Simple Poverty Scorecard® Poverty-Assessment Tool Angola

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This document in English is at `SimplePovertyScorecard.com`.

Abstract

The Simple Poverty Scorecard-brand poverty-assessment tool uses ten low-cost indicators from Angola's 2008/9 Household Living Standards Survey to estimate the likelihood that a household has consumption below a given poverty line. Field workers can collect responses in about ten minutes. The scorecard's bias and precision are reported for a range of poverty lines. The scorecard is a practical way for pro-poor programs in Angola to measure poverty rates, to track changes in poverty rates over time, and to segment clients for targeted services.

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Simple Poverty Scorecard® Poverty-Assessment Tool

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

Indicator	Response	Points	Score
1. In what province does the household live?	A. Malanje, or Benguela	0	
	B. Kwanza Norte, Huambo, or Bie	5	
	C. Lunda Sul, or Lunda Norte	9	
	D. Huila, or Luanda	10	
	E. Uige, or Kuando Kubango	12	
	F. Namibe, Bengo, or Kwanza Sul	16	
	G. Moxico, Cunene, Zaire, or Cabinda	19	
2. How many members does the household have?	A. Nine or more	0	
	B. Eight	5	
	C. Seven	9	
	D. Six	11	
	E. Five	16	
	F. Four	21	
	G. Three	26	
	H. Two	31	
	I. One	100	
3. In the last 7 days, did any household members in their main activity work for someone else (as a civil servant, for a para-statal, or in the private sector)?	A. No	0	
	B. Yes	3	
4. Does the male head/spouse know how to read and write?	A. No	0	
	B. No male head/spouse	1	
	C. Yes	2	
5. Does the female head/spouse know how to read and write?	A. No female head/spouse	0	
	B. No	2	
	C. Yes	5	
6. What is the material of the floor of the residence?	A. Dirt, or adobe	0	
	B. Cement, wood or parquet, marble, granite, brick, or other	5	
7. What is the main type of cooking fuel used by the household?	A. Firewood, cardboard/paper, or other	0	
	B. Kerosene, or charcoal	5	
	C. LPG, electricity, or does not cook	100	
8. How many beds does the household have in good working order?	A. None	0	
	B. One	3	
	C. Two or more	7	
9. Does the household have a black-and-white or color television in good working order?	A. No	0	
	B. Yes, only black-and-white	6	
	C. Yes, color (regardless of black-and-white)	9	
10. Does the household have a bicycle, motorcycle/scooter, or car in good working order?	A. No	0	
	B. Only bicycle	5	
	C. One motorcycle, but no car (regardless of bicycle)	6	
	D. Two or more motorcycles, or a car (regardless of bicycle)	13	

Score (maximum of 100):

Back-page Worksheet:
Household Membership and Employment Status

In the header, record the interview identifier, the interview date, and the client's sampling weight. Write the name and identification number of the client, of the field agent, and of the service point the client uses. Circle the province of residence for the scorecard's first indicator.

Read to the respondent: *Please tell me the names and ages of all the members of your household. A* household *is one or more people, with or without blood or marital ties, who normally live in the same residence and who work together to meet their basic needs.*

Write down the names and ages, noting the male and female heads/spouses. For each person, ask: "Was <name> present for at least 6 of the past 12 months?" If Yes, circle "Yes". If No, then ask: "Does <name> intend to return and remain with the household?" Circle "No" or "Yes". In the next column, circle "Yes" for people who were present for at least 6 months or who intend to return and remain. Count household members, and write the count by "Number of household members:" in the scorecard header. Circle the response to the scorecard's second indicator.

For each household member 14-years-old or older, ask: "In the past 7 days, did <name> work or have a job even though he/she did not work?" If Yes, then ask: "Did <name> in his/her main activity work for someone else as a civil servant, for a para-statal, or in the private sector?" Circle the response. Repeat for all household members ages 14 or older, then circle the response to the scorecard's third indicator.

Keep in mind the full definitions *household*, *work*, and *work for someone else* in the "Guidelines for the Interpretation of Scorecard Indicators".

Name	Age	Was <name> present for at least 6 of the past 12 months? If not, does <name> intend to return and remain with the household?	Is <name> a household member?	If <name> if 14-years-old or older, did he/she, in the past 7 days, work or have a job even though he/she did not work?	If "Yes", did <name> in his/her main activity work for someone else as a civil servant, for a para-statal, or in the private sector?
1.		No Yes	No Yes	No, or younger than 14 Yes	No, or does not work Yes
2.		No Yes	No Yes	No, or younger than 14 Yes	No, or does not work Yes
3.		No Yes	No Yes	No, or younger than 14 Yes	No, or does not work Yes
4.		No Yes	No Yes	No, or younger than 14 Yes	No, or does not work Yes
5.		No Yes	No Yes	No, or younger than 14 Yes	No, or does not work Yes
6.		No Yes	No Yes	No, or younger than 14 Yes	No, or does not work Yes
7.		No Yes	No Yes	No, or younger than 14 Yes	No, or does not work Yes
8.		No Yes	No Yes	No, or younger than 14 Yes	No, or does not work Yes
9.		No Yes	No Yes	No, or younger than 14 Yes	No, or does not work Yes
10.		No Yes	No Yes	No, or younger than 14 Yes	No, or does not work Yes
11.		No Yes	No Yes	No, or younger than 14 Yes	No, or does not work Yes
12.		No Yes	No Yes	No, or younger than 14 Yes	No, or does not work Yes
13.		No Yes	No Yes	No, or younger than 14 Yes	No, or does not work Yes
14.		No Yes	No Yes	No, or younger than 14 Yes	No, or does not work Yes
		Number HH members:			Someone employed?

Look-up table to convert scores to poverty likelihoods

	Poverty likelihood (%)							
	National			Poorest half	Intl. 2005 PPP			
Score	**100%**	**150%**	**200%**	**below 100% natl.**	**$1.25**	**$2.00**	**$2.50**	**$5.00**
0–4	100.0	100.0	100.0	86.5	100.0	100.0	100.0	100.0
5–9	100.0	100.0	100.0	80.9	100.0	100.0	100.0	100.0
10–14	98.9	99.4	100.0	79.1	99.3	100.0	100.0	100.0
15–19	97.9	98.8	100.0	75.7	98.8	100.0	100.0	100.0
20–24	86.1	97.8	99.9	56.0	94.1	99.9	100.0	100.0
25–29	78.8	95.7	99.0	44.1	87.7	99.0	99.5	100.0
30–34	68.0	92.2	97.8	29.1	78.7	97.0	98.4	100.0
35–39	59.3	87.7	96.0	16.5	70.1	93.8	96.6	100.0
40–44	40.0	76.1	88.2	13.0	52.0	86.4	92.7	99.8
45–49	29.5	62.1	81.6	6.2	39.8	79.7	89.8	98.4
50–54	10.0	44.5	69.9	3.5	19.1	64.1	80.4	97.4
55–59	5.6	32.3	62.5	1.2	12.4	53.8	73.4	96.9
60–64	4.6	30.9	55.9	1.1	10.4	49.8	65.9	94.8
65–69	4.4	18.5	55.9	1.1	7.5	45.0	62.5	94.8
70–74	4.4	18.5	33.4	1.1	7.5	28.1	42.1	93.9
75–79	4.4	18.5	33.4	1.1	7.5	28.1	42.1	84.7
80–84	4.4	18.5	33.4	1.1	7.5	28.1	42.1	80.9
85–89	4.4	18.5	33.4	1.1	7.5	28.1	42.1	80.9
90–94	4.4	18.5	33.4	1.1	7.5	28.1	42.1	80.9
95–100	4.4	18.5	33.4	1.1	7.5	28.1	42.1	80.9

Simple Poverty Scorecard® Poverty-Assessment Tool Angola

1. Introduction

Pro-poor programs in Angola can use the low-cost Simple Poverty Scorecard poverty-assessment tool to estimate the likelihood that a household has consumption 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 segment clients for targeted services.

The direct approach to poverty measurement via surveys is difficult and costly, asking households about a lengthy list of consumption items. As a case in point, Angola's 2008/9 Household Living Standards Survey (*Inquérito Integrado sobre o Bem Estar da População*, IBEP) ran 79 pages. Enumerators visited households four times over a 10-day period, asking hundreds of questions, many of which were repeated for each household member or which had several follow-up questions. For seven days, responding households kept a diary of their food consumption. Enumerators completed surveys at a rate of about one household per day.

In contrast, the indirect approach via the scorecard is simple, quick, and low-cost. It uses ten verifiable indicators (such as "What is the material of the floor of the residence?" and "Does the household have a black-and-white or color television in good working order?") to get a score that is highly correlated with poverty status as measured by the exhaustive IBEP survey.

The scorecard differs from "proxy-means tests" (Coady, Grosh, and Hoddinott, 2004) in that it is transparent, it is freely available,[1] 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). Poverty measures 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, $1.25/day at 2005 purchase-power parity (PPP). USAID microenterprise partners in Angola can use scoring with the $1.25/day line to report how many of their participants are "very poor".[2] Scoring can also be used to measure net movement across a poverty line over time. In all these applications, the scorecard provides a consumption-based, objective tool with known accuracy. While consumption surveys are costly even for governments, some local pro-poor organizations

[1] Angola's Simple Poverty Scorecard tool is not, however, in the public domain; copyright is held by Microfinance Risk Management, L.L.C.

[2] USAID defines a household as *very poor* if its daily per-capita consumption is less than the highest of the $1.25/day line (AOA134 in prices in Luanda in December 2008) or the line (AOA84) that marks the poorest half of people below 100% of the national poverty line. USAID (2013, p. 8) has approved scorecards that are re-branded as a PPI® for use by their microenterprise partners. "PPI" is a Registered Trademark of Innovations for Poverty Action.

may be able to implement a low-cost poverty-assessment tool to help with monitoring poverty and (if desired) segmenting clients for targeted services.

The statistical approach here aims to be understood by non-specialists. After all, if managers are to adopt the scorecard on their own and apply it to inform their decisions, then they must first trust that it works. Transparency and 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 often 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, transparent scoring approaches can be about as accurate as complex, opaque 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 the 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 2008/9 IBEP conducted by Angola's *Instituto Nacional de Estatística* (INE). 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 Angola

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-adult-equivalent consumption or per-capita consumption 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 of poverty likelihoods 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, both of which are representative of the same population) between two points in time. For households in the group(s), this estimate is the annual rate of change in the average baseline poverty likelihood versus the average follow-up likelihood.

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

This paper presents a single scorecard whose indicators and points are derived from household consumption data and Angola's national poverty line. Scores from this one scorecard are calibrated to poverty likelihoods for eight poverty lines.

The scorecard is constructed and calibrated using half of the data from the 2008/9 IBEP, and its accuracy is validated on the other half of the IBEP data.

All three scoring-based estimators (the poverty likelihood of a household, the poverty rate of a group of households at a point in time, and the average annual rate of change in the poverty rate of households over time) are *unbiased*. That is, they match the true value on average in repeated samples when constructed from (and applied to) a single, unchanging population in which the relationship between scorecard indicators and poverty is constant. Like all predictive models, the scorecard here is constructed from a single sample and so misses the mark to some unknown extent when applied (in this paper) to a validation sample. Furthermore, it is biased when applied (in practice) to a different population or when applied after 2008/9 (because the relationships between indicators and poverty change over time).[3]

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 necessarily assumes that 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.

[3] Important examples include nationally representative samples at a later point in time or sub-groups that are not nationally representative (Diamond *et al.*, 2016; Tarozzi and Deaton, 2009).

On average across 1,000 bootstraps of $n = 16{,}384$ from the validation sample, the difference between scorecard estimates of groups' poverty rates versus the true rates at a point in time for the national poverty line is –4.6 percentage points. Across all eight poverty lines, the average absolute difference is about 2.2 percentage points, and the maximum absolute difference is 4.6 percentage points. These differences reflect sampling variation, not bias; the average difference would be zero if the whole 2008/9 IBEP survey was 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 ±0.8 percentage points or less. For $n = 1{,}024$, the 90-percent intervals are ±3.2 percentage points or less.

Section 2 below describes data and poverty lines. Sections 3 and 4 describe scorecard construction and offer guidelines for use in practice. Sections 5 and 6 detail the estimation of households' poverty likelihoods and of groups' poverty rates at a point in time. Section 7 discusses estimating changes in poverty rates through time, and Section 8 covers targeting. Section 9 is a summary.

The "Guidelines for the Interpretation of Scorecard Indicators" appears as an annex after the bibliographic references. The "Guidelines" tell how to ask questions (and how to interpret responses) so as to mimic practice in the 2008/9 IBEP as closely as possible. These "Guidelines" (and the scorecard's "Back-page Worksheet") are integral parts of the Simple Poverty Scorecard tool.

2. Data and poverty lines

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

2.1 Data

The scorecard is based on data from 8,987 households in the 2008/9 IBEP conducted from May 2008 to July 2009.[4] This is Angola's most recent national consumption survey.

The 2008/9 IBEP interviewed 11,852 households, and 9,002 had complete data on consumption (INE, 2013). In this paper, an additional 15 cases in the poverty file were dropped because they could not be uniquely matched with records in other files, giving $n = 8{,}987$.[5] Nevertheless, the poverty rate here for people by 100% of the national poverty line (36.6 percent, Figure 1) matches that in INE (2013, p. 23).

For the purposes of the scorecard, the households in the 2008/9 IBEP 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

[4] INE (2013) reports two periods for field work: May 2008 to July 2009, and June 2008 to August 2009.

[5] The poverty-data file provided by INE lacked household identifiers. I derived identifiers by combining fields in the poverty file that also appear in other data files in such a way that records could be uniquely matched across files.

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

A *poverty rate* is the share of units in households in which total household consumption (divided by the number of adult equivalents or by the number of household members) is below a given poverty line. The unit of analysis is either the household itself or a person in the household. Each household member has the same poverty status (or estimated poverty likelihood) as the other household members.

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

Poverty rates are in terms of either households or people. If the program defines its *participants* as households, then the household level is relevant. The estimated household-level poverty rate is the equal-weighted average of poverty statuses (or estimated poverty likelihoods) across households with participants.[6] In the example here, this is $\frac{1 \cdot 1 + 1 \cdot 0}{1 + 1} = \frac{1}{2} = 0.5 = 50$ percent. In the "$1 \cdot 1$" term in the numerator, the first "1" is the first household's weight, and the second "1" 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).

[6] The examples here assume simple random sampling at the household level.

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 of poverty statuses for households with participants, or $\frac{3 \cdot 1 + 4 \cdot 0}{3 + 4} = \frac{3}{7} = 0.43 = 43$ percent. In the "$3 \cdot 1$" term in the numerator, the "3" is the first household's weight because it has three members, and the "1" 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, a program might count 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 $\frac{1 \cdot 1 + 2 \cdot 0}{1 + 2} = \frac{1}{3} = 0.33 = 33$ percent. The first "1" in the "$1 \cdot 1$" in the numerator is the first household's weight because it has one participant, and the second "1" 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, organizations should make explicit the unit of analysis—household, household member, or participant—and explain why that unit is relevant.

Figure 1 reports poverty lines and poverty rates for households and people in the 2008/9 IBEP for Angola as a whole and for the construction/calibration and validation sub-samples. Figure 2 reports poverty lines and poverty rates for households and people for Angola as a whole and for each of Angola's 11 poverty-line regions. Household-level poverty rates are reported because—as shown above—household-level poverty likelihoods can be straightforwardly converted into poverty rates for other units of analysis. This is also why the scorecard is constructed, calibrated, and validated with household weights. Person-level poverty rates are also included in Figures 1 and 2 because these are the rates reported by the government of Angola and because person-level rates are usually used in policy discussions.

In Figure 1, the all-Angola person-level poverty rate of 36.6 percent by 100% of the national poverty line matches that in INE (2013, p. 23).

2.2.1 Poverty lines

Angola's national poverty line (sometimes called here "100% of the national poverty line") is defined using the cost-of-basic-needs approach (Ravallion, 1998). The steps are (INE, 2013):

- Compute each household's daily aggregate nominal food and non-food consumption with data from the 2008/9 IBEP
- Use temporal price indexes to adjust each household's aggregate nominal consumption to prices in December 2008
- Define the daily standard food requirement for an adult equivalent to be 2,100 Calories
- Compute the number of adult equivalents in each household based on the age and sex of each household member (INE, 2013, p. 172).
- Find a given household's daily per-adult-equivalent consumption (and daily per-capita consumption) by dividing its consumption by the number of adult equivalents (or by the number of people)
- Develop a typical food basket based on IBEP consumption data for the poorest 70 percent of people (ranked by per-adult-equivalent consumption)
- Define the food component of the national poverty line as the cost of the food basket after scaling it to provide 2,100 Calories
- Define the non-food component of the national poverty line as the average of the average non-food consumption across 10 groups of IBEP households:
  - Those whose food consumption is within ±1 percent of the food requirement
  - Those whose food consumption is within ±2 percent of the food requirement
  - . . .
  - Those whose food consumption is within ±10 percent of the food requirement
- Define the all-Angola national poverty line as the food component plus the non-food component
- Use regional food-price indexes to adjust the all-Angola national line in prices in Luanda for cost-of-living differences across 11 regions

For Angola overall, the average national line is AOA155 per adult equivalent per day (Figure 1). This gives a household-level poverty rate of 32.1 percent and a person-level poverty rate of 36.6 percent. The national line is used to construct the scorecard.

Because local pro-poor organizations may want to use different or various poverty lines, this paper calibrates scores from its single scorecard to poverty likelihoods for eight lines:

- 100% of national
- 150% of national
- 200% of national
- Line marking the poorest half of people below 100% of the national line
- $1.25/day 2005 PPP
- $2.00/day 2005 PPP
- $2.50/day 2005 PPP
- $5.00/day 2005 PPP

150% of the national line and 200% of the national line are found by multiplying 100% of the national line by 1.5 and 2 (two).

The line that marks the poorest half of people below 100% of the national line is defined—separately in each of Angola's 11 poverty-line regions—as the median aggregate household per-adult-equivalent expenditure of people (not households nor adult equivalents) below 100% of the national line (U.S. Congress, 2004).

The $1.25/day 2005 PPP line is derived from:

- 2005 PPP exchange rate for "individual consumption expenditure by households" (World Bank, 2008): AOA70.505 per $1.00
- Average Consumer Price Index (base 2001 = 100) in calendar-year 2005 of 521.945 (Kula, 2013)
- December 2008 CPI of 793.232

Given this, the \$1.25/day 2005 PPP line for Angola in prices in Luanda in December 2008 is (Sillers, 2006):

$$(\text{2005 PPP exchange rate}) \cdot \$1.25 \cdot \left(\frac{\text{CPI}_{\text{Dec. 2008}}}{\text{CPI}_{\text{2005 average}}} \right) =$$

$$\left(\frac{\text{AOA}70.505}{\$1.00} \right) \cdot \$1.25 \cdot \left(\frac{793.232}{521.945} \right) = \text{AOA}134.$$

The other 2005 PPP lines are multiples of the \$1.25/day line.

These 2005 PPP lines apply to Angola on average. In a given poverty-line region, the \$1.25/day line is the all-Angola \$1.25/day line, multiplied the national line in that region, and divided by Angola's average national line.

For example, the \$1.25/day 2005 PPP line in urban Huambo, Blie, Benguele, and Kwanza Sul is the all-Angola \$1.25/day line of AOA134 (Figure 1), multiplied by the national line in urban Huambo, Blie, Benguele, and Kwanza Sul of AOA139 (Figure 2), and divided by the average all-Angola national line of AOA155 (Figure 1). This gives a \$1.25/day line in urban Huambo, Blie, Benguele, and Kwanza Sul of 134 x 139 ÷ 155 = AOA120 (Figure 2).

The person-level $1.25/day poverty rate reported by the World Bank's PovcalNet[7] for the 2008/9 IBEP is 43.4 percent, which is close to the 44.1 percent here in Figure 1. The $1.25/day poverty-rate estimate here is to be preferred (Schreiner, 2014) because PovcalNet does not document whether/how it:

- Adjusts for regional differences in prices
- Expresses the poverty line in prices as of December 2008
- Deflates 2005 PPP factors

USAID microenterprise partners in Angola who use the scorecard to report poverty rates to USAID should use the $1.25/day 2005 PPP line. This is because USAID defines the "very poor" as those people in households whose daily per-capita consumption is below the highest of the following poverty lines:

- The line that marks the poorest half of people below 100% of the national line (AOA84, with a person-level poverty rate of 18.3 percent, Figure 1)
- $1.25/day 2005 PPP (AOA134, with a person-level poverty rate of 44.1 percent)

[7] `iresearch.worldbank.org/PovcalNet/index.htm`, retrieved 29 March 2015.

3. Scorecard construction

For Angola, about 90 candidate indicators are initially prepared in the areas of:

- Household composition (such as the number of members)
- Education (such as the literacy of the male and female heads/spouses)
- Housing (such as the type of floor)
- Ownership of durable assets (such as beds or televisions)
- Employment (such as the number of household members who work for someone else)
- Agriculture (such as the number of household members who work in agriculture)

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 status on its own.[8]

One possible application of the scorecard is to measure *changes* in poverty through time. Thus, when selecting indicators and holding other considerations constant, preference is given to more sensitive indicators. For example, the ownership of a bed 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 100% of the 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).

[8] The uncertainty coefficient is not used as a criterion when selecting scorecard indicators; it is just a way to order the candidate indicators in Figure 3.

One of these one-indicator scorecards is then selected based on several factors (Schreiner *et al.*, 2014; Zeller, 2004). These include improvement in accuracy, likelihood of acceptance by users (determined by simplicity, cost of collection, and "face validity" in terms of experience, theory, and common sense), sensitivity to changes in poverty, variety among indicators, applicability across regions, tendency to have a slow-changing relationship with poverty over time, relevance for distinguishing among households at the poorer end of the distribution of consumption, and verifiability.

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

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

This algorithm is similar to common R^2-based stepwise least-squares regression. It differs from naïve stepwise in that the selection of indicators considers both statistical[9] and non-statistical criteria. The use of non-statistical criteria can improve

[9] The statistical criterion for selecting an indicator is not the p values of its coefficients but rather the indicator's contribution to the ranking of households by poverty status.

robustness through time and helps ensure that indicators are simple, sensible, and acceptable to users.

The single scorecard here applies to all of Angola. 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. In general, segmentation may improve the accuracy of estimates of poverty rates (Diamond *et al.*, 2016; Tarozzi and Deaton, 2009), but it may also increase the risk of overfitting (Haslett, 2012).

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 on their own and use it properly. Of course, accuracy matters, but it must be balanced with simplicity, ease-of-use, and "face validity". Programs are more likely to collect data, compute scores, and pay attention to the results if, in their view, scoring does not imply a lot of additional work and if the whole process generally seems to them to make sense.

To this end, Angola'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 "multiple-choice" indicators
- Only simple points (non-negative integers, and no arithmetic beyond addition)

A field worker using Angola's scorecard would:

- Record the interview identifier, the date of the interview, the county identifier ("AGO"), the scorecard identifier ("001"), and the sampling weight assigned by the survey design to the household of the participant
- Record the names and identifiers of the participant (who may or may not be the respondent), field agent, and relevant organizational service point
- Record the household's province of residence for the first scorecard indicator
- Complete the "Back-Page Worksheet" with each household member's:
  - Name
  - Age
  - Whether he/she has been present for at least six of the past 12 months, and, if not, whether he/she intends to return and remain with the household
  - Whether the person qualifies as a *household member*
  - If the household member is 14-years-old or older, whether he/she worked in the past seven days
  - If the member worked, whether he/she worked for someone else
- Record household size in the header next to "Number of household members:"
- Record the responses to the scorecard's second and third indicators based on the responses on the "Back-Page Worksheet"
- Read each of the remaining seven questions one-by-one from the scorecard, drawing a circle around the relevant responses and their points, and writing each point value in the far right-hand column
- Add up the points to get a total score. Cap the total score at 100
- Implement targeting policy (if any)
- Deliver the paper scorecard to a central office for data capture 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).[10] 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 are essential, and field workers should scrupulously study and follow the "Guidelines for the Interpretation of Scorecard Indicators" found at the end of this paper, as the "Guidelines"—along with the "Back-page Worksheet"—are an integral part of the Simple Poverty Scorecard tool.[11]

[10] If a program does not want field workers and respondents to know the points associated with responses, 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 (2011) argues that hiding points in Colombia (Camacho and Conover, 2011) did little to deter cheating and that, in any case, cheating by the user's central office was more damaging than cheating by field workers and respondents. Even if points are hidden, field workers and respondents can apply common sense to guess how response options are linked with poverty.

[11] The "Guidelines" here are the only ones that organizations should give to field workers. All other issues of interpretation should be left to the judgment of field workers and respondents, as this seems to be what Angola's INE does in the IBEP.

For the example of Nigeria, one study (Onwujekwe, Hanson, and Fox-Rushby, 2006) found distressingly low inter-rater and test-retest correlations for indicators as seemingly simple as whether the household owns an automobile. At the same time, Grosh and Baker (1995) suggest that gross underreporting of assets does not affect targeting. For the first stage of targeting in a conditional cash-transfer program in Mexico, Martinelli and Parker (2007, pp. 24–25) find that "underreporting [of asset ownership] is widespread but not overwhelming, except for a few goods . . . [and] overreporting is common for a few goods, 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 workers who make a home visit. This is the recommended procedure for local, pro-poor organizations who use scoring for segmenting participants for targeted services in Angola.

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

- Who will do the interviews
- 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 main goal should be to make sure that the sample is representative of a well-defined population and that the scorecard will inform an issue that matters to the organization.

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

- Employees of the 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 captured in 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. The focus, however, should not be on having a sample size large enough to achieve some arbitrary level of statistical significance but rather to get a representative sample from a well-defined population so that the analysis of the results can have a chance to meaningfully inform questions that matter to the organization.

The 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 declared their intention to apply the Simple Poverty Scorecard tool for Bangladesh (Schreiner, 2013a) with a sample of about 25,000. Their design is that all 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 Angola, scores range from 0 (most likely below a poverty line) to 100 (least likely below a poverty line).[12] While higher scores indicate less likelihood of being poor, the scores themselves have only relative units. For example, doubling the score decreases the likelihood of being below a given poverty line, but it does not cut it in half.

To get absolute units, scores 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 100% of the national line, scores of 35–39 have a poverty likelihood of 59.3 percent, and scores of 40–44 have a poverty likelihood of 40.0 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 59.3 percent for 100% of the national line but of 70.1 percent for the $1.25/day 2005 PPP line.[13]

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

[12] Scores are capped at 100. If the sum of scorecard points is more than 100, then the score is 100.

[13] Starting with Figure 4, many figures have eight versions, one for each of the eight poverty lines. To keep them straight, the figures are grouped by poverty line. Single tables pertaining to all lines are placed with the tables for 100% of the national line.

have the score and who have per-adult-equivalent consumption or per-capita consumption below a given poverty line.

For the example of 100% of the national line (Figure 5), there are 8,420 (normalized) households in the calibration sub-sample with a score of 35–39. Of these, 4,995 (normalized) are below the poverty line. The estimated poverty likelihood associated with a score of 35–39 is then 59.3 percent, as 4,995 ÷ 8,420 = 59.3 percent.

To illustrate with 100% of the national line and a score of 40–44, there are 8,501 (normalized) households in the calibration sample, of whom 3,397 (normalized) are below the line (Figure 5). The poverty likelihood for this score range is then 3,397 ÷ 8,501 = 40.0 percent.

The same method is used to calibrate scores with estimated poverty likelihoods for all eight poverty lines.[14]

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

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

select indicators and points (Fuller, 2006; Caire, 2004; Schreiner *et al.*, 2014). Of course, the scorecard here is constructed with both data and judgment. The fact that this paper acknowledges that some choices in scorecard construction—as in most statistical analysis—are informed by judgment in no way impugns the objectivity of the poverty likelihoods, as this objectivity depends on using data in score calibration, not on using data (and nothing else) in scorecard construction.

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

5.2 Accuracy of estimates of households' poverty likelihoods

As long as the relationships between indicators and poverty do not change over time, and as long as the scorecard is applied to households 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 in the population. Given the assumptions above, the scorecard also produces unbiased estimates of poverty rates at a point in time and unbiased estimates of changes in poverty rates between two points in time.[15]

Of course, the relationships between indicators and poverty do change to some unknown extent over time and also across sub-national groups in Angola's population. Thus, the scorecard will generally be biased when applied after July 2009 (the last month of fieldwork for the 2008/9 IBEP) or when applied with sub-groups that are not nationally representative.

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

- Score each household in the validation sample
- Draw a bootstrap sample *with replacement* from the validation sample
- For each score, compute the true poverty likelihood in the bootstrap sample, that is, the share of households with the score and with consumption below a poverty line
- For each score, 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

[15] 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 6 shows the average difference between estimated and true poverty likelihoods as well as confidence intervals for the differences.

For the example of 100% of the national line, the average poverty likelihood across bootstrap samples for scores of 35–39 in the validation sample is too low by 1.5 percentage points. For scores of 30–34, the estimate is too high by 0.4 percentage points.[16]

The 90-percent confidence interval for the differences for scores of 35–39 is ±2.8 percentage points (100% of the national line, Figure 6). This means that in 900 of 1,000 bootstraps, the difference between the estimate and the true value is between –4.3 and +1.3 percentage points (because –1.5 – 2.8 = –4.3, and –1.5 + 2.8 = +1.3). In 950 of 1,000 bootstraps (95 percent), the difference is –1.5 ± 3.2 percentage points, and in 990 of 1,000 bootstraps (99 percent), the difference is –1.5 ± 4.4 percentage points.

A few differences between estimated poverty likelihoods and true values in Figure 6 are large. There are differences because the validation sample is a single sample that—thanks to sampling variation—differs in distribution from the construction/calibration sub-samples and from Angola's population. For targeting, however, what matters is less the difference in all score ranges and more the differences

[16] These differences are not zero, despite the estimator's unbiasedness, because the scorecard comes from a single sample from the 2008/9 IBEP. The average difference by score range would be zero if the IBEP was repeatedly applied to samples of the population of Angola and then split into sub-samples before repeating the entire process of scorecard construction/calibration and validation.

in the score ranges just above and below the targeting cut-off. This mitigates the effects of bias and sampling variation on targeting (Friedman, 1997). Section 8 below looks at targeting accuracy in detail.

In addition, if estimates of groups' poverty rates are to be usefully accurate, then errors for individual households' poverty likelihoods must largely balance out. As discussed in the next section, this is generally the case for nationally representative samples.

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 IBEP fieldwork in July 2009. That is, the scorecard may fit the data from the 2008/9 IBEP so closely that it captures not only some real patterns but also some random patterns that, due to sampling variation, show up only in the 2008/9 IBEP but not in the overall population of Angola. Or the scorecard may be overfit in the sense that it is not robust when relationships between indicators and poverty change over time or when the scorecard is applied to samples that are not nationally representative.

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

Most errors in individual households' likelihoods do balance out in the estimates of groups' poverty rates for nationally representative samples (see the next two sections). Furthermore, at least some of the differences in change-through-time estimates may 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 across geographic regions. These factors can be addressed only by improving the availability, frequency, quantity, and quality of data from national consumption surveys (which is beyond the scope of the scorecard) or by reducing overfitting (which likely has limited returns, given the scorecard's parsimony).

6. Estimates of a 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 2015 and that they have scores of 20, 30, and 40, corresponding to poverty likelihoods of 86.1, 68.0, and 40.0 percent (100% of the national line, Figure 4). The group's estimated poverty rate is the households' average poverty likelihood of (86.1 + 68.0 + 40.0) ÷ 3 = 64.7 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 68.0 percent. This differs from the 64.7 percent found as the average of the three individual poverty likelihoods associated with each of the three scores. Unlike poverty likelihoods, scores are ordinal symbols, like letters in the alphabet or colors in the spectrum. Because scores are not cardinal numbers, they cannot meaningfully be added up or averaged across households. Only three operations are valid for scores: conversion to poverty likelihoods, analysis of distributions (Schreiner, 2012a), or comparison—if desired—with a cut-off for 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 Angola scorecard applied to 1,000 bootstraps of n = 16,384 from the validation sample and using 100% of the national poverty line, the average difference between the estimated poverty rate at a point in time versus the true rate is –4.6 percentage points (Figure 8, summarizing Figure 7 across all poverty lines). Across all eight poverty lines in the the validation sample, the maximum absolute difference is 4.6 percentage points, and the average absolute difference is about 2.2 percentage points. At least part of these differences is due to sampling variation in the division of the 2008/9 IBEP into two sub-samples.

When estimating poverty rates at a point in time, the bias reported in Figure 8 should be subtracted from the average poverty likelihood to make the estimate unbiased. For the example of Angola's scorecard and 100% of the national line, bias is –4.6 percentage points, so the unbiased estimate in the three-household example above is 64.7 – (–4.6) = 69.3 percent.

In terms of precision, the 90-percent confidence interval for a group's estimated poverty rate at a point in time with n = 16,384 is ±0.8 percentage points or better (Figure 8). This means that in 900 of 1,000 bootstraps of this size, the estimate (after subtracting off bias) is within 0.8 percentage points of the true value.

For example, suppose that the average poverty likelihood in a sample of n = 16,384 with the Angola scorecard and 100% of the national line is 64.7 percent. Then estimates in 90 percent of such samples would be expected to fall in the range of 64.7 –

(–4.6) – 0.7 = 68.6 percent to 64.7 – (–4.6) + 0.7 = 70.0 percent, with the most likely true value being the unbiased estimate in the middle of this range, that is, 64.7 – (–4.6) = 69.3 percent. This is because the original (biased) estimate is 64.7 percent, bias is –4.6 percentage points, and the 90-percent confidence interval for 100% of the national line with this sample size is ±0.7 percentage points (Figure 8).

6.2 Formula for standard errors for estimates of poverty rates

How precise are the point-in-time estimates? Because these estimates are averages, they have (in "large" samples) a Normal distribution and can be characterized by their average difference vis-à-vis true values (*bias*), together with their standard error (*precision*).

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

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

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

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

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

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

N is the population size, and

n is the sample size.

For example, Angola's 2008/9 IBEP gives a direct-measurement estimate of the household-level poverty rate for 100% of the national line in the validation sample of $\hat{p}$ = 32.2 percent (Figure 1). If this estimate came from a sample of n = 16,384 households from a population N of 3,228,482 (the number of households in Angola in 2008/9 according to the IBEP sampling weights), then the finite population correction ϕ is $\sqrt{\frac{3{,}228{,}482 - 16{,}384}{3{,}228{,}482 - 1}} = 0.9975$, which very close to $\phi = 1$. If the desired confidence level is 90-percent ($z = 1.64$), then the confidence interval $\pm c$ is

$$\pm z \cdot \sqrt{\frac{\hat{p} \cdot (1 - \hat{p})}{n}} \cdot \sqrt{\frac{N - n}{N - 1}} = \pm 1.64 \cdot \sqrt{\frac{0.322 \cdot (1 - 0.322)}{16{,}384}} \cdot \sqrt{\frac{3{,}228{,}482 - 16{,}384}{3{,}228{,}482 - 1}} = \pm 0.597$$

percentage points. (If ϕ were taken as 1, then the interval is ±0.599 percentage points.)

Scorecards, however, do not measure poverty directly, so this formula is not applicable. To derive a formula for the Angola scorecard, consider Figure 7, 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 100% of the national line, the 90-percent confidence interval is ±0.689 percentage points.[17]

Thus, the 90-percent confidence interval with n = 16,384 is ±0.689 percentage points for the Angola scorecard and ±0.597 percentage points for direct measurement. The ratio of the two intervals is 0.689 ÷ 0.597 = 1.15.

[17] Due to rounding, Figure 7 displays 0.7, not 0.689.

Now consider the same exercise, but with $n = 8{,}192$. The confidence interval under direct measurement and 100% of the national line in the validation sample is $\pm 1.64 \cdot \sqrt{\frac{0.322 \cdot (1 - 0.322)}{8{,}192}} \cdot \sqrt{\frac{3{,}228{,}482 - 8{,}192}{3{,}228{,}482 - 1}} = \pm 0.846$ percentage points. The empirical confidence interval with the Angola scorecard (Figure 7) is ± 1.025 percentage points. Thus for $n = 8{,}192$, the ratio of the two intervals is $1.025 \div 0.846 = 1.21$.

This ratio of 1.21 for $n = 8{,}192$ is close to the ratio of 1.15 for $n = 16{,}384$. Across all sample sizes of 256 or more in Figure 7, the ratios are generally close to each other, and the average ratio in the the validation sample turns out to be 1.19, implying that confidence intervals for indirect estimates of poverty rates via the Angola scorecard and 100% of the national poverty line are—for a given sample size—about 20-percent wider than confidence intervals for direct estimates via the 2008/9 IBEP. This 1.19 appears in Figure 8 as the "α factor" because if $\alpha = 1.19$, then the formula for confidence intervals $\pm c$ for the Angola 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 more than 1.00, it means that the scorecard is less precise than direct measurement. It turns out that α is more than 1.00 for seven of eight poverty lines in Figure 8.

The formula relating confidence intervals with standard errors for the scorecard can be rearranged to give a formula for determining sample size before measurement. If

$\widetilde{p}$ is the expected poverty rate before measurement, then the formula for sample size n from a population of size N that is based on the desired confidence level that corresponds to z and the desired confidence interval $\pm c$ is $n = N \cdot \left(\frac{z^2 \cdot \alpha^2 \cdot \widetilde{p} \cdot (1 - \widetilde{p})}{z^2 \cdot \alpha^2 \cdot \widetilde{p} \cdot (1 - \widetilde{p}) + c^2 \cdot (N - 1)} \right)$. If the population N is "large" relative to the sample size n, then the finite population correction factor ϕ can be taken as one (1), and the formula becomes $n = \left(\frac{\alpha \cdot z}{c} \right)^2 \cdot \widetilde{p} \cdot (1 - \widetilde{p})$.

To illustrate how to use this, suppose the population N is 3,228,482 (the number of households in Angola in 2008/9), suppose $c = 0.05920$, $z = 1.64$ (90-percent confidence), and the relevant poverty line is 100% of the national line so that the most sensible expected poverty rate $\widetilde{p}$ is Angola's overall poverty rate for that line in 2008/9 (32.1 percent at the household level, Figure 1). The α factor is 1.19 (Figure 8). Then the sample-size formula gives

$$n = 3{,}228{,}482 \cdot \left(\frac{1.64^2 \cdot 1.19^2 \cdot 0.321 \cdot (1 - 0.321)}{1.64^2 \cdot 1.19^2 \cdot 0.321 \cdot (1 - 0.321) + 0.05920^2 \cdot (3{,}228{,}482 - 1)} \right) = 237, \text{ which}$$

is not far from the sample size of 256 observed for these parameters in Figure 7 for 100% of the national line. Taking the finite population correction factor ϕ as one (1) gives the same result, as $n = \left(\frac{1.19 \cdot 1.64}{0.05920} \right)^2 \cdot 0.321 \cdot (1 - 0.321) = 237$.[18]

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

[18] Although USAID has not specified confidence levels nor intervals, IRIS Center (2007a and 2007b) says that a sample size of $n = 300$ is sufficient for USAID reporting. USAID microenterprise partners in Angola should report using the $1.25/day line. Given the α factor of 1.07 for this line (Figure 8), an expected before-measurement household-level poverty rate of 38.8 percent (the all-Angola rate in 2008/9, Figure 1), and a confidence level of 90 percent ($z = 1.64$), then $n = 300$ implies a confidence interval of $\pm 1.64 \cdot 1.07 \cdot \sqrt{\frac{0.388 \cdot (1 - 0.388)}{300}} = \pm 4.9$ percentage points.

In practice after the end of fieldwork for the IBEP in July 2009, a program would select a poverty line (say, 100% of the national line), note its participants' population size (for example, $N = 10{,}000$ participants), select a desired confidence level (say, 90 percent, or $z = 1.64$), select a desired confidence interval (say, ± 2.0 percentage points, or $c = \pm 0.02$), make an assumption about $\widetilde{p}$ (perhaps based on a previous measurement such as the household-level poverty rate for 100% of the national line for Angola of 32.1 percent in the 2008/9 IBEP in Figure 1), look up α (here, 1.19 in Figure 8), assume that the scorecard will still work in the future and for sub-groups that are not nationally representative,[19] and then compute the required sample size. In this illustration, $n = 10{,}000 \cdot \left(\frac{1.64^2 \cdot 1.19^2 \cdot 0.321 \cdot (1 - 0.321)}{1.64^2 \cdot 1.19^2 \cdot 0.321 \cdot (1 - 0.321) + 0.02^2 \cdot (10{,}000 - 1)} \right) = 1{,}719.$

[19] 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 July 2009 will resemble that in the 2008/9 IBEP with deterioration over time to the extent that the relationships between indicators and poverty status change.

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 only data from the 2008/9 IBEP, this paper cannot test estimates of change over time for Angola, and it can only suggest approximate formulas for standard errors. Nonetheless, the relevant concepts are presented here because, in practice, local pro-poor organizations in Angola 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 causes 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 beyond the scorecard.

7.2 Estimating changes in poverty rates over time

Consider the illustration begun in the previous section. On 1 January 2016, an organization samples three households who score 20, 30, and 40 and so have poverty likelihoods of 86.1, 68.0, and 40.0 percent (100% of the national line, Figure 4). Adjusting for the known bias in the validation sample of –4.6 percentage points (Figure 8), the group's baseline estimated poverty rate is the households' average poverty likelihood of [(86.1 + 68.0 + 40.0) ÷ 3] – (–4.6) = 53.1 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 2018, 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 25, 35, and 45 (poverty likelihoods of 78.8, 59.3, and 29.5 percent, 100% of the national line, Figure 4). Adjusting for the known bias, the average poverty likelihood at follow-up is [(78.8 + 59.3 + 29.5) ÷ 3] – (–4.6) = 60.5 percent, an improvement of 69.3 – 60.5 = 8.8 percentage points.[20]

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

Thus, about one in 11 participants in this hypothetical example cross the poverty line in 2016/8.[21] Among those who start below the line, about one in eight (8.8 ÷ 69.3 = 12.7 percent) on net end up above the line.[22]

7.3 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 $\pm c$ 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,[23] and α is the average (across a range of bootstrap samples of various sample sizes) of the ratio of the observed confidence interval from a scorecard and the theoretical confidence interval under direct measurement.

[21] This is a net figure; some start above the line and end below it, and vice versa.
[22] The scorecard does not reveal the reasons for this change.
[23] This means that—given precision—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.

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

This α has been measured for 11 countries (Schreiner, 2015, 2013a, 2013b, 2012b, 2010, 2009a, 2009b, 2009c, 2009d; and Chen and Schreiner, 2009). The simple average of α across countries—after averaging α across poverty lines and survey years within each country—is 1.09. This rough figure is as reasonable as any to use for Angola.

To illustrate the use of this formula to determine sample size for estimating changes in poverty rates across two independent samples, suppose the desired confidence level is 90 percent ($z = 1.64$), the desired confidence interval is ± 2 percentage points ($\pm c = \pm 0.02$), the poverty line is 100% of the national line, $\alpha = 1.09$, $\hat{p} = 0.321$ (the household-level poverty rate in 2008/9 for 100% of the national line in Figure 1), and the population N is large enough relative to the expected sample size n that the finite population correction ϕ can be taken as one. Then the baseline sample size is $n = 2 \cdot \left(\frac{1.09 \cdot 1.64}{0.02} \right)^2 \cdot 0.321 \cdot (1 - 0.321) \cdot 1 = 3{,}483$, and the follow-up sample size is also 3,483.

7.4 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:[24]

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

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:

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

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

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

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

In Peru (the only source of a data-based estimate, Schreiner, 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 100% of the national line, the sample will first be scored in 2015 and then again in 2018 ($y = 3$), and the population N is so large relative to the expected sample size n that the finite population correction ϕ can be taken as one. The pre-baseline poverty rate $p_{2008/9}$ is taken as 32.1 percent (Figure 1), and α is assumed to be 1.30. Then the baseline sample size is

$n = 2 \cdot \left(\frac{1.30 \cdot 1.64}{0.02}\right)^2 \cdot \left\{-0.02 + 0.016 \cdot 3 + 0.47 \cdot [0.321 \cdot (1 - 0.321)]\right\} \cdot 1 = 2{,}965$. The same group of 2,965 households is scored at follow-up as well.

8. Targeting

When a program 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 consumption below a poverty line). Poverty status is a fact that depends on whether consumption is below a poverty line as directly measured by a survey. In contrast, targeting status is a program's policy choice that depends on a cut-off and on an indirect estimate from a scorecard.

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 9 depicts these four possible targeting outcomes. Targeting accuracy varies by the cut-off score; a higher cut-off has better inclusion (but greater leakage), while a lower cut-off has better exclusion (but higher 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 10 shows the distribution of households by targeting outcome for Angola. For an example cut-off of 39 or less, outcomes for 100% of the national line in the validation sample are:

- Inclusion: 22.4 percent are below the line and correctly targeted
- Undercoverage: 9.9 percent are below the line and mistakenly not targeted
- Leakage: 8.6 percent are above the line and mistakenly targeted
- Exclusion: 59.2 percent are above the line and correctly not targeted

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

- Inclusion: 26.0 percent are below the line and correctly targeted
- Undercoverage: 6.3 percent are below the line and mistakenly not targeted
- Leakage: 13.5 percent are above the line and mistakenly targeted
- Exclusion: 54.2 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 10 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 the "hit rate", where total net benefit is the number of households correctly included or correctly excluded:

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

Figure 10 shows the hit rate for all cut-offs for the Angola scorecard. For 100% of the national line in the validation sample, the hit rate is greatest (81.6) for a cut-off of 39 or less, with more than four in five households in Angola correctly classified.

The hit rate weighs successful inclusion of households below the line the same as successful exclusion of households above the line. If a program values inclusion more (say, twice as much) than exclusion, then it can reflect this by setting the benefit for inclusion to 2 and the benefit for exclusion to 1. Then the chosen cut-off will maximize (2 x Households correctly included) + (1 x Households correctly excluded).[25]

[25] Figure 10 also reports BPAC, the Balanced Poverty Accuracy Criteria adopted by USAID for certifying poverty-assessment tools. IRIS Center (2005) made BPAC to consider accuracy in terms of the bias of estimated poverty rates and in terms of targeting inclusion. BPAC = (Inclusion – |Undercoverage – Leakage|) x [100 ÷ (Inclusion + Undercoverage)]. Schreiner (2014) explains why BPAC does not add any useful information over-and-above that provided by the other, more-standard measures here.

As an alternative to assigning benefits and costs to targeting outcomes and then choosing a cut-off to maximize total net benefits, a program could set a cut-off to achieve a desired poverty rate among targeted households. The third column of Figure 11 ("% targeted HHs who are poor") shows, for the Angola 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 100% of the national line, targeting households in the validation sample who score 39 or less would target 31.0 percent of all households (second column) and would be associated with a poverty rate among those targeted of 72.3 percent (third column).

Figure 11 also reports two other measures of targeting accuracy. The first is a version of coverage ("% poor HHs who are targeted"). For the example of 100% of the national line with the validation sample and a cut-off of 39 or less, 69.4 percent of all poor households are covered.

The final targeting measure in Figure 11 is the number of successfully targeted poor households for each non-poor household mistakenly targeted (right-most column). For 100% of the national line with the validation sample and a cut-off of 39 or less, covering 2.6 poor households means leaking to 1 non-poor household.

9. Conclusion

The scorecard is a low-cost way for pro-poor organizations in Angola to estimate the likelihood that a given household has consumption 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 to segment clients for targeted services.

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

The scorecard is constructed with half of the data from Angola's 2008/9 IBEP, calibrated to eight poverty lines, and tested on data from the other half of the 2008/9 IBEP. 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 change are not the same as estimates of program impact. Accuracy for targeting is also reported.

When the scorecard is applied to the the validation sample, the maximum absolute difference between estimates versus true poverty rates for groups of households at a point in time is 4.6 percentage points. The average absolute bias across the eight poverty lines is about 2.2 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 ± 0.8 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 feels 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 voluntary adoption by helping managers to understand and trust scoring and by allowing non-specialists to add up scores quickly in the field.

In summary, the scorecard is a practical, transparent, low-cost, objective way for pro-poor programs in Angola to estimate consumption-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.

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Guidelines for the Interpretation of Scorecard Indicators

The following is taken from:

Instituto Nacional de Estatística. (2008) "Manual de Instruções do Inquiridor", Luanda: Departamento de Censos e Inqueritos Especiais. ("the *Manual*").

Enumerator

According to p. 10 of the *Manual*, "You, as the enumerator, are entrusted by [your organization] with the key task of requesting, obtaining, and recording accurate data to fulfill the goals of the [scorecard]. The quality of your work is the most important determinant of the quality of the [scoring project]."

According to pp. 12–13 of the *Manual*, "Your specific tasks and functions as an enumerator are:

- Learn and follow the instructions in [these 'Guidelines'] . . .
- Do your work yourself, and do not take with you to an interview any third parties who do not have an official reason to be there
- Personally interview the household in their residence, carefully following [these 'Guidelines'], a copy of which you should always carry with you
- Keep the paper scorecards secure and on your person, both before and after the interview
- Ask the survey questions of the head of the household [or another capable adult household member] and then record the responses accurately. When asking for the household's cooperation, show your identification card from [your organization], be courteous, and respect local cultural norms
- Review the scorecard at the end of each interview before taking your leave from the household, being sure to correct any errors and to complete any omissions
- Always behave impeccably, as is fitting for the task with which you are entrusted
- Keep the data strictly confidential"

How to do the interview

According to pp. 14–18 of the *Manual*, "An *interview* gets information by questioning willing informants who answer directly and immediately. Effective interviewing is an art, not a mechanical process. It should flow like a normal conversation between two (or more) people. Follow these basic guidelines.

Access to the respondent

"Before the interview, you and the respondent do not know each other. Therefore, the first impression that you make—based on your appearance, actions, and words—is crucial for convincing the respondent to cooperate. When you meet the respondent for the first time, introduce yourself amicably, tell the respondent for whom you work, and explain the reason for the interview.

"A basic introduction might go like this: 'Good morning. I am an enumerator working with [your organization]. We are conducting a survey in order [to better understand our participants]. With your permission, I would like to ask you some questions.

"Make a positive first impression. Avoid an invitation—such as 'Are you very busy?', 'Could you give me a few minutes of your time?', or 'Could you answer a few questions for me?'—that may seem to invite rejection or that suggests an excuse to the respondent. Instead, ask for cooperation in a way that invites the respondent to accept, such as 'I would like to ask you some questions . . .'.

"Before diving in and asking any questions from the questionnaire, explain the goals of the survey clearly to the respondent.

"If someone from [your organization] is accompanying you, be sure to introduce him/her to the respondent before starting the interview. Careful explanations help to create a positive atmosphere in which the respondent is willing to cooperate.

Keep the interview private

"The interview should be done in private . . . . If other people who are not members of the household are present, then the respondent is more likely to give incorrect or dishonest answers.

"If someone does not understand or respect the interview's requirement for privacy, then be creative and courteous in finding a solution. There are many ways to do this. For example, you can ask the respondent to convince the third party to give the respondent privacy. Or you could explain the need for privacy to the interloper, asking him/her—as politely as possible—to leave until the interview is complete.

Keep responses confidential

"Before asking the first question, inform the respondent that all information collected will be kept strictly confidential. In particular, explain that the names of the respondent and other household members will never be divulged and that no information will be shared that could be linked to their particular household. Instead, the responses will go into an anonymous database. Statistical results from the database will be presented only in aggregate forms that combine all households' answers without linking any particular household to any particular response.

"Never show anyone—including other enumerators or supervisors—a completed questionnaire in the presence of the respondent or of anyone outside of project team.

Be neutral

"The questionnaire was carefully designed to avoid suggesting answers to the respondent. Thus, you must maintain a completely neutral attitude and appearance in relation to the content and answers in the interview. If you do not read each question carefully and exactly as it is written, then this neutrality could be destroyed.

"When the respondent gives a vague or imprecise answer, you should gently (and neutrally) probe for a clearer answer, saying, for example, 'Could you explain a little more?', 'I am not sure that I heard what you said, could you please repeat it?', or 'Oh, there is no rush; please take as much time as you need to think.' . . .

"Never suggest to the respondent—be it by your facial expression, body language, or tone of voice—that he/she has given an incorrect or unacceptable answer.

"Often the respondent will ask you for your opinion or point of view. You should tell the respondent that, for the survey, it is his/her opinion that matters, but that you would be happy to talk about other things for a few minutes after the interview is complete, if the respondent would like.

"If the respondent hesitates to answer a question—or if he/she refuses to answer—stay calm and politely try to win his/her cooperation. Explain again that all responses are confidential and that many other households are being interviewed.

"If the respondent continues to refuse, simply write 'Refused' next to the question and continue with the next question as you normally would. Once all the other items in the survey have been completed, go back to the missing item and politely try to get a response for it.

Leading/managing the interview

"You are the one in charge of the interview, so you must lead/manage it. If the respondent expresses doubts about your authority or your right to ask certain questions, then you should explain that you are trained for this task and that it is part of your job to ask these questions.

"If the respondent gives irrelevant answers to a question or digresses into topics that have nothing to do with the questionnaire, do not interrupt. Instead, wait for the first opportunity to present the question again, creatively and politely.

"During the interview, always build a positive and friendly atmosphere. Respondents are much more likely to make an effort to respond quickly and in good faith when they believe that you are a nice, friendly, accepting person.

Dealing with indecisive respondents

"Often, a respondent will say 'I don't know', make an evasive comment in an attempt not to give a straight answer, claim to have already answered the question, giggle or make some other non-meaningful sounds, simply repeat the question in different words, or outright refuse to answer. When this happens (and before asking the next question or repeating the current question), try to find a way to restore confidence to help the respondent to feel comfortable in answering.

The art of asking questions

"Asking questions in an interview is both a science and an art, and as such it requires practice. The following practical guidelines should help.

"*Ask the questions exactly as they are written in the survey instrument*. Read the questions off the questionnaire exactly as they are written, using the same words in the same order as they appear there.

"If you change a question's wording, then you may also inadvertently change its meaning. If the respondent does not understand a question, then repeat it again, word-for-word, slowly, and clearly. If he/she still seems confused, you may try to convey the meaning of the question in other words, always being sure to maintain its original sense. Do this in a way that does not affect the neutrality of the interview.

"*Probe when answers are incomplete or inadequate*. Sometimes, respondents will give unsatisfactory answers, whether because they are incomplete (intentionally or not) or because the respondent does not know how to answer.

"When this happens, try to obtain an appropriate response by asking some additional questions. This is called *probing*. Of course, you should continue to use neutral words and expressions to avoid suggesting that any particular answers are more appropriate or acceptable than others.

"*Do not assume that you know what an answer will be*. Regardless of the respondent's social status, socio-economic level, location of residence, or quality of housing, you should never assume that you know what the answer to any question will be, nor should you expect to receive any particular answers.

"Do not assume what any answer will be based on a respondent's culture, ethnic group, or appearance. In case of doubt—for example, when you are not sure whether you understand a response—probe until you are sure that you understand. On the other hand, the respondent may have his/her own expectations about your behavior, and he/she may fear that his/her point of view will not be understood or accepted. Just as you should avoid expressing (or acting on) any of your own preconceived notions about the respondent, you should also be sensitive to the possibility that the respondent may have preconceived notions about you and that these preconceptions may affect his/her responses. You should always try to behave in such as way as to help the respondent feel at ease.

"*Do not rush the interview*. You should ask the questions slowly and deliberately to ensure that the respondent understands what is being asked. Once you have read the question, pause; allow the respondent the time that he/she needs to think. If you try to hurry the respondent, or if you do not give him/her enough time, then it increases the risk of an evasive—and thus inaccurate—response.

"If you suspect that the respondent is answering without thinking (perhaps to get the interview over with quickly), then explain to him/her that there is no rush and that the responses are very important to [your organization].

"*Make a good impression and act professional*. Ensure that your personal appearance—both looks and actions—makes a favorable impression. Assume a neutral and professional posture, and do not appear to be embarassed or otherwise affected by any questions or responses. . . . Let your conduct—both with respondents and with any local authorities—be exemplary and respectful.

"*Wrap up the interview*. Once the interview is complete, review the questionnaire to make sure that no item has been omitted and that all responses are complete. If needed, ask any questions that are required to complete the interview.

"Before leaving the respondent's residence, thank him/her profusely for his/her cooperation, say good-bye, and take your leave."

The respondent

According to p. 29 of the *Manual*, "The preferred respondent is the head of the household. If he/she is not available, then another household member who is capable of providing data on behalf of the entire household may serve as a substitute."

Guidelines for the interpretation of specific indicators

1. In what province does the household live?
    A. Malanje, or Benguela
    B. Kwanza Norte, Huambo, or Bie
    A. Lunda Sul, or Lunda Norte
    B. Huila, or Luanda
    C. Uige, or Kuando Kubango
    D. Namibe, Bengo, or Kwanza Sul
    E. Moxico, Cunene, Zaire, or Cabinda

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

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

According to p. 7 of the *Manual*, a *household* is "one or more people, with or without blood or marital ties, who normally live in the same residence and who partly or completely work together to meet their basic needs. . . .

"Household members must have resided in the residence for at least six of the past twelve months. Nevertheless, anyone who currently lives with the household and who intends to remain permanently is considered to be a household member, even if he/she has not been with the household for at least six of the past twelve months.

According to pp. 30–32 of the *Manual*, "Do count as *household members*:

- The head of the household, even if he/she has been absent for more than six of the past twelve months
- People who have been absent for at least six of the past twelve months but who, on the day of the interview, are part of the household and intend to remain permanently with the household
- People who usually live with the household but who, on the day of the interview, are temporarily absent for due to work, holidays, illness, studies, etc., as long as they have been present for six or more of the past 12 months
- New-born babies younger than six months who are children of a household member

"Do *not* count as *household members*:

- Visitors who have stayed temporarily with the household in the past twelve months
- People who who, on the day of the interview, are absent for due to work, holidays, illness, studies, etc. and who have been absent for six or more of the past 12 months
- Lodgers who live with the household but who pay for their room and board or who eat elsewhere and who pay for their living quarters (even if the lodger is a blood or marital relative of a household members). Renters are considered to be separate households
- Employees of the household
- Children or other relatives of lodgers or of employees of the household
- People who are deceased as of the day of the interview

"Paying lodgers and domestic servants are not members of the household.

"In cases of polygamy, each woman and her children are considered to be separate households as long as each woman is separately responsible for the basic needs of herself and of her own children.

"Any new-born child of [a household member] is counted as a household member, even if the new-born is younger than six months.

"For example, suppose a woman from the interviewed household left four months ago to give birth in the residence of her parents. At the time of the interview, the new-born is four-months-old and has been with the mother in the home of her parents. The mother is a member of the interviewed household because she has been absent for less than six of the past twelve months. Although her new-born has been absent from the household being interviewed for all of the past twelve months, he/she is still counted as a household member because he/she is the new-born child of a household member."

3. In the last 7 days, did any household members in their main activity work for someone else (as a civil servant, for a para-statal, or in the private sector)?
    A. No
    B. Yes

According to pp. 62–63 of the *Manual*, *work* "encompasses all economic activities that are remunerated (in-cash or in-kind). This conception of *work* does not include unremunerated work, such as housewives who perform domestic chores and members performing obligatory military service.

People who are currently employed, but who did not do work in the past seven days—for example, due to illness, holidays, or strike—are still counted as *working*.

Likewise, people who work in a family business but who receive no explicit remuneration are also counted as *working*."

According to p. 64 of the *Manual*, someone *works for someone else* if he/she receives remuneration—in-cash or in-kind—from an employer, be it the government, a para-statal enterprise, or a private firm.

4. Does the male head/spouse know how to read and write?
    A. No
    B. No male head/spouse
    C. Yes

According to p. 39 of the *Manual*, "To clarify the question as presented above, you as the enumerator can note to the respondent that the ability to read and write refers to 'a simple phrase in any language'."

According to p. 7 of the *Manual*, "The determination of who is the head of the household shall be made by the members of the household themselves. That is, the head of the household is whoever the members of the household say he/she is. The head may be a male or a female. In case of doubt or disagreement among household members, take the head to be the person who provides the greatest financial support to the household or—as a last resort—the oldest household member."

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

- The household head, if the head is male
- The spouse/conjugal partner of the household head, if the head is female
- Non-existent, if the head is female and if she does not have a spouse/conjugal partner who is also a member of the household

5. Does the female head/spouse know how to read and write?
    A. No female head/spouse
    B. No
    C. Yes

According to p. 39 of the *Manual*, "To clarify the question as presented above, you as the enumerator can note to the respondent that the ability to read and write refers to 'a simple phrase in any language'."

According to p. 7 of the *Manual*, "The determination of who is the head of the household shall be made by the members of the household themselves. That is, the head of the household is whoever the members of the household say he/she is. The head may be a male or a female. In case of doubt or disagreement among household members, take the head to be the person who provides the greatest financial support to the household or—as a last resort—the oldest household member."

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

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

6. What is the material of the floor of the residence?
    A. Dirt, or adobe
    B. Cement, wood or parquet, marble, granite, brick, or other

According to pp. 96–97 of the *Manual*, "If the floor is made up of more than one material, then record the main one.

"Even though you as the enumerator will, in general, accept the respondent's response, when it is possible, try to check what the respondent says against what you yourself can see of the floor." Even though you will generally check the response, you should always read the question to the respondent and wait to hear how he/she responds before doing any check of your own.

7. What is the main type of cooking fuel used by the household?
    A. Firewood, cardboard/paper, or other
    B. Kerosene, or charcoal
    C. LPG, electricity, or does not cook

According to p. 102 of the *Manual*, "Record a single response for the main type of fuel used for cooking. Mark the type of cooking fuel that is used for the greatest part of the year."

8. How many beds does the household have in good working order?
    A. None
    B. One
    C. Two or more

According to p. 201 of the *Manual*, "When possible, the enumerator should check the accuracy of the responses offered by the respondent. Of course, this should be done without violating the respondent's privacy."

9. Does the household have a black-and-white or color television in good working order?
    A. No
    B. Yes, only black-and-white
    C. Yes, color (regardless of black-and-white)

According to p. 201 of the *Manual*, "When possible, the enumerator should check the accuracy of the responses offered by the respondent. Of course, this should be done without violating the respondent's privacy."

10. Does the household have a bicycle, motorcycle/scooter, or car in good working order?
    A. No
    B. Only bicycle
    C. One motorcycle, but no car (regardless of bicycle)
    D. Two or more motorcycles, or a car (regardless of bicycle)

According to p. 201 of the *Manual*, "When possible, the enumerator should check the accuracy of the responses offered by the respondent. Of course, this should be done without violating the respondent's privacy."

Figure 1: Sample sizes, poverty lines, and poverty rates (for households and people) for all of Angola and by sub-sample

	Line or	Households or		% with consumption below a poverty line							
				National			Poorest half	Intl. 2005 PPP			
Sample	**Rate**	**people**	**Households surveyed**	**100%**	**150%**	**200%**	**below 100% natl.**	**$1.25**	**$2.00**	**$2.50**	**$5.00**
All Angola	Line			155	233	310	84	134	214	268	536
	Rate	Households	8.987	32,1	52,2	65,7	14,8	38,8	62,3	71,3	92,1
	Rate	People		36,6	57,5	71,2	18,3	44,1	68,1	76,8	94,7
Construction and calibration (Selecting indicators and weights, and associating scores with likelihoods)											
	Rate	Households	4.501	32,1	52,4	65,7	14,9	38,6	62,2	71,5	91,8
	Rate	People		36,5	57,7	71,2	18,7	44,0	67,9	77,0	94,6
Validation (Measuring accuracy)											
	Rate	Households	4.486	32,2	52,1	65,6	14,7	39,0	62,4	71,1	92,3
	Rate	People		36,8	57,3	71,2	18,0	44,3	68,2	76,5	94,8

Source: 2008/9 *Inquérito Integrado sobre o Bem Estar da População*.

National poverty lines are in AOA per adult equivalent per day.

International 2005 PPP lines and the line marking the poorest half below 100% of the national line are in AOA per person per day.

AOA are in prices in Luanda in December 2008.

See note on sample size in text.

Figure 2: Sample sizes, poverty lines, and poverty rates (for households and people) for Angola as a whole and by poverty-line region

Poverty-line region	Line or Rate	Households or people	n	Poverty line: National 100%	National 150%	National 200%	Poorest half below 100% natl.	Intl. 2005 PPP $1.25	Intl. 2005 PPP $2.00	Intl. 2005 PPP $2.50	Intl. 2005 PPP $5.00
All Angola	Line			155	233	310	84	134	214	268	536
	Rate	Households	8,987	32.1	52.2	65.7	14.8	38.8	62.3	71.3	92.1
	Rate	People		36.6	57.5	71.2	18.3	44.1	68.1	76.8	94.7
Luanda											
	Line			178	267	356	110	154	246	308	615
	Rate	Households	1,144	6.7	20.6	38.8	3.1	11.4	33.7	48.4	85.3
	Rate	People		8.6	25.9	46.6	4.3	14.6	40.2	56.0	90.0
Huambo, Bie, Benguela, Kwanza Sul: Urban											
	Line			139	208	277	75	120	192	240	479
	Rate	Households	795	22.4	41.7	55.2	11.1	27.5	53.6	61.2	87.4
	Rate	People		29.1	50.1	64.1	14.5	34.4	62.6	69.7	91.3
Huambo, Bie, Benguela, Kwanza Sul: Rural											
	Line			121	182	243	51	105	168	210	419
	Rate	Households	923	62.2	82.6	90.2	28.8	68.8	87.6	92.0	98.7
	Rate	People		69.4	87.5	93.6	34.8	77.0	92.3	95.3	99.2
Lunda Norte, Lunda Sul, Moxico, Kuando Kunbango: Urban											
	Line			213	319	426	121	184	294	367	735
	Rate	Households	707	32.1	57.7	73.4	15.6	44.4	70.2	79.6	96.6
	Rate	People		36.5	63.7	80.2	18.3	49.8	78.0	86.1	99.0
Lunda Norte, Lunda Sul, Moxico, Kuando Kunbango: Rural											
	Line			183	274	366	83	158	253	316	632
	Rate	Households	898	47.2	73.2	83.8	20.5	56.9	81.9	88.5	98.7
	Rate	People		58.3	82.2	89.9	29.1	68.6	89.2	93.6	99.4

Source: 2008/9 *Inquérito Integrado sobre o Bem Estar da População*.

Figure 2 (cont.): Sample sizes, poverty lines, and poverty rates (for households and people) for Angola as a whole and by poverty-line region

Poverty-line region	Line or Rate	Households or people	n	Poverty line: National 100%	National 150%	National 200%	Poorest half below 100% natl.	Intl. 2005 PPP $1.25	Intl. 2005 PPP $2.00	Intl. 2005 PPP $2.50	Intl. 2005 PPP $5.00
Bengo, Malanje, Kwanza Norte: Urban											
	Line			177	265	353	97	152	244	305	610
	Rate	Households	787	27.5	54.9	66.8	13.6	37.7	64.1	72.8	90.5
	Rate	People		34.4	64.0	74.7	17.2	45.2	73.3	81.0	94.6
Bengo, Malanje, Kwanza Norte: Rural											
	Line			170	255	340	81	147	235	294	588
	Rate	Households	811	49.8	72.2	84.5	22.6	56.1	79.6	86.6	97.9
	Rate	People		64.0	83.2	91.9	32.0	70.6	89.6	93.6	99.3
Namibe, Cunene, Huila: Urban											
	Line			131	196	262	66	113	181	226	452
	Rate	Households	776	27.7	43.6	58.8	12.6	31.0	56.3	64.3	86.9
	Rate	People		29.8	48.9	65.1	14.9	34.0	62.7	71.4	92.0
Namibe, Cunene, Huila: Rural											
	Line			113	170	227	61	98	157	196	392
	Rate	Households	606	40.2	67.6	79.1	18.6	50.9	77.1	84.3	96.3
	Rate	People		48.0	75.6	85.5	24.0	59.1	84.3	90.2	97.6
Cabinda, Uige, Zaire: Urban											
	Line			169	253	337	99	146	233	291	583
	Rate	Households	643	13.8	34.0	55.2	7.0	16.9	49.1	60.2	87.2
	Rate	People		19.2	43.2	63.9	9.6	23.6	58.5	69.8	93.1
Cabinda, Uige, Zaire: Rural											
	Line			170	255	340	89	147	235	294	588
	Rate	Households	897	33.3	60.3	73.2	14.7	43.5	69.5	78.4	95.5
	Rate	People		42.3	71.0	81.9	21.1	54.8	79.1	86.1	98.0

Source: 2008/9 *Inquérito Integrado sobre o Bem Estar da População*.

Figure 3: Poverty indicators, ordered by uncertainty coefficient

Uncertainty coefficient	Indicator (Answers ordered starting with those most strongly linked with higher poverty likelihoods)
765	In what province does the household live? (Malanje, or Benguela; Kwanza Norte, Huambo, or Bie; Lunda Sul, or Lunda Norte; Huila, or Luanda; Uige, or Kuando Kubango; Namibe, Bengo, or Kwanza Sul; Moxico, Cunene, Zaire, or Cabinda)
765	Does the household have a bicycle, motorcycle/scooter, or car in good working order? (No; Only bicycle; One motorcycle, but no car (regardless of bicycle); Two or more motorcycles, or a car (regardless of bicycle))
739	Does the household have a motorcycle/scooter in good working order? (None; One; Two or more)
610	How many members does the household have? (Nine or more; Eight; Seven; Six; Five; Four; Three; Two; One)
610	What is the highest grade that the female head/spouse has completed? (None; First grade, primary school, PUNIV, or other; Second grade, primary school, PUNIV, or other; Third grade, primary school, PUNIV, or other; Fourth grade, primary school, PUNIV, or other; Fifth grade, primary school, PUNIV, or other; No female head/spouse; Sixth grade (primary school, PUNIV, or other) or seventh grade, middle school; Grade 8 or 9 of secondary school, grade 10, 11 or 12 of secondary school (education, finance, business, health, or PUNIV), or university)
607	How many household members are 16-years-old or younger? (Five or more; Four; Three Two; One; None)
588	How many household members are 18-years-old or younger? (Six or more; Five; Four; Three Two; One; None)
583	How many household members are 17-years-old or younger? (Six or more; Five; Four; Three Two; One; None)
571	How many household members are 15-years-old or younger? (Five or more; Four; Three Two; One; None)
546	Does the household have a black-and-white or color television in good working order? (No; Yes, only black-and-white; Yes, color (regardless of black-and-white))
545	What is the main type of cooking fuel used by the household? (Firewood, cardboard/paper, or other; Kerosene, or charcoal; LPG, electricity, or does not cook)

Figure 3 (cont.): Poverty indicators, ordered by uncertainty coefficient

Uncertainty coefficient	Indicator (Answers ordered starting with those most strongly linked with higher poverty likelihoods)
37	How many household members are 14-years-old or younger? (Five or more; Four; Three Two; One; None)
535	For whom did the male head/spouse work in his main activity in the past 7 days? (Self-employed without employees; No male head/spouse; Did not work, domestic servant, or in a cooperative; Civil servant; In a para-statal, as a private-sector employee, or self-employed with employees)
533	In the past 7 days, how many household members in their main activity worked as something other than skilled agricultural or fishery workers or in elementary occupations? (None; One; Two or more)
531	How many household members are 13-years-old or younger? (Five or more; Four; Three Two; One; None)
510	How many beds does the household have in good working order? (None; One; Two or more)
504	What is the highest grade that the male head/spouse has completed? (None; First grade, primary school, PUNIV, or other; Second grade, primary school, PUNIV, or other; Third grade, primary school, PUNIV, or other; Fourth grade, primary school, PUNIV, or other; Fifth grade, primary school, PUNIV, or other; No male head/spouse; Sixth grade (primary school, PUNIV, or other); Seventh grade, middle school; Eighth grade, middle school; Ninth grade of middle school, or tenth grade of secondary school (education, finance, business, health, or PUNIV); Eleventh or twelfth grade of secondary school (education, finance, business, health, or PUNIV), or university)
497	How many household members are 12-years-old or younger? (Five or more; Four; Three Two; One; None)
493	In the past 7 days, how many household members in their main activity worked as skilled agricultural or fishery workers or in elementary occupations? (Two or more; One; None)
490	What is the main type of lighting used by the household? (Flaming torch, or no artificial lighting; Wall-mouted candle; or other; Candles; Public grid, or generator)
484	What is the material of the floor of the residence? (Dirt, or adobe; Cement, wood or parquet, marble, granite, brick, or other)

Figure 3 (cont.): Poverty indicators, ordered by uncertainty coefficient

Uncertainty coefficient	Indicator (Answers ordered starting with those most strongly linked with higher poverty likelihoods)
448	What was the occupation of male head/spouse in his main activity in the past 7 days? (Skilled agricultural and fishery workers; Elementary occupations; Does not work; No male head/spouse; Craft and related trades workers, service workers and shop and market sales people, plant and machinery operators and assemblers, armed forces, executives and legislators in the government, and upper-level management in the public and private sectors; professionals, or clerks)
446	How many chairs does the household have in good working order? (None; One; Two; Three; Four; Five or more)
424	How many household members are 11-years-old or younger? (Five or more; Four; Three Two; One; None)
421	Does the household have a color television or a black-and-white television in good working order? (No; Sim)
417	Are all household members ages 6 to 12 attending school now? (No; Yes; No one ages 6 to 12)
417	In the past 7 days, how many household members in their main activity worked as skilled agricultural or fishery workers? (Two or more; One; None)
417	Are all household members ages 6 to 11 attending school now? (No; Yes; No one ages 6 to 11)
402	Does the household have a wall/table clock in good working order? (No; Yes)
401	What is the tenancy status of the household in its residence? (Self-built; Squatting; Usufruct from the government or others; Owned free-and-clear, or owned with a mortgage; Rent)
392	Are all household members ages 6 to 14 attending school now? (No; Yes; No one ages 6 to 14)
392	Are all household members ages 6 to 16 attending school now? (No; Yes; No one ages 6 to 16)
379	Are all household members ages 6 to 13 attending school now? (No; Yes; No one ages 6 to 13)
378	Are all household members ages 6 to 15 attending school now? (No; Yes; No one ages 6 to 15)
364	Are all household members ages 6 to 17 attending school now? (No; Yes; No one ages 6 to 17)
338	Does the household have any telephones (landline or cellular) in good working order? (No; Yes)
305	What is the material of the walls of the residence? (Wattle and daub, bamboo, or other; Adobe; Cement, brick, wood and metal sheets, or concrete blocks)
296	Does the household have a color television in good working order? (No; Yes)

Figure 3 (cont.): Poverty indicators, ordered by uncertainty coefficient

Uncertainty coefficient	Indicator (Answers ordered starting with those most strongly linked with higher poverty likelihoods)
294	Does the household have a black-and-white television in good working order? (No; Yes)
294	Can the female head/spouse speak Portuguese as his mother tongue or as a second language? (No; Yes, but not as the mother tongue; No female head/spouse; Yes, as the mother tongue)
289	Does the male head/spouse know how to read and write? (No; No male head/spouse; Yes)
287	Does the female head/spouse know how to read and write? (No female head/spouse; No; Yes)
286	Does the household have a table in good working order? (No; Yes)
285	Does the household have a fan in good working order? (No; Yes)
278	Are all household members ages 6 to 18 attending school now? (No; Yes; No one ages 6 to 18)
274	How many household members are 6-years-old or younger? (Three or more; Two; One; None)
271	What was the occupation of female head/spouse in her main activity in the past 7 days? (Skilled agricultural and fishery workers; Elementary occupations; Does not work; No female head/spouse; Craft and related trades workers, service workers and shop and market sales people, plant and machinery operators and assemblers, armed forces, executives and legislators in the government, and upper-level management in the public and private sectors; professionals, or clerks)
268	In the last 7 days, how many household members in their main activity worked in self-employment (with or without employees)? (Two or more; One; None)
258	Where does the head of the household usually defecate (go number two)? (Bush, or out in the open; Dry latrine/with pour flush, open trench, river/sea/lake, or other; septic tank/seepage pit; Sewer)
236	Does the household have a DVD player in good working order? (No; Yes)
220	In what type of residence does the household live? (Hut/shack or cabin; Traditional house; Out-building; Conventional detached house; Villa/detached house, apartment, or other)
210	In the past 7 days, how many household members in their main activity worked as professionals, technicians and associate professionals, clerks, executives or legislators in the government, upper-level management in the public and private sectors or in the armed forces? (None; One or more)

Figure 3 (cont.): Poverty indicators, ordered by uncertainty coefficient

Uncertainty coefficient	Indicator (Answers ordered starting with those most strongly linked with higher poverty likelihoods)
199	What is the material of the walls of the residence? (Wattle and daub, bamboo, or other; Adobe; Cement, brick, or wood and metal sheets; Concrete blocks)
195	Can the female head/spouse speak Portuguese? (No; Yes; No female head/spouse)
178	In the last 7 days, how many household members in their main activity worked, did not work even though they are employed, or helped a family member without pay? (Three or more; Two; One; None)
176	What is the marital status of the female head/spouse? (Married; Widow; Cohabiting/customary union; Divorced, or separated; Single, never-married; No female head/spouse)
174	Can the male head/spouse speak Portuguese as his mother tongue or as a second language? (No; Yes, but not as the mother tongue; No male head/spouse; Yes, as the mother tongue)
173	Does the household have a satellite dish in good working order? (No; Yes)
170	Is the mother tongue of the female head/spouse Portuguese? (No; No female head/spouse; Yes)
162	Does the household have a refrigerator or freezer in good working order? (No; Yes)
162	For whom did the female head/spouse work in her main activity in the past 7 days? (Self-employed without employees; As a private-sector employee; Does not work, domestic servant, or in a cooperative; No female head/spouse; As civil servant, in a para-statal, or self-employed with employees)
156	In the last 7 days, did any household members in their main activity work for someone else (as a civil servant, for a para-statal, or in the private sector)? (No; Yes)
139	In the past 7 days, how many household members in their main activity worked in elementary occupations? (Two or more; One; None)
138	Last night, how many household members slept under a mosquito net? (None; One or more)
137	Does the household have a gas or kerosene stove in good working order? (No; Yes)
117	Is the mother tongue of the male head/spouse Portuguese? (No; No male head/spouse; Yes)
117	How many rooms does the household occupy in its residence? (None; One; Two; Three; Four; Five or more)
108	Does the household have a radio/radio-cassette in good working order? (No; Yes)
104	Does the household have an electric or fire-heated iron in good working order? (No; Yes)

Figure 3 (cont.): Poverty indicators, ordered by uncertainty coefficient

Uncertainty coefficient	Indicator (Answers ordered starting with those most strongly linked with higher poverty likelihoods)
90	Can the male head/spouse speak Portuguese? (No; Yes; No male head/spouse)
84	Does the household have a microwave in good working order? (No; Yes)
78	Does the household have an electric grill in good working order? (No; Yes)
70	In the last 7 days, was the main activity of the male head/spouse or the female head/spouse self-employment without employees in something other than agriculture? (No; Yes)
53	What is the marital status of the male head/spouse? (Married; Cohabiting/customary union; No male head/spouse; Divorced, separated, or widower; Single, never-married)
48	How many rooms in the residence are used only as bedrooms? (None, or one; Two; Three or more)
44	In the past 7 days, did the female head/spouse in her main activity work, not work even though he is employed, or help a family member without pay? (Yes; No; No female head/spouse)
39	Does the household have a washing machine in good working order? (No; Yes)
28	Does the household have a bicycle in good working order? (No; Yes)
27	In the past 7 days, did the male head/spouse in his main activity work, not work even though he is employed, or help a family member without pay? (Yes; No; No male head/spouse)
27	Does the household have a car in good working order? (No; Yes)
24	What is the structure of household headship? (Both male and female heads/spouses; Female head/spouse only; Male head/spouse only)
16	Does the household have a personal computer in good working order? (No; Yes)
2	Does the household have a mosquito net (treated or untreated) in good working order? (No; Yes)
0	Does the household have a generator in good working order? (No; Yes)

Source: 2008/9 *Inquérito Integrado sobre o Bem Estar da População*

Tables for
100% of the National Poverty Line

(and Tables Pertaining to All Eight Poverty Lines)

Figure 4 (100% of the 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	100.0
10–14	98.9
15–19	97.9
20–24	86.1
25–29	78.8
30–34	68.0
35–39	59.3
40–44	40.0
45–49	29.5
50–54	10.0
55–59	5.6
60–64	4.6
65–69	4.4
70–74	4.4
75–79	4.4
80–84	4.4
85–89	4.4
90–94	4.4
95–100	4.4

Figure 5 (100% of the national line): Derivation of estimated poverty likelihoods associated with scores

Score	Households in range and < poverty line		All households in range		Poverty likelihood (%)
0–4	32	÷	32	=	100.0
5–9	283	÷	283	=	100.0
10–14	1,377	÷	1,392	=	98.9
15–19	1,979	÷	2,022	=	97.9
20–24	4,522	÷	5,249	=	86.1
25–29	4,800	÷	6,088	=	78.8
30–34	5,093	÷	7,489	=	68.0
35–39	4,995	÷	8,420	=	59.3
40–44	3,397	÷	8,501	=	40.0
45–49	1,983	÷	6,717	=	29.5
50–54	560	÷	5,604	=	10.0
55–59	190	÷	3,381	=	5.6
60–64	118	÷	2,538	=	4.6
65–69	57	÷	1,304	=	4.4
70–74	20	÷	469	=	4.4
75–79	31	÷	707	=	4.4
80–84	4	÷	97	=	4.4
85–89	5	÷	110	=	4.4
90–94	1	÷	23	=	4.4
95–100	1,732	÷	39,574	=	4.4

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

Figure 6 (100% of the national line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample (n = 16,384) with confidence intervals, 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	0.0	0,0	0,0	0,0
5–9	+56.1	14,5	16,6	21,8
10–14	+20.7	5,4	6,4	9,0
15–19	+0.6	1,1	1,3	1,7
20–24	–4.7	3,2	3,4	3,6
25–29	–0.7	2,4	3,0	4,2
30–34	+0.4	3,3	4,1	5,2
35–39	–1.5	2,8	3,2	4,4
40–44	–29.0	15,8	16,0	16,8
45–49	–7.9	5,8	6,1	6,7
50–54	+5.6	1,0	1,2	1,6
55–59	–12.3	7,9	8,3	9,0
60–64	–7.8	5,9	6,2	7,1
65–69	+2.6	1,2	1,5	2,0
70–74	+4.3	0,1	0,2	0,2
75–79	+4.4	0,0	0,0	0,0
80–84	+4.4	0,0	0,0	0,0
85–89	+4.4	0,0	0,0	0,0
90–94	+4.4	0,0	0,0	0,0
95–100	–3.0	1,8	1,9	2,0

Figure 7 (100% of the national line): Differences and confidence intervals for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 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	–2.0	64.9	81.8	90.9
4	–2.5	39.0	47.6	60.6
8	–3.8	29.2	35.0	44.9
16	–3.9	22.2	26.6	36.6
32	–4.6	15.8	18.8	26.2
64	–4.7	11.3	13.3	18.1
128	–4.9	8.0	9.7	12.1
256	–4.8	5.9	7.0	9.2
512	–4.7	4.0	4.8	6.4
1,024	–4.6	2.9	3.4	4.4
2,048	–4.6	2.1	2.4	3.0
4,096	–4.6	1.4	1.7	2.2
8,192	–4.6	1.0	1.2	1.6
16,384	–4.6	0.7	0.8	1.0

Figure 8 (All poverty lines): Differences, precision of differences, and the α factor for bootstrapped estimates of poverty rates for groups of households at a point in time (n = 16,384), scorecard applied to the validation sample

	Poverty line							
	National			Poorest half	Intl. 2005 PPP			
	100%	150%	200%	below 100% natl.	$1.25	$2.00	$2.50	$5.00
Estimate minus true value	–4.6	–0.2	+1.6	–4.3	–3.0	+0.1	+2.8	–1.3
Precision of difference	0,7	0,6	0,8	0,7	0,7	0,8	0,8	0,3
α factor for precision	1,19	1,01	1,32	1,49	1,07	1,26	1,46	0,95

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 bootstraps with 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 poverty lines): Possible types of outcomes from targeting by poverty score

True poverty status	Targeting segment: Targeted	Targeting segment: Non-targeted
Below poverty line	**Inclusion** Below poverty line correctly targeted	**Undercoverage** Below poverty line mistakenly non-targeted
Above poverty line	**Leakage** Above poverty line mistakenly targeted	**Exclusion** Above poverty line correctly non-targeted

Figure 10 (100% of the national line): Households by targeting classification and score, along with the "Hit Rate" and BPAC, scorecard applied to the validation sample

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: ≥ poverty line mistakenly targeted	Exclusion: ≥ poverty line correctly non-targeted	Hit rate Inclusion + Exclusion	BPAC See text
≤4	0.0	32.2	0.0	67.8	67.8	–99.8
≤9	0.2	32.0	0.1	67.7	67.9	–98.3
≤14	1.4	30.8	0.3	67.5	68.9	–90.3
≤19	3.3	28.9	0.4	67.3	70.6	–78.2
≤24	7.9	24.3	1.1	66.7	74.6	–47.6
≤29	12.7	19.6	2.4	65.4	78.0	–14.0
≤34	17.7	14.6	4.9	62.9	80.5	+24.8
≤39	22.4	9.9	8.6	59.2	81.6	+65.5
≤44	26.0	6.3	13.5	54.2	80.2	+58.0
≤49	27.9	4.3	18.3	49.5	77.5	+43.4
≤54	28.6	3.6	23.2	44.6	73.2	+28.1
≤59	29.1	3.1	26.0	41.7	70.9	+19.2
≤64	29.3	2.9	28.4	39.4	68.7	+12.0
≤69	29.4	2.9	29.6	38.1	67.5	+8.0
≤74	29.4	2.8	30.1	37.7	67.0	+6.6
≤79	29.4	2.8	30.8	37.0	66.3	+4.4
≤84	29.4	2.8	30.9	36.9	66.2	+4.1
≤89	29.4	2.8	31.0	36.7	66.1	+3.8
≤94	29.4	2.8	31.0	36.7	66.1	+3.7
≤100	32.2	0.0	67.8	0.0	32.2	–110.2

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

Figure 11 (100% of the national line): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successfully targeted (included) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all HHs who are targeted	% targeted HHs who are poor	% poor HHs who are targeted	Poor HHs targeted per non-poor HH targeted
≤4	0.0	100.0	0.1	Only poor targeted
≤9	0.3	70.2	0.7	2.4:1
≤14	1.7	82.2	4.4	4.6:1
≤19	3.7	88.0	10.2	7.4:1
≤24	9.0	88.2	24.6	7.5:1
≤29	15.1	84.1	39.3	5.3:1
≤34	22.6	78.3	54.8	3.6:1
≤39	31.0	72.3	69.4	2.6:1
≤44	39.5	65.7	80.5	1.9:1
≤49	46.2	60.5	86.7	1.5:1
≤54	51.8	55.3	88.8	1.2:1
≤59	55.2	52.8	90.4	1.1:1
≤64	57.7	50.8	91.0	1.0:1
≤69	59.0	49.8	91.2	1.0:1
≤74	59.5	49.4	91.2	1.0:1
≤79	60.2	48.8	91.2	1.0:1
≤84	60.3	48.7	91.2	1.0:1
≤89	60.4	48.6	91.2	0.9:1
≤94	60.4	48.6	91.2	0.9:1
≤100	100.0	32.2	100.0	0.5:1

Tables for
150% of the National Poverty Line

Figure 4 (150% of the 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	100.0
10–14	99.4
15–19	98.8
20–24	97.8
25–29	95.7
30–34	92.2
35–39	87.7
40–44	76.1
45–49	62.1
50–54	44.5
55–59	32.3
60–64	30.9
65–69	18.5
70–74	18.5
75–79	18.5
80–84	18.5
85–89	18.5
90–94	18.5
95–100	18.5

Figure 6 (150% of the national line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample (n = 16,384) with confidence intervals, 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	0.0	0.0	0.0	0.0
5–9	0.0	0.0	0.0	0.0
10–14	–0.6	0.3	0.3	0.3
15–19	–1.2	0.6	0.6	0.6
20–24	–1.1	0.8	0.8	0.9
25–29	+3.2	1.8	2.1	2.7
30–34	–3.9	2.3	2.3	2.5
35–39	–2.5	2.0	2.2	2.5
40–44	–9.6	5.6	5.8	6.1
45–49	+6.5	3.4	3.9	5.4
50–54	+21.2	2.9	3.5	4.4
55–59	–17.2	10.9	11.4	12.0
60–64	+6.2	4.4	5.2	7.0
65–69	+12.4	2.4	2.8	3.6
70–74	+15.4	2.3	2.9	3.7
75–79	+18.3	0.2	0.3	0.3
80–84	+18.5	0.0	0.0	0.0
85–89	+18.5	0.0	0.0	0.0
90–94	+18.5	0.0	0.0	0.0
95–100	–2.1	1.5	1.7	1.8

Figure 7 (150% of the national line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 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	–3.1	71.8	84.6	86.9
4	–1.2	36.0	44.3	57.9
8	–0.5	26.7	32.1	41.3
16	+0.1	19.5	22.1	28.7
32	–0.3	14.1	16.7	22.1
64	–0.2	10.0	11.8	15.9
128	–0.3	7.3	8.8	11.4
256	–0.2	5.2	6.4	8.3
512	–0.2	3.7	4.5	5.8
1,024	–0.1	2.5	3.1	4.2
2,048	–0.2	1.9	2.2	2.9
4,096	–0.1	1.3	1.6	2.0
8,192	–0.2	0.9	1.1	1.5
16,384	–0.2	0.6	0.8	1.0

Figure 10 (150% of the national line): Households by targeting classification and score, along with the "Hit Rate" and BPAC, scorecard applied to the validation sample

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: ≥ poverty line mistakenly targeted	Exclusion: ≥ poverty line correctly non-targeted	Hit rate Inclusion + Exclusion	BPAC See text
≤4	0.0	52.0	0.0	47.9	48.0	–99.9
≤9	0.3	51.7	0.0	47.9	48.3	–98.8
≤14	1.7	50.3	0.0	47.9	49.7	–93.4
≤19	3.7	48.3	0.0	47.9	51.7	–85.7
≤24	8.9	43.2	0.1	47.8	56.7	–65.7
≤29	14.6	37.5	0.5	47.5	62.0	–43.1
≤34	21.4	30.7	1.2	46.8	68.2	–15.5
≤39	28.8	23.3	2.2	45.8	74.6	+14.8
≤44	35.2	16.9	4.3	43.6	78.8	+43.4
≤49	39.0	13.1	7.2	40.7	79.7	+63.6
≤54	41.5	10.6	10.3	37.6	79.1	+79.2
≤59	43.2	8.9	12.0	35.9	79.1	+76.9
≤64	43.9	8.1	13.8	34.1	78.1	+73.5
≤69	44.1	8.0	15.0	33.0	77.0	+71.2
≤74	44.1	8.0	15.4	32.5	76.6	+70.4
≤79	44.1	8.0	16.1	31.8	75.9	+69.1
≤84	44.1	8.0	16.2	31.8	75.9	+68.9
≤89	44.1	8.0	16.3	31.6	75.7	+68.7
≤94	44.1	8.0	16.3	31.6	75.7	+68.6
≤100	52.1	0.0	47.9	0.0	52.1	+7.9

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

Figure 11 (150% of the national line): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successfully targeted (included) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all HHs who are targeted	% targeted HHs who are poor	% poor HHs who are targeted	Poor HHs targeted per non-poor HH targeted
≤4	0.0	100.0	0.1	Only poor targeted
≤9	0.3	100.0	0.6	Only poor targeted
≤14	1.7	100.0	3.3	Only poor targeted
≤19	3.7	100.0	7.2	Only poor targeted
≤24	9.0	98.8	17.0	83.6:1
≤29	15.1	96.7	28.0	29.7:1
≤34	22.6	94.9	41.1	18.6:1
≤39	31.0	93.0	55.3	13.3:1
≤44	39.5	89.1	67.5	8.1:1
≤49	46.2	84.3	74.8	5.4:1
≤54	51.8	80.1	79.7	4.0:1
≤59	55.2	78.2	82.9	3.6:1
≤64	57.7	76.1	84.4	3.2:1
≤69	59.0	74.6	84.6	2.9:1
≤74	59.5	74.1	84.7	2.9:1
≤79	60.2	73.3	84.7	2.7:1
≤84	60.3	73.1	84.7	2.7:1
≤89	60.4	73.0	84.7	2.7:1
≤94	60.4	73.0	84.7	2.7:1
≤100	100.0	52.1	100.0	1.1:1

Tables for
200% of the National Poverty Line

Figure 4 (200% of the 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	100.0
10–14	100.0
15–19	100.0
20–24	99.9
25–29	99.0
30–34	97.8
35–39	96.0
40–44	88.2
45–49	81.6
50–54	69.9
55–59	62.5
60–64	55.9
65–69	55.9
70–74	33.4
75–79	33.4
80–84	33.4
85–89	33.4
90–94	33.4
95–100	33.4

Figure 6 (200% of the national line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample (n = 16,384) with confidence intervals, 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	0.0	0.0	0.0	0.0
5–9	0.0	0.0	0.0	0.0
10–14	0.0	0.0	0.0	0.0
15–19	0.0	0.0	0.0	0.0
20–24	–0.1	0.1	0.1	0.1
25–29	+2.9	1.4	1.6	2.0
30–34	–0.2	0.5	0.6	0.8
35–39	–1.5	1.0	1.0	1.1
40–44	–6.1	3.6	3.6	3.9
45–49	–2.3	2.1	2.4	3.4
50–54	+40.4	3.3	3.9	5.2
55–59	+8.0	4.4	5.4	7.0
60–64	+15.9	5.4	6.4	8.1
65–69	+30.3	5.8	6.8	9.0
70–74	–5.1	12.4	14.7	19.3
75–79	+33.1	0.3	0.4	0.5
80–84	+26.5	9.5	10.8	13.9
85–89	+33.4	0.0	0.0	0.0
90–94	–61.6	33.3	33.3	50.0
95–100	–6.2	3.7	3.9	4.0

Figure 7 (200% of the national line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 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	–3.9	64.5	74.1	81.7
4	–1.2	38.8	48.0	60.4
8	+0.2	31.1	37.8	47.9
16	+1.3	23.5	27.9	34.5
32	+1.3	16.8	21.6	27.9
64	+1.2	11.7	14.0	19.5
128	+1.3	8.6	10.5	14.1
256	+1.4	6.5	8.0	10.0
512	+1.5	4.6	5.5	6.8
1,024	+1.6	3.1	3.6	4.8
2,048	+1.6	2.2	2.8	3.5
4,096	+1.6	1.6	1.9	2.4
8,192	+1.6	1.1	1.3	1.7
16,384	+1.6	0.8	0.9	1.2

Figure 10 (200% of the national line): Households by targeting classification and score, along with the "Hit Rate" and BPAC, scorecard applied to the validation sample

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: ≥ poverty line mistakenly targeted	Exclusion: ≥ poverty line correctly non-targeted	Hit rate Inclusion + Exclusion	BPAC See text
≤4	0.0	65.6	0.0	34.4	34.4	–99.9
≤9	0.3	65.3	0.0	34.4	34.7	–99.0
≤14	1.7	63.9	0.0	34.4	36.1	–94.8
≤19	3.7	61.9	0.0	34.4	38.1	–88.6
≤24	9.0	56.6	0.0	34.4	43.4	–72.6
≤29	14.9	50.7	0.1	34.3	49.2	–54.3
≤34	22.1	43.5	0.4	34.0	56.1	–31.9
≤39	30.1	35.5	0.8	33.6	63.7	–6.8
≤44	37.8	27.8	1.7	32.7	70.6	+17.8
≤49	43.2	22.4	3.0	31.4	74.6	+36.3
≤54	46.8	18.8	5.0	29.4	76.1	+50.2
≤59	48.8	16.8	6.4	28.0	76.8	+58.5
≤64	50.1	15.5	7.6	26.8	76.8	+64.3
≤69	50.5	15.1	8.5	25.9	76.4	+66.9
≤74	50.6	15.0	8.9	25.5	76.2	+67.9
≤79	50.6	15.0	9.6	24.8	75.5	+69.0
≤84	50.7	14.9	9.6	24.8	75.4	+69.1
≤89	50.7	14.9	9.7	24.7	75.3	+69.3
≤94	50.7	14.9	9.8	24.6	75.3	+69.4
≤100	65.6	0.0	34.4	0.0	65.6	+47.6

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

Figure 11 (200% of the national line): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successfully targeted (included) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all HHs who are targeted	% targeted HHs who are poor	% poor HHs who are targeted	Poor HHs targeted per non-poor HH targeted
≤4	0.0	100.0	0.0	Only poor targeted
≤9	0.3	100.0	0.5	Only poor targeted
≤14	1.7	100.0	2.6	Only poor targeted
≤19	3.7	100.0	5.7	Only poor targeted
≤24	9.0	100.0	13.7	Only poor targeted
≤29	15.1	99.2	22.8	116.7:1
≤34	22.6	98.1	33.7	52.5:1
≤39	31.0	97.3	45.9	35.9:1
≤44	39.5	95.8	57.7	22.9:1
≤49	46.2	93.5	65.9	14.5:1
≤54	51.8	90.3	71.3	9.3:1
≤59	55.2	88.4	74.4	7.6:1
≤64	57.7	86.8	76.3	6.5:1
≤69	59.0	85.5	77.0	5.9:1
≤74	59.5	85.1	77.2	5.7:1
≤79	60.2	84.1	77.2	5.3:1
≤84	60.3	84.0	77.2	5.3:1
≤89	60.4	83.9	77.2	5.2:1
≤94	60.4	83.9	77.2	5.2:1
≤100	100.0	65.6	100.0	1.9:1

Tables for
the Line that Marks the Poorest Half of People
under 100% of the National Poverty Line

Figure 4 (Poorest half under 100% of 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	86.5
5–9	80.9
10–14	79.1
15–19	75.7
20–24	56.0
25–29	44.1
30–34	29.1
35–39	16.5
40–44	13.0
45–49	6.2
50–54	3.5
55–59	1.2
60–64	1.1
65–69	1.1
70–74	1.1
75–79	1.1
80–84	1.1
85–89	1.1
90–94	1.1
95–100	1.1

Figure 6 (Poorest half under 100% of national line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample (n = 16,384) with confidence intervals, 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	+42.4	50.0	50.0	50.0
5–9	+38.4	14.0	16.4	21.7
10–14	+11.5	6.1	7.0	9.1
15–19	–9.8	6.4	6.6	7.0
20–24	–16.3	9.6	9.8	10.5
25–29	+4.5	3.1	3.6	4.8
30–34	–3.3	3.3	3.8	4.6
35–39	+3.0	1.9	2.2	3.1
40–44	–25.6	14.5	15.0	15.4
45–49	–2.3	2.0	2.2	2.8
50–54	+2.9	0.2	0.2	0.3
55–59	–0.2	0.6	0.7	0.9
60–64	+0.7	0.3	0.4	0.5
65–69	+1.1	0.0	0.0	0.0
70–74	+1.1	0.0	0.0	0.0
75–79	+1.1	0.0	0.0	0.0
80–84	+1.1	0.0	0.0	0.0
85–89	+1.1	0.0	0.0	0.0
90–94	+1.1	0.0	0.0	0.0
95–100	–2.2	1.4	1.4	1.5

Figure 7 (Poorest half under 100% of national line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 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	–1.8	63.8	74.9	87.3
4	–2.5	33.3	45.4	57.6
8	–3.2	25.9	32.8	44.9
16	–3.3	20.3	23.7	32.9
32	–4.1	14.4	17.9	24.1
64	–4.2	11.2	12.8	16.3
128	–4.4	7.8	9.2	11.3
256	–4.4	5.4	6.3	8.3
512	–4.4	3.9	4.6	6.0
1,024	–4.3	2.7	3.3	4.5
2,048	–4.3	2.0	2.4	3.2
4,096	–4.3	1.5	1.8	2.4
8,192	–4.2	1.0	1.2	1.5
16,384	–4.3	0.7	0.8	1.1

Figure 10 (Poorest half under 100% of national line): Households by targeting classification and score, along with the "Hit Rate" and BPAC, scorecard applied to the validation sample

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: ≥ poverty line mistakenly targeted	Exclusion: ≥ poverty line correctly non-targeted	Hit rate Inclusion + Exclusion	BPAC See text
≤4	0.0	14.6	0.0	84.9	85.0	–99.7
≤9	0.2	14.4	0.1	84.8	85.0	–96.6
≤14	1.2	13.4	0.5	84.4	85.6	–80.3
≤19	2.5	12.1	1.2	83.7	86.2	–57.4
≤24	5.7	8.9	3.2	81.7	87.4	+0.7
≤29	8.3	6.3	6.8	78.2	86.4	+53.5
≤34	10.4	4.2	12.2	72.8	83.2	+16.6
≤39	11.7	2.9	19.3	65.7	77.4	–32.1
≤44	12.7	1.8	26.3	58.7	71.4	–80.2
≤49	13.3	1.3	32.4	52.5	65.8	–122.5
≤54	13.5	1.1	37.9	47.1	60.5	–159.8
≤59	13.6	1.0	41.1	43.8	57.4	–182.2
≤64	13.6	1.0	43.7	41.3	54.9	–199.4
≤69	13.6	1.0	45.0	40.0	53.6	–208.4
≤74	13.6	1.0	45.4	39.5	53.1	–211.6
≤79	13.6	1.0	46.1	38.8	52.4	–216.4
≤84	13.6	1.0	46.2	38.7	52.3	–217.1
≤89	13.6	1.0	46.3	38.6	52.2	–217.8
≤94	13.6	1.0	46.4	38.6	52.2	–218.0
≤100	14.6	0.0	85.0	0.0	14.6	–482.7

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

Figure 11 (Poorest half under 100% of national line): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successfully targeted (included) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all HHs who are targeted	% targeted HHs who are poor	% poor HHs who are targeted	Poor HHs targeted per non-poor HH targeted
≤4	0.0	52.7	0.1	1.1:1
≤9	0.3	58.8	1.3	1.4:1
≤14	1.7	68.4	8.0	2.2:1
≤19	3.7	67.0	17.1	2.0:1
≤24	9.0	63.8	39.3	1.8:1
≤29	15.1	54.9	56.7	1.2:1
≤34	22.6	46.0	71.2	0.9:1
≤39	31.0	37.7	80.0	0.6:1
≤44	39.5	32.3	87.4	0.5:1
≤49	46.2	28.8	91.1	0.4:1
≤54	51.8	26.0	92.3	0.4:1
≤59	55.2	24.6	93.1	0.3:1
≤64	57.7	23.6	93.3	0.3:1
≤69	59.0	23.0	93.3	0.3:1
≤74	59.5	22.9	93.3	0.3:1
≤79	60.2	22.6	93.3	0.3:1
≤84	60.3	22.6	93.3	0.3:1
≤89	60.4	22.5	93.3	0.3:1
≤94	60.4	22.5	93.3	0.3:1
≤100	100.0	14.6	100.0	0.2:1

Tables for
the $1.25/day 2005 PPP Poverty Line

Figure 4 ($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	100.0
10–14	99.3
15–19	98.8
20–24	94.1
25–29	87.7
30–34	78.7
35–39	70.1
40–44	52.0
45–49	39.8
50–54	19.1
55–59	12.4
60–64	10.4
65–69	7.5
70–74	7.5
75–79	7.5
80–84	7.5
85–89	7.5
90–94	7.5
95–100	7.5

Figure 6 ($1.25/day line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample (n = 16,384) with confidence intervals, 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	0.0	0.0	0.0	0.0
5–9	0.0	0.0	0.0	0.0
10–14	+12.6	4.8	5.7	7.9
15–19	–0.2	0.5	0.6	0.8
20–24	–3.8	2.2	2.2	2.4
25–29	+0.6	2.1	2.4	3.2
30–34	+2.8	3.1	3.7	5.4
35–39	–1.0	2.4	2.9	4.1
40–44	–19.8	11.2	11.4	12.0
45–49	–4.0	3.7	4.1	5.3
50–54	+4.4	2.4	2.7	3.4
55–59	–10.7	7.2	7.6	8.6
60–64	–5.4	4.7	5.2	6.2
65–69	+5.4	1.4	1.6	2.2
70–74	+7.4	0.1	0.2	0.2
75–79	+7.5	0.0	0.0	0.0
80–84	+7.5	0.0	0.0	0.0
85–89	+7.5	0.0	0.0	0.0
90–94	+7.5	0.0	0.0	0.0
95–100	–2.3	1.5	1.6	1.7

Figure 7 ($1.25/day line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 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	–2.4	81.3	81.3	90.1
4	–1.8	36.7	45.3	60.0
8	–2.8	27.3	33.3	46.4
16	–2.6	20.3	24.0	33.3
32	–3.3	15.1	18.4	24.3
64	–3.2	10.6	12.6	17.1
128	–3.3	7.8	8.9	11.6
256	–3.3	5.4	6.7	8.4
512	–3.1	3.8	4.6	6.0
1,024	–3.0	2.8	3.2	4.2
2,048	–3.0	2.0	2.2	3.1
4,096	–3.1	1.4	1.6	2.2
8,192	–3.0	1.0	1.2	1.6
16,384	–3.0	0.7	0.8	1.0

Figure 10 ($1.25/day line): Households by targeting classification and score, along with the "Hit Rate" and BPAC, scorecard applied to the validation sample

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: ≥ poverty line mistakenly targeted	Exclusion: ≥ poverty line correctly non-targeted	Hit rate Inclusion + Exclusion	BPAC See text
≤4	0.0	39.0	0.0	61.0	61.0	–99.8
≤9	0.3	38.7	0.0	61.0	61.3	–98.4
≤14	1.6	37.4	0.1	60.9	62.5	–91.5
≤19	3.5	35.5	0.2	60.8	64.4	–81.4
≤24	8.6	30.4	0.4	60.6	69.2	–55.0
≤29	13.9	25.1	1.2	59.8	73.7	–25.8
≤34	19.9	19.1	2.7	58.3	78.2	+8.8
≤39	25.6	13.4	5.4	55.6	81.2	+45.0
≤44	29.9	9.1	9.6	51.4	81.2	+75.3
≤49	32.5	6.5	13.7	47.3	79.9	+65.0
≤54	33.9	5.1	17.9	43.1	77.0	+54.1
≤59	34.7	4.3	20.5	40.5	75.2	+47.5
≤64	35.1	3.9	22.6	38.4	73.4	+41.9
≤69	35.1	3.9	23.9	37.1	72.2	+38.7
≤74	35.1	3.9	24.4	36.6	71.8	+37.5
≤79	35.1	3.9	25.1	35.9	71.1	+35.7
≤84	35.1	3.9	25.2	35.8	71.0	+35.4
≤89	35.1	3.9	25.3	35.7	70.9	+35.2
≤94	35.1	3.9	25.3	35.7	70.8	+35.1
≤100	39.0	0.0	61.0	0.0	39.0	–56.5

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

Figure 11 ($1.25/day line): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successfully targeted (included) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all HHs who are targeted	% targeted HHs who are poor	% poor HHs who are targeted	Poor HHs targeted per non-poor HH targeted
≤4	0.0	100.0	0.1	Only poor targeted
≤9	0.3	100.0	0.8	Only poor targeted
≤14	1.7	93.2	4.1	13.7:1
≤19	3.7	94.8	9.1	18.3:1
≤24	9.0	95.4	22.0	20.9:1
≤29	15.1	92.1	35.6	11.6:1
≤34	22.6	88.0	50.9	7.3:1
≤39	31.0	82.5	65.6	4.7:1
≤44	39.5	75.6	76.6	3.1:1
≤49	46.2	70.4	83.4	2.4:1
≤54	51.8	65.5	87.0	1.9:1
≤59	55.2	62.9	89.0	1.7:1
≤64	57.7	60.8	90.0	1.5:1
≤69	59.0	59.5	90.1	1.5:1
≤74	59.5	59.0	90.1	1.4:1
≤79	60.2	58.4	90.1	1.4:1
≤84	60.3	58.3	90.1	1.4:1
≤89	60.4	58.2	90.1	1.4:1
≤94	60.4	58.1	90.1	1.4:1
≤100	100.0	39.0	100.0	0.6:1

Tables for
the $2.00/day 2005 PPP Poverty Line

Figure 4 ($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	100.0
15–19	100.0
20–24	99.9
25–29	99.0
30–34	97.0
35–39	93.8
40–44	86.4
45–49	79.7
50–54	64.1
55–59	53.8
60–64	49.8
65–69	45.0
70–74	28.1
75–79	28.1
80–84	28.1
85–89	28.1
90–94	28.1
95–100	28.1

Figure 6 ($2.00/day line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample (n = 16,384) with confidence intervals, 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	0.0	0.0	0.0	0.0
5–9	0.0	0.0	0.0	0.0
10–14	0.0	0.0	0.0	0.0
15–19	0.0	0.0	0.0	0.0
20–24	–0.1	0.1	0.1	0.1
25–29	+3.5	1.4	1.7	2.1
30–34	–1.3	0.9	0.9	1.0
35–39	–1.1	1.1	1.2	1.6
40–44	–8.0	4.5	4.6	4.7
45–49	–2.3	2.2	2.4	3.2
50–54	+36.8	3.1	3.8	5.0
55–59	–18.0	11.0	11.4	12.4
60–64	+15.6	4.9	5.8	7.3
65–69	+23.7	5.7	6.6	8.2
70–74	–5.2	12.7	15.3	19.3
75–79	+27.9	0.2	0.3	0.3
80–84	+21.2	9.5	10.8	13.9
85–89	+28.1	0.0	0.0	0.0
90–94	+28.1	0.0	0.0	0.0
95–100	–6.5	3.8	4.0	4.2

Figure 7 ($2.00/day line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 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	–4.7	68.0	75.8	83.6
4	–2.2	38.0	47.2	62.8
8	–1.1	30.4	37.3	47.6
16	–0.3	23.5	27.7	33.8
32	–0.2	17.5	20.8	25.6
64	–0.2	11.2	14.2	18.6
128	–0.1	8.2	10.2	13.4
256	–0.0	6.4	7.6	9.8
512	+0.1	4.6	5.4	6.6
1,024	+0.2	3.0	3.7	4.8
2,048	+0.2	2.2	2.6	3.4
4,096	+0.2	1.5	1.8	2.3
8,192	+0.2	1.1	1.2	1.7
16,384	+0.1	0.8	0.9	1.2

Figure 10 ($2.00/day line): Households by targeting classification and score, along with the "Hit Rate" and BPAC, scorecard applied to the validation sample

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: ≥ poverty line mistakenly targeted	Exclusion: ≥ poverty line correctly non-targeted	Hit rate Inclusion + Exclusion	BPAC See text
≤4	0.0	62.4	0.0	37.6	37.6	–99.9
≤9	0.3	62.1	0.0	37.6	37.9	–99.0
≤14	1.7	60.7	0.0	37.6	39.3	–94.5
≤19	3.7	58.7	0.0	37.6	41.3	–88.1
≤24	9.0	53.5	0.0	37.6	46.5	–71.2
≤29	14.9	47.6	0.2	37.4	52.2	–52.0
≤34	22.1	40.3	0.5	37.1	59.2	–28.5
≤39	30.0	32.5	1.0	36.5	66.5	–2.4
≤44	37.5	24.9	2.0	35.6	73.1	+23.3
≤49	42.7	19.8	3.5	34.0	76.7	+42.3
≤54	46.0	16.5	5.8	31.7	77.7	+56.6
≤59	48.3	14.2	6.9	30.6	78.9	+65.6
≤64	49.4	13.0	8.3	29.3	78.7	+71.6
≤69	49.7	12.7	9.3	28.3	78.0	+74.1
≤74	49.8	12.6	9.7	27.9	77.7	+75.1
≤79	49.8	12.6	10.3	27.2	77.1	+76.2
≤84	49.9	12.6	10.4	27.1	77.0	+76.4
≤89	49.9	12.6	10.5	27.0	76.9	+76.6
≤94	49.9	12.6	10.6	27.0	76.8	+76.6
≤100	62.4	0.0	37.6	0.0	62.4	+39.9

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

Figure 11 ($2.00/day line): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successfully targeted (included) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all HHs who are targeted	% targeted HHs who are poor	% poor HHs who are targeted	Poor HHs targeted per non-poor HH targeted
≤4	0.0	100.0	0.1	Only poor targeted
≤9	0.3	100.0	0.5	Only poor targeted
≤14	1.7	100.0	2.7	Only poor targeted
≤19	3.7	100.0	6.0	Only poor targeted
≤24	9.0	100.0	14.4	Only poor targeted
≤29	15.1	98.8	23.8	79.6:1
≤34	22.6	98.0	35.4	49.0:1
≤39	31.0	96.7	48.0	29.3:1
≤44	39.5	95.0	60.1	19.1:1
≤49	46.2	92.4	68.3	12.1:1
≤54	51.8	88.8	73.6	7.9:1
≤59	55.2	87.4	77.3	7.0:1
≤64	57.7	85.6	79.1	6.0:1
≤69	59.0	84.3	79.6	5.4:1
≤74	59.5	83.8	79.8	5.2:1
≤79	60.2	82.8	79.8	4.8:1
≤84	60.3	82.7	79.8	4.8:1
≤89	60.4	82.5	79.8	4.7:1
≤94	60.4	82.5	79.8	4.7:1
≤100	100.0	62.4	100.0	1.7:1

Tables for
the $2.50/day 2005 PPP Poverty Line

Figure 4 ($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	100.0
20–24	100.0
25–29	99.5
30–34	98.4
35–39	96.6
40–44	92.7
45–49	89.8
50–54	80.4
55–59	73.4
60–64	65.9
65–69	62.5
70–74	42.1
75–79	42.1
80–84	42.1
85–89	42.1
90–94	42.1
95–100	42.1

Figure 6 ($2.50/day line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample (n = 16,384) with confidence intervals, 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	0.0	0.0	0.0	0.0
5–9	0.0	0.0	0.0	0.0
10–14	0.0	0.0	0.0	0.0
15–19	0.0	0.0	0.0	0.0
20–24	0.0	0.0	0.0	0.0
25–29	–0.5	0.3	0.3	0.3
30–34	–0.9	0.6	0.6	0.7
35–39	–2.2	1.3	1.3	1.3
40–44	–3.4	2.1	2.2	2.4
45–49	–0.1	1.5	1.8	2.4
50–54	+48.2	3.4	4.1	5.5
55–59	–15.6	8.9	9.2	9.6
60–64	+21.4	5.5	6.7	8.2
65–69	+20.5	6.8	8.4	10.8
70–74	+2.6	12.3	14.6	19.4
75–79	+40.3	1.1	1.3	1.7
80–84	+30.9	12.2	13.7	17.6
85–89	+42.1	0.0	0.0	0.0
90–94	–52.9	29.0	29.0	50.0
95–100	–3.7	2.5	2.6	2.9

Figure 7 ($2.50/day line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 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	–3.0	61.9	69.2	77.3
4	–0.4	39.1	47.7	61.4
8	+0.8	31.9	37.7	46.5
16	+2.1	25.0	28.9	34.9
32	+2.3	18.4	21.3	28.2
64	+2.3	12.4	14.2	20.0
128	+2.5	9.2	10.9	14.0
256	+2.6	7.0	8.1	10.1
512	+2.7	4.9	5.7	7.2
1,024	+2.8	3.2	3.9	4.9
2,048	+2.8	2.4	2.8	3.7
4,096	+2.8	1.6	1.9	2.6
8,192	+2.8	1.1	1.3	1.8
16,384	+2.8	0.8	1.0	1.3

Figure 10 ($2.50/day line): Households by targeting classification and score, along with the "Hit Rate" and BPAC, scorecard applied to the validation sample

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: ≥ poverty line mistakenly targeted	Exclusion: ≥ poverty line correctly non-targeted	Hit rate Inclusion + Exclusion	BPAC See text
≤4	0.0	71.0	0.0	28.9	29.0	–99.9
≤9	0.3	70.7	0.0	28.9	29.3	–99.1
≤14	1.7	69.4	0.0	28.9	30.6	–95.2
≤19	3.7	67.3	0.0	28.9	32.7	–89.5
≤24	9.0	62.1	0.0	28.9	37.9	–74.7
≤29	15.1	56.0	0.0	28.9	44.0	–57.6
≤34	22.5	48.6	0.1	28.8	51.3	–36.7
≤39	30.7	40.4	0.3	28.6	59.3	–13.3
≤44	38.7	32.4	0.8	28.2	66.8	+10.0
≤49	44.5	26.6	1.7	27.2	71.7	+27.6
≤54	48.4	22.6	3.4	25.6	74.0	+41.0
≤59	51.2	19.9	4.0	25.0	76.2	+49.7
≤64	52.7	18.4	5.0	23.9	76.6	+55.4
≤69	53.3	17.8	5.7	23.2	76.5	+58.1
≤74	53.4	17.6	6.0	22.9	76.3	+58.9
≤79	53.5	17.5	6.7	22.3	75.8	+60.0
≤84	53.5	17.5	6.8	22.2	75.7	+60.2
≤89	53.5	17.5	6.9	22.1	75.6	+60.3
≤94	53.5	17.5	6.9	22.1	75.6	+60.4
≤100	71.1	0.0	28.9	0.0	71.1	+59.3

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

Figure 11 ($2.50/day line): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successfully targeted (included) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all HHs who are targeted	% targeted HHs who are poor	% poor HHs who are targeted	Poor HHs targeted per non-poor HH targeted
≤4	0.0	100.0	0.0	Only poor targeted
≤9	0.3	100.0	0.4	Only poor targeted
≤14	1.7	100.0	2.4	Only poor targeted
≤19	3.7	100.0	5.2	Only poor targeted
≤24	9.0	100.0	12.6	Only poor targeted
≤29	15.1	99.9	21.2	1,235.2:1
≤34	22.6	99.5	31.6	219.3:1
≤39	31.0	99.0	43.2	98.6:1
≤44	39.5	98.0	54.4	49.2:1
≤49	46.2	96.2	62.6	25.6:1
≤54	51.8	93.5	68.1	14.3:1
≤59	55.2	92.8	72.1	12.9:1
≤64	57.7	91.3	74.1	10.5:1
≤69	59.0	90.3	75.0	9.3:1
≤74	59.5	89.8	75.2	8.8:1
≤79	60.2	88.9	75.3	8.0:1
≤84	60.3	88.8	75.3	7.9:1
≤89	60.4	88.6	75.3	7.8:1
≤94	60.4	88.6	75.4	7.8:1
≤100	100.0	71.1	100.0	2.5:1

Tables for
the $5.00/day 2005 PPP Poverty Line

Figure 4 ($5.00/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	100.0
15–19	100.0
20–24	100.0
25–29	100.0
30–34	100.0
35–39	100.0
40–44	99.8
45–49	98.4
50–54	97.4
55–59	96.9
60–64	94.8
65–69	94.8
70–74	93.9
75–79	84.7
80–84	80.9
85–89	80.9
90–94	80.9
95–100	80.9

Figure 6 ($5.00/day line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample (n = 16,384) with confidence intervals, 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	0.0	0.0	0.0	0.0
5–9	0.0	0.0	0.0	0.0
10–14	0.0	0.0	0.0	0.0
15–19	0.0	0.0	0.0	0.0
20–24	0.0	0.0	0.0	0.0
25–29	0.0	0.0	0.0	0.0
30–34	0.0	0.0	0.0	0.0
35–39	0.0	0.0	0.0	0.0
40–44	+0.1	0.2	0.2	0.3
45–49	–0.9	0.6	0.7	0.7
50–54	–1.1	0.8	0.8	0.9
55–59	+1.7	1.9	2.2	2.8
60–64	+5.0	3.7	4.5	6.0
65–69	+7.8	4.7	5.6	7.0
70–74	+11.8	8.1	9.3	11.9
75–79	–9.6	6.3	6.6	7.0
80–84	–4.6	13.6	17.4	21.8
85–89	+23.6	22.6	27.4	36.0
90–94	–17.3	9.6	9.6	10.0
95–100	–3.5	2.2	2.2	2.4

Figure 7 ($5.00/day line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 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	–1.2	50.0	50.0	56.9
4	–0.2	24.8	29.3	37.9
8	–0.8	15.7	20.1	27.1
16	–1.2	10.8	13.0	17.4
32	–1.3	7.5	9.5	12.8
64	–1.3	5.3	6.2	8.3
128	–1.2	3.7	4.3	5.5
256	–1.3	2.6	3.1	3.9
512	–1.3	1.7	2.1	2.6
1,024	–1.3	1.3	1.5	2.1
2,048	–1.3	0.9	1.1	1.4
4,096	–1.3	0.6	0.7	1.0
8,192	–1.3	0.5	0.5	0.7
16,384	–1.3	0.3	0.4	0.5

Figure 10 ($5.00/day line): Households by targeting classification and score, along with the "Hit Rate" and BPAC, scorecard applied to the validation sample

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: ≥ poverty line mistakenly targeted	Exclusion: ≥ poverty line correctly non-targeted	Hit rate Inclusion + Exclusion	BPAC See text
≤4	0.0	92.2	0.0	7.7	7.8	–99.9
≤9	0.3	92.0	0.0	7.7	8.0	–99.3
≤14	1.7	90.6	0.0	7.7	9.4	–96.3
≤19	3.7	88.5	0.0	7.7	11.5	–91.9
≤24	9.0	83.3	0.0	7.7	16.7	–80.5
≤29	15.1	77.2	0.0	7.7	22.8	–67.3
≤34	22.6	69.7	0.0	7.7	30.3	–51.1
≤39	31.0	61.3	0.0	7.7	38.7	–32.9
≤44	39.4	52.8	0.0	7.7	47.1	–14.5
≤49	46.1	46.2	0.1	7.6	53.7	+0.0
≤54	51.5	40.8	0.3	7.4	58.9	+11.9
≤59	54.7	37.6	0.5	7.3	62.0	+19.1
≤64	57.1	35.2	0.6	7.1	64.2	+24.4
≤69	58.3	34.0	0.8	7.0	65.2	+27.1
≤74	58.6	33.6	0.8	6.9	65.5	+28.0
≤79	59.3	33.0	0.9	6.8	66.1	+29.5
≤84	59.4	32.9	0.9	6.8	66.2	+29.7
≤89	59.4	32.9	1.0	6.7	66.2	+29.9
≤94	59.4	32.8	1.0	6.7	66.2	+29.9
≤100	92.3	0.0	7.7	0.0	92.3	+91.6

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

Figure 11 ($5.00/day line): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successfully targeted (included) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all HHs who are targeted	% targeted HHs who are poor	% poor HHs who are targeted	Poor HHs targeted per non-poor HH targeted
≤4	0.0	100.0	0.0	Only poor targeted
≤9	0.3	100.0	0.3	Only poor targeted
≤14	1.7	100.0	1.9	Only poor targeted
≤19	3.7	100.0	4.0	Only poor targeted
≤24	9.0	100.0	9.7	Only poor targeted
≤29	15.1	100.0	16.3	Only poor targeted
≤34	22.6	100.0	24.4	Only poor targeted
≤39	31.0	100.0	33.6	Only poor targeted
≤44	39.5	99.9	42.7	802.3:1
≤49	46.2	99.8	49.9	429.9:1
≤54	51.8	99.4	55.8	162.8:1
≤59	55.2	99.2	59.3	119.8:1
≤64	57.7	98.9	61.9	94.0:1
≤69	59.0	98.7	63.1	77.1:1
≤74	59.5	98.6	63.6	69.6:1
≤79	60.2	98.5	64.2	65.0:1
≤84	60.3	98.5	64.3	63.6:1
≤89	60.4	98.4	64.4	60.1:1
≤94	60.4	98.4	64.4	60.0:1
≤100	100.0	92.3	100.0	11.9:1