Simple Poverty Scorecard® Poverty-Assessment Tool Ghana

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This document and related tools are available at `SimplePovertyScorecard.com`.

Abstract

The Simple Poverty Scorecard®-brand poverty-assessment tool for Ghana uses ten low-cost indicators from the 2005/6 Living Standards Survey to estimate the likelihood that a household has expenditure below a given poverty line. Field workers can collect responses in about ten minutes. The scorecard's bias and precision are reported for a range of poverty lines. The scorecard is a practical way for pro-poor programs in Ghana to measure poverty rates, to track changes in poverty rates over time, and to segment clients for targeted services.

Acknowledgements

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Simple Poverty Scorecard® Poverty-Assessment Tool

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

Indicator	Value	Points	Score
1. How many members does the household have?	A. Seven or more	0	
	B. Six	6	
	C. Five	8	
	D. Four	11	
	E. Three	15	
	F. Two	23	
	G. One	31	
2. Are all children ages 5 to 12 in school?	A. No	0	
	B. Yes, or no children ages 5 to 12	4	
3. What is the highest grade completed by the female head/spouse?	A. No female head/spouse	0	
	B. None or pre-school	4	
	C. Primary or middle	7	
	D. Any JSS, SSS, S, L, U, or higher	10	
4. Is the main job of the male head/spouse in agriculture?	A. Male head/spouse has no job	0	
	B. Yes, main job is in agriculture	8	
	C. No, main job is not in agriculture	10	
	D. No male head/spouse	10	
5. What is the main construction material used for the roof?	A. Palm leaves/raffia/thatch, wood, mud bricks/earth, bamboo, or other	0	
	B. Corrugated iron sheets, cement/concrete, asbestos/slate, or roofing tiles	3	
6. What is the main source of lighting for the dwelling?	A. Not electricity (mains)	0	
	B. Electricity (mains)	5	
7. What is the main source of drinking water for the household?	A. Borehole, well (with pump or not, protected or not), or other	0	
	B. River/stream, rain water/spring, or dugout/pond/lake/dam	5	
	C. Indoor plumbing, inside standpipe, sachet/bottled water, standpipe/tap (public or private outside), pipe in neighbors, water truck/tanker, or water vendor	7	
8. Does any household member own a working stove (kerosene, electric, or gas)?	A. No	0	
	B. Yes	10	
9. Does any household member own a working iron (box or electric)?	A. No	0	
	B. Yes	6	
10. Does any household member own a working radio, radio cassette, record player, or 3-in-1 radio system?	A. None	0	
	B. Only radio	2	
	C. Radio cassette but no record player nor 3-in-1 (regardless of radio)	6	
	D. Record player but no 3-in-1 (regardless of radio or cassette)	9	
	E. 3-in-1 radio system (regardless of any others)	14	

Simple Poverty Scorecard® Poverty-Assessment Tool Ghana

1. Introduction

This paper presents the Simple Poverty Scorecard®-brand poverty-assessment tool. Pro-poor programs in Ghana can use it to estimate the likelihood that a household has expenditure below a given poverty line. This poverty likelihood can then be used to monitor groups' poverty rates at a point in time, to track changes in groups' poverty rates between two points in time, and to target services to households.

The direct approach to poverty measurement via surveys is difficult and costly. As a case in point, the 2005/6 Ghana Living Standards Survey (GLSS) runs more than 100 pages. Households keep a diary of their expenditure, and enumerators visit each household 11 times. The expenditure module includes hundreds of questions, such as "Did the household consume any own-produced sorghum/guinea corn in the past twelve months? How many months altogether was own-produced sorghum/guinea corn consumed in the past twelve months? How much own-produced sorghum/guinea corn was consumed since my last visit? . . . Now then, did the household consume any own-produced millet grain in the past twelve months? . . ."

In contrast, the indirect approach via the scorecard is simple, quick, and inexpensive. It uses ten verifiable indicators (such as "What is the main construction material used for the roof?" and "Does any household member own a working iron (box

1

or electric)?") to get a score that is highly correlated with poverty status as measured by expenditure from the exhaustive survey.

The scorecard here differs from "proxy means tests" (Coady, Grosh, and Hoddinott, 2002) in that 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 subjective and relative (such as participatory wealth ranking by skilled field workers) or blunt (such as rules based on land-ownership or housing quality). These approaches may be costly, their results are not comparable across organizations or across countries, and their accuracy and precision are unknown.

The scorecard here can be used by organizations that want to know what share of their participants are below a poverty line, perhaps because they want to relate participants' poverty status to the Millennium Development Goals' $1.25/day poverty line at 2005 purchase-power parity (PPP). It can also be used by USAID microenterprise partners who want to report how many of their participants are among the poorest half of people below the national poverty line. Or it can be used by organizations that want to measure movement across a poverty line (for example, Daley-Harris, 2009). The scorecard is an expenditure-based, objective tool with known accuracy that can serve for monitoring, management, and/or targeting. While expenditure surveys are difficult and costly even for governments, a simple, inexpensive scorecard can be feasible for many local, pro-poor organizations.

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, 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 these tools do not work, but because they are presented (when they are presented at all) as tables of regression coefficients incomprehensible to non-specialists (with indicator names such as "`LGHHSZ_2`", negative points, and points with many decimal places). Thanks to the predictive-modeling phenomenon known as the "flat maximum", simple scorecards are about as accurate as complex ones.

The technical approach here 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 (Figure 1) is based on data from the 2005/6 GLSS conducted by the Ghana Statistical Service (GSS). 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

All points in the scorecard are zeroes or positive 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 five to 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 expenditure below a given poverty line.

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

Third, the scorecard can estimate changes in the poverty rate for a given group of households (or for two independent samples, both of which are representative of the same group) between two points in time. This estimate is simply the change in the average poverty likelihood of the group(s) of households over time.

The scorecard can also be used for targeting services to poorer households. To help managers choose a targeting cut-off, 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 Ghana's national poverty line and data on household expenditure. Scores from this scorecard are calibrated to poverty likelihoods for eight poverty lines.

The scorecard is constructed and calibrated using a sub-sample from the 2005/6 GLSS. Its accuracy is then validated on a different sub-sample from the 2005/6 GLSS as well as on the entire 1998/9 GLSS. While all three scoring estimators are unbiased

4

when applied to the population from which they are derived (that is, they match the true value on average in repeated samples from the same population from which the scorecard is built), they are—like all predictive models—biased to some extent when applied to a different population.[1]

Thus, while the indirect scoring approach is less costly than the direct survey approach, it is also biased. (The direct survey approach is unbiased by definition.) There is bias because scoring must assume that the relationships between indicators and poverty in the future will be the same as they are in the data used to build the scorecard. It must also assume that these relationships will be the same in all sub-groups as in the population as a whole. Of course, these assumptions—ubiquitous and inevitable in predictive modeling—hold only partly.

When applied to the 2005/6 validation sample for Ghana with the national poverty line and $n = 16,384$, the average difference between scorecard estimates of groups' poverty rates and true rates at a point in time is +0.8 percentage points. Across all eight lines, the average absolute difference is 0.7 percentage points, and the maximum absolute difference is 1.0 percentage points.

Because the 2005/6 validation sample is representative of the same population as the data that is used to construct the scorecard and because all the data come from the same time frame, the scorecard estimators are unbiased and these observed differences

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[1] Examples of "different populations" include nationally representative samples at another point in time or non-representative sub-groups (Tarozzi and Deaton, 2007).

are due to sampling variation; the average difference would be zero if the 2005/6 GLSS were to be repeatedly redrawn and then divided into sub-samples before repeating the entire scorecard-building and accuracy-testing process.

For $n = 16,384$, the 90-percent confidence intervals for these estimates are $+/-$ 0.6 percentage points or less. For $n = 1,024$, these intervals are $+/-2.2$ percentage points or less.

When the scorecard built from the 2005/6 construction and calibration samples is applied to both the 2005/6 validation sample and the entire 1998/9 GLSS for the national line with $n = 16,384$ to estimate change in groups' poverty rates over these seven years, the difference between scorecard estimates and true values is –5.6 percentage points, or about 50 percent of the true change of –11.0 percentage points. Across all eight lines, the average absolute difference is 3.3 percentage points, which is about one-third of the true change. The differences between estimates and true values are probably mostly due to changes in the relationships between indicators and poverty over the seven-year period and to changes in the way the GLSS asks some of the indicators.

Section 2 below documents data, poverty rates, and poverty lines for Ghana. Sections 3 and 4 describe scorecard construction and offer practical guidelines for use. 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, and Section 8 covers targeting. Section 9 places the new scorecard here in the context of similar exercises for Ghana. The final section is a summary.

2. Data and poverty lines

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

2.1 Data

The scorecard is based on data from the 8,687 households in the 2005/6 GLSS. This is the most recent national expenditure survey available for Ghana. Households are randomly divided into three sub-samples (Figure 2):

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

In addition, the validation of estimates of changes in poverty rates for two independent samples over time uses the 5,998 households in the 1998/9 GLSS.

2.2 Poverty rates and poverty lines

2.2.1 Rates

As a general definition, the *poverty rate* is the share of people in a given group who live in households whose total household expenditure (divided by the number of adult equivalents) is below a given poverty line.

Beyond this general definition, there two special cases, *household-level poverty rates* and *person-level poverty rates.* With household-level rates, each household is

counted as if it had only one person, regardless of true household size, so all households are counted equally. With person-level rates (the "head-count index"), each household is weighted by the number of people in it, so larger households have greater weight.

For example, consider a group of two households, the first with one member and the second with two members. Suppose further that the first household has per-adult-equivalent expenditure above a poverty line (it is "non-poor") and that the second household has per-adult-equivalent expenditure below a poverty line (it is "poor"). The household-level rate counts both households as if they had only one member and so gives a poverty rate for the group of $1 \div (1 + 1) = 50$ percent. In contrast, the person-level rate weighs each household by the number of people in it and so gives a poverty rate for the group of $2 \div (1 + 2) = 67$ percent.

Whether the household-level rate or the person-level rate is most relevant depends on the situation. If an organization's "participants" include all the people in a household, then the person-level rate is relevant. Governments, for example, are concerned with the well-being of their people, regardless of how those people are arranged in households, so governments typically report person-level poverty rates.

If an organization has only one "participant" per household, however, then the household-level rate is relevant. For example, if a microlender has only one borrower per household, then it might want to report household-level poverty rates.

The scorecard here is constructed using Ghana's 2005/6 GLSS and household-level lines, scores are calibrated to household-level poverty likelihoods, and accuracy is

measured for household-level rates. This household-level focus reflects the belief that it is the most relevant for most pro-poor organizations.

Organizations can estimate person-level poverty rates by taking a household-size-weighted average of the household-level poverty likelihoods. It is also possible to construct a scorecard based on person-level lines, to calibrate scores to person-level likelihoods, and to measure accuracy for person-level rates, but it is not done here.

2.2.2 Poverty lines

Figure 3 reports poverty lines and household- and person-level poverty rates for urban, rural, and all Ghana, for each of Ghana's 10 regions, and for the 2005/6 and 1998/9 GLSS.

The derivation of Ghana's official poverty lines is documented in GSS (2007 and 2000) and in Coulombe and McKay (2008). The food line (sometimes called the "lower" or "extreme" line) is based on a food basket that provides 2,900 calories per adult equivalent. The number of adult equivalents in a household is determined by the age and sex of each of the household members. Following the "cost-of-basic-needs" method (Ravallion, 1994), the average consumption expenditure on food that is observed for people in the bottom half of the expenditure distribution is scaled up to 2,900 calories per adult equivalent. This food line is adjusted for price differences across five regions (Accra, other urban, rural coastal, rural forest, and rural savannah) based on the 1998/9 GLSS price questionnaire and expenditure from the 1998/9 household questionnaire. Using Ghana's overall Consumer Price Index, the food line is also

adjusted for price changes between January 1999 and January 2006. In the 2005/6 GLSS, the average food line for Ghana overall is GHC6,600 per adult equivalent per day, giving a household-level poverty rate of 11.3 percent and a person-level poverty rate of 18.1 percent (Figure 3a).[2]

The national poverty line (sometimes call the "upper" or "general" line) is defined as the food line plus the cost of essential non-food goods and services (including housing). This non-food allowance is defined as the observed non-food expenditure for households whose total expenditure is equal to the food line. In the 2005/6 GLSS, the average national line for Ghana overall is GHC8,485 per adult equivalent per day, giving a household-level poverty rate of 18.9 percent and a person-level poverty rate of 28.5 percent (Figure 3a).

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

- National
- Food
- 150% of national
- 200% of national
- USAID "extreme"
- $1.25/day 2005 PPP
- $2.50/day 2005 PPP
- $3.75/day 2005 PPP

The lines for 150% and 200% of national are multiples of the national line.

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[2] GHC is the "second cedi". It was replaced by the GHS in 2007.

The USAID "extreme" line is defined as the median aggregate household per-adult-equivalent expenditure of people (not households) below the national line (U.S. Congress, 2002), by region and by urban/rural.

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

- 2005 PPP exchange rate for "individual consumption expenditure by households" (World Bank, 2008): GHC4,475.82 per $1.00
- Price deflators for Ghana overall: 185.84 in January 2006, and 176.87 for 2005 on average[3]

Using the formula in Sillers (2006), the $1.25/day 2005 PPP line for Ghana as a whole in GHC in Accra in January 2006 is:

$$\left(2005 \text{ PPP exchange rate}\right) \cdot \$1.25 \cdot \frac{\text{CPI}_{\text{Jan. 2006}}}{\text{CPI}_{\text{Ave. 2005}}} =$$

$$\left(\frac{\text{GHC4,475.82}}{\$1.00}\right) \cdot \$1.25 \cdot \frac{185.84}{176.87} = \text{GHC5,879.}$$

The $1.25/day 2005 PPP line for 1998/9 is found in a similar way. The $2.50/day and $3.75/day lines are multiples of the $1.25/day line.

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[3] `http://www.statsghana.gov.gh/docfiles/CPI%20Release_pdf/` `national_cpi_&_inflation_rates.pdf`, retrieved 4 January 2010.

The 2005 PPP lines apply to Ghana as a whole. These are adjusted for differences in regional cost-of-living and for each household's composition using:

- L, an all-Ghana 2005 PPP poverty line
- i, index to households
- N, number of households in a given round of the GLSS
- w_i, person-level weight for household i
- π_i, national poverty line for household i

The 2005 PPP poverty line L_j for household j is then $\dfrac{L \cdot \pi_j}{\displaystyle\sum_{i=1}^{N} w_i \cdot \pi_i}$.

3. Scorecard construction

For the Ghana scorecard, about 110 potential indicators are initially prepared in the areas of:

- Family composition (such as household size)
- Education (such as school attendance by children)
- Employment (such as whether the male head/spouse works in agriculture)
- Housing (such as the main construction material of the roof)
- Ownership of durable goods (such as irons or stoves)

Figure 4 lists all the candidate indicators, ranked by the entropy-based "uncertainty coefficient" that is a measure of how well an indicator predicts poverty on its own (Goodman and Kruskal, 1979). For a given indicator, responses are ordered starting with those associated with higher poverty likelihoods.

The scorecard also aims to measure *changes* in poverty through time. This means that, when selecting indicators and holding other considerations constant, preference is given to more sensitive indicators. For example, ownership of a stove is probably more likely to change in response to changes in poverty than is the age of the male head/spouse.

The scorecard itself is built using the national poverty line and Logit regression on the construction sub-sample. Indicator selection uses both judgment and statistics (forward stepwise, based on "c"). The first step is to use Logit to build one scorecard for each candidate indicator. Each scorecard's accuracy is taken as "c", a measure of ability to rank by poverty status (SAS Institute Inc., 2004).

One of these one-indicator scorecards is then selected based on several factors (Schreiner *et al.*, 2004; Zeller, 2004), including 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 status, variety among indicators, and verifiability.

A series of two-indicator scorecards are then built, each based on the one-indicator scorecard selected from the first step, with a second candidate indicator added. The best two-indicator scorecard is then selected, again based on "c" and judgment. These steps are repeated until the scorecard has 10 indicators.

This algorithm is the Logit analogue to the familiar R^2-based stepwise with least-squares regression. It differs from naïve stepwise in that the criteria for selecting indicators include not only statistical accuracy but also judgment and non-statistical factors. The use of non-statistical criteria can improve robustness through time and helps ensure that indicators are simple and make sense to users.

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).

The single scorecard here applies to all of Ghana. Tests for Mexico and India (Schreiner, 2006a and 2006b), Sri Lanka (Narayan and Yoshida, 2005), and Jamaica (Grosh and Baker, 1995) suggest that segmenting scorecards by urban/rural does not improve targeting much, although such segmentation may improve the accuracy of estimated poverty rates (Tarozzi and Deaton, 2007).

4. Practical guidelines for scorecard use

The main challenge of scorecard design is not to squeeze out the last drops of accuracy but rather to improve the chances that scoring is actually used (Schreiner, 2005). When scoring projects fail, the reason is not usually technical inaccuracy but rather the failure of an organization to decide to do what is needed to integrate scoring in its processes and to learn to use it properly (Schreiner, 2002). After all, most reasonable scorecards predict tolerably well, thanks to the empirical phenomenon known as the "flat maximum" (Falkenstein, 2008; Hand, 2006; Baesens *et al.*, 2003; Lovie and Lovie, 1986; Kolesar and Showers, 1985; Stillwell, Barron, and Edwards, 1983; Dawes, 1979; Wainer, 1976; Myers and Forgy, 1963). The bottleneck is less technical and more human, not statistics but organizational-change management. Accuracy is easier to achieve than adoption.

The scorecard here is designed to encourage understanding and trust so that users will want to adopt it and use it properly. Of course, accuracy is important, but so are simplicity, ease-of-use, and "face validity". Programs are more likely to collect data, compute scores, and pay attention to the results if, in their view, scoring does not imply a lot of additional work and if the whole process generally seems to make sense.

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

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

A field worker using the paper scorecard would:

- Record participant identifiers
- Read each question verbatim from the scorecard
- Circle each response and its points
- Write the points in the far-right column
- Add up the points to get the total score
- Implement targeting policy (if any)
- Deliver the paper scorecard to a central office for data entry and filing

4.1   Quality control

Of course, field workers must be trained. High-quality outputs require high-quality inputs. If organizations or field workers gather their own data and if they believe that they have an incentive to exaggerate poverty rates (for example, if 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).[4] IRIS Center (2007a) and Toohig (2008) are useful nuts-and-bolts guides for planning, budgeting, training field

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[4] If an organization does not want field workers to know the points associated with indicators, then it can use the version of Figure 1 without points and apply the points later at the central office.

workers and supervisors, logistics, sampling, interviewing, piloting, recording data, and controlling quality.

In particular, while collecting scorecard indicators is relatively easier than most alternatives, it is still absolutely difficult. Training and explicit definitions of the terms and concepts in the scorecard is essential.[5] For example, one study in Nigeria finds distressingly low inter-rater and test-retest correlations for indicators as seemingly simple and obvious as whether the household owns an automobile (Onwujekwe, Hanson, and Fox-Rushby, 2006).

For the example of a Mexican conditional cash-transfer program that uses self-reported indicators in the first stage of scorecard-based targeting, Martinelli and Parker (2007) 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" (pp. 24–25). Still, as done in the second stage of the Mexican targeting process, field agents using the scorecard can verify responses with a home visit and correct any false reports.

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[5] Appendix A is a guide for interpreting indicators in Ghana's scorecard.

4.2 Implementation and sampling

In terms of implementation and sample design, an organization must make

choices about:

- Who will do the scoring
- How scores will be recorded
- What participants will be scored
- How many participants will be scored
- How frequently participants will be scored
- Whether scoring will be applied at more than one point in time
- Whether the same participants will be scored at more than one point in time

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

- Employees of the organization
- Third-party contractors

Responses, scores, and poverty likelihoods can be recorded:

- On paper in the field and then filed at an office
- On paper in the field and then keyed into a database or spreadsheet at an office
- On portable electronic devices in the field and then downloaded to a database

The subjects to be scored can be:

- All participants
- A representative sample of all participants
- All participants in a representative sample of branches
- A representative sample of all participants in a representative sample of branches
- A representative sample of a sub-group that is relevant for a particular question

If not determined by other factors, the number of participants to be scored can

be derived from sample-size formulas (presented later) for a desired confidence level and

a desired confidence interval.

Frequency of application can be:

- At in-take of new clients only (precluding measuring changes in poverty rates)
- As a once-off project for current participants (precluding measuring changes)
- Once a year or at some other fixed time interval (allowing measuring changes)
- Each time a field worker visits a participant at home (allowing measuring changes)

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

- With different sets of participants, with each set representative of all participants
- With a single set of participants

An example set of implementation and design choices is provided by BRAC and ASA, two microlenders in Bangladesh (each with more than 7 million participants) who are applying a scorecard similar to the one here (Chen and Schreiner, 2009a). Their design is that loan officers in a random sample of branches score all their clients each time they visit a homestead (about once a year) as part of their standard due diligence prior to loan disbursement. Responses in the field are recorded on paper before being sent to a central office to be entered into a spreadsheet database. The sampling plans of ASA and BRAC cover 50,000–100,000 participants each (far more than would be required to inform most relevant decisions at a typical pro-poor organization).

5. Estimates of household poverty likelihoods

The sum of scorecard points for a household is called the *score.* For Ghana,

scores range from 0 (most likely below a poverty line) to 100 (least likely below a

poverty line). While higher scores indicate less likelihood of being below a poverty line,

the scores themselves have only relative units. For example, doubling the score does not

double the likelihood of being above a poverty line.

To get absolute units, scores must be converted to *poverty likelihoods*, that is,

probabilities of being below a poverty line. This is done via simple look-up tables. For

the example of the national line with the 2005/6 GLSS, scores of 30–34 correspond to a

poverty likelihood of 40.0 percent, and scores of 35–39 correspond to a poverty

likelihood of 21.4 percent (Figure 5).

The poverty likelihood associated with a score varies by poverty line. For

example, scores of 30–34 are associated with a poverty likelihood of 40.0 percent for the

national line but 21.8 percent for the food line.[6]

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[6] Starting with Figure 5, many figures have 16 versions, one for each of the eight
poverty lines for the 2005/6 scorecard applied to the 2005/6 validation sample and one
for each of the eight poverty lines for the 2005/6 scorecard applied to the 1998/9 GLSS.
The tables are grouped by poverty line and by the data used for validation. Single
tables that pertain to all poverty lines and survey rounds are placed with the tables for
the national line and the 2005/6 validation sample.

5.1 Calibrating scores with poverty likelihoods

A given score is non-parametrically associated ("calibrated") with a poverty likelihood by defining the poverty likelihood as the share of households in the calibration sub-sample who have the score and who are below a given poverty line.

For the example of the national line (Figure 6), there are 8,358 (normalized) households in the calibration sub-sample with a score of 30–34, of whom 3,345 (normalized) are below the poverty line. The estimated poverty likelihood associated with a score of 30–34 is then 40.0 percent, because 3,345 ÷ 8,358 = 0.400.

As another illustration, consider the national line and a score of 35–39. Now there are 9,443 (normalized) households in the calibration sample, of whom 2,025 (normalized) are below the line (Figure 6). Thus, the poverty likelihood for this score is 2,025 ÷ 9,443 = 0.214, or 21.4 percent.

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

Figures 7a and 7b show, for all scores, the likelihood that expenditure falls in a

range demarcated by two adjacent poverty lines.[7] For the example of the poverty lines

in adult-equivalent units (Figure 7a), daily per-adult-equivalent expenditure of someone

with a score of 30–34 falls in the following ranges with probability:

- 16.1 percent less than the USAID "extreme" line
- 5.7 percent between the USAID "extreme" and the food lines
- 18.2 percent between the food and the national lines
- 25.9 percent between the national and 150% of national lines
- 19.0 percent between the 150% of national and 200% of national lines
- 15.1 percent more than 200% of the national line

For the example of the 2005 PPP poverty lines in per-person units (Figure 7b),

the daily per-adult-equivalent expenditure of someone with a score of 30–34 falls in the

following ranges with probability:

- 34.0 percent less than the $1.25/day 2005 PPP line
- 47.7 percent between the $1.25/day and $2.50/day 2005 PPP lines
- 11.9 percent between the $2.50/day and $3.75/day 2005 PPP lines
- 6.4 percent more than the $3.75/day line

Even though the process of scorecard construction involves some judgment, this

calibration process produces poverty likelihoods that are objective, that is, derived from

survey data on expenditure and quantitative poverty lines. The poverty likelihoods

would be objective even if indicators and/or points were selected without any data at

all. In fact, objective scorecards of proven accuracy are often based only on judgment

(Fuller, 2006; Caire, 2004; Schreiner *et al.*, 2004). Of course, the scorecard here is

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[7] There are two versions of Figure 7, one for the national poverty lines (and derivatives)
in adult-equivalent units, and one for the 2005 PPP lines in per-capita units.

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

Although the points in Ghana's scorecard are transformed coefficients from a Logit regression, scores are not converted to poverty likelihoods via the Logit formula of $2.718281828^{\text{score}}$ x $(1+ 2.718281828^{\text{score}})^{-1}$. This is because the Logit formula is esoteric and difficult to compute by hand. It is 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. Converting scores to poverty likelihoods requires no arithmetic at all, just a look-up table. This non-parametric calibration can also improve accuracy, especially with large calibration samples.

5.2   Accuracy of estimates of households' poverty likelihoods

As long as the relationships between indicators and poverty do not change and as long as the scorecard is applied to households who are representative of the same population from which the scorecard is constructed, 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 poverty likelihood.

The scorecard also produces unbiased estimates of poverty rates at a point in time, as well as unbiased estimates of changes in poverty rates between two points in time.[8]

But the relationships between indicators and poverty do change with time, and they also change across sub-groups in Ghana's population. Thus, the scorecard will generally be biased when applied after the end date of fieldwork for the 2005/6 GLSS (as it must be applied in practice) or when applied with non-nationally representative groups (as it will most often be applied by local, pro-poor organizations). Furthermore, in the tests reported here with the 2005/6 and 1998/9 GLSS, bias may also result from changes over time in data collection, changes in the real value of poverty lines, or changes in the adjustment of poverty lines to account for differences in cost-of-living across time or geographic regions. These sources of bias are not present when the scorecard is actually applied to participants of a given organization.

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

How accurate are estimates of households' poverty likelihoods, given the

assumption of representativeness? To check, the scorecard is applied to 1,000 bootstrap

samples of size $n = 16{,}384$ from the 2005/6 validation sub-sample. Bootstrapping

entails (Efron and Tibshirani, 1993):

- Score each household in the validation sample
- Draw a new bootstrap sample *with replacement* from the validation sample
- For each score, compute the true poverty likelihood in the bootstrap sample, that is, the share of households with the score who have expenditure below a poverty line
- For each score, record the difference between the estimated poverty likelihood (Figure 5) 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 interval containing the central 900, 950, or 990 differences between estimated and true poverty likelihoods

For each score range and for $n = 16{,}384$, Figure 8 shows the average difference

between estimated and true poverty likelihoods as well as confidence intervals for the

differences.

For the national line in the 2005/6 validation sample, the average poverty

likelihood across bootstrap samples for scores of 30–34 is too high by 7.8 percentage

points. For scores of 35–39, the estimate is too low by 10.9 percentage points.[9]

The 90-percent confidence interval for the differences for scores of 30–34 is $+/-$

2.2 percentage points (Figure 8). This means that in 900 of 1,000 bootstraps, the

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

difference between the estimate and the true value is between +5.6 and +10.0 percentage points (because +7.8 − 2.2 = +5.6, and +7.8 + 2.2 = +10.0). In 950 of 1,000 bootstraps (95 percent), the difference is +7.8 +/−2.6 percentage points, and in 990 of 1,000 bootstraps (99 percent), the difference is +7.8 +/−3.4 percentage points.

For most scores, Figure 8 shows differences—many of them large—between estimated poverty likelihoods and true values. This is because the validation sub-sample is a single sample that—thanks to sampling variation—differs in distribution from the construction/calibration sub-samples and from Ghana's population. Also, some score ranges have few households in them, increasing the importance of sampling variation.

When the 2005/6 scorecard is applied to the 1998/9 GLSS, differences are due in part to changes in the relationships between indicators and poverty over time and in part to changes in GLSS indicators between the two survey rounds.

For targeting, what matters is less the differences across all score ranges and more the differences in score ranges just above and just 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.

Of course, if estimates of groups' poverty rates are to be usefully accurate, then errors for individual households must largely balance out. As discussed in the next section, this is generally the case, although moreso for the 2005/6 validation sub-sample than for the 1998/9 GLSS.

Another possible source of bias is overfitting. By construction, the scorecard here is unbiased, but it may still be *overfit* when applied after the end of field work for the 2005/6 GLSS. That is, the scorecard may fit the 2005/6 data so closely that it captures not only some real patterns but also some false patterns that, due to sampling variation, show up only in the 2005/6 data. Or the scorecard may be overfit in the sense that it is not robust to changes in the relationships between indicators and poverty over time. Finally, the scorecard could also be overfit when it is applied to samples from non-nationally representative sub-groups.

Overfitting can be mitigated by simplifying the scorecard and by not relying only on data but rather also considering experience, judgment, and theory. Of course, the scorecard here does this. Bootstrapping scorecard construction—which is not done here—can also mitigate overfitting by reducing (but not eliminating) dependence on a single sampling instance. Combining scorecards can also help, at the cost of complexity. Simplifying the scorecard can also reduce overfitting (at the cost of decreased precision), although the scorecard is already parsimonious and so there is limited scope for simplification. Often the best option is to be sure to update the scorecard as soon as new data is available.

In any case, errors in individual households' likelihoods largely balance out in the estimates of groups' poverty rates (see the next section). Furthermore, much of the differences between scorecard estimates and true values may come from non-scorecard sources such as sampling variation, changes in poverty lines, inconsistencies in data quality across time, and inconsistencies/imperfections in cost-of-living adjustments across time and regions. These factors can be addressed only by improving data quantity and quality, which is beyond the scope of the scorecard.

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 a program samples three households on Jan. 1, 2010 and that they have scores of 20, 30, and 40, corresponding to poverty likelihoods of 68.7, 40.0, and 17.8 percent (national line, Figure 5). The group's estimated poverty rate is the households' average poverty likelihood of (68.7 + 40.0 + 17.8) ÷ 3 = 42.2 percent.[10]

6.1   Accuracy of estimated poverty rates at a point in time

How accurate is this estimate? For a range of sample sizes, Figure 10 reports average differences between estimated and true poverty rates as well as precision (confidence intervals for the differences) for the 2005/6 scorecard applied to 1,000 bootstrap samples from the 2005/6 validation sample and also to the complete 1998/9 GLSS.

Summarizing Figure 10 across poverty lines and years for $n = 16,384$, Figure 9 shows that the absolute differences between estimated poverty rates and true rates for the 2005/6 scorecard applied to the 2005/6 validation sample are 1.0 percentage points

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[10] The group's poverty rate is *not* the poverty likelihood associated with the average score. Here, the average score is (20 + 30 + 40) ÷ 3 = 30, and the poverty likelihood associated with the average score is 40.0 percent. This is not the 42.2 percent found as the average of the three poverty likelihoods associated with each of the three scores.

or less. The average absolute difference across the eight poverty lines for the 2005/6 validation sample is 0.7 percentage points.

Differences are greater for the 2005/6 Ghana scorecard applied seven years back to the 1998/9 GLSS; the average absolute difference is 2.9 percentage points, and the maximum absolute difference is 4.8 percentage points.

In terms of precision, the 90-percent confidence interval for a group's estimated poverty rate at a point in time in any round with $n = 16{,}384$ is $+/-0.7$ percentage points or less (Figure 9). This means that in 900 of 1,000 bootstraps of this size, the absolute difference between the estimate and the average estimate is 0.7 percentage points or less.

In the specific case of the national line and the 2005/6 validation sample, 90 percent of all samples of $n = 16{,}384$ produce estimates that differ from the true value in the range of $+0.8 + 0.4 = +1.2$ to $+0.8 - 0.4 = +0.4$ percentage points. This is because $+0.8$ is the average difference and $+/-0.4$ is its 90-percent confidence interval. The average difference is $+0.8$ because the average scorecard estimate is too high by 0.8 percentage points; the scorecard tends to estimate a poverty rate of 20.0 percent for the 2005/6 validation sample, but the true value is 19.2 percent (Figure 2).

Regardless of changes over time in the GLSS and changes in the relationships between indicators and poverty, at least part of these differences is due to sampling variation across survey rounds and to the division of the 2005/6 GLSS into three sub-samples. Of course, estimates of poverty rates at a point in time from now on will be

most accurate for periods that resemble the twelve months beginning September 2005, that is, the period of fieldwork for the 2005/6 GLSS.

6.2 Standard-error formula for estimates of poverty rates at a point in time

How precise are the point-in-time estimates? Because they are averages, the estimates have a Normal distribution and can be characterized by their average difference vis-à-vis true values, along with the standard error of the average difference.

To derive a formula for the standard errors of estimated poverty rates at a point in time for indirect measurement via scorecards (Schreiner, 2008a), note that the textbook formula (Cochran, 1977) that relates confidence intervals with standard errors in the case of direct measurement of poverty rates is $c = +/- z \cdot \sigma$, where:

c is a confidence interval as a proportion (*e.g.*, 0.02 for $+/-2$ percentage points),

z is from the Normal distribution and is $\begin{cases} 1.64 \text{ for confidence levels of 90 percent} \\ 1.96 \text{ for confidence levels of 95 percent} \\ 2.58 \text{ for confidence levels of 99 percent} \end{cases}$,

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

p is the proportion of households below the poverty line in the sample, and

n is the sample size.

For example, with a sample $n = 16{,}384$, 90-percent confidence ($z = 1.64$), and a poverty rate p of 19.2 percent (the true rate in the 2005/6 validation sample for the national line in Figure 2), the confidence interval c is

$$+/- z \cdot \sqrt{\frac{p \cdot (1-p)}{n}} = +/- 1.64 \cdot \sqrt{\frac{0.192 \cdot (1 - 0.192)}{16{,}384}} = +/-0.505 \text{ percentage points.}$$

Scorecards, however, do not measure poverty directly, so this formula is not applicable. To derive a formula for the Ghana scorecard, consider Figure 10, which reports empirical confidence intervals c for the differences for the scorecard applied to 1,000 bootstrap samples of various sample sizes from a validation sample. For $n = 16{,}384$, the national line, and the 2005/6 validation sub-sample, the 90-percent confidence interval is $+/-0.435$ percentage points.[11] Thus, the ratio of confidence intervals with the scorecard and with direct measurement is $0.435 \div 0.505 = 0.86$.

Now consider the same case, but with $n = 8{,}192$. The confidence interval under direct measurement is $+/- 1.64 \cdot \sqrt{\frac{0.192 \cdot (1 - 0.192)}{8{,}192}} = +/-0.714$ percentage points. The empirical confidence interval with the Ghana scorecard for the national line (Figure 10) is $+/-0.590$ percentage points. Thus for $n = 8{,}192$, the ratio for the scorecard to direct measurement is $0.590 \div 0.714 = 0.83$.

This ratio of 0.83 for $n = 8{,}192$ is close to the ratio of 0.86 for $n = 16{,}384$. Indeed, across all sample sizes of 256 or more in Figure 10, the average ratio turns out to be 0.83, implying that confidence intervals for indirect estimates of poverty rates via

[11] Due to rounding, Figure 10 displays 0.4, not 0.435.

the Ghana scorecard and this poverty line are about 17 percent narrower than those for

direct estimates. This 0.83 appears in Figure 9 as the "α factor" because if $\alpha = 0.83$,

then the formula relating confidence intervals c and standard errors σ for the Ghana

scorecard is $c = +/- z \cdot \alpha \cdot \sigma$. The standard error σ for point-in-time estimates of

poverty rates via scoring is $\alpha \cdot \sqrt{\dfrac{p \cdot (1-p)}{n}}$.

In general, α could be greater than or less than 1.00. When α is less than 1.00, it

means that the scorecard is more precise than direct measurement. This occurs for all

eight lines for the 2005/6 validation sample in Figure 9 and for two of the eight lines for

the 1998/9 GLSS.

The formula relating confidence intervals to standard errors for the scorecard can

be rearranged to give a formula for determining sample size n before measurement.[12] If

$\hat{p}$ is the expected poverty rate before measurement, then the formula for n based on the

desired confidence level that corresponds to z and the desired confidence interval $+/-c$

under the scorecard is $n = \left(\dfrac{\alpha \cdot z}{c}\right)^2 \cdot \hat{p} \cdot (1 - \hat{p})$.

To illustrate how to use this, suppose $c = 0.03530$ and $z = 1.64$ (90-percent

confidence), and $\hat{p} = 0.187$ (the average poverty rate for the national line in the 2005/6

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[12] IRIS Center (2007a and 2007b) says that a sample size of $n = 300$ is sufficient for reporting estimated poverty rates to USAID. If a scorecard is as precise as direct measurement, if the expected (before measurement) poverty rate is 50 percent, and if the confidence level is 90 percent, then $n = 300$ implies a confidence interval of $+/-2.2$ percentage points. In fact, USAID has not specified confidence levels or intervals. Furthermore, the expected poverty rate may not be 50 percent, and the scorecard could be more or less precise than direct measurement.

construction and calibration sub-samples, Figure 2). Then the formula gives

$$n = \left(\frac{0.83 \cdot 1.64}{0.03530}\right)^2 \cdot 0.187 \cdot (1 - 0.187) = 227,$$ which is not too far from the sample size of

256 observed for these parameters in Figure 10.

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

poverty rates, and this scorecard. The method for deriving the formulas, however, is

valid for any scorecard following the basic approach in this paper.

In practice after the end of the 2005/6 GLSS field work in September 2006, an

organization would select a poverty line (say, the national line), select a desired

confidence level (say, 90 percent, or $z = 1.64$), select a desired confidence interval (say,

+/–2.0 percentage points, or $c = 0.02$), make an assumption about $\hat{p}$ (perhaps based

on a previous measurement such as the 18.9 percent average for the national line in

2005/6 in Figure 2), look up α (here, 0.83), assume that the scorecard will work the

same in the future and/or for non-nationally representative sub-groups,[13] and then

compute the required sample size. In this illustration,

$$n = \left(\frac{0.83 \cdot 1.64}{0.02}\right)^2 \cdot 0.189 \cdot (1 - 0.189) = 711.$$

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[13] This paper reports accuracy for the scorecard applied to the 2005/6 validation sample and to the 1998/9 GLSS, but it cannot test accuracy for later years or for other groups. Performance will deteriorate with time to the extent that the relationships between indicators and poverty change.

7. Estimates of changes in group 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.

7.1 Warning: Change is not impact

Scoring can estimate change. Of course, change could be for the better or for the worse, and scoring does not indicate what caused change. This point is often forgotten, confused, or ignored, 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 program participation on poverty status 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 program impact only if there is some way to know what would have happened in the absence of the program. And that information must come from somewhere beyond the scorecard.

7.2 Calculating estimated changes in poverty rates over time

Consider the illustration begun in the previous section. On Jan. 1, 2010, a program samples three households who score 20, 30, and 40 and so have poverty likelihoods of 68.7, 40.0, and 17.8 percent (national line, Figure 5). The group's baseline

estimated poverty rate is the households' average poverty likelihood of (68.7 + 40.0 +

17.8) ÷ 3 = 42.2 percent.

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

- Score a new, independent sample, measuring change by cohort across samples
- Score the same sample at follow-up as at baseline

By way of illustration, suppose that a year later on Jan. 1, 2011, the program

samples three additional households who are in the same cohort as the three households

originally sampled (or suppose that the program scores the same three original

households a second time) and finds that their scores are now 25, 35, and 45 (poverty

likelihoods of 52.9, 21.4, and 11.0 percent, national line, Figure 5). Their average

poverty likelihood at follow-up is (52.9 + 21.4 + 11.0) ÷ 3 = 28.4 percent, an

improvement of 42.2 – 28.4 = 13.8 percentage points.[14]

This suggests that about one of seven participants crossed the poverty line in

2010. (This is a net figure; some people start above the line and end below it, and vice

versa.) Among those who started below the line, about one in three (13.8 ÷ 42.2 = 32.7

percent) ended up above the line. Of course, the scorecard does not reveal the reasons

for this change.

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[14] Of course, such a huge reduction in poverty is unlikely in a year's time, but this is
just an example to show how the scorecard can be used to estimate change.

7.3 Estimated changes in poverty rates in Ghana

Given the Ghana scorecard built from the construction and calibration samples of the 2005/6 GLSS, an estimate of the change in the poverty rate is the difference between the estimated poverty rate in the 2005/6 validation sample and the estimated poverty rate in the 1998/9 GLSS.

In Figure 11 (summarizing Figure 12 across poverty lines), the difference between this estimate and the true value for the national line is –5.6 percentage points; the scorecard estimates a change of –16.6 percentage points, when the true change was –11.0 percentage points.

Across all eight lines, the average absolute difference is 3.3 percentage points, and the maximum absolute difference is 5.6 percentage points. The average change in poverty rates in the seven years between the two rounds was –10.0 percentage points, so the estimated changes in rates are, roughly speaking, within one-third of the true changes in rates.

These differences are probably mostly due to changes in the relationships between indicators and poverty in the seven-year period. Another issue—one that is beyond the scope of the scorecard—is that some indicators changed between the 1998/9 and 2005/6 GLSS. In the data pre-processing for scorecard construction, response categories are rearranged to align the two surveys as closely as possible, but matches are not perfect.

In terms of precision, the 90-percent confidence intervals for the estimated changes across all eight lines with $n = 16{,}384$ is $+/\!-0.9$ percentage points or less.

Because the scorecard estimates are unbiased, these differences are due to sampling variation, changes in the relationships between indicators and poverty, changes in data collection, and/or changes in poverty lines. The differences for Ghana—even though they cover a span of seven years—are not unlike those in other tests with shorter periods (Schreiner, 2009a, 2009b, 2009c, 2009d, 2009e, and 2008b; Chen and Schreiner, 2009a and 2009b); Mathiassen, 2008).

7.4 Accuracy for estimated change in two independent samples

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

$$c = +/\!-z \cdot \sigma = +/\!-z \cdot \alpha \cdot \sqrt{\frac{2 \cdot p \cdot (1 - p)}{n}} \ .$$

z, c, and p are defined as before, n is the sample size at both baseline and follow-up,[15] and α is the average (across a range of bootstrapped sample sizes) of the ratio of the observed confidence intervals from a scorecard and the theoretical confidence intervals from the textbook formula for direct measurement for two equal-sized

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

independent samples. All the α factors for Ghana exceed 1.00 (Figure 11), so scoring for this purpose is less precise than direct measurement, usually on the order of 30 to 40 percent.

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

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

To illustrate the use of the formula above to determine sample size for estimating changes in poverty rates across two independent samples between 1998/9 and 2005/6 in Ghana, suppose the desired confidence level is 90 percent ($z = 1.64$), the desired confidence interval is 2 percentage points ($c = 0.02$), the poverty line is the national line, α = 1.40 (from Figure 11), and $\hat{p} = 0.189$ (from Figure 2 for 2005/6). Then the baseline sample size is $n = 2 \cdot \left(\frac{1.40 \cdot 1.64}{0.02} \right)^2 \cdot 0.189 \cdot (1 - 0.189) = 4{,}041$, and the follow-up sample is also 4,041.

7.5 Accuracy for estimated change for one sample, scored twice

The general formula relating the confidence interval c to the standard error σ when using scoring to estimate change for a single group of households, all of whom are scored at two points in time, is:[16]

$$c = +/- z \cdot \sigma = +/- z \cdot \alpha \cdot \sqrt{\frac{p_{12} \cdot (1 - p_{12}) + p_{21} \cdot (1 - p_{21}) + 2 \cdot p_{12} \cdot p_{21}}{n}}.$$

z, c, and α are defined as before, p_{12} is the share of all sampled households that move from below the poverty line to above it, and p_{21} is the share of all sampled households that move from above the line to below it.

As usual, the formula for σ can be rearranged to give a formula for sample size n before measurement. This requires an estimate (based on information available before measurement) of the expected shares of all households who cross the poverty line $\hat{p}_{12}$ and $\hat{p}_{21}$. Before measurement, it is reasonable to assume that the overall change in the poverty rate will be zero, which implies $\hat{p}_{12} = \hat{p}_{21} = \hat{p}_*$, giving:

$$n = 2 \cdot \left(\frac{\alpha \cdot z}{c}\right)^2 \cdot \hat{p}_*.$$

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

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

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

Given this, a sample-size formula for a group of households to whom the Ghana scorecard is applied twice (once after the end of field work for the 2005/6 GLSS and then again later) is:

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

In Peru (the only other country for which there is a data-based estimate, Schreiner 2009a), 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 ($c = 0.02$), the poverty line is the national line, and the sample will be scored first in 2010 and then again in 2013 ($y = 3$). The before-baseline poverty rate is 18.9 percent ($p_{2005/6} = 0.189$, Figure 2), and suppose $\alpha = 1.30$. Then the baseline sample size is

$n = 2 \cdot \left(\frac{1.3 \cdot 1.64}{0.02}\right)^2 \cdot \{-0.02 + 0.016 \cdot 3 + 0.47 \cdot [0.189 \cdot (1 - 0.189)]\} = 2{,}274.$ The same

group of 2,274 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 expenditure below a poverty line). Poverty status is a fact that depends on whether expenditure 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 13 depicts these four possible targeting outcomes. Targeting accuracy varies by cut-off; a higher cut-off has better inclusion (but greater leakage), while a lower cut-off has better exclusion (but higher undercoverage).

A program 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 14 shows the distribution of households by targeting outcome. For an

example cut-off of 34 or less and the 2005/6 scorecard applied to the 2005/6 validation

sample, outcomes for the national line are:

- Inclusion: 11.5 percent are below the line and correctly targeted
- Undercoverage: 7.8 percent are below the line and mistakenly not targeted
- Leakage: 10.9 percent are above the line and mistakenly targeted
- Exclusion: 69.8 percent are above the line and correctly not targeted

Increasing the cut-off to 39 or less improves inclusion and undercoverage but

worsens leakage and exclusion:

- Inclusion: 14.8 percent are below the line and correctly targeted
- Undercoverage: 4.4 percent are below the line and mistakenly not targeted
- Leakage: 17.0 percent are above the line and mistakenly targeted
- Exclusion: 63.7 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 14 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. Any

program that uses targeting—with or without scoring—should thoughtfully consider

how it values successful inclusion or exclusion versus errors of undercoverage and leakage. It is healthy to go through a process of thinking explicitly and intentionally about how possible targeting outcomes are valued.

A common choice of benefits and costs is "Total Accuracy" (IRIS Center, 2005; Grootaert and Braithwaite, 1998). With "Total Accuracy", total net benefit is the number of households successfully included or successfully excluded:

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

Figure 14 shows "Total Accuracy" for all cut-offs for Ghana's scorecard. For the national line in the 2005/6 validation sample, total net benefit is greatest (83.4) for a cut-off of 29 or less, with about five in six households in Ghana correctly classified.

"Total Accuracy" weighs successful inclusion of households below the line the same as successful exclusion of households above the line. If a program valued inclusion more (say, twice as much) than exclusion, it could reflect this by setting the benefit for inclusion to 2 and the benefit for exclusion to 1. Then the chosen cut-off would maximize (2 x Households correctly included) + (1 x Households correctly excluded).

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 15 ("% targeted who are poor") shows the expected poverty rate among Ghana households who score at or below a given cut-off. For the example of the national line

and the 2005/6 validation sample, targeting households who score 34 or less would target 22.4 percent of all households (second column) and produce a poverty rate among those targeted of 51.2 percent (third column).

Figure 15 also reports two other measures of targeting accuracy. The first is a version of inclusion ("% of poor who are targeted"). For the example of the national line and the 2005/6 validation sample with a cut-off of 34 or less, 59.6 percent of all poor households are covered.

The final targeting measure in Figure 15 is the number of successfully targeted poor households for each non-poor household mistakenly targeted (right-most column). For the national line, the 2005/6 validation sample, and a cut-off of 34 or less, covering one poor household means leaking to one non-poor household.

9. Context of poverty-assessment tools for Ghana

This section discusses eight existing poverty-assessment tools for Ghana in terms of their goals, methods, poverty lines, poverty definitions, indicators, cost, accuracy, and precision. The advantages of the new scorecard here are its use of the latest nationally representative data, its focus on feasibility for local, pro-poor organizations, its testing of accuracy and precision out-of-sample and out-of-time, and its reporting of formulas for standard errors.

9.1   Gwatkin *et al.*

Gwatkin *et al.* (2007) apply to Ghana an approach used in 56 countries with Demographic and Health Surveys (Rutstein and Johnson, 2004). Principal Components Analysis is used to make an asset index from simple, low-cost indicators available for the 6,251 households in Ghana's 2003 DHS. The PCA index is like the scorecard here except that, because the DHS does not collect data on income or expenditure, it is based on a different conception of poverty, its accuracy vis-à-vis expenditure-based poverty is unknown, and it can only be assumed to be a proxy for long-term wealth/economic status.[17] Well-known examples of the PCA asset-index approach

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[17] Still, because the indicators are similar and because the "flat maximum" is important, carefully built PCA indices and expenditure-based poverty-assessment tools may pick up the same underlying construct (perhaps "permanent income", see Bollen, Glanville, and Stecklov, 2007), and they rank households much the same. Tests of how well rankings by PCA indices correspond with rankings by expenditure-based scorecards

include Stifel and Christiaensen (2007), Zeller *et al.* (2006), and Filmer and Pritchett (2001), and several applications to Ghana are discussed below.

The 17 indicators in Gwatkin *et al.* are similar to those in the new scorecard here in terms of their simplicity, low cost, and verifiability:

- Characteristics of the residence:
  — Type of floor
  — Presence of electricity
  — Source of drinking water
  — Type of cooking fuel
  — Type of toilet arrangement
  — Type of arrangement for the disposal of garbage
- Ownership of consumer durables:
  — Radios
  — Televisions
  — VCRs
  — Telephones
  — Refrigerators
  — Bicycles
  — Motorcycles or scooters
  — Cars or trucks
  — Tractors
  — Horses or carts
- Whether any household members work agricultural land

Gwatkin *et al.* discuss three basic uses for their index:

- Segmenting households by quintiles to see how health, population, and nutrition vary with socio-economic status
- Monitoring (via exit surveys) how well local health-service posts reach the poor
- Measuring coverage of health services via local, small-scale surveys

The first goal is akin to targeting, and the last two goals resemble the monitoring goals here, so the uses of the index are similar to those of the scorecard here.

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include Lindelow (2006), Wagstaff and Watanabe (2003), and Montgomery *et al.* (2000).

Still, the Gwatkin *et al.* index is more difficult and costly: it has 17 indicators, it does not fit on a single page, and it cannot be computed by hand in the field, as it has 100 point values, half of them negative, and all with five decimal places.

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

9.2 Sahn and Stifel (2003)

Like Gwatkin *et al.* and this paper, Sahn and Stifel (2003) seek a low-cost, practical way to measure poverty. They build an asset index using factor analysis (like PCA) using the 7,744 households in the 1991/2 and 1998/9 GLSS. Sahn and Stifel (2003) seek "to see if there exist simpler and less demanding alternatives to collecting data on expenditure for purposes of measuring economic welfare and ranking households" (p. 484). Their motivation is similar to that of the new scorecard here: they want tools that are affordable and feasible given constraints on budgets and non-specialists' technical resources, and they want to make comparisons over time and countries without the complications and assumptions required for direct measurement via expenditure surveys. Like this paper, they also seek a tool for targeting.

In essence, Sahn and Stifel (2003)—like Gwatkin *et al.* and all other asset indices—redefine poverty to be based on the indicators in their index. Their index can be interpreted not as a proxy of something else but rather as a direct measure of a non-

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expenditure-based definition of poverty. There is nothing wrong—and a lot right—about redefining poverty in this way. This definition is not as commonly used, however, as the expenditure-based definition.

Sahn and Stifel's (2003) nine indicators are simple, inexpensive, and verifiable:

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

To check coherency between the asset index and reported expenditure in the 1991/2 and 1998/9 GLSS[18] and between the asset index and child nutrition, Sahn and Stifel (2003) rank Ghana households based on the index, on expenditure, and on height-for-age. For each pair, they judge the coherence of the two rankings by the distance between a given household's decile ranks. They conclude that the asset index predicts long-term nutritional status no worse than does current expenditure, and does so more inexpensively and simply. They also report that the asset index predicts expenditure worse than does a least-squares regression that predicts expenditure based on household

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[18] Sahn and Stifel check the index against expenditure because it is a common proxy for living standards, not because they believe expenditure should be the benchmark.

demographics, education, residence quality, and access to public services. Finally, they find that measurement error is worse for expenditure than for their index.

Sahn and Stifle (2003) report only *in-sample* tests; that is, they check accuracy with the same data that is used to construct the index in the first place. In-sample tests overstate accuracy. In contrast, this paper reports only *out-of-sample* tests with data that is not used to construct the scorecard. Furthermore, the accuracy tests here that use the 1998/9 GLSS are not only out-of-sample but also *out-of-time*, as the data used for testing comes from a different period than the data used for construction. This is the most stringent—and most appropriate—way to test accuracy.

Sahn and Stifel (2003) do not report measures that would allow a comparison of the ranking ability—with expenditure as the benchmark—of their asset index versus the scorecard here. And their asset index—like all asset indices—cannot be used to estimate poverty rates using expenditure-based poverty lines. Finally, their scorecard is more complex and so is more difficult for non-specialists.

9.3   Sahn and Stifel (2000)

Like Sahn and Stifel (2003), Sahn and Stifel (2000) use factor analysis to construct an asset index meant to measure poverty in terms of long-term wealth. They construct their index by pooling Ghana's 1998 and 1993 DHS. Defining poverty status according to relative lines set at the 25th and 40th percentiles of the asset index, they then compare the distribution of the index and poverty rates over time (within Ghana)

and across countries (Ghana and 10 other sub-Saharan countries). For the cross-country analysis, Sahn and Stifel (2000) construct a single cross-country index from pooled DHS data for the 11 countries (plus five others for which only a single DHS round was available). This is possible because the DHS in all rounds and countries uses a common set of simple, inexpensive, and verifiable indicators (the same as in Sahn and Stifle, 2003).

This approach shares many of the strengths of the approach here in that it can be used for targeting and in that it is flexible, low-cost, and adaptable to diverse contexts. Because it does not require price adjustments over time or between countries, it is even more comparable in those dimensions than the new scorecard here. Sahn and Stifle (2000) differs from the approach here in that it does not require expenditure data.

Sahn and Stifel (2000) share the disadvantages of Sahn and Stifel (2003) in that they use a less-common definition of poverty, do not report formula for standard errors, and do not test the (weak) assumption that their index captures an important and relevant conception of poverty. Also, their purpose is to inform governments and donors about the broad progress of poverty-reduction efforts in Africa, not to provide a tool to help local, pro-poor organizations in their poverty-alleviation efforts.[19]

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[19] Booysen *et al.* (2008) is similar to Sahn and Stifel (2000) except that they use Multiple Correspondence Analysis instead of factor analysis, they look at both poverty rates and inequality measures, and they use three rounds of DHS data rather than two.

9.4   Burger *et al.*

Like Sahn and Stifel (2000), Burger *et al.* (2006) seek a tool to track changes in household wealth over time. To this end, they construct an asset index using the 1993 Ghana DHS and then apply it to the 1998 and 2003 Ghana DHS. Rather than PCA (Gwatkin *et al.*) or factor analysis (Sahn and Stifel, 2000 and 2003), Burger *et al.* use Multiple Correspondence Analysis. MCA resembles PCA, but it does not assume that indicators have Normal distributions. In principle, this makes MCA better suited for indicators with "multiple-choice" response options, although Burger *et al.* and Booysen *et al.* (2008) do not show that MCA ranks—for a given benchmark—better than PCA.

Burger *et al.* shares with Gwatkin *et al.* and Sahn and Stifel (2000 and 2003) the basic advantages and disadvantages of asset indices. Given the limited options in the DHS, all these papers use essentially the same list of indicators.

9.5   Kobina Annim, Awusabo-Asare, and Asare-Mintah

Kobina Annim, Awusabo-Asare, and Asare-Mintah ("KAAAAM", 2008) use another asset index—the Poverty Assessment Tool, developed by the Consultative Group to Assist the Poor—to analyze how the poverty of participants in microfinance in Ghana differs from the poverty of non-participants. They also look at how organizational characteristics are associated with microfinance's poverty outreach.

To do this, KAAAAM first survey 1,628 households with microfinance participants and a comparison group of 1,104 households without microfinance

participants. The country-wide special-purpose survey took place in 2004 and is not representative of Ghana as a whole nor of microfinance participants. KAAAAM then follow Henry *et al.* (2003) to build a PCA-based asset index. KAAAAM do not report indicators, points, or any measures of accuracy, so there is no way for local, pro-poor organizations in Ghana to use their tool.

KAAAAM find that households involved in agriculture tend to be among the poorest, that microfinance participants tend to be less poor than non-participants, and that participants tend to be poorer if they live in poorer areas. In a companion paper, Awusabo-Asare *et al.* (2009) find that credit unions have the least-poor clients, followed by *susu* collectors and savings-and-loan companies, and that the poorest participants tend to be found among financial NGOs and rural/community banks.

KAAAAM is a fine example of the use of the scorecard to address policy questions relevant for the supporters of local, pro-poor organizations. Their approach, however, shares the disadvantages of asset indices in general, as it is not grounded in an expenditure-based poverty line. In particular, its accuracy is unknown.

9.6   Filmer and Scott

Filmer and Scott (2008) test how well different approaches to constructing asset indices produce ranks that correlate with ranks from other asset indices, with expenditure as directly measured by a survey, and with expenditure as predicted by a scorecard. They run tests on 11 countries, one of which is Ghana.

Filmer and Scott find that different approaches to constructing asset indices (such as those by the authors discussed above) generally lead to similar rankings vis-à-vis the benchmarks of directly measured expenditure and scorecard-predicted expenditure. Furthermore, this result is most robust in countries where scoring works well for predicting expenditure and in less-poor countries where total expenditure is not dominated by food.

For Ghana, Filmer and Scott use the 1991/2 GLSS to select 27 indicators that are simple, low-cost, and verifiable:

- Characteristics of the residence:
    — Whether the dwelling is shared with other households
    — Type of floor
    — Type of wall
    — Type of roof
    — Type of toilet arrangement
- Ownership of consumer durables:
    — Furniture
    — Fan
    — Radio
    — Radio cassette
    — Record player
    — 3-in-1 stereo
    — VCR
    — Television
    — Camera
    — Bicycle
    — Car
    — Canoe
    — Outboard motor
    — Boat
    — Sewing machine
    — Electric iron
    — Stove
    — Refrigerator/freezer
    — Washing machine

— Air conditioner
— House
— Land/plot

As Filmer and Scott's goal is to establish general properties of approaches to constructing asset indices (rather than provide asset indices that local, pro-poor organizations can use), they do not report scorecard points.

9.7   Fofack

Fofack (2000) is an early example of the use of scoring to construct a "poverty map" (Elbers, Lanjouw, and Lanjouw, 2003; Hentschel *et al.*, 2000). It uses data on the 4,500 households in the 1991/2 GLSS to construct poverty-assessment tools that are then applied in-sample to the same data to estimate poverty rates for Ghana's five regions, for urban and rural areas, and the country overall. Fofack says that the map "can help researchers reduce targeting errors significantly" (p. 195) and that scoring can be applied to data from "light" monitoring surveys to track poverty rates at shorter intervals than would be possible with more costly, less frequent expenditure surveys.[20]

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[20] After targeting and poverty mapping (that is, measuring poverty rates at a point in time for sub-national areas), the most commonly proposed motivation for poverty-assessment tools is tracking poverty frequently using low-cost surveys (that is, measuring change over time). Despite the existence of many appropriate "light" monitoring surveys, however, few applications have actually used scoring to track poverty. As far as I know, the only applications are Christiaensen *et al.* (2008) and Mathiassen (2008 and 2006).

Fofack constructs scorecards with R^2-based stepwise least-squares regression on the logarithm of per-capita expenditure. The poverty line is equivalent to the USAID "extreme" line and gives a person-level poverty rate of 19.0 percent. The all-Ghana scorecard has 10 indicators:

- Number of spouses
- Percentage of school-age children in school
- Number of household members per room
- Asset score (not further documented)
- Ownership of land
- Export crops (not further documented)
- Expenditures on soap (in some undocumented time frame)
- Expenditures on meat (in some undocumented time frame)
- Consumption of bread (in some undocumented time frame)

Although Fofack calls these "a set of minimum core variables that can be easily collected with minimal measurement error" (p. 207), some of these indicators are in fact complex, difficult to collect, and/or non-verifiable. For example, calculating ratios is required for the percentage of children enrolled in school and for the number of people per room. Likewise, some undocumented calculation by field agents or respondents is also presumably required for the asset score. Finally, respondents must recall and compute expenditure/consumption on soap, meat, and bread, all of which are past events and hence non-verifiable.

Local, pro-poor organizations could not use Fofack's scorecard because the documentation does not define the indicators nor report scorecard points.

Fofack reports that the in-sample difference between estimated and true poverty rates for Ghana overall is –1.5 percentage points, which—even given sampling

variability and that fact that Fofack's measure is in-sample and the measure here is out-of-sample—is higher than the new scorecard's +0.9 percentage points for the food line (the line with a person-level poverty rate closest to that of Fofack) and the 2005/6 validation sample (Figure 9). Fofack does not report standard errors.

9.8   IRIS Center

An earlier draft of this document included a discussion of the scorecard using the 1998/9 GLSS in IRIS Center (2007c). IRIS informed the authors that an updated scorecard using the 2005/6 GLSS would soon be released, so the previous discussion has been removed. Once the updated scorecard is released, this section will be rewritten and added to this document.

10. Conclusion

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

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

The scorecard is built with a sub-sample of data from the 2005/6 GLSS, calibrated to eight poverty lines, and tested on a different sub-sample from the 2005/6 GLSS and also on the entire 1998/9 GLSS.

Accuracy is reported for estimates of households' poverty likelihoods, groups' poverty rates at a point in time, and changes in groups' poverty rates over time. Of course, the scorecard's estimates of changes in poverty rates are not the same as estimates of program impact. Targeting accuracy and formula for standard errors are also reported.

When the scorecard is applied to the 2005/6 validation sample with $n = 16,384$, the absolute difference between estimates and true poverty rates at a point in time is 1.0 percentage points or less and averages—across the eight poverty lines—0.7

percentage points. With 90-percent confidence, the precision of these differences for all lines and rounds is $+/–0.7$ percentage points or less.

When used to measure change across independent samples of $n = 16{,}384$ between the 2005/6 validation sample and the 1998/9 GLSS, the average absolute difference between estimates and true changes is 3.3 percentage points for a seven-year period in which the average true change was –10.0 percentage points. These differences are probably due mostly to changes in the relationships between indicators and poverty over time and to small differences between the two GLSS questionnaires.

For targeting, programs can use the results reported here to select a cut-off that fits their mission and values.

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, a perfectly accurate scorecard is worthless if programs feel so daunted by its complexity or its cost that they do not even try to use it. For this reason, the scorecard is kept simple, using ten indicators that are inexpensive to collect and that are straightforward to verify. Points are all zeros or positive integers, and scores range from 0 to 100. Scores are related to poverty likelihoods via simple look-up tables, and targeting cut-offs are likewise simple to apply. The design attempts to facilitate adoption by helping managers understand and trust scoring and by allowing non-specialists to generate scores quickly in the field.

In sum, the scorecard is a practical, objective way for pro-poor programs in Ghana to monitor poverty rates, track changes in poverty rates over time, and target services, provided that it is applied during a period similar to that of the twelve months beginning September 2005, the period when the data used to construct the scorecard was collected. The same approach can be applied to any country with similar data from a national income and/or expenditure survey.

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Figure 2: Sample sizes and household poverty rates by sub-sample and poverty line

| | | | % with expenditure below a poverty line | | | | | | | |
| | | | National | | | | USAID | International 2005 PPP | | |
Sub-sample	GLSS	Households	100%	Food	150%	200%	'Extreme'	$1.25/day	$2.50/day	$3.75/day
All Ghana	2005/6	8,687	18.9	11.3	36.5	52.5	8.9	16.2	48.9	66.8
	1998/9	5,998	30.2	20.1	50.3	64.7	14.5	25.9	58.1	75.9
Construction										
Selecting indicators and weights	2005/6	2,904	18.7	11.1	36.2	52.8	8.7	16.0	46.8	66.7
Calibration										
Associating scores with likelihoods	2005/6	2,816	18.7	11.1	36.2	52.5	8.4	16.1	47.2	67.0
Validation										
Measuring accuracy	2005/6	2,967	19.2	11.6	37.1	52.2	9.4	16.6	46.7	66.7
Change in poverty rate (percentage points)										
From 2005/6 construction/calibration to 2005/6 validation			−0.5	−0.5	−0.9	+0.5	−0.9	−0.5	+0.3	+0.1
From 2005/6 validation to 1998/9 for all Ghana			−11.0	−8.5	−13.2	−12.6	−5.0	−9.3	−11.4	−9.2

Source: Ghana Living Standards Survey, 2005/6 and 1998/9

Figure 3a: All Ghana, poverty lines and poverty rates, round, and urban/rural/all

Region	Round	Line/rate	National				USAID 'extreme'	International 2005 PPP		
			100%	Food	150%	200%		$1.25/day	$2.50/day	$3.75/day
Urban	1998/9	Line	2,283	1,776	3,425	4,566	1,739	1,582	3,163	4,745
		Rate (households)	13.9	8.2	29.4	45.2	6.9	11.0	37.7	59.7
		Rate (people)	19.4	11.6	38.7	56.5	9.6	15.5	48.7	72.4
	2005/6	Line	8,644	6,723	12,965	17,287	6,522	5,988	11,977	17,965
		Rate (households)	7.3	3.4	18.3	32.3	3.3	5.5	26.0	48.6
		Rate (people)	10.7	5.7	25.9	43.3	5.3	8.8	35.8	62.3
Rural	1998/9	Line	2,122	1,651	3,184	4,245	1,414	1,470	2,941	4,411
		Rate (households)	39.6	27.0	62.4	76.1	18.9	34.5	69.8	85.3
		Rate (people)	49.5	34.4	73.2	85.0	24.7	44.1	80.4	92.4
	2005/6	Line	8,389	6,525	12,584	16,779	5,879	5,812	11,624	17,437
		Rate (households)	27.7	17.3	50.3	67.8	13.1	24.4	62.7	80.7
		Rate (people)	39.3	25.6	64.2	79.9	19.6	35.3	76.1	90.7
All	1998/9	Line	2,176	1,692	3,264	4,352	1,522	1,507	3,015	4,522
		Rate (households)	30.2	20.1	50.3	64.7	14.5	25.9	58.1	75.9
		Rate (people)	39.5	26.8	61.7	75.5	19.7	34.6	69.9	85.8
	2005/6	Line	8,485	6,600	12,728	16,970	6,121	5,879	11,757	17,636
		Rate (households)	18.9	11.3	36.5	52.5	8.9	16.2	46.9	66.8
		Rate (people)	28.5	18.1	49.8	66.1	14.2	25.3	60.9	80.0

National poverty lines are in GHC per adult equivalent per day. 2005 PPP lines are per capita per day. Poverty rates are percentages.

Figure 3b: Western, poverty lines and poverty rates, round, and urban/rural/all

Region	Round	Line/rate	National				USAID 'extreme'	International 2005 PPP		
			100%	Food	150%	200%		$1.25/day	$2.50/day	$3.75/day
Urban	1998/9	Line	2,227	1,732	3,341	4,454	1,648	1,543	3,086	4,629
		Rate (households)	8.0	3.8	28.0	42.9	3.2	6.2	37.3	60.6
		Rate (people)	9.6	3.8	35.6	53.6	2.7	7.2	45.6	71.0
	2005/6	Line	7,843	6,100	11,764	15,685	5,779	5,433	10,867	16,300
		Rate (households)	8.0	4.6	18.0	36.7	4.0	6.4	30.1	53.2
		Rate (people)	11.0	6.9	26.2	49.0	6.7	10.1	41.9	70.3
Rural	1998/9	Line	2,166	1,685	3,249	4,332	1,589	1,501	3,001	4,502
		Rate (households)	26.1	13.0	54.2	72.0	10.9	21.7	64.3	83.4
		Rate (people)	31.9	16.2	63.8	79.2	14.0	27.4	73.4	90.8
	2005/6	Line	8,730	6,790	13,095	17,460	6,635	6,048	12,097	18,145
		Rate (households)	13.2	4.7	35.0	52.6	4.5	10.5	47.6	67.6
		Rate (people)	21.8	8.5	49.7	68.7	7.7	17.9	63.4	83.4
All	1998/9	Line	2,179	1,695	3,268	4,358	1,601	1,510	3,019	4,529
		Rate (households)	21.8	10.9	48.0	65.2	9.1	18.1	57.9	78.1
		Rate (people)	27.3	13.6	57.9	73.9	11.6	23.1	67.6	86.6
	2005/6	Line	8,466	6,584	12,699	16,931	6,380	5,865	11,730	17,595
		Rate (households)	11.5	4.7	29.7	47.6	4.3	9.2	42.1	63.1
		Rate (people)	18.6	8.1	42.7	62.9	7.4	15.6	57.0	79.5

National poverty lines are in GHC per adult equivalent per day. 2005 PPP lines are per capita per day. Poverty rates are percentages.

Figure 3c: Central, poverty lines and poverty rates, round, and urban/rural/all

Region	Round	Line/rate	National				USAID	International 2005 PPP		
			100%	Food	150%	200%	'extreme'	$1.25/day	$2.50/day	$3.75/day
Urban	1998/9	Line	2,219	1,726	3,329	4,439	1,648	1,538	3,075	4,613
		Rate (households)	36.3	23.9	64.5	80.0	22.9	33.4	75.9	91.3
		Rate (people)	42.7	28.8	71.1	84.5	26.8	39.2	79.9	94.2
	2005/6	Line	7,701	5,989	11,551	15,402	5,779	5,335	10,670	16,005
		Rate (households)	3.5	0.9	11.6	21.5	0.4	3.2	15.5	37.5
		Rate (people)	6.4	1.7	18.2	33.1	0.7	5.2	26.1	54.2
Rural	1998/9	Line	2,205	1,715	3,307	4,410	1,586	1,528	3,055	4,583
		Rate (households)	37.9	23.8	58.1	74.0	18.7	33.2	69.2	85.0
		Rate (people)	50.8	32.7	70.6	85.8	27.0	44.7	82.1	93.6
	2005/6	Line	8,593	6,683	12,890	17,186	6,718	5,953	11,907	17,860
		Rate (households)	16.6	7.9	38.9	62.5	8.5	13.2	56.7	77.8
		Rate (people)	26.1	13.3	53.8	75.0	14.0	20.6	70.7	88.5
All	1998/9	Line	2,209	1,718	3,314	4,418	1,604	1,530	3,061	4,591
		Rate (households)	37.4	23.8	59.9	75.7	19.9	33.3	71.1	86.8
		Rate (people)	48.4	31.5	70.7	85.4	27.0	43.1	81.4	93.8
	2005/6	Line	8,316	6,468	12,474	16,632	6,426	5,761	11,522	17,284
		Rate (households)	12.2	5.6	29.8	48.8	5.8	9.8	42.9	64.3
		Rate (people)	19.9	9.7	42.8	62.0	9.9	15.9	56.9	77.8

National poverty lines are in GHC per adult equivalent per day. 2005 PPP lines are per capita per day. Poverty rates are percentages.

Figure 3d: Greater Accra, poverty lines and poverty rates, round, and urban/rural/all

Region	Round	Line/rate	National				USAID 'extreme'	International 2005 PPP		
			100%	Food	150%	200%		$1.25/day	$2.50/day	$3.75/day
Urban	1998/9	Line	2,381	1,852	3,571	4,762	1,921	1,650	3,299	4,949
		Rate (households)	3.0	1.0	12.1	29.7	0.8	2.4	21.4	46.2
		Rate (people)	4.2	1.7	15.9	37.7	1.4	3.4	28.7	58.3
	2005/6	Line	10,507	8,172	15,760	21,013	8,105	7,279	14,558	21,837
		Rate (households)	6.9	2.9	18.6	33.5	3.0	5.0	25.5	47.6
		Rate (people)	10.3	5.1	26.1	43.7	5.1	8.3	34.4	59.0
Rural	1998/9	Line	2,177	1,694	3,266	4,355	1,586	1,509	3,017	4,526
		Rate (households)	12.4	7.8	35.9	44.9	6.6	10.6	41.9	60.6
		Rate (people)	17.8	11.8	48.7	60.8	10.3	15.7	57.1	77.3
	2005/6	Line	9,060	7,047	13,590	18,120	6,807	6,277	12,554	18,830
		Rate (households)	13.3	7.0	34.6	53.3	7.6	11.3	45.2	74.9
		Rate (people)	21.2	10.8	48.4	68.2	12.2	18.0	61.7	87.4
All	1998/9	Line	2,366	1,840	3,549	4,732	1,897	1,639	3,278	4,918
		Rate (households)	3.7	1.6	14.1	31.0	1.2	3.1	23.1	47.3
		Rate (people)	5.2	2.4	18.3	39.4	2.0	4.3	30.8	59.7
	2005/6	Line	10,311	8,020	15,467	20,623	7,930	7,144	14,287	21,431
		Rate (households)	7.7	3.4	20.4	35.8	3.6	5.7	27.8	50.8
		Rate (people)	11.8	5.8	29.2	47.0	6.0	9.6	38.1	62.8

National poverty lines are in GHC per adult equivalent per day. 2005 PPP lines are per capita per day. Poverty rates are percentages.

Figure 3e: Volta, poverty lines and poverty rates, round, and urban/rural/all

Region	Round	Line/rate	National				USAID 'extreme'	International 2005 PPP		
			100%	Food	150%	200%		$1.25/day	$2.50/day	$3.75/day
Urban	1998/9	Line	2,252	1,752	3,378	4,504	1,648	1,560	3,120	4,681
		Rate (households)	28.9	14.6	58.6	72.6	10.8	17.7	64.8	86.7
		Rate (people)	35.3	18.9	69.4	84.0	13.3	23.0	78.2	92.5
	2005/6	Line	7,698	5,987	11,547	15,396	5,779	5,333	10,666	15,999
		Rate (households)	5.6	1.0	19.8	35.7	0.4	3.6	30.7	55.7
		Rate (people)	5.8	0.8	25.2	43.5	0.1	3.7	39.6	67.7
Rural	1998/9	Line	2,134	1,660	3,201	4,268	1,393	1,478	2,957	4,435
		Rate (households)	39.1	28.1	62.0	77.9	21.2	35.7	71.2	86.6
		Rate (people)	46.0	33.6	70.2	84.3	24.9	42.5	77.9	91.8
	2005/6	Line	8,416	6,545	12,623	16,831	6,104	5,830	11,661	17,491
		Rate (households)	28.3	14.7	54.6	72.0	12.7	23.7	67.3	84.0
		Rate (people)	40.6	20.3	69.2	83.8	16.6	34.7	80.4	93.2
All	1998/9	Line	2,159	1,679	3,239	4,319	1,448	1,496	2,992	4,488
		Rate (households)	36.8	25.1	61.3	76.7	18.9	31.7	69.8	86.6
		Rate (people)	43.7	30.4	70.0	84.2	22.4	38.3	78.0	92.0
	2005/6	Line	8,232	6,403	12,348	16,464	6,021	5,703	11,406	17,110
		Rate (households)	22.1	11.0	45.1	62.2	9.4	18.2	57.3	76.3
		Rate (people)	31.7	15.3	57.9	73.5	12.4	26.8	70.0	86.6

National poverty lines are in GHC per adult equivalent per day. 2005 PPP lines are per capita per day. Poverty rates are percentages.

Figure 3f: Eastern, poverty lines and poverty rates, round, and urban/rural/all

Region	Round	Line/rate	National 100%	National Food	National 150%	National 200%	USAID 'extreme'	International 2005 PPP $1.25/day	International 2005 PPP $2.50/day	International 2005 PPP $3.75/day
Urban	1998/9	Line	2,232	1,736	3,348	4,464	1,648	1,546	3,092	4,639
		Rate (households)	31.0	20.9	53.4	66.5	17.8	25.3	60.3	81.6
		Rate (people)	37.8	27.5	61.8	74.5	22.8	31.9	69.3	89.2
	2005/6	Line	7,875	6,125	11,812	15,749	5,779	5,456	10,911	16,367
		Rate (households)	4.4	2.4	13.2	28.7	2.1	3.2	21.9	47.2
		Rate (people)	6.3	3.1	18.8	39.0	2.6	4.1	30.2	61.3
Rural	1998/9	Line	2,168	1,686	3,251	4,335	1,569	1,502	3,003	4,505
		Rate (households)	30.1	15.4	57.8	75.9	13.1	23.8	69.4	86.2
		Rate (people)	37.7	18.6	68.1	84.3	15.8	31.1	79.9	92.6
	2005/6	Line	8,465	6,584	12,697	16,929	6,317	5,864	11,728	17,593
		Rate (households)	13.1	5.4	37.4	60.5	5.0	10.1	51.8	77.5
		Rate (people)	18.6	8.2	46.7	70.3	7.5	14.3	63.8	87.2
All	1998/9	Line	2,181	1,696	3,271	4,362	1,585	1,511	3,022	4,533
		Rate (households)	30.3	16.7	56.8	73.7	14.2	24.2	67.3	85.1
		Rate (people)	37.7	20.4	66.8	82.3	17.3	31.3	77.7	91.9
	2005/6	Line	8,281	6,441	12,421	16,562	6,150	5,737	11,474	17,211
		Rate (households)	10.1	4.3	29.0	49.5	4.0	7.7	41.4	67.0
		Rate (people)	14.7	6.6	38.0	60.5	6.0	11.1	53.3	79.2

National poverty lines are in GHC per adult equivalent per day. 2005 PPP lines are per capita per day. Poverty rates are percentages.

Figure 3g: Ashanti, poverty lines and poverty rates, round, and urban/rural/all

Region	Round	Line/rate	National 100%	National Food	National 150%	National 200%	USAID 'extreme'	International 2005 PPP $1.25/day	International 2005 PPP $2.50/day	International 2005 PPP $3.75/day
Urban	1998/9	Line	2,225	1,730	3,337	4,450	1,648	1,541	3,083	4,624
		Rate (households)	9.0	4.5	18.0	30.5	3.6	7.6	23.0	41.8
		Rate (people)	14.7	7.8	29.7	44.4	6.1	13.1	36.0	60.7
	2005/6	Line	7,794	6,062	11,691	15,589	5,779	5,400	10,800	16,200
		Rate (households)	3.4	1.3	12.1	22.3	1.2	2.5	18.7	40.0
		Rate (people)	4.6	2.0	17.3	32.0	1.8	3.7	26.4	55.8
Rural	1998/9	Line	2,134	1,659	3,200	4,267	1,591	1,478	2,956	4,434
		Rate (households)	25.9	15.4	48.4	63.1	14.2	19.5	53.8	75.5
		Rate (people)	35.9	21.8	60.9	76.0	20.0	27.9	68.3	85.7
	2005/6	Line	8,596	6,686	12,894	17,193	6,590	5,955	11,911	17,866
		Rate (households)	23.3	12.0	48.3	67.0	10.8	20.0	61.9	80.4
		Rate (people)	32.4	18.1	60.5	79.1	16.9	28.1	74.1	89.7
All	1998/9	Line	2,169	1,687	3,253	4,338	1,613	1,503	3,005	4,508
		Rate (households)	18.8	10.8	35.6	49.4	9.8	14.5	40.9	61.4
		Rate (people)	27.7	16.4	48.9	63.8	14.7	22.2	55.9	76.0
	2005/6	Line	8,253	6,419	12,380	16,507	6,243	5,718	11,436	17,154
		Rate (households)	13.6	6.8	30.7	45.2	6.1	11.5	40.9	60.7
		Rate (people)	20.5	11.2	42.0	58.9	10.4	17.7	53.7	75.2

National poverty lines are in GHC per adult equivalent per day. 2005 PPP lines are per capita per day. Poverty rates are percentages.

Figure 3h: Brong Ahafo, poverty lines and poverty rates, round, and urban/rural/all

Region	Round	Line/rate	National				USAID 'extreme'	International 2005 PPP		
			100%	Food	150%	200%		$1.25/day	$2.50/day	$3.75/day
Urban	1998/9	Line	2,246	1,747	3,369	4,492	1,648	1,556	3,112	4,668
		Rate (households)	4.3	2.5	17.5	37.9	2.5	2.7	29.0	62.4
		Rate (people)	7.6	4.3	25.9	51.1	4.3	4.4	40.6	76.8
	2005/6	Line	7,737	6,018	11,606	15,475	5,779	5,360	10,721	16,081
		Rate (households)	13.0	5.3	24.0	38.4	5.3	9.0	34.2	55.7
		Rate (people)	17.4	8.5	32.3	48.6	8.5	14.8	43.9	65.9
Rural	1998/9	Line	2,106	1,638	3,159	4,211	1,376	1,459	2,918	4,376
		Rate (households)	35.1	17.7	65.0	77.9	10.4	28.4	68.4	86.4
		Rate (people)	46.5	24.3	78.3	89.1	14.3	39.7	82.4	95.1
	2005/6	Line	8,192	6,371	12,287	16,383	5,510	5,675	11,350	17,025
		Rate (households)	26.0	12.5	54.1	70.7	6.9	23.0	67.1	83.1
		Rate (people)	37.2	18.9	68.3	82.2	10.4	32.9	80.4	92.9
All	1998/9	Line	2,144	1,668	3,216	4,288	1,450	1,485	2,971	4,456
		Rate (households)	25.7	13.1	50.6	65.8	8.0	20.6	56.5	79.1
		Rate (people)	35.8	18.8	63.9	78.7	11.5	30.1	70.9	90.1
	2005/6	Line	8,020	6,237	12,029	16,039	5,612	5,556	11,112	16,668
		Rate (households)	20.7	9.6	41.8	57.5	6.2	17.3	53.6	71.9
		Rate (people)	29.7	15.0	54.6	69.5	9.7	26.0	66.5	82.7

National poverty lines are in GHC per adult equivalent per day. 2005 PPP lines are per capita per day. Poverty rates are percentages.

Figure 3i: Northern, poverty lines and poverty rates, round, and urban/rural/all

Region	Round	Line/rate	National				USAID 'extreme'	International 2005 PPP		
			100%	Food	150%	200%		$1.25/day	$2.50/day	$3.75/day
Urban	1998/9	Line	2,251	1,751	3,377	4,502	1,648	1,560	3,119	4,679
		Rate (households)	40.0	30.8	62.0	84.4	25.8	34.0	74.0	87.4
		Rate (people)	46.5	33.6	69.1	89.2	29.4	41.0	81.5	92.1
	2005/6	Line	7,610	5,919	11,414	15,219	5,779	5,272	10,544	15,816
		Rate (households)	19.6	13.0	42.8	60.6	12.4	15.6	51.6	76.0
		Rate (people)	27.3	19.3	52.6	69.7	17.8	23.5	61.0	83.7
Rural	1998/9	Line	2,030	1,579	3,046	4,061	1,024	1,407	2,813	4,220
		Rate (households)	65.9	54.7	82.8	88.7	29.5	60.6	86.8	93.4
		Rate (people)	73.8	62.2	89.2	92.6	35.4	69.3	91.8	96.2
	2005/6	Line	7,993	6,216	11,989	15,985	4,589	5,537	11,075	16,612
		Rate (households)	49.1	36.0	67.4	78.5	22.5	45.8	75.3	87.1
		Rate (people)	58.5	43.9	77.4	87.0	28.3	55.9	84.8	93.6
All	1998/9	Line	2,068	1,608	3,101	4,135	1,129	1,432	2,865	4,297
		Rate (households)	61.2	50.4	79.0	87.9	28.8	55.7	84.5	92.3
		Rate (people)	69.2	57.4	85.8	92.0	34.4	64.6	90.0	95.5
	2005/6	Line	7,915	6,156	11,872	15,830	4,831	5,483	10,967	16,450
		Rate (households)	42.0	30.5	61.4	74.2	20.0	38.5	69.6	84.5
		Rate (people)	52.2	38.9	72.4	83.5	26.2	49.4	80.0	91.6

National poverty lines are in GHC per adult equivalent per day. 2005 PPP lines are per capita per day. Poverty rates are percentages.

Figure 3j: Upper East, poverty lines and poverty rates, round, and urban/rural/all

Region	Round	Line/rate	National				USAID 'extreme'	International 2005 PPP		
			100%	Food	150%	200%		$1.25/day	$2.50/day	$3.75/day
Urban	1998/9	Line	2,241	1,743	3,362	4,482	1,648	1,553	3,105	4,658
		Rate (households)	45.0	20.0	85.0	90.0	15.0	25.0	90.0	95.0
		Rate (people)	60.2	26.2	91.3	96.1	20.4	32.0	96.1	99.0
	2005/6	Line	7,833	6,092	11,749	15,665	5,779	5,427	10,853	16,280
		Rate (households)	36.2	19.7	54.4	68.2	16.0	31.3	61.7	82.2
		Rate (people)	42.2	26.8	59.8	75.1	22.9	36.4	67.1	87.0
Rural	1998/9	Line	2,024	1,574	3,036	4,049	1,024	1,402	2,805	4,207
		Rate (households)	87.9	76.6	96.9	97.2	52.1	84.4	97.2	99.4
		Rate (people)	94.5	87.1	99.5	99.6	62.5	93.1	99.6	99.9
	2005/6	Line	8,025	6,242	12,038	16,050	4,589	5,560	11,120	16,680
		Rate (households)	67.9	55.8	84.6	92.2	37.6	63.5	90.5	94.9
		Rate (people)	73.7	63.5	88.1	93.7	43.9	70.6	92.8	96.6
All	1998/9	Line	2,091	1,627	3,137	4,182	1,216	1,449	2,898	4,346
		Rate (households)	72.4	56.3	92.6	94.6	38.7	63.0	94.6	97.8
		Rate (people)	83.9	68.3	96.9	98.5	49.5	74.2	98.5	99.6
	2005/6	Line	8,005	6,226	12,008	16,011	4,712	5,546	11,092	16,638
		Rate (households)	64.4	51.8	81.3	89.5	35.2	59.9	87.3	93.5
		Rate (people)	70.5	59.8	85.2	91.8	41.7	67.1	90.1	95.6

National poverty lines are in GHC per adult equivalent per day. 2005 PPP lines are per capita per day. Poverty rates are percentages.

Figure 3k: Upper West, poverty lines and poverty rates, round, and urban/rural/all

Region	Round	Line/rate	National				USAID	International 2005 PPP		
			100%	Food	150%	200%	'extreme'	$1.25/day	$2.50/day	$3.75/day
Urban	1998/9	Line	2,279	1,773	3,419	4,559	1,648	1,579	3,158	4,737
		Rate (households)	30.0	25.0	65.0	85.0	20.0	25.0	70.0	90.0
		Rate (people)	44.4	37.6	80.3	93.2	29.1	37.6	83.8	96.6
	2005/6	Line	7,543	5,867	11,314	15,086	5,779	5,226	10,451	15,677
		Rate (households)	50.2	42.1	56.9	58.3	42.1	45.0	56.9	62.9
		Rate (people)	49.7	40.1	59.5	61.3	40.1	44.2	59.5	67.2
Rural	1998/9	Line	1,990	1,548	2,985	3,980	1,024	1,379	2,757	4,136
		Rate (households)	89.6	79.3	95.7	97.7	48.1	86.9	97.0	98.9
		Rate (people)	94.1	85.3	97.9	99.0	54.8	91.5	98.5	99.7
	2005/6	Line	8,017	6,235	12,025	16,033	4,589	5,554	11,108	16,662
		Rate (households)	87.2	78.1	96.0	98.7	61.3	84.3	98.2	99.4
		Rate (people)	90.5	81.8	98.1	99.6	65.2	88.3	99.4	99.9
All	1998/9	Line	2,025	1,575	3,037	4,050	1,099	1,403	2,806	4,208
		Rate (households)	83.4	73.7	92.5	96.3	45.2	80.5	94.2	98.0
		Rate (people)	88.2	79.6	95.8	98.3	51.7	85.0	96.7	99.3
	2005/6	Line	7,986	6,211	11,979	15,972	4,666	5,533	11,065	16,598
		Rate (households)	84.1	75.1	92.7	95.3	59.6	81.0	94.8	96.3
		Rate (people)	87.9	79.1	95.6	97.1	63.6	85.4	96.8	97.8

National poverty lines are in GHC per adult equivalent per day. 2005 PPP lines are per capita per day. Poverty rates are percentages.

Figure 4: Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (responses are ordered starting with those associated with higher poverty likelihoods)
1,580	In their main job, how many household members are in a trade, service, or industry connected with agriculture, hunting, forestry, mining, or quarrying? (Six or more; Five; Four; Three; Two; One; None)
1,300	How many members does the household have? (Seven or more; Six; Five; Four; Three; Two; One)
1,131	How many members 18-years-old or younger does the household have? (Five or more; Four; Three; Two; One; None)
1,107	In their main job, how many household members are farmers and skilled workers in agriculture and fishing? (Three or more; Two; One; None)
1,098	How many members 17-years-old or younger does the household have? (Four or more; Three; Two; One; None)
1,093	Are all children ages 5 to 12 in public or private school? (No; Yes, and all are in public schools; No children ages 5 to 12; Yes, and at least some are in private schools)
1,093	Are all children ages 5 to 12 in school? (No; Yes, or no children ages 5 to 12)
1,089	How many members 15-years-old or younger does the household have? (Four or more; Three; Two; One; None)
1,089	Are all children ages 5 to 13 in public or private school? (No; Yes, and all are in public schools; No children ages 5 to 13; Yes, and at least some are in private schools)
1,089	Are all children ages 5 to 13 in school? (No; Yes; No children ages 5 to 13)
1,087	Are all children ages 5 to 14 in public or private school? (No; Yes, and all are in public schools; No children ages 5 to 14; Yes, and at least some are in private schools)
1,086	Are all children ages 5 to 14 in school? (No; Yes; No children ages 5 to 14)
1,080	How many members 16-years-old or younger does the household have? (Four or more; Three; Two; One; None)

Figure 4 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (responses are ordered starting with those associated with higher poverty likelihoods)
1,075	How many members 14-years-old or younger does the household have? (Four or more; Three; Two; One; None)
1,053	Are all children ages 5 to 15 in public or private school? (No; Yes, and all are in public schools; No children ages 5 to 15; Yes, and at least some are in private schools)
1,052	Are all children ages 5 to 15 in school? (No; Yes; No children ages 5 to 15)
1,045	What is the highest grade that the male head/spouse has completed? (None, or pre-school; Primary 1 to 5; Middle 1 to 3; Primary 6, JSS1, or JSS2; M4; No male head/spouse; JSS3; SSS1 or higher)
1,041	How many members 13-years-old or younger does the household have? (Four or more; Three; Two; One; None)
1,036	In their main job, how many household members are in elementary occupations or are farmers and skilled workers in agriculture and fishing? (Three or more; Two; One; None)
1,035	Are all children ages 5 to 11 in public or private school? (No; Yes, and all are in public schools; No children ages 5 to 11; Yes, and at least some are in private schools)
1,031	Are all children ages 5 to 11 in school? (No; Yes; No children ages 5 to 11)
1,015	Are all children ages 5 to 17 in public or private school? (No; Yes, and all are in public schools; No children ages 5 to 17; Yes, and at least some are in private schools)
1,015	Are all children ages 5 to 17 in school? (No; Yes; No children ages 5 to 17)
1,015	Are all children ages 5 to 18 in public or private school? (No; Yes, and all are in public schools; No children ages 5 to 18; Yes, and at least some are in private schools)
1,014	Are all children ages 5 to 18 in school? (No; Yes; No children ages 5 to 18)
993	Are all children ages 5 to 16 in public or private school? (No; Yes, and all are in public schools; No children ages 5 to 16; Yes, and at least some are in private schools)

Figure 4 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (responses are ordered starting with those associated with higher poverty likelihoods)
993	Are all children ages 5 to 16 in school? (No; Yes; No children ages 5 to 16)
943	How many members 12-years-old or younger does the household have? (Three or more; Two; One; None)
919	What is the main fuel used by the household for cooking? (Wood, kerosene, crop waste/residue, animal waste, other, or no data; Charcoal; None, no cooking; Gas, or electricity)
896	How many members 11-years-old or younger does the household have? (Three or more; Two; One; None)
859	Does any household member own a working box iron or electric iron? (No; Only box; Only electric; Both box and electric)
843	What type of toilet is used by your household? (Pan/bucket, no toilet facility (bush, beach), or other; Pit latrine, or toilet in another house; KVIP; Public toilet (flush/bucket/KVIP); Flush toilet (w.c.))
842	Can the male head/spouse read a phrase/sentence in English and do written calculations? (No, neither; One but not the other; No male head/spouse; Yes, both)
829	What is the main source of lighting for the dwelling? (Not electricity (mains); Electricity (mains))
796	Does any household member own a working electric iron? (No; Yes)
792	Can the female head/spouse read a phrase/sentence in English and do written calculations? (No, neither; One but not the other; No female head/spouse; Yes, both)
789	Does any household member own a working mobile telephone? (No; Yes)
781	In the main job of the male head/spouse, what were the main tasks and duties that he spent most of his time on? (Does not work; Skilled worker in agriculture and fishing; No male head/spouse; Other)
772	What is the highest grade completed by the female head/spouse? (No female head/spouse; None or pre-school; Any primary or middle; Any JSS, SSS, S, L, U, or higher)

Figure 4 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (responses are ordered starting with those associated with higher poverty likelihoods)
769	What is the main source of drinking water for this household? (Borehole, well (with pump or not, protected or not), or other; River/stream, rain water/spring, or dugout/pond/lake/dam; Indoor plumbing, inside standpipe, sachet/bottled water, standpipe/tap (public or private outside), pipe in neighboring household, water truck/tanker, or water vendor)
763	What is the main construction material used for the outer wall? (Mud/mud bricks, wood/bamboo, metal sheets/corrugated iron/slate/asbestos, landcrete, thatch, cardboard, other, or no walls; Stone or burned bricks, or cement/sandcrete blocks)
761	Is the main job of the male head/spouse in agriculture? (Male head/spouse has no job; Yes; Main job is not in agriculture; No male head/spouse)
757	What was the status of the female head/spouse in her main job? (Agricultural contributing family worker; Agricultural self-employed, with or without employees; Does not work; Non-agricultural self-employed, without employees, or non-agricultural contributing family worker or apprentice; Paid employee, or non-agricultural self-employed, with employees; No female head/spouse)
744	Does any household member own a working T.V. and/or working video player? (No T.V. (regardless of video player); T.V., but no video player; Both T.V. and video player)
738	Can the male head/spouse do written calculations? (No; Yes; No male head/spouse)
715	Can the male head/spouse read a phrase/sentence in English? (No; No male head/spouse; Yes)
706	What kind of trade, service, or industry is the main job of the male head/spouse connected with? (Agriculture, hunting, forestry, mining, and quarrying; No male head/spouse; Other)
689	How many household members do any work for pay, profit, or family gain, or produce anything for barter or home use? (Three or more; None; Two; One)
665	Does any household member own a working T.V.? (No; Yes)
657	What is the highest grade that a member of the household has completed? (Pre-school, primary 1, or primary 2; Primary 3 to 5; None; Primary 6; Middle 1 to 3; JSS1 or JSS2; Middle 4; JSS4; SSS1 or higher)

Figure 4 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (responses are ordered starting with those associated with higher poverty likelihoods)
656	Can the female head/spouse read a phrase/sentence in English? (No; No female head/spouse; Yes)
655	Can the female head/spouse do written calculations? (No; Yes; No female head/spouse)
642	Does any household member own a working fan? (No; Yes)
632	In the main job of the female head/spouse, what were the main tasks and duties that she spent most of her time on? (Skilled worker in agriculture and fishing; Does not work; Craft and related trades workers; Service workers and shop and market saleswomen; No female head/spouse; Other)
629	Does any household member own a working iron (be it electric or box)? (No; Yes)
615	What is your present occupancy status? (Owning or perching; Rent-free; Renting)
601	In their main job, how many household members are self-employed in an agricultural activity? (Two or more; One; None)
557	Does any household member own a working stove (kerosene, electric, or gas)? (No; Yes)
557	Does any household member own a working refrigerator and/or freezer? (No; Yes)
524	Does any household member own a working refrigerator? (No; Yes)
502	What kind of trade, service, or industry is the main job of the female head/spouse connected with? (Agriculture, hunting, forestry, mining, and quarrying; Other; no female head/spouse)
499	Does any household member own a working video player? (No; Yes)
492	How many members 5-years-old or younger does the household have? (Two or more; One; None)
486	Does any household member own a working gas stove? (No; Yes)
458	What is the main construction material used for the roof? (Palm leaves/raffia/thatch, wood, mud bricks/earth, bamboo, or other; Corrugated iron sheets, cement/concrete, asbestos/slate, or roofing tiles)
445	Does any member of the household own any chickens or other poultry? (Yes; No)

Figure 4 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (responses are ordered starting with those associated with higher poverty likelihoods)
437	What is the present marital status of the female head/spouse? (Married; Widowed; Divorced; No female head/spouse; Consensual union; Separated; Never married, or no data)
437	Does any member of the household own any draught animals (e.g., donkey, horse, or bullock), cattle (including calves), sheep, goats, or pigs? (Yes; No)
426	Does any household member own a bicycle, motorcycle, and/or car? (Only bicycle; Motorcycle, but no car (regardless of bicycle); None; Car (regardless of bicycle and car))
415	Does any household member own a working radio, radio cassette, record player, or 3-in-1 radio system? (None; Only radio; Radio cassette but no record player nor 3-in-1 (regardless of radio); Record player but no 3-in-1 (regardless of radio or cassette); 3-in-1 radio system (regardless of any others))
407	Does any member of the household own any sheep, goats, or pigs? (Yes; No)
400	Does the household use a fixed-line and/or mobile telephone? (No, neither; Only mobile; Only fixed-line; Both fixed-line and mobile)
394	Does any member of the household own any livestock of any type? (Yes; No)
391	What is the present marital status of the male head/spouse? (Married or widowed; No male head/spouse; Consensual union, separated, or divorced; Never married, or no data)
373	Does any household member own a bicycle and/or motorcycle? (Bicycle, but no motorcycle; Both bicycle and motorcycle; None; Motorcycle, but no bicycle)
369	Does any household member own a bicycle? (Yes; No)
358	What is the structure of household headship? (Both male and female heads/spouses; Female head/spouse only; Male head/spouse only)
344	How many rooms does the household occupy (count living rooms, dinings rooms, and bedrooms, but not bathrooms, toilet, and kitchen)? (Three or more; Two; One)
335	Does any household member own working furniture? (No; Yes)

Figure 4 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (responses are ordered starting with those associated with higher poverty likelihoods)
314	How many household members attend a private school? (None; One or more)
299	In what type of dwelling does the household live? (Several huts/buildings in same or different compounds, tents/improvised home, or other; Rooms (other type); Rooms (compound house); Separate house (bungalow)/semi-detached house/single-family house, or flat/apartment)
293	Does any household member own a 3-in-1 radio system? (No; Yes)
291	Does any member of the household own any draught animals (e.g., donkey, horse, or bullock), or cattle (including calves)? (Yes; No)
274	In their main job, how many household members are paid employees (including domestic employees/househelp)? (None; One or more)
245	What is the area of the dwelling in square meters? (Less than 10; 10 to less than 18; 18 to less than 24; 24 to less than 36; 36 or more)
231	How old is the male head/spouse? (56 or older; 46 to 55; 36 to 45; 26 to 35; 25 or younger; No male head/spouse)
203	Does any member of the household own any land (including land outside this area)? (Yes; No)
176	How old is the female head/spouse? (25 to 47; 48 or older; 24 or younger; No female head/spouse)
176	Does the male head/spouse do any work for pay, profit, or family gain, or does he produce anything for barter or home use? (No; Yes)
165	In their main job, how many household members are service workers, shop and market salespeople, craft and related trades workers, or plant and machine operators and assemblers? (None; One; Two or more)
164	What is the main construction material used for the floor? (Earth/mud/mud bricks, or wood; Stone or burned brick, cement/concrete, fiberglass, vinyl tile, ceramic/marble/tiles/terazzo, or other)
161	Can any household members read a phrase/sentence in English and do written calculations? (No; Yes)

Figure 4 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (responses are ordered starting with those associated with higher poverty likelihoods)
159	Does any household member own a house? (Yes; No)
157	Does the female head/spouse do any work for pay, profit, or family gain, or does she produce anything for barter or home use? (Yes; No; No female head/spouse)
155	Can any household members read a phrase/sentence in English? (No; Yes)
154	Can any household members do written calculations? (No; Yes)
152	In their main job, are any household members legislators, senior officials, managers, professionals, technicians and associated professionals, or clerks? (No; Yes)
131	In their main job, are any household members self-employed in a non-agricultural activity? (No; Yes)
125	How does your household dispose of refuse? (Burned or buried by the household, no data, or other; Dumped in public dump or elsewhere; Collected)
103	Do other households share this dwelling with you? (Yes; No)
99	Does any household member own a working sewing machine? (No; Yes)
98	Does any household member own a working kerosene stove? (No; Yes)
93	Does any household member own a working freezer? (No; Yes)
73	Does any household member own a working radio cassette? (No; Yes)
73	Does any household member own a working car? (No; Yes)
72	How many working radios, radio cassettes, record players, and 3-in-1 radio systems do members of the household own? (None; One; Two; Three or more)
60	Does any household member own a working electric stove? (No; Yes)
48	Does any household member own a working radio? (Yes; No)
36	In their main job, are any household members are in elementary occupations? (No; Yes)
22	Does any household member own a working record player? (No; Yes)
22	Does any household member own a working box iron? (No; Yes)
12	Does any household member own land/plot? (Yes; No)
1	Does any household member own a working motorcycle? (No; Yes)

Source: 2005/6 Ghana Living Standards Survey and the national poverty line.

National Poverty Line

2005/6 Scorecard
Applied to the 2005/6 Validation Sample

(and tables pertaining to all eight poverty lines)

Figure 5 (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	40.3
5–9	100.0
10–14	88.1
15–19	78.5
20–24	68.7
25–29	52.9
30–34	40.0
35–39	21.4
40–44	17.8
45–49	11.0
50–54	9.0
55–59	2.0
60–64	1.8
65–69	1.2
70–74	0.0
75–79	0.0
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Figure 6 (National line): Derivation of estimated poverty likelihoods associated with scores

Score	Households below poverty line		All households at score		Poverty likelihood (estimated, %)
0–4	12	÷	29	=	40.3
5–9	179	÷	179	=	100.0
10–14	611	÷	694	=	88.1
15–19	2,093	÷	2,667	=	78.5
20–24	2,900	÷	4,220	=	68.7
25–29	3,309	÷	6,252	=	52.9
30–34	3,345	÷	8,358	=	40.0
35–39	2,025	÷	9,443	=	21.4
40–44	1,654	÷	9,308	=	17.8
45–49	1,170	÷	10,602	=	11.0
50–54	991	÷	10,987	=	9.0
55–59	188	÷	9,356	=	2.0
60–64	125	÷	6,999	=	1.8
65–69	76	÷	6,573	=	1.2
70–74	0	÷	5,881	=	0.0
75–79	0	÷	3,514	=	0.0
80–84	0	÷	3,135	=	0.0
85–89	0	÷	981	=	0.0
90–94	0	÷	703	=	0.0
95–100	0	÷	119	=	0.0

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

Figure 7a (All poverty lines in units of adult equivalents): Distribution of household poverty likelihoods across ranges demarcated by poverty lines

	Likelihood of expenditure in range demarcated by poverty lines per day per adult equivalent					
	<USAID	=>USAID and <Food	=>Food and <National	=>National and <150% Natl.	=>150% Natl. and <200% Natl.	=>200% Natl.
Score	<GHC6,121	=>GHC6,121 and <GHC6,600	=>GHC6,600 and <GHC8,485	=>GHC8,485 and <GHC12,728	=>GHC12,728 and <GHC16,970	=>GHC16,970
0–4	40.3	0.0	0.0	0.0	29.9	29.9
5–9	62.4	23.5	14.1	0.0	0.0	0.0
10–14	68.3	9.6	10.2	3.8	4.1	4.1
15–19	41.1	23.0	14.3	16.7	2.3	2.6
20–24	33.1	13.1	22.5	15.3	8.2	7.8
25–29	29.9	7.5	15.6	27.8	11.0	8.3
30–34	16.1	5.7	18.2	25.9	19.0	15.1
35–39	7.2	2.7	11.6	33.0	23.3	22.3
40–44	5.9	2.2	9.7	30.6	24.7	26.9
45–49	3.9	1.0	6.2	20.1	24.4	44.5
50–54	2.5	0.2	6.3	20.1	18.2	52.7
55–59	1.1	0.0	1.0	12.7	23.3	62.0
60–64	0.3	0.0	1.5	4.4	13.3	80.5
65–69	0.0	0.0	1.2	3.0	9.9	86.0
70–74	0.0	0.0	0.0	3.1	9.3	87.7
75–79	0.0	0.0	0.0	4.2	1.1	94.7
80–84	0.0	0.0	0.0	0.0	0.7	99.3
85–89	0.0	0.0	0.0	0.0	0.0	100.0
90–94	0.0	0.0	0.0	0.0	0.0	100.0
95–100	0.0	0.0	0.0	0.0	0.0	100.0

Note: All poverty likelihoods in percentage units.

Figure 7b (All poverty lines in units of people): Distribution of household poverty likelihoods across ranges demarcated by poverty lines

| | Likelihood of expenditure in range demarcated by poverty lines per day per person | | | |
| | <$1.25/day | =>$1.25/day and <$2.50/day | =>$2.50/day and <$3.75/day | =>$3.75/day |
Score	<GHC5,879	=>GHC5,879 and <GHC11,757	=>GHC11,757 and <GHC17,636	=>GHC17,636
0–4	40.3	29.9	29.9	0.0
5–9	100.0	0.0	0.0	0.0
10–14	85.4	10.5	4.1	0.0
15–19	75.9	19.3	4.9	0.0
20–24	65.5	25.1	6.5	2.9
25–29	48.1	39.9	9.9	2.1
30–34	34.0	47.7	11.9	6.4
35–39	16.8	56.7	18.1	8.4
40–44	13.4	52.7	20.1	13.8
45–49	8.9	38.1	29.2	23.7
50–54	6.0	36.0	26.4	31.7
55–59	1.6	26.4	32.5	39.5
60–64	1.2	8.4	33.7	56.9
65–69	1.2	7.9	23.9	67.1
70–74	0.0	9.8	12.1	78.1
75–79	0.0	4.2	5.3	90.6
80–84	0.0	0.7	5.7	93.6
85–89	0.0	0.0	0.0	100.0
90–94	0.0	0.0	3.3	96.7
95–100	0.0	0.0	0.0	100.0

Note: All poverty likelihoods in percentage units.

Figure 8 (National line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16{,}384$) from the validation sample, with confidence intervals, 2005/6 scorecard applied to the 2005/6 validation sample

| | | Difference between estimate and true value | | |
| | | Confidence interval (+/− percentage points) | | |
Score	Diff.	90-percent	95-percent	99-percent
0–4	+40.3	0.0	0.0	0.0
5–9	+0.0	0.0	0.0	0.0
10–14	+6.0	7.4	8.7	11.1
15–19	+8.5	4.0	4.8	6.3
20–24	+20.0	3.4	4.0	5.2
25–29	+3.5	2.7	3.2	4.6
30–34	+7.8	2.2	2.6	3.4
35–39	−10.9	6.6	6.7	7.0
40–44	+0.6	1.7	1.9	2.7
45–49	+0.9	1.2	1.5	1.9
50–54	+4.3	0.9	1.0	1.4
55–59	−3.6	2.3	2.4	2.6
60–64	−1.4	1.1	1.2	1.3
65–69	−0.1	0.5	0.6	0.7
70–74	−0.7	0.5	0.6	0.7
75–79	+0.0	0.0	0.0	0.0
80–84	+0.0	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 9 (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 for the 2005/6 scorecard applied to the 2005/6 validation sample and to the 1998/9 GLSS

	Poverty line							
	National				**USAID**	**International 2005 PPP**		
	100%	**Food**	**150%**	**200%**	**'Extreme'**	**$1.25/day**	**$2.50/day**	**$3.75/day**
Estimate minus true value								
2005/6 scorecard applied to 2005/6 validation	+0.8	+0.9	+0.2	+1.0	–0.3	+1.0	+1.0	–0.5
2005/6 scorecard applied to 1998/8 GLSS	–4.8	–4.3	–3.5	–0.1	–1.9	–4.0	+1.0	+3.6
Precision of difference								
2005/6 scorecard applied to 2005/6 validation	0.4	0.3	0.5	0.6	0.3	0.4	0.6	0.5
2005/6 scorecard applied to 1998/8 GLSS	0.6	0.5	0.6	0.6	0.4	0.6	0.7	0.6
α factor								
2005/6 scorecard applied to 2005/6 validation	0.83	0.79	0.85	0.88	0.83	0.79	0.89	0.87
2005/6 scorecard applied to 1998/8 GLSS	1.15	1.19	0.99	1.00	1.09	1.17	0.99	1.05
Precision is measured as 90-percent confidence intervals in units of +/– percentage points.								
Differences and precision estimated from 1,000 bootstraps of size $n = 16{,}384$.								
α is estimated from 1,000 bootstrap samples of $n = 256, 512, 1{,}024, 2{,}048, 4{,}096, 8{,}192$, and 16,384.								

Figure 10 (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, 2005/6 scorecard applied to the 2005/6 validation sample

Sample Size n	Difference between estimate and true value			
		Confidence interval (+/− percentage points)		
	Diff.	90-percent	95-percent	99-percent
1	+0.2	65.7	73.2	88.3
4	+1.1	27.7	36.0	45.5
8	+0.7	19.1	22.5	31.0
16	+0.7	13.3	15.8	20.6
32	+0.7	9.5	11.3	14.4
64	+0.7	6.7	7.7	10.8
128	+0.9	5.0	5.8	7.6
256	+0.8	3.5	4.1	5.2
512	+0.8	2.3	2.9	3.7
1,024	+0.8	1.6	1.9	2.7
2,048	+0.8	1.2	1.4	1.8
4,096	+0.8	0.8	1.0	1.3
8,192	+0.8	0.6	0.7	1.0
16,384	+0.8	0.4	0.5	0.6

Figure 11 (All poverty lines): Differences, precision of differences, and the α factor for bootstrapped estimates of changes in poverty rates for groups of households between two points in time for the 2005/6 scorecard applied to the 1998/9 GLSS

		Poverty line							
		National				USAID	International 2005 PPP		
		100%	**Food**	**150%**	**200%**	**'Extreme'**	**$1.25/day**	**$2.50/day**	**$3.75/day**
Estimated change minus true change									
2005/6 scorecard applied to 1998/8 GLSS		–5.6	–5.2	–3.7	–1.1	–1.7	–5.1	–0.0	+4.1
Precision of estimated change minus true change									
2005/6 scorecard applied to 1998/8 GLSS		0.7	0.6	0.9	0.8	0.5	0.7	0.8	0.8
α factor									
2005/6 scorecard applied to 1998/8 GLSS		1.40	1.44	1.33	1.27	1.41	1.43	1.27	1.36
Precision is measured as 90-percent confidence intervals in units of +/– percentage points.									
Differences and precision estimated from 1,000 bootstraps of size n = 16,384.									
α is estimated from 1,000 bootstrap samples of n = 256, 512, 1,024, 2,048, 4,096, 8,192, and 16,384.									

Figure 12 (National line): Differences and precision of differences for bootstrapped estimates of changes in poverty rates for groups of households between two points in time, by sample size, 2005/6 scorecard applied to the 2005/6 validation sample

By definition, this table does not exist for the 2005/6 scorecard applied to the 2005/6 validation sample.

Figure 13 (All poverty lines): Possible outcomes from targeting by poverty score

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

Figure 14 (National line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2005/6 scorecard applied to the 2005/6 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	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	0.0	19.2	0.0	80.7	80.7	−99.8
5–9	0.2	19.0	0.0	80.7	80.9	−98.0
10–14	0.8	18.4	0.1	80.7	81.4	−91.2
15–19	2.7	16.5	0.9	79.9	82.6	−67.5
20–24	5.0	14.2	2.8	78.0	83.0	−33.5
25–29	8.3	10.9	5.7	75.1	83.4	+16.4
30–34	11.5	7.8	10.9	69.8	81.3	+43.1
35–39	14.8	4.4	17.0	63.7	78.6	+11.4
40–44	16.6	2.7	24.6	56.2	72.8	−27.8
45–49	17.8	1.5	34.0	46.8	64.6	−76.7
50–54	18.3	1.0	44.5	36.3	54.6	−131.3
55–59	18.8	0.4	53.3	27.5	46.3	−177.2
60–64	19.0	0.2	60.1	20.7	39.8	−212.3
65–69	19.2	0.1	66.5	14.3	33.4	−245.8
70–74	19.2	0.0	72.3	8.5	27.7	−276.1
75–79	19.2	0.0	75.8	4.9	24.2	−294.4
80–84	19.2	0.0	79.0	1.8	21.0	−310.7
85–89	19.2	0.0	79.9	0.8	20.1	−315.8
90–94	19.2	0.0	80.7	0.1	19.3	−319.5
95–100	19.2	0.0	80.8	0.0	19.2	−320.1

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

Figure 15 (National line): For a given score cut-off, the percentage of all households who are targeted, the percentage of targeted households who are poor, the percentage of poor households who are targeted, and the number of poor households who are successful targeted (inclusion) per non-poor household mistakenly targeted (leakage), 2005/6 scorecard applied to the 2005/6 validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	0.0	0.0	0.0	0.0:1
5–9	0.2	86.1	0.9	6.2:1
10–14	0.9	86.8	4.1	6.6:1
15–19	3.6	75.1	13.9	3.0:1
20–24	7.8	64.3	26.0	1.8:1
25–29	14.0	59.4	43.4	1.5:1
30–34	22.4	51.2	59.6	1.0:1
35–39	31.8	46.5	77.0	0.9:1
40–44	41.1	40.3	86.2	0.7:1
45–49	51.8	34.3	92.4	0.5:1
50–54	62.7	29.1	95.0	0.4:1
55–59	72.1	26.1	97.7	0.4:1
60–64	79.1	24.1	99.0	0.3:1
65–69	85.7	22.4	99.7	0.3:1
70–74	91.5	21.0	100.0	0.3:1
75–79	95.1	20.2	100.0	0.3:1
80–84	98.2	19.6	100.0	0.2:1
85–89	99.2	19.4	100.0	0.2:1
90–94	99.9	19.3	100.0	0.2:1
95–100	100.0	19.2	100.0	0.2:1

Food Poverty Line

2005/6 Scorecard
Applied to the 2005/6 Validation Sample

Figure 5 (Food line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	40.3
5–9	85.9
10–14	77.9
15–19	64.1
20–24	46.3
25–29	37.4
30–34	21.8
35–39	9.9
40–44	8.1
45–49	4.9
50–54	2.7
55–59	1.1
60–64	0.3
65–69	0.0
70–74	0.0
75–79	0.0
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Figure 6 (Food line): Derivation of estimated poverty likelihoods associated with scores

Score	Households below poverty line		All households at score		Poverty likelihood (estimated, %)
0–4	12	÷	29	=	40.3
5–9	154	÷	179	=	85.9
10–14	541	÷	694	=	77.9
15–19	1,711	÷	2,667	=	64.1
20–24	1,952	÷	4,220	=	46.3
25–29	2,336	÷	6,252	=	37.4
30–34	1,822	÷	8,358	=	21.8
35–39	933	÷	9,443	=	9.9
40–44	755	÷	9,308	=	8.1
45–49	517	÷	10,602	=	4.9
50–54	296	÷	10,987	=	2.7
55–59	98	÷	9,356	=	1.1
60–64	22	÷	6,999	=	0.3
65–69	0	÷	6,573	=	0.0
70–74	0	÷	5,881	=	0.0
75–79	0	÷	3,514	=	0.0
80–84	0	÷	3,135	=	0.0
85–89	0	÷	981	=	0.0
90–94	0	÷	703	=	0.0
95–100	0	÷	119	=	0.0

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

Figure 8 (Food line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16{,}384$) from the validation sample, with confidence intervals, 2005/6 scorecard applied to the 2005/6 validation sample

| | | Difference between estimate and true value | | |
| | | Confidence interval (+/− percentage points) | | |
Score	Diff.	90-percent	95-percent	99-percent
0–4	+40.3	0.0	0.0	0.0
5–9	−14.1	7.0	7.0	7.0
10–14	+14.3	9.1	11.2	15.1
15–19	+11.8	4.7	5.4	6.8
20–24	+6.0	3.3	3.9	5.0
25–29	+13.5	2.2	2.6	3.4
30–34	+2.7	1.8	2.2	2.8
35–39	−5.7	3.6	3.7	3.9
40–44	+1.1	1.1	1.3	1.7
45–49	−0.9	1.0	1.2	1.6
50–54	+0.3	0.7	0.8	1.1
55–59	+0.3	0.4	0.4	0.6
60–64	−0.5	0.5	0.6	0.7
65–69	+0.0	0.0	0.0	0.0
70–74	+0.0	0.0	0.0	0.0
75–79	+0.0	0.0	0.0	0.0
80–84	+0.0	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 10 (Food line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2005/6 scorecard applied to the 2005/6 validation sample

| Sample Size n | Difference between estimate and true value | | | |
| | Diff. | Confidence interval (+/− percentage points) | | |
		90-percent	95-percent	99-percent
1	−1.4	57.8	68.2	79.6
4	+0.3	23.4	29.0	43.0
8	+0.3	14.4	18.9	26.5
16	+0.4	10.5	12.7	16.3
32	+0.6	7.3	9.0	12.0
64	+0.7	5.3	6.5	8.7
128	+0.8	3.7	4.6	6.4
256	+0.8	2.8	3.3	4.0
512	+0.9	1.8	2.2	2.9
1,024	+0.9	1.3	1.5	2.0
2,048	+0.9	0.9	1.1	1.4
4,096	+0.9	0.6	0.8	1.0
8,192	+0.9	0.5	0.5	0.7
16,384	+0.9	0.3	0.4	0.5

Figure 12 (Food line): Differences and precision of differences for bootstrapped estimates of changes in poverty rates for groups of households between two points in time, by sample size, 2005/6 scorecard applied to the 2005/6 validation sample

By definition, this table does not exist for the 2005/6 scorecard applied to the 2005/6 validation sample.

Figure 14 (Food line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2005/6 scorecard applied to the 2005/6 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	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	0.0	11.6	0.0	88.4	88.4	−99.8
5–9	0.2	11.4	0.0	88.4	88.6	−96.7
10–14	0.7	10.9	0.2	88.2	88.9	−86.2
15–19	2.2	9.4	1.3	87.1	89.3	−49.9
20–24	4.2	7.4	3.6	84.8	89.0	+3.2
25–29	6.1	5.5	7.9	80.5	86.6	+31.6
30–34	8.0	3.6	14.4	74.0	82.1	−23.8
35–39	9.8	1.8	22.1	66.3	76.1	−90.3
40–44	10.6	1.0	30.6	57.8	68.4	−163.8
45–49	11.2	0.4	40.5	47.9	59.1	−249.3
50–54	11.5	0.1	51.3	37.1	48.6	−342.1
55–59	11.5	0.1	60.6	27.8	39.4	−422.1
60–64	11.6	0.0	67.5	20.9	32.5	−481.9
65–69	11.6	0.0	74.1	14.3	25.9	−538.6
70–74	11.6	0.0	79.9	8.5	20.1	−589.3
75–79	11.6	0.0	83.5	4.9	16.5	−619.6
80–84	11.6	0.0	86.6	1.8	13.4	−646.6
85–89	11.6	0.0	87.6	0.8	12.4	−655.1
90–94	11.6	0.0	88.3	0.1	11.7	−661.2
95–100	11.6	0.0	88.4	0.0	11.6	−662.2

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

Figure 15 (Food line): For a given score cut-off, the percentage of all households who are targeted, the percentage of targeted households who are poor, the percentage of poor households who are targeted, and the number of poor households who are successful targeted (inclusion) per non-poor household mistakenly targeted (leakage), 2005/6 scorecard applied to the 2005/6 validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	0.0	0.0	0.0	0.0:1
5–9	0.2	86.1	1.5	6.2:1
10–14	0.9	77.6	6.0	3.5:1
15–19	3.6	63.0	19.4	1.7:1
20–24	7.8	53.6	36.0	1.2:1
25–29	14.0	43.5	52.7	0.8:1
30–34	22.4	35.9	69.3	0.6:1
35–39	31.8	30.7	84.3	0.4:1
40–44	41.1	25.7	91.0	0.3:1
45–49	51.8	21.7	96.9	0.3:1
50–54	62.7	18.3	98.8	0.2:1
55–59	72.1	16.0	99.5	0.2:1
60–64	79.1	14.7	100.0	0.2:1
65–69	85.7	13.5	100.0	0.2:1
70–74	91.5	12.7	100.0	0.1:1
75–79	95.1	12.2	100.0	0.1:1
80–84	98.2	11.8	100.0	0.1:1
85–89	99.2	11.7	100.0	0.1:1
90–94	99.9	11.6	100.0	0.1:1
95–100	100.0	11.6	100.0	0.1:1

150% of the National Poverty Line

2005/6 Scorecard
Applied to the 2005/6 Validation Sample

Figure 5 (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	40.3
5–9	100.0
10–14	91.8
15–19	95.1
20–24	84.1
25–29	80.7
30–34	65.9
35–39	54.4
40–44	48.4
45–49	31.1
50–54	29.1
55–59	14.7
60–64	6.2
65–69	4.2
70–74	3.1
75–79	4.2
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Figure 6 (150% of the national line): Derivation of estimated poverty likelihoods associated with scores

Score	Households below poverty line		All households at score		Poverty likelihood (estimated, %)
0–4	12	÷	29	=	40.3
5–9	179	÷	179	=	100.0
10–14	638	÷	694	=	91.8
15–19	2,537	÷	2,667	=	95.1
20–24	3,548	÷	4,220	=	84.1
25–29	5,048	÷	6,252	=	80.7
30–34	5,507	÷	8,358	=	65.9
35–39	5,137	÷	9,443	=	54.4
40–44	4,502	÷	9,308	=	48.4
45–49	3,300	÷	10,602	=	31.1
50–54	3,200	÷	10,987	=	29.1
55–59	1,377	÷	9,356	=	14.7
60–64	432	÷	6,999	=	6.2
65–69	273	÷	6,573	=	4.2
70–74	181	÷	5,881	=	3.1
75–79	147	÷	3,514	=	4.2
80–84	0	÷	3,135	=	0.0
85–89	0	÷	981	=	0.0
90–94	0	÷	703	=	0.0
95–100	0	÷	119	=	0.0

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

Figure 8 (150% of the national line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16,384$) from the validation sample, with confidence intervals, 2005/6 scorecard applied to the 2005/6 validation sample

| | | Difference between estimate and true value | | |
| | | Confidence interval (+/− percentage points) | | |
Score	Diff.	90-percent	95-percent	99-percent
0–4	−59.7	29.9	29.9	29.9
5–9	+0.0	0.0	0.0	0.0
10–14	+6.4	7.3	8.5	11.2
15–19	+10.5	3.0	3.7	4.6
20–24	+1.8	2.6	3.1	4.3
25–29	−0.0	2.1	2.4	3.4
30–34	−0.1	2.4	2.8	3.8
35–39	−9.0	5.6	5.9	6.3
40–44	+3.4	2.3	2.7	3.5
45–49	+0.8	1.9	2.2	2.9
50–54	+4.9	1.7	2.1	2.8
55–59	−1.6	1.6	1.9	2.5
60–64	−1.8	1.6	1.7	2.1
65–69	−1.8	1.5	1.6	1.9
70–74	+1.8	0.5	0.6	0.8
75–79	+1.2	1.3	1.5	2.0
80–84	+0.0	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 10 (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, 2005/6 scorecard applied to the 2005/6 validation sample

| Sample Size | Difference between estimate and true value | | | |
| | | Confidence interval (+/− percentage points) | | |
n	Diff.	90-percent	95-percent	99-percent
1	−0.3	62.6	83.0	95.5
4	−0.9	34.0	40.1	50.7
8	−0.6	24.2	28.9	38.1
16	−0.1	17.2	20.3	28.7
32	−0.1	11.9	14.2	18.8
64	+0.1	8.3	10.3	13.9
128	+0.1	5.8	7.0	9.4
256	+0.1	4.1	4.9	6.2
512	+0.1	2.9	3.5	4.4
1,024	+0.2	2.0	2.4	3.3
2,048	+0.2	1.5	1.7	2.3
4,096	+0.2	1.1	1.3	1.7
8,192	+0.1	0.8	0.9	1.2
16,384	+0.2	0.5	0.6	0.9

Figure 12 (150% of the national line): Differences and precision of differences for bootstrapped estimates of changes in poverty rates for groups of households between two points in time, by sample size, 2005/6 scorecard applied to the 2005/6 validation sample

By definition, this table does not exist for the 2005/6 scorecard applied to the 2005/6 validation sample.

Figure 14 (150% of the national line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2005/6 scorecard applied to the 2005/6 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	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	0.0	37.0	0.0	62.9	63.0	–99.8
5–9	0.2	36.9	0.0	62.9	63.1	–98.9
10–14	0.8	36.2	0.1	62.9	63.7	–95.3
15–19	3.1	33.9	0.4	62.5	65.6	–81.9
20–24	6.7	30.4	1.1	61.9	68.6	–60.9
25–29	11.8	25.2	2.2	60.7	72.5	–30.2
30–34	17.6	19.4	4.8	58.2	75.8	+8.0
35–39	23.7	13.3	8.1	54.8	78.5	+49.9
40–44	28.1	9.0	13.1	49.9	77.9	+64.7
45–49	31.7	5.4	20.1	42.8	74.5	+45.8
50–54	34.2	2.9	28.6	34.4	68.5	+22.9
55–59	35.8	1.3	36.3	26.6	62.4	+2.0
60–64	36.4	0.7	42.7	20.2	56.6	–15.2
65–69	36.9	0.2	48.8	14.1	51.0	–31.7
70–74	37.0	0.1	54.6	8.3	45.3	–47.3
75–79	37.1	0.0	58.0	4.9	42.0	–56.5
80–84	37.1	0.0	61.1	1.8	38.9	–64.9
85–89	37.1	0.0	62.1	0.8	37.9	–67.6
90–94	37.1	0.0	62.8	0.1	37.2	–69.5
95–100	37.1	0.0	62.9	0.0	37.1	–69.8

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

Figure 15 (150% of the national line): For a given score cut-off, the percentage of all households who are targeted, the percentage of targeted households who are poor, the percentage of poor households who are targeted, and the number of poor households who are successful targeted (inclusion) per non-poor household mistakenly targeted (leakage), 2005/6 scorecard applied to the 2005/6 validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	0.0	100.0	0.1	Only poor targeted
5–9	0.2	100.0	0.6	Only poor targeted
10–14	0.9	93.9	2.3	15.5:1
15–19	3.6	87.6	8.4	7.1:1
20–24	7.8	86.1	18.1	6.2:1
25–29	14.0	84.2	31.9	5.3:1
30–34	22.4	78.7	47.6	3.7:1
35–39	31.8	74.5	64.0	2.9:1
40–44	41.1	68.2	75.7	2.1:1
45–49	51.8	61.2	85.4	1.6:1
50–54	62.7	54.5	92.2	1.2:1
55–59	72.1	49.6	96.5	1.0:1
60–64	79.1	46.0	98.2	0.9:1
65–69	85.7	43.0	99.4	0.8:1
70–74	91.5	40.4	99.7	0.7:1
75–79	95.1	39.0	100.0	0.6:1
80–84	98.2	37.7	100.0	0.6:1
85–89	99.2	37.4	100.0	0.6:1
90–94	99.9	37.1	100.0	0.6:1
95–100	100.0	37.1	100.0	0.6:1

200% of the National Poverty Line

2005/6 Scorecard
Applied to the 2005/6 Validation Sample

Figure 5 (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	70.1
5–9	100.0
10–14	95.9
15–19	97.4
20–24	92.2
25–29	91.7
30–34	84.9
35–39	77.7
40–44	73.1
45–49	55.6
50–54	47.3
55–59	38.0
60–64	19.5
65–69	14.0
70–74	12.3
75–79	5.3
80–84	0.7
85–89	0.0
90–94	0.0
95–100	0.0

Figure 6 (200% of the national line): Derivation of estimated poverty likelihoods associated with scores

Score	Households below poverty line		All households at score		Poverty likelihood (estimated, %)
0–4	20	÷	29	=	70.1
5–9	179	÷	179	=	100.0
10–14	666	÷	694	=	95.9
15–19	2,598	÷	2,667	=	97.4
20–24	3,892	÷	4,220	=	92.2
25–29	5,733	÷	6,252	=	91.7
30–34	7,093	÷	8,358	=	84.9
35–39	7,339	÷	9,443	=	77.7
40–44	6,801	÷	9,308	=	73.1
45–49	5,889	÷	10,602	=	55.6
50–54	5,198	÷	10,987	=	47.3
55–59	3,553	÷	9,356	=	38.0
60–64	1,362	÷	6,999	=	19.5
65–69	921	÷	6,573	=	14.0
70–74	725	÷	5,881	=	12.3
75–79	186	÷	3,514	=	5.3
80–84	23	÷	3,135	=	0.7
85–89	0	÷	981	=	0.0
90–94	0	÷	703	=	0.0
95–100	0	÷	119	=	0.0

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

Figure 8 (200% of the national line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16{,}384$) from the validation sample, with confidence intervals, 2005/6 scorecard applied to the 2005/6 validation sample

| Score | Diff. | Difference between estimate and true value | | |
| | | Confidence interval (+/− percentage points) | | |
		90-percent	95-percent	99-percent
0–4	−29.9	14.9	14.9	14.9
5–9	+0.0	0.0	0.0	0.0
10–14	−4.1	2.1	2.1	2.1
15–19	+2.4	1.8	2.1	2.8
20–24	−5.2	3.1	3.2	3.3
25–29	+1.3	1.6	1.9	2.6
30–34	+4.2	2.0	2.4	3.3
35–39	−5.2	3.5	3.6	4.0
40–44	+4.3	2.0	2.6	3.2
45–49	+6.2	2.2	2.5	3.2
50–54	−0.4	2.0	2.4	3.0
55–59	+7.3	1.9	2.3	3.1
60–64	−5.9	4.1	4.4	5.0
65–69	−0.3	1.8	2.1	2.7
70–74	+2.4	1.7	1.9	2.5
75–79	−0.5	1.7	2.0	2.7
80–84	−2.8	2.1	2.2	2.6
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 10 (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, 2005/6 scorecard applied to the 2005/6 validation sample

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/− percentage points)		
		90-percent	95-percent	99-percent
1	+1.0	67.5	79.1	89.7
4	+1.5	34.6	41.1	56.3
8	+1.2	24.9	30.0	38.4
16	+0.7	18.5	21.8	29.2
32	+0.7	12.5	15.5	21.8
64	+1.1	9.1	10.6	13.0
128	+1.1	6.1	7.3	9.8
256	+1.0	4.6	5.4	7.4
512	+1.1	3.0	3.7	4.9
1,024	+1.1	2.2	2.8	3.6
2,048	+1.1	1.6	2.0	2.6
4,096	+1.1	1.1	1.3	1.8
8,192	+1.0	0.8	1.0	1.3
16,384	+1.0	0.6	0.7	0.9

Figure 12 (200% of the national line): Differences and precision of differences for bootstrapped estimates of changes in poverty rates for groups of households between two points in time, by sample size, 2005/6 scorecard applied to the 2005/6 validation sample

By definition, this table does not exist for the 2005/6 scorecard applied to the 2005/6 validation sample.

Figure 14 (200% of the national line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2005/6 scorecard applied to the 2005/6 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	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	0.0	52.1	0.0	47.8	47.9	–99.9
5–9	0.2	52.0	0.0	47.8	48.0	–99.2
10–14	0.9	51.3	0.0	47.8	48.7	–96.5
15–19	3.4	48.7	0.1	47.7	51.1	–86.6
20–24	7.6	44.6	0.2	47.6	55.2	–70.5
25–29	13.3	38.9	0.8	47.1	60.4	–47.6
30–34	20.3	31.9	2.1	45.7	66.0	–18.2
35–39	28.2	24.0	3.6	44.2	72.4	+15.1
40–44	34.7	17.5	6.5	41.4	76.1	+45.4
45–49	40.5	11.7	11.2	36.6	77.1	+76.8
50–54	45.4	6.7	17.3	30.5	76.0	+66.8
55–59	48.5	3.7	23.6	24.2	72.7	+54.8
60–64	50.2	2.0	28.9	18.9	69.0	+44.5
65–69	51.3	0.9	34.4	13.4	64.7	+34.0
70–74	51.9	0.3	39.7	8.1	60.0	+23.9
75–79	52.1	0.1	43.0	4.8	56.9	+17.6
80–84	52.2	0.0	46.0	1.8	54.0	+11.8
85–89	52.2	0.0	47.0	0.8	53.0	+9.9
90–94	52.2	0.0	47.7	0.1	52.3	+8.6
95–100	52.2	0.0	47.8	0.0	52.2	+8.3

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

Figure 15 (200% of the national line): For a given score cut-off, the percentage of all households who are targeted, the percentage of targeted households who are poor, the percentage of poor households who are targeted, and the number of poor households who are successful targeted (inclusion) per non-poor household mistakenly targeted (leakage), 2005/6 scorecard applied to the 2005/6 validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	0.0	100.0	0.1	Only poor targeted
5–9	0.2	100.0	0.4	Only poor targeted
10–14	0.9	100.0	1.7	Only poor targeted
15–19	3.6	96.6	6.6	28.5:1
20–24	7.8	97.3	14.5	36.7:1
25–29	14.0	94.6	25.5	17.6:1
30–34	22.4	90.5	38.9	9.6:1
35–39	31.8	88.6	54.1	7.8:1
40–44	41.1	84.3	66.5	5.4:1
45–49	51.8	78.3	77.6	3.6:1
50–54	62.7	72.4	87.1	2.6:1
55–59	72.1	67.3	93.0	2.1:1
60–64	79.1	63.4	96.1	1.7:1
65–69	85.7	59.8	98.2	1.5:1
70–74	91.5	56.6	99.4	1.3:1
75–79	95.1	54.8	99.8	1.2:1
80–84	98.2	53.1	100.0	1.1:1
85–89	99.2	52.6	100.0	1.1:1
90–94	99.9	52.2	100.0	1.1:1
95–100	100.0	52.2	100.0	1.1:1

USAID "Extreme" Poverty Line

2005/6 Scorecard
Applied to the 2005/6 Validation Sample

Figure 5 (USAID "extreme" line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	40.3
5–9	62.4
10–14	68.3
15–19	41.1
20–24	33.1
25–29	29.9
30–34	16.1
35–39	7.2
40–44	5.9
45–49	3.9
50–54	2.5
55–59	1.1
60–64	0.3
65–69	0.0
70–74	0.0
75–79	0.0
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Figure 6 (USAID "extreme" line): Derivation of estimated poverty likelihoods associated with scores

Score	Households below poverty line		All households at score		Poverty likelihood (estimated, %)
0–4	12	÷	29	=	40.3
5–9	112	÷	179	=	62.4
10–14	474	÷	694	=	68.3
15–19	1,096	÷	2,667	=	41.1
20–24	1,397	÷	4,220	=	33.1
25–29	1,868	÷	6,252	=	29.9
30–34	1,342	÷	8,358	=	16.1
35–39	676	÷	9,443	=	7.2
40–44	553	÷	9,308	=	5.9
45–49	410	÷	10,602	=	3.9
50–54	275	÷	10,987	=	2.5
55–59	98	÷	9,356	=	1.1
60–64	22	÷	6,999	=	0.3
65–69	0	÷	6,573	=	0.0
70–74	0	÷	5,881	=	0.0
75–79	0	÷	3,514	=	0.0
80–84	0	÷	3,135	=	0.0
85–89	0	÷	981	=	0.0
90–94	0	÷	703	=	0.0
95–100	0	÷	119	=	0.0

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

Figure 8 (USAID "extreme" line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16,384$) from the validation sample, with confidence intervals, 2005/6 scorecard applied to the 2005/6 validation sample

Score	Diff.	Difference between estimate and true value		
		Confidence interval (+/− percentage points)		
		90-percent	95-percent	99-percent
0–4	+40.3	0.0	0.0	0.0
5–9	−33.4	18.8	18.8	18.8
10–14	+8.0	9.1	10.7	14.5
15–19	−4.9	4.8	5.4	7.1
20–24	−0.1	3.3	3.9	5.1
25–29	+10.0	2.0	2.5	3.2
30–34	+3.6	1.6	1.8	2.4
35–39	−6.0	3.7	3.8	4.2
40–44	−1.1	1.1	1.3	1.8
45–49	−1.8	1.4	1.5	1.7
50–54	+0.6	0.6	0.8	1.0
55–59	−1.3	1.0	1.1	1.3
60–64	−0.5	0.5	0.5	0.7
65–69	−0.1	0.1	0.1	0.1
70–74	+0.0	0.0	0.0	0.0
75–79	+0.0	0.0	0.0	0.0
80–84	+0.0	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 10 (USAID "extreme" line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2005/6 scorecard applied to the 2005/6 validation sample

Sample Size n	Diff.	Confidence interval (+/− percentage points)		
		90-percent	95-percent	99-percent
1	−2.6	50.0	63.0	68.6
4	−0.9	20.7	26.5	39.4
8	−0.8	14.1	17.4	25.0
16	−0.7	10.0	12.0	15.4
32	−0.5	7.4	8.5	11.1
64	−0.4	5.3	6.4	7.9
128	−0.4	3.6	4.3	5.8
256	−0.3	2.5	2.9	3.9
512	−0.3	1.8	2.1	2.7
1,024	−0.3	1.2	1.5	1.9
2,048	−0.3	0.9	1.0	1.4
4,096	−0.3	0.6	0.8	1.0
8,192	−0.3	0.4	0.5	0.7
16,384	−0.3	0.3	0.4	0.5

The header note "Difference between estimate and true value" spans the columns above.

Figure 12 (USAID "extreme" line): Differences and precision of differences for bootstrapped estimates of changes in poverty rates for groups of households between two points in time, by sample size, 2005/6 scorecard applied to the 2005/6 validation sample

By definition, this table does not exist for the 2005/6 scorecard applied to the 2005/6 validation sample.

Figure 14 (USAID "extreme" line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2005/6 scorecard applied to the 2005/6 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	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	0.0	9.4	0.0	90.5	90.5	–99.7
5–9	0.2	9.3	0.0	90.5	90.7	–96.0
10–14	0.6	8.8	0.3	90.3	90.9	–83.7
15–19	1.9	7.5	1.6	88.9	90.9	–41.5
20–24	3.5	5.9	4.3	86.3	89.8	+19.6
25–29	5.0	4.4	9.0	81.5	86.6	+4.4
30–34	6.2	3.2	16.2	74.4	80.7	–71.1
35–39	7.6	1.8	24.2	66.4	74.0	–156.3
40–44	8.4	1.1	32.8	57.8	66.2	–247.1
45–49	9.0	0.4	42.7	47.8	56.8	–352.7
50–54	9.2	0.2	53.5	37.0	46.2	–467.2
55–59	9.4	0.1	62.7	27.8	37.2	–564.4
60–64	9.4	0.0	69.7	20.9	30.3	–638.0
65–69	9.4	0.0	76.2	14.3	23.8	–707.5
70–74	9.4	0.0	82.1	8.5	17.9	–769.8
75–79	9.4	0.0	85.6	4.9	14.4	–807.0
80–84	9.4	0.0	88.8	1.8	11.2	–840.3
85–89	9.4	0.0	89.7	0.8	10.3	–850.6
90–94	9.4	0.0	90.4	0.1	9.6	–858.1
95–100	9.4	0.0	90.6	0.0	9.4	–859.4

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

Figure 15 (USAID "extreme" line): For a given score cut-off, the percentage of all households who are targeted, the percentage of targeted households who are poor, the percentage of poor households who are targeted, and the number of poor households who are successful targeted (inclusion) per non-poor household mistakenly targeted (leakage), 2005/6 scorecard applied to the 2005/6 validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	0.0	0.0	0.0	0.0:1
5–9	0.2	80.6	1.8	4.2:1
10–14	0.9	70.8	6.8	2.4:1
15–19	3.6	54.6	20.7	1.2:1
20–24	7.8	44.9	37.1	0.8:1
25–29	14.0	35.7	53.2	0.6:1
30–34	22.4	27.9	66.2	0.4:1
35–39	31.8	24.0	81.0	0.3:1
40–44	41.1	20.4	88.8	0.3:1
45–49	51.8	17.4	95.5	0.2:1
50–54	62.7	14.7	97.4	0.2:1
55–59	72.1	13.0	99.3	0.1:1
60–64	79.1	11.9	99.8	0.1:1
65–69	85.7	11.0	100.0	0.1:1
70–74	91.5	10.3	100.0	0.1:1
75–79	95.1	9.9	100.0	0.1:1
80–84	98.2	9.6	100.0	0.1:1
85–89	99.2	9.5	100.0	0.1:1
90–94	99.9	9.5	100.0	0.1:1
95–100	100.0	9.4	100.0	0.1:1

$1.25/Day 2005 PPP Poverty Line

2005/6 Scorecard
Applied to the 2005/6 Validation Sample

Figure 5 ($1.25/day 2005 PPP 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	40.3
5–9	100.0
10–14	85.4
15–19	75.9
20–24	65.5
25–29	48.1
30–34	34.0
35–39	16.8
40–44	13.4
45–49	8.9
50–54	6.0
55–59	1.6
60–64	1.2
65–69	1.2
70–74	0.0
75–79	0.0
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Figure 6 ($1.25/day 2005 PPP line): Derivation of estimated poverty likelihoods associated with scores

Score	Households below poverty line		All households at score		Poverty likelihood (estimated, %)
0–4	12	÷	29	=	40.3
5–9	179	÷	179	=	100.0
10–14	593	÷	694	=	85.4
15–19	2,023	÷	2,667	=	75.9
20–24	2,765	÷	4,220	=	65.5
25–29	3,009	÷	6,252	=	48.1
30–34	2,838	÷	8,358	=	34.0
35–39	1,582	÷	9,443	=	16.8
40–44	1,245	÷	9,308	=	13.4
45–49	948	÷	10,602	=	8.9
50–54	657	÷	10,987	=	6.0
55–59	148	÷	9,356	=	1.6
60–64	80	÷	6,999	=	1.2
65–69	76	÷	6,573	=	1.2
70–74	0	÷	5,881	=	0.0
75–79	0	÷	3,514	=	0.0
80–84	0	÷	3,135	=	0.0
85–89	0	÷	981	=	0.0
90–94	0	÷	703	=	0.0
95–100	0	÷	119	=	0.0

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

Figure 8 ($1.25/day 2005 PPP line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16,384$) from the validation sample, with confidence intervals, 2005/6 scorecard applied to the 2005/6 validation sample

Score	Diff.	Difference between estimate and true value		
		Confidence interval (+/− percentage points)		
		90-percent	95-percent	99-percent
0–4	+40.3	0.0	0.0	0.0
5–9	+0.0	0.0	0.0	0.0
10–14	+3.3	7.4	8.7	11.1
15–19	+3.3	3.9	4.5	5.9
20–24	+16.3	3.3	4.1	5.1
25–29	+10.0	2.6	3.1	4.1
30–34	+5.0	2.0	2.4	3.4
35–39	−6.7	4.2	4.4	4.8
40–44	+2.2	1.3	1.6	2.0
45–49	+1.0	1.1	1.3	1.7
50–54	+2.4	0.8	0.9	1.2
55–59	−5.3	3.2	3.3	3.5
60–64	−0.2	0.6	0.6	0.9
65–69	+0.7	0.3	0.3	0.4
70–74	−0.5	0.4	0.4	0.5
75–79	+0.0	0.0	0.0	0.0
80–84	+0.0	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 10 ($1.25/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2005/6 scorecard applied to the 2005/6 validation sample

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/− percentage points)		
		90-percent	95-percent	99-percent
1	−0.5	65.7	67.4	87.1
4	+0.6	26.4	32.2	45.5
8	+0.5	18.0	21.5	30.1
16	+0.7	11.9	14.5	19.1
32	+0.7	8.3	10.2	13.4
64	+0.8	6.1	7.2	9.5
128	+0.9	4.2	5.0	6.6
256	+1.0	3.0	3.7	4.4
512	+1.0	2.1	2.5	3.4
1,024	+1.0	1.4	1.7	2.4
2,048	+1.0	1.1	1.3	1.7
4,096	+1.0	0.8	0.9	1.3
8,192	+1.0	0.5	0.7	0.9
16,384	+1.0	0.4	0.4	0.6

Figure 12 ($1.25/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of changes in poverty rates for groups of households between two points in time, by sample size, 2005/6 scorecard applied to the 2005/6 validation sample

By definition, this table does not exist for the 2005/6 scorecard applied to the 2005/6 validation sample.

Figure 14 ($1.25/day 2005 PPP line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2005/6 scorecard applied to the 2005/6 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	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	0.0	16.6	0.0	83.4	83.4	−99.8
5–9	0.2	16.4	0.0	83.4	83.6	−97.7
10–14	0.8	15.8	0.1	83.3	84.1	−89.8
15–19	2.7	13.9	0.9	82.5	85.3	−62.2
20–24	5.1	11.5	2.7	80.7	85.7	−22.6
25–29	7.9	8.7	6.2	77.2	85.1	+31.9
30–34	10.6	6.0	11.8	71.6	82.3	+29.2
35–39	13.3	3.3	18.6	64.9	78.1	−11.8
40–44	14.5	2.1	26.6	56.8	71.3	−60.5
45–49	15.5	1.1	36.3	47.1	62.6	−118.6
50–54	15.9	0.7	46.9	36.5	52.4	−182.5
55–59	16.4	0.2	55.7	27.7	44.1	−235.4
60–64	16.5	0.1	62.6	20.8	37.4	−276.9
65–69	16.6	0.0	69.1	14.3	30.9	−316.3
70–74	16.6	0.0	74.9	8.5	25.1	−351.5
75–79	16.6	0.0	78.5	4.9	21.5	−372.7
80–84	16.6	0.0	81.6	1.8	18.4	−391.6
85–89	16.6	0.0	82.6	0.8	17.4	−397.5
90–94	16.6	0.0	83.3	0.1	16.7	−401.7
95–100	16.6	0.0	83.4	0.0	16.6	−402.5

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

Figure 15 ($1.25/day 2005 PPP line): For a given score cut-off, the percentage of all households who are targeted, the percentage of targeted households who are poor, the percentage of poor households who are targeted, and the number of poor households who are successful targeted (inclusion) per non-poor household mistakenly targeted (leakage), 2005/6 scorecard applied to the 2005/6 validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	0.0	0.0	0.0	0.0:1
5–9	0.2	86.1	1.1	6.2:1
10–14	0.9	86.8	4.7	6.6:1
15–19	3.6	76.0	16.3	3.2:1
20–24	7.8	64.9	30.4	1.8:1
25–29	14.0	55.9	47.3	1.3:1
30–34	22.4	47.5	64.1	0.9:1
35–39	31.8	41.7	80.1	0.7:1
40–44	41.1	35.3	87.4	0.5:1
45–49	51.8	29.9	93.2	0.4:1
50–54	62.7	25.3	95.5	0.3:1
55–59	72.1	22.8	98.9	0.3:1
60–64	79.1	20.9	99.6	0.3:1
65–69	85.7	19.3	99.8	0.2:1
70–74	91.5	18.1	100.0	0.2:1
75–79	95.1	17.5	100.0	0.2:1
80–84	98.2	16.9	100.0	0.2:1
85–89	99.2	16.7	100.0	0.2:1
90–94	99.9	16.6	100.0	0.2:1
95–100	100.0	16.6	100.0	0.2:1

$2.50/Day 2005 PPP Poverty Line

2005/6 Scorecard
Applied to the 2005/6 Validation Sample

Figure 5 ($2.50/day 2005 PPP 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	70.1
5–9	100.0
10–14	95.9
15–19	95.1
20–24	90.6
25–29	88.0
30–34	81.7
35–39	73.5
40–44	66.1
45–49	47.0
50–54	42.0
55–59	28.0
60–64	9.5
65–69	9.0
70–74	9.8
75–79	4.2
80–84	0.7
85–89	0.0
90–94	0.0
95–100	0.0

Figure 6 ($2.50/day 2005 PPP line): Derivation of estimated poverty likelihoods associated with scores

Score	Households below poverty line		All households at score		Poverty likelihood (estimated, %)
0–4	20	÷	29	=	70.1
5–9	179	÷	179	=	100.0
10–14	666	÷	694	=	95.9
15–19	2,537	÷	2,667	=	95.1
20–24	3,825	÷	4,220	=	90.6
25–29	5,504	÷	6,252	=	88.0
30–34	6,827	÷	8,358	=	81.7
35–39	6,938	÷	9,443	=	73.5
40–44	6,154	÷	9,308	=	66.1
45–49	4,987	÷	10,602	=	47.0
50–54	4,613	÷	10,987	=	42.0
55–59	2,621	÷	9,356	=	28.0
60–64	665	÷	6,999	=	9.5
65–69	592	÷	6,573	=	9.0
70–74	574	÷	5,881	=	9.8
75–79	147	÷	3,514	=	4.2
80–84	23	÷	3,135	=	0.7
85–89	0	÷	981	=	0.0
90–94	0	÷	703	=	0.0
95–100	0	÷	119	=	0.0

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

Figure 8 ($2.50/day 2005 PPP line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16,384$) from the validation sample, with confidence intervals, 2005/6 scorecard applied to the 2005/6 validation sample

| Score | Diff. | Difference between estimate and true value Confidence interval (+/− percentage points) | | |
		90-percent	95-percent	99-percent
0–4	−29.9	14.9	14.9	14.9
5–9	+0.0	0.0	0.0	0.0
10–14	−4.1	2.1	2.1	2.1
15–19	+2.6	2.2	2.6	3.5
20–24	−5.5	3.3	3.5	3.7
25–29	−1.8	1.7	2.0	2.6
30–34	+4.7	2.1	2.5	3.4
35–39	−2.3	2.2	2.3	3.1
40–44	+3.6	2.2	2.6	3.3
45–49	+4.1	2.1	2.6	3.4
50–54	+5.6	1.9	2.3	3.2
55–59	+0.7	1.9	2.3	2.9
60–64	−9.9	6.1	6.3	6.8
65–69	+1.2	1.3	1.6	2.0
70–74	+4.3	1.1	1.4	1.8
75–79	+2.1	0.8	0.9	1.3
80–84	−1.7	1.5	1.7	2.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 10 ($2.50/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2005/6 scorecard applied to the 2005/6 validation sample

Sample Size	Difference between estimate and true value			
	Diff.	Confidence interval (+/− percentage points)		
n		90-percent	95-percent	99-percent
1	+1.3	72.7	79.4	89.5
4	+1.4	35.3	41.3	52.2
8	+1.0	24.6	29.7	38.8
16	+0.8	17.8	21.9	28.2
32	+1.0	12.2	14.3	18.8
64	+1.1	8.9	10.4	13.3
128	+1.0	6.1	7.3	9.6
256	+1.0	4.6	5.5	7.2
512	+1.1	3.2	3.8	4.8
1,024	+1.1	2.2	2.6	3.5
2,048	+1.1	1.6	1.9	2.5
4,096	+1.1	1.1	1.3	1.8
8,192	+1.0	0.8	1.0	1.2
16,384	+1.0	0.6	0.7	1.0

Figure 12 ($2.50/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of changes in poverty rates for groups of households between two points in time, by sample size, 2005/6 scorecard applied to the 2005/6 validation sample

By definition, this table does not exist for the 2005/6 scorecard applied to the 2005/6 validation sample.

Figure 14 ($2.50/day 2005 PPP line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2005/6 scorecard applied to the 2005/6 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	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	0.0	46.6	0.0	53.3	53.4	−99.9
5–9	0.2	46.5	0.0	53.3	53.5	−99.1
10–14	0.9	45.8	0.0	53.3	54.2	−96.1
15–19	3.4	43.3	0.2	53.2	56.6	−85.1
20–24	7.5	39.2	0.3	53.0	60.5	−67.3
25–29	13.1	33.5	0.9	52.4	65.6	−41.8
30–34	19.8	26.8	2.6	50.8	70.6	−9.5
35–39	27.2	19.5	4.7	48.6	75.8	+26.4
40–44	33.0	13.7	8.1	45.2	78.2	+58.9
45–49	38.0	8.6	13.7	39.6	77.7	+70.6
50–54	41.8	4.9	21.0	32.4	74.1	+55.1
55–59	44.4	2.3	27.7	25.6	70.0	+40.6
60–64	45.5	1.2	33.6	19.7	65.3	+28.1
65–69	46.1	0.5	39.5	13.8	59.9	+15.3
70–74	46.5	0.2	45.0	8.3	54.8	+3.5
75–79	46.6	0.1	48.4	4.9	51.5	−3.8
80–84	46.7	0.0	51.5	1.8	48.5	−10.4
85–89	46.7	0.0	52.5	0.8	47.5	−12.5
90–94	46.7	0.0	53.2	0.1	46.8	−14.0
95–100	46.7	0.0	53.3	0.0	46.7	−14.2

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

Figure 15 ($2.50/day 2005 PPP line): For a given score cut-off, the percentage of all households who are targeted, the percentage of targeted households who are poor, the percentage of poor households who are targeted, and the number of poor households who are successful targeted (inclusion) per non-poor household mistakenly targeted (leakage), 2005/6 scorecard applied to the 2005/6 validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	0.0	100.0	0.1	Only poor targeted
5–9	0.2	100.0	0.4	Only poor targeted
10–14	0.9	100.0	1.9	Only poor targeted
15–19	3.6	95.3	7.3	20.4:1
20–24	7.8	96.0	16.0	24.0:1
25–29	14.0	93.5	28.1	14.5:1
30–34	22.4	88.5	42.5	7.7:1
35–39	31.8	85.3	58.2	5.8:1
40–44	41.1	80.2	70.7	4.1:1
45–49	51.8	73.5	81.5	2.8:1
50–54	62.7	66.6	89.5	2.0:1
55–59	72.1	61.5	95.1	1.6:1
60–64	79.1	57.5	97.5	1.4:1
65–69	85.7	53.9	98.9	1.2:1
70–74	91.5	50.8	99.6	1.0:1
75–79	95.1	49.0	99.9	1.0:1
80–84	98.2	47.5	100.0	0.9:1
85–89	99.2	47.1	100.0	0.9:1
90–94	99.9	46.7	100.0	0.9:1
95–100	100.0	46.7	100.0	0.9:1

$3.75/Day 2005 PPP Poverty Line

2005/6 Scorecard
Applied to the 2005/6 Validation Sample

Figure 5 ($3.75/day 2005 PPP 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	97.1
25–29	97.9
30–34	93.6
35–39	91.6
40–44	86.2
45–49	76.3
50–54	68.4
55–59	60.5
60–64	43.2
65–69	32.9
70–74	21.9
75–79	9.4
80–84	6.4
85–89	0.0
90–94	3.3
95–100	0.0

Figure 6 ($3.75/day 2005 PPP line): Derivation of estimated poverty likelihoods associated with scores

Score	Households below poverty line		All households at score		Poverty likelihood (estimated, %)
0–4	29	÷	29	=	100.0
5–9	179	÷	179	=	100.0
10–14	694	÷	694	=	100.0
15–19	2,667	÷	2,667	=	100.0
20–24	4,100	÷	4,220	=	97.1
25–29	6,121	÷	6,252	=	97.9
30–34	7,823	÷	8,358	=	93.6
35–39	8,646	÷	9,443	=	91.6
40–44	8,021	÷	9,308	=	86.2
45–49	8,085	÷	10,602	=	76.3
50–54	7,510	÷	10,987	=	68.4
55–59	5,660	÷	9,356	=	60.5
60–64	3,020	÷	6,999	=	43.2
65–69	2,164	÷	6,573	=	32.9
70–74	1,287	÷	5,881	=	21.9
75–79	332	÷	3,514	=	9.4
80–84	202	÷	3,135	=	6.4
85–89	0	÷	981	=	0.0
90–94	23	÷	703	=	3.3
95–100	0	÷	119	=	0.0

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

Figure 8 ($3.75/day 2005 PPP line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n =$ 16,384) from the validation sample, with confidence intervals, 2005/6 scorecard applied to the 2005/6 validation sample

| Score | Diff. | Difference between estimate and true value | | |
| | | Confidence interval (+/− percentage points) | | |
		90-percent	95-percent	99-percent
0–4	+0.0	0.0	0.0	0.0
5–9	+0.0	0.0	0.0	0.0
10–14	+0.0	0.0	0.0	0.0
15–19	+0.4	0.4	0.4	0.5
20–24	−2.9	1.4	1.4	1.4
25–29	−0.2	0.7	0.8	1.1
30–34	−2.1	1.5	1.6	1.8
35–39	−5.8	3.2	3.3	3.4
40–44	+1.5	1.6	1.9	2.3
45–49	+1.5	1.8	2.1	2.8
50–54	−4.5	3.1	3.2	3.6
55–59	+2.6	2.2	2.6	3.4
60–64	+4.1	2.6	3.1	4.3
65–69	+7.1	2.3	2.8	3.7
70–74	−1.2	2.3	2.9	3.6
75–79	−11.8	7.8	8.1	8.8
80–84	−0.9	1.8	2.1	2.9
85–89	+0.0	0.0	0.0	0.0
90–94	+3.3	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 10 ($3.75/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2005/6 scorecard applied to the 2005/6 validation sample

Sample Size	Difference between estimate and true value			
		Confidence interval (+/− percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	+1.1	66.6	79.4	92.1
4	+0.5	32.0	38.0	49.6
8	+0.5	23.5	28.6	37.9
16	+0.2	16.8	20.8	27.4
32	−0.3	12.2	14.4	18.8
64	−0.3	8.5	9.9	12.6
128	−0.4	5.7	6.9	9.5
256	−0.5	4.1	4.9	6.9
512	−0.5	2.9	3.6	4.5
1,024	−0.5	2.1	2.5	3.6
2,048	−0.5	1.5	1.8	2.4
4,096	−0.5	1.1	1.3	1.7
8,192	−0.5	0.7	0.9	1.2
16,384	−0.5	0.5	0.6	0.9

Figure 12 ($3.75/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of changes in poverty rates for groups of households between two points in time, by sample size, 2005/6 scorecard applied to the 2005/6 validation sample

By definition, this table does not exist for the 2005/6 scorecard applied to the 2005/6 validation sample.

Figure 14 ($3.75/day 2005 PPP line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2005/6 scorecard applied to the 2005/6 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	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	0.0	66.7	0.0	33.3	33.3	–99.9
5–9	0.2	66.5	0.0	33.3	33.5	–99.4
10–14	0.9	65.8	0.0	33.3	34.2	–97.3
15–19	3.6	63.2	0.0	33.3	36.8	–89.3
20–24	7.8	59.0	0.0	33.3	41.0	–76.7
25–29	13.9	52.8	0.2	33.1	47.0	–58.1
30–34	21.9	44.9	0.5	32.7	54.6	–33.6
35–39	31.0	35.7	0.8	32.4	63.5	–5.8
40–44	39.0	27.7	2.1	31.1	70.1	+20.1
45–49	47.0	19.8	4.8	28.5	75.5	+47.9
50–54	54.6	12.2	8.2	25.1	79.7	+75.8
55–59	59.9	6.8	12.2	21.1	80.9	+81.7
60–64	62.6	4.1	16.5	16.8	79.4	+75.3
65–69	64.5	2.2	21.2	12.1	76.6	+68.3
70–74	65.9	0.9	25.7	7.6	73.5	+61.5
75–79	66.5	0.3	28.6	4.7	71.1	+57.1
80–84	66.7	0.0	31.5	1.8	68.5	+52.8
85–89	66.7	0.0	32.4	0.8	67.6	+51.4
90–94	66.7	0.0	33.1	0.1	66.9	+50.3
95–100	66.7	0.0	33.3	0.0	66.7	+50.1

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

Figure 15 ($3.75/day 2005 PPP line): For a given score cut-off, the percentage of all households who are targeted, the percentage of targeted households who are poor, the percentage of poor households who are targeted, and the number of poor households who are successful targeted (inclusion) per non-poor household mistakenly targeted (leakage), 2005/6 scorecard applied to the 2005/6 validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	0.0	100.0	0.0	Only poor targeted
5–9	0.2	100.0	0.3	Only poor targeted
10–14	0.9	100.0	1.4	Only poor targeted
15–19	3.6	99.5	5.3	201.0:1
20–24	7.8	99.8	11.6	439.9:1
25–29	14.0	98.9	20.8	89.9:1
30–34	22.4	97.7	32.8	42.0:1
35–39	31.8	97.4	46.5	37.4:1
40–44	41.1	94.8	58.5	18.3:1
45–49	51.8	90.8	70.4	9.8:1
50–54	62.7	87.0	81.8	6.7:1
55–59	72.1	83.1	89.7	4.9:1
60–64	79.1	79.2	93.8	3.8:1
65–69	85.7	75.3	96.6	3.0:1
70–74	91.5	72.0	98.7	2.6:1
75–79	95.1	69.9	99.6	2.3:1
80–84	98.2	68.0	100.0	2.1:1
85–89	99.2	67.3	100.0	2.1:1
90–94	99.9	66.8	100.0	2.0:1
95–100	100.0	66.7	100.0	2.0:1

National Poverty Line

2005/6 Scorecard Applied to the 1998/9 GLSS

Figure 8 (National line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16{,}384$) from the validation sample, with confidence intervals, 2005/6 scorecard applied to the 1998/9 GLSS

| Score | Diff. | Difference between estimate and true value | | |
| | | Confidence interval ($+/-$ percentage points) | | |
		90-percent	95-percent	99-percent
0–4	###	-50.0	-50.0	-50.0
5–9	+39.5	29.6	38.9	44.8
10–14	+2.3	5.1	6.1	7.9
15–19	−2.3	3.0	3.6	4.8
20–24	−3.1	2.9	3.6	4.7
25–29	−12.7	7.5	7.8	8.1
30–34	−11.2	6.7	6.9	7.3
35–39	−12.4	7.3	7.5	7.9
40–44	−6.0	4.1	4.3	4.7
45–49	−2.7	2.1	2.3	2.6
50–54	+3.2	1.0	1.3	1.6
55–59	−0.3	0.5	0.6	0.8
60–64	−1.6	1.3	1.4	1.6
65–69	+0.9	0.3	0.3	0.4
70–74	+0.0	0.0	0.0	0.0
75–79	+0.0	0.0	0.0	0.0
80–84	+0.0	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	###	-50.0	-50.0	-50.0

Figure 10 (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, 2005/6 scorecard applied to the 1998/9 GLSS

Sample Size n	Diff.	Difference between estimate and true value		
		Confidence interval (+/− percentage points)		
		90-percent	95-percent	99-percent
1	−8.0	61.1	74.9	84.7
4	−5.8	32.9	38.9	48.6
8	−5.5	24.6	29.2	38.5
16	−4.8	18.3	21.6	28.5
32	−5.2	13.1	15.3	18.8
64	−5.2	9.2	10.8	13.7
128	−5.0	6.6	8.1	11.2
256	−4.8	4.6	5.5	7.5
512	−4.8	3.2	3.9	5.5
1,024	−4.8	2.2	2.7	3.6
2,048	−4.8	1.6	2.0	2.4
4,096	−4.8	1.2	1.4	1.8
8,192	−4.8	0.9	1.0	1.3
16,384	−4.8	0.6	0.7	0.9

Figure 12 (National line): Differences and precision of differences for bootstrapped estimates of changes in poverty rates for groups of households between two points in time, by sample size, 2005/6 scorecard applied to the 1998/9 GLSS

Sample Size	Difference between estimate and true value			
	Diff.	Confidence interval (+/− percentage points)		
n		90-percent	95-percent	99-percent
1	−8.2	99.3	106.5	109.3
4	−6.9	44.9	55.1	72.1
8	−6.1	31.1	37.7	49.0
16	−5.6	22.4	27.6	35.9
32	−5.9	16.3	19.0	23.9
64	−5.9	11.1	13.3	17.2
128	−5.8	8.1	9.6	13.2
256	−5.7	5.7	7.0	9.1
512	−5.6	3.9	4.8	6.1
1,024	−5.6	2.7	3.3	4.2
2,048	−5.7	2.0	2.4	3.1
4,096	−5.6	1.4	1.7	2.3
8,192	−5.6	1.0	1.2	1.6
16,384	−5.6	0.7	0.9	1.1

Figure 14 (National line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2005/6 scorecard applied to the 1998/9 GLSS

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	0.0	30.2	0.0	69.8	69.8	−100.0
5–9	0.0	30.2	0.0	69.8	69.8	−99.7
10–14	1.0	29.2	0.1	69.7	70.7	−93.1
15–19	3.4	26.8	0.7	69.1	72.5	−75.1
20–24	8.2	22.0	2.4	67.4	75.6	−37.5
25–29	14.4	15.8	6.2	63.6	77.9	+15.7
30–34	20.5	9.7	12.0	57.8	78.3	+60.2
35–39	24.7	5.5	19.4	50.4	75.1	+35.8
40–44	27.2	3.0	27.3	42.5	69.7	+9.4
45–49	28.9	1.3	36.4	33.4	62.3	−20.4
50–54	29.5	0.7	45.5	24.3	53.9	−50.6
55–59	29.9	0.3	52.8	17.0	46.9	−74.8
60–64	30.2	0.0	60.4	9.4	39.5	−100.2
65–69	30.2	0.0	63.9	5.9	36.1	−111.7
70–74	30.2	0.0	67.4	2.4	32.6	−123.1
75–79	30.2	0.0	68.5	1.4	31.5	−126.7
80–84	30.2	0.0	69.4	0.5	30.6	−129.7
85–89	30.2	0.0	69.7	0.1	30.3	−130.8
90–94	30.2	0.0	69.8	0.0	30.2	−131.2
95–100	30.2	0.0	69.8	0.0	30.2	−131.2

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

Figure 15 (National line): For a given score cut-off, the percentage of all households who are targeted, the percentage of targeted households who are poor, the percentage of poor households who are targeted, and the number of poor households who are successful targeted (inclusion) per non-poor household mistakenly targeted (leakage), 2005/6 scorecard applied to the 1998/9 GLSS

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	0.0	0.0	0.0	0.0:1
5–9	0.1	63.2	0.1	1.7:1
10–14	1.1	89.1	3.3	8.1:1
15–19	4.1	83.1	11.3	4.9:1
20–24	10.7	77.2	27.2	3.4:1
25–29	20.6	69.8	47.5	2.3:1
30–34	32.5	63.1	67.9	1.7:1
35–39	44.1	56.1	81.9	1.3:1
40–44	54.6	49.9	90.2	1.0:1
45–49	65.2	44.2	95.6	0.8:1
50–54	75.0	39.4	97.8	0.6:1
55–59	82.7	36.2	99.1	0.6:1
60–64	90.6	33.3	100.0	0.5:1
65–69	94.1	32.1	100.0	0.5:1
70–74	97.6	30.9	100.0	0.4:1
75–79	98.6	30.6	100.0	0.4:1
80–84	99.5	30.3	100.0	0.4:1
85–89	99.9	30.2	100.0	0.4:1
90–94	100.0	30.2	100.0	0.4:1
95–100	100.0	30.2	100.0	0.4:1

Food Poverty Line

2005/6 Scorecard Applied to the 1998/9 GLSS

Figure 8 (Food line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16,384$) from the validation sample, with confidence intervals, 2005/6 scorecard applied to the 1998/9 GLSS

| | | Difference between estimate and true value | | |
| | | Confidence interval (+/− percentage points) | | |
Score	Diff.	90-percent	95-percent	99-percent
0–4	###	-50.0	-50.0	-50.0
5–9	+25.4	29.6	38.9	44.8
10–14	+0.6	5.8	6.8	9.4
15–19	−4.5	4.1	4.4	5.7
20–24	−4.0	3.5	3.9	4.8
25–29	−14.9	8.7	8.9	9.2
30–34	−6.5	4.3	4.4	4.7
35–39	−13.6	7.8	8.0	8.3
40–44	−1.4	1.4	1.6	2.1
45–49	−0.2	1.0	1.1	1.6
50–54	−0.2	0.7	0.8	1.1
55–59	−0.1	0.3	0.4	0.6
60–64	−1.3	1.1	1.2	1.4
65–69	+0.0	0.0	0.0	0.0
70–74	+0.0	0.0	0.0	0.0
75–79	+0.0	0.0	0.0	0.0
80–84	+0.0	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	###	-50.0	-50.0	-50.0

Figure 10 (Food line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2005/6 scorecard applied to the 1998/9 GLSS

| Sample Size | Difference between estimate and true value | | | |
| | | Confidence interval (+/− percentage points) | | |
n	Diff.	90-percent	95-percent	99-percent
1	–5.9	63.7	68.6	80.7
4	–4.6	31.2	36.8	51.1
8	–4.6	22.1	26.0	36.6
16	–4.1	15.8	19.2	25.9
32	–4.5	11.3	13.5	17.5
64	–4.4	8.1	9.4	12.7
128	–4.3	5.8	6.9	9.0
256	–4.2	4.0	4.7	5.9
512	–4.2	2.8	3.3	4.2
1,024	–4.2	1.9	2.2	3.1
2,048	–4.3	1.3	1.6	2.0
4,096	–4.3	1.0	1.2	1.6
8,192	–4.3	0.7	0.8	1.2
16,384	–4.3	0.5	0.6	0.8

Figure 12 (Food line): Differences and precision of differences for bootstrapped estimates of changes in poverty rates for groups of households between two points in time, by sample size, 2005/6 scorecard applied to the 1998/9 GLSS

Sample Size	Difference between estimate and true value			
	Diff.	Confidence interval (+/− percentage points)		
n		90-percent	95-percent	99-percent
1	−4.6	99.1	104.4	107.8
4	−4.8	40.8	49.9	64.7
8	−4.9	26.0	32.4	44.0
16	−4.6	19.2	23.3	31.8
32	−5.1	14.0	16.3	21.7
64	−5.1	9.3	11.8	15.7
128	−5.1	7.1	8.3	10.7
256	−5.1	4.8	5.6	7.3
512	−5.1	3.3	3.9	5.0
1,024	−5.1	2.3	2.7	3.5
2,048	−5.2	1.6	1.9	2.4
4,096	−5.2	1.2	1.4	1.8
8,192	−5.2	0.8	1.0	1.4
16,384	−5.2	0.6	0.7	1.0

Figure 14 (Food line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2005/6 scorecard applied to the 1998/9 GLSS

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	0.0	20.1	0.0	79.9	79.9	−100.0
5–9	0.0	20.1	0.0	79.9	79.9	−99.6
10–14	0.9	19.2	0.2	79.7	80.6	−90.1
15–19	2.9	17.2	1.2	78.7	81.6	−65.2
20–24	6.6	13.5	4.1	75.8	82.4	−14.2
25–29	11.1	9.0	9.5	70.4	81.5	+52.8
30–34	14.9	5.2	17.6	62.3	77.1	+12.2
35–39	17.6	2.5	26.5	53.4	71.1	−31.8
40–44	18.8	1.3	35.8	44.1	63.0	−78.0
45–49	19.4	0.7	45.8	34.1	53.5	−128.0
50–54	19.8	0.3	55.2	24.7	44.5	−174.7
55–59	20.0	0.1	62.7	17.2	37.2	−212.1
60–64	20.1	0.0	70.5	9.4	29.5	−251.1
65–69	20.1	0.0	74.0	5.9	26.0	−268.6
70–74	20.1	0.0	77.5	2.4	22.5	−285.6
75–79	20.1	0.0	78.6	1.4	21.4	−291.0
80–84	20.1	0.0	79.5	0.5	20.5	−295.5
85–89	20.1	0.0	79.8	0.1	20.2	−297.1
90–94	20.1	0.0	79.9	0.0	20.1	−297.8
95–100	20.1	0.0	79.9	0.0	20.1	−297.8

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

Figure 15 (Food line): For a given score cut-off, the percentage of all households who are targeted, the percentage of targeted households who are poor, the percentage of poor households who are targeted, and the number of poor households who are successful targeted (inclusion) per non-poor household mistakenly targeted (leakage), 2005/6 scorecard applied to the 1998/9 GLSS

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	0.0	100.0	0.0	Only poor targeted
5–9	0.1	63.2	0.2	1.7:1
10–14	1.1	80.5	4.4	4.1:1
15–19	4.1	70.3	14.4	2.4:1
20–24	10.7	61.8	32.8	1.6:1
25–29	20.6	53.9	55.2	1.2:1
30–34	32.5	45.8	74.0	0.8:1
35–39	44.1	40.0	87.7	0.7:1
40–44	54.6	34.5	93.6	0.5:1
45–49	65.2	29.8	96.7	0.4:1
50–54	75.0	26.4	98.6	0.4:1
55–59	82.7	24.2	99.6	0.3:1
60–64	90.6	22.2	100.0	0.3:1
65–69	94.1	21.3	100.0	0.3:1
70–74	97.6	20.6	100.0	0.3:1
75–79	98.6	20.4	100.0	0.3:1
80–84	99.5	20.2	100.0	0.3:1
85–89	99.9	20.1	100.0	0.3:1
90–94	100.0	20.1	100.0	0.3:1
95–100	100.0	20.1	100.0	0.3:1

150% of the National Poverty Line

2005/6 Scorecard Applied to the 1998/9 GLSS

Figure 8 (150% of the national line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n =$ 16,384) from the validation sample, with confidence intervals, 2005/6 scorecard applied to the 1998/9 GLSS

| Score | Diff. | Difference between estimate and true value | | |
| | | Confidence interval (+/− percentage points) | | |
		90-percent	95-percent	99-percent
0–4	###	-50.0	-50.0	-50.0
5–9	+0.0	0.0	0.0	0.0
10–14	−6.7	3.9	4.1	4.1
15–19	−1.2	1.5	1.8	2.2
20–24	−6.8	4.2	4.3	4.5
25–29	−6.0	3.8	3.9	4.2
30–34	−17.1	9.3	9.5	9.8
35–39	−6.5	4.4	4.6	5.2
40–44	−1.4	2.5	3.0	4.4
45–49	−7.5	5.0	5.2	5.5
50–54	+10.6	1.6	2.0	2.5
55–59	+4.2	1.5	1.8	2.1
60–64	−3.3	2.4	2.5	2.8
65–69	−0.4	1.2	1.5	1.9
70–74	+0.4	1.3	1.5	2.1
75–79	+4.2	0.0	0.0	0.0
80–84	+0.0	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	###	-50.0	-50.0	-50.0

Figure 10 (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, 2005/6 scorecard applied to the 1998/9 GLSS

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/− percentage points)		
		90-percent	95-percent	99-percent
1	−7.3	62.6	72.0	88.9
4	−4.7	34.9	40.2	50.4
8	−4.0	26.0	30.0	37.7
16	−3.3	19.0	22.2	28.5
32	−3.7	13.4	16.9	21.3
64	−3.7	9.4	11.3	15.1
128	−3.6	7.0	8.4	10.7
256	−3.7	4.9	5.6	7.6
512	−3.6	3.4	4.1	5.3
1,024	−3.6	2.4	2.9	3.9
2,048	−3.6	1.7	2.1	2.8
4,096	−3.6	1.2	1.5	1.9
8,192	−3.6	0.9	1.0	1.3
16,384	−3.5	0.6	0.8	1.0

Figure 12 (150% of the national line): Differences and precision of differences for bootstrapped estimates of changes in poverty rates for groups of households between two points in time, by sample size, 2005/6 scorecard applied to the 1998/9 GLSS

Sample Size n	Diff.	Difference between estimate and true value		
		Confidence interval (+/− percentage points)		
		90-percent	95-percent	99-percent
1	−7.0	104.7	107.4	100.0
4	−3.7	50.5	60.0	73.6
8	−3.4	36.6	43.0	57.4
16	−3.2	26.1	31.0	39.2
32	−3.7	18.1	21.7	28.9
64	−3.8	12.8	15.2	18.6
128	−3.8	8.9	10.9	13.7
256	−3.7	6.1	7.2	9.7
512	−3.7	4.6	5.4	7.0
1,024	−3.8	3.2	3.7	5.1
2,048	−3.8	2.4	2.8	3.6
4,096	−3.7	1.7	2.0	2.5
8,192	−3.7	1.2	1.4	1.8
16,384	−3.7	0.9	1.0	1.3

Figure 14 (150% of the national line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2005/6 scorecard applied to the 1998/9 GLSS

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	0.0	50.3	0.0	49.7	49.7	−100.0
5–9	0.1	50.3	0.0	49.7	49.7	−99.8
10–14	1.1	49.2	0.0	49.7	50.8	−95.7
15–19	4.0	46.3	0.1	49.6	53.5	−83.9
20–24	9.9	40.4	0.7	49.0	58.9	−59.1
25–29	18.5	31.8	2.1	47.6	66.0	−22.4
30–34	28.0	22.3	4.5	45.2	73.3	+20.4
35–39	35.5	14.8	8.6	41.1	76.5	+58.2
40–44	40.9	9.4	13.6	36.1	77.0	+72.9
45–49	45.3	5.0	19.9	29.8	75.1	+60.4
50–54	47.7	2.6	27.3	22.4	70.1	+45.7
55–59	49.0	1.3	33.7	16.0	65.0	+33.0
60–64	50.0	0.3	40.7	9.0	59.0	+19.1
65–69	50.2	0.1	43.9	5.8	56.0	+12.7
70–74	50.3	0.0	47.3	2.4	52.7	+6.1
75–79	50.3	0.0	48.3	1.4	51.7	+3.9
80–84	50.3	0.0	49.2	0.5	50.8	+2.1
85–89	50.3	0.0	49.6	0.1	50.4	+1.5
90–94	50.3	0.0	49.7	0.0	50.3	+1.2
95–100	50.3	0.0	49.7	0.0	50.3	+1.2

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

Figure 15 (150% of the national line): For a given score cut-off, the percentage of all households who are targeted, the percentage of targeted households who are poor, the percentage of poor households who are targeted, and the number of poor households who are successful targeted (inclusion) per non-poor household mistakenly targeted (leakage), 2005/6 scorecard applied to the 1998/9 GLSS

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	0.0	100.0	0.0	Only poor targeted
5–9	0.1	100.0	0.1	Only poor targeted
10–14	1.1	98.4	2.2	60.1:1
15–19	4.1	96.9	7.9	30.9:1
20–24	10.7	93.3	19.8	13.8:1
25–29	20.6	89.7	36.7	8.7:1
30–34	32.5	86.3	55.8	6.3:1
35–39	44.1	80.4	70.5	4.1:1
40–44	54.6	75.0	81.4	3.0:1
45–49	65.2	69.5	90.1	2.3:1
50–54	75.0	63.6	94.8	1.7:1
55–59	82.7	59.2	97.4	1.5:1
60–64	90.6	55.1	99.3	1.2:1
65–69	94.1	53.3	99.8	1.1:1
70–74	97.6	51.6	100.0	1.1:1
75–79	98.6	51.0	100.0	1.0:1
80–84	99.5	50.5	100.0	1.0:1
85–89	99.9	50.4	100.0	1.0:1
90–94	100.0	50.3	100.0	1.0:1
95–100	100.0	50.3	100.0	1.0:1

200% of the National Poverty Line

2005/6 Scorecard Applied to the 1998/9 GLSS

Figure 8 (200% of the national line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16,384$) from the validation sample, with confidence intervals, 2005/6 scorecard applied to the 1998/9 GLSS

		Difference between estimate and true value		
		Confidence interval (+/− percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	###	-50.0	-50.0	-50.0
5–9	+0.0	0.0	0.0	0.0
10–14	−2.6	1.9	2.1	2.1
15–19	−0.7	1.0	1.2	1.5
20–24	−2.5	1.8	2.0	2.1
25–29	−2.8	1.9	2.0	2.1
30–34	−8.0	4.5	4.6	4.7
35–39	−1.1	2.0	2.4	3.3
40–44	+3.9	2.4	2.8	3.6
45–49	−4.1	3.4	3.6	4.0
50–54	+7.1	2.3	2.8	3.6
55–59	+8.0	2.7	3.1	4.1
60–64	−3.3	2.8	3.0	3.4
65–69	+2.8	2.1	2.5	3.1
70–74	+5.3	1.9	2.3	2.9
75–79	−6.8	6.1	6.8	9.0
80–84	+0.7	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	###	-50.0	-50.0	-50.0

Figure 10 (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, 2005/6 scorecard applied to the 1998/9 GLSS

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/− percentage points)		
		90-percent	95-percent	99-percent
1	−3.3	67.5	79.1	87.1
4	−1.5	34.0	39.9	53.7
8	−1.7	26.2	30.5	38.8
16	−0.6	20.3	23.1	28.6
32	−0.3	14.0	16.8	21.5
64	−0.2	9.8	11.9	16.2
128	−0.0	7.2	8.2	10.7
256	−0.2	5.1	6.1	8.2
512	−0.1	3.7	4.3	6.0
1,024	−0.2	2.7	3.1	3.9
2,048	−0.1	1.8	2.1	2.7
4,096	−0.1	1.2	1.5	2.0
8,192	−0.1	0.9	1.1	1.4
16,384	−0.1	0.6	0.8	1.0

Figure 12 (200% of the national line): Differences and precision of differences for bootstrapped estimates of changes in poverty rates for groups of households between two points in time, by sample size, 2005/6 scorecard applied to the 1998/9 GLSS

Sample Size	Difference between estimate and true value			
	Diff.	Confidence interval (+/− percentage points)		
n		90-percent	95-percent	99-percent
1	–4.4	101.4	106.4	112.4
4	–3.0	47.9	56.7	72.4
8	–2.9	34.6	41.6	53.9
16	–1.2	25.4	29.5	39.9
32	–1.0	18.9	22.5	30.3
64	–1.2	12.9	15.0	19.4
128	–1.1	8.8	10.4	13.2
256	–1.3	6.5	7.7	10.0
512	–1.2	4.5	5.5	7.5
1,024	–1.2	3.3	3.8	5.2
2,048	–1.2	2.3	2.8	3.6
4,096	–1.2	1.6	1.9	2.6
8,192	–1.1	1.1	1.3	1.8
16,384	–1.1	0.8	1.0	1.3

Figure 14 (200% of the national line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2005/6 scorecard applied to the 1998/9 GLSS

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	0.0	64.7	0.0	35.3	35.3	−100.0
5–9	0.1	64.7	0.0	35.3	35.3	−99.8
10–14	1.1	63.7	0.0	35.2	36.3	−96.6
15–19	4.0	60.7	0.1	35.2	39.2	−87.4
20–24	10.3	54.5	0.4	34.9	45.1	−67.7
25–29	19.7	45.1	0.9	34.4	54.1	−37.8
30–34	30.7	34.0	1.8	33.5	64.2	−2.3
35–39	40.2	24.6	3.9	31.3	71.5	+30.2
40–44	47.7	17.1	6.9	28.4	76.0	+57.9
45–49	54.2	10.5	11.0	24.3	78.5	+83.0
50–54	58.7	6.1	16.3	18.9	77.6	+74.8
55–59	61.5	3.2	21.2	14.1	75.6	+67.3
60–64	63.8	1.0	26.8	8.4	72.2	+58.5
65–69	64.4	0.4	29.8	5.5	69.8	+54.0
70–74	64.6	0.1	32.9	2.3	67.0	+49.1
75–79	64.7	0.0	33.9	1.4	66.1	+47.6
80–84	64.7	0.0	34.8	0.5	65.2	+46.2
85–89	64.7	0.0	35.1	0.1	64.9	+45.7
90–94	64.7	0.0	35.3	0.0	64.7	+45.5
95–100	64.7	0.0	35.3	0.0	64.7	+45.5

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

Figure 15 (200% of the national line): For a given score cut-off, the percentage of all households who are targeted, the percentage of targeted households who are poor, the percentage of poor households who are targeted, and the number of poor households who are successful targeted (inclusion) per non-poor household mistakenly targeted (leakage), 2005/6 scorecard applied to the 1998/9 GLSS

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	0.0	100.0	0.0	Only poor targeted
5–9	0.1	100.0	0.1	Only poor targeted
10–14	1.1	98.4	1.7	60.1:1
15–19	4.1	98.0	6.2	49.7:1
20–24	10.7	96.3	15.9	26.1:1
25–29	20.6	95.7	30.4	22.2:1
30–34	32.5	94.5	47.5	17.3:1
35–39	44.1	91.1	62.0	10.2:1
40–44	54.6	87.3	73.6	6.9:1
45–49	65.2	83.2	83.8	4.9:1
50–54	75.0	78.2	90.6	3.6:1
55–59	82.7	74.4	95.0	2.9:1
60–64	90.6	70.4	98.5	2.4:1
65–69	94.1	68.4	99.4	2.2:1
70–74	97.6	66.3	99.8	2.0:1
75–79	98.6	65.6	100.0	1.9:1
80–84	99.5	65.0	100.0	1.9:1
85–89	99.9	64.8	100.0	1.8:1
90–94	100.0	64.7	100.0	1.8:1
95–100	100.0	64.7	100.0	1.8:1

USAID "Extreme" Poverty Line

2005/6 Scorecard Applied to the 1998/9 GLSS

Figure 8 (USAID "extreme" line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16{,}384$) from the validation sample, with confidence intervals, 2005/6 scorecard applied to the 1998/9 GLSS

Score	Diff.	Difference between estimate and true value		
		Confidence interval (+/− percentage points)		
		90-percent	95-percent	99-percent
0–4	###	-50.0	-50.0	-50.0
5–9	+43.0	20.5	25.5	31.6
10–14	+4.9	6.6	7.8	10.5
15–19	−12.4	8.2	8.6	9.3
20–24	−4.3	3.5	3.7	4.3
25–29	−5.5	4.1	4.4	4.7
30–34	−4.6	3.2	3.4	3.7
35–39	−5.4	3.4	3.5	3.7
40–44	+1.3	0.7	0.9	1.2
45–49	+1.4	0.5	0.6	0.8
50–54	+0.0	0.6	0.8	1.1
55–59	+0.2	0.3	0.3	0.5
60–64	−1.3	1.0	1.1	1.3
65–69	+0.0	0.0	0.0	0.0
70–74	+0.0	0.0	0.0	0.0
75–79	+0.0	0.0	0.0	0.0
80–84	+0.0	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	###	-50.0	-50.0	-50.0

Figure 10 (USAID "extreme" line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2005/6 scorecard applied to the 1998/9 GLSS

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/− percentage points)		
		90-percent	95-percent	99-percent
1	−3.9	58.5	63.0	69.3
4	−2.9	28.7	34.9	43.3
8	−2.8	19.5	24.4	33.6
16	−2.2	13.6	16.2	22.0
32	−2.3	10.2	11.8	16.0
64	−2.0	6.8	8.1	10.4
128	−2.0	4.8	5.8	8.2
256	−1.9	3.4	4.1	5.4
512	−1.9	2.3	2.8	3.6
1,024	−1.9	1.6	2.0	2.7
2,048	−2.0	1.1	1.3	1.8
4,096	−1.9	0.8	1.0	1.3
8,192	−1.9	0.6	0.7	0.9
16,384	−1.9	0.4	0.5	0.7

Figure 12 (USAID "extreme" line): Differences and precision of differences for bootstrapped estimates of changes in poverty rates for groups of households between two points in time, by sample size, 2005/6 scorecard applied to the 1998/9 GLSS

Sample Size	Difference between estimate and true value			
	Diff.	Confidence interval (+/− percentage points)		
n		90-percent	95-percent	99-percent
1	−1.3	99.4	101.6	104.5
4	−2.1	34.2	44.4	62.4
8	−2.0	24.1	30.0	40.9
16	−1.6	16.6	20.2	27.2
32	−1.8	12.0	14.4	19.1
64	−1.6	8.4	9.5	12.5
128	−1.6	6.2	7.6	9.4
256	−1.6	4.1	5.1	6.4
512	−1.6	2.8	3.3	4.2
1,024	−1.7	2.1	2.5	3.2
2,048	−1.7	1.4	1.7	2.4
4,096	−1.7	1.0	1.3	1.7
8,192	−1.7	0.7	0.9	1.2
16,384	−1.7	0.5	0.6	0.8

Figure 14 (USAID "extreme" line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2005/6 scorecard applied to the 1998/9 GLSS

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	0.0	14.5	0.0	85.5	85.5	−100.0
5–9	0.0	14.5	0.0	85.5	85.5	−99.6
10–14	0.7	13.8	0.4	85.1	85.9	−87.3
15–19	2.3	12.2	1.8	83.7	86.0	−55.9
20–24	5.0	9.4	5.6	79.9	84.9	+8.3
25–29	8.1	6.4	12.5	73.0	81.1	+13.9
30–34	10.9	3.6	21.6	63.9	74.7	−49.3
35–39	12.7	1.8	31.4	54.1	66.8	−116.7
40–44	13.5	1.0	41.0	44.5	58.0	−183.3
45–49	13.9	0.5	51.3	34.2	48.2	−253.9
50–54	14.3	0.2	60.7	24.8	39.0	−319.1
55–59	14.4	0.1	68.3	17.2	31.6	−371.3
60–64	14.5	0.0	76.1	9.4	23.9	−425.5
65–69	14.5	0.0	79.6	5.9	20.4	−449.7
70–74	14.5	0.0	83.1	2.4	16.9	−473.4
75–79	14.5	0.0	84.2	1.4	15.8	−480.8
80–84	14.5	0.0	85.1	0.5	14.9	−487.1
85–89	14.5	0.0	85.4	0.1	14.6	−489.3
90–94	14.5	0.0	85.5	0.0	14.5	−490.2
95–100	14.5	0.0	85.5	0.0	14.5	−490.2

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

Figure 15 (USAID "extreme" line): For a given score cut-off, the percentage of all households who are targeted, the percentage of targeted households who are poor, the percentage of poor households who are targeted, and the number of poor households who are successful targeted (inclusion) per non-poor household mistakenly targeted (leakage), 2005/6 scorecard applied to the 1998/9 GLSS

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	0.0	100.0	0.0	Only poor targeted
5–9	0.1	25.5	0.1	0.3:1
10–14	1.1	66.9	5.1	2.0:1
15–19	4.1	55.7	15.8	1.3:1
20–24	10.7	47.3	34.8	0.9:1
25–29	20.6	39.4	55.9	0.7:1
30–34	32.5	33.4	75.0	0.5:1
35–39	44.1	28.8	87.7	0.4:1
40–44	54.6	24.8	93.4	0.3:1
45–49	65.2	21.4	96.2	0.3:1
50–54	75.0	19.0	98.5	0.2:1
55–59	82.7	17.4	99.5	0.2:1
60–64	90.6	16.0	100.0	0.2:1
65–69	94.1	15.4	100.0	0.2:1
70–74	97.6	14.9	100.0	0.2:1
75–79	98.6	14.7	100.0	0.2:1
80–84	99.5	14.6	100.0	0.2:1
85–89	99.9	14.5	100.0	0.2:1
90–94	100.0	14.5	100.0	0.2:1
95–100	100.0	14.5	100.0	0.2:1

$1.25/Day 2005 PPP Poverty Line

2005/6 Scorecard Applied to the 1998/9 GLSS

Figure 8 ($1.25/day 2005 PPP line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16{,}384$) from the validation sample, with confidence intervals, 2005/6 scorecard applied to the 1998/9 GLSS

		Difference between estimate and true value		
		Confidence interval (+/− percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	###	-50.0	-50.0	-50.0
5–9	+39.5	29.6	38.9	44.8
10–14	−0.4	5.1	6.1	7.9
15–19	−1.4	3.4	4.0	5.2
20–24	+3.4	3.3	3.8	5.1
25–29	−12.7	7.5	7.7	8.2
30–34	−9.4	5.9	6.1	6.6
35–39	−14.2	8.2	8.3	8.6
40–44	−4.8	3.3	3.6	4.0
45–49	+0.5	1.3	1.5	2.1
50–54	+1.6	1.0	1.2	1.6
55–59	+0.3	0.4	0.4	0.6
60–64	−1.5	1.2	1.3	1.6
65–69	+0.9	0.3	0.3	0.4
70–74	+0.0	0.0	0.0	0.0
75–79	+0.0	0.0	0.0	0.0
80–84	+0.0	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	###	-50.0	-50.0	-50.0

Figure 10 ($1.25/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2005/6 scorecard applied to the 1998/9 GLSS

Sample Size	Difference between estimate and true value			
	Diff.	Confidence interval (+/− percentage points)		
n		90-percent	95-percent	99-percent
1	−5.3	65.7	76.1	84.9
4	−4.7	32.7	39.0	51.9
8	−4.3	23.6	27.7	35.9
16	−4.1	17.7	20.3	25.2
32	−4.3	12.4	14.9	18.7
64	−4.3	8.5	10.6	13.1
128	−4.2	6.4	7.5	9.8
256	−4.0	4.5	5.3	6.9
512	−4.0	3.2	3.7	4.7
1,024	−4.0	2.2	2.6	3.4
2,048	−4.0	1.6	1.9	2.4
4,096	−4.0	1.1	1.3	1.8
8,192	−4.0	0.8	1.0	1.3
16,384	−4.0	0.6	0.7	0.8

Figure 12 ($1.25/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of changes in poverty rates for groups of households between two points in time, by sample size, 2005/6 scorecard applied to the 1998/9 GLSS

Sample Size	Difference between estimate and true value			
	Diff.	Confidence interval (+/− percentage points)		
n		90-percent	95-percent	99-percent
1	–4.8	100.2	107.1	108.7
4	–5.3	42.8	52.9	68.9
8	–4.8	28.9	34.6	46.0
16	–4.8	22.0	26.0	32.2
32	–5.0	15.1	18.2	23.1
64	–5.1	10.6	12.8	17.0
128	–5.1	7.7	8.9	11.6
256	–5.0	5.4	6.3	8.1
512	–5.0	3.8	4.3	5.5
1,024	–5.0	2.6	3.1	3.9
2,048	–5.1	1.9	2.3	2.9
4,096	–5.0	1.4	1.6	2.2
8,192	–5.0	1.0	1.2	1.6
16,384	–5.1	0.7	0.8	1.1

Figure 14 ($1.25/day 2005 PPP line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2005/6 scorecard applied to the 1998/9 GLSS

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	0.0	25.9	0.0	74.1	74.1	−100.0
5–9	0.0	25.9	0.0	74.1	74.1	−99.7
10–14	1.0	24.9	0.1	74.0	75.0	−92.0
15–19	3.3	22.6	0.8	73.3	76.5	−71.5
20–24	7.7	18.2	3.0	71.1	78.8	−29.3
25–29	13.3	12.7	7.3	66.8	80.0	+30.6
30–34	18.4	7.5	14.1	60.0	78.4	+45.6
35–39	22.1	3.9	22.1	52.0	74.1	+14.9
40–44	24.0	1.9	30.6	43.5	67.5	−18.0
45–49	25.0	0.9	40.2	33.9	59.0	−55.1
50–54	25.5	0.4	49.5	24.6	50.1	−91.0
55–59	25.7	0.2	57.0	17.1	42.9	−119.8
60–64	25.9	0.0	64.7	9.4	35.3	−149.9
65–69	25.9	0.0	68.2	5.9	31.8	−163.3
70–74	25.9	0.0	71.7	2.4	28.3	−176.6
75–79	25.9	0.0	72.7	1.4	27.3	−180.7
80–84	25.9	0.0	73.6	0.5	26.4	−184.2
85–89	25.9	0.0	74.0	0.1	26.0	−185.5
90–94	25.9	0.0	74.1	0.0	25.9	−186.0
95–100	25.9	0.0	74.1	0.0	25.9	−186.0

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

Figure 15 ($1.25/day 2005 PPP line): For a given score cut-off, the percentage of all households who are targeted, the percentage of targeted households who are poor, the percentage of poor households who are targeted, and the number of poor households who are successful targeted (inclusion) per non-poor household mistakenly targeted (leakage), 2005/6 scorecard applied to the 1998/9 GLSS

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	0.0	100.0	0.0	Only poor targeted
5–9	0.1	63.2	0.1	1.7:1
10–14	1.1	89.1	3.8	8.1:1
15–19	4.1	79.8	12.7	4.0:1
20–24	10.7	72.0	29.6	2.6:1
25–29	20.6	64.4	51.2	1.8:1
30–34	32.5	56.6	71.1	1.3:1
35–39	44.1	50.0	85.1	1.0:1
40–44	54.6	44.0	92.7	0.8:1
45–49	65.2	38.4	96.7	0.6:1
50–54	75.0	34.0	98.5	0.5:1
55–59	82.7	31.1	99.3	0.5:1
60–64	90.6	28.6	99.9	0.4:1
65–69	94.1	27.5	100.0	0.4:1
70–74	97.6	26.6	100.0	0.4:1
75–79	98.6	26.3	100.0	0.4:1
80–84	99.5	26.0	100.0	0.4:1
85–89	99.9	25.9	100.0	0.4:1
90–94	100.0	25.9	100.0	0.3:1
95–100	100.0	25.9	100.0	0.3:1

$2.50/Day 2005 PPP Poverty Line

2005/6 Scorecard Applied to the 1998/9 GLSS

Figure 8 ($2.50/day 2005 PPP line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16,384$) from the validation sample, with confidence intervals, 2005/6 scorecard applied to the 1998/9 GLSS

Score	Diff.	Difference between estimate and true value		
		Confidence interval (+/− percentage points)		
		90-percent	95-percent	99-percent
0–4	###	-50.0	-50.0	-50.0
5–9	+0.0	0.0	0.0	0.0
10–14	−4.1	2.1	2.1	2.1
15–19	−2.6	1.8	1.9	2.1
20–24	−2.5	1.9	2.1	2.2
25–29	−4.3	2.8	2.9	3.0
30–34	−8.0	4.6	4.7	4.9
35–39	+1.2	2.2	2.7	3.8
40–44	+7.6	2.6	3.1	4.5
45–49	−4.2	3.4	3.6	4.0
50–54	+13.9	2.0	2.4	3.1
55–59	+7.3	2.4	2.8	3.8
60–64	−5.0	3.4	3.5	3.8
65–69	+3.9	1.3	1.6	2.0
70–74	+7.8	0.8	0.9	1.2
75–79	+4.2	0.0	0.0	0.0
80–84	+0.7	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	###	-50.0	-50.0	-50.0

Figure 10 ($2.50/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2005/6 scorecard applied to the 1998/9 GLSS

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/− percentage points)		
		90-percent	95-percent	99-percent
1	−1.5	65.8	76.8	89.9
4	−0.2	34.3	41.4	54.6
8	+0.2	26.9	31.5	40.8
16	+0.8	20.0	22.8	32.7
32	+0.8	14.5	17.2	22.0
64	+0.9	10.1	12.0	16.7
128	+1.0	7.2	8.6	10.9
256	+0.9	5.2	6.0	7.7
512	+1.0	3.7	4.3	5.9
1,024	+1.0	2.5	3.0	4.0
2,048	+1.0	1.7	2.0	2.6
4,096	+1.0	1.3	1.5	1.9
8,192	+1.0	0.9	1.0	1.4
16,384	+1.0	0.7	0.8	1.1

Figure 12 ($2.50/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of changes in poverty rates for groups of households between two points in time, by sample size, 2005/6 scorecard applied to the 1998/9 GLSS

Sample Size	Difference between estimate and true value			
		Confidence interval (+/− percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	–2.8	101.6	108.7	113.4
4	–1.6	50.1	60.3	72.7
8	–0.8	35.1	43.1	59.9
16	+0.1	25.9	30.4	38.9
32	–0.3	19.1	22.9	28.9
64	–0.2	13.2	15.2	20.3
128	–0.0	9.3	11.1	14.0
256	–0.1	6.4	7.6	10.0
512	–0.1	4.7	5.7	7.1
1,024	–0.1	3.3	4.0	4.9
2,048	–0.1	2.3	2.8	3.6
4,096	–0.0	1.6	2.0	2.6
8,192	+0.0	1.1	1.4	1.8
16,384	+0.0	0.8	1.0	1.3

Figure 14 ($2.50/day 2005 PPP line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2005/6 scorecard applied to the 1998/9 GLSS

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	0.0	58.1	0.0	41.9	41.9	−100.0
5–9	0.1	58.0	0.0	41.9	42.0	−99.8
10–14	1.1	57.0	0.0	41.9	43.0	−96.2
15–19	4.0	54.0	0.1	41.9	45.9	−86.0
20–24	10.2	47.9	0.5	41.5	51.6	−64.1
25–29	19.3	38.7	1.2	40.7	60.1	−31.2
30–34	29.9	28.2	2.6	39.3	69.2	+7.4
35–39	38.7	19.4	5.4	36.5	75.2	+42.6
40–44	45.3	12.7	9.2	32.7	78.1	+72.1
45–49	50.9	7.1	14.3	27.6	78.6	+75.4
50–54	54.2	3.9	20.8	21.1	75.3	+64.1
55–59	56.2	1.9	26.5	15.4	71.6	+54.4
60–64	57.7	0.4	33.0	9.0	66.6	+43.2
65–69	58.0	0.1	36.2	5.8	63.7	+37.7
70–74	58.1	0.0	39.5	2.4	60.5	+32.0
75–79	58.1	0.0	40.6	1.4	59.4	+30.1
80–84	58.1	0.0	41.5	0.5	58.5	+28.5
85–89	58.1	0.0	41.8	0.1	58.2	+28.0
90–94	58.1	0.0	41.9	0.0	58.1	+27.8
95–100	58.1	0.0	41.9	0.0	58.1	+27.8

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

Figure 15 ($2.50/day 2005 PPP line): For a given score cut-off, the percentage of all households who are targeted, the percentage of targeted households who are poor, the percentage of poor households who are targeted, and the number of poor households who are successful targeted (inclusion) per non-poor household mistakenly targeted (leakage), 2005/6 scorecard applied to the 1998/9 GLSS

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	0.0	0.0	0.0	0.0:1
5–9	0.1	100.0	0.1	Only poor targeted
10–14	1.1	100.0	1.9	Only poor targeted
15–19	4.1	98.1	6.9	51.7:1
20–24	10.7	95.5	17.5	21.0:1
25–29	20.6	94.0	33.3	15.7:1
30–34	32.5	91.9	51.4	11.3:1
35–39	44.1	87.7	66.6	7.2:1
40–44	54.6	83.1	78.1	4.9:1
45–49	65.2	78.1	87.7	3.6:1
50–54	75.0	72.2	93.3	2.6:1
55–59	82.7	68.0	96.8	2.1:1
60–64	90.6	63.6	99.3	1.7:1
65–69	94.1	61.6	99.8	1.6:1
70–74	97.6	59.5	100.0	1.5:1
75–79	98.6	58.9	100.0	1.4:1
80–84	99.5	58.3	100.0	1.4:1
85–89	99.9	58.1	100.0	1.4:1
90–94	100.0	58.1	100.0	1.4:1
95–100	100.0	58.1	100.0	1.4:1

$3.75/Day 2005 PPP Poverty Line

2005/6 Scorecard Applied to the 1998/9 GLSS

Figure 8 ($3.75/day 2005 PPP line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16,384$) from the validation sample, with confidence intervals, 2005/6 scorecard applied to the 1998/9 GLSS

Score	Diff.	Difference between estimate and true value		
		Confidence interval (+/− percentage points)		
		90-percent	95-percent	99-percent
0–4	###	-50.0	-50.0	-50.0
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	−1.5	1.0	1.1	1.2
25–29	+1.9	0.9	1.1	1.5
30–34	−4.3	2.4	2.5	2.5
35–39	−2.6	1.8	1.9	2.1
40–44	+6.8	2.3	2.9	3.7
45–49	+0.7	2.4	2.9	3.7
50–54	+10.0	2.5	3.1	3.8
55–59	+19.3	3.0	3.6	4.8
60–64	−0.9	2.9	3.4	4.3
65–69	+6.6	3.5	4.2	5.6
70–74	+14.6	1.7	2.0	2.6
75–79	+4.6	2.1	2.6	3.5
80–84	+4.7	1.4	1.6	2.1
85–89	+0.0	0.0	0.0	0.0
90–94	+3.3	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 10 ($3.75/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2005/6 scorecard applied to the 1998/9 GLSS

Sample Size	Difference between estimate and true value			
	Diff.	Confidence interval (+/− percentage points)		
n		90-percent	95-percent	99-percent
1	−0.7	62.6	71.5	85.9
4	+1.6	31.3	38.9	48.2
8	+2.1	25.7	30.0	38.2
16	+3.0	19.4	22.8	29.8
32	+3.4	14.2	17.0	22.1
64	+3.6	10.2	12.3	17.2
128	+3.6	7.2	8.7	10.9
256	+3.6	5.0	6.1	8.2
512	+3.6	3.7	4.3	5.6
1,024	+3.6	2.5	3.0	4.0
2,048	+3.6	1.8	2.1	2.7
4,096	+3.6	1.3	1.5	2.0
8,192	+3.6	0.9	1.1	1.4
16,384	+3.6	0.6	0.7	0.9

Figure 12 ($3.75/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of changes in poverty rates for groups of households between two points in time, by sample size, 2005/6 scorecard applied to the 1998/9 GLSS

Sample Size	Difference between estimate and true value			
		Confidence interval (+/− percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	−1.8	101.0	106.0	113.8
4	+1.1	45.8	54.3	70.5
8	+1.6	35.2	42.7	54.8
16	+2.8	25.6	30.2	43.3
32	+3.7	18.7	22.6	29.4
64	+4.0	12.7	15.7	19.7
128	+4.0	8.9	10.9	14.7
256	+4.1	6.8	8.1	10.5
512	+4.1	4.8	5.8	7.3
1,024	+4.1	3.3	4.0	5.2
2,048	+4.1	2.3	2.8	3.6
4,096	+4.1	1.7	1.9	2.4
8,192	+4.1	1.1	1.3	1.8
16,384	+4.1	0.8	0.9	1.3

Figure 14 ($3.75/day 2005 PPP line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2005/6 scorecard applied to the 1998/9 GLSS

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	0.0	75.9	0.0	24.1	24.1	−100.0
5–9	0.1	75.9	0.0	24.1	24.1	−99.9
10–14	1.1	74.8	0.0	24.1	25.2	−97.1
15–19	4.1	71.8	0.0	24.1	28.2	−89.2
20–24	10.6	65.4	0.1	24.0	34.6	−72.1
25–29	20.2	55.8	0.4	23.7	43.8	−46.3
30–34	31.8	44.1	0.7	23.4	55.3	−15.2
35–39	42.7	33.2	1.4	22.7	65.5	+14.4
40–44	51.7	24.2	2.9	21.2	73.0	+40.0
45–49	60.2	15.7	5.0	19.0	79.2	+65.2
50–54	66.5	9.4	8.5	15.6	82.1	+86.4
55–59	70.5	5.4	12.2	11.9	82.5	+84.0
60–64	74.3	1.6	16.4	7.7	82.0	+78.5
65–69	75.4	0.5	18.7	5.4	80.7	+75.3
70–74	75.8	0.1	21.8	2.3	78.1	+71.3
75–79	75.9	0.0	22.8	1.3	77.2	+70.0
80–84	75.9	0.0	23.6	0.5	76.4	+68.9
85–89	75.9	0.0	24.0	0.1	76.0	+68.4
90–94	75.9	0.0	24.1	0.0	75.9	+68.3
95–100	75.9	0.0	24.1	0.0	75.9	+68.3

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

Figure 15 ($3.75/day 2005 PPP line): For a given score cut-off, the percentage of all households who are targeted, the percentage of targeted households who are poor, the percentage of poor households who are targeted, and the number of poor households who are successful targeted (inclusion) per non-poor household mistakenly targeted (leakage), 2005/6 scorecard applied to the 1998/9 GLSS

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	0.0	0.0	0.0	0.0:1
5–9	0.1	100.0	0.1	Only poor targeted
10–14	1.1	100.0	1.5	Only poor targeted
15–19	4.1	100.0	5.4	Only poor targeted
20–24	10.7	99.1	13.9	112.1:1
25–29	20.6	98.0	26.6	48.8:1
30–34	32.5	98.0	41.9	48.6:1
35–39	44.1	96.9	56.3	31.3:1
40–44	54.6	94.8	68.1	18.1:1
45–49	65.2	92.3	79.3	11.9:1
50–54	75.0	88.7	87.6	7.8:1
55–59	82.7	85.3	92.9	5.8:1
60–64	90.6	81.9	97.8	4.5:1
65–69	94.1	80.1	99.3	4.0:1
70–74	97.6	77.7	99.9	3.5:1
75–79	98.6	76.9	100.0	3.3:1
80–84	99.5	76.3	100.0	3.2:1
85–89	99.9	76.0	100.0	3.2:1
90–94	100.0	75.9	100.0	3.2:1
95–100	100.0	75.9	100.0	3.2:1

Appendix A:
Guide to Interpretation of Scorecard Indicators

The following information comes from:

Ghana Statistical Service. (2004) "Ghana Living Standards Survey 5: Interviewer's
  Manual", Accra,
  `http://www.statsghana.gov.gh/nada/ddibrowser/getresource.php?resourc`
  `eid=81`, retrieved 12 March 2010. ("the manual")

1. <u>How many members does the household have?</u>

According to pp. 19–20 of the manual:

"A *household* consists of a person or group of related or unrelated persons, who live
together in the same housing unit, who acknowledge one adult male or female as the
head of the household, who share the same housekeeping and cooking arrangements,
and are considered as one unit. In some cases, one may find a group of people living
together in the same house, but each person has separate eating arrangements; they
should be counted as separate one-person households. Remember that not all related
persons living in a house form one household, and that more than one household may
live in the same house but one household cannot live in two different houses. Probe well
to put every person in the right household.

"It is not an easy task putting persons found in a house or compound into the right
households. The following examples are therefore given as guidelines:

a. In general, a household consists of a man, his wife, children and some other relatives
  or a household helper who may be living with them

b. In large family houses where there may be two or more generations of relatives living,
  care should be taken not to treat the grandfather, his married children and their
  families as forming one large household. Note that sharing meals with each other
  is not the same as sharing the same housekeeping and cooking arrangements.
  Probe well to separate the various households

c. Treat as one household if a man lives with more than one wife and their children in
  the same house and eats successively with each of the wives in turns

d. If a man does not live in the same house as his wife or wives, the man and his wife/wives must be considered as separate households. Any children and others must be included in the household of the one in whose house they sleep. Thus, if a man and his wife live in different houses and their two sons sleep in the father's house after eating in their mother's house, the children must be included in the father's household while the mother is listed as a single-person household

e. A lodger who sleeps and eats at least one meal with the household a day must be treated as a member of that household

f. A household helper and his family who live in a house or an out-house in the same compound as the employer must not be included in the employer's household if they prepare their own food. However, if they eat and sleep with the employer, they should be considered as part of the employer's household

g. If two or more unrelated persons live together in one room or apartment, they should be considered as separate single-person households if they do not share a common catering arrangement

2. <u>Are all children ages 5 to 12 in school?</u>

According to p. 27 of the manual, the question refers to current school attendance.

3. <u>What is the highest grade completed by the female head/spouse?</u>

According to p. 26 of the manual, "the *highest grade completed* is the last full grade completed, not the one attended or attending during the current school year. For instance, if the person is now in JSS2, the last grade completed will be JSS1."

The manual and the questionnaire do not define JSS, SSS, S, L, or U.

For the purposes of the scorecard, the *female head/spouse* is defined as the head of the household (if the head is a woman) or as the spouse of the head of household (if the head is a man). If the head of the household is a man who does not have a spouse, then there is no female head/spouse.

4. Is the main job of the male head/spouse in agriculture?

For the purposes of the scorecard, the *male head/spouse* is defined as the head of the household (if the head is a man) or as the spouse of the head of household (if the head is a woman). If the head of the household is a woman who does not have a spouse, then there is no male head/spouse.

5. What is the main construction material used for the roof?

According to p. 62 of the manual, "if the [roof] of the dwelling are composed of several materials, for instance, one part of the [roof] is of bamboo, another part of earth and yet another part of concrete, choose the predominant material."

6. What is the main source of lighting for the dwelling?

There is no additional information about this indicator.

7. What is the main source of drinking water supply for this household?

There is no additional information about this indicator.

8. Does any household member own a working stove (kerosene, electric, or gas)?

There is no additional information about this indicator.

9. Does any household member own a working box iron or electric iron?

There is no additional information about this indicator.

10. Does any household member own a working radio, radio cassette, record player, or 3-in-1 radio system?

There is no additional information about this indicator.