Simple Poverty Scorecard® Poverty-Assessment Tool Zambia

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This document is at `SimplePovertyScorecard.com`.

Abstract

The Simple Poverty Scorecard-brand poverty-assessment tool uses ten low-cost indicators from Zambia's 2010 Living Conditions Monitoring Survey to estimate the likelihood that a household has expenditure below a given poverty line. Field workers can collect responses in about ten minutes. The tool'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, and to segment clients for targeted services.

Acknowledgements

Simple Poverty Scorecard® Poverty-Assessment Tool

Interview ID:				**Name**	**Identifier**
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 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?	A. Mud, wood only, or other	0	
	B. Concrete, or covered concrete	2	
5. What kind of building material is the roof of this dwelling made of?	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, coal, crop/livestock residues, or other	0	
	B. Charcoal	4	
	C. Gas, electricity, solar, or kerosene/paraffin	15	
7. Does your household own any televisions, DVDs/VCRs or home theatres, or satellite dish/decoders (free to air, or DSTV) or other pay-TV arrangements?	A. No TVs (regardless of others)	0	
	B. TV, but nothing else	6	
	C. TV, and something else (DVD, dish, etc.)	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

At the start, read to the respondent: *Please give me the names 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, etc. Also, please tell me the age of each member. For members ages 7 to 16, please tell me whether he or she is currently attending school.*

Record each household member's name and age. Record the total number of household members in the scorecard header next to "# HH members", and then mark the corresponding response for Indicator 1. For household members ages 7 to 16—including both boys and girls—ask about school attendance, and mark Indicator 2 accordingly. If "No" is ever circled, then mark response A ("No") for Indicator 2. If "Not 7 to 16" is circled for all household members, then mark response C ("No one 7 to 16") for Indicator 2. Otherwise, mark response B ("Yes").

Name	Age	If <name> is 7- to 16-years-old, does he or she currently attend school?		
1.		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
17.		Not 7 to 16	No	Yes
18.		Not 7 to 16	No	Yes
19.		Not 7 to 16	No	Yes
20.		Not 7 to 16	No	Yes

Look-up table to convert scores to poverty likelihoods (Göttingen poverty lines)

					Poverty likelihood (%)			
		National			USAID	Intl. 2005 PPP		
Score	Food	100%	150%	200%	'Extreme'	$1.25	$2.00	$2.50
0–4	91.6	98.3	100.0	100.0	86.7	100.0	100.0	100.0
5–9	82.8	96.8	99.9	99.9	68.2	99.9	100.0	100.0
10–14	75.6	94.3	98.3	99.4	62.2	97.9	99.9	100.0
15–19	69.7	92.2	97.9	99.4	52.0	97.0	99.6	99.8
20–24	58.3	88.1	97.0	99.4	41.8	96.5	99.5	99.8
25–29	52.6	81.7	95.6	98.9	36.2	94.8	99.0	99.6
30–34	38.8	71.0	91.1	97.4	24.4	87.4	97.9	98.8
35–39	25.3	60.0	87.4	95.7	14.3	80.1	96.4	98.0
40–44	18.8	48.7	78.6	89.0	10.1	69.9	89.2	95.7
45–49	7.6	32.8	63.1	82.1	4.5	54.3	83.3	91.3
50–54	2.8	19.3	43.3	67.5	1.5	35.1	68.6	81.1
55–59	0.4	10.6	35.1	55.1	0.6	23.4	56.5	71.1
60–64	0.3	5.3	25.0	51.4	0.4	16.2	51.3	67.0
65–69	0.2	3.4	19.1	37.6	0.4	11.8	39.4	54.4
70–74	0.0	1.4	8.8	22.7	0.0	5.4	28.5	41.9
75–79	0.0	0.3	6.3	16.8	0.0	3.4	21.3	34.1
80–84	0.0	0.0	1.7	7.4	0.0	0.6	9.5	17.0
85–89	0.0	0.0	0.2	2.7	0.0	0.1	3.3	13.0
90–94	0.0	0.0	0.1	0.3	0.0	0.0	2.6	5.3
95–100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Look-up table to convert scores to poverty likelihoods (CSO poverty lines)

| | Poverty likelihood (%) | | | | | | | |
| | National | | | | USAID | Intl. 2005 PPP | | |
Score	Food	100%	150%	200%	'Extreme'	$1.25	$2.00	$2.50
0–4	91.8	97.4	100.0	100.0	86.8	100.0	100.0	100.0
5–9	85.9	95.6	99.9	99.9	70.7	99.9	100.0	100.0
10–14	76.9	94.1	98.2	99.3	62.0	98.0	99.9	99.9
15–19	72.7	92.0	97.8	99.3	54.9	97.8	99.6	99.8
20–24	59.6	87.8	96.2	99.1	42.6	96.7	99.4	99.8
25–29	51.9	78.5	94.6	98.6	33.8	94.8	99.0	99.4
30–34	39.7	66.7	89.7	97.1	19.1	88.9	97.7	98.7
35–39	24.9	55.1	85.6	94.2	10.4	79.5	96.0	98.3
40–44	17.1	46.2	74.7	88.8	5.7	69.1	90.3	95.1
45–49	8.2	29.8	58.7	76.3	3.3	53.3	81.8	91.0
50–54	3.8	14.9	36.5	59.9	1.0	31.2	65.7	80.4
55–59	0.2	8.0	27.9	49.5	0.0	21.7	54.5	73.5
60–64	0.2	3.3	19.3	39.6	0.0	15.0	46.7	64.4
65–69	0.2	1.9	13.0	28.5	0.0	9.4	33.5	48.2
70–74	0.1	0.5	5.3	14.4	0.0	2.8	24.0	35.7
75–79	0.0	0.1	4.3	10.3	0.0	1.4	16.5	28.1
80–84	0.0	0.0	1.1	2.9	0.0	0.0	5.4	16.0
85–89	0.0	0.0	0.0	0.4	0.0	0.0	1.1	8.6
90–94	0.0	0.0	0.0	0.0	0.0	0.0	0.4	4.1
95–100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3

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 expenditure below a given poverty line, to measure groups' poverty rates at a point in time, to track changes in groups' poverty rates over time, and to target services to households.

The direct approach to poverty measurement via expenditure surveys is difficult and costly. As a case in point, Zambia's 2010 Living Conditions Monitoring Survey (LCMS) runs 70 pages. From each household, enumerators collected more than 250 expenditure items, including, for example, "Did your household purchase/consume/receive unshelled maize grain during the last 4 weeks? If purchased, how much did your household spend on unshelled maize grain? How many units of unshelled maize grain did your houseold purchase for that amount? If consumed from your own production, how many units of unshelled maize grain were consumed? How much would this unshelled maize grain cost if you were to buy it? How many units of unshelled maize grain did your household receive without paying? How much would this unshelled maize grain cost if you were to buy it? Now then, did your household purchase/consume/receive shelled maize grain during the last 4 weeks? . . ."

In comparison, the indirect approach via the scorecard is simple, quick, and inexpensive. It uses ten verifiable indicators (such as "What is the main type of energy that your household uses for cooking" and "Does your household own any non-electric or electric irons?") to get a score that is highly correlated with 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, and it is tailored to the capabilities and purposes not of national governments but rather of local, pro-poor organizations. The feasible poverty-measurement options for local organizations are typically blunt (such as rules based on land-ownership or housing quality) or subjective and relative (such as participatory wealth ranking facilitated by skilled field workers). Estimates from these approaches may be costly, their accuracy is unknown, and they are not comparable across places, organizations, nor time.

The scorecard can be used to measure the share of a program's participants who are below a given poverty line, for example, the Millennium Development Goals' $1.25/day line at 2005 purchase-power parity (PPP). USAID microenterprise partners in Zambia can use scoring with the $1.25/day line to report how many of their participants are "very poor".[1] Scoring can also be used to measure net movement across

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[1] USAID defines a household as "very poor" if its daily per-capita expenditure is less than the highest of the Göttingen $1.25/day 2005 PPP line (ZMK5,772 in prices as of Feb./March 2010, Figure 1) or the Göttingen USAID "extreme" line that divides people in households below the Göttingen national line into two equal-size groups (ZMK2,249).

a poverty line over time. In all these cases, the scorecard provides an expenditure-based, objective tool with known accuracy. While expenditure surveys are costly even for governments, some local pro-poor organizations may be able to implement an inexpensive scorecard to help with poverty monitoring and (if desired) targeting.

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 first must trust that it works. Transparency and simplicity build trust. Getting "buy-in" matters; proxy means tests and regressions on the "determinants of poverty" have been around for three decades, but they are rarely used to inform decisions by local, pro-poor organizations. This is not because they do not work, but because they are presented (when they are presented at all) 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", simple approaches can be about as accurate as complex ones (Schreiner, 2012a; Caire and Schreiner, 2012).

Beyond its simplicity and transparency, the scorecard's technical approach is innovative in how it associates scores with poverty likelihoods, in the extent of its accuracy tests, and in how it derives formulas for standard errors. Although these accuracy tests are simple 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 2010 LCMS from Zambia's Central Statistical Office (CSO). Indicators are selected to be:

- Inexpensive to collect, easy to answer quickly, and simple to verify
- Strongly correlated with poverty
- Liable to change over time as poverty status changes
- Applicable in all regions of 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 expenditure below a given poverty line.

Second, the scorecard can estimate the poverty rate of a group of households at a point in time. This estimate is the average poverty likelihood among the households in the group.

Third, the scorecard can estimate changes in the poverty rate for a group of households (or for two independent samples of households that are both representative of the same population) between two points in time. This estimate is the baseline/follow-up change in the average poverty likelihood of the group(s).

The scorecard can also be used for targeting. To help managers choose an appropriate targeting cut-off for their purposes, this paper reports several measures of targeting accuracy for a range of possible cut-offs.

The scorecard's indicators and points are derived from household expenditure data and Zambia's Göttingen national poverty line. Scores from this one scorecard are calibrated to poverty likelihoods for 16 poverty lines.

The scorecard is constructed and calibrated using half of the data from the 2010 LCMS. The other half is used to validate the scorecard's accuracy for estimating households' poverty likelihoods, for estimating groups' poverty rates at a point in time, and for targeting.

All three scoring estimators are *unbiased*. That is, they match the true value on average in repeated samples when constructed from (and applied to) a single, unchanging population. Like all predictive models, the specific scorecard here is constructed from a single sample and so misses the mark to some unknown extent when applied to a different population or when applied after 2010.[2]

Thus, while the indirect scoring approach is less costly than the direct survey approach, it is also biased when applied in practice. (The survey approach is unbiased by definition.) There is bias because the scorecard must assume that the future relationships between indicators and poverty in all possible groups of households will be the same as in the construction data. Of course, this assumption—inevitable in predictive modeling—holds only partly.

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[2] Important examples include nationally representative samples at a different point in time or sub-groups that are not nationally representative (Tarozzi and Deaton, 2009).

When applied to the validation sample with 1,000 bootstraps of $n = 16{,}384$, the average difference between scorecard estimates of groups' poverty rates and the true rates at a point in time for the Göttingen national line is –0.1 percentage points. The average difference across all 16 poverty lines is –0.6 percentage points, and the maximum absolute difference is 2.0 percentage points. These differences are due to sampling variation, not bias; the average difference would be zero if the whole 2010 LCMS were to be repeatedly re-fielded and divided into sub-samples before repeating the entire process of constructing and validating scorecards.

The 90-percent confidence intervals for these estimates are ±0.6 percentage points or less. For $n = 1{,}024$, the 90-percent intervals are ±2.5 percentage points or less.

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

2. Data and poverty lines

This section discusses the data used to construct and validate the scorecard. It also documents the poverty lines to which scores are calibrated.

2.1 Data

The scorecard is based on data from the 19,373 households in the 2010 LCMS. This is Zambia's most recent national expenditure survey.

For the purposes of the scorecard, the households in the 2010 LCMS are randomly divided into two sub-samples:

- *Construction and calibration* for selecting indicators and points and for associating scores with poverty likelihoods
- *Validation* for measuring accuracy with data not used in construction or calibration

2.2 Poverty rates

A *poverty rate* is the share of units in households in which total household expenditure (divided by the number of its members or by the number of its adult equivalents) is below a given poverty line. The unit is either the household itself or a person in the household. Each household member is defined to have the same poverty status (or estimated poverty likelihood) as does the household as a whole.

Suppose a program serves two households. The first household is poor (its per-capita or per-adult-equivalent expenditure 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 at the level 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 equal-weighted average of poverty statuses (or estimated poverty likelihoods) across participants' households. In the example here, this is $\dfrac{1 \cdot 1 + 1 \cdot 0}{1 + 1} = \dfrac{1}{2} = 0.5 = 50$ percent. In the "$1 \cdot 1$" term in the numerator, the first "1" is the first household's weight, and the second "1" is the first household's poverty status (poor). In the "$1 \cdot 0$" term in the numerator, the "1" is the second household's weight, and the "0" is the second household's poverty status (non-poor). The "$1 + 1$" in the denominator is the sum of the weights of the two households. Each household has a weight of one (1) 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 person-level rate is the household-size-weighted average[3] of poverty statuses for households with participants, or $\dfrac{3 \cdot 1 + 4 \cdot 0}{3 + 4} = \dfrac{3}{7} = 0.43 = 43$ percent. In the "$3 \cdot 1$" term in the numerator, the "3" is the first household's weight because it has three members,

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[3] Even if adult equivalents are used to determine whether a household is poor, poverty rates are always weighted by people or households, never by adult equivalents. Adult equivalents are determined by caloric needs based on age and sex, so weighting poverty rates by adult equivalents would treat children as less important than adults—and women as less important than men—simply because they have lower caloric needs.

and the "1" is its poverty status (poor). 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 is its poverty status (non-poor). 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—one that pertains to what is likely the most common situation in practice—a program counts as *participants* only those household members with whom it deals with directly. 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 of the poverty statuses of households with participants, or

$\dfrac{1 \cdot 1 + 2 \cdot 0}{1 + 2} = \dfrac{1}{3} = 0.33 = 33$ 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" is its poverty status (poor). In the "$2 \cdot 0$" term in the numerator, the "2" is the second household's weight because it has two participants, and the zero is its poverty status (non-poor). 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 the weights are the number of relevant units in the household. When reporting, programs should explain who is counted as a *participant* and why.

Figure 1 reports poverty rates for 16 poverty lines for Zambia in 2010 for both households and people and for the construction and validation samples. Figure 2 is similar, covering the Göttingen poverty lines for the nine provinces.[4] Person-level poverty rates are included in Figures 1 and 2 because these are the rates reported by governments and used in most policy discussions. Household-level poverty rates are also reported because—as discussed above—household-level poverty likelihoods can be straightforwardly converted into poverty rates for other units of analysis. This is also why the scorecard is constructed, calibrated, and validated with household weights.

2.3 Poverty status, expenditure, and poverty lines

Poverty status is whether a household is poor or non-poor. It is determined by whether per-capita (or per-adult-equivalent) aggregate household expenditure is less than a poverty line. Thus, the definition of *poverty status* has two elements: a poverty line, and a way to measure aggregate household expenditure. Zambia's 2010 LCMS is associated with two definitions of *poverty status*.

The first definition was developed by CSO with consultants from the University of Göttingen (CSO 2010a, 2010b, and 2010c). As shorthand, this definition (covering both expenditure and poverty lines) is called the *Göttingen poverty lines*. Poverty rates for Göttingen lines are in CSO (2010c) for the 1996, 1998, 2004, and 2006 LCMS.

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[4] During the 2010 LCMS, Muchinga was still part of Northern Province.

CSO (2012) developed the second definition of *poverty status*—called here the *CSO lines*—by modifying aspects of the Göttingen definition. CSO (2012) reports poverty rates by CSO lines for the 2006 and 2010 LCMS.

2.4.1   Göttingen lines

The Göttingen lines are based on Ravallion's (1988) cost-of-basic-needs method. They start with a "food" line that is the cost of a basket providing 2,800 Calories (CSO, 2010b), a daily norm for Zambians 13-years-old or older. The shares of items in the basket reflect the consumption of households in the 2006 LCMS in the fifth and sixth deciles of per-adult-equivalent[5] aggregate expenditure, with the food portion of expenditure adjusted for price differences at the province level. The Göttingen food line is ZMK3,084 per adult-equivalent per day (Figure 1).[6] This is the average cost of the food basket after adjusting for province-level price differences for 11 core food items as of Nov./Dec. 2010 and then deflating back to prices as of Feb./March 2010 using the all-Zambia consumer price index. By this line, about 35.7 percent of households (and 41.3 percent of people) are poor. The Göttingen food line is updated over time using the national medians of item-specific prices.

The Göttingen food-plus-non-food line (here called the "national" line) is the food line, plus the cost of non-food necessities. This is taken as the average non-food expenditure of households in the fifth and sixth deciles of per-adult-equivalent aggregate

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[5] Children ages 0 to 3-years-old count as 0.37 adults, those 4 to 6 count as 0.64 adults, 7 to 9 are 0.79 adults, and 10 to 12 are 0.80 adults.
[6] ZMK are Zambian kwacha before three zeros were lopped off on 1 January 2013.

expenditure in the 2006 LCMS, without adjusting for province-level differences in non-food prices (CSO, 2010b). The Göttingen national line is then ZMK5,015 per adult equivalent per day, giving a household-level poverty rate of 56.8 percent and person-level poverty rate of 62.8 percent (Figure 1).

2.4.2   CSO lines

The CSO food and food-plus-non-food (national) lines differ from Göttingen lines in a few respects (CSO, 2012). One change is definitional and not obviously better or worse: the non-food part of the national CSO line is the average non-food share of expenditure among households whose food expenditure is close to the CSO food line (34 percent), rather than the average non-food share of expenditure among households in the fifth to sixth deciles of total expenditure (41.5 percent).

This improvement, however, weakens comparability with poverty rates for Göttingen lines in 1996, 1998, 2004, and 2006 (CSO, 2010c). Other CSO changes seem less like improvements and also weaken comparability. In particular, CSO:

- Derives its food-basket reference group from Zambia's 1991 Social Dimensions of Adjustment Priority Survey (rather than the 2006 LCMS)
- Updates the cost of its food basket using prices at the national level (rather than at the provincial level)[7]
- Counts out-going remittances as expenditure (rather than as non-expenditure transfers)[8]

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[7] CSO (2010b, p. 22) notes that "it is uncontroversial that differences in absolute price levels between regions should not drive poverty status." World Bank (2005, p. 32) says "There is wide variation in the cost of living across space in Zambia."
[8] Deaton and Zaidi (2002, p. 32) suggest that out-going remittances should not be counted as expenditure.

Like all poverty-status definitions, the Göttingen definition makes some

compromises to deal with data constraints and to maintain a degree of comparability

over time.[9] Nevertheless, this paper focuses on Göttingen lines because they:

- Are more comparable with previous estimates
- Are more completely documented
- Use a more recent food basket
- Account for differences in the price of food across provinces
- Do not count out-going remittances as expenditure

While the scorecard is constructed with the Göttingen national line, it also

calibrated to both Göttingen and CSO lines, so users can select their preferred

definition of *poverty status*. For most decisions in most contexts, the choice is unlikely

to have a material effect. After all, the poverty rates for the Göttingen and CSO lines

do not differ much; for the national line, 56.8 percent versus 54.5 percent (households)

and 62.8 percent versus 60.4 percent (people, Figure 1). About 5.3 percent of households

in the 2010 LCMS are poor by one definition but not by the other.

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[9] In personal communication on 30 November 2012, Isis Gaddis notes that the 2010 Göttingen lines also diverge in a few small ways from the definitions in CSO (2010b).

2.4 Additional poverty lines

Because local, 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 eight Göttingen lines and eight CSO lines:

- Göttingen food
- 100% of Göttingen national
- 150% of Göttingen national
- 200% of Göttingen national
- Göttingen USAID "extreme"
- Göttingen $1.25/day 2005 PPP
- Göttingen $2.00/day 2005 PPP
- Göttingen $2.50/day 2005 PPP
- CSO food
- 100% of CSO national
- 150% of CSO national
- 200% of CSO national
- CSO USAID "extreme"
- CSO $1.25/day 2005 PPP
- CSO $2.00/day 2005 PPP
- CSO $2.50/day 2005 PPP

The scorecard is constructed using the Göttingen national line, sometimes called here "100% of the Göttingen national line".

The Göttingen USAID "extreme" line is defined as the median per-capita expenditure of people (not households nor adult equivalents) in a given poverty-line region (province) who are below the Göttingen national line (United States Congress, 2004). The CSO USAID "extreme" line is defined likewise using the CSO national line, except that—like all CSO lines—the CSO national line is a single line that applies to all of Zambia rather than varying—due to food-price differences—by province.

The Göttingen and CSO $1.25/day 2005 PPP lines are derived from:

- 2005 PPP exchange rate of ZMK2830.33 per $1.00 (World Bank, 2008)
- Consumer Price Index for Zambia of:
    — Average in 2005: 1199.621[10]
    — Feb./Mar. 2010 (during LCMS fieldwork): 1957.025[11]
- Average all-Zambia Göttingen national line (Figure 1): ZMK5,015
- Göttingen national line for each of nine poverty-line regions (Figure 2)

Using the formula from Sillers (2006), the all-Zambia Göttingen $1.25/day 2005

PPP line (which is the same as the all-Zambia CSO $1.25/day line) is:

$$
\left(\text{2005 PPP exchange rate}\right) \cdot \$1.25 \cdot \left(\frac{\text{CPI}_{\text{Feb./March 2010}}}{\text{CPI}_{2005}}\right) =
$$
$$
\left(\frac{\text{ZMK2830.33}}{\$1.00}\right) \cdot \$1.25 \cdot \left(\frac{1957.025}{1199.621}\right) = \text{ZMK5,772.}
$$

This line applies to Zambia as a whole. At the household level, the Göttingen

line (but not the CSO line) is adjusted for food-price differences across poverty-line

regions. This is done by multiplying the all-Zambia Göttingen $1.25/day line by a given

province's Göttingen national line and then dividing it by the all-Zambia average

Göttingen national line. Thus, the average all-Zambia $1.25/day lines are identical for

Göttingen and CSO, but they differ by province.

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[10] Table 16 in the Statistical Annex to Bank of Zambia. (2006) *Annual Report 2005*,
`boz.zm/AnnualReports/BOZAnnualReport2005.pdf`, retrieved 29 March 2013.
[11] Bank of Zambia. (2011) *Annual Report 2010*,
`boz.zm/AnnualReports/BOZAnnualReport2010.pdf`, retrieved 29 March 2013.

USAID microenterprise partners who use the scorecard to report poverty rates to USAID should use the Göttingen $1.25/day 2005 PPP line. This is because USAID defines "very poor" as those households whose expenditure is below the highest of two lines:

- Göttingen $1.25/day 2005 PPP (ZMK5,772, Figure 1)
- Göttingen USAID "extreme" line (ZMK2,249).

3. Scorecard construction

For Zambia, about 110 candidate indicators are initially prepared in the areas of:

- Household composition (such as number of members)
- Education (such as school attendance)
- Housing (such as type of floor or roof)
- Ownership of durable assets (such as irons or cellular phones)
- Employment (such as whether any household member works in agriculture)
- Agriculture (such as ownership of livestock)

Figure 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 on its own.

The scorecard also aims to measure *changes* in poverty through time. This means that, when selecting indicators and holding other considerations constant, preference is given to more sensitive indicators. For example, the ownership of an 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 built using the Göttingen national poverty line and Logit regression on the construction sub-sample. Indicator selection uses both judgment and statistics. The first step is to use Logit to build one scorecard for each candidate indicator. Each scorecard's power to rank households by poverty status is measured as "c" (SAS Institute Inc., 2004).

One of these one-indicator scorecards is then selected based on several factors (Schreiner *et al.*, 2004; 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, relevance for distinguishing among households at the poorer end of the distribution of expenditure, and verifiability.

A series of two-indicator scorecards are then built, each based on the one-indicator scorecard selected from the first round, with a second candidate indicator added. The best two-indicator scorecard is then selected, again based on "c" and judgment about how best to balance the non-statistical criteria. These steps are repeated until the scorecard has 10 indicators that work together well.

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 the common R^2-based stepwise least-squares regression. It differs from naïve stepwise in that the selection of indicators considers both statistical[12] and non-statistical criteria. The non-statistical criteria can improve robustness through time and help ensure that indicators are simple, sensible, and acceptable to users.

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[12] The statistical criterion for selecting an indicator is not the p value of its coefficient but rather its contribution to the ranking of households by poverty status.

The single scorecard here applies to all of Zambia. Tests for Indonesia (World Bank, 2012), Bangladesh (Sharif, 2009), India and Mexico (Schreiner, 2006 and 2005a), Sri Lanka (Narayan and Yoshida, 2005), and Jamaica (Grosh and Baker, 1995) suggest that segmenting scorecards by urban/rural does not improve targeting accuracy much, although segmentation in general may improve the bias and precision of estimates of poverty rates (Tarozzi and Deaton, 2009).

4. Practical guidelines for scorecard use

The main challenge of scorecard design is not to maximize statistical accuracy but rather to improve the chances that the scorecard is actually used (Schreiner, 2005b). When scoring 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 scoring 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 here is designed to encourage understanding and trust so that users will want to adopt it and use it properly. Of course, accuracy matters, but it is balanced against 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, scoring does not imply a lot of additional work and if the whole process generally seems to make sense.

To this end, Zambia's scorecard fits on one page. The construction process,

indicators, and points are simple and transparent. Additional work is minimized; non-

specialists can compute scores by hand in the field because the scorecard has:

- Only 10 indicators
- Only categorical indicators
- Only simple weights (non-negative integers, and no arithmetic beyond addition)

The scorecard (and its back-page worksheet) is ready to be photocopied. A field

worker using Zambia's paper scorecard would:

- Record the names and identifiers of the participant, the field worker, and the relevant organizational service point
- Record the date that the participant first participated with the organization
- Record the date of the scorecard interview
- Complete the back-page worksheet with each household member's name, age, and school attendance
- Record household size and the responses to the first and second indicators based on the back-page worksheet
- Read each of the remaining eight questions one-by-one from the scorecard, drawing a circle around the relevant response options and their points, and writing each point value in the far right-hand column
- Add up the points to get the 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 organizations or field workers gather their own data and believe

that they have an incentive to exaggerate poverty rates (for example, if 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).[13] 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.

In particular, while collecting scorecard indicators is relatively easier than alternative ways of measuring poverty, it is still absolutely difficult. Training and explicit definitions of terms and concepts in the scorecard is essential, and field workers should scrupulously study and follow the "Guidelines for the Interpretation of Indicators" found at the end of this paper, as they are an integral part of the Simple Poverty Scorecard tool.[14]

For the example of Nigeria, Onwujekwe, Hanson, and Fox-Rushby (2006) find distressingly low inter-rater and test-retest correlations for indicators as seemingly simple as whether the household owns an automobile. At the same time, Grosh and Baker (1995) find that gross underreporting of assets did not affect targeting. For the first stage of targeting in a conditional cash-transfer program in Mexico, Martinelli and

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[13] If a program does not want field workers to know the points associated with indicators, then it can use a version of the scorecard that does not display the points and then apply the points and compute scores later at a central office. 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 agents and respondents. Even if points are hidden, response options and poverty still have common-sense relationships.

[14] The guidelines here are the only ones that organizations should give to field workers. All other issues of interpretation are to be left to the judgment of field workers and respondents, as this seems to be what the CSO did when it fielded the 2010 LCMS.

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, which implies that self-reporting may lead to the exclusion of deserving households". Still, as is done in Mexico in the second stage of its targeting process, most false self-reports can be corrected (or avoided in the first place) by field agents who make a home visit. This is the recommended procedure for local, pro-poor organizations in Zambia.

In terms of sampling design, an organization must make choices about:

- Who will do the scoring
- How scores will be recorded
- What participants will be scored
- How many participants will be scored
- How frequently participants will be scored
- Whether scoring 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 organization's goals for the exercise, the questions to be answered, and the budget.

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

- Employees of the organization
- Third parties

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

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
- A representative sample of relevant participants in a representative sample of relevant field offices

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.

Frequency of application can be:

- As a once-off project (precluding measuring change)
- Every two 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 change 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 apply the Simple Poverty Scorecard tool (Schreiner, 2013a) with a sample of about 25,000 participants. Their design is that loan officers in a random sample of branches 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 household poverty likelihoods

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 below a line, the scores themselves have only relative units. For example, doubling the score increases the likelihood of being above a given poverty line, but it does not double the likelihood.

To get absolute units, scores must be converted to *poverty likelihoods*, that is, probabilities of being below a poverty line. This is done via simple look-up tables. For the example of the Göttingen national line, scores of 35–39 have a poverty likelihood of 60.0 percent, and scores of 40–44 have a poverty likelihood of 48.7 percent (Figure 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 60.0 percent for the Göttingen national line but of 80.1 percent for the Göttingen $1.25/day 2005 PPP line.[15]

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[15] Starting with Figure 4, many figures have 16 versions, one for each of the 16 poverty lines. To keep them straight, they are grouped by poverty line. Single tables pertaining to all lines are placed with the tables for the Göttingen 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 expenditure below a given poverty line.

For the example of the Göttingen national line (Figure 5), there are 9,600 (normalized) households in the calibration sub-sample with a score of 35–39. Of these, 5,756 (normalized) are below the poverty line. The estimated poverty likelihood associated with a score of 35–39 is then 60.0 percent, because 5,756 ÷ 9,600 = 60.0 percent.

To illustrate with the Göttingen national line and a score of 40–44, there are 7,373 (normalized) households in the calibration sample, of whom 3,589 (normalized) are below the line (Figure 5). The poverty likelihood for this score is then 3,589 ÷ 7,373 = 48.7 percent.

The same method is used to calibrate scores with estimated poverty likelihoods for the other 15 poverty lines.[16]

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[16] To ensure that poverty likelihoods always decrease as scores increase, likelihoods across series of adjacent scores are sometimes iteratively averaged before grouping scores into ranges. This preserves unbiasedness, and it keeps users from balking when sampling variation in score ranges with few households leads to higher scores being linked with higher poverty likelihoods.

The four versions of Figure 6 (by per-capita/per-adult-equivalent, and by Göttingen/CSO) show, for all scores, the likelihood that a given household's expenditure falls in a range demarcated by two adjacent poverty lines.

For the example of the Göttingen national line and per-adult-equivalent expenditure, the probability that a household with a score of 35–39 falls between two adjacent poverty lines is:

- 25.3 percent   below the food line
- 34.6 percent   between the food line and 100% of the national line
- 27.4 percent   between 100% and 150% of the national line
- 8.3 percent   between 150% and 200% of the national line
- 4.3 percent   above 200% of the national line

For the example of the CSO $1.25/day line and per-capita expenditure, the probability that a household with a score of 35–39 falls between two adjacent poverty lines is:

- 10.4 percent   below the USAID "extreme" line
- 69.1 percent   between the USAID "extreme" line and $1.25/day
- 16.5 percent   between $1.25 and $2.00/day
- 2.3 percent   between $2.00 and $2.50/day
- 1.8 percent   above $2.50/day

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 expenditure. 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.*, 2004). 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 this 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 $2.718281828^{\text{score}}$ x $(1+ 2.718281828^{\text{score}})^{-1}$. 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 that 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. 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.[17]

Of course, the relationships between indicators and poverty do change to some unknown extent over time and also across sub-groups in Zambia's population. Thus, the scorecard will generally be biased when applied after March 2010 (the last month of fieldwork for the 2010 LCMS) or when applied with sub-groups that are not nationally representative.

How accurate are estimates of households' poverty likelihoods, given the assumption of constant 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 $n = 16,384$ from the validation sample. Bootstrapping entails:

- Score each household in the validation sample
- Draw a new bootstrap sample *with replacement* from the validation sample
- For each score, compute the true poverty likelihood in the bootstrap sample, that is, the share of households with the score and with expenditure below a poverty line
- For each score, record the difference between the estimated poverty likelihood (Figure 4) and the true poverty likelihood in the bootstrap sample
- Repeat the previous three steps 1,000 times
- For each score, report the average difference between estimated and true poverty likelihoods across the 1,000 bootstrap samples
- For each score, report the two-sided intervals containing the central 900, 950, and 990 differences between estimated and true poverty likelihoods

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[17] This follows because these estimates of groups' poverty rates are linear functions of the unbiased estimates of households' poverty likelihoods.

For each score range and for $n = 16{,}384$, Figure 7 shows the average difference between estimated and true poverty likelihoods as well as confidence intervals for the differences.

For the Göttingen national line, the average poverty likelihood across bootstrap samples for scores of 35–39 in the validation sample is too low by 3.7 percentage points. For scores of 40–44, the estimate is too high by 2.9 percentage points.[18]

The 90-percent confidence interval for the differences for scores of 35–39 is ±2.9 percentage points (Göttingen national line, Figure 7). This means that in 900 of 1,000 bootstraps, the difference between the estimate and the true value is between –6.6 and –0.8 percentage points (because –3.7 – 2.9 = –6.6, and –3.7 + 2.9 = –0.8). In 950 of 1,000 bootstraps (95 percent), the difference is –3.7 ± 3.2 percentage points, and in 990 of 1,000 bootstraps (99 percent), the difference is –3.7 ± 3.6 percentage points.

Figure 7 shows some differences—usually small—between estimated poverty likelihoods and true values. There are differences is because the validation sample is a single sample that—thanks to sampling variation—differs in distribution from the construction/calibration sub-samples and from Zambia's population. For targeting, however, what matters is less the difference in all score ranges and more the difference in score ranges just above and below the targeting cut-off. This mitigates the effects of

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[18] These differences are not zero, despite the estimator's unbiasedness, because the scorecard comes from a single sample. The average difference by score range would be zero if samples were repeatedly drawn from the population and split into sub-samples before repeating the entire process of scorecard construction/calibration and validation.

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.

Another possible source of differences between estimates and true values is overfitting. The scorecard here is unbiased, but it may still be *overfit* when applied after the end of the LCMS fieldwork in March 2010. That is, it may fit the data from the 2010 LCMS so closely that it captures not only some timeless patterns but also some random patterns that, due to sampling variation, show up only in the 2010 LCMS 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 it is applied to non-nationally representative samples.

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 groups' poverty rates (see the next section). Furthermore, at least some of the differences will 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 across time, and imperfections in cost-of-living adjustments across time and geographic regions. These factors can be addressed only by improving data quantity and quality (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 group's poverty rate at a point in time

A group's estimated poverty rate at a point in time is the average of the estimated poverty likelihoods of the individual households in the group.

To illustrate, suppose an organization samples three households on 1 January 2013 and that they have scores of 20, 30, and 40, corresponding to poverty likelihoods of 88.1, 71.0, and 48.7 percent (Göttingen national line, Figure 4). The group's estimated poverty rate is the households' average poverty likelihood of (88.1 + 71.0 + 48.7) ÷ 3 = 69.3 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 71.0 percent. This differs from the 69.3 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 cardinal numbers, they cannot 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. The safest rule to follow is: Always use poverty likelihoods, never scores.

6.1 Accuracy of estimated poverty rates at a point in time

For the Zambia scorecard applied to 1,000 bootstraps of $n = 16{,}384$ from the validation sample, the maximum absolute difference between the estimated poverty rate at a point in time and the true rate is 2.0 percentage points (Figure 9, summarizing Figure 8 across all 16 Göttingen and CSO poverty lines). The average difference is –0.5 percentage points across the eight Göttingen lines and –0.8 percentage points across the eight CSO lines. At least part of these differences is due to sampling variation in the division of the 2010 LCMS into two sub-samples.

When estimating poverty rates at a point in time, the bias reported in Figure 9 should be subtracted from the average poverty likelihood to make the estimate unbiased. For the Zambia scorecard and the Göttingen national line, bias is –0.1 percentage points, so the unbiased estimate in the three-household example above is $69.3 - (-0.1) = 69.4$ 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 ± 0.6 percentage points or less (Figure 9). This means that in 900 of 1,000 bootstraps of this size, the estimate (after subtracting off bias) is within 0.6 percentage points of the true value.

For example, suppose that the average poverty likelihood in a sample of $n = 16{,}384$ with the Zambia scorecard and the Göttingen national line is 69.3 percent. Then estimates in 90 percent of such samples would be expected to fall in the range of $69.3 - (-0.1) - 0.6 = 68.8$ percent to $69.3 - (-0.1) + 0.6 = 70.0$ percent percent, with the most

likely true value being the unbiased estimate in the middle of this range (69.3 – (–0.1)

= 69.4 percent). This is because the original (biased) estimate is 69.3 percent, bias is –

0.1 percentage points, and the 90-percent confidence interval for the Göttingen national

line is ±0.6 percentage points (Figure 9).

6.2   Formula for standard errors for estimates of poverty rates

How precise are the point-in-time estimates? Because the estimates are averages,

they have (in "large" samples) a Normal distribution and can be characterized by their

average difference vis-à-vis true values, together with the standard error of the average

difference.

To derive a formula for the standard errors of estimated poverty rates at a point

in time from indirect measurement via poverty-assessment tools (Schreiner, 2008), first

note that the textbook formula (Cochran, 1977) that relates confidence intervals with

standard errors in the case of direct measurement of ratios is $\pm c = \pm z \cdot \sigma$, 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, $\sqrt{\dfrac{\hat{p} \cdot (1 - \hat{p})}{n}} \cdot \phi$,

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

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

N is the population size, and

n is the sample size.

For example, Zambia's 2010 LCMS gives a direct-measurement estimate of the household-level poverty rate for the Göttingen national line of $\hat{p} = 56.8$ percent (Figure 1). If this estimate came from a sample of $n = 16{,}384$ households from a population N of 2,488,400 (the number of households in Zambia in 2010), then the finite population correction ϕ is $\sqrt{\dfrac{2{,}488{,}400 - 16{,}384}{2{,}488{,}400 - 1}} = 0.9967$, which can be taken as $\phi = 1$. If the desired confidence level is 90-percent ($z = 1.64$), then the confidence interval $\pm c$ is

$$\pm z \cdot \sqrt{\frac{\hat{p} \cdot (1 - \hat{p})}{n}} \cdot \sqrt{\frac{N-n}{N-1}} = \pm 1.64 \cdot \sqrt{\frac{0.568 \cdot (1 - 0.568)}{16{,}384}} \cdot 1 = \pm 0.635 \text{ percentage points.}$$

The scorecard, however, does not measure poverty directly, so this formula is not applicable. To derive a formula for the Zambia scorecard, consider Figure 8, which reports empirical confidence intervals $\pm c$ for the differences for the scorecard applied to 1,000 bootstraps of various sizes from the validation sample. For example, with $n = 16{,}384$ and the Göttingen national line, the 90-percent confidence interval is ± 0.570 percentage points.[19]

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[19] Due to rounding, Figure 8 displays 0.6, not 0.570.

Thus, the 90-percent confidence interval with $n = 16{,}384$ is ± 0.570 percentage points for the Zambia scorecard and ± 0.635 percentage points for direct measurement. The ratio of the two intervals is $0.570 \div 0.635 = 0.90$.

Now consider the same exercise, but with $n = 8{,}192$. The confidence interval under direct measurement and the Göttingen national line is

$$\pm 1.64 \cdot \sqrt{\frac{0.568 \cdot (1 - 0.568)}{8{,}192}} \cdot 1 = \pm 0.898 \text{ percentage points.}$$ The empirical confidence interval with the Zambia scorecard (Figure 8) is ± 0.795 percentage points. Thus for $n = 8{,}192$, the ratio of the two intervals is $0.795 \div 0.898 = 0.89$.

This ratio of 0.89 for $n = 8{,}192$ is almost the same as the ratio of 0.90 for $n = 16{,}384$. Across all sample sizes of 256 or more in Figure 8, the average ratio turns out to be 0.91, implying that confidence intervals for indirect estimates of poverty rates via the Zambia scorecard and the Göttingen national poverty line are—for a given sample size—about 9 percent narrower than confidence intervals for direct estimates via the 2010 LCMS. This 0.91 appears in Figure 9 as the "α factor" because if $\alpha = 0.91$, then the formula for confidence intervals c for the Zambia 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 scoring 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 more precise than direct measurement. This occurs for 13 of 16 poverty lines in Figure 9.

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

To illustrate how to use this, suppose the population N is 2,488,400 (the number of households in Zambia while the 2010 LCMS was in the field), suppose $c = 0.04855$, $z = 1.64$ (90-percent confidence), and the relevant poverty line is the Göttingen national line so that the most sensible expected poverty rate $\widetilde{p}$ is Zambia's overall poverty rate for that line in 2010 (56.8 percent at the household level, Figure 1). The α factor is 0.91 (Figure 9). Then the sample-size formula gives

$$n = 2{,}488{,}400 \cdot \left(\frac{1.64^2 \cdot 0.91^2 \cdot 0.568 \cdot (1 - 0.568)}{1.64^2 \cdot 0.91^2 \cdot 0.568 \cdot (1 - 0.568) + 0.04855^2 \cdot (2{,}488{,}400 - 1)} \right) = 232, \text{ which}$$

is not too far from the sample size of 256 observed for these parameters in Figure 8 for

the Göttingen national line. Taking the finite population correction factor ϕ as one (1)

gives the same answer, as $n = \left(\dfrac{0.91 \cdot 1.64}{0.04855}\right)^2 \cdot 0.568 \cdot (1 - 0.568) = 232.$[20]

Of course, the α factors in Figure 9 are specific to Zambia, its poverty lines, its

poverty rates, and this 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.

In practice after the end of fieldwork for the LCMS in March 2010, a program

would select a poverty line (say, the Göttingen 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 the Göttingen national line

for Zambia overall of 56.8 percent in the 2010 LCMS in Figure 1), look up α (here, 0.91,

Figure 9), assume that the scorecard will still work in the future and for non-nationally

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[20] Although USAID has not specified required confidence levels nor intervals, IRIS
Center (2007a and 2007b) says that a sample size of $n = 300$ is sufficient for USAID
reporting. USAID microenterprise partners in Zambia should report using the Göttingen
$\$1.25$/day 2005 PPP line. Given the α factor of 0.91 for this line (Figure 9), an expected
before-measurement household-level poverty rate of 56.8 percent (the all-Zambia rate
for 2010, Figure 1), and a confidence level of 90 percent, then $n = 300$ implies a
confidence interval of $\pm 1.64 \cdot 0.91 \cdot \sqrt{\dfrac{0.568 \cdot (1 - 0.568)}{300}} = \pm 4.3$ percentage points.

representative sub-groups,[21] and then compute the required sample size. In this

illustration, $n = 10{,}000 \cdot \left(\dfrac{1.64^2 \cdot 0.91^2 \cdot 0.568 \cdot (1 - 0.568)}{1.64^2 \cdot 0.91^2 \cdot 0.568 \cdot (1 - 0.568) + 0.02^2 \cdot (10{,}000 - 1)} \right) = 1{,}203.$

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[21] This paper reports accuracy for the scorecard applied to the validation sample, but it cannot test accuracy for later years or for sub-groups. Performance after March 2010 will resemble that in the 2010 LCMS with deterioration over time to the extent that the relationships between indicators and poverty status change. Harttgen, Klasen, and Vollmer (2011) find that asset ownership in Zambia is not closely tied with income, although the papers cited in the next section find that poverty-measurement tools elsewhere can estimate change over time with a known—and possibly useful—degree of accuracy.

7. Estimates of changes in poverty rates over time

The change in a group's poverty rate between two points in time is estimated as the change in the average poverty likelihood of the households in the group. With data only from the 2010 LCMS, this paper cannot test estimates of change over time for Zambia, and it can only suggest approximate formulas for standard errors. Nevertheless, the relevant concepts are presented here because, in practice, local pro-poor organizations can apply the scorecard to collect their own data and measure change through time.

7.1 Warning: Change is not impact

Scoring can estimate change. Of course, poverty could get better or worse, and scoring does not indicate what caused change. This point is often forgotten or confused, so it bears repeating: the scorecard simply estimates change, and it does not, in and of itself, indicate the reason for the change. In particular, estimating the impact of participation requires knowing what would have happened to participants if they had not been participants. Knowing this 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 information must come from somewhere beyond the scorecard.

7.2   Calculating estimated changes in poverty rates over time

Consider the illustration begun in the previous section. On 1 January 2013, an organization samples three households who score 20, 30, and 40 and so have poverty likelihoods of 88.1, 71.0, and 48.7 percent (Göttingen national line, Figure 4). Adjusting for the known bias of –0.1 percentage points (Figure 9), the group's baseline estimated poverty rate is the households' average poverty likelihood of $[(88.1 + 71.0 + 48.7) \div 3] - (-0.1) = 69.4$ percent.

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

- Score a new, independent sample, measuring change across samples
- Score the same sample at both baseline and follow-up

By way of illustration, suppose that two years later on 1 January 2015, the organization samples three additional households who are in the same population as the three original households (or suppose that the same three original households are scored a second time) and finds that their scores are now 25, 35, and 45 (poverty likelihoods of 81.7, 60.0, and 32.8 percent, Göttingen national line, Figure 4). Adjusting for known bias, the average poverty likelihood at follow-up is $[(81.7 + 60.0 + 32.8) \div 3] - (-0.1) = 58.3$ percent, an improvement of $69.4 - 58.3 = 11.1$ percentage points.[22]

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[22] Of course, such a huge reduction in poverty in two years is highly unlikely, but this is just an example to show how the approach can be used to estimate change.

Thus, about one in nine participants in this hypothetical example cross the poverty line in 2013/5.[23] Among those who start below the line, about one in six (11.1 ÷ 69.4 = 16.0 percent) on net end up above the line.[24]

7.3 Accuracy for estimated change in two independent samples

With only the 2010 LCMS, it is not possible to measure the accuracy of scorecard estimates of changes in groups' poverty rates over time. In practice, of course, local pro-poor organizations in Zambia can still use the scorecard to estimate change. The rest of this section suggests approximate formulas for standard errors that may be used until there is additional data.

7.1 Precision for estimates of change in two samples

For two equal-sized independent samples, the same logic as in the previous section can be used to derive a formula relating the confidence interval c with the standard error σ of a scorecard'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,[25] and α is the average (across a range of bootstrapped sample sizes) of

[23] This is a net figure; some people start above the line and end below it, and vice versa.
[24] The estimate *per se* does not reveal the reasons for this change.

the ratio of the observed confidence interval from a scorecard and the theoretical confidence interval under direct measurement.

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

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

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

This α has been measured for 11 countries (Schreiner, 2013a, 2013b, 2012c, 2010, 2009a, 2009b, 2009c, 2009d; Chen and Schreiner, 2009; and Schreiner and Woller, 2010a and 2010b). After averaging α across poverty lines and survey years within each country, the simple average of α across countries is 1.15. This is as reasonable a figure as any to use for Zambia.

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 the Göttingen national line, $\alpha = 1.15$, $\hat{p} = 0.568$ (the household-level poverty rate in 2010 for the Göttingen national line in Figure 1), and the population N is large enough relative to the expected sample

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[25] This means that, for a given precision and with direct measurement, estimating the change in a poverty rate between two points in time requires four times as many measurements (not twice as many) as does estimating a poverty rate at a point in time.

size n that the finite population correction factor ϕ can be taken as one. Then the

baseline sample size is $n = 2 \cdot \left(\dfrac{1.15 \cdot 1.64}{0.02}\right)^2 \cdot 0.568 \cdot (1 - 0.568) \cdot 1 = 4{,}364$, and the

follow-up sample size is also 4,364.

7.2 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:[26]

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

where z, c, α, N, and n are defined as usual, $\hat{p}_{12}$ is the share of all sampled households

that move from below the poverty line to above it, and $\hat{p}_{21}$ is the share of all sampled

households that move from above the line to below it.

The formula for confidence intervals can be 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, a conservative assumption is that the

change in the poverty rate will be zero, which implies $\tilde{p}_{12} = \tilde{p}_{21} = \tilde{p}_*$, giving:

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

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

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 $p_{\text{pre-baseline}} \cdot (1 - p_{\text{pre-baseline}})$ is—as in Peru (Schreiner, 2009e)—close to:

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

Given this, a sample-size formula for a group of households to whom the Zambia scorecard is applied twice (once after March 2010 and then again later) is

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

In Peru (the only source of a data-based estimate, Schreiner, 2009e), the average 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 the Göttingen national line, the sample will first be scored in 2013 and then again in 2016 ($y = 3$), and the population N is so large relative to the expected sample size n that the finite population correction factor ϕ can be taken as one. The pre-baseline poverty rate p_{2010} is taken as 56.8 percent (Figure 1), and α is assumed to be 1.30. Then the baseline sample size is

$$n = 2 \cdot \left(\frac{1.30 \cdot 1.64}{0.02} \right)^2 \cdot \left\{ -0.02 + 0.016 \cdot 3 + 0.47 \cdot \left[0.568 \cdot (1 - 0.568) \right] \right\} \cdot 1 = 3{,}258.$$ The same

group of 3,258 households is scored at follow-up as well.

8. Targeting

When an organization uses the scorecard for targeting, households with scores at or below a cut-off are labeled *targeted* and treated—for program purposes—as if they are below a given poverty line. Households with scores above a cut-off are labeled *non-targeted* and treated—for program purposes—as if they are above a given poverty line.

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

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*). Of course, no scorecard 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*).

Figure 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).

Figure 11 shows the distribution of households by targeting outcome for Zambia. For an example cut-off of 35–39, outcomes for the Göttingen national line in the validation sample are:

- Inclusion: 49.9 percent are below the line and correctly targeted
- Undercoverage: 7.3 percent are below the line and mistakenly not targeted
- Leakage: 10.1 percent are above the line and mistakenly targeted
- Exclusion: 32.7 percent are above the line and correctly not targeted

Increasing the cut-off to 40–44 improves inclusion and undercoverage but worsens leakage and exclusion:

- Inclusion: 53.4 percent are below the line and correctly targeted
- Undercoverage: 3.9 percent are below the line and mistakenly not targeted
- Leakage: 14.0 percent are above the line and mistakenly targeted
- Exclusion: 28.8 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 Figure 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 scoring—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 "Total Accuracy" (IRIS Center, 2005; Grootaert and Braithwaite, 1998). With "Total Accuracy", total net benefit is the number of households correctly included or correctly excluded:

Total Accuracy =	1	x	Households correctly included	–
	0	x	Households mistakenly undercovered	–
	0	x	Households mistakenly leaked	+
	1	x	Households correctly excluded.	

Figure 11 shows "Total Accuracy" for all cut-offs for the Zambia scorecard. For the Göttingen national line in the validation sample, total net benefit is greatest (82.6) for a cut-off of 39 or less, with about five in six households in Zambia correctly classified.

"Total Accuracy" weighs successful inclusion of households below the line the same as successful exclusion of households above the line. If a program valued inclusion more (say, twice as much) than exclusion, it could reflect this by setting the benefit for

inclusion to 2 and the benefit for exclusion to 1. Then the chosen cut-off would

maximize (2 x Households correctly included) + (1 x Households correctly excluded).[27]

As an alternative to assigning benefits and costs to targeting outcomes and then

choosing a cut-off to maximize total net benefit, a program could set a cut-off to

achieve a desired poverty rate among targeted households. The third column of Figure

12 ("% targeted who are poor") shows, for the Zambia scorecard applied to the

validation sample, the expected poverty rate among households who score at or below a

given cut-off. For the example of the Göttingen national line, targeting households who

score 39 or less would target 60.0 percent of all households (second column) and

produce a poverty rate among those targeted of 83.2 percent (third column).

Figure 12 also reports two other measures of targeting accuracy. The first is a

version of coverage ("% of poor who are targeted"). For the example of the Göttingen

national line with the validation sample and a cut-off of 39 or less, 87.2 percent of all

poor households are covered.

The final targeting measure in Figure 12 is the number of successfully targeted

poor households for each non-poor household mistakenly targeted (right-most column).

For the Göttingen national line with the validation sample and a cut-off of 39 or less,

covering 4.9 poor households means leaking to 1 non-poor household.

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[27] Figure 11 also reports BPAC, the Balanced Poverty Accuracy Criteria adopted by USAID for certifying poverty-measurement 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)].

9. Context of poverty-assessment tools in Zambia

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

- Use of data from the latest nationally representative expenditure survey
- Accuracy for targeting that is similar to that of alternatives
- Reporting of bias and precision from out-of-sample and out-of-time tests, including formulas for standard errors
- Feasibility for local, pro-poor programs, due to its simplicity 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 Components Analysis to make an asset index from simple, low-cost indicators available for the 7,126 households in Zambia's 2001/2 DHS. The PCA index is like the scorecard here except that, because the DHS does not collect data on expenditure, it is based on a different conception of poverty, its accuracy vis-à-vis an expenditure-based poverty is unknown, and it can only be assumed to be a proxy for long-term wealth/economic status.[28] Well-known examples of the PCA asset-

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[28] Nevertheless, the indicators are similar and the "flat maximum" is important, so carefully built PCA indexes and expenditure-based poverty-measurement tools may pick up the same underlying construct (perhaps "permanent income", see Bollen, Glanville, and Stecklov, 2007), and they may rank households much the same. Comparisons of rankings by PCA indexes and expenditure-based poverty-assessment tools include

index approach include Stifel and Christiaensen (2007), Zeller *et al.* (2006), Filmer and

Pritchett (2001), and Sahn and Stifel (2000 and 2003). The other papers for Zambia

discussed in this section also use the PCA asset-index approach.

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
    — 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 their quintile index value to see how health, population, and nutrition vary with socio-economic status
- 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 akin to targeting, and the last two goals deal with performance

monitoring, so the PCA index would be used much like the scorecard here.

Filmer and Scott (2012), Lindelow (2006), Sahn and Stifel (2003), Wagstaff and
Watanabe (2003), and Montgomery *et al.* (2000).

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Still, the Gwatkin *et al.* index is more difficult and costly than the scorecard. While the scorecard here requires adding up 10 integers, some of which are usually zero, Gwatkin *et al.*'s asset index requires adding up 46 numbers, each with five decimal places and half with negative signs.

Unlike the PCA index, the scorecard here is linked directly to an expenditure-based poverty line. Thus, while both approaches can rank households, only the scorecard can estimate expenditure-based poverty status.

In essence, Gwatkin *et al.*—like all PCA 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 expenditure) but rather a direct measure of a non-expenditure-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 an expenditure-based definition.

The asset-index approach defines people as *poor* if their assets (physical, human, financial, and social) fall below a threshold. Arguments for the asset-based view 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:

- Asset ownership is easier to measure accurately than expenditure
- 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 capability more directly, the difference between, say, "Does income permit adequate sanitation?" versus "Does the toilet drain to a septic tank?"

While the asset view and the income/consumption view are distinct, they are also tightly linked. After all, income/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
- Expenditure as directly measured by a survey
- Expenditure as estimated by a regression (that is, 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 expenditure and regression-estimated expenditure. This result is strongest for countries where regression works well for predicting expenditure and for less-poor countries with larger shares of non-food expenditure. The 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 25 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 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.

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 meant to measure poverty in terms of long-term wealth. They construct their index by pooling Zambia's 1992 and 1996 DHS. Defining poverty status according to lines set at the 25th and 40th percentiles of values from the asset 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 (plus five others for which only a single DHS round is available). This is possible because the DHS generally uses a common set of simple, inexpensive, and verifiable indicators.

The eight indicators in Sahn and Stifel are similar to those in the other tools discussed here in terms of their simplicity, low cost, 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.*, this approach shares 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. Because it does not require price adjustments over time or between countries—or even expenditure data—it is more adaptable in those dimensions than the scorecard here.

Sahn and Stifel also share with Gwatkin *et al.* the disadvantages of using a less-common definition of poverty and of not reporting formula for standard errors. Also, their purpose is to inform governments and donors about the broad progress of poverty-reduction efforts in Africa, not to provide a tool to help local, pro-poor organizations in their poverty-alleviation efforts.[29]

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[29] Booysen *et al.* (2008) covers Zambia in a way like Sahn and Stifel except that they use Multiple Correspondence Analysis instead of factor analysis, they look at both poverty rates and inequality measures, and they use three DHS rounds rather than two.

10. Conclusion

This paper presents the scorecard. Pro-poor programs in Zambia can use it to estimate the likelihood that a household has expenditure below a given poverty line, to estimate the poverty rate of a group of households at a point in time, and to estimate changes in the poverty rate of a group of households between two points in time. The scorecard can also be used for targeting.

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

The scorecard is constructed with half of the data from Zambia's 2010 LCMS, calibrated to 16 poverty lines, and tested on the other half of the LCMS data. Bias and precision are reported for estimates of households' poverty likelihoods, groups' poverty rates at a point in time, and changes in groups' poverty rates over time. Of course, the scorecard's estimates of changes are not the same as estimates of program impact. Targeting accuracy is also reported.

When the scorecard is applied to the validation sample, the maximum absolute difference between estimates versus true poverty rates for groups of households at a point in time is 2.0 percentage points. The average bias across the 16 poverty lines is about –0.6 percentage points. Unbiased estimates may be had by subtracting the known bias for a given poverty line from the original estimates. For $n = 16{,}384$ and 90-percent confidence, the precision of these differences is ±0.6 percentage points or better.

If an organization wants to use the scorecard for targeting, then the results here provide useful information for selecting a 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 an organization feel so daunted by a scorecard's complexity or its cost that it does not even try to use it.

For this reason, the scorecard is kept simple, using ten 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 simple look-up tables, and targeting cut-offs are likewise straightforward to apply. The design attempts to facilitate adoption by helping managers understand and trust scoring and by allowing non-specialists to add up scores quickly in the field.

In summary, the scorecard is a practical, objective way for pro-poor programs in Zambia to estimate expenditure-based poverty rates, track changes in poverty rates over time, and target services. The same approach can be applied to any country with similar data.

References

Adams, Niall M.; and David J. Hand. (2000) "Improving the Practice of Classifier Performance Assessment", *Neural Computation*, Vol. 12, pp. 305–311.

Baesens, Bart; Van Gestel, Tony; Viaene, Stijn; Stepanova, Maria; Suykens, Johan A. K.; and Jan Vanthienen. (2003) "Benchmarking State-of-the-Art Classification Algorithms for Credit Scoring", *Journal of the Operational Research Society*, Vol. 54, pp. 627–635.

Bollen, Kenneth A.; Glanville, Jennifer L.; and Guy Stecklov. (2007) "Socio-Economic Status, Permanent Income, and Fertility: A Latent-Variable Approach", *Population Studies*, Vol. 61, No. 1, pp. 15–34.

Booysen, Frikkie; van der Berg, Servaas; Burger, Ronelle; von Maltitz, Michael; and Gideon du Rand. (2008) "Using an Asset Index to Assess Trends in Poverty in Seven Sub-Saharan African Countries", *World Development*, Vol. 36, No. 6, pp. 1113–1130.

Caire, Dean. (2004) "Building Credit Scorecards for Small-Business Lending in Developing Markets", `microfinance.com/English/Papers/ Scoring_SMEs_Hybrid.pdf`, retrieved 29 March 2013.

_____; and Mark Schreiner. (2012) "Cross-Tab Weighting for Credit Scorecards in Developing Markets", `dean_caire@hotmail.com`.

Camacho, Adriana; and Emily Conover. (2011) "Manipulation of Social-Program Eligibility", *American Economic Journal: Economic Policy*, Vol. 3, No. 2, pp. 41–65.

Carter, Michael R.; and Christopher B. Barrett. (2006) "The Economics of Poverty Traps and Persistent Poverty: An Asset-Based Approach", *Journal of Development Studies,* Vol. 42, No. 2, pp. 178–199.

Central Statistical Office. (2012) *Living Conditions Monitoring Survey Report, 2006 and 2010*, Lusaka.

_____. (2010a) *Poverty Manual 2010*, Lusaka.

_____. (2010b) *Best Practice Report on Poverty Calculations*, Lusaka.

_____. (2010c) *Poverty Trends Report*, Lusaka.

Chen, Shiyuan; and Mark Schreiner. (2009) "Simple Poverty Scorecard Poverty-Assessment Tool: Vietnam", `simplepovertyscorecard.com/VNM_2006_ENG.pdf`, retrieved 29 March 2013.

Coady, David; Grosh, Margaret; and John Hoddinott. (2004) *Targeting of Transfers in Developing Countries*, `hdl.handle.net/10986/14902`, retrieved 13 May 2016.

Cochran, William G. (1977) *Sampling Techniques, Third Edition*.

Dawes, Robyn M. (1979) "The Robust Beauty of Improper Linear Models in Decision-Making", *American Psychologist*, Vol. 34, No. 7, pp. 571–582.

Deaton, Angus; and Salman Zaidi. (2002) "Guidelines for Constructing Consumption Aggregates for Welfare Analysis", World Bank LSMS Working Paper No. 135, `go.worldbank.org/8YRCR9ERJ0`, retrieved 29 March 2013.

Filmer, Deon; and Lant Pritchett. (2001) "Estimating Wealth Effects without Expenditure Data—or Tears: An Application to Educational Enrollments in States of India", *Demography*, Vol. 38, No. 1, pp. 115–132.

_____; and Kinnon Scott. (2012) "Assessing Asset Indexes", *Demography*, Vol. 49, pp. 359–392.

Friedman, Jerome H. (1997) "On Bias, Variance, 0–1 Loss, and the Curse-of-Dimensionality", *Data Mining and Knowledge Discovery*, Vol. 1, pp. 55–77.

Fuller, Rob. (2006) "Measuring the Poverty of Microfinance Clients in Haiti", `microfinance.com/English/Papers/Scoring_Poverty_Haiti_Fuller.pdf`, retrieved 29 March 2013.

Goodman, Leo A.; and Kruskal, William H. (1979) *Measures of Association for Cross Classification*.

Grootaert, Christiaan; and Jeanine Braithwaite. (1998) "Poverty Correlates and Indicator-Based Targeting in Eastern Europe and the Former Soviet Union", World Bank Policy Research Working Paper No. 1942, Washington, D.C., `go.worldbank.org/VPMWVLU8E0`, retrieved 29 March 2013.

Grosh, Margaret; and Judy L. Baker. (1995) "Proxy Means Tests for Targeting Social Programs: Simulations and Speculation", World Bank LSMS Working Paper No. 118, `go.worldbank.org/W9OWN57PD0`, retrieved 29 March 2013.

Gwatkin, Davidson R.; Rutstein, Shea; Johnson, Kiersten; Suliman, Eldaw; Wagstaff, Adam; and Agbessi Amouzou. (2007) "Socio-Economic Differences in Health, Nutrition, and Population: Zambia", World Bank Country Reports on HNP and Poverty, `go.worldbank.org/T6LCN5A340`, retrieved 29 March 2013.

Hand, David J. (2006) "Classifier Technology and the Illusion of Progress", *Statistical Science*, Vol. 22, No. 1, pp. 1–15.

Harttgen, Kenneth; Klasen, Stephen; and Sebastian Vollmer. (2011) "An African Growth Miracle? or: What Do Asset Indices Tell Us about Trends in Economic Development?" `iariw.org/papers/2011/harttgenpaper.pdf`, retrieved 29 March 2013.

Hoadley, Bruce; and Robert M. Oliver. (1998) "Business Measures of Scorecard Benefit", *IMA Journal of Mathematics Applied in Business and Industry*, Vol. 9, pp. 55–64.

IRIS Center. (2007a) "Manual for the Implementation of USAID Poverty Assessment Tools", `povertytools.org/training_documents/Manuals/USAID_PAT_Manual_Eng.pdf`, retrieved 29 March 2013.

_____. (2007b) "Introduction to Sampling for the Implementation of PATs", `povertytools.org/training_documents/Sampling/Introduction_Sampling.ppt`, retrieved 29 March 2013.

_____. (2005) "Notes on Assessment and Improvement of Tool Accuracy", `povertytools.org/other_documents/AssessingImproving_Accuracy.pdf`, retrieved 29 March 2013.

Johnson, Glenn. (2007) "Lesson 3: Two-Way Tables—Dependent Samples", `onlinecourses.science.psu.edu/stat504/node/96`, retrieved 29 March 2013.

Kolesar, Peter; and Janet L. Showers. (1985) "A Robust Credit-Screening Model Using Categorical Data", *Management Science*, Vol. 31, No. 2, pp. 124–133.

Lindelow, Magnus. (2006) "Sometimes More Equal Than Others: How Health Inequalities Depend on the Choice of Welfare Indicator", *Health Economics*, Vol. 15, pp. 263–279.

Lovie, Sandra; and Patricia Lovie. (1986) "The Flat-Maximum Effect and Linear Scoring Models for Prediction", *Journal of Forecasting*, Vol. 5, pp. 159–168.

Martinelli, César; and Susan W. Parker. (2007) "Deception and Misreporting in a Social Program", *Journal of the European Economic Association*, Vol. 4, No. 6, pp. 886–908.

Matul, Michal; and Sean Kline. (2003) "Scoring Change: Prizma's Approach to Assessing Poverty", Microfinance Centre for Central and Eastern Europe and the New Independent States Spotlight Note No. 4, `imp-act.org/sites/default/files/mfc_sn4.pdf`, retrieved 29 March 2013.

McNemar, Quinn. (1947) "Note on the Sampling Error of the Difference between Correlated Proportions or Percentages", *Psychometrika*, Vol. 17, pp. 153–157.

Montgomery, Mark; Gragnolati, Michele; Burke, Kathleen A.; and Edmundo Paredes. (2000) "Measuring Living Standards with Proxy Variables", *Demography*, Vol. 37, No. 2, pp. 155–174.

Myers, James H.; and Edward W. Forgy. (1963) "The Development of Numerical Credit-Evaluation Systems", *Journal of the American Statistical Association*, Vol. 58, No. 303, pp. 779–806.

Narayan, Ambar; and Nobuo Yoshida. (2005) "Proxy Means Tests for Targeting Welfare Benefits in Sri Lanka", World Bank Report No. SASPR–7, Washington, D.C.: `documents.worldbank.org/curated/en/2005/07/6209268/proxy-means-test-targeting-welfare-benefits-sri-lanka`, retrieved 29 March 2013.

Onwujekwe, Obinna; Hanson, Kara; and Julia Fox-Rushby. (2006) "Some Indicators of Socio-Economic Status May Not Be Reliable and Use of Indexes with These Data Could Worsen Equity", *Health Economics*, Vol. 15, pp. 639–644.

Ravallion, Martin. (1998) "Poverty Lines in Theory and Practice", World Bank LSMS Working Paper No. 133, `go.worldbank.org/8P3IBJPQS1`, retrieved 29 March 2013.

Rutstein, Shea Oscar; and Kiersten Johnson. (2004) "The DHS Wealth Index", DHS Comparative Reports No. 6, `measuredhs.com/pubs/pdf/CR6/CR6.pdf`, retrieved 29 March 2013.

Sahn, David E.; and David Stifel. (2003) "Exploring Alternative Measures of Welfare in the Absence of Expenditure Data", *Review of Income and Wealth*, Series 49, No. 4, pp. 463–489.

_____. (2000) "Poverty Comparisons over Time and across Countries in Africa", *World Development*, Vol. 28, No. 12, pp. 2123–2155.

SAS Institute Inc. (2004) "The LOGISTIC Procedure: Rank Correlation of Observed Responses and Predicted Probabilities", in *SAS/STAT User's Guide, Version 9*, `support.sas.com/documentation/cdl/en/statug/63033/HTML/default/viewer.htm#statug_logistic_sect035.htm`, retrieved 29 March 2013.

Schreiner, Mark. (2013a) "Simple Poverty Scorecard Poverty-Assessment Tool: Bangladesh", `simplepovertyscorecard.com/BGD_2010_ENG.pdf`, retrieved 1 May 2013.

_____. (2013b) "Simple Poverty Scorecard Poverty-Assessment Tool: Nicaragua", `simplepovertyscorecard.com/NIC_2009_ENG.pdf`, retrieved 29 March 2013.

_____. (2012a) "An Expert-Based Poverty Scorecard: Rural China".

_____. (2012b) "Simple Poverty Scorecard Poverty-Assessment Tool: Colombia", `simplepovertyscorecard.com/COL_2009_ENG.pdf`, retrieved 29 March 2013.

_____. (2012c) "Simple Poverty Scorecard Poverty-Assessment Tool: Peru", `simplepovertyscorecard.com/PER_2010_ENG.pdf`, retrieved 29 March 2013.

_____. (2010) "Simple Poverty Scorecard Poverty-Assessment Tool: Honduras", `simplepovertyscorecard.com/HND_2007_ENG.pdf`, retrieved 29 March 2013.

_____. (2009a) "Simple Poverty Scorecard Poverty-Assessment Tool: Philippines", `simplepovertyscorecard.com/PHL_2002_ENG.pdf`, retrieved 29 March 2013.

_____. (2009b) "Simple Poverty Scorecard Poverty-Assessment Tool: Pakistan", `simplepovertyscorecard.com/PAK_2005_ENG.pdf`, retrieved 29 March 2013.

_____. (2009c) "Simple Poverty Scorecard Poverty-Assessment Tool: Bolivia", `microfinance.com/English/Papers/Scoring_Poverty_Bolivia_EN_2007.pdf`, retrieved 29 March 2013.

_____. (2009d) "Simple Poverty Scorecard Poverty-Assessment Tool: Mexico", `simplepovertyscorecard.com/MEX_2008_ENG.pdf`, retrieved 29 March 2013.

_____. (2009e) "Simple Poverty Scorecard Poverty-Assessment Tool: Peru", `simplepovertyscorecard.com/PER_2007_ENG.pdf`, retrieved 29 March 2013.

_____. (2008) "Simple Poverty Scorecard Poverty-Assessment Tool: Peru", `simplepovertyscorecard.com/PER_2003_ENG.pdf`, retrieved 29 March 2013.

_____. (2006) "Is One Simple Poverty Scorecard Poverty-Assessment Tool Enough for India?", `microfinance.com/English/Papers/Scoring_Poverty_India_Segments.pdf`, retrieved 29 March 2013.

_____. (2005a) "La Herramienta del Índice de Calificacíon de la Pobreza™: México", `simplepovertyscorecard.com/MEX_2002_SPA.pdf`, retrieved 29 March 2013.

_____. (2005b) "IRIS Questions on the Simple Poverty Scorecard Poverty-Assessment Tool", `microfinance.com/English/Papers/Scoring_Poverty_Response_to_IRIS.pdf`, retrieved 29 March 2013.

_____. (2002) *Scoring: The Next Breakthrough in Microfinance?* CGAP Occasional Paper No. 7, `microfinance.com/English/Papers/Scoring_Breakthrough_CGAP.pdf`, retrieved 29 March 2013.

_____; Matul, Michal; Pawlak, Ewa; and Sean Kline. (2004) "Poverty Scoring: Lessons from a Microlender in Bosnia-Herzegovina", `microfinance.com/English/Papers/Scoring_Poverty_in_BiH_Short.pdf`, retrieved 29 March 2013.

_____; and Michael Sherraden. (2006) *Can the Poor Save? Saving and Asset Accumulation in Individual Development Accounts.*

_____; and Gary Woller. (2010a) "Simple Poverty Scorecard Poverty-Assessment Tool: Ghana", `simplepovertyscorecard.com/GHA_2005_ENG.pdf`, retrieved 29 March 2013.

_____; and Gary Woller. (2010b) "Simple Poverty Scorecard Poverty-Assessment Tool: Guatemala", `simplepovertyscorecard.com/GTM_2006_ENG.pdf`, retrieved 29 March 2013.

Sharif, Iffath Anwar. (2009) "Building a Targeting System for Bangladesh Based on Proxy-Means Testing", World Bank Social Protection Discussion Paper No. 0914, `siteresources.worldbank.org/SOCIALPROTECTION/Resources/SP-Discussion-papers/Safety-Nets-DP/0914.pdf`, retrieved 29 March 2013.

Sherraden, Michael. (1991) *Assets and the Poor: A New American Welfare Policy.*

Sillers, Don. (2006) "National and International Poverty Lines: An Overview", `pdf.usaid.gov/pdf_docs/Pnadh069.pdf`, retrieved 29 March 2013.

Stifel, David; and Luc Christiaensen. (2007) "Tracking Poverty over Time in the Absence of Comparable Consumption Data", *World Bank Economic Review*, Vol. 21, No. 2, pp. 317–341.

Stillwell, William G.; Barron, F. Hutton; and Ward Edwards. (1983) "Evaluating Credit Applications: A Validation of Multi-Attribute Utility-Weight Elicitation Techniques", *Organizational Behavior and Human Performance*, Vol. 32, pp. 87–108.

Tarozzi, Alessandro; and Angus Deaton. (2009) "Using Census and Survey Data to Estimate Poverty and Inequality for Small Areas", *Review of Economics and Statistics*, Vol. 91, No. 4, pp. 773–792.

Toohig, Jeff. (2008) "PPI Pilot Training Guide", `microfinancegateway.org/gm/document-1.1.6364/PPITrainingGuide.pdf`, retrieved 29 March 2013.

United States Congress. (2004) "Microenterprise Results and Accountability Act of 2004 (HR 3818 RDS)", November 20, `smith4nj.com/laws/108-484.pdf`, retrieved 29 March 2013.

Wainer, Howard. (1976) "Estimating Coefficients in Linear Models: It Don't Make No Nevermind", *Psychological Bulletin*, Vol. 83, pp. 223–227.

Wagstaff, Adam; and Naoko Watanabe. (2003) "What Difference Does the Choice of SES Make in Health-Inequality Measurement?", *Health Economics*, Vol. 12, No. 10, pp. 885–890.

World Bank. (2012) *Targeting Poor and Vulnerable Households in Indonesia*, `ausaid.gov.au/Publications/Pages/report-targeting-poor-households-indonesia.aspx`, retrieved 29 March 2013.

_____. (2008) "International Comparison Project: Tables of Results", `siteresources.worldbank.org/ICPINT/Resources/icp-final-tables.pdf`, retrieved 29 March 2013.

_____. (2005) *Zambia Poverty and Vulnerability Assessment*, Report No. 32573–ZM, `go.worldbank.org/N24EEN8DG0`, retrieved 29 March 2013.

Zeller, Manfred. (2004) "Review of Poverty Assessment Tools",
    `pdf.usaid.gov/pdf_docs/PNADH120.pdf`, retrieved 29 March 2013.

_____; Sharma, Manohar; Henry, Carla; and Cécile Lapenu. (2006) "An Operational
    Method for Assessing the Poverty-Outreach Performance of Development Policies
    and Projects: Results of Case Studies in Africa, Asia, and Latin America", *World
    Development*, Vol. 34, No. 3, pp. 446–464.

Guidelines for the Interpretation
of Scorecard Indicators

The following is from:

Central Statistical Office. (2009) "Enumerator's Instruction Manual: Living Conditions
Monitoring Survey VI—2010", Lusaka. [the *Manual*]

<u>General guidelines</u>

<u>Enumerator Conduct</u>

According to p. 4 of the *Manual*, "As an enumerator, you should always 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.
    "You are not allowed to argue with respondents, rebuke them, or enter into any
political discussions 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.
    "You must dress appropriately when collecting data from the various households.
You should always be clean and dressed in a manner accepted by the community where
you are operating."

<u>Confidentiality</u>

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. . . . In the course
of your work, do not leave the questionnaires issued to you in any place where an
unauthorised person may have access to them. It is your duty as an enumerator to
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 an essential factor in 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, you are required to introduce yourself and to announce the purpose of your visit in a polite manner. After every interview, you should thank the respondent(s)."

Preferred respondent

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. You may also find situations in which the head of the household is available but refers you to another knowledgeable person within the household. This will become your main respondent."

Beginning the interview

According to p. 8–9 of the *Manual*, "The ultimate success of an interview depends on many factors, visible and invisible, often occurring 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 on 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 no answer that they will provide will 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 when treating the information obtained from the respondents. Under no circumstances will it be possible for any third party 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, politely leave without making any threats."

How to ask questions

According to pp. 9–10 of the *Manual*, "you must maintain a neutral attitude with the respondents. You must be careful that nothing in your words or manner implies criticism, surprise, approval, or disapproval of either the questions asked or the respondents' answers. You can 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 opinions with the respondent. The questions are also 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 provide 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. 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. However, you must be careful not to alter the intent of the question.

"Avoid showing 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 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

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. Such people are called *members of the household.*

"A *household* will thus include 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 have different persons whom they regard as head. These should be considered as belonging to separate households. There can also be one-member households where 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 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 they 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 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 of usual members 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. 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

See the guidelines for Indicator 1 for the definition of *household* and *household member*.

According to p. 37 of the *Manual*, "Record age in completed years. For example, a person who is 17 years and 11 months old will have 17 entered as his/her age."

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 school attendance of not only boys but rather both boys and girls.

If no one in the household is 7- to 16-years-old, then response C should be marked, not response A.

3. What is the highest grade that the 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

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

- The household head, if the head is a woman
- The spouse/partner/companion of the household head, if the head is a man
- Non-existent, if neither of the previous two criteria are met

According to p. 15 and pp. 31–32 of the *Manual*, the *head of the household* is "the person 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 head if the household members themselves cannot identify or consider 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 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'
- 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'"

4. What kind of building material is the floor of this dwelling made of?
   A. Mud, wood only, or other
   B. Concrete, or covered concrete

According to p. 73 of the *Manual*, "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*, the flooring materials are defined as follows:

- *Concrete only* is a concrete floor that is not covered with carpets etc.
- *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?
   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*, "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, coal, crop/livestock residues, or other
    B. Charcoal
    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."

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

*   "*Coal* is a natural dark brown-to-black graphite-like material used as a fuel, formed from fossilized plants
*   *Crop/livestock residues* include, for example, cow dung, or the remains of a cob of maize"

According to p. 69 of the *Manual*, "If the question asked is for the main source/type of something and a household uses more than one source of a particular facility, 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 or home theatres, or satellite dish/decoders (free to air, or DSTV), or other pay-TV arrangements?
    A. No TVs (regardless of others)
    B. TV, but nothing else
    C. TV, and something else (DVD, dish, etc.)

According to p. 67 of the *Manual*, "a *home theater* is an audio/video entertainment center 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 or home theatres, satellite dish/decoders (free to air, or DSTV), or other pay-TV arrangements that are owned by a household and that are in good working condition or just temporarily out-of-order but usable. Do not count if permanently broken.

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

"Inherited televisions, DVDs/VCRs or 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 or 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 or home theatres, satellite dish/decoders (free to air, or DSTV), or other pay-TV arrangements exclusively owned by a 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

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

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

"If a household is keeping a cellular phone for somebody else and using it, 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 a 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)

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

"If a household is keeping a bed or mattress for somebody else and using it, 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 a household should be considered."

Figure 1: Poverty lines and poverty rates for all of Zambia by Göttingen/CSO poverty-status definition, sub-sample, poverty line, and household-level/person-level

Poverty status definition	Line or rate	Person or HH level	# HHs surveyed	% with daily household expenditure below a poverty line							
				Per-adult-equivalent lines				Per-capita lines			
				National				USAID 'Extreme'	Intl. 2005 PPP		
				Food	100%	150%	200%		$1.25	$2.00	$2.50
All Zambia											
Göttingen	Line		19,373	3,084	5,015	7,522	10,030	2,249	5,772	9,235	11,543
	Rate	Household		35.7	56.8	71.9	80.3	26.0	67.7	81.0	85.8
	Rate	Person		41.3	62.8	77.0	84.7	31.4	73.5	85.7	89.8
CSO	Line		19,373	3,160	4,787	7,181	9,574	2,057	5,772	9,235	11,543
	Rate	Household		36.3	54.5	69.6	77.9	24.9	67.2	80.1	85.0
	Rate	Person		42.2	60.4	74.6	82.3	30.2	72.8	84.7	88.8
Construction/calibration: Selecting indicators and points, and associating scores with likelihoods											
Göttingen	Rate	Household	9,761	35.4	56.4	71.8	80.3	25.8	67.7	81.1	85.9
CSO	Rate	Household		35.9	54.4	69.5	77.8	24.7	67.2	80.0	85.1
Validation: Measuring accuracy of scorecard											
Göttingen	Rate	Household	9,612	41.7	63.0	77.2	85.7	32.0	73.6	85.5	89.6
CSO	Rate	Household		42.5	60.5	74.7	82.4	30.4	72.9	84.8	88.7

Source: 2010 Living Conditions Monitoring Survey. Poverty rates are percentages.

Both Göttingen and CSO poverty lines are in ZMK with prices as of Feb./Mar. 2010.

The food and national poverty lines are per adult equivalent per day. All other lines are per person per day.

Figure 2: For the Göttingen poverty-status definition, sample size, poverty lines, and poverty rates by province, poverty line, and people/households

| Region | n | Göttingen poverty line (daily ZMK per person or per adult equivalent) and poverty rate (%) | | | | | | | |
| | | | National | | | USAID | Intl. 2005 PPP | | |
		Food	100%	150%	200%	'Extreme'	$1.25	$2.00	$2.50
Central									
Poverty line	1,858	2,933	4,770	7,155	9,540	2,423	5,490	8,784	10,980
Household poverty rate		26.7	53.4	72.5	81.8	25.0	67.5	82.2	87.0
Person poverty rate		32.0	60.5	77.9	86.5	30.2	73.4	87.2	91.0
Copperbelt									
Poverty line	3,539	3,202	5,207	7,810	10,413	2,823	5,992	9,588	11,985
Household poverty rate		15.1	32.8	50.3	63.3	15.0	44.8	64.2	72.2
Person poverty rate		19.0	38.4	56.5	69.7	19.2	51.0	70.9	78.1
Eastern									
Poverty line	1,749	3,048	4,956	7,434	9,911	1,927	5,704	9,126	11,407
Household poverty rate		51.9	74.5	88.6	93.3	34.3	86.2	93.6	96.6
Person poverty rate		57.5	78.6	91.2	95.4	39.3	89.5	95.9	97.4
Luapula									
Poverty line	1,366	3,038	4,941	7,411	9,881	1,789	5,686	9,098	11,372
Household poverty rate		58.7	80.0	90.7	95.0	36.2	88.8	95.2	96.9
Person poverty rate		64.1	83.8	93.3	96.7	41.9	92.1	97.0	98.1
Lusaka									
Poverty line	2,585	3,432	5,580	8,370	11,160	3,083	6,422	10,275	12,844
Household poverty rate		11.3	25.7	42.0	55.7	12.2	36.4	58.1	66.2
Person poverty rate		14.6	31.6	49.4	62.4	15.8	43.5	65.3	72.9
Nothern									
Poverty line	2,619	2,851	4,799	7,198	9,598	1,875	5,523	8,837	11,046
Household poverty rate		46.9	70.9	85.2	91.9	31.4	81.3	91.8	95.2
Person poverty rate		52.9	75.3	88.3	94.1	37.7	85.6	94.2	96.6
North-Western									
Poverty line	1,640	3,328	5,412	8,117	10,823	2,018	6,228	9,965	12,456
Household poverty rate		45.2	65.2	78.5	85.0	31.2	74.1	85.7	89.7
Person poverty rate		50.9	71.5	83.8	89.5	35.7	80.7	90.2	93.7
Southern									
Poverty line	2,749	3,004	4,885	7,328	9,771	2,021	5,623	8,996	11,245
Household poverty rate		38.3	62.4	75.8	83.8	28.8	72.3	84.3	89.3
Person poverty rate		45.2	69.8	82.0	88.7	34.9	79.1	89.6	93.9
Western									
Poverty line	1,268	2,728	4,436	6,654	8,872	1,647	5,106	8,169	10,211
Household poverty rate		51.0	72.7	87.1	91.3	32.7	82.7	91.4	95.1
Person poverty rate		58.8	78.4	89.8	93.4	39.3	87.1	93.7	96.8

Figure 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, coal, crop/livestock residues, or other; Charcoal; 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, borehole, or spring; Boils or adds chlorine to water that comes directly from river/lake/stream/dam, rainwater, well, borehole, 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? (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)

Figure 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? (Mud, wood only, or other; Concrete, 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 or home theatres, or satellite dish/decoders (free to air, or DSTV) or other pay-TV arrangements? (No TVs (regardless of others); TV, but nothing else; TV, and something else (DVD, dish, etc.))
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)

Figure 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)

Figure 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)

Figure 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 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)

Figure 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 beds)
1,255	How many mattresses does your household own? (None; One; Two)

Figure 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)

Figure 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)

Figure 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 bicycle, 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)

Figure 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)

Figure 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 Göttingen national poverty line

Tables for
100% of the Göttingen National Poverty Line

(and Tables Pertaining to All 16 Poverty Lines)

Figure 4 (Göttingen 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	98.3
5–9	96.8
10–14	94.3
15–19	92.2
20–24	88.1
25–29	81.7
30–34	71.0
35–39	60.0
40–44	48.7
45–49	32.8
50–54	19.3
55–59	10.6
60–64	5.3
65–69	3.4
70–74	1.4
75–79	0.3
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Figure 5 (Göttingen national line): Derivation of estimated poverty likelihoods associated with scores

Score	Households below poverty line		All households at score		Poverty likelihood (estimated, %)
0–4	1,670	÷	1,699	=	98.3
5–9	3,228	÷	3,335	=	96.8
10–14	6,549	÷	6,948	=	94.3
15–19	8,365	÷	9,072	=	92.2
20–24	9,075	÷	10,299	=	88.1
25–29	8,774	÷	10,736	=	81.7
30–34	5,907	÷	8,315	=	71.0
35–39	5,756	÷	9,600	=	60.0
40–44	3,589	÷	7,373	=	48.7
45–49	1,800	÷	5,489	=	32.8
50–54	917	÷	4,743	=	19.3
55–59	462	÷	4,366	=	10.6
60–64	187	÷	3,536	=	5.3
65–69	115	÷	3,358	=	3.4
70–74	42	÷	3,077	=	1.4
75–79	11	÷	3,555	=	0.3
80–84	0	÷	2,033	=	0.0
85–89	0	÷	1,285	=	0.0
90–94	0	÷	625	=	0.0
95–100	0	÷	554	=	0.0

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

Figure 6 (All Göttingen per-adult-equivalent lines): Probability that a given household's per-adult-equivalent expenditure falls in a range demarcated by two adjacent Göttingen per-adult-equivalent poverty lines

	Likelihood (%) of having expenditure in ranges demarcated by per-adult-equivalent national poverty lines				
Score	<Food <ZMK3,084	=>Food and <100% Natl. =>ZMK3,084 and <ZMK5,015	=>100% Natl. and <150% Natl. =>ZMK5,015 and <ZMK7,522	=>150% Natl. and <200% Natl. =>ZMK7,522 and <ZMK10,030	=>200% Natl. =>ZMK10,030
0–4	91.6	6.7	1.7	0.0	0.0
5–9	82.8	14.0	3.1	0.0	0.1
10–14	75.6	18.6	4.0	1.1	0.6
15–19	69.7	22.6	5.7	1.5	0.6
20–24	58.3	29.8	8.9	2.4	0.6
25–29	52.6	29.1	13.8	3.4	1.1
30–34	38.8	32.3	20.0	6.4	2.6
35–39	25.3	34.6	27.4	8.3	4.3
40–44	18.8	29.9	29.9	10.4	11.0
45–49	7.6	25.2	30.3	19.0	17.9
50–54	2.8	16.6	23.9	24.2	32.5
55–59	0.4	10.2	24.6	20.0	44.9
60–64	0.3	5.0	19.7	26.4	48.6
65–69	0.2	3.2	15.7	18.5	62.5
70–74	0.0	1.4	7.4	13.9	77.3
75–79	0.0	0.3	6.0	10.5	83.2
80–84	0.0	0.0	1.7	5.7	92.6
85–89	0.0	0.0	0.2	2.5	97.3
90–94	0.0	0.0	0.1	0.2	99.7
95–100	0.0	0.0	0.0	0.0	100.0

Figure 6 (All Göttingen per-capita lines): Probability that a given household's per-capita expenditure falls in a range demarcated by two adjacent Göttingen per-capita poverty lines

Score	<USAID <ZMK2,249	=>USAID and <$1.25/day =>ZMK2,249 and <ZMK5,772	=>$1.25/day and <$2.00/day =>ZMK5,772 and <ZMK9,235	=>$2.00/day and <$2.50/day =>ZMK9,235 and <ZMK11,543	=>$2.50/day =>ZMK11,543
		Likelihood (%) of having expenditure in ranges demarcated by per-capita poverty lines			
0–4	86.7	13.4	0.0	0.0	0.0
5–9	68.2	31.7	0.1	0.0	0.0
10–14	62.2	35.8	2.0	0.1	0.0
15–19	52.0	44.9	2.6	0.3	0.2
20–24	41.8	54.7	3.0	0.4	0.2
25–29	36.2	58.6	4.3	0.5	0.4
30–34	24.4	63.0	10.5	0.9	1.2
35–39	14.3	65.8	16.3	1.6	2.0
40–44	10.1	59.9	19.3	6.6	4.3
45–49	4.5	49.8	29.0	8.0	8.7
50–54	1.5	33.6	33.6	12.5	18.9
55–59	0.6	22.8	33.2	14.6	28.9
60–64	0.4	15.7	35.2	15.6	33.0
65–69	0.4	11.5	27.6	15.0	45.6
70–74	0.0	5.4	23.1	13.4	58.1
75–79	0.0	3.4	17.9	12.8	65.9
80–84	0.0	0.6	8.9	7.4	83.1
85–89	0.0	0.1	3.2	9.7	87.0
90–94	0.0	0.0	2.6	2.7	94.7
95–100	0.0	0.0	0.0	0.0	100.0

Figure 6 (All CSO per-adult-equivalent lines): Probability that a given household's per-adult-equivalent expenditure falls in a range demarcated by two adjacent CSO per-adult-equivalent poverty lines

| | Likelihood (%) of having expenditure in ranges demarcated by per-adult-equivalent national poverty lines | | | | |
| | <Food | =>Food and <100% Natl. | =>100% Natl. and <150% Natl. | =>150% Natl. and <200% Natl. | =>200% Natl. |
Score	<ZMK3,160	=>ZMK3,160 and <ZMK4,787	=>ZMK4,787 and <ZMK7,181	=>ZMK7,181 and <ZMK9,574	=>ZMK9,574
0–4	91.8	5.6	2.6	0.0	0.0
5–9	85.9	9.7	4.3	0.0	0.1
10–14	76.9	17.2	4.1	1.1	0.7
15–19	72.7	19.3	5.8	1.4	0.7
20–24	59.6	28.2	8.4	2.8	0.9
25–29	51.9	26.6	16.1	4.0	1.4
30–34	39.7	27.0	23.0	7.4	2.9
35–39	24.9	30.1	30.5	8.6	5.8
40–44	17.1	29.2	28.5	14.0	11.3
45–49	8.2	21.7	28.9	17.6	23.7
50–54	3.8	11.1	21.6	23.5	40.1
55–59	0.2	7.8	19.9	21.6	50.5
60–64	0.2	3.1	16.0	20.3	60.4
65–69	0.2	1.7	11.1	15.6	71.5
70–74	0.1	0.4	4.8	9.1	85.6
75–79	0.0	0.1	4.2	6.0	89.7
80–84	0.0	0.0	1.1	1.8	97.1
85–89	0.0	0.0	0.0	0.4	99.6
90–94	0.0	0.0	0.0	0.0	100.0
95–100	0.0	0.0	0.0	0.0	100.0

Figure 6 (All CSO per-capita lines): Probability that a given household's per-capita expenditure falls in a range demarcated by two adjacent CSO per-capita poverty lines

	Likelihood (%) of having expenditure in ranges demarcated by per-capita poverty lines				
	<USAID	=>USAID and <$1.25/day	=>$1.25/day and <$2.00/day	=>$2.00/day and <$2.50/day	=>$2.50/day
Score	<ZMK2,057	=>ZMK2,057 and <ZMK5,772	=>ZMK5,772 and <ZMK9,235	=>ZMK9,235 and <ZMK11,543	=>ZMK11,543
0–4	86.8	13.2	0.0	0.0	0.0
5–9	70.7	29.2	0.1	0.0	0.0
10–14	62.0	36.0	1.9	0.1	0.1
15–19	54.9	42.9	1.8	0.2	0.2
20–24	42.6	54.0	2.8	0.3	0.3
25–29	33.8	61.1	4.2	0.3	0.6
30–34	19.1	69.8	8.9	1.0	1.3
35–39	10.4	69.1	16.5	2.3	1.8
40–44	5.7	63.4	21.3	4.8	4.9
45–49	3.3	49.9	28.5	9.2	9.1
50–54	1.0	30.3	34.5	14.6	19.6
55–59	0.0	21.7	32.8	19.0	26.5
60–64	0.0	15.0	31.7	17.7	35.6
65–69	0.0	9.4	24.2	14.6	51.8
70–74	0.0	2.8	21.2	11.8	64.3
75–79	0.0	1.4	15.2	11.6	71.9
80–84	0.0	0.0	5.4	10.6	84.0
85–89	0.0	0.0	1.1	7.5	91.4
90–94	0.0	0.0	0.4	3.7	95.9
95–100	0.0	0.0	0.0	0.3	99.7

Figure 7 (Göttingen national line): Average differences between estimated and true poverty likelihoods for households from 1,000 bootstraps of $n = 16{,}384$ with confidence intervals by score range, scorecard applied to the validation sample

| Score | Diff. | Difference between estimate and true value | | |
| | | Confidence interval ($\pm$ percentage points) | | |
		90-percent	95-percent	99-percent
0–4	−1.7	0.9	0.9	0.9
5–9	+1.6	1.8	2.1	2.6
10–14	−1.2	1.2	1.5	1.9
15–19	+2.0	1.6	1.9	2.3
20–24	+1.1	1.6	1.9	2.4
25–29	+0.9	2.0	2.6	3.3
30–34	−0.4	2.4	2.8	3.7
35–39	−3.7	2.9	3.2	3.6
40–44	+2.9	3.0	3.6	4.8
45–49	−0.8	3.2	3.8	4.9
50–54	−5.5	4.4	4.8	5.2
55–59	+1.4	2.0	2.4	3.1
60–64	+0.7	1.4	1.8	2.1
65–69	−0.3	1.6	1.9	2.4
70–74	−2.0	1.7	1.9	2.4
75–79	−1.4	1.1	1.3	1.4
80–84	−0.1	0.2	0.2	0.3
85–89	−0.0	0.0	0.0	0.1
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 8 (Göttingen national line): Average differences between estimated poverty rates and true values for a group at a point in time, with confidence intervals, for 1,000 bootstraps of various sample sizes, scorecard applied to the validation sample

Sample Size	Difference between estimate and true value			
		Confidence interval (± percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	−1.7	61.2	74.5	93.5
4	−0.6	32.6	39.7	57.6
8	−0.6	23.9	29.1	37.9
16	−0.2	18.2	21.5	27.0
32	−0.4	13.0	15.7	20.4
64	+0.0	9.1	10.8	13.8
128	−0.1	6.3	7.5	9.9
256	−0.1	4.9	5.7	7.0
512	−0.1	3.3	3.9	5.3
1,024	−0.1	2.3	2.7	3.7
2,048	−0.1	1.6	2.0	2.4
4,096	−0.1	1.2	1.4	1.8
8,192	−0.1	0.8	0.9	1.2
16,384	−0.1	0.6	0.7	0.9

Figure 9 (All Göttingen poverty lines): Average differences between estimates and true 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 validation sample

	Poverty line							
	National				USAID	Intl. 2005 PPP		
	Food	100%	150%	200%	'Extreme'	$1.25	$2.00	$2.50
Estimate minus true value								
Scorecard applied to the validation sample	−1.5	−0.1	−0.4	−0.5	−0.8	−0.0	−0.2	−0.1
Precision of difference								
Scorecard applied to the validation sample	0.6	0.6	0.4	0.4	0.6	0.5	0.3	0.3
α factor for standard errors								
Scorecard applied to the validation sample	1.00	0.91	0.74	0.67	1.10	0.79	0.67	0.68

Differences between estimates and true values are displayed in units of percentage points.

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

Differences and precision estimated from 1,000 bootstrap samples of size $n = 16{,}384$.

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

Figure 9 (All CSO poverty lines): Average differences between estimates and true 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 validation sample

	Poverty line							
	National				USAID	Intl. 2005 PPP		
	Food	100%	150%	200%	'Extreme'	$1.25	$2.00	$2.50
Estimate minus true value								
Scorecard applied to the validation sample	–2.0	+0.0	–0.8	–0.5	–1.6	–0.6	–0.4	–0.2
Precision of difference								
Scorecard applied to the validation sample	0.6	0.6	0.4	0.4	0.6	0.5	0.3	0.3
α factor for standard errors								
Scorecard applied to the validation sample	0.99	0.92	0.73	0.68	1.14	0.75	0.66	0.68

Differences between estimates and true values are displayed in units of percentage points.

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

Differences and precision estimated from 1,000 bootstrap samples of size $n = 16,384$.

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

Figure 10 (All poverty lines): Possible targeting outcomes

		Targeting segment	
		Targeted	**Non-targeted**
True poverty status	**Below poverty line**	**Inclusion** Under poverty line Correctly Targeted	**Undercoverage** Under poverty line Mistakenly Non-targeted
	Above poverty line	**Leakage** Above poverty line Mistakenly Targeted	**Exclusion** Above poverty line Correctly Non-targeted

Figure 11 (Göttingen national line): Shares of households by cut-off score and targeting classification, along with "Total Accuracy" and BPAC, scorecard applied to the validation sample

Score cut-off	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
<=4	1.7	55.5	0.0	42.8	44.4	−94.1
<=9	4.9	52.3	0.1	42.6	47.5	−82.6
<=14	11.6	45.7	0.4	42.3	53.9	−58.9
<=19	19.8	37.4	1.2	41.6	61.4	−28.5
<=24	28.9	28.4	2.5	40.3	69.1	+5.2
<=29	37.8	19.4	4.3	38.5	76.3	+39.6
<=34	43.9	13.4	6.5	36.2	80.1	+64.7
<=39	49.9	7.3	10.1	32.7	82.6	+82.4
<=44	53.4	3.9	14.0	28.8	82.1	+75.5
<=49	55.2	2.1	17.7	25.1	80.3	+69.1
<=54	56.3	0.9	21.3	21.4	77.7	+62.8
<=59	56.7	0.5	25.2	17.5	74.3	+55.9
<=64	57.0	0.3	28.6	14.2	71.2	+50.1
<=69	57.1	0.2	31.8	11.0	68.0	+44.4
<=74	57.2	0.1	34.8	8.0	65.1	+39.2
<=79	57.2	0.0	38.3	4.5	61.7	+33.1
<=84	57.2	0.0	40.3	2.5	59.7	+29.6
<=89	57.2	0.0	41.6	1.2	58.4	+27.4
<=94	57.2	0.0	42.2	0.6	57.8	+26.3
<=100	57.2	0.0	42.8	0.0	57.2	+25.3

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

Figure 12 (Göttingen national line): Share of all households who are targeted (that is, score at or below the cut-off), the share of targeted households who are poor (that is, have expenditure below the poverty line), the share of poor households who are targeted, and the number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
<=4	1.7	99.6	3.0	280.4:1
<=9	5.0	97.3	8.6	35.7:1
<=14	12.0	96.5	20.2	27.5:1
<=19	21.1	94.3	34.7	16.5:1
<=24	31.4	92.0	50.4	11.6:1
<=29	42.1	89.8	66.1	8.8:1
<=34	50.4	87.0	76.6	6.7:1
<=39	60.0	83.2	87.2	4.9:1
<=44	67.4	79.2	93.3	3.8:1
<=49	72.9	75.7	96.4	3.1:1
<=54	77.6	72.5	98.3	2.6:1
<=59	82.0	69.2	99.1	2.2:1
<=64	85.5	66.6	99.5	2.0:1
<=69	88.9	64.2	99.7	1.8:1
<=74	91.9	62.2	99.9	1.6:1
<=79	95.5	59.9	100.0	1.5:1
<=84	97.5	58.7	100.0	1.4:1
<=89	98.8	57.9	100.0	1.4:1
<=94	99.4	57.6	100.0	1.4:1
<=100	100.0	57.2	100.0	1.3:1

Tables for

the Göttingen Food Poverty Line

Figure 4 (Göttingen food 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	91.6
5–9	82.8
10–14	75.6
15–19	69.7
20–24	58.3
25–29	52.6
30–34	38.8
35–39	25.3
40–44	18.8
45–49	7.6
50–54	2.8
55–59	0.4
60–64	0.3
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

Figure 7 (Göttingen food line): Average differences between estimated and true poverty likelihoods for households from 1,000 bootstraps of $n = 16{,}384$ with confidence intervals by score range, scorecard applied to the validation sample

| | | Difference between estimate and true value | | |
| | | Confidence interval ($\pm$ percentage points) | | |
Score	Diff.	90-percent	95-percent	99-percent
0–4	−1.2	2.8	3.3	4.0
5–9	−3.2	2.9	3.4	4.2
10–14	−8.0	5.0	5.1	5.5
15–19	−4.8	3.4	3.6	3.9
20–24	−5.5	3.9	4.0	4.3
25–29	+6.8	2.2	2.7	3.7
30–34	−3.1	2.9	3.1	3.8
35–39	+3.3	1.9	2.3	2.9
40–44	+2.8	2.3	2.9	3.9
45–49	−6.2	4.3	4.5	5.1
50–54	−1.8	1.8	1.9	2.7
55–59	−1.1	1.1	1.2	1.6
60–64	−0.6	0.7	0.8	1.0
65–69	−1.5	1.4	1.6	2.0
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

Figure 8 (Göttingen food line): Average differences between estimated poverty rates and true values for a group at a point in time, with confidence intervals, for 1,000 bootstraps of various sample sizes, scorecard applied to the validation sample

| Sample Size | Difference between estimate and true value | | | |
| | | Confidence interval (± percentage points) | | |
n	Diff.	90-percent	95-percent	99-percent
1	−1.6	59.8	72.2	85.2
4	−2.0	36.6	43.6	51.9
8	−2.4	26.9	32.4	40.5
16	−1.8	18.7	22.6	30.0
32	−1.7	13.2	15.7	20.3
64	−1.5	9.6	11.2	14.8
128	−1.7	6.8	8.3	10.6
256	−1.5	5.0	5.8	8.0
512	−1.5	3.4	4.2	5.9
1,024	−1.5	2.5	2.9	3.9
2,048	−1.5	1.7	2.1	2.7
4,096	−1.5	1.2	1.5	1.9
8,192	−1.5	0.9	1.1	1.4
16,384	−1.5	0.6	0.7	0.9

Figure 11 (Göttingen food line): Shares of households by cut-off score and targeting classification, along with "Total Accuracy" and BPAC, scorecard applied to the validation sample

Score cut-off	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
<=4	1.6	34.4	0.1	63.9	65.5	−90.9
<=9	4.4	31.5	0.6	63.4	67.9	−73.7
<=14	10.2	25.8	1.8	62.2	72.4	−38.5
<=19	16.6	19.3	4.4	59.6	76.2	+4.8
<=24	23.1	12.9	8.3	55.7	78.8	+51.3
<=29	28.3	7.7	13.8	50.2	78.5	+61.6
<=34	31.7	4.3	18.7	45.3	76.9	+47.9
<=39	33.9	2.0	26.1	38.0	71.9	+27.5
<=44	35.0	1.0	32.4	31.7	66.7	+10.0
<=49	35.7	0.3	37.2	26.8	62.5	−3.4
<=54	35.9	0.1	41.8	22.3	58.1	−16.1
<=59	35.9	0.1	46.1	18.0	53.9	−28.1
<=64	35.9	0.0	49.6	14.5	50.4	−37.8
<=69	36.0	0.0	52.9	11.1	47.1	−47.1
<=74	36.0	0.0	56.0	8.1	44.0	−55.7
<=79	36.0	0.0	59.5	4.5	40.5	−65.5
<=84	36.0	0.0	61.6	2.5	38.4	−71.2
<=89	36.0	0.0	62.9	1.2	37.1	−74.8
<=94	36.0	0.0	63.5	0.6	36.5	−76.5
<=100	36.0	0.0	64.0	0.0	36.0	−78.0

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

Figure 12 (Göttingen food line): Share of all households who are targeted (that is, score at or below the cut-off), the share of targeted households who are poor (that is, have expenditure below the poverty line), the share of poor households who are targeted, and the number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
<=4	1.7	92.0	4.3	11.5:1
<=9	5.0	88.1	12.3	7.4:1
<=14	12.0	84.7	28.2	5.5:1
<=19	21.1	79.0	46.2	3.8:1
<=24	31.4	73.6	64.1	2.8:1
<=29	42.1	67.2	78.6	2.0:1
<=34	50.4	62.8	88.0	1.7:1
<=39	60.0	56.5	94.3	1.3:1
<=44	67.4	52.0	97.4	1.1:1
<=49	72.9	48.9	99.2	1.0:1
<=54	77.6	46.2	99.7	0.9:1
<=59	82.0	43.8	99.8	0.8:1
<=64	85.5	42.0	99.9	0.7:1
<=69	88.9	40.5	100.0	0.7:1
<=74	91.9	39.1	100.0	0.6:1
<=79	95.5	37.7	100.0	0.6:1
<=84	97.5	36.9	100.0	0.6:1
<=89	98.8	36.4	100.0	0.6:1
<=94	99.4	36.2	100.0	0.6:1
<=100	100.0	36.0	100.0	0.6:1

Tables for

150% of the Göttingen National Poverty Line

Figure 4 (150% of Göttingen 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	100.0
5–9	99.9
10–14	98.3
15–19	97.9
20–24	97.0
25–29	95.6
30–34	91.1
35–39	87.4
40–44	78.6
45–49	63.1
50–54	43.3
55–59	35.1
60–64	25.0
65–69	19.1
70–74	8.8
75–79	6.3
80–84	1.7
85–89	0.2
90–94	0.1
95–100	0.0

Figure 7 (150% of Göttingen national line): Average differences between estimated and true poverty likelihoods for households from 1,000 bootstraps of n = 16,384 with confidence intervals by score range, scorecard applied to the validation sample

Score	Diff.	Difference between estimate and true value		
		Confidence interval (± percentage points)		
		90-percent	95-percent	99-percent
0–4	+0.1	0.1	0.1	0.1
5–9	−0.1	0.1	0.1	0.1
10–14	−1.1	0.7	0.8	0.8
15–19	−0.8	0.6	0.7	0.8
20–24	−0.3	0.7	0.8	1.1
25–29	−0.5	0.9	1.1	1.3
30–34	+1.9	1.8	2.3	2.9
35–39	+1.1	1.6	2.0	2.6
40–44	−0.1	2.1	2.5	3.2
45–49	−3.3	3.2	3.9	5.3
50–54	−13.3	8.4	8.8	9.4
55–59	+3.2	3.6	4.4	5.6
60–64	+8.0	2.6	3.1	4.2
65–69	+4.3	2.9	3.6	4.5
70–74	−9.8	7.2	7.5	8.4
75–79	+2.7	1.3	1.5	1.9
80–84	+0.4	1.0	1.2	1.5
85–89	+0.2	0.0	0.0	0.1
90–94	+0.1	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 8 (150% of Göttingen national line): Average differences between estimated poverty rates and true values for a group at a point in time, with confidence intervals, for 1,000 bootstraps of various sample sizes, scorecard applied to the validation sample

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (± percentage points)		
		90-percent	95-percent	99-percent
1	−0.3	59.9	76.1	93.8
4	−0.3	26.5	31.9	51.8
8	−0.5	17.5	22.8	31.1
16	−0.5	12.6	15.5	22.5
32	−0.7	9.2	11.4	16.1
64	−0.5	7.0	8.2	10.5
128	−0.5	4.8	5.8	7.5
256	−0.4	3.5	4.3	5.4
512	−0.5	2.4	2.9	3.8
1,024	−0.4	1.7	2.0	2.5
2,048	−0.4	1.2	1.4	1.9
4,096	−0.4	0.8	1.0	1.3
8,192	−0.4	0.6	0.7	0.9
16,384	−0.4	0.4	0.5	0.6

Figure 11 (150% of Göttingen national line): Shares of households by cut-off score and targeting classification, along with "Total Accuracy" and BPAC, scorecard applied to the validation sample

Score cut-off	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
<=4	1.7	70.3	0.0	28.0	29.7	−95.3
<=9	5.0	67.0	0.0	28.0	33.0	−86.0
<=14	11.9	60.1	0.1	28.0	39.9	−66.8
<=19	20.8	51.1	0.2	27.8	48.7	−41.8
<=24	30.9	41.1	0.5	27.5	58.4	−13.6
<=29	41.2	30.8	0.9	27.1	68.3	+15.7
<=34	48.7	23.3	1.7	26.3	75.1	+37.7
<=39	57.0	14.9	3.0	25.1	82.1	+62.6
<=44	62.6	9.4	4.8	23.2	85.8	+80.6
<=49	66.1	5.8	6.7	21.3	87.4	+90.6
<=54	68.7	3.3	8.9	19.1	87.8	+87.6
<=59	70.1	1.9	11.9	16.1	86.2	+83.5
<=64	70.9	1.1	14.6	13.4	84.3	+79.7
<=69	71.4	0.6	17.5	10.5	81.9	+75.7
<=74	71.8	0.2	20.2	7.8	79.6	+72.0
<=79	71.9	0.0	23.6	4.5	76.4	+67.3
<=84	72.0	0.0	25.6	2.5	74.4	+64.5
<=89	72.0	0.0	26.8	1.2	73.2	+62.7
<=94	72.0	0.0	27.5	0.6	72.5	+61.8
<=100	72.0	0.0	28.0	0.0	72.0	+61.1

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

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

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
<=4	1.7	99.6	2.4	280.4:1
<=9	5.0	99.8	7.0	415.2:1
<=14	12.0	99.5	16.6	192.5:1
<=19	21.1	99.0	29.0	100.8:1
<=24	31.4	98.4	42.9	62.1:1
<=29	42.1	97.8	57.2	44.6:1
<=34	50.4	96.7	67.7	29.0:1
<=39	60.0	95.0	79.2	19.2:1
<=44	67.4	92.9	86.9	13.0:1
<=49	72.9	90.7	91.9	9.8:1
<=54	77.6	88.5	95.5	7.7:1
<=59	82.0	85.5	97.4	5.9:1
<=64	85.5	82.9	98.5	4.9:1
<=69	88.9	80.3	99.2	4.1:1
<=74	91.9	78.1	99.7	3.6:1
<=79	95.5	75.3	99.9	3.1:1
<=84	97.5	73.8	100.0	2.8:1
<=89	98.8	72.8	100.0	2.7:1
<=94	99.4	72.4	100.0	2.6:1
<=100	100.0	72.0	100.0	2.6:1

Tables for

200% of the Göttingen National Poverty Line

Figure 4 (200% of Göttingen 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	100.0
5–9	99.9
10–14	99.4
15–19	99.4
20–24	99.4
25–29	98.9
30–34	97.4
35–39	95.7
40–44	89.0
45–49	82.1
50–54	67.5
55–59	55.1
60–64	51.4
65–69	37.6
70–74	22.7
75–79	16.8
80–84	7.4
85–89	2.7
90–94	0.3
95–100	0.0

Figure 7 (200% of Göttingen national line): Average differences between estimated and true poverty likelihoods for households from 1,000 bootstraps of n = 16,384 with confidence intervals by score range, scorecard applied to the validation sample

| | | Difference between estimate and true value | | |
| | | Confidence interval ($\pm$ percentage points) | | |
Score	Diff.	90-percent	95-percent	99-percent
0–4	+0.1	0.1	0.1	0.1
5–9	–0.1	0.1	0.1	0.1
10–14	–0.6	0.3	0.3	0.3
15–19	–0.1	0.3	0.4	0.5
20–24	+0.3	0.4	0.5	0.6
25–29	–0.8	0.5	0.5	0.5
30–34	–1.6	0.9	1.0	1.0
35–39	+3.1	1.3	1.5	2.1
40–44	–2.6	1.9	2.1	2.3
45–49	+2.4	2.6	3.2	4.3
50–54	–9.7	6.2	6.4	6.9
55–59	–2.4	3.8	4.6	5.9
60–64	+5.0	4.4	5.3	6.9
65–69	+5.0	3.9	4.6	5.9
70–74	–10.1	7.4	7.7	8.9
75–79	+0.3	3.1	3.7	5.3
80–84	+3.1	1.8	2.1	2.6
85–89	+0.6	1.7	2.1	2.7
90–94	–5.1	5.2	5.9	6.9
95–100	+0.0	0.0	0.0	0.0

Figure 8 (200% of Göttingen national line): Average differences between estimated poverty rates and true values for a group at a point in time, with confidence intervals, for 1,000 bootstraps of various sample sizes, scorecard applied to the validation sample

| Sample Size | Difference between estimate and true value | | | |
| | | Confidence interval ($\pm$ percentage points) | | |
n	Diff.	90-percent	95-percent	99-percent
1	+0.6	50.9	72.3	89.4
4	−0.2	23.0	28.6	44.5
8	−0.3	15.9	19.7	27.5
16	−0.3	10.5	12.8	18.0
32	−0.3	7.8	9.2	12.4
64	−0.3	5.5	6.7	9.0
128	−0.4	3.7	4.6	6.4
256	−0.4	2.7	3.2	4.1
512	−0.4	1.9	2.3	3.0
1,024	−0.5	1.4	1.6	2.0
2,048	−0.5	1.0	1.1	1.5
4,096	−0.5	0.7	0.8	1.1
8,192	−0.5	0.5	0.6	0.8
16,384	−0.5	0.4	0.4	0.5

Figure 11 (200% of Göttingen national line): Shares of households by cut-off score and targeting classification, along with "Total Accuracy" and BPAC, scorecard applied to the validation sample

Score cut-off	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
<=4	1.7	78.6	0.0	19.7	21.4	−95.8
<=9	5.0	75.3	0.0	19.7	24.7	−87.5
<=14	12.0	68.4	0.0	19.7	31.6	−70.2
<=19	21.0	59.3	0.1	19.6	40.6	−47.6
<=24	31.2	49.1	0.2	19.5	50.7	−22.1
<=29	41.9	38.4	0.2	19.5	61.3	+4.5
<=34	50.0	30.3	0.4	19.3	69.3	+25.0
<=39	59.0	21.3	1.0	18.7	77.6	+48.1
<=44	65.5	14.8	1.8	17.8	83.4	+65.5
<=49	69.9	10.4	2.9	16.8	86.7	+77.8
<=54	73.5	6.8	4.1	15.6	89.0	+88.1
<=59	76.0	4.3	6.0	13.7	89.7	+92.5
<=64	77.6	2.8	8.0	11.7	89.3	+90.1
<=69	78.7	1.6	10.2	9.5	88.2	+87.3
<=74	79.6	0.7	12.3	7.4	87.0	+84.7
<=79	80.2	0.2	15.3	4.3	84.5	+80.9
<=84	80.3	0.0	17.3	2.4	82.7	+78.5
<=89	80.3	0.0	18.5	1.2	81.5	+76.9
<=94	80.3	0.0	19.1	0.6	80.9	+76.2
<=100	80.3	0.0	19.7	0.0	80.3	+75.5

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

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

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
<=4	1.7	99.7	2.1	394.5:1
<=9	5.0	99.8	6.3	594.1:1
<=14	12.0	99.9	14.9	948.2:1
<=19	21.1	99.7	26.1	386.9:1
<=24	31.4	99.5	38.8	197.5:1
<=29	42.1	99.5	52.1	199.0:1
<=34	50.4	99.3	62.3	133.2:1
<=39	60.0	98.3	73.4	58.0:1
<=44	67.4	97.3	81.6	35.6:1
<=49	72.9	96.0	87.1	24.0:1
<=54	77.6	94.7	91.5	17.8:1
<=59	82.0	92.7	94.6	12.7:1
<=64	85.5	90.7	96.6	9.7:1
<=69	88.9	88.5	97.9	7.7:1
<=74	91.9	86.6	99.1	6.5:1
<=79	95.5	83.9	99.8	5.2:1
<=84	97.5	82.3	99.9	4.6:1
<=89	98.8	81.3	100.0	4.3:1
<=94	99.4	80.8	100.0	4.2:1
<=100	100.0	80.3	100.0	4.1:1

Tables for

the Göttingen USAID "Extreme" Poverty Line

Figure 4 (Göttingen USAID "extreme" 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	86.7
5–9	68.2
10–14	62.2
15–19	52.0
20–24	41.8
25–29	36.2
30–34	24.4
35–39	14.3
40–44	10.1
45–49	4.5
50–54	1.5
55–59	0.6
60–64	0.4
65–69	0.4
70–74	0.0
75–79	0.0
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Figure 7 (Göttingen USAID "extreme" line): Average differences between estimated and true poverty likelihoods for households from 1,000 bootstraps of n = 16,384 with confidence intervals by score range, scorecard applied to the validation sample

Score	Diff.	Difference between estimate and true value Confidence interval ($\pm$ percentage points) 90-percent	95-percent	99-percent
0–4	+11.1	5.0	6.0	7.5
5–9	−1.5	3.5	4.1	5.5
10–14	−10.5	6.5	6.7	7.1
15–19	+1.2	2.5	3.1	3.9
20–24	−3.3	2.8	3.0	3.6
25–29	+3.9	2.1	2.5	3.1
30–34	−2.5	2.5	2.7	3.4
35–39	+0.0	1.6	1.9	2.4
40–44	+3.5	1.2	1.5	1.9
45–49	−4.1	3.1	3.3	3.7
50–54	−0.1	0.8	1.0	1.3
55–59	−0.8	1.0	1.2	1.7
60–64	−0.2	0.5	0.7	0.8
65–69	+0.4	0.0	0.0	0.0
70–74	+0.0	0.0	0.0	0.0
75–79	−0.5	0.6	0.6	0.8
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

Figure 8 (Göttingen USAID "extreme" line): Average differences between estimated poverty rates and true values for a group at a point in time, with confidence intervals, for 1,000 bootstraps of various sample sizes, scorecard applied to the validation sample

Sample Size n	Difference between estimate and true value			
		Confidence interval ($\pm$ percentage points)		
	Diff.	90-percent	95-percent	99-percent
1	−1.9	63.8	73.9	81.9
4	−1.7	36.3	42.9	52.5
8	−1.7	26.1	30.4	38.2
16	−1.5	19.4	22.6	29.9
32	−1.2	13.9	16.4	21.1
64	−1.2	9.6	11.3	14.9
128	−1.1	7.3	8.4	11.7
256	−0.9	4.9	5.8	7.9
512	−0.9	3.5	4.0	5.6
1,024	−0.9	2.5	2.9	3.7
2,048	−0.8	1.7	2.0	2.7
4,096	−0.8	1.2	1.5	1.9
8,192	−0.8	0.9	1.1	1.4
16,384	−0.8	0.6	0.7	0.9

Figure 11 (Göttingen USAID "extreme" line): Shares of households by cut-off score and targeting classification, along with "Total Accuracy" and BPAC, scorecard applied to the validation sample

Score cut-off	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
<=4	1.3	25.0	0.4	73.3	74.6	−88.6
<=9	3.6	22.7	1.4	72.2	75.9	−67.1
<=14	8.5	17.8	3.5	70.2	78.7	−22.1
<=19	13.1	13.2	7.9	65.7	78.9	+29.9
<=24	17.7	8.6	13.7	60.0	77.6	+48.0
<=29	21.4	4.9	20.6	53.0	74.4	+21.5
<=34	23.6	2.7	26.7	46.9	70.6	−1.6
<=39	25.1	1.1	34.8	38.8	64.0	−32.3
<=44	25.8	0.5	41.5	32.1	57.9	−58.0
<=49	26.1	0.2	46.7	27.0	53.1	−77.5
<=54	26.2	0.1	51.3	22.3	48.5	−95.2
<=59	26.2	0.0	55.6	18.0	44.2	−111.7
<=64	26.3	0.0	59.2	14.5	40.7	−125.0
<=69	26.3	0.0	62.5	11.1	37.4	−137.8
<=74	26.3	0.0	65.6	8.0	34.3	−149.5
<=79	26.3	0.0	69.1	4.5	30.8	−162.9
<=84	26.3	0.0	71.2	2.5	28.8	−170.7
<=89	26.3	0.0	72.5	1.2	27.5	−175.6
<=94	26.3	0.0	73.1	0.6	26.8	−178.0
<=100	26.3	0.0	73.6	0.0	26.3	−180.1

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

Figure 12 (Göttingen USAID "extreme" line): Share of all households who are targeted (that is, score at or below the cut-off), the share of targeted households who are poor (that is, have expenditure below the poverty line), the share of poor households who are targeted, and the number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
<=4	1.7	77.8	5.0	3.5:1
<=9	5.0	72.1	13.8	2.6:1
<=14	12.0	71.0	32.3	2.4:1
<=19	21.1	62.3	49.9	1.7:1
<=24	31.4	56.3	67.2	1.3:1
<=29	42.1	50.8	81.3	1.0:1
<=34	50.4	46.9	89.9	0.9:1
<=39	60.0	41.9	95.7	0.7:1
<=44	67.4	38.2	98.0	0.6:1
<=49	72.9	35.9	99.4	0.6:1
<=54	77.6	33.8	99.7	0.5:1
<=59	82.0	32.0	99.8	0.5:1
<=64	85.5	30.7	99.9	0.4:1
<=69	88.9	29.6	99.9	0.4:1
<=74	91.9	28.6	99.9	0.4:1
<=79	95.5	27.5	100.0	0.4:1
<=84	97.5	27.0	100.0	0.4:1
<=89	98.8	26.6	100.0	0.4:1
<=94	99.4	26.4	100.0	0.4:1
<=100	100.0	26.3	100.0	0.4:1

Tables for

the Göttingen $1.25/day 2005 PPP Poverty Line

Figure 4 (Göttingen \$1.25/day 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	100.0
5–9	99.9
10–14	97.9
15–19	97.0
20–24	96.5
25–29	94.8
30–34	87.4
35–39	80.1
40–44	69.9
45–49	54.3
50–54	35.1
55–59	23.4
60–64	16.2
65–69	11.8
70–74	5.4
75–79	3.4
80–84	0.6
85–89	0.1
90–94	0.0
95–100	0.0

Figure 7 (Göttingen $1.25/day line): Average differences between estimated and true poverty likelihoods for households from 1,000 bootstraps of $n = 16{,}384$ with confidence intervals by score range, scorecard applied to the validation sample

| Score | Diff. | Difference between estimate and true value | | |
| | | Confidence interval ($\pm$ percentage points) | | |
		90-percent	95-percent	99-percent
0–4	+0.1	0.1	0.1	0.1
5–9	−0.1	0.1	0.1	0.1
10–14	−1.5	0.9	0.9	1.0
15–19	+1.6	1.4	1.6	1.9
20–24	+0.0	0.8	1.0	1.3
25–29	+0.5	1.0	1.3	1.6
30–34	+1.5	2.0	2.4	3.2
35–39	+0.3	1.9	2.2	3.0
40–44	+0.9	2.6	3.2	4.1
45–49	−3.6	3.5	4.0	5.3
50–54	−11.6	7.6	7.9	8.6
55–59	+4.8	2.7	3.1	4.5
60–64	+2.8	2.4	2.8	3.9
65–69	+1.4	2.8	3.3	4.4
70–74	−0.2	1.7	2.1	2.8
75–79	+1.3	1.0	1.2	1.5
80–84	+0.1	0.6	0.6	0.8
85–89	+0.0	0.0	0.0	0.1
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 8 (Göttingen \$1.25/day line): Average differences between estimated poverty rates and true values for a group at a point in time, with confidence intervals, for 1,000 bootstraps of various sample sizes, scorecard applied to the validation sample

Sample Size n	Difference between estimate and true value			
		Confidence interval ($\pm$ percentage points)		
	Diff.	90-percent	95-percent	99-percent
1	−0.9	57.8	78.3	93.9
4	+0.2	26.9	33.7	44.0
8	−0.2	18.5	23.9	34.4
16	−0.3	14.1	17.6	23.8
32	−0.3	10.0	12.8	16.4
64	−0.0	7.6	8.9	11.8
128	−0.1	5.2	6.2	7.8
256	−0.0	3.9	4.6	5.8
512	+0.0	2.6	3.1	4.5
1,024	+0.0	1.9	2.3	3.3
2,048	−0.0	1.3	1.6	2.1
4,096	−0.0	1.0	1.1	1.3
8,192	+0.0	0.7	0.8	1.0
16,384	−0.0	0.5	0.5	0.7

Figure 11 (Göttingen $1.25/day line): Shares of households by cut-off score and targeting classification, along with "Total Accuracy" and BPAC, scorecard applied to the validation sample

Score cut-off	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
<=4	1.7	66.1	0.0	32.2	33.9	−95.0
<=9	5.0	62.8	0.0	32.2	37.2	−85.2
<=14	11.9	55.9	0.1	32.1	44.1	−64.7
<=19	20.7	47.1	0.3	31.9	52.6	−38.4
<=24	30.6	37.2	0.7	31.5	62.1	−8.6
<=29	40.7	27.1	1.4	30.8	71.6	+22.2
<=34	48.0	19.8	2.4	29.8	77.8	+45.2
<=39	55.7	12.1	4.3	27.9	83.6	+70.7
<=44	60.5	7.3	6.8	25.4	85.9	+88.7
<=49	63.6	4.2	9.3	22.9	86.5	+86.3
<=54	65.7	2.1	12.0	20.2	85.9	+82.4
<=59	66.6	1.2	15.4	16.8	83.3	+77.3
<=64	67.2	0.6	18.3	13.9	81.1	+73.0
<=69	67.5	0.3	21.4	10.8	78.3	+68.5
<=74	67.7	0.1	24.3	7.9	75.6	+64.2
<=79	67.8	0.0	27.7	4.5	72.3	+59.1
<=84	67.8	0.0	29.7	2.5	70.3	+56.1
<=89	67.8	0.0	31.0	1.2	69.0	+54.2
<=94	67.8	0.0	31.6	0.6	68.4	+53.3
<=100	67.8	0.0	32.2	0.0	67.8	+52.5

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

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

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
<=4	1.7	99.6	2.5	280.4:1
<=9	5.0	99.8	7.4	415.2:1
<=14	12.0	99.5	17.6	192.5:1
<=19	21.1	98.5	30.6	64.0:1
<=24	31.4	97.7	45.2	42.4:1
<=29	42.1	96.8	60.1	30.1:1
<=34	50.4	95.3	70.8	20.1:1
<=39	60.0	92.8	82.1	12.9:1
<=44	67.4	89.9	89.3	8.9:1
<=49	72.9	87.3	93.8	6.9:1
<=54	77.6	84.6	96.8	5.5:1
<=59	82.0	81.2	98.2	4.3:1
<=64	85.5	78.6	99.1	3.7:1
<=69	88.9	75.9	99.6	3.2:1
<=74	91.9	73.6	99.8	2.8:1
<=79	95.5	71.0	100.0	2.4:1
<=84	97.5	69.5	100.0	2.3:1
<=89	98.8	68.6	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 Göttingen $2.00/day 2005 PPP Poverty Line

Figure 4 (Göttingen $2.00/day 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	100.0
5–9	100.0
10–14	99.9
15–19	99.6
20–24	99.5
25–29	99.0
30–34	97.9
35–39	96.4
40–44	89.2
45–49	83.3
50–54	68.6
55–59	56.5
60–64	51.3
65–69	39.4
70–74	28.5
75–79	21.3
80–84	9.5
85–89	3.3
90–94	2.6
95–100	0.0

Figure 7 (Göttingen \$2.00/day line): Average differences between estimated and true poverty likelihoods for households from 1,000 bootstraps of $n = 16,384$ with confidence intervals by score range, scorecard applied to the validation sample

Score	Diff.	Difference between estimate and true value		
		Confidence interval ($\pm$ percentage points)		
		90-percent	95-percent	99-percent
0–4	+0.1	0.1	0.1	0.1
5–9	+0.0	0.0	0.0	0.1
10–14	–0.1	0.1	0.1	0.1
15–19	+0.0	0.3	0.4	0.5
20–24	–0.3	0.2	0.2	0.3
25–29	–0.9	0.5	0.5	0.5
30–34	–1.1	0.7	0.8	0.8
35–39	+3.3	1.2	1.5	2.0
40–44	–2.7	2.0	2.1	2.3
45–49	+3.3	2.7	3.2	4.2
50–54	–9.7	6.2	6.4	6.9
55–59	–2.3	3.8	4.4	5.9
60–64	+6.4	4.5	5.3	6.9
65–69	+3.7	3.9	4.8	6.4
70–74	–4.8	4.7	5.7	7.7
75–79	+2.7	3.4	4.1	5.5
80–84	+6.2	1.6	1.8	2.4
85–89	–1.3	2.5	3.0	3.7
90–94	+2.6	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 8 (Göttingen $2.00/day line): Average differences between estimated poverty rates and true values for a group at a point in time, with confidence intervals, for 1,000 bootstraps of various sample sizes, scorecard applied to the validation sample

| Sample Size n | Difference between estimate and true value | | | |
| | | Confidence interval ($\pm$ percentage points) | | |
	Diff.	90-percent	95-percent	99-percent
1	+0.4	52.6	72.0	87.6
4	−0.0	23.3	28.5	44.0
8	+0.1	15.6	20.0	27.3
16	−0.0	10.0	12.2	17.7
32	−0.1	7.7	9.1	12.9
64	−0.0	5.5	6.5	8.1
128	−0.1	3.7	4.6	6.1
256	−0.1	2.8	3.3	4.2
512	−0.1	1.9	2.3	2.9
1,024	−0.2	1.3	1.5	2.1
2,048	−0.2	1.0	1.1	1.4
4,096	−0.2	0.7	0.8	1.0
8,192	−0.2	0.4	0.5	0.7
16,384	−0.2	0.3	0.4	0.5

Figure 11 (Göttingen $2.00/day line): Shares of households by cut-off score and targeting classification, along with "Total Accuracy" and BPAC, scorecard applied to the validation sample

Score cut-off	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
<=4	1.7	79.2	0.0	19.1	20.8	−95.8
<=9	5.0	75.9	0.0	19.1	24.1	−87.6
<=14	12.0	68.9	0.0	19.1	31.1	−70.4
<=19	21.0	59.9	0.0	19.1	40.1	−48.0
<=24	31.3	49.6	0.1	19.0	50.3	−22.6
<=29	42.0	38.9	0.1	19.0	61.0	+3.9
<=34	50.1	30.7	0.3	18.9	69.0	+24.3
<=39	59.1	21.8	0.9	18.2	77.4	+47.3
<=44	65.7	15.2	1.7	17.5	83.2	+64.6
<=49	70.1	10.7	2.7	16.4	86.6	+76.8
<=54	73.8	7.1	3.8	15.3	89.1	+87.2
<=59	76.3	4.5	5.6	13.5	89.8	+93.0
<=64	78.0	2.9	7.5	11.6	89.6	+90.7
<=69	79.2	1.7	9.7	9.4	88.6	+88.0
<=74	80.1	0.7	11.8	7.3	87.4	+85.4
<=79	80.7	0.2	14.8	4.3	85.1	+81.7
<=84	80.8	0.1	16.7	2.4	83.2	+79.3
<=89	80.9	0.0	17.9	1.2	82.1	+77.8
<=94	80.9	0.0	18.6	0.6	81.4	+77.0
<=100	80.9	0.0	19.1	0.0	80.9	+76.4

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

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

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
<=4	1.7	99.7	2.1	394.5:1
<=9	5.0	99.8	6.2	594.1:1
<=14	12.0	99.9	14.8	1,415.4:1
<=19	21.1	99.8	26.0	489.8:1
<=24	31.4	99.7	38.7	357.0:1
<=29	42.1	99.7	51.9	370.4:1
<=34	50.4	99.5	62.0	189.9:1
<=39	60.0	98.5	73.1	67.2:1
<=44	67.4	97.5	81.3	39.6:1
<=49	72.9	96.3	86.7	25.8:1
<=54	77.6	95.1	91.2	19.4:1
<=59	82.0	93.1	94.4	13.5:1
<=64	85.5	91.2	96.4	10.3:1
<=69	88.9	89.1	97.9	8.1:1
<=74	91.9	87.2	99.1	6.8:1
<=79	95.5	84.5	99.8	5.5:1
<=84	97.5	82.9	99.9	4.8:1
<=89	98.8	81.8	100.0	4.5:1
<=94	99.4	81.3	100.0	4.4:1
<=100	100.0	80.9	100.0	4.2:1

Tables for

the Göttingen $2.50/day 2005 PPP Poverty Line

Figure 4 (Göttingen $2.50/day 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	100.0
5–9	100.0
10–14	100.0
15–19	99.8
20–24	99.8
25–29	99.6
30–34	98.8
35–39	98.0
40–44	95.7
45–49	91.3
50–54	81.1
55–59	71.1
60–64	67.0
65–69	54.4
70–74	41.9
75–79	34.1
80–84	17.0
85–89	13.0
90–94	5.3
95–100	0.0

Figure 7 (Göttingen \$2.50/day line): Average differences between estimated and true poverty likelihoods for households from 1,000 bootstraps of $n = 16,384$ with confidence intervals by score range, scorecard applied to the validation sample

| Score | Diff. | Difference between estimate and true value | | |
| | | Confidence interval ($\pm$ percentage points) | | |
		90-percent	95-percent	99-percent
0–4	+0.0	0.0	0.0	0.0
5–9	+0.0	0.0	0.0	0.1
10–14	−0.1	0.0	0.0	0.0
15–19	+0.3	0.3	0.4	0.5
20–24	−0.1	0.1	0.1	0.1
25–29	−0.3	0.2	0.2	0.2
30–34	−1.0	0.6	0.6	0.6
35–39	+0.9	0.8	1.0	1.3
40–44	+1.2	1.1	1.4	1.9
45–49	−1.7	1.7	2.0	2.7
50–54	−2.8	2.7	3.1	4.1
55–59	+2.0	3.7	4.3	5.4
60–64	+5.6	4.4	5.1	6.6
65–69	+4.1	4.3	5.0	6.7
70–74	−9.2	6.9	7.5	8.3
75–79	−8.4	6.3	6.7	7.5
80–84	+6.2	2.9	3.3	4.5
85–89	+7.5	2.7	3.2	3.9
90–94	−0.3	4.6	5.9	7.0
95–100	−0.4	0.6	0.7	0.9

Figure 8 (Göttingen $2.50/day line): Average differences between estimated poverty rates and true values for a group at a point in time, with confidence intervals, for 1,000 bootstraps of various sample sizes, scorecard applied to the validation sample

Sample Size n	Diff.	Difference between estimate and true value		
		Confidence interval ($\pm$ percentage points)		
		90-percent	95-percent	99-percent
1	−0.1	50.0	64.6	80.8
4	−0.2	21.2	27.8	42.2
8	−0.1	13.4	17.8	25.5
16	+0.2	9.6	11.7	16.9
32	+0.1	6.9	8.1	11.5
64	+0.1	4.9	5.8	8.2
128	+0.1	3.4	4.2	5.5
256	+0.0	2.4	2.8	3.7
512	+0.0	1.7	1.9	2.6
1,024	−0.1	1.2	1.4	1.9
2,048	−0.1	0.9	1.0	1.4
4,096	−0.1	0.6	0.7	1.0
8,192	−0.1	0.4	0.5	0.7
16,384	−0.1	0.3	0.4	0.5

Figure 11 (Göttingen $2.50/day line): Shares of households by cut-off score and targeting classification, along with "Total Accuracy" and BPAC, scorecard applied to the validation sample

Score cut-off	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
<=4	1.7	84.1	0.0	14.2	15.9	−96.0
<=9	5.0	80.8	0.0	14.2	19.2	−88.3
<=14	12.0	73.8	0.0	14.2	26.2	−72.1
<=19	21.0	64.8	0.0	14.2	35.2	−51.0
<=24	31.3	54.5	0.1	14.2	45.5	−27.0
<=29	42.0	43.8	0.1	14.1	56.1	−2.0
<=34	50.3	35.5	0.1	14.1	64.4	+17.4
<=39	59.6	26.2	0.4	13.8	73.4	+39.4
<=44	66.5	19.2	0.8	13.4	79.9	+56.1
<=49	71.6	14.2	1.3	13.0	84.6	+68.4
<=54	75.7	10.1	1.9	12.3	87.9	+78.7
<=59	78.8	7.0	3.2	11.0	89.7	+87.4
<=64	81.0	4.8	4.6	9.7	90.6	+94.0
<=69	82.7	3.1	6.2	8.0	90.7	+92.8
<=74	84.2	1.6	7.8	6.4	90.6	+90.9
<=79	85.4	0.4	10.1	4.1	89.5	+88.2
<=84	85.7	0.1	11.9	2.4	88.0	+86.2
<=89	85.8	0.0	13.1	1.1	86.9	+84.8
<=94	85.8	0.0	13.7	0.5	86.3	+84.1
<=100	85.8	0.0	14.2	0.0	85.8	+83.4

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

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

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
<=4	1.7	100.0	2.0	Only poor targeted
<=9	5.0	99.9	5.9	1,208.2:1
<=14	12.0	100.0	14.0	2,877.0:1
<=19	21.1	99.8	24.5	572.8:1
<=24	31.4	99.8	36.5	549.6:1
<=29	42.1	99.8	49.0	524.5:1
<=34	50.4	99.7	58.6	396.2:1
<=39	60.0	99.3	69.5	149.7:1
<=44	67.4	98.8	77.6	79.9:1
<=49	72.9	98.3	83.5	56.8:1
<=54	77.6	97.5	88.2	38.8:1
<=59	82.0	96.1	91.8	24.4:1
<=64	85.5	94.7	94.4	17.8:1
<=69	88.9	93.0	96.4	13.4:1
<=74	91.9	91.5	98.1	10.8:1
<=79	95.5	89.4	99.5	8.4:1
<=84	97.5	87.8	99.9	7.2:1
<=89	98.8	86.8	100.0	6.6:1
<=94	99.4	86.3	100.0	6.3:1
<=100	100.0	85.8	100.0	6.0:1

Tables for

the CSO National Poverty Line

Figure 4 (CSO 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	97.4
5–9	95.6
10–14	94.1
15–19	92.0
20–24	87.8
25–29	78.5
30–34	66.7
35–39	55.1
40–44	46.2
45–49	29.8
50–54	14.9
55–59	8.0
60–64	3.3
65–69	1.9
70–74	0.5
75–79	0.1
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Figure 7 (CSO national line): Average differences between estimated and true poverty likelihoods for households from 1,000 bootstraps of $n = 16,384$ with confidence intervals by score range, scorecard applied to the validation sample

Score	Diff.	Difference between estimate and true value		
		Confidence interval ($\pm$ percentage points)		
		90-percent	95-percent	99-percent
0–4	−2.5	1.3	1.3	1.3
5–9	+1.7	1.9	2.3	3.1
10–14	−1.4	1.3	1.4	1.9
15–19	+3.3	1.6	1.9	2.5
20–24	+1.9	1.7	1.9	2.4
25–29	+0.6	2.0	2.4	3.3
30–34	−4.1	3.2	3.4	3.9
35–39	−3.3	2.8	3.0	3.6
40–44	+7.2	2.9	3.5	4.5
45–49	+0.4	3.2	3.8	4.8
50–54	−9.4	6.3	6.6	7.5
55–59	+1.9	1.7	2.0	2.6
60–64	−0.1	1.3	1.5	1.9
65–69	−1.3	1.6	1.8	2.3
70–74	−1.1	1.2	1.3	1.6
75–79	−0.8	0.7	0.8	1.0
80–84	−0.1	0.2	0.2	0.3
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

Figure 8 (CSO national line): Average differences between estimated poverty rates and true values for a group at a point in time, with confidence intervals, for 1,000 bootstraps of various sample sizes, scorecard applied to the validation sample

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (± percentage points)		
		90-percent	95-percent	99-percent
1	−0.6	66.1	79.0	92.0
4	+0.1	33.4	41.2	57.2
8	−0.5	24.3	29.1	39.9
16	−0.0	17.9	21.6	27.0
32	−0.1	13.4	15.4	19.1
64	+0.1	9.5	11.0	14.1
128	−0.0	6.5	7.7	11.2
256	+0.0	4.8	5.7	7.5
512	+0.0	3.4	4.1	4.9
1,024	+0.0	2.3	2.8	3.5
2,048	+0.0	1.6	1.9	2.6
4,096	+0.0	1.2	1.4	1.9
8,192	+0.0	0.8	1.0	1.3
16,384	+0.0	0.6	0.7	0.9

Figure 11 (CSO national line): Shares of households by cut-off score and targeting classification, along with "Total Accuracy" and BPAC, scorecard applied to the validation sample

Score cut-off	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
<=4	1.7	52.9	0.0	45.4	47.1	−93.8
<=9	4.9	49.7	0.2	45.2	50.1	−81.9
<=14	11.5	43.1	0.5	44.9	56.4	−57.0
<=19	19.6	35.0	1.4	44.0	63.6	−25.5
<=24	28.5	26.1	2.9	42.5	71.0	+9.6
<=29	37.0	17.6	5.1	40.3	77.3	+44.9
<=34	43.0	11.6	7.4	38.0	80.9	+71.0
<=39	48.5	6.1	11.5	33.9	82.5	+79.0
<=44	51.5	3.1	15.9	29.5	81.0	+70.9
<=49	53.0	1.6	19.8	25.6	78.6	+63.7
<=54	54.0	0.6	23.6	21.8	75.8	+56.7
<=59	54.3	0.3	27.7	17.7	72.0	+49.3
<=64	54.4	0.2	31.1	14.3	68.7	+43.1
<=69	54.5	0.1	34.4	11.1	65.6	+37.1
<=74	54.6	0.0	37.4	8.0	62.6	+31.5
<=79	54.6	0.0	40.9	4.5	59.1	+25.1
<=84	54.6	0.0	42.9	2.5	57.1	+21.4
<=89	54.6	0.0	44.2	1.2	55.8	+19.0
<=94	54.6	0.0	44.8	0.6	55.2	+17.9
<=100	54.6	0.0	45.4	0.0	54.6	+16.8

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

Figure 12 (CSO national line): Share of all households who are targeted (that is, score at or below the cut-off), the share of targeted households who are poor (that is, have expenditure below the poverty line), the share of poor households who are targeted, and the number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
<=4	1.7	99.6	3.1	280.4:1
<=9	5.0	96.6	8.9	28.6:1
<=14	12.0	96.0	21.1	23.7:1
<=19	21.1	93.3	36.0	13.9:1
<=24	31.4	90.8	52.1	9.8:1
<=29	42.1	87.9	67.8	7.3:1
<=34	50.4	85.2	78.7	5.8:1
<=39	60.0	80.9	88.9	4.2:1
<=44	67.4	76.4	94.3	3.2:1
<=49	72.9	72.8	97.1	2.7:1
<=54	77.6	69.6	98.9	2.3:1
<=59	82.0	66.2	99.4	2.0:1
<=64	85.5	63.6	99.7	1.8:1
<=69	88.9	61.3	99.9	1.6:1
<=74	91.9	59.3	99.9	1.5:1
<=79	95.5	57.2	100.0	1.3:1
<=84	97.5	56.0	100.0	1.3:1
<=89	98.8	55.2	100.0	1.2:1
<=94	99.4	54.9	100.0	1.2:1
<=100	100.0	54.6	100.0	1.2:1

Tables for

the CSO Food Poverty Line

Figure 4 (CSO food 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	91.8
5–9	85.9
10–14	76.9
15–19	72.7
20–24	59.6
25–29	51.9
30–34	39.7
35–39	24.9
40–44	17.1
45–49	8.2
50–54	3.8
55–59	0.2
60–64	0.2
65–69	0.2
70–74	0.1
75–79	0.0
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Figure 7 (CSO food line): Average differences between estimated and true poverty likelihoods for households from 1,000 bootstraps of $n = 16{,}384$ with confidence intervals by score range, scorecard applied to the validation sample

| | | Difference between estimate and true value | | |
| | | Confidence interval ($\pm$ percentage points) | | |
Score	Diff.	90-percent	95-percent	99-percent
0–4	−0.0	2.9	3.5	4.8
5–9	−1.7	2.7	3.1	4.0
10–14	−8.7	5.3	5.4	5.7
15–19	−1.6	2.2	2.6	3.5
20–24	−5.6	3.9	4.1	4.5
25–29	+2.6	2.2	2.7	3.5
30–34	−2.3	2.5	3.0	4.2
35–39	−3.8	3.0	3.2	3.4
40–44	+0.7	2.3	2.7	3.7
45–49	−1.3	1.8	2.1	2.7
50–54	−0.7	1.6	2.0	2.7
55–59	+0.0	0.2	0.2	0.3
60–64	−0.4	0.6	0.7	0.8
65–69	−1.5	1.4	1.6	2.0
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

Figure 8 (CSO food line): Average differences between estimated poverty rates and true values for a group at a point in time, with confidence intervals, for 1,000 bootstraps of various sample sizes, scorecard applied to the validation sample

| Sample Size | Difference between estimate and true value | | | |
| | | Confidence interval (± percentage points) | | |
n	Diff.	90-percent	95-percent	99-percent
1	−2.7	67.3	73.9	84.4
4	−2.3	37.3	42.9	52.9
8	−2.6	27.2	32.9	41.2
16	−2.1	19.0	22.6	30.2
32	−2.5	13.2	15.7	21.6
64	−2.3	9.7	11.6	15.2
128	−2.2	6.6	7.9	10.3
256	−2.1	4.9	5.8	7.5
512	−2.2	3.5	4.2	5.3
1,024	−2.1	2.4	2.9	3.8
2,048	−2.1	1.7	2.0	2.5
4,096	−2.0	1.2	1.4	1.8
8,192	−2.0	0.9	1.1	1.4
16,384	−2.0	0.6	0.7	1.0

Figure 11 (CSO food line): Shares of households by cut-off score and targeting classification, along with "Total Accuracy" and BPAC, scorecard applied to the validation sample

Score cut-off	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
<=4	1.6	35.1	0.1	63.2	64.7	−91.1
<=9	4.5	32.2	0.5	62.8	67.3	−74.0
<=14	10.3	26.4	1.7	61.6	72.0	−39.2
<=19	16.8	19.9	4.3	59.0	75.8	+3.1
<=24	23.3	13.4	8.0	55.3	78.6	+49.1
<=29	28.8	7.9	13.3	50.0	78.7	+63.7
<=34	32.2	4.5	18.2	45.1	77.2	+50.3
<=39	34.7	2.0	25.3	38.0	72.8	+31.2
<=44	35.9	0.8	31.5	31.8	67.7	+14.2
<=49	36.4	0.3	36.4	26.9	63.3	+0.8
<=54	36.6	0.1	41.0	22.3	59.0	−11.7
<=59	36.7	0.0	45.3	18.0	54.6	−23.5
<=64	36.7	0.0	48.8	14.5	51.1	−33.1
<=69	36.7	0.0	52.2	11.1	47.8	−42.1
<=74	36.7	0.0	55.2	8.1	44.8	−50.5
<=79	36.7	0.0	58.8	4.5	41.2	−60.2
<=84	36.7	0.0	60.8	2.5	39.2	−65.8
<=89	36.7	0.0	62.1	1.2	37.9	−69.3
<=94	36.7	0.0	62.7	0.6	37.3	−71.0
<=100	36.7	0.0	63.3	0.0	36.7	−72.5

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

Figure 12 (CSO food line): Share of all households who are targeted (that is, score at or below the cut-off), the share of targeted households who are poor (that is, have expenditure below the poverty line), the share of poor households who are targeted, and the number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
<=4	1.7	91.4	4.2	10.6:1
<=9	5.0	89.3	12.2	8.3:1
<=14	12.0	86.1	28.1	6.2:1
<=19	21.1	79.8	45.8	3.9:1
<=24	31.4	74.5	63.6	2.9:1
<=29	42.1	68.3	78.4	2.2:1
<=34	50.4	63.8	87.7	1.8:1
<=39	60.0	57.9	94.7	1.4:1
<=44	67.4	53.3	97.8	1.1:1
<=49	72.9	50.0	99.3	1.0:1
<=54	77.6	47.2	99.8	0.9:1
<=59	82.0	44.7	99.9	0.8:1
<=64	85.5	42.9	99.9	0.8:1
<=69	88.9	41.3	100.0	0.7:1
<=74	91.9	39.9	100.0	0.7:1
<=79	95.5	38.4	100.0	0.6:1
<=84	97.5	37.6	100.0	0.6:1
<=89	98.8	37.1	100.0	0.6:1
<=94	99.4	36.9	100.0	0.6:1
<=100	100.0	36.7	100.0	0.6:1

Tables for

150% of the CSO National Poverty Line

Figure 4 (150% of CSO 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	100.0
5–9	99.9
10–14	98.2
15–19	97.8
20–24	96.2
25–29	94.6
30–34	89.7
35–39	85.6
40–44	74.7
45–49	58.7
50–54	36.5
55–59	27.9
60–64	19.3
65–69	13.0
70–74	5.3
75–79	4.3
80–84	1.1
85–89	0.0
90–94	0.0
95–100	0.0

Figure 7 (150% of CSO national line): Average differences between estimated and true poverty likelihoods for households from 1,000 bootstraps of n = 16,384 with confidence intervals by score range, scorecard applied to the validation sample

| | | Difference between estimate and true value | | |
| | | Confidence interval ($\pm$ percentage points) | | |
Score	Diff.	90-percent	95-percent	99-percent
0–4	+0.1	0.1	0.1	0.1
5–9	−0.1	0.1	0.1	0.1
10–14	−1.0	0.7	0.7	0.8
15–19	−0.1	0.7	0.8	1.0
20–24	−0.2	0.8	0.9	1.2
25–29	−1.2	1.0	1.1	1.3
30–34	−1.7	1.5	1.7	2.0
35–39	+2.8	1.8	2.1	2.7
40–44	+0.9	2.4	2.9	3.8
45–49	−3.3	3.2	3.8	4.7
50–54	−14.2	9.0	9.4	10.1
55–59	−0.8	3.5	4.3	5.9
60–64	+1.7	3.7	4.5	5.7
65–69	−0.5	3.0	3.6	4.6
70–74	−1.4	1.9	2.3	3.0
75–79	+1.9	1.0	1.2	1.6
80–84	+0.6	0.6	0.6	0.8
85–89	−0.0	0.0	0.1	0.1
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 8 (150% of CSO national line): Average differences between estimated poverty rates and true values for a group at a point in time, with confidence intervals, for 1,000 bootstraps of various sample sizes, scorecard applied to the validation sample

Sample Size n	Diff.	Confidence interval ($\pm$ percentage points) 90-percent	95-percent	99-percent
1	+0.1	58.0	78.8	91.6
4	−0.1	26.1	33.0	49.5
8	−0.4	18.4	23.4	35.5
16	−0.8	13.3	16.8	24.1
32	−0.8	9.7	11.7	15.5
64	−0.7	6.7	7.8	10.4
128	−0.8	4.7	5.9	7.7
256	−0.8	3.6	4.2	5.6
512	−0.8	2.4	2.9	3.5
1,024	−0.8	1.7	1.9	2.6
2,048	−0.8	1.2	1.4	1.7
4,096	−0.8	0.8	1.0	1.3
8,192	−0.8	0.6	0.7	1.0
16,384	−0.8	0.4	0.5	0.7

Figure 11 (150% of CSO national line): Shares of households by cut-off score and targeting classification, along with "Total Accuracy" and BPAC, scorecard applied to the validation sample

Score cut-off	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
<=4	1.7	67.9	0.0	30.4	32.1	−95.1
<=9	5.0	64.5	0.0	30.4	35.4	−85.5
<=14	11.9	57.7	0.1	30.4	42.2	−65.7
<=19	20.8	48.8	0.3	30.1	50.9	−39.9
<=24	30.7	38.9	0.7	29.7	60.4	−10.9
<=29	40.9	28.7	1.2	29.2	70.2	+19.3
<=34	48.4	21.1	2.0	28.5	76.9	+42.1
<=39	56.4	13.2	3.6	26.8	83.2	+67.3
<=44	61.6	8.0	5.8	24.6	86.2	+85.4
<=49	64.8	4.8	8.1	22.4	87.1	+88.4
<=54	67.0	2.6	10.6	19.8	86.8	+84.7
<=59	68.2	1.4	13.8	16.7	84.9	+80.2
<=64	68.8	0.7	16.7	13.7	82.6	+76.0
<=69	69.2	0.4	19.7	10.8	80.0	+71.7
<=74	69.4	0.1	22.5	7.9	77.3	+67.6
<=79	69.5	0.0	26.0	4.5	74.0	+62.7
<=84	69.6	0.0	28.0	2.5	72.0	+59.8
<=89	69.6	0.0	29.3	1.2	70.7	+57.9
<=94	69.6	0.0	29.9	0.6	70.1	+57.0
<=100	69.6	0.0	30.4	0.0	69.6	+56.2

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

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

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
<=4	1.7	99.6	2.4	280.4:1
<=9	5.0	99.8	7.2	415.2:1
<=14	12.0	99.3	17.1	138.2:1
<=19	21.1	98.6	29.8	70.8:1
<=24	31.4	97.8	44.1	44.2:1
<=29	42.1	97.2	58.8	34.4:1
<=34	50.4	96.1	69.6	24.5:1
<=39	60.0	93.9	81.0	15.5:1
<=44	67.4	91.4	88.5	10.6:1
<=49	72.9	88.9	93.1	8.0:1
<=54	77.6	86.3	96.3	6.3:1
<=59	82.0	83.2	98.1	5.0:1
<=64	85.5	80.5	98.9	4.1:1
<=69	88.9	77.9	99.5	3.5:1
<=74	91.9	75.5	99.8	3.1:1
<=79	95.5	72.8	100.0	2.7:1
<=84	97.5	71.3	100.0	2.5:1
<=89	98.8	70.4	100.0	2.4:1
<=94	99.4	69.9	100.0	2.3:1
<=100	100.0	69.6	100.0	2.3:1

Tables for

200% of the CSO National Poverty Line

Figure 4 (200% of CSO 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	100.0
5–9	99.9
10–14	99.3
15–19	99.3
20–24	99.1
25–29	98.6
30–34	97.1
35–39	94.2
40–44	88.8
45–49	76.3
50–54	59.9
55–59	49.5
60–64	39.6
65–69	28.5
70–74	14.4
75–79	10.3
80–84	2.9
85–89	0.4
90–94	0.0
95–100	0.0

Figure 7 (200% of CSO national line): Average differences between estimated and true poverty likelihoods for households from 1,000 bootstraps of n = 16,384 with confidence intervals by score range, scorecard applied to the validation sample

		Difference between estimate and true 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	−0.1	0.1	0.1	0.1
10–14	−0.5	0.3	0.3	0.3
15–19	+0.4	0.5	0.6	0.9
20–24	+0.9	0.6	0.7	0.9
25–29	−0.9	0.5	0.6	0.6
30–34	−0.5	0.7	0.9	1.1
35–39	+3.2	1.4	1.7	2.3
40–44	+0.5	1.6	1.9	2.5
45–49	−0.7	2.7	3.3	4.4
50–54	−15.2	9.1	9.3	9.7
55–59	+1.4	4.0	4.8	6.3
60–64	+2.4	4.4	5.1	6.6
65–69	−0.9	4.0	4.6	5.6
70–74	−10.9	7.7	8.2	9.3
75–79	−0.2	2.5	3.0	3.6
80–84	+0.1	1.4	1.7	2.1
85–89	−1.4	1.8	2.1	2.5
90–94	−5.6	5.4	6.1	7.0
95–100	+0.0	0.0	0.0	0.0

Figure 8 (200% of CSO national line): Average differences between estimated poverty rates and true values for a group at a point in time, with confidence intervals, for 1,000 bootstraps of various sample sizes, scorecard applied to the validation sample

Sample Size n	Diff.	Confidence interval (± percentage points)		
		90-percent	95-percent	99-percent
1	−0.0	50.0	77.4	91.7
4	−0.7	23.3	31.3	45.7
8	−0.4	16.8	20.3	30.7
16	−0.3	11.5	14.1	19.7
32	−0.5	8.3	10.3	13.9
64	−0.4	5.9	7.2	9.9
128	−0.4	4.2	4.9	6.3
256	−0.5	2.8	3.5	4.7
512	−0.5	2.0	2.4	3.3
1,024	−0.5	1.4	1.7	2.2
2,048	−0.5	1.0	1.3	1.5
4,096	−0.5	0.7	0.8	1.1
8,192	−0.5	0.5	0.6	0.8
16,384	−0.5	0.4	0.5	0.6

Figure 11 (200% of CSO national line): Shares of households by cut-off score and targeting classification, along with "Total Accuracy" and BPAC, scorecard applied to the validation sample

Score cut-off	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
<=4	1.7	76.3	0.0	22.0	23.7	−95.6
<=9	5.0	72.9	0.0	22.0	27.1	−87.1
<=14	12.0	66.0	0.0	22.0	34.0	−69.3
<=19	20.9	57.0	0.1	21.9	42.9	−46.1
<=24	31.0	46.9	0.3	21.7	52.8	−20.0
<=29	41.7	36.3	0.4	21.6	63.3	+7.4
<=34	49.7	28.3	0.7	21.3	71.0	+28.4
<=39	58.5	19.4	1.5	20.6	79.1	+52.1
<=44	64.8	13.1	2.5	19.5	84.3	+69.6
<=49	69.1	8.9	3.8	18.3	87.4	+82.1
<=54	72.5	5.5	5.1	16.9	89.4	+92.6
<=59	74.6	3.3	7.4	14.7	89.3	+90.5
<=64	75.8	2.1	9.7	12.4	88.2	+87.6
<=69	76.8	1.2	12.1	10.0	86.8	+84.5
<=74	77.4	0.5	14.5	7.5	85.0	+81.4
<=79	77.8	0.1	17.7	4.4	82.2	+77.3
<=84	77.9	0.0	19.6	2.4	80.3	+74.8
<=89	77.9	0.0	20.9	1.2	79.1	+73.2
<=94	78.0	0.0	21.5	0.6	78.5	+72.4
<=100	78.0	0.0	22.0	0.0	78.0	+71.7

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

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

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
<=4	1.7	99.6	2.2	280.4:1
<=9	5.0	99.8	6.4	492.5:1
<=14	12.0	99.8	15.3	413.3:1
<=19	21.1	99.5	26.9	193.8:1
<=24	31.4	99.0	39.8	96.2:1
<=29	42.1	99.0	53.4	96.3:1
<=34	50.4	98.6	63.8	70.4:1
<=39	60.0	97.5	75.1	39.8:1
<=44	67.4	96.2	83.2	25.5:1
<=49	72.9	94.8	88.6	18.3:1
<=54	77.6	93.4	93.0	14.2:1
<=59	82.0	91.0	95.7	10.1:1
<=64	85.5	88.7	97.3	7.8:1
<=69	88.9	86.4	98.5	6.4:1
<=74	91.9	84.2	99.3	5.3:1
<=79	95.5	81.5	99.8	4.4:1
<=84	97.5	79.9	99.9	4.0:1
<=89	98.8	78.9	100.0	3.7:1
<=94	99.4	78.4	100.0	3.6:1
<=100	100.0	78.0	100.0	3.5:1

Tables for

the CSO USAID "Extreme" Poverty Line

Figure 4 (CSO USAID "extreme" 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	86.8
5–9	70.7
10–14	62.0
15–19	54.9
20–24	42.6
25–29	33.8
30–34	19.1
35–39	10.4
40–44	5.7
45–49	3.3
50–54	1.0
55–59	0.0
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

Figure 7 (CSO USAID "extreme" line): Average differences between estimated and true poverty likelihoods for households from 1,000 bootstraps of n = 16,384 with confidence intervals by score range, scorecard applied to the validation sample

| Score | Diff. | Difference between estimate and true value | | |
| | | Confidence interval ($\pm$ percentage points) | | |
		90-percent	95-percent	99-percent
0–4	+15.7	5.1	6.2	7.5
5–9	–3.9	3.6	4.0	5.5
10–14	–12.0	7.2	7.5	8.1
15–19	+2.1	2.5	3.1	4.0
20–24	–5.5	3.9	4.1	4.3
25–29	+6.2	2.0	2.3	3.0
30–34	–4.4	3.3	3.6	3.9
35–39	–3.9	2.9	3.1	3.6
40–44	–2.9	2.5	2.7	3.0
45–49	–0.1	1.2	1.4	1.8
50–54	+0.2	0.5	0.5	0.7
55–59	–0.1	0.1	0.1	0.1
60–64	+0.0	0.0	0.0	0.0
65–69	–0.1	0.1	0.1	0.2
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

Figure 8 (CSO USAID "extreme" line): Average differences between estimated poverty rates and true values for a group at a point in time, with confidence intervals, for 1,000 bootstraps of various sample sizes, scorecard applied to the validation sample

Sample Size	Difference between estimate and true value			
		Confidence interval (± percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	−0.5	60.5	71.4	81.3
4	−1.0	35.9	40.7	51.5
8	−1.8	25.2	30.8	41.3
16	−2.0	19.5	23.4	31.1
32	−2.0	13.9	15.9	20.5
64	−2.0	10.0	11.7	15.6
128	−1.9	7.0	8.3	10.9
256	−1.7	5.1	6.0	7.8
512	−1.7	3.6	4.2	5.3
1,024	−1.6	2.4	2.9	3.8
2,048	−1.6	1.7	2.1	2.6
4,096	−1.6	1.3	1.5	2.0
8,192	−1.6	0.9	1.1	1.3
16,384	−1.6	0.6	0.7	0.9

Figure 11 (CSO USAID "extreme" line): Shares of households by cut-off score and targeting classification, along with "Total Accuracy" and BPAC, scorecard applied to the validation sample

Score cut-off	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
<=4	1.3	23.8	0.4	74.5	75.8	−88.2
<=9	3.7	21.4	1.3	73.6	77.3	−65.2
<=14	8.6	16.4	3.4	71.6	80.2	−17.7
<=19	13.4	11.7	7.7	67.3	80.7	+37.5
<=24	18.1	7.0	13.3	61.7	79.8	+47.0
<=29	21.2	3.8	20.9	54.1	75.3	+16.7
<=34	23.1	2.0	27.3	47.6	70.7	−9.1
<=39	24.3	0.7	35.7	39.3	63.6	−42.4
<=44	24.8	0.2	42.6	32.4	57.2	−70.0
<=49	25.0	0.1	47.9	27.1	52.0	−91.2
<=54	25.0	0.0	52.6	22.4	47.4	−109.9
<=59	25.0	0.0	56.9	18.0	43.1	−127.3
<=64	25.0	0.0	60.5	14.5	39.5	−141.4
<=69	25.0	0.0	63.8	11.1	36.2	−154.8
<=74	25.0	0.0	66.9	8.1	33.1	−167.1
<=79	25.0	0.0	70.5	4.5	29.5	−181.3
<=84	25.0	0.0	72.5	2.5	27.5	−189.4
<=89	25.0	0.0	73.8	1.2	26.2	−194.6
<=94	25.0	0.0	74.4	0.6	25.6	−197.0
<=100	25.0	0.0	75.0	0.0	25.0	−199.3

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

Figure 12 (CSO USAID "extreme" line): Share of all households who are targeted (that is, score at or below the cut-off), the share of targeted households who are poor (that is, have expenditure below the poverty line), the share of poor households who are targeted, and the number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
<=4	1.7	73.6	5.0	2.8:1
<=9	5.0	73.3	14.7	2.7:1
<=14	12.0	72.0	34.4	2.6:1
<=19	21.1	63.5	53.4	1.7:1
<=24	31.4	57.7	72.2	1.4:1
<=29	42.1	50.4	84.8	1.0:1
<=34	50.4	45.8	92.1	0.8:1
<=39	60.0	40.5	97.1	0.7:1
<=44	67.4	36.8	99.1	0.6:1
<=49	72.9	34.3	99.7	0.5:1
<=54	77.6	32.3	99.9	0.5:1
<=59	82.0	30.5	100.0	0.4:1
<=64	85.5	29.3	100.0	0.4:1
<=69	88.9	28.2	100.0	0.4:1
<=74	91.9	27.2	100.0	0.4:1
<=79	95.5	26.2	100.0	0.4:1
<=84	97.5	25.7	100.0	0.3:1
<=89	98.8	25.3	100.0	0.3:1
<=94	99.4	25.2	100.0	0.3:1
<=100	100.0	25.0	100.0	0.3:1

Tables for

the CSO $1.25/day 2005 PPP Poverty Line

Figure 4 (CSO $1.25/day 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	100.0
5–9	99.9
10–14	98.0
15–19	97.8
20–24	96.7
25–29	94.8
30–34	88.9
35–39	79.5
40–44	69.1
45–49	53.3
50–54	31.2
55–59	21.7
60–64	15.0
65–69	9.4
70–74	2.8
75–79	1.4
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Figure 7 (CSO $1.25/day line): Average differences between estimated and true poverty likelihoods for households from 1,000 bootstraps of $n = 16,384$ with confidence intervals by score range, scorecard applied to the validation sample

| | | Difference between estimate and true value | | |
| | | Confidence interval ($\pm$ percentage points) | | |
Score	Diff.	90-percent	95-percent	99-percent
0–4	+0.1	0.1	0.1	0.1
5–9	−0.1	0.1	0.1	0.1
10–14	−1.2	0.8	0.9	0.9
15–19	+0.4	0.8	0.9	1.2
20–24	+0.6	0.9	1.0	1.4
25–29	−1.1	1.0	1.0	1.3
30–34	+1.9	2.0	2.4	3.1
35–39	+0.6	1.8	2.2	3.1
40–44	+0.2	2.5	3.1	4.3
45–49	−3.5	3.4	4.1	5.2
50–54	−16.6	10.2	10.6	11.3
55–59	+4.0	2.6	3.1	4.3
60–64	+5.1	2.1	2.5	3.3
65–69	+0.0	2.5	3.1	4.0
70–74	−3.4	2.7	3.0	3.3
75–79	−0.8	1.0	1.2	1.5
80–84	−0.5	0.6	0.6	0.8
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

Figure 8 (CSO $1.25/day line): Average differences between estimated poverty rates and true values for a group at a point in time, with confidence intervals, for 1,000 bootstraps of various sample sizes, scorecard applied to the validation sample

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (± percentage points)		
		90-percent	95-percent	99-percent
1	−0.1	63.1	76.5	93.7
4	−0.1	27.3	34.6	46.3
8	−0.6	18.9	23.8	35.6
16	−0.8	14.0	17.6	25.3
32	−0.8	9.6	11.5	16.2
64	−0.6	7.2	8.6	11.3
128	−0.6	4.9	5.9	7.6
256	−0.5	3.8	4.6	5.8
512	−0.5	2.6	3.0	3.9
1,024	−0.5	1.8	2.1	2.8
2,048	−0.6	1.2	1.5	2.1
4,096	−0.5	0.9	1.1	1.4
8,192	−0.5	0.6	0.7	1.0
16,384	−0.6	0.5	0.5	0.7

Figure 11 (CSO $1.25/day line): Shares of households by cut-off score and targeting classification, along with "Total Accuracy" and BPAC, scorecard applied to the validation sample

Score cut-off	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
<=4	1.7	65.6	0.0	32.7	34.4	−95.0
<=9	5.0	62.2	0.0	32.7	37.8	−85.0
<=14	11.9	55.4	0.1	32.7	44.6	−64.5
<=19	20.7	46.5	0.3	32.4	53.2	−37.9
<=24	30.6	36.6	0.7	32.0	62.6	−7.9
<=29	40.9	26.4	1.2	31.5	72.4	+23.3
<=34	48.2	19.1	2.2	30.5	78.7	+46.6
<=39	55.7	11.5	4.3	28.5	84.2	+72.1
<=44	60.5	6.8	6.9	25.9	86.4	+89.8
<=49	63.4	3.9	9.5	23.3	86.6	+85.9
<=54	65.4	1.9	12.3	20.5	85.9	+81.8
<=59	66.2	1.1	15.8	17.0	83.2	+76.5
<=64	66.7	0.6	18.8	13.9	80.6	+72.0
<=69	66.9	0.3	21.9	10.8	77.7	+67.4
<=74	67.1	0.1	24.8	7.9	75.1	+63.1
<=79	67.2	0.0	28.3	4.5	71.7	+58.0
<=84	67.3	0.0	30.3	2.5	69.7	+55.0
<=89	67.3	0.0	31.6	1.2	68.4	+53.1
<=94	67.3	0.0	32.2	0.6	67.8	+52.1
<=100	67.3	0.0	32.7	0.0	67.3	+51.3

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

Figure 12 (CSO \$1.25/day line): Share of all households who are targeted (that is, score at or below the cut-off), the share of targeted households who are poor (that is, have expenditure below the poverty line), the share of poor households who are targeted, and the number of poor households who are successfully targeted (inclusion) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
<=4	1.7	99.6	2.5	280.4:1
<=9	5.0	99.8	7.4	415.2:1
<=14	12.0	99.5	17.6	192.5:1
<=19	21.1	98.5	30.6	64.0:1
<=24	31.4	97.7	45.2	42.4:1
<=29	42.1	96.8	60.1	30.1:1
<=34	50.4	95.3	70.8	20.1:1
<=39	60.0	92.8	82.1	12.9:1
<=44	67.4	89.9	89.3	8.9:1
<=49	72.9	87.3	93.8	6.9:1
<=54	77.6	84.6	96.8	5.5:1
<=59	82.0	81.2	98.2	4.3:1
<=64	85.5	78.6	99.1	3.7:1
<=69	88.9	75.9	99.6	3.2:1
<=74	91.9	73.6	99.8	2.8:1
<=79	95.5	71.0	100.0	2.4:1
<=84	97.5	69.5	100.0	2.3:1
<=89	98.8	68.6	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 CSO \$2.00/day 2005 PPP Poverty Line

Figure 4 (CSO $2.00/day 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	100.0
5–9	100.0
10–14	99.9
15–19	99.6
20–24	99.4
25–29	99.0
30–34	97.7
35–39	96.0
40–44	90.3
45–49	81.8
50–54	65.7
55–59	54.5
60–64	46.7
65–69	33.5
70–74	24.0
75–79	16.5
80–84	5.4
85–89	1.1
90–94	0.4
95–100	0.0

Figure 7 (CSO $2.00/day line): Average differences between estimated and true poverty likelihoods for households from 1,000 bootstraps of $n = 16,384$ with confidence intervals by score range, scorecard applied to the validation sample

| | | Difference between estimate and true value | | |
| | | Confidence interval ($\pm$ percentage points) | | |
Score	Diff.	90-percent	95-percent	99-percent
0–4	+0.1	0.1	0.1	0.1
5–9	+0.0	0.0	0.0	0.1
10–14	−0.1	0.1	0.1	0.1
15–19	+0.7	0.5	0.6	0.9
20–24	+0.2	0.3	0.4	0.5
25–29	−0.9	0.5	0.5	0.5
30–34	−1.3	0.8	0.9	0.9
35–39	+2.7	1.3	1.5	1.9
40–44	−1.4	1.4	1.7	2.1
45–49	−1.2	2.4	2.9	3.8
50–54	−8.5	5.8	6.0	6.6
55–59	−0.9	3.9	4.5	6.2
60–64	+2.4	4.4	5.2	6.6
65–69	+1.5	3.8	4.6	5.8
70–74	−5.9	5.3	5.8	7.1
75–79	+1.1	3.0	3.7	5.1
80–84	+2.1	1.5	1.8	2.3
85–89	−1.7	2.0	2.5	3.2
90–94	+0.2	0.3	0.4	0.5
95–100	+0.0	0.0	0.0	0.0

Figure 8 (CSO $2.00/day line): Average differences between estimated poverty rates and true values for a group at a point in time, with confidence intervals, for 1,000 bootstraps of various sample sizes, scorecard applied to the validation sample

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (± percentage points)		
		90-percent	95-percent	99-percent
1	−0.2	53.9	74.1	89.7
4	−0.3	23.0	29.4	44.4
8	−0.3	15.6	19.8	28.4
16	−0.3	10.2	13.4	18.5
32	−0.5	8.2	9.8	13.0
64	−0.3	5.6	6.8	8.8
128	−0.3	3.8	4.5	6.6
256	−0.3	2.7	3.3	4.2
512	−0.3	1.9	2.3	3.0
1,024	−0.4	1.4	1.6	2.1
2,048	−0.4	0.9	1.1	1.5
4,096	−0.4	0.7	0.8	1.1
8,192	−0.4	0.5	0.6	0.7
16,384	−0.4	0.3	0.4	0.6

Figure 11 (CSO \$2.00/day line): Shares of households by cut-off score and targeting classification, along with "Total Accuracy" and BPAC, scorecard applied to the validation sample

Score cut-off	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
<=4	1.7	78.5	0.0	19.8	21.5	−95.8
<=9	5.0	75.2	0.0	19.8	24.8	−87.5
<=14	12.0	68.2	0.0	19.8	31.8	−70.1
<=19	21.0	59.2	0.1	19.7	40.7	−47.6
<=24	31.2	49.0	0.2	19.6	50.8	−22.1
<=29	41.9	38.3	0.2	19.6	61.4	+4.7
<=34	50.0	30.2	0.4	19.4	69.5	+25.2
<=39	59.0	21.2	1.0	18.8	77.9	+48.4
<=44	65.6	14.6	1.7	18.1	83.7	+65.9
<=49	70.2	10.0	2.7	17.1	87.3	+78.4
<=54	73.7	6.5	3.9	15.9	89.6	+88.7
<=59	76.1	4.1	5.9	13.9	90.0	+92.7
<=64	77.6	2.6	7.9	11.9	89.6	+90.2
<=69	78.7	1.5	10.1	9.7	88.4	+87.4
<=74	79.6	0.6	12.4	7.4	87.0	+84.6
<=79	80.1	0.1	15.4	4.4	84.4	+80.8
<=84	80.2	0.0	17.4	2.4	82.6	+78.3
<=89	80.2	0.0	18.6	1.2	81.4	+76.8
<=94	80.2	0.0	19.2	0.6	80.8	+76.0
<=100	80.2	0.0	19.8	0.0	80.2	+75.3

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

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

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
<=4	1.7	99.7	2.1	394.5:1
<=9	5.0	99.8	6.3	594.1:1
<=14	12.0	99.9	14.9	1,415.4:1
<=19	21.1	99.6	26.2	260.9:1
<=24	31.4	99.4	38.9	164.7:1
<=29	42.1	99.5	52.2	188.7:1
<=34	50.4	99.3	62.4	137.5:1
<=39	60.0	98.4	73.6	61.9:1
<=44	67.4	97.4	81.8	37.9:1
<=49	72.9	96.3	87.5	26.3:1
<=54	77.6	95.0	91.9	19.0:1
<=59	82.0	92.8	94.9	13.0:1
<=64	85.5	90.8	96.8	9.9:1
<=69	88.9	88.6	98.2	7.8:1
<=74	91.9	86.5	99.2	6.4:1
<=79	95.5	83.8	99.8	5.2:1
<=84	97.5	82.2	100.0	4.6:1
<=89	98.8	81.2	100.0	4.3:1
<=94	99.4	80.7	100.0	4.2:1
<=100	100.0	80.2	100.0	4.1:1

Tables for

the CSO $2.50/day 2005 PPP Poverty Line

Figure 4 (CSO $2.50/day 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	100.0
5–9	100.0
10–14	99.9
15–19	99.8
20–24	99.8
25–29	99.4
30–34	98.7
35–39	98.3
40–44	95.1
45–49	91.0
50–54	80.4
55–59	73.5
60–64	64.4
65–69	48.2
70–74	35.7
75–79	28.1
80–84	16.0
85–89	8.6
90–94	4.1
95–100	0.3

Figure 7 (CSO \$2.50/day line): Average differences between estimated and true poverty likelihoods for households from 1,000 bootstraps of $n = 16{,}384$ with confidence intervals by score range, scorecard applied to the validation sample

Score	Diff.	Difference between estimate and true value		
		Confidence interval ($\pm$ percentage points)		
		90-percent	95-percent	99-percent
0–4	+0.0	0.0	0.0	0.0
5–9	+0.0	0.0	0.0	0.1
10–14	−0.1	0.0	0.0	0.0
15–19	+0.9	0.5	0.6	0.8
20–24	+0.3	0.3	0.4	0.4
25–29	−0.7	0.3	0.3	0.3
30–34	−1.0	0.6	0.6	0.6
35–39	+1.1	0.8	1.0	1.3
40–44	−0.4	1.1	1.3	1.6
45–49	−1.5	1.7	2.0	2.7
50–54	−3.4	2.9	3.2	4.0
55–59	+2.8	3.5	4.1	5.3
60–64	+0.3	4.2	4.8	6.3
65–69	+5.9	4.1	4.9	6.7
70–74	−16.5	10.5	10.9	12.0
75–79	−0.4	4.1	5.1	7.0
80–84	+8.9	2.3	2.6	3.4
85–89	+1.5	3.1	3.8	4.8
90–94	−1.8	4.7	5.8	7.2
95–100	−0.1	0.6	0.7	0.9

Figure 8 (CSO \$2.50/day line): Average differences between estimated poverty rates and true values for a group at a point in time, with confidence intervals, for 1,000 bootstraps of various sample sizes, scorecard applied to the validation sample

Sample Size n	Diff.	Difference between estimate and true value		
		Confidence interval (± percentage points)		
		90-percent	95-percent	99-percent
1	−0.3	50.0	68.9	89.6
4	−0.4	20.0	27.3	42.5
8	−0.2	13.9	17.8	26.3
16	+0.1	9.7	11.7	17.2
32	+0.1	7.1	8.6	12.2
64	−0.1	4.9	5.8	8.0
128	−0.0	3.3	4.1	5.1
256	−0.1	2.4	2.8	3.5
512	−0.1	1.7	2.0	2.6
1,024	−0.2	1.2	1.5	1.8
2,048	−0.2	0.9	1.0	1.3
4,096	−0.2	0.6	0.8	1.0
8,192	−0.2	0.5	0.6	0.7
16,384	−0.2	0.3	0.4	0.5

Figure 11 (CSO $2.50/day line): Shares of households by cut-off score and targeting classification, along with "Total Accuracy" and BPAC, scorecard applied to the validation sample

Score cut-off	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
<=4	1.7	83.2	0.0	15.1	16.8	−96.0
<=9	5.0	79.9	0.0	15.1	20.1	−88.1
<=14	12.0	72.9	0.0	15.1	27.1	−71.8
<=19	21.0	63.9	0.1	15.0	36.0	−50.5
<=24	31.2	53.7	0.1	14.9	46.2	−26.3
<=29	41.9	43.0	0.1	14.9	56.9	−1.0
<=34	50.2	34.7	0.2	14.9	65.1	+18.5
<=39	59.5	25.4	0.5	14.6	74.1	+40.7
<=44	66.5	18.4	0.9	14.2	80.7	+57.7
<=49	71.5	13.4	1.3	13.7	85.3	+70.0
<=54	75.5	9.4	2.1	13.0	88.5	+80.3
<=59	78.6	6.3	3.4	11.7	90.3	+89.1
<=64	80.8	4.2	4.8	10.3	91.1	+94.4
<=69	82.2	2.7	6.6	8.5	90.7	+92.2
<=74	83.7	1.2	8.3	6.8	90.5	+90.3
<=79	84.6	0.3	10.9	4.2	88.7	+87.1
<=84	84.8	0.1	12.7	2.3	87.1	+85.0
<=89	84.9	0.0	13.9	1.1	86.0	+83.6
<=94	84.9	0.0	14.5	0.5	85.5	+82.9
<=100	84.9	0.0	15.1	0.0	84.9	+82.2

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

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

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
<=4	1.7	100.0	2.0	Only poor targeted
<=9	5.0	99.9	5.9	1,208.2:1
<=14	12.0	100.0	14.1	2,877.0:1
<=19	21.1	99.6	24.7	282.8:1
<=24	31.4	99.6	36.8	227.5:1
<=29	42.1	99.7	49.4	290.7:1
<=34	50.4	99.6	59.1	243.2:1
<=39	60.0	99.2	70.1	120.9:1
<=44	67.4	98.7	78.3	77.0:1
<=49	72.9	98.2	84.2	53.6:1
<=54	77.6	97.3	88.9	36.2:1
<=59	82.0	95.9	92.6	23.4:1
<=64	85.5	94.4	95.1	17.0:1
<=69	88.9	92.5	96.8	12.4:1
<=74	91.9	91.0	98.6	10.1:1
<=79	95.5	88.6	99.6	7.7:1
<=84	97.5	86.9	99.8	6.6:1
<=89	98.8	85.9	100.0	6.1:1
<=94	99.4	85.4	100.0	5.8:1
<=100	100.0	84.9	100.0	5.6:1