1
<=100	100.0	23.0	100.0	0.3:1

Tables for the New-Definition First-Quintile (20^{th}-percentile) Poverty Line

Table 4 (First-quintile (20th-percentile) line (new definition)): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	75.5
5–9	61.7
10–14	51.4
15–19	46.2
20–24	31.1
25–29	18.8
30–34	14.3
35–39	9.2
40–44	3.1
45–49	0.7
50–54	0.3
55–59	0.1
60–64	0.0
65–69	0.0
70–74	0.0
75–79	0.0
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Table 6 (First-quintile (20th-percentile) line (new definition)): Average errors (estimates minus observed values) for poverty likelihoods for households by score range with confidence intervals from 1,000 bootstraps of $n = 16{,}384$, scorecard applied to the 2015 validation sample

	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	–0.8	4.5	5.3	7.1
5–9	–6.0	4.9	5.3	6.2
10–14	–1.1	3.0	3.5	4.4
15–19	+5.0	2.4	2.8	3.9
20–24	–2.1	2.2	2.6	3.4
25–29	–7.5	4.9	5.2	5.4
30–34	+0.8	1.8	2.2	2.9
35–39	+4.4	0.8	0.9	1.2
40–44	–0.8	1.1	1.3	1.8
45–49	+0.2	0.2	0.3	0.3
50–54	+0.3	0.0	0.0	0.0
55–59	–1.4	1.1	1.2	1.4
60–64	0.0	0.0	0.0	0.0
65–69	0.0	0.0	0.0	0.0
70–74	0.0	0.0	0.0	0.0
75–79	0.0	0.0	0.0	0.0
80–84	0.0	0.0	0.0	0.0
85–89	0.0	0.0	0.0	0.0
90–94	0.0	0.0	0.0	0.0
95–100	0.0	0.0	0.0	0.0

Table 7 (First-quintile (20th-percentile) line (new definition)): Average errors (estimates minus observed values) for poverty rates at a point in time by sample size, with confidence intervals for 1,000 bootstraps of various sample sizes, scorecard applied to the 2015 validation sample

Sample Size	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	–2.6	63.7	68.5	77.8
4	–0.9	29.5	35.9	45.2
8	–1.2	19.3	25.0	36.0
16	–0.9	13.4	15.7	21.7
32	–0.6	8.9	11.1	15.4
64	–0.4	6.4	7.7	10.7
128	–0.3	4.5	5.3	6.7
256	–0.3	3.2	3.8	4.7
512	–0.3	2.3	2.7	3.3
1,024	–0.3	1.6	1.9	2.5
2,048	–0.3	1.1	1.4	1.8
4,096	–0.3	0.8	0.9	1.2
8,192	–0.3	0.6	0.7	0.9
16,384	–0.3	0.4	0.5	0.6

Table 11 (First-quintile (20th-percentile) line (new definition)): Percentages of households by cut-off score and targeting classification, along with the hit rate and BPAC, scorecard applied to the 2015 validation sample

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	BPAC See text
<=4	1.2	15.7	0.4	82.7	83.9	–83.7
<=9	3.0	13.9	1.3	81.7	84.8	–56.1
<=14	5.9	11.0	3.9	79.2	85.1	–6.9
<=19	9.5	7.4	8.8	74.3	83.8	+47.9
<=24	12.6	4.3	15.0	68.0	80.7	+11.1
<=29	14.7	2.2	22.0	61.1	75.8	–29.8
<=34	15.8	1.1	28.9	54.2	70.0	–70.7
<=39	16.5	0.4	37.4	45.7	62.2	–120.8
<=44	16.8	0.1	44.9	38.2	55.0	–165.0
<=49	16.9	0.1	51.0	32.1	49.0	–201.1
<=54	16.9	0.1	55.9	27.2	44.1	–230.1
<=59	16.9	0.0	61.0	22.0	39.0	–260.6
<=64	16.9	0.0	65.3	17.8	34.7	–285.8
<=69	16.9	0.0	69.9	13.2	30.1	–312.8
<=74	16.9	0.0	74.2	8.9	25.8	–338.2
<=79	16.9	0.0	77.8	5.3	22.2	–359.5
<=84	16.9	0.0	80.1	3.0	19.9	–373.1
<=89	16.9	0.0	81.1	1.9	18.9	–379.4
<=94	16.9	0.0	82.4	0.6	17.6	–387.1
<=100	16.9	0.0	83.1	0.0	16.9	–390.8

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Table 12 (First-quintile (20th-percentile) line (new definition)): Share of all households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor (that is, have consumption below the poverty line), share of poor households who are targeted, and number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the 2015 validation sample

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
<=4	1.6	76.3	7.1	3.2:1
<=9	4.4	69.7	18.0	2.3:1
<=14	9.8	60.4	35.0	1.5:1
<=19	18.4	52.0	56.3	1.1:1
<=24	27.7	45.6	74.6	0.8:1
<=29	36.7	40.2	87.1	0.7:1
<=34	44.7	35.4	93.6	0.5:1
<=39	53.9	30.6	97.5	0.4:1
<=44	61.6	27.2	99.1	0.4:1
<=49	67.8	24.9	99.6	0.3:1
<=54	72.7	23.2	99.6	0.3:1
<=59	78.0	21.7	100.0	0.3:1
<=64	82.2	20.6	100.0	0.3:1
<=69	86.8	19.5	100.0	0.2:1
<=74	91.1	18.6	100.0	0.2:1
<=79	94.7	17.9	100.0	0.2:1
<=84	97.0	17.4	100.0	0.2:1
<=89	98.1	17.3	100.0	0.2:1
<=94	99.4	17.0	100.0	0.2:1
<=100	100.0	16.9	100.0	0.2:1

Tables for the New-Definition Second-Quintile (40^{th}-percentile) Poverty Line

Table 4 (Second-quintile (40th-percentile) line (new definition)): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	95.9
5–9	90.0
10–14	88.2
15–19	82.3
20–24	70.4
25–29	56.7
30–34	43.3
35–39	29.7
40–44	16.3
45–49	5.4
50–54	2.4
55–59	1.2
60–64	0.9
65–69	0.2
70–74	0.0
75–79	0.0
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Table 6 (Second-quintile (40th-percentile) line (new definition)): Average errors (estimates minus observed values) for poverty likelihoods for households by score range with confidence intervals from 1,000 bootstraps of $n = 16{,}384$, scorecard applied to the 2015 validation sample

	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	–1.5	1.6	1.9	2.6
5–9	+2.1	3.1	3.7	4.8
10–14	+5.2	2.4	2.7	3.5
15–19	+3.5	2.0	2.5	3.4
20–24	+2.2	2.2	2.5	3.5
25–29	+1.9	2.5	3.0	3.9
30–34	+0.4	2.8	3.3	4.2
35–39	+5.2	2.1	2.5	3.3
40–44	+4.4	1.7	2.0	2.6
45–49	–0.2	1.3	1.5	1.9
50–54	+2.0	0.2	0.2	0.3
55–59	–0.2	0.8	0.9	1.2
60–64	+0.7	0.2	0.2	0.2
65–69	+0.2	0.0	0.0	0.0
70–74	0.0	0.0	0.0	0.0
75–79	0.0	0.0	0.0	0.0
80–84	0.0	0.0	0.0	0.0
85–89	0.0	0.0	0.0	0.0
90–94	0.0	0.0	0.0	0.0
95–100	0.0	0.0	0.0	0.0

Table 7 (Second-quintile (40th-percentile) line (new definition)): Average errors (estimates minus observed values) for poverty rates at a point in time by sample size, with confidence intervals for 1,000 bootstraps of various sample sizes, scorecard applied to the 2015 validation sample

Sample Size	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	0.0	56.7	70.3	91.4
4	+1.8	32.1	39.5	53.4
8	+1.8	23.4	28.5	39.0
16	+1.8	15.5	17.9	25.4
32	+1.9	10.3	12.5	17.1
64	+1.8	7.2	8.5	11.0
128	+1.8	5.1	5.9	7.7
256	+1.8	3.6	4.3	5.5
512	+1.8	2.5	3.0	4.0
1,024	+1.9	1.8	2.2	2.9
2,048	+1.9	1.3	1.6	2.1
4,096	+1.8	1.0	1.2	1.5
8,192	+1.8	0.6	0.8	1.1
16,384	+1.8	0.5	0.5	0.8

Table 11 (Second-quintile (40th-percentile) line (new definition)): Percentages of households by cut-off score and targeting classification, along with the hit rate and BPAC, scorecard applied to the 2015 validation sample

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	BPAC See text
<=4	1.5	32.9	0.0	65.5	67.0	–91.0
<=9	4.0	30.4	0.3	65.2	69.3	–75.5
<=14	8.7	25.8	1.2	64.4	73.1	–46.3
<=19	15.5	19.0	2.9	62.7	78.2	–1.8
<=24	22.0	12.5	5.7	59.9	81.8	+44.2
<=29	26.9	7.5	9.8	55.8	82.7	+71.5
<=34	30.3	4.1	14.4	51.2	81.5	+58.2
<=39	32.7	1.7	21.1	44.4	77.2	+38.6
<=44	33.8	0.6	27.8	37.8	71.6	+19.3
<=49	34.3	0.2	33.6	32.0	66.3	+2.5
<=54	34.3	0.1	38.4	27.2	61.5	–11.6
<=59	34.4	0.0	43.6	22.0	56.4	–26.5
<=64	34.4	0.0	47.8	17.8	52.2	–38.8
<=69	34.4	0.0	52.4	13.2	47.6	–52.1
<=74	34.4	0.0	56.7	8.9	43.3	–64.6
<=79	34.4	0.0	60.3	5.3	39.7	–75.1
<=84	34.4	0.0	62.6	3.0	37.4	–81.8
<=89	34.4	0.0	63.6	1.9	36.4	–84.8
<=94	34.4	0.0	64.9	0.6	35.1	–88.6
<=100	34.4	0.0	65.6	0.0	34.4	–90.5

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Table 12 (Second-quintile (40th-percentile) line (new definition)): Share of all households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor (that is, have consumption below the poverty line), share of poor households who are targeted, and number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the 2015 validation sample

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
<=4	1.6	97.0	4.4	32.1:1
<=9	4.4	92.5	11.8	12.4:1
<=14	9.8	88.2	25.2	7.4:1
<=19	18.4	84.3	44.9	5.4:1
<=24	27.7	79.3	63.8	3.8:1
<=29	36.7	73.3	78.2	2.7:1
<=34	44.7	67.8	88.1	2.1:1
<=39	53.9	60.8	95.1	1.5:1
<=44	61.6	54.9	98.3	1.2:1
<=49	67.8	50.5	99.5	1.0:1
<=54	72.7	47.2	99.7	0.9:1
<=59	78.0	44.1	99.9	0.8:1
<=64	82.2	41.9	100.0	0.7:1
<=69	86.8	39.7	100.0	0.7:1
<=74	91.1	37.8	100.0	0.6:1
<=79	94.7	36.4	100.0	0.6:1
<=84	97.0	35.5	100.0	0.6:1
<=89	98.1	35.1	100.0	0.5:1
<=94	99.4	34.6	100.0	0.5:1
<=100	100.0	34.4	100.0	0.5:1

Tables for
the New-Definition Median (50th-percentile) Poverty Line

Table 4 (Median (50th-percentile) line (new definition)): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	98.8
5–9	96.4
10–14	96.3
15–19	93.1
20–24	83.5
25–29	72.7
30–34	61.8
35–39	44.1
40–44	30.9
45–49	14.0
50–54	10.3
55–59	3.1
60–64	1.9
65–69	1.9
70–74	0.3
75–79	0.0
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Table 6 (Median (50th-percentile) line (new definition)): Average errors (estimates minus observed values) for poverty likelihoods for households by score range with confidence intervals from 1,000 bootstraps of n = 16,384, scorecard applied to the 2015 validation sample

	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	–1.1	0.6	0.6	0.6
5–9	+5.0	2.9	3.4	4.3
10–14	+5.1	1.8	2.2	2.9
15–19	+2.4	1.3	1.6	2.1
20–24	–2.2	1.9	2.1	2.8
25–29	–0.9	2.1	2.7	3.3
30–34	+3.7	2.7	3.2	4.3
35–39	+3.5	2.5	2.9	3.9
40–44	+7.4	2.3	2.6	3.4
45–49	+2.7	1.7	2.0	2.7
50–54	+4.0	1.5	1.7	2.2
55–59	–5.9	4.1	4.4	4.8
60–64	–2.4	2.1	2.3	2.9
65–69	+0.6	0.7	0.9	1.2
70–74	+0.3	0.0	0.0	0.0
75–79	0.0	0.0	0.0	0.0
80–84	0.0	0.0	0.0	0.0
85–89	0.0	0.0	0.0	0.0
90–94	0.0	0.0	0.0	0.0
95–100	0.0	0.0	0.0	0.0

Table 7 (Median (50th-percentile) line (new definition)): Average errors (estimates minus observed values) for poverty rates at a point in time by sample size, with confidence intervals for 1,000 bootstraps of various sample sizes, scorecard applied to the 2015 validation sample

Sample Size	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	+0.4	58.9	70.9	93.2
4	+1.2	32.2	40.4	59.1
8	+1.3	22.8	26.7	37.5
16	+1.8	16.7	19.7	25.5
32	+1.7	11.8	13.6	17.4
64	+1.3	7.5	8.7	11.6
128	+1.3	5.6	6.6	8.4
256	+1.4	4.0	4.6	6.3
512	+1.4	2.7	3.3	4.8
1,024	+1.4	2.0	2.4	3.2
2,048	+1.4	1.4	1.7	2.4
4,096	+1.4	1.0	1.2	1.6
8,192	+1.4	0.7	0.9	1.1
16,384	+1.4	0.5	0.6	0.8

Table 11 (Median (50th-percentile) line (new definition)): Percentages of households by cut-off score and targeting classification, along with the hit rate and BPAC, scorecard applied to the 2015 validation sample

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	BPAC See text
<=4	1.6	42.9	0.0	55.5	57.1	–93.0
<=9	4.2	40.3	0.2	55.3	59.5	–80.7
<=14	9.3	35.2	0.6	54.9	64.2	–57.1
<=19	16.9	27.5	1.4	54.1	71.1	–20.7
<=24	25.0	19.5	2.7	52.8	77.8	+18.4
<=29	31.6	12.9	5.1	50.4	82.0	+53.6
<=34	36.4	8.1	8.3	47.2	83.6	+81.3
<=39	40.4	4.1	13.5	42.0	82.4	+69.7
<=44	42.6	1.9	19.1	36.4	79.0	+57.1
<=49	43.5	1.0	24.3	31.2	74.7	+45.4
<=54	43.9	0.6	28.8	26.7	70.7	+35.3
<=59	44.3	0.2	33.7	21.8	66.1	+24.3
<=64	44.4	0.1	37.8	17.7	62.1	+15.1
<=69	44.5	0.0	42.3	13.2	57.7	+4.9
<=74	44.5	0.0	46.6	8.9	53.4	–4.7
<=79	44.5	0.0	50.2	5.3	49.8	–12.8
<=84	44.5	0.0	52.5	3.0	47.5	–18.0
<=89	44.5	0.0	53.6	1.9	46.4	–20.4
<=94	44.5	0.0	54.9	0.6	45.1	–23.3
<=100	44.5	0.0	55.5	0.0	44.5	–24.8

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Table 12 (Median (50th-percentile) line (new definition)): Share of all households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor (that is, have consumption below the poverty line), share of poor households who are targeted, and number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the 2015 validation sample

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
<=4	1.6	99.4	3.5	171.7:1
<=9	4.4	95.8	9.4	22.9:1
<=14	9.8	94.2	20.8	16.3:1
<=19	18.4	92.4	38.1	12.1:1
<=24	27.7	90.2	56.1	9.2:1
<=29	36.7	86.1	71.0	6.2:1
<=34	44.7	81.4	81.8	4.4:1
<=39	53.9	75.0	90.8	3.0:1
<=44	61.6	69.1	95.7	2.2:1
<=49	67.8	64.2	97.8	1.8:1
<=54	72.7	60.4	98.8	1.5:1
<=59	78.0	56.8	99.5	1.3:1
<=64	82.2	54.0	99.9	1.2:1
<=69	86.8	51.3	100.0	1.1:1
<=74	91.1	48.8	100.0	1.0:1
<=79	94.7	47.0	100.0	0.9:1
<=84	97.0	45.9	100.0	0.8:1
<=89	98.1	45.4	100.0	0.8:1
<=94	99.4	44.8	100.0	0.8:1
<=100	100.0	44.5	100.0	0.8:1

Tables for the New-Definition Third-Quintile (60^{th}-percentile) Poverty Line

Table 4 (Third-quintile (60th-percentile) line (new definition)): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	99.8
5–9	99.3
10–14	99.2
15–19	98.1
20–24	92.7
25–29	87.9
30–34	79.3
35–39	62.9
40–44	49.6
45–49	30.8
50–54	21.9
55–59	8.5
60–64	5.5
65–69	4.6
70–74	3.1
75–79	0.5
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Table 6 (Third-quintile (60th-percentile) line (new definition)): Average errors (estimates minus observed values) for poverty likelihoods for households by score range with confidence intervals from 1,000 bootstraps of $n = 16{,}384$, scorecard applied to the 2015 validation sample

	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	–0.2	0.1	0.1	0.1
5–9	+0.5	0.7	0.9	1.1
10–14	+2.5	1.2	1.5	2.0
15–19	+1.5	0.8	1.0	1.4
20–24	–4.2	2.4	2.5	2.7
25–29	+0.6	1.7	2.0	2.7
30–34	+0.8	2.2	2.6	3.3
35–39	+1.5	2.4	2.9	3.9
40–44	+7.3	2.9	3.4	4.2
45–49	–2.6	2.9	3.5	4.5
50–54	+3.5	2.7	3.2	4.4
55–59	–3.8	3.2	3.5	3.9
60–64	–0.4	1.8	2.2	3.0
65–69	+3.1	0.7	0.9	1.2
70–74	–0.5	1.6	1.9	2.4
75–79	+0.5	0.0	0.0	0.0
80–84	0.0	0.0	0.0	0.0
85–89	0.0	0.0	0.0	0.0
90–94	0.0	0.0	0.0	0.0
95–100	0.0	0.0	0.0	0.0

Table 7 (Third-quintile (60th-percentile) line (new definition)): Average errors (estimates minus observed values) for poverty rates at a point in time by sample size, with confidence intervals for 1,000 bootstraps of various sample sizes, scorecard applied to the 2015 validation sample

Sample Size	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	+0.8	56.7	74.3	92.9
4	+1.1	32.2	40.3	57.8
8	+0.7	23.5	28.6	39.6
16	+0.9	17.1	20.9	29.6
32	+1.0	11.7	14.7	20.0
64	+0.7	8.2	9.8	12.6
128	+0.6	5.7	6.7	9.0
256	+0.7	4.0	4.7	6.2
512	+0.6	2.9	3.5	4.5
1,024	+0.6	2.1	2.6	3.3
2,048	+0.7	1.4	1.8	2.3
4,096	+0.6	1.0	1.2	1.7
8,192	+0.6	0.7	0.9	1.1
16,384	+0.6	0.5	0.6	0.8

Table 11 (Third-quintile (60th-percentile) line (new definition)): Percentages of households by cut-off score and targeting classification, along with the hit rate and BPAC, scorecard applied to the 2015 validation sample

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	BPAC See text
<=4	1.6	52.8	0.0	45.6	47.2	–94.2
<=9	4.3	50.0	0.1	45.6	49.9	–84.0
<=14	9.7	44.7	0.2	45.5	55.2	–64.1
<=19	17.9	36.4	0.5	45.2	63.1	–33.3
<=24	26.8	27.5	0.8	44.8	71.7	+0.4
<=29	34.8	19.6	2.0	43.7	78.4	+31.6
<=34	41.0	13.3	3.7	41.9	82.9	+57.8
<=39	46.8	7.5	7.1	38.6	85.4	+85.3
<=44	50.4	4.0	11.3	34.4	84.8	+79.3
<=49	52.4	1.9	15.4	30.2	82.6	+71.6
<=54	53.4	0.9	19.3	26.3	79.7	+64.4
<=59	53.9	0.5	24.1	21.6	75.5	+55.7
<=64	54.2	0.2	28.0	17.6	71.8	+48.4
<=69	54.2	0.1	32.5	13.1	67.4	+40.1
<=74	54.3	0.0	36.7	8.9	63.2	+32.4
<=79	54.3	0.0	40.4	5.3	59.6	+25.7
<=84	54.3	0.0	42.7	3.0	57.3	+21.5
<=89	54.3	0.0	43.7	1.9	56.3	+19.5
<=94	54.3	0.0	45.0	0.6	55.0	+17.1
<=100	54.3	0.0	45.6	0.0	54.3	+16.0

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Table 12 (Third-quintile (60th-percentile) line (new definition)): Share of all households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor (that is, have consumption below the poverty line), share of poor households who are targeted, and number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the 2015 validation sample

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
<=4	1.6	100.0	2.9	Only poor targeted
<=9	4.4	98.8	8.0	80.2:1
<=14	9.8	98.4	17.8	61.1:1
<=19	18.4	97.5	32.9	39.7:1
<=24	27.7	97.0	49.4	32.1:1
<=29	36.7	94.7	64.0	17.7:1
<=34	44.7	91.6	75.5	11.0:1
<=39	53.9	86.8	86.1	6.6:1
<=44	61.6	81.7	92.7	4.5:1
<=49	67.8	77.3	96.4	3.4:1
<=54	72.7	73.4	98.3	2.8:1
<=59	78.0	69.1	99.2	2.2:1
<=64	82.2	65.9	99.7	1.9:1
<=69	86.8	62.5	99.8	1.7:1
<=74	91.1	59.7	100.0	1.5:1
<=79	94.7	57.4	100.0	1.3:1
<=84	97.0	56.0	100.0	1.3:1
<=89	98.1	55.4	100.0	1.2:1
<=94	99.4	54.7	100.0	1.2:1
<=100	100.0	54.3	100.0	1.2:1

Tables for the New-Definition Fourth-Quintile (80^{th}-percentile) Poverty Line

Table 4 (Fourth-quintile (80th-percentile) line (new definition)): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	100.0
5–9	100.0
10–14	100.0
15–19	100.0
20–24	99.8
25–29	99.4
30–34	98.1
35–39	92.6
40–44	88.9
45–49	79.3
50–54	73.4
55–59	54.0
60–64	37.1
65–69	30.0
70–74	26.9
75–79	10.1
80–84	6.4
85–89	6.4
90–94	1.5
95–100	0.0

Table 6 (Fourth-quintile (80th-percentile) line (new definition)): Average errors (estimates minus observed values) for poverty likelihoods for households by score range with confidence intervals from 1,000 bootstraps of $n = 16{,}384$, scorecard applied to the 2015 validation sample

	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	0.0	0.0	0.0	0.0
5–9	+0.8	0.6	0.7	0.9
10–14	0.0	0.0	0.0	0.0
15–19	+0.1	0.1	0.1	0.1
20–24	–0.2	0.1	0.1	0.1
25–29	0.0	0.3	0.4	0.5
30–34	+1.8	1.1	1.2	1.6
35–39	–3.8	2.3	2.3	2.5
40–44	–5.7	3.3	3.4	3.6
45–49	–2.9	2.6	2.8	3.5
50–54	+8.5	3.3	3.9	5.2
55–59	–11.0	7.1	7.3	7.9
60–64	–8.8	6.5	6.9	7.6
65–69	–4.9	4.3	4.6	5.5
70–74	+9.4	3.0	3.6	4.6
75–79	–20.4	12.2	12.7	13.7
80–84	–4.8	4.4	4.7	5.6
85–89	+6.4	0.0	0.1	0.1
90–94	+1.5	0.0	0.0	0.0
95–100	0.0	0.0	0.0	0.0

Table 7 (Fourth-quintile (80th-percentile) line (new definition)): Average errors (estimates minus observed values) for poverty rates at a point in time by sample size, with confidence intervals for 1,000 bootstraps of various sample sizes, scorecard applied to the 2015 validation sample

Sample Size	Difference between estimate and observed value			
		Confidence interval (±percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	+0.3	54.2	74.7	94.0
4	–1.3	32.0	39.2	51.0
8	–2.3	22.5	27.2	35.5
16	–1.9	16.0	19.0	26.0
32	–2.1	11.5	13.6	17.9
64	–2.4	8.3	9.5	13.4
128	–2.2	5.7	6.8	9.5
256	–2.1	4.1	4.9	6.4
512	–2.2	3.1	3.6	4.7
1,024	–2.2	2.1	2.5	3.3
2,048	–2.2	1.5	1.8	2.4
4,096	–2.2	1.1	1.3	1.6
8,192	–2.2	0.8	0.9	1.2
16,384	–2.2	0.5	0.6	0.8

Table 11 (Fourth-quintile (80th-percentile) line (new definition)): Percentages of households by cut-off score and targeting classification, along with the hit rate and BPAC, scorecard applied to the 2015 validation sample

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	BPAC See text
<=4	1.6	74.2	0.0	24.3	25.8	–95.9
<=9	4.3	71.4	0.0	24.2	28.6	–88.5
<=14	9.8	65.9	0.0	24.2	34.0	–74.1
<=19	18.3	57.4	0.0	24.2	42.5	–51.6
<=24	27.6	48.1	0.0	24.2	51.9	–27.0
<=29	36.6	39.1	0.1	24.1	60.8	–3.2
<=34	44.4	31.4	0.4	23.9	68.3	+17.7
<=39	53.0	22.7	0.8	23.4	76.5	+41.2
<=44	60.1	15.6	1.5	22.8	82.9	+60.8
<=49	65.2	10.5	2.6	21.6	86.8	+75.6
<=54	68.3	7.5	4.5	19.8	88.1	+86.2
<=59	71.2	4.5	6.8	17.5	88.7	+91.1
<=64	72.8	2.9	9.4	14.9	87.7	+87.6
<=69	74.1	1.6	12.7	11.6	85.6	+83.2
<=74	74.8	0.9	16.3	8.0	82.7	+78.5
<=79	75.5	0.2	19.2	5.1	80.6	+74.6
<=84	75.7	0.0	21.3	3.0	78.7	+71.9
<=89	75.7	0.0	22.3	1.9	77.7	+70.5
<=94	75.7	0.0	23.6	0.6	76.4	+68.8
<=100	75.7	0.0	24.3	0.0	75.7	+67.9

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Table 12 (Fourth-quintile (80th-percentile) line (new definition)): Share of all households who are targeted (that is, score at or below a cut-off), share of targeted households who are poor (that is, have consumption below the poverty line), share of poor households who are targeted, and number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targketed (leakage), scorecard applied to the 2015 validation sample

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
<=4	1.6	100.0	2.1	Only poor targeted
<=9	4.4	99.2	5.7	124.6:1
<=14	9.8	99.6	12.9	280.9:1
<=19	18.4	99.7	24.2	375.2:1
<=24	27.7	99.8	36.5	566.4:1
<=29	36.7	99.7	48.3	295.7:1
<=34	44.7	99.2	58.6	122.5:1
<=39	53.9	98.4	70.0	62.6:1
<=44	61.6	97.6	79.4	40.5:1
<=49	67.8	96.1	86.1	24.7:1
<=54	72.7	93.9	90.2	15.3:1
<=59	78.0	91.3	94.0	10.5:1
<=64	82.2	88.6	96.2	7.8:1
<=69	86.8	85.4	97.8	5.8:1
<=74	91.1	82.1	98.7	4.6:1
<=79	94.7	79.7	99.7	3.9:1
<=84	97.0	78.1	100.0	3.6:1
<=89	98.1	77.2	100.0	3.4:1
<=94	99.4	76.2	100.0	3.2:1
<=100	100.0	75.7	100.0	3.1:1