

A Simple Poverty Scorecard for Colombia

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This document and related tools are at <http://www.microfinance.com/#Colombia>.

Abstract

This study uses Colombia's 2009 Integrated Household Survey to construct an easy-to-use scorecard that estimates the likelihood that a household has income below a given poverty line. The scorecard uses ten simple indicators that field agents can quickly collect and verify. Poverty scores can be computed on paper in the field in five to ten minutes. The scorecard's accuracy and precision are reported for a range of poverty lines. Poverty scoring is a practical way for pro-poor programs in Colombia to estimate poverty rates, track changes in poverty rates over time, and target services.

Note

This paper is an update that calibrates the scorecard to additional poverty lines based on Colombia's recent re-definition of poverty status (MESEP, 2012). The new lines are better than the old ones, so they should be applied from now on.

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<u>Entity</u>	<u>Name</u>	<u>ID</u>	<u>Date</u> (DD/MM/YY)
Member:	_____	_____	Joined: _____
Field agent:	_____	_____	Today: _____
Service point:	_____	_____	Household size: _____

Indicator	Value	Points	Score
1. How many household members are 18-years-old or younger?	A. Four or more	0	
	B. Three	5	
	C. Two	11	
	D. One	17	
	E. None	23	
2. What is the highest educational level reached by the female head/spouse?	A. None, or pre-school	0	
	B. Primary or middle school	3	
	C. High school	6	
	D. No female head/spouse	8	
	E. Post-secondary or college (1 to 4 years)	9	
	F. Post-secondary or college (5 years or more)	17	
3. How many household members spent most of the past week working?	A. None	0	
	B. One	9	
	C. Two or more	14	
4. In their main line of work, how many household members work as wage or salary employees for a private firm or the government?	A. None	0	
	B. One	4	
	C. Two or more	11	
5. What is the residence's rate class for electricity?	A. No class or zero (no connection, pirated connection, or generator), one, or two	0	
	B. Three	4	
	C. Four, five, or six	9	
6. What fuel or energy source does the household usually cook with?	A. Firewood, wood, charcoal, coal, electricity, gasoline, petroleum, kerosene, alcohol, or waste material	0	
	B. LPG from a cylinder or tank	2	
	C. Natural gas from a public network	3	
	D. Does not cook	6	
7. Does the household have a working clothes washing machine?	A. No	0	
	B. Yes	4	
8. Does the household have a working refrigerator or freezer?	A. No	0	
	B. Yes	3	
9. Does the household have a working DVD?	A. No	0	
	B. Yes	4	
10. Does the household have a motorcycle and/or a car for its own use?	A. None	0	
	B. Motorcycle only	3	
	C. Car (regardless of motorcycle)	9	

Note on this revised document and using the old and new definitions of poverty status

This paper updates an earlier version. Both versions use the same data from Colombia's 2009 Integrated Household Survey (GEIH, *Gran Encuesta Integrada de Hogares*). The update differs in that it calibrates the scorecard to additional poverty lines based on Colombia's recent re-definition of poverty status (MESEP, 2012). The new definition of income and the new poverty lines are better than the old ones, so they should be used from now on. Examples in this paper are for the new lines.

First-time users of Colombia's poverty scorecard should ignore the old definitions and use only the new ones. The old lines are included in this paper because some pro-poor organizations in Colombia already have poverty-rate estimates based on the old lines. Such legacy users should start calibrating scores and recording poverty likelihoods not only for the old lines (to measure change against existing old-definition baselines) but also for the new lines (to establish new-definition baselines from which to measure change from now on).¹

¹ If the original scores are still on file, then legacy users can retroactively look up new-line poverty likelihoods even for the baseline and dispense with the old, inferior lines.

A Simple Poverty Scorecard for Colombia

1. Introduction

This paper presents an easy-to-use poverty scorecard that pro-poor programs in Colombia can use to estimate the likelihood that a household has income below a given poverty line, to measure groups' poverty rates at a point in time, to track changes in groups' poverty rates between two points in time, and to target services.

The direct approach to poverty measurement via surveys is difficult and costly. As a case in point, Colombia's 2009 GEIH runs 41 pages.

In contrast, the indirect approach via poverty scoring is simple, quick, and inexpensive. It uses ten verifiable indicators (such as "Does the household have a working clothes washing machine?" and "What is the residence's rate class for electricity?") to get a score that is highly correlated with poverty status as measured by the exhaustive survey.

The poverty 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 these organizations are typically subjective and relative (such as participatory wealth ranking by skilled field agents) or blunt (such as rules based on land-ownership or housing quality). Measurements from these approaches are not comparable across organizations, they may be costly, and their accuracy is unknown.

Pro-poor organizations can use the poverty scorecard to measure the share of their participants who are below a given poverty line, such as the Millennium Development Goals' \$1.25/day line at 2005 purchase-power parity. USAID microenterprise partners can use the poverty scorecard to report how many of their participants are “very poor” using the new USAID “extreme” line.² Organizations can also use the tool to measure movement across a poverty line. For all these purposes, the poverty scorecard provides an income-based, objective tool with known accuracy. While income surveys are costly even for governments, some small, local organizations may be able to implement an inexpensive scorecard that can serve for monitoring and targeting.

The statistical approach here aims to be understood by non-specialists. After all, if managers are to adopt poverty scoring 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 decades, but they are rarely used to inform decisions, not because they do not work, but because they are presented (when they are presented at all) as tables of regression coefficients incomprehensible to non-specialists (with cryptic indicator names such as “LGHHSZ_2”, negative values, and many decimal places).

² USAID defines households as “very poor” if their new-definition per-capita income is below the highest of the new-definition \$1.25/day 2005 PPP line (COP1,863 in Colombia, Figure 1) or the USAID “extreme” line that divides people in households below the new-definition national poverty line into two equal-size groups (COP3,761).

Thanks to the predictive-modeling phenomenon known as the “flat maximum”, simple scorecards are often about as accurate as complex ones.

The technical approach here is also innovative in how it associates scores with poverty likelihoods, in how it derives formulas for standard errors, and in the extent of its accuracy tests. Although these tests are simple and common in statistical practice and in for-profit credit-risk scoring, they are rarely applied to poverty scorecards.

The scorecard is based on the 2009 GEIH conducted by Colombia’s *Departamento Administrativo Nacional de Estadística* (DANE). 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 non-negative integers, and total scores range from 0 (most likely below a poverty line) to 100 (least likely below a poverty line). Non-specialists can collect data and tally scores on paper in the field in five to ten minutes.

Poverty scoring can be used to estimate three basic quantities. First, it can estimate a particular household’s “poverty likelihood”, that is, the probability that the household has per-capita income below a given poverty line.

Second, poverty scoring can be used to estimate the poverty rate of a group of households at a point in time. This estimate is the average of the poverty likelihoods among the households in the group.

Third, poverty scoring can be used to estimate changes in the poverty rate of a group of households (or of two independent samples of households that are representative of the same population) between two points in time. This estimate is the change in the average poverty likelihood of the group(s) over time.

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

This paper presents a single scorecard whose indicators and points are derived from household income data and Colombia's old-definition national poverty line. Scores from this one scorecard are calibrated to poverty likelihoods for 18 poverty lines (nine based on the old definitions, and nine based on the new definitions).

The scorecard is constructed and calibrated using half the households in the 2009 GEIH, and its accuracy is validated on the other half.

While all three scoring estimators are *unbiased* (that is, they match the true value on average in repeated samples when applied to the same population from which the scorecard was built), they are—like all predictive models—biased to some extent when applied to a different population.³

Thus, while the indirect scoring approach is less costly than the direct survey approach, it is also biased. There is bias because scoring must assume that the

³ Important cases in practice include nationally representative samples at a different point in time or non-nationally representative sub-groups (Tarozzi and Deaton, 2007).

relationship between indicators and poverty in any future application with any particular group will be the same as in the 2009 GEIH data used to build the scorecard.⁴ Of course, this unavoidable assumption holds only partly.

When applied to the validation sample with bootstrap samples of $n = 16,384$, the difference between scorecard estimates of new-definition poverty rates and the true rates at a point in time is +1.2 percentage points for the new national line, and the average absolute difference across all nine new lines is 0.9 percentage points.⁵ These differences are due to sampling variation and not bias (and, in the case of Colombia, the switch in poverty-status definitions); the average of each difference would be zero if the whole 2009 GEIH were to be repeatedly redone and divided into sub-samples before repeating the entire process of building, calibrating, and validating scorecards.

The 90-percent confidence intervals for these new-definition estimates are ± 0.7 percentage points or less. For $n = 1,024$, these intervals are ± 2.7 percentage points or less.⁶

⁴ Bias may also result from changes in data quality or changes in poverty lines.

⁵ Accuracy is better for old lines because the scorecard was built with old definitions. The difference between estimates and true poverty rates is +0.3 percentage points for the old national line, and the average absolute difference across all nine old lines is 0.5 percentage points.

⁶ These measures of precision are the same for the old-definition lines as well.

Section 2 below describes data and poverty lines. Sections 3 and 4 describe scorecard construction and offer guidelines for use in practice. Sections 5 and 6 detail the estimation of households' poverty likelihoods and of groups' poverty rates at a point in time. Section 7 discusses estimating changes in poverty rates over time, and Section 8 covers targeting. Section 9 places the new scorecard here in the context of existing poverty-measurement tools for Colombia, and Section 10 is a summary.

2. Data and poverty lines

This section discusses the data used to construct and test the poverty scorecard. It also discusses the two poverty-status definitions that give the old and new poverty lines to which scores are calibrated.

2.1 Data

The scorecard is based on data from the 220,954 households in Colombia's 2009 GEIH that have non-missing data for all survey modules needed for poverty scoring. The GEIH is nationally representative, and it is conducted continuously, covering about 20,000 households each month. Data from January through December is used here to average out seasonal variation.

For the purposes of poverty scoring, the households in the 2009 GEIH are randomly divided into two sub-samples (Figure 1):

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

2.2 Poverty rates

A *poverty rate* is the share of units in households in which total household income (divided by the number of household members) is below a given poverty line. The unit is either the household itself or a person in the household. Each household

member has the same poverty status (or estimated poverty likelihood) as does the household as a whole.

Suppose a pro-poor microfinance organization serves two households. The first household is poor (its per-capita income is less than the poverty line), and it has three members, one of whom is a client of the microfinance organization. The second household is non-poor and has four members, two of whom are clients.

Poverty rates are either at the household-level or person-level. If the organization defines its participants as households (say, because all household members are affected by any member's being a microfinance client), then the household level is relevant. The estimated household-level poverty rate is the equal-weighted average of poverty statuses (or estimated poverty likelihoods) across households with clients. In the example here, this is $\frac{1 \cdot 1 + 1 \cdot 0}{1 + 1} = \frac{1}{2} = 0.5 = 50$ percent. In the "1 · 1" term in the numerator, the first "1" is the first household's weight, and the second "1" is the first household's poverty status (poor). In the "1 · 0" term in the numerator, the "1" is the second household's weight, and the "0" is the second household's poverty status (non-poor). The "1 + 1" in the denominator is the sum of the weights.

Alternatively, a person-level rate is relevant if an organization defines all people in households that benefit from its services as participants. In the example here, the person-level rate is the household-size-weighted average of poverty statuses for households with clients, or $\frac{3 \cdot 1 + 4 \cdot 0}{3 + 4} = \frac{3}{7} = 0.43 = 43$ percent. In the "3 · 1" term in

the numerator, the “3” is the first household’s weight because it has three members, and the “1” is its poverty status (poor). In the “4 · 0” term in the numerator, the “4” is the second household’s weight because it has four members, and the zero is its poverty status (non-poor). The “4 + 3” in the denominator is the sum of the weights.

As a final (common) example, an organization may count as participants only those with whom it deals with directly. For the hypothetical organization here, this means that some—but not all—household members are counted. The person-level rate is now the participant-weighted average of the poverty statuses of households with

clients, or $\frac{1 \cdot 1 + 2 \cdot 0}{1 + 2} = \frac{1}{3} = 0.33 = 33$ percent. As in previous examples, the first “1” in

the “1 · 1” in the numerator is the first household’s weight because it has one client, and the second “1” is its poverty status (poor). In the “2 · 0” term in the numerator, the “2” is the second household’s weight because it has two clients, and the zero is its poverty status (non-poor). The “2 + 1” in the denominator is the sum of the weights.

To summarize, estimated poverty rates are weighted averages of households’ poverty statuses (or estimated poverty likelihoods), where the weights are the number of relevant units in the household. When reporting, organizations should explain who they count as a participant and why.

The poverty scorecard is constructed using the 2009 GEIH and household-level lines, scores are calibrated to household-level poverty likelihoods, and accuracy is measured for household-level rates. Person-level poverty rates can be estimated as the household-size-weighted average of the household-level poverty likelihoods. It is also

possible to construct a scorecard based on person-level lines, calibrate scores to person-level likelihoods, and measure accuracy for person-level rates, but it is not done here.

2.3 Poverty status

A household's *poverty status* as poor or non-poor depends on whether its per-capita income is below a poverty line. Thus, poverty status is defined by a definition of a poverty line and a definition of income.

Colombia has two definitions of poverty status. The poverty scorecard was constructed in 2011 using the old definition of the national poverty line, and it was calibrated to that line and to eight other old lines. After the scorecard's release, Colombia adopted new, improved definitions (MESEP, 2012). This paper calibrates the scorecard (constructed with the old national line) to the new national line and to new-definition versions of the other eight lines.

The new definitions are better than the old definitions. Thus, first-time users of the Colombia scorecard should use only poverty likelihoods for the new lines.

Legacy users already have baselines with old-definition poverty likelihoods. They prefer to use the new (better) lines from now on, but they also want to measure change from old-definition baselines. If scores collected in the past are still on file, then legacy users can convert them to poverty likelihoods for new lines, use those poverty likelihoods in their baselines, and forget about the old poverty likelihoods. If past scores have been lost, then legacy users should convert scores collected from now on to poverty

likelihoods for both the new and old lines. Then they can measure change between past baselines and current measures with old lines at the same time as they establish a baseline for measuring change from now on with new lines.

2.3.1 Old poverty-status definitions

The scorecard was constructed with the old-definition of national poverty line described in Muñoz and Rivas (2006) and in *Misión para el Diseño de una Estrategia para la Reducción de la Pobreza y la Desigualdad* (2006).

Colombia has two official poverty lines. Under the old definition, the food line (*línea de pobreza extrema* or *línea de indigencia*) is defined as the cost in each of 15 regions⁷ of a food basket with 2,297 Calories and recommended levels of protein and other micro-nutrients. The original content and cost of the basket is based on Colombia's 1994/5 Income and Expenditure Survey for urban areas, and a 2003 survey of participants in *Familias en Acción* in rural areas. Over time, the old food line is updated based on the food prices faced by the quarter of people with the lowest expenditure on food. In prices as of December 2009, the average old food line in Colombia is COP3,876 per person per day (Figure 1). The poverty rate for the food line is 14.3 percent at the household level and 16.4 percent at the person level.

⁷ Barranquilla, Bucaramanga, Bogotá, Manizales, Medellín, Cali, Pasto, Villavicencio, Pereira, Cúcuta, Cartagena, Neiva/Ibagué, Montería, other central cities (Tunja, Florencia, Popayán, Valledupar, Quibdó, Riohacha, Santa Marta, Armenia, and Sincelejo), and other rural areas.

The old-definition national poverty line (sometimes referred to here as “100% of the national line”) is the old food line multiplied by the ratio of total expenditure to food expenditure for people in the lowest quartile of total expenditure. The average old national line in Colombia is COP9,244 per person per day, giving a household-level poverty rate of 39.3 percent and a person-level rate of 45.5 percent (Figure 1).

Figure 1 reports old and new poverty lines and poverty rates for Colombia at the household-level and the person-level. Figure 2 reports the same information for the regions for which Colombia’s *Departamento Nacional de Planeación* (DNP) defines poverty lines. The national figures are weighted averages of the regional figures, and they match the poverty rates in MESEP (2010 and 2012).

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

- Food
- 100% of national
- 150% of national
- 200% of national
- USAID “extreme”
- \$1.25/day 2005 PPP
- \$2.50/day 2005 PPP
- \$3.75/day 2005 PPP
- \$5.00/day 2005 PPP

The old USAID “extreme” line is defined as the median income of people (not households) in a given poverty-line region who are below the old national line (U.S. Congress, 2004).

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

- 2005 PPP exchange rate for “individual consumption expenditure by households” (World Bank, 2008): COP1191.74 per \$1.00
- Average monthly Consumer Price Index for 2005 for the 15 poverty-line regions
- CPIs by poverty-line region for December 2009⁸

Given this, the old \$1.25/day 2005 PPP line for a given poverty-line region in Colombia in COP as of December 2009 is (Sillers, 2006):

$$(\text{2005 PPP exchange rate}) \cdot \$1.25 \cdot \left(\frac{\text{CPI}_{\text{Dec. 2009}}}{\text{CPI}_{\text{2005 average}}} \right).$$

In the example of Bogotá, the old \$1.25/day line is $1191.74 \times 1.25 \times (126.207 / 103.214) = \text{COP}1,821$ per person per day (Figure 2). The average old \$1.25/day line for all of Colombia is COP1,863. The old \$2.50/day line, the old \$3.75/day line, and the old \$5.00/day line are multiples of the old \$1.25/day line.

This old \$1.25/day 2005 PPP line is not correctly adjusted for geographic difference in cost-of-living at a point in time. It is left unfixed here because the error is made moot by the correctly adjusted new \$1.25/day 2005 PPP line.

Besides poverty lines, the other half of poverty status is income; a household is “poor” if its per-capita income is less than a given poverty line. Colombia’s old definition of income includes imputations for missing data in the GEIH as well as an adjustment for under-reported income, where the benchmark is the national accounts (MESEP, 2009). This is the definition of old income used for comparisons with the old

⁸ Regional CPIs for 2005 and December 2009 are derived as implied by the region-month poverty lines supplied by DNP and are available on request.

food line, the old national line, multiples of the old national line, and the old USAID “extreme” line.

It is unusual to adjust income to match the national accounts. To improve comparability, poverty status for the old \$1.25/day 2005 PPP line (and its multiples) is defined here for income without this adjustment.

2.3.2 New poverty-status definitions

After the poverty scorecard was released, Colombia switched to a new definition of poverty status (MESEP, 2012). The scorecard (built with the old national line) is here calibrated to nine new lines. The new definitions are incorporated not by changing the scorecard but rather by adding score/poverty likelihood look-up tables.

MESEP (2012) documents the improvements from the old to new definitions.

The new lines should be used unless old-definition baselines cannot be updated to new lines. The definitional improvements include:

- Using a single source of more recent data (2006/7 *Encuesta Nacional de Ingresos y Gastos*) to derive the basic food basket for urban and rural areas
- Dropping the adjustment that forced income to match the national accounts
- Increasing the number of poverty-line regions from 15 to 26
- Basing caloric standards on the age and sex distributions by poverty-line region
- Adjusting for differences in cost-of-living by region
- Aligning some technical processes with international practice:
 - Imputation of rental value of owner-occupied housing
 - Imputation of “false zeros” in income data
 - Imputation of missing values
 - Detection and adjustment of outliers
 - Iterative derivation of the reference group
 - Use of a single reference group (not 13)

In December 2009 prices, the average new food line in Colombia is COP2,730 per person per day (Figure 1). The poverty rate for the new food line is 11.4 percent (household level) and 14.4 percent (person level).

The new national line in urban areas is the new food line multiplied by 2.4. In rural areas, it is the new food line multiplied by a value that makes the lines' urban/rural ratio match the urban/rural ratio of total expenditure to food expenditure in the 2006/7 *Encuesta Nacional de Ingresos y Gastos*. On average in Colombia, the new national line is COP6,004 per person per day, giving a household-level poverty rate of 33.3 percent and a person-level rate of 40.2 percent (Figure 1).

In total, there are nine new lines, analogous to the nine old lines:

- Food
- 100% of national
- 150% of national
- 200% of national
- USAID “extreme”
- \$1.25/day 2005 PPP
- \$2.50/day 2005 PPP
- \$3.75/day 2005 PPP
- \$5.00/day 2005 PPP

A single (new) measure of income is used with all nine new lines.

The new USAID “extreme” line is defined as the median income of people (not households) in a given poverty-line region who are below the new national line (U.S. Congress, 2004).

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

- 2005 PPP exchange rate for “individual consumption expenditure by households” (World Bank, 2008): COP1191.74 per \$1.00
- Average monthly all-Colombia Consumer Price Index for 2005 (103.2029)
- Average all-Colombia CPI for December 2009 (129.0883)
- Average all-Colombia new national line (COP6,004)
- New national line for each poverty-line region (Figure 2)

Given this, the new \$1.25/day 2005 PPP line for a given poverty-line region in Colombia in COP as of December 2009 is (Sillers, 2006):

$$(\text{2005 PPP exchange rate}) \cdot \$1.25 \cdot \left(\frac{\text{CPI}_{\text{Dec. 2009}}}{\text{CPI}_{\text{2005 average}}} \right) \cdot \left(\frac{\text{New Natl. line in region}}{\text{All - Colombia Natl. line}} \right).$$

In the example of Bogotá, the region’s new national line is COP6,593, so the region’s \$1.25/day line is $1191.74 \times 1.25 \times (129.0883/103.2029) \times (6,593 / 6,004) =$ COP2,046 per person per day (Figure 2). The average new \$1.25/day line for Colombia overall is COP1,863. The new \$2.50/day line, the new \$3.75/day line, and the new \$5.00/day line are multiples of the new \$1.25/day line.

For Colombia overall, the new and old \$1.25/day 2005 PPP lines are the same.

The corresponding poverty rates, however, are not the same, due to different:

- Definitions of income
- Numbers of poverty-line regions
- Adjustments for cost-of-living across poverty-line regions

USAID microenterprise partners who use the poverty scorecard should report poverty rates based on the new USAID “extreme” line. USAID defines “very poor” as those households whose income is below the highest of two lines:

- New \$1.25/day 2005 PPP (COP 1,863)
- The new USAID “extreme” line that divides people in households below the new national line into two equal-size groups (COP3,761).

3. Scorecard construction

For Colombia, about 95 potential indicators are initially prepared in the areas of:

- Family composition (such as number of members 18-years-old or younger)
- Education (such as the highest level reached by the female head/spouse)
- Employment (such as number of wage or salary employees)
- Housing (such as wall material)
- Ownership of durable goods (such as refrigerators or freezers)

Figure 3 lists all potential indicators, ordered by the entropy-based “uncertainty coefficient” that measures how well a given indicator predicts poverty on its own (Goodman and Kruskal, 1979).

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, having a clothes washing machine is probably more likely to respond to changes in poverty than is the age of the male head/spouse.

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

One of these single-indicator scorecards is then selected based on several factors (Schreiner *et al.*, 2004; Zeller, 2004). These include improvement in accuracy, likelihood of acceptance by users (determined by simplicity, cost of collection, and “face validity”

in terms of experience, theory, and common sense), sensitivity to changes in poverty 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.

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

This algorithm is the Logit analogue to the common R^2 -based stepwise 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 single poverty scorecard here applies to all of Colombia. Evidence from India and Mexico (Schreiner, 2006 and 2005a), Sri Lanka (Narayan and Yoshida, 2005), and Jamaica (Grosh and Baker, 1995) suggests that segmenting scorecards by urban/rural does not improve targeting accuracy much, although it may improve the accuracy of estimates of poverty rates for sub-groups (Tarozzi and Deaton, 2007).

4. Practical guidelines for scorecard use

The main challenge of scorecard design is not to maximize statistical accuracy but rather to improve the chances that the scorecard is actually adopted and used in practice (Schreiner, 2005b). When scoring projects fail, the reason is not usually statistical inaccuracy but rather the failure of an organization to decide to do what is needed to integrate scoring in its processes and to learn to use it properly (Schreiner, 2002). After all, most reasonable scorecards predict about the same, 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 adopt it and use it properly. Of course, accuracy matters, but it is balanced against simplicity, ease-of-use, and “face validity”. Programs are more likely to collect data, compute scores, and pay attention to the results if, in their view, scoring does not imply much additional work and if the whole process generally seems to make sense.

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

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

The scorecard in this paper is ready to be photocopied and can be used with a simple spreadsheet database (Microfinance Risk Management, L.L.C., 2012) that records identifying information, dates, indicator values, scores, and poverty likelihoods.

A field agent using the paper scorecard would:

- Record participant identifiers and household size
- Read each question from the scorecard
- Circle the response and its point value
- Write the point value 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 filing/data-entry and analysis

4.1 Data quality

Of course, field agents must be trained. Quality outputs depend on quality inputs. If organizations or field agents gather their own data and believe that they have an incentive to exaggerate poverty rates (for example, if funders reward them for higher poverty rates), then it is wise to do on-going quality control via data review and audits

(Matul and Kline, 2003).⁹ IRIS Center (2007a) and Toohig (2008) are useful nuts-and-bolts guides for budgeting, training field agents and supervisors, logistics, sampling, interviewing, piloting, recording data, and controlling quality.

In particular, while collecting scorecard indicators is relatively easier than alternatives, it is still absolutely difficult. Training and explicit definitions of terms and concepts in the scorecard is essential (see Appendix). For the example of Nigeria, Onwujekwe, Hanson, and Fox-Rushby (2006) found distressingly low inter-rater and test/retest correlations for indicators as seemingly simple and obvious as whether the household owns a car. At the same time, Grosh and Baker (1995) find that gross underreporting of assets does not affect targeting. For the first stage of targeting in a Mexican social program, 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 is done in Mexico in the second stage of its targeting process, most false self-reports can be corrected by field agents who verify responses with a home visit, and this is suggested for Colombia.

As detailed in Section 9 below, Colombia’s SISBEN for targeting social subsidies has collected poverty-scoring data from millions of households over the past 15 years. Households have incentives to cheat; they know that low scores can qualify them for

⁹ If an organization does not want field agents to know the points associated with indicators, then they can make a version of the scorecard without points and apply the points later in a spreadsheet or database at the central office.

large subsidies, and in particular, for health insurance. The municipal governments that administer SISBEN also have incentives to cheat because they are elected by local voters but the social subsidies are funded by the national government. To discourage cheating, SISBEN (Camacho and Conover, 2011; Castañeda, 2005):

- Keeps scorecard points secret
- Provides a closed-source software program to compute scores
- Makes falsifying data a crime
- Restricts scorecard application in the run-up before local elections
- Mandates regular audits

In practice, supervision and audits have been weak, and anecdotes and news stories about corruption—both by households and by local governments—are common (Camacho and Conover, 2011; Castañeda, 2005). Households' scores are supposed to be updated every three years, but, in practice, updating is rare unless a household gets sick (and wants subsidized health insurance) or a new mayor takes office.

In the only test/retest audit of SISBEN (Castañeda, 2005), a comparison of updated scores with original scores from a few years earlier showed:

- No change in poverty (48 percent)
- Increased poverty (8 percent)
- Decreased poverty (44 percent)

The decrease in poverty could be real or due to cheating on the original survey. Nevertheless, Castañeda (2005) suggests that cheating by enumerators and/or households is low, noting that correlations are 95 percent for three indicators (type of wall, type of floor, and method of disposal of garbage) that can be compared between

households qualifying for subsidized health insurance in the SISBEN database and in the 1997 Living Standards Survey.

Furthermore, the test/retest audit mentioned earlier found 28-percent leakage. A test applying SISBEN to the 1997 Living Standards Survey—whose households have no incentive to lie—found that 31-percent leakage is to be expected (even in the absence of cheating) due to the scorecard’s unavoidable inaccuracies (Castañeda 2005, p. 32). The share of social subsidies going to households in lower ranges of income has also increased steadily since the advent of SISBEN.

In sum, the discussion in Castañeda suggests that while some enumerators and households cheat on Colombia’s SISBEN poverty scorecard, the result is not material.

Camacho and Conover (2011) find widespread cheating in SISBEN, estimating that 3 million people (8 percent of Colombia’s population) were dishonestly qualified. This is mostly due to centralized data falsification by municipal governments rather than widespread cheating by enumerators and households. In particular, the number of households scoring just low enough to qualify for subsidized health insurance spiked after the SISBEN formula was divulged in 1997. If this were due to households and enumerators lying, the resulting scores would not be bunched just below the cut-off.

So how did municipal governments cheat, and why? The SISBEN database suggests that they found a few sets of responses that led to scores just under the cut-off and that they then entered these sets of responses for hundreds of thousands of households. This seemed to be more common in the run-up before local elections.

What does Colombia's experience with cheating in SISBEN mean for the new poverty scorecard here? First, incentive structures can lead to corruption that can thwart efforts to use poverty scoring to reach the poor and/or to improve management. Second, the risk is greater at higher levels (the organization, service point, or field agent) than for individual households, if only because higher-level entities can taint the scores of more households. Third, corruption of poverty scoring cannot be prevented by keeping the formula secret. After all, everyone involved knows (for example) what types of floors are linked with greater poverty. Even if a formula is secret, an organization can still note the scores produced by different combinations of responses.

All in all, Colombia's experience with SISBEN suggests that explicit, intentional procedures are needed to keep scoring's users honest. This means regular audits, monitoring, and punishment for cheaters. Keeping the scorecard formula secret does not help much.

4.2 Sample design

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

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

In general, the sampling design should follow from the organization's goals for the exercise and from the business questions that it seeks to inform.

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

Given a well-defined group that is relevant to a particular business question, 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

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 level of confidence and a desired confidence interval.

Frequency of application can be:

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

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

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

An example set of choices is illustrated by BRAC and ASA, two microlenders in Bangladesh. Each has more than 7 million participants, and each is using a poverty scorecard similar to the one here (Chen and Schreiner, 2009b). Their design is that loan officers in a random sample of branches score all their participants each time they visit a homestead (about once a year) as part of their standard due diligence prior to loan disbursement. Responses are recorded on paper in the field before being sent to a central office to be entered into a database. ASA's and BRAC's sampling plans cover more than 50,000 participants (far more than most pro-poor organizations would need).

5. Estimates of household poverty likelihoods

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

To get absolute units, scores are 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 new national line, scores of 35–39 have a poverty likelihood of 45.0 percent, and scores of 40–44 have a poverty likelihood of 29.6 percent (Figure 4).

The poverty likelihood associated with a score varies by poverty line. For example, scores of 35–39 are associated with a poverty likelihood of 45.0 percent for the new national line but 3.8 percent for the new \$1.25/day 2005 PPP line.¹⁰

5.1 Calibrating scores with poverty likelihoods

A given score is associated (“calibrated”) with a poverty likelihood by defining the poverty likelihood as the share of households in the calibration sub-sample who have the score and who have per-capita income below a given poverty line.

¹⁰ From Figure 4 on, many figures have 18 versions, one set of each of nine poverty lines for both the old and new definitions of poverty status. To keep them straight, they are grouped by poverty line. Single tables that pertain to all poverty lines are placed with the first group of tables for the old national line.

For the example of the new national line (Figure 5), there are 11,639 (normalized) households in the calibration sub-sample with a score of 35–39, of whom 5,232 (normalized) are below the poverty line. The estimated poverty likelihood associated with a score of 35–39 is then 45.0 percent, because $6,218 \div 11,639 = 45.0$ percent.

To illustrate again with the new national line and a score of 40–44, there are 13,628 (normalized) households in the construction/calibration sample, of whom 4,030 (normalized) are below the line (Figure 5). Thus, the poverty likelihood for this score is $4,030 \div 13,628 = 29.6$ percent.

This method is used to calibrate scores with estimated poverty likelihoods for all 18 poverty lines.

Figure 6a shows, for all scores, the likelihood that income falls in a range demarcated by two adjacent old national poverty lines.¹¹ For example, the daily income of someone with a score of 35–39 falls in the following ranges with probability (all lines in Figure 6a use the old definition):

- 13.9 percent below the food line
- 8.0 percent between the food line and the USAID “extreme” line
- 31.6 percent between the USAID “extreme” line and 100% of the national line
- 24.0 percent between 100% of the national line and 150% of the national line
- 10.6 percent between 150% of the national line and 200% of the national line
- 12.1 percent above 200% of the national line

¹¹ Figure 6a is for the old food line, the old national line (and its multiples), and the old USAID “extreme” line compared with the old definition of income that is adjusted to match the national accounts. Figure 6b is for the old international 2005 PPP lines that do not have the income adjustment to the national accounts.

Figure 6b is for the old international 2005 PPP lines. For example, the daily income of someone with a score of 35–39 falls in the following ranges with probability:

- 8.9 percent below \$1.25/day 2005 PPP
- 17.9 percent between \$1.25/day and \$2.50/day 2005 PPP
- 24.5 percent between \$2.50/day and \$3.75/day 2005 PPP
- 17.8 percent between \$3.75/day and \$5.00/day 2005 PPP
- 31.0 percent above \$5.00/day 2005 PPP

Finally, there is a Figure 6 for the nine new-definition lines, all of which appear in the same figure because they all use the same (new) definition of income. For these new lines, the daily income of someone with a score of 35–39 falls in the following ranges with probability:

- 3.8 percent below \$1.25/day 2005 PPP
- 5.4 percent between \$1.25/day and the food line
- 8.7 percent between the food line and \$2.50/day
- 21.9 percent between \$2.50/day and \$3.75/day
- 5.2 percent between \$3.75/day and 100% of the national line
- 14.3 percent between 100% of the national line and \$5.00/day
- 11.6 percent between \$5.00/day and 150% of the national line
- 12.4 percent between 150% of the national line and 200% of the national line
- 16.9 percent above 200% of the national line

Even though the scorecard is constructed partly based on judgment, the calibration process produces poverty likelihoods that are objective, that is, derived from survey data on income 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 constructed using only expert judgment (Fuller, 2006; Caire, 2004; Schreiner *et al.*, 2004). Of course, the scorecard here is constructed with both data and judgment. The fact that this paper

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

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

5.2 Accuracy of estimates of households' poverty likelihoods

As long as the relationships between indicators and poverty do not change, and as long as the scorecard is applied to households that are representative of the same population from which the scorecard was constructed, then this calibration process produces unbiased estimates of poverty likelihoods. *Unbiased* means that in repeated samples from the same population, the average estimate matches the true value. The

scorecard also produces unbiased estimates of poverty rates at a point in time, as well as unbiased estimates of changes in poverty rates between two points in time.¹²

Of course, the relationships between indicators and poverty do change to some unknown extent over time and also across sub-groups in Colombia. Thus, the scorecard will generally be biased when applied after December 2009 (when fieldwork for the 2009 GEIH ended) or when applied with non-nationally representative sub-groups.

How accurate are estimates of households' poverty likelihoods? To get a measurement of accuracy under the assumption that the scorecard is used with a nationally representative sample in the period from January to December of 2009, a test is done with 1,000 bootstrap samples of size $n = 16,384$ from the 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 and income below a poverty line
- For each score, record the difference between the estimated poverty likelihood (Figure 4) and the true poverty likelihood in the bootstrap sample
- Repeat the previous three steps 1,000 times
- For each score, report the average difference between estimated and true poverty likelihoods across the 1,000 bootstrap samples
- For each score, report the two-sided intervals containing the central 900, 950, and 990 differences between estimated and true poverty likelihoods

¹² This follows because these estimates of groups' poverty rates are linear functions of the unbiased estimates of households' poverty likelihoods.

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

For the new national line, the average poverty likelihood across bootstrap samples for scores of 35–39 in the validation sample is too high by 2.2 percentage points. For scores of 40–44, the estimate is too high by 2.9 percentage points.¹³

The 90-percent confidence interval for the differences for scores of 35–39 is ± 2.5 percentage points (Figure 7). This means that in 900 of 1,000 bootstraps, the difference between the estimate and the true value is between -0.2 and $+4.8$ percentage points (because $+2.3 - 2.5 = -0.2$, and $+2.3 + 2.5 = +4.8$). In 950 of 1,000 bootstraps (95 percent), the difference is $+2.2 \pm 2.9$ percentage points, and in 990 of 1,000 bootstraps (99 percent), the difference is $+2.3 \pm 4.3$ percentage points.

For most scores, Figure 7 shows small differences between estimated poverty likelihoods and true values. There are differences 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 Colombia’s population. For targeting, however, what matters is less the difference in all score ranges and more the difference

¹³ These differences are not zero, in spite of 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 process of scorecard construction/calibration and validation.

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

In addition, if estimates of groups' poverty rates are to be usefully accurate, then errors for individual households must largely cancel out. This is generally the case, as discussed in the next section.

Another possible source of differences between estimates and true values is overfitting. By construction, the scorecard here is unbiased, but it may still be *overfit* when applied after the end of the GEIH fieldwork in December 2009. That is, it may fit the 2009 GEIH construction data so closely that it captures not only some timeless patterns but also some random patterns that, due to sampling variation, show up only in the construction data. Or the scorecard may be overfit in the sense that its bias is highly sensitive to changes over time in the relationship between indicators and poverty when it is applied to non-nationally representative samples.

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

Most errors in individual households' likelihoods, however, cancel out in the estimates of groups' poverty rates (see later sections). Furthermore, at least some of the differences arise from non-scorecard sources such as sampling variation that can be addressed only by improving data quantity and quality (which is beyond the scope of

the scorecard) or by reducing overfitting (which likely has limited returns, given the scorecard's parsimony).

6. Estimates of a group's poverty rate at a point in time

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

To illustrate, suppose a program samples three households on Jan. 1, 2012 and that they have scores of 20, 30, and 40, corresponding to poverty likelihoods of 85.2, 60.9, and 29.6 percent (new national line, Figure 4). The group's estimated poverty rate is the households' average poverty likelihood of $(85.2 + 60.9 + 29.6) \div 3 = 58.6$ percent.¹⁴

6.1 Accuracy of estimated poverty rates at a point in time

For the Colombia scorecard applied to the validation sample with $n = 16,384$, the difference between the estimated poverty rate at a point in time and the true rate for the new national line is +1.2 percentage points (Figure 9, summarizing Figure 8 for all poverty lines). Across all nine new lines, the absolute differences are 1.6 percentage points or less, and the average absolute difference is 0.9 percentage points. Part of these differences is due to sampling variation and the division of the 2009 GEIH into two sub-samples.

¹⁴ The group's poverty rate is *not* the poverty likelihood associated with the average score. Here, the poverty likelihood associated with the average score of $(20 + 30 + 40) \div 3 = 30$ is 60.9 percent, which differs from the average of the three poverty likelihoods associated with each of the three scores (58.6 percent).

For the nine old lines, absolute differences are 1.2 percentage points or less, and the average absolute difference is 0.5 percentage points. For the old national line, the difference is +0.3 percentage points. Overall, accuracy is better for the old lines than for the new lines because the scorecard was constructed based on the old definitions.

In terms of precision, both sets of lines are similar, with the 90-percent confidence interval for a group's estimated poverty rate at a point in time 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 difference between the estimate and the true value is within 0.7 percentage points of the average difference.

In the specific case of the new national line and the validation sample, 90 percent of all samples of $n = 16,384$ produce estimates that differ from the true value in the range of $+1.2 - 0.6 = +0.6$ to $+1.2 + 0.6 = +1.8$ percentage points. This is because +1.2 is the average difference, and ± 0.6 is its 90-percent confidence interval. The average difference is +1.2 because the average scorecard estimate is too high by 1.2 percentage points; the average estimated poverty rate for the new national line in the validation sample is 34.4 percent, but the true value is 33.2 percent (Figure 1).

6.2 Formula for standard errors for estimates of poverty rates

How precise are the point-in-time estimates? Because they are averages of binary (0/1, or poor/non-poor) variables, the estimates (in “large” samples) have a Normal

distribution and can be characterized by their average difference vis-à-vis true values, together with the standard error of the average difference.

To derive a formula for the standard errors of estimated poverty rates at a point in time from indirect measurement via poverty scorecards (Schreiner, 2008a), note that the textbook formula (Cochran, 1977) that relates confidence intervals with standard errors in the case of direct measurement of a proportion is $c = \pm z \cdot \sigma$, 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 $\begin{cases} 1.28 \text{ for confidence levels of 80 percent} \\ 1.64 \text{ for confidence levels of 90 percent,} \\ 1.96 \text{ for confidence levels of 95 percent} \end{cases}$

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

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

n is the sample size.

For example, this implies that for a sample n of 16,384 with 90-percent confidence ($z = 1.64$) and a poverty rate p of 33.4 percent (the poverty rate in the construction/calibration sample in Figure 1 for the new national line), the confidence

interval c is $\pm z \cdot \sqrt{\frac{p \cdot (1 - p)}{n}} = \pm 1.64 \cdot \sqrt{\frac{0.334 \cdot (1 - 0.334)}{16,384}} = \pm 0.604$ percentage points.

Poverty scorecards, however, do not measure poverty directly, so this formula is not applicable. To derive a formula for the Colombia scorecard, consider Figure 8, which reports empirical confidence intervals c for the differences for the scorecard

applied to 1,000 bootstrap samples of various sizes from the validation sample. For $n = 16,384$ and the new national line, the 90-percent confidence interval is 0.640 percentage points.¹⁵

Thus, the 90-percent confidence interval with $n = 16,384$ is 0.640 percentage points for the Colombia poverty scorecard and 0.604 percentage points for direct measurement. The ratio of the two intervals is $0.640 \div 0.604 = 1.06$.

Now consider the same case, but with $n = 8,192$. The confidence interval under direct measurement is $\pm 1.64 \cdot \sqrt{\frac{0.334 \cdot (1 - 0.334)}{8,192}} = \pm 0.855$ percentage points. The empirical confidence interval with the Colombia poverty scorecard (Figure 8) is 0.900 percentage points. Thus for $n = 8,192$, the ratio of the two intervals is $0.900 \div 0.855 = 1.05$.

This ratio of 1.05 for $n = 8,192$ is very close to the ratio of 1.06 for $n = 16,384$. Across all sample sizes of 256 or more in Figure 8, the average ratio turns out to be 1.05, implying that confidence intervals for indirect estimates of poverty rates via the Colombia scorecard and this poverty line are slightly wider than for direct estimates via the 2009 GEIH. This 1.05 appears in Figure 9 as the “ α factor for standard errors” because if $\alpha = 1.05$, then the formula relating confidence intervals c and standard errors σ for the Colombia poverty scorecard is $c = \pm z \cdot \alpha \cdot \sigma$. That is, formula for the standard error σ for point-in-time estimates of poverty rates via scoring is $\alpha \cdot \sqrt{\frac{p \cdot (1 - p)}{n}}$.

¹⁵ Due to rounding, Figure 8 displays 0.6, not 0.640.

In general, α can be more or less than 1.00. When α is more than 1.00, it means that the scorecard is less precise than direct measurement. This occurs for all 18 poverty lines in Figure 9.

The formula relating confidence intervals with standard errors for poverty scoring can be rearranged to give a formula for determining sample size before measurement. If \hat{p} is the expected poverty rate before measurement, then the formula for sample size n based on the desired confidence level that corresponds to z and the desired confidence interval $\pm c$ is $n = \left(\frac{\alpha \cdot z}{c}\right)^2 \cdot \hat{p} \cdot (1 - \hat{p})$.¹⁶

To illustrate how to use this, suppose $c = 0.05040$ and $z = 1.64$ (90-percent confidence). Then the formula gives $n = \left(\frac{1.05 \cdot 1.64}{0.05040}\right)^2 \cdot 0.334 \cdot (1 - 0.334) = 260$, close to as the sample size of 256 observed for these parameters in Figure 8 for the new national line.

Of course, the α factors in Figure 9 are specific to Colombia, its poverty lines, its poverty rates, and this scorecard. The derivation of the formulas, however, is valid for any poverty scorecard following the approach in this paper.

¹⁶ Although USAID has not specified required confidence levels or intervals, IRIS Center (2007a and 2007b) says that a sample size of $n = 300$ is sufficient for USAID reporting. USAID microenterprise partners in Colombia should report using the new USAID “extreme” line. Given the α factor of 1.20 for this line, an expected before-measurement poverty rate of 19.5 percent (the all-Colombia rate for 2009), and a confidence level of 90 percent, then $n = 300$ implies a confidence interval of

$$\pm 1.20 \cdot 1.64 \cdot \sqrt{\frac{0.195 \cdot (1 - 0.195)}{300}} = \pm 4.5 \text{ percentage points.}$$

In practice after the end of fieldwork for the GEIH in December 2009, 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 33.3 percent national average in the 2009 GEIH in Figure 1), look up α (here, 1.05), assume that the scorecard will still work in the future and/or for non-nationally representative sub-groups,¹⁷ and then compute the required sample size. In this illustration, $n = \left(\frac{1.05 \cdot 1.64}{0.02} \right)^2 \cdot 0.333 \cdot (1 - 0.333) = 1,647$.

¹⁷ This paper reports accuracy for the scorecard applied to the validation sample, but it cannot test accuracy for later years or for other groups. Performance after December 2009 will resemble that in the 2009 GEIH with deterioration to the extent that the relationships between indicators and poverty status change over time.

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. With data only from the 2009 GEIH, this paper cannot test estimates of change over time for Colombia, and it can only suggest approximate formulas for standard errors. Nevertheless, the relevant concepts are presented here because, in practice, pro-poor organizations can apply the scorecard to collect their own data and to measure change through time.

7.1 Warning: Change is not impact

Scoring can estimate change. Of course, poverty could get better or worse, and scoring does not indicate what caused change. This point is often forgotten or confused, so it bears repeating: poverty scoring 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 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, poverty scoring 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 poverty scoring.

7.2 Calculating estimated changes in poverty rates over time

Consider the illustration begun in the previous section. On Jan. 1, 2012, a program samples three households who score 20, 30, and 40 and so have poverty likelihoods of 85.2, 60.9, and 29.6 percent (new national line, Figure 4). The group's baseline estimated poverty rate is the households' average poverty likelihood of $(85.2 + 60.9 + 29.6) \div 3 = 58.6$ 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, 2013, 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 72.9, 45.0, and 18.2 percent, new national line, Figure 4). Their average poverty likelihood at follow-up is now $(72.9 + 45.0 + 18.2) \div 3 = 45.4$ percent, an improvement of $58.6 - 45.4 = 13.2$ percentage points.¹⁸

This suggests that about one in eight participants in this hypothetical example crossed the poverty line in 2012.¹⁹ Among those who started below the line, about one in five ($13.2 \div 58.6 = 22.5$ percent) on net ended up above the line.²⁰

¹⁸ Of course, such a large reduction in poverty in one year would be miraculous, but this is just an example to show how poverty scoring can be used to estimate change.

¹⁹ This is a net figure; some people start above the line and end below it, and vice versa.

7.3 Accuracy for estimated change in two independent samples

With only the 2009 GEIH, it is not possible to measure the accuracy of scorecard estimates of changes in groups' poverty rates over time. In practice, of course, local pro-poor organizations can still apply the Colombia poverty scorecard to estimate change. The rest of this section suggests approximate formulas for standard errors and sample sizes that may be used until there is additional data.

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

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

z , c , and p are defined as above, n is the sample size at both baseline and follow-up,²¹ and α is the average (across a range of bootstrapped sample sizes) of the ratio of the observed confidence interval from a poverty scorecard and the theoretical confidence interval under direct measurement.

²⁰ Poverty scoring does not reveal the reasons for this change.

²¹ This means that, for a given precision and with direct measurement, estimating the change in a poverty rate between two points in time requires four times as many measurements (not twice as many) as does estimating a poverty rate at a point in time.

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

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

In countries for which this α has been measured (Schreiner, 2010, 2009a, 2009b, 2009c, 2009d, 2009e, and 2008b; Schreiner and Woller, 2010a and 2010b; and Chen and Schreiner, 2009a and 2009b), the simple average of α across poverty lines and years for a given country and then across countries is 1.19. This is as reasonable a figure as any to use for Colombia.

To illustrate the use of the formula above to determine sample size for estimating changes in poverty rates across two independent samples, suppose the desired confidence level is 90 percent ($z = 1.64$), the desired confidence interval is 2 percentage points ($c = 0.02$), the poverty line is the new national line, $\alpha = 1.19$, and $\hat{p} = 0.333$ (from Figure 1). Then the baseline sample size is

$$n = 2 \cdot \left(\frac{1.19 \cdot 1.64}{0.02} \right)^2 \cdot 0.333 \cdot (1 - 0.333) = 4,230, \text{ and the follow-up sample size is also } 4,230.$$

7.4 Accuracy for estimated change for one sample, scored twice

Analogous to previous derivations, the general formula relating the confidence interval c to the standard error σ when using a poverty scorecard to estimate change for a single group of households, all of whom are scored at two points in time, is:²²

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

where z , c , and α are defined as usual, 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.

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

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

²² McNemar (1947) and Johnson (2007). John Pezzullo helped find this formula.

Because \hat{p}_* can range from 0–0.5, more information is needed to apply this formula. In Peru (Schreiner, 2009a), 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 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 Colombia scorecard is applied twice (once after December 2009 and then again later) is

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

Peru is the only other country with an estimate of α (Schreiner 2009a). There, 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 new national line, and the sample will first be scored in 2012 and then again in 2015 ($y = 3$). The before-baseline poverty rate is 33.3 percent ($p_{2009} = 0.333$, Figure 1), and suppose $\alpha = 1.30$. Then the baseline sample size is

$$n = 2 \cdot \left(\frac{1.30 \cdot 1.64}{0.02} \right)^2 \cdot \{ -0.02 + 0.016 \cdot 3 + 0.47 \cdot [0.333 \cdot (1 - 0.333)] \} = 2,282. \text{ The same}$$

group of 2,282 households is scored at follow-up as well.

8. Targeting

When a program uses poverty scoring 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 income below a poverty line). Poverty status is a fact that depends on whether income 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 10 depicts these four possible targeting outcomes. Targeting accuracy varies with the cut-off score; a higher cut-off has better inclusion (but greater leakage), while a lower cut-off has better exclusion (but higher undercoverage).

Programs should weigh these trade-offs when setting a cut-off. A formal way to do this is to assign net benefits—based on a program’s values and mission—to each of

the four possible targeting outcomes and then to choose the cut-off that maximizes total net benefits (Adams and Hand, 2000; Hoadley and Oliver, 1998).

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

- Inclusion: 25.6 percent are below the line and correctly targeted
- Undercoverage: 7.6 percent are below the line and mistakenly not targeted
- Leakage: 13.6 percent are above the line and mistakenly targeted
- Exclusion: 53.2 percent are above the line and correctly not targeted

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

- Inclusion: 29.6 percent are below the line and correctly targeted
- Undercoverage: 3.7 percent are below the line and mistakenly not targeted
- Leakage: 23.3 percent are above the line and mistakenly targeted
- Exclusion: 43.5 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:

$$\begin{array}{rcl}
 (\text{Benefit per household correctly included} & \times & \text{Households correctly included}) & - \\
 (\text{Cost per household mistakenly not covered} & \times & \text{Households mistakenly not covered}) & - \\
 (\text{Cost per household mistakenly leaked} & \times & \text{Households mistakenly leaked}) & + \\
 (\text{Benefit per household correctly excluded} & \times & \text{Households correctly excluded}). &
 \end{array}$$

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

- Assign benefits and costs to possible outcomes, based on its values and mission
- Tally total net benefits for each cut-off using Figure 11 for a given poverty line
- Select the cut-off with the highest total net benefit

The most difficult step is assigning benefits and costs to targeting outcomes. A program that uses targeting—with or without scoring—should thoughtfully consider

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

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

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

Figure 11 shows “Total Accuracy” for all cut-offs for the Colombia scorecard. For the new national line in the validation sample, total net benefit is greatest (80.1) for a cut-off of 34 or less, with about four in five households in Colombia 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 $(2 \times \text{Households correctly included}) + (1 \times \text{Households correctly excluded})$.²³

As an alternative to assigning benefits and costs to targeting outcomes and then choosing a cut-off to maximize total net benefit, a program could set a cut-off to achieve a desired poverty rate among targeted households. The third column of Figure

²³ Figure 11 also reports “BPAC”, a measure discussed in the next section.

12 (“% targeted who are poor”) shows, for the Colombia scorecard applied to the validation sample, the expected poverty rate among households who score at or below a given cut-off. For the example of the new national line, targeting households who score 39 or less would target 39.2 percent of all households (second column) and lead to a poverty rate among those targeted of 65.4 percent (third column).

Figure 12 also reports two other measures of targeting accuracy. The first is a version of coverage (“% of poor who are targeted”). For the example of the new national line in the validation sample and a cut-off of 39 or less, 77.1 percent of all poor households are covered.

The final targeting measure in Figure 12 is the number of successfully targeted poor households for each non-poor household mistakenly targeted (right-most column). For the new national line in the validation sample and a cut-off of 39 or less, covering 1.9 poor households means leaking to 1 non-poor household.

9. The context of poverty scorecards for Colombia

This section discusses three existing poverty scorecards for Colombia in terms of their goals, methods, poverty-status definitions, data, indicators, cost, accuracy, and precision. The advantages of the new scorecard here are its use of the latest nationally representative data, its calibration to the latest definition of poverty status, its focus on feasibility for local, pro-poor organizations, and its reporting of accuracy and formulas for standard errors.

9.1 Gwatkin *et al.*

Gwatkin *et al.* (2007) apply to Colombia an approach used in 56 countries with Demographic and Health Surveys (Rutstein and Johnson, 2004). They use Principal Components Analysis to make an asset index from simple, low-cost indicators available for the 37,211 households in Colombia's 2005 DHS. The PCA index is like the poverty scorecard here except that, because the DHS does not collect data on income, it is based on a different conception of poverty, its accuracy vis-à-vis income-based poverty is unknown, and it can only be assumed to be a proxy for long-term wealth/economic status.²⁴ Well-known examples of the PCA asset-index approach include Ferguson *et al.* (2003), Sahn and Stifel (2000 and 2003), and Filmer and Pritchett (2001).

²⁴ Still, carefully built PCA indices and income-based poverty scorecards may pick up the same underlying construct (perhaps “permanent income”, see Bollen, Glanville, and Stecklov, 2007). Tests of how well rankings by PCA indices correspond with rankings by expenditure-based scorecards include Howe *et al.* (2009), Filmer and Scott (2008),

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 asset index are similar to those of the scorecard here.

The 30 indicators in Gwatkin *et al.* are similar to those in the scorecard here in terms of their simplicity, low cost, and verifiability:

- Characteristics of the residence:
 - Type of dwelling
 - Type of floor
 - Type of wall
 - Source of drinking water
 - Presence of a shower
 - Type of toilet arrangement
 - Method of disposal of garbage
 - Main fuel used for cooking
- Ownership of consumer durables:
 - Blenders
 - Fans
 - Radios
 - Stereos
 - VCRs
 - DVDs
 - Televisions
 - Telephones
 - Computers
 - Internet access
 - Gas or electric stovetop ranges
 - Gas or electric ovens
 - Microwave ovens
 - Refrigerators
 - Washing machines

Lindelov (2006), Sahn and Stifel (2003), Wagstaff and Watanabe (2003), and Montgomery *et al.* (2000).

- Hot-water heaters
- Air conditioners
- Vacuums or buffers
- Motorcycles or scooters
- Cars or trucks
- Number of people per sleeping room

In practice, the Gwatkin *et al.* index is more difficult and costly than the poverty scorecard here because it has twice the number of indicators, it cannot be computed by hand in the field, and it has 159 point values (half of them negative, and all with five decimal places).

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

In essence, Gwatkin *et al.*—like all PCA asset indices—define poverty in terms of the indicators and the points in the index itself. Thus, the index can be seen not as a proxy standing in for something else (such as income) but rather as a direct measure of a non-income-based definition of poverty. There is nothing wrong—and a lot right—about defining poverty in this way, but it is not as common or as well-understood as an income-based definition.²⁵

²⁵ Arguments in favor of the asset-based view include Carter and Barrett (2006), Schreiner and Sherraden (2006), and Sherraden (1991). In practice, the two views are distinct but tightly linked, as income/consumption are flows of resources received/consumed from the use of stocks of assets. Both views are low-dimensional simplifications—due to practical limits on definitions and measurement—of a higher-dimensional and more complete conception of the production of human well-being.

9.2 IRIS Center

USAID commissioned IRIS Center (2010) to build a poverty scorecard (called a “Poverty Assessment Tool”, or PAT) so that USAID’s microenterprise partners in Colombia could report on their participants’ poverty rates. In general, the IRIS PAT for Colombia is like the poverty scorecard here, except that it uses older data, it supports only one old-definition poverty line, is less transparent, it uses more indicators, and it does not report standard errors.

IRIS uses the 2003 Living Standards Survey (*Encuesta de Calidad de Vida*), see IRIS (2007c). Scorecard construction uses the USAID “extreme” line and a household-level poverty rate of 25.6 percent.²⁶ This is the only line supported. The data are evenly divided into construction and validation samples.

After comparing several statistical approaches, IRIS settles on a quantile regression (Koenker and Hallock, 2001) that estimates not poverty likelihoods but rather the 39th percentile of the logarithm of per-capita household expenditure. Its 14 indicators are:

- Demographics:
 - Household size (and its square)
 - Age of head (and its square)
- Education:
 - Share of household members ages 6 to 16 who attend school
 - Education of the household head
 - Share of household members with a university education

²⁶ This exceeds the poverty rates for old and new USAID “extreme” lines here because the data are different.

- Employment: Main activity of the household head
- Characteristics of the residence:
 - Tenancy status
 - Number of rooms
- Ownership of consumer durables:
 - VCR
 - Refrigerator or freezer
 - Clothes washing machine
 - Motorcycle
 - Car
- Region

The purpose of the IRIS PAT is to estimate poverty rates for USAID. In unpublished out-of-sample bootstrap tests with 1,000 replications and $n = 11,484$, reported bias is 0.5 percentage points in absolute value, and the α factor is 1.49. IRIS' published test (2007c) is *in-sample* (it uses the same data for both construction and validation), so its published bias is understated. In contrast, the tests of the new scorecard in this paper are *out-of-sample* (using different data for construction and validation) and so do not understate bias.²⁷

IRIS reports targeting accuracy in terms of inclusion, undercoverage, leakage, and exclusion, as well as Total Accuracy and the “Balanced Poverty Accuracy Criterion”. BPAC is a measure invented by IRIS (2005) that USAID has adopted as its criterion for certifying poverty scorecards. It considers accuracy both in terms of the estimated poverty rate (the purpose of the IRIS PAT) and in terms of inclusion (a targeting purpose that IRIS disavows). The formula is:

$$\text{BPAC} = (\text{Inclusion} - |\text{Undercoverage} - \text{Leakage}|) \times [100 \div (\text{Inclusion} + \text{Undercoverage})].$$

²⁷ The comparison is imperfect as the two tools are built and tested on different data. The unpublished results come from personal communication with Anthony Leegwater.

BPAC for IRIS for the USAID “extreme” line is 58.4, while the scorecard here with a cut-off of 29 or less for the new USAID “extreme” line has a BPAC of 46.5 (Figure 11). (A cut-off of 28 or less leads to a BPAC of 49.7.) As noted above, these comparisons are imperfect due to differences in data, poverty rates, poverty-status definitions, and the use of in-sample versus out-of-sample tests.

In terms of total accuracy for targeting purposes, the figure for the IRIS PAT is 78.9, slightly less than the 86.2 for the new scorecard here for the new USAID “extreme” poverty line with a cut-off of 22 or less. But as usual, the comparison is not apples-to-apples.

IRIS states that the PAT should not be used for targeting,²⁸ and IRIS doubts that the PAT can be useful for measuring changes in poverty rates, noting that “it is unclear that the tools will be able to identify real changes in poverty over time due to their inherent measurement errors. Unless the changes in the poverty rate are exceptionally large and the tools exceptionally accurate, the changes identified are likely to be contained within the margin of error.”²⁹ In contrast, this paper supports this use, reporting margins of error so that users can decide for themselves whether accuracy is adequate for their purposes.

²⁸ <http://www.povertytools.org/faq/faq.html#11>, retrieved 19 February 2009.

²⁹ <http://www.povertytools.org/faq/faq.html#12>, retrieved 19 February 2009.

9.3 SISBEN

SISBEN (*Sistema de Selección de Beneficiarios para Programas Sociales*) is Colombia's most important poverty scorecard. Since 1994, most government social spending—in particular, subsidized health insurance and conditional cash transfers—is targeted with SISBEN (Castañeda, 2005). SISBEN is meant to be a national qualification tool that is objective and uniform. As constitutionally mandated, SISBEN targets not on income (like the scorecard here) but rather on “unsatisfied basic needs”.

Municipal governments apply the SISBEN questionnaire to all households in the areas thought to have the worst concentrations of poverty.³⁰ Interviews last 15–20 minutes. After responses are entered into a municipal database, a closed-source software program provided by the national government generates a card with a name, family-identification number, person-identification number, and SISBEN score.

Scores range from 0 to 100, with lower scores signaling more poverty. Cut-offs define six score ranges;³¹ people in the lowest two ranges qualify for subsidized health insurance, and rural families in the lowest score range in the poorest municipalities qualify for conditional cash transfers. Other social programs use the scores similarly.

SISBEN is in its third incarnation. The first version had urban and rural scorecards and was used from 1994 to 2003 (Vélez, Castaño, and Deutsch, 1998). Its indicators and points were divulged in 1997. The second version also used urban and rural formulas. While its indicators are known, the points remain secret. The third

³⁰ Households outside these areas can go to a SISBEN office and request to be scored.

³¹ These six SISBEN ranges do not correspond to the six electrical-rate classes, which are part of a different community-level system for targeting subsidies.

version now in use has one scorecard for each of the old poverty-line regions in Figure 2 (Flórez, Espinosa, and Sánchez, 2008). Its indicators are public knowledge, and its points, while not explicitly divulged, can be derived from census data.

Like Gwatkin *et al.*, the first two SISBEN versions rank households with a PCA asset index based on national survey data. These scorecards are the standardized first principle component of the variance-covariance matrix of their indicators. Other than through the selection of indicators directly related to basic needs, this process does not explicitly model any particular conception of poverty; rather, it finds the linear combination of points and indicators that maximizes the explained variation among the indicators. In particular, it does not optimize coherence with poverty status as defined by an income-based poverty line. Rather, poverty is *defined* by index's indicators and points.

The first SISBEN used the following 16 (sometimes complex or unverifiable) indicators derived from its 62-question survey instrument:

- Demographics: Share of household members ages 6 or younger
- Education:
 - Education of the oldest income producer
 - Average education of household members ages 12 or older
- Employment:
 - Affiliation with social-security program, along with the size of the employer
 - Share of family members who are employed
 - Income per person in multiples of the minimum wage
- Characteristics of the residence:
 - Type of wall
 - Type of roof
 - Type of floor
 - Type of water supply
 - Time required to fetch water
 - Type of toilet arrangement
 - Method of disposal of garbage

- Number of people per room
- Ownership of consumer durables:
 - Number of basic appliances
 - Clothes washing machine

The second SISBEN has 25 indicators, many different from the first version:

- Demographics:
 - Share of household members ages 6 or younger
 - Share of household members with tax-registration numbers
- Education:
 - Education of the household head
 - Education of the spouse of the household head
 - Average educational deficit for members ages 6 to 25
- Employment:
 - Share of household members who work
- Characteristics of the residence:
 - Type of wall
 - Type of floor
 - Location of water supply
 - Number of bathrooms
 - Type of toilet arrangement
 - Method of disposal of garbage
 - Presence of a shower
 - Type of cooking fuel
 - Number of people per room
 - Electrical-rate class
- Ownership of consumer durables:
 - Color television
 - Cable television
 - Presence of a telephone
 - Exclusivity of use of a telephone
 - Oven
 - Refrigerator
 - Clothes washing machine
 - Hot-water heater
 - Air conditioner

The third SISBEN breaks from the first two versions in both concept and technique (Flórez, Espinosa, and Sánchez, 2008). In terms of concept, it intentionally

selects indicators directly related to poverty in Amartya Sen’s widely accepted theory of capabilities. In this, it is like Alkire and Santos’ Multidimensional Poverty Index (2010).

In terms of technique, Flórez, Espinosa, and Sánchez test whether a PCA index or a fuzzy-set scorecard concentrates more people with given unsatisfied basic needs in lower score ranges.

Flórez, Espinosa, and Sánchez conclude that the fuzzy-set approach is better. This is unsurprising; fuzzy-set points are picked specifically to fulfill the criterion used in this case to judge scorecard power, but PCA points do not fulfill any poverty-related criterion.

The fuzzy-set approach sounds more cutting-edge than it is. The flat-maximum phenomenon suggests that most reasonable scorecards will have similar targeting power. While the fuzzy-set SISBEN scorecard is more accurate than PCA, the typical difference is probably small (and PCA is better in the other-rural region).

In fact, this third SISBEN scorecard is a straightforward combination of the two oldest and simplest scoring approaches: indicators selected by experts, and points defined as the share of households with a given response or a more-poor response. That is, the fuzzy-set approach is just the “expert” approach (Schreiner, 2002) combined with “naïve Bayes” or “cross-tab” points (Caire, 2011). In particular, the fuzzy-set approach is simpler than the already-simple approach used to construct for the poverty scorecard in this paper. “Fuzzy set” sounds *avant garde*, but it is in fact old school.

Regardless of this rhetorical flourish, fuzzy set/expert/cross-tab scorecards are powerful, common, valid, and easy for users to understand.³²

The 24 hand-picked indicators in the third SISBEN are:

- Health:
 - Permanent disability
 - Teen-age parenthood
- Education:
 - Share of adult household members who are functionally illiterate
 - Share of school-age children who are not attending school
 - Average educational deficit among school-age children
 - Share of adults who have not completed high school
 - Share of children who are working
- Housing:
 - Type of residence
 - Type of wall
 - Type of floor
 - Source of drinking water
 - Type of toilet arrangement
 - Exclusivity of toilet arrangement
 - Method of disposal of garbage
 - Type of cooking fuel
 - Number of people per room
- Vulnerability:
 - Individual level:
 - Household size
 - Structure of headship
 - Dependency ratio
 - Ownership of consumer durables
 - Municipality level:
 - Infant mortality
 - Homicide rate
 - School-attendance rate
 - Utilization of formal health services

Except for health and municipality-level vulnerability indicators, these indicators do not differ much from the first two SISBEN versions nor from the poverty scorecard

³² The effort in this paper to design an easy-to-understand scorecard leads to something that looks as if it were constructed with fuzzy sets/experts/cross-tabs.

here. The questionnaire to collect the data has 90 items, some of which are completed once for each household member (Flórez, Espinosa, and Sánchez, 2008, pp. 32–33).

Points are derived straightforwardly from 2005 Census data. For example, suppose there are three types of floors: dirt, concrete, and tile. Suppose further that 20 percent of households have dirt floors (the “poorest” floor), 35 percent have concrete floors, and 45 percent have tile floors (the “least-poor” floor). Then the points are 0.20 for dirt floors, 0.55 for concrete floors, and 1.00 for tile floors.

Accuracy cannot be compared between any of the three SISBEN versions and the poverty scorecard here because they use different definitions of poverty. Indeed, “accuracy” is not a useful concept in the context of the SISBEN formulas because—like Gwatkin *et al.*—they *define* poverty in terms of the score derived from their indicators and points. By their own definition, the SISBEN tools are 100-percent accurate.

Given the ubiquitous use of SISBEN, what value of the new scorecard here? Of course, nothing will replace SISBEN as a tool for qualifying people for government social programs. Instead, the scorecard here aims to serve a different niche. It offers a simple, quick, inexpensive way to measure poverty whose inputs, outputs, and processes are transparently available to local, pro-poor organizations. Such organizations can only see SISBEN’s final score, and SISBEN’s formula is secret. In contrast, they can see and store the survey responses that are inputs to the new poverty scorecard, the scorecard formula itself, and the scores and poverty likelihoods produced by the survey responses applied to the scorecard formula. Beyond enabling targeting, this open access facilitates

custom analyses to inform a wide range of management questions linked with an income-base definition of poverty.

10. Conclusion

This paper presents a simple poverty scorecard for Colombia that can be used to estimate the likelihood that a household has income 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 manage their social performance.

The scorecard is built with a sub-sample of data from Colombia's 2009 GEIH, tested with a different sub-sample, and calibrated to 18 poverty lines that cover Colombia's old and new definitions of poverty status. First-time and legacy users can use the scorecard to track progress over time, and they all should use the new-definition poverty lines from now on.

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

When the scorecard is applied to the validation sample with $n = 16,384$ and new-definition poverty lines, the absolute difference between estimates versus true poverty rates for groups of households at a point in time is 1.6 percentage points or less

and averages—across the nine new poverty lines—about 0.9 percentage points. For $n = 16,384$ and 90-percent confidence, the precision of these differences is ± 0.7 percentage points or better. For the old-definition poverty lines, the figures are similar or better.

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

Although the statistical technique is innovative, and although technical accuracy is important, the design of the scorecard here 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 poverty 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 poverty scorecard is a practical, objective way for pro-poor programs in Colombia to estimate poverty rates, track changes in poverty rates over time, and target services. The same approach can be applied to any country with similar data.

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Appendix:

Guidelines to the Interpretation of Scorecard Indicators

The following is taken from:

Departamento Administrativo Nacional de Estadística. (2009) *Manual de Recolección y Conceptos Básicas, Gran Encuesta Integrada de Hogares*, Dirección de Metodología y Producción Estadística, Bogotá,
<http://190.25.231.249/aplicativos/sen/NADA/ddibrowser/getresource.php?resourceid=1743>, retrieved 18 May 2011 (the *Manual*).

1. How many household members are 18-years-old or younger?

According to p. 40 of the *Manual*, ages are to be expressed in units of years completed.

Pages 15–17 of the *Manual* define *household* as follows:

“A household is a person or a group of people—whether or not related by blood—who occupy all or part of a residence, who meet their basic needs with pooled resources, and who usually share meals.

“More than one household might live in a given residence, if groups of people live in different parts of the residence and prepare their meals separately. Households may also be made up of people who have no blood or marital relationship, such as three friends who get together to share a place of residence.

“Domestic servants and their family members and other household workers and their family members are part of the household if and only if they sleep in the same residence where they work.

“Note: The members of the households are counted as of the moment that the survey is applied, regardless of whether those people were or were not members of the household during the past week.

Households made up of boarders or workers are sometimes found in a residence. To distinguish them from the members of other households, use the following criteria:

- A *renter* is someone who leases one or more rooms in a residence and who takes meals separately. *Households made up of renters should be counted as distinct households*
- A *boarder* is a person who pays to live in the residence and to be provided with meals. Boarders are counted as household members as long as there are five of them or less. If there are six or more, then they are not to be counted as part of the household with whom they board

“Notes: Keep in mind that to be counted as a boarder, the person must pay for shelter and meals, whether in kind, in cash, or by covering some expense of the household with whom they board as a form of payment for their shelter and meals.

“Children assigned to a household’s care as part of the Substitute Mothers Program should be counted as boarders and as household members if they number five or less. If they number more than five, then they are not counted as part of the household with whom they board.

Habitual Residents

“A *habitual resident* is a person who lives permanently or most of the time in a residence even though he or she happens to be absent at the moment of the survey.

“Other people who are to be counted as habitual residents—because they do not reside elsewhere—include the following:

- People who are absent due to special circumstances such as vacation, training courses, or business trips, if the absence is six months or less
- Travel guides and sailors
- Kidnapped people (regardless of the length of their absence)
- People in hospitals or clinics (regardless of the length of their absence)
- Refugees, regardless of the time they have been in the location of the interview
- People temporarily arrested and detained by the police
- People performing military or police service who sleep at their stations

Worker

“A *worker* is a person who—whether a laborer, day laborer, or employee—lives in the residence and works in the business enterprise or farm run by one of the members of the household being interviewed. Workers are counted as part of the household for which they work if they number five or less. Otherwise, they are not counted.

The following are not habitual residents of the interviewed household:

- People who, because they are students or for some other reason, stay most of the time somewhere different from where the household being interviewed resides. These people should be considered to be habitual residents of the place where they live most of the time, even though they may travel regularly (for example, on week-ends, twice a month, or monthly) to visit the household being interviewed
- People who at the time of the interview are serving sentences in prison, serving in the army, air force, or the national military and living in barracks, study internships, asylums, convents, or monasteries

“If it happens that someone is studying, working, or doing something else and *spends exactly half their time in two different places, then that person should be considered as a habitual resident of that person’s household*, which is probably where one finds people who are his or her blood relatives.

Make-up of the household

“A household is made-up of:

- Its habitual residents (whether or not they are blood relatives)
- People who habitually reside in the household but who are absent *for less than six (6) months* due to work, health, vacation, etc. and who do not reside elsewhere
- People who do not have a habitual residence elsewhere are to be considered as members of the household interviewed. Examples are travel guides, sailors, etc.
- Boarders or workers (if they number five or less)
- Domestic workers and their children are to be considered as members of the household where they work in the following cases:
 - When they sleep in the same residence in which they work (internal domestic workers)
 - When they stay most of their time in the residence where they work (for example, if they work from Monday to Friday and return to where their relatives live on week-ends)
- Young men performing their obligatory military service in the National Guard or as guards in the penal system are considered to be household members if they return home to sleep at night

Exceptions

“Domestic workers and their children are not to be considered as members of the household where they work when they:

- Work in various households (self-employed)
- Work in only one household but return daily to their own household

“Note: People who are absent for more than six months for work-related reasons and who reside somewhere else are not to be counted as members of the household being interviewed, even if they are the principal bread-winner.”

2. What is the highest educational level reached by the female head/spouse?

According to p. 12 of the *Manual*, “The *household head* is the person who—whether by virtue of age, being the main bread-winner, or other reasons—is recognized by the rest of the household members as the head. The head may be a man or a woman.”

According to p. 40 of the *Manual*, if a person’s name does not unambiguously imply the person’s sex, then the interviewer should inquire about it explicitly.

The purposes of the simple poverty scorecard, the *female head/spouse* is defined as:

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

According to p. 40 of the *Manual*, the interviewer should not count “as the spouse/partner/companion of the household head any person younger than 10 years old. Keep in mind that only one person in the household can be the spouse/partner/companion of the household head.”

According to p. 47 of the *Manual*, “record the highest educational level reached.”

For the purposes of the simple poverty scorecard, if it is not possible to obtain any responses related to the educational level, it should be counted as “none”.

According to pp. 50–52 of the *Manual*, “The levels of education are as follows:

- *None*. If the person did not pass any grade among the levels of formal education
- *Pre-school*. Pre-school is designed to promote and stimulate the physical, empathetic, and spiritual development of the child, as well as his or her social integration, attention, and cooperation in school activities, always in concert with the efforts of the child’s parents. This option should be recorded regardless of whether the person is attending pre-school, pre-kindergarten, kindergarten, or if the child is between a course that comes before the first year of primary school and the first year of primary school

- *Basic education.* The obligatory basic education corresponds with that identified in Article 356 of the Political Constitution as primary and middle school. It encompasses nine (9) grades and is structured around a universal curriculum that covers the fundamental areas of human knowledge and activity:
 - Basic education in primary school. The five (5) first grades (first through fifth) of make up primary school
 - Basic education in middle school. The four grade (sixth through ninth) that follow primary school make up middle school
- *High school:*
 - *Duration and purpose.* High school serves to culminate, consolidate, and advance the achievement started in pre-school and basic education. High school encompasses two grades, tenth and eleventh. Its purpose is to understand universal ideas and values and to prepare the student to enter into the work force and/or post-secondary education or college
 - *Nature of high school.* High school is either college preparatory or technical. The high-school graduate receives the title of *bachiller* and is able to enter to post-secondary education or college at any level and with any major/specialty
 - *College preparatory high school.* This enables the student—according to his or her interests and abilities—to specialize in a specific area of the sciences, arts, or the humanities and to be qualified for college
 - *Technical high school.* This branch prepares the student for the work force in the manufacturing or service sectors, and for continuing on to post-secondary education. Note: Keep in mind that basic education (primary and middle school) and high school no longer refer to *courses* (first through sixth), rather to *grades*, as established by the National Ministry of Education. That is, middle school and high school encompass sixth through eleventh grades. For normal schools (teacher’s college), grades twelve and thirteen are considered to be post-secondary education. People who have completed grades ten and eleven of high school are consider to have completed high school
- *Post-secondary or college.* This level covers higher education that results in a college degree at the level of professional, technician, post-graduate degree, specialty degree, or master’s degree.

“In accord with the previous discussion, post-secondary or college includes formal education received after high school, that is, the education given by technical schools, universities, SENA, and technical courses of study.

“Even though most university majors are organized in units of semesters, the interviewer should count only complete years that have been passed. For example, a student who has completed the fifth semester in medical school would be counted as having completed two years of post-secondary or college.

“Note: In the case of people who have studied more than one major or course of study (whether or not they have completed it) or post-graduate studies, the interviewer should add up all the semesters passed, translate the result into years, and record the years. Examples include:

- A respondent reports that he/she has taken and passed:

- 3 semesters of Business Administration
- 1 semester of Industrial Engineering
- 3 semesters in Food Technology
- 1 semester of Medicine

In total, the person have taken and passed 8 semesters of post-secondary education or college, equivalent to four years.

- A respondent reports that he/she has taken and passed:

- A professional major of five years (10 semesters)
- A technical major of four years (8 semesters)
- 1 semester at the master’s level
- Is currently in the fourth semester of a post-graduate degree

In total, the person has taken and passed 22 semesters of post-secondary or college, equivalent to 11 years

“As can be seen in the previous examples, the summation of semesters should include all types of post-secondary or college (technical or professional) and includes all majors, whether completed or not.”

3. How many household members spent most of the past week working?

According to p. 53 of the *Manual*, “the *reference week* or the *past week* is defined as the complete calendar week, from Monday to Sunday, immediately preceding the week in which the interview takes place.

According to pp. 56–57 of the *Manual*, “Ask the question and *wait for the response*.”

“If the person worked for the majority of time during the reference week—be he or she employed, self-employed, or a business owner with employees—then the response to this question is ‘working’.

“In reference to the year of rural service performed by medical doctors, note that this is a legal requirement to practice medicine, not an academic requirement to graduate as a medical doctor. Furthermore, the rural service is remunerated. For these reasons, people in this situation are to be considered as ‘working’.

“Self-employed people are counted as ‘working’ if, in the reference week, they:

- Attended to their business or worked at their profession even though they did not make any sales or perform any professional services during the reference week
- Had in their home one or more boarders

“Notes: Young men performing their obligatory military service in the National Guard or as guards in the penal system are considered to be working.

“If a person was serving in the military during the reference week but was discharged during the week in which the interview takes place and is considered to be part of the household being interviewed, then the person is considered to be working.

People who spent most of their time during the reference week in the following activities are not considered to be working:

- Looking for work
- Studying
- Doing housework
- Permanently disabled people who cannot work
- Other situations, such as:
 - People who are temporarily ill
 - People who have a job but who were not working during the reference week due to vacation, work conflicts, work stoppages due to strikes, etc.
 - People with a job who have been laid-off temporarily or indefinitely
 - People without a job who plan to start a business or to start farming
 - Volunteers who work without remuneration
 - People who are remodeling a house that they own to rent it out
 - People who are retired or independently wealthy
 - People who are kidnapped or disappeared, if their families express the hope that they are alive and will return soon to the household

4. In their main line of work, how many household members work as wage or salary employees for a private firm or the government?

According to p. 66 of the *Manual*: “*Wage or salaried work* is remunerated with a salary, hourly wage, piecework rate, tips, or commission paid in cash or in kind (food, shelter, or merchandise received in the place of a monetary payment). Both white-collar and blue-collar workers are counted as “wage or salaried employees”, whether or not they are paid hourly or in terms of some less-frequent time unit.”

According to p. 66 of the *Manual*, some examples of “wage or salaried employees” are:

- A taxi driver who, regardless of his or her production in a given day, received a pre-determined, regular, and continuous monetary payment
- A registered nurse who works with a public or government institution, for which he or she receives a salary, has a set place of work, and a regular work schedule

According to p. 66 of the *Manual*, some examples of cases that are not “wage or salaried employees” are:

- A taxi driver who has the use of someone else’s car for a day and who, at the end of the day, pays a fixed daily rent for the use of the car, keeping any surplus as his own profit
- Two people who come together to buy a taxi and who both drive it in turns, each with their own pre-established schedules, and who together use their revenues to maintain the taxi and who keep any surplus as their profit
- A nurse who works full-time in a single household
- A registered nurse who works for a single person or household, or who works for various households or businesses, be they private or public/government, and who is paid fees for his or her services

5. What is the residence’s rate class for electricity?

According to pp. 26–27 of the *Manual*, “this question relates to access to residential electrical service. The residence can have electrical service access via a legal or illegal connection, and the service may be provided by or administered by a public entity, a private business, or a community-managed service. It does not matter whether, at the time that the interview takes place, the electrical service is working. . . .”

“Keep in mind that if the residence has an electrical connection, the rate class is from one to six in most cities, the rate class is zero if the connection is illegal/pirated, and the rate class is 9 if it is not possible to determine the rate class or if the residence uses its own electrical generator.”

“Notes: Ask the respondent for the most recent receipt for electrical service, and use it to determine the rate class.

“To determine the rate class, keep in mind:

- If the receipts do not indicate the rate class, or if the electrical connection is pirated/illegal, then record the rate class as zero (0)
- If the respondent does not know the rate class and cannot produce a payment receipt, then record nine (9) (corresponding to “no class”)
- In some cities, payment receipts do not indicate the rate class but rather residential categories. Convert these categories to rate classes using the following table:

<u>Category</u>	<u>Rate class</u>	<u>Category</u>	<u>Rate class</u>
Low–Low	1	Middle	4
Low	2	Middle–High	5
Middle–Low	3	High	6

“If the residence includes a business locale or a small factory and therefore the receipt for payment for electricity indicates a commercial or industrial rate, the interviewer should assign the rate class that is most common among other residences in the census block.

“If the household uses its own electrical generator, record “no class”.

“If the household being interviewed lives in a building or in a group of residential buildings in which the questionnaire has been applied to other households, and if the respondent for a specific household claims to be ignorant of the rate class of his or her household, then the interviewer should assume that the rate class is the same as for the other households interviewed in this same building or group of buildings.

“Likewise, keep in mind that the rate class can vary from one residence to another, even within the same city block.”

6. What fuel or energy source does the household usually cook with?

According to p. 32 of the *Manual*:

“If a household uses more than one type of fuel or energy source for cooking, then the interviewer should record the one that is used the most.”

“Keep in mind the following definitions:

- *Electricity*. When the members of the household cook on a stove or hotplate that uses electrical energy
- *Petroleum, gasoline, kerosene, or alcohol*. When the household cooks using inflammable fuels such as kerosene, petroleum, gasoline, or alcohol
- *Natural gas from a public network*. When the household cooks using natural gas that comes from a network exterior to the residence. Note that in some apartment buildings and residential communities, the gas cylinders or tanks are located in a basement or in a common area and are connected to individual residences via pipes. These cases—like those residences that are connected directly to LPG (propane) cylinders or tanks—are not counted as ‘natural gas from a public network’
- *LPG from a cylinder or tank*. When the household cooks with LPG (propane gas) that comes from cylinders or tanks that are periodically changed or refilled by a gas company. In some residences, the household has a deposit of organic material which, as it decomposes, gives off methane gas which is collected for use in cooking. These cases are counted as ‘LPG from a cylinder or tank’
- *Firewood, wood, or charcoal*. When the household cooks with firewood, wood, or charcoal
- *Coal*. When the household cooks with coal, a mineral extracted from an underground mine or a surface mine, using modern technological methods or traditional artisanal methods
- *Waste materials*. When the household cooks with trash, dried animal dung, etc.

7. Does the household have a working clothes washing machine?

According to p. 34 of the *Manual*: “*working* household appliances are those that the household possesses and are available to be used during the week in which the interview is taking place.”

According to page 38 of the *Manual* (June 2010 revision): “The term *has* refers to whether the household possesses access, availability, and autonomy to use the good.

“Example. If a household rents a furnished residence, then the household can be said to have the goods (furnishings) that the contract covers, even though the goods are not the property of the renter, because the goods are available for the renter’s use and the renter has the right to use them. Therefore, the household is considered to have them.

“If a household has access to a good but it is not freely available for the household’s use whenever it wants to use it, then the household is not considered to have the good.”

According to p. 35 of the *Manual*, a *clothes washing machine* is “an electrical machine used to wash clothes and other textiles.”

8. Does the household have a working refrigerator or freezer?

According to p. 34 of the *Manual*: “*working* household appliances are those that the household possesses and are available to be used during the week in which the interview is taking place.”

According to page 38 of the *Manual* (June 2010 revision): “The term *has* refers to whether the household possesses access, availability, and autonomy to use the good.

“Example. If a household rents a furnished residence, then the household can be said to have the goods (furnishings) that the contract covers, even though the goods are not the property of the renter, because the goods are available for the renter’s use and the renter has the right to use them. Therefore, the household is considered to have them.

“If a household has access to a good but it is not freely available for the household’s use whenever it wants to use it, then the household is not considered to have the good.”

According to p. 35 of the *Manual*, a refrigerator or freezer is “an electronic appliance used to chill and preserve food and drink.”

9. Does the household have a working DVD?

According to p. 34 of the *Manual*: “*working* household appliances are those that the household possesses and are available to be used during the week in which the interview is taking place.”

According to page 38 of the *Manual* (June 2010 revision): “The term *has* refers to whether the household possesses access, availability, and autonomy to use the good.

“Example. If a household rents a furnished residence, then the household can be said to have the goods (furnishings) that the contract covers, even though the goods are not the property of the renter, because the goods are available for the renter’s use and the renter has the right to use them. Therefore, the household is considered to have them.

“If a household has access to a good but it is not freely available for the household’s use whenever it wants to use it, then the household is not considered to have the good.”

According to p. 35 of the *Manual* (June 2010 revision), *DVD* means “Digital Versatile/Video Disk or Digital Versatile/Video Disk/Blu-Ray” and stands for “the possession of a video player in DVD or Blu-Ray format connected to a display such as a television.”

10. Does the household have a motorcycle and/or a car for its own use?

According to p. 34 of the *Manual*: “*working* household appliances are those that the household possesses and are available to be used during the week in which the interview is taking place.”

According to page 38 of the *Manual* (June 2010 revision): “The term *has* refers to whether the household possesses access, availability, and autonomy to use the good.

“Example. If a household rents a furnished residence, then the household can be said to have the goods (furnishings) that the contract covers, even though the goods are not the property of the renter, because the goods are available for the renter’s use and the renter has the right to use them. Therefore, the household is considered to have them.

“If a household has access to a good but it is not freely available for the household’s use whenever it wants to use it, then the household is not considered to have the good.”

According to p. 35 of the *Manual*, a *motorcycle* is “a two-wheeled vehicle with an internal combustion engine” and a *car for its own use* is “an automobile for personal, non-commercial, non-public use”.

Figure 1: Sample sizes and poverty rates by sub-sample and by poverty line at both the household level and the person level

Sub-sample	Definition of poverty status	# households	% with per-capita daily household income below a poverty line								
			National				USAID	International 2005 PPP			
			Food	100%	150%	200%	'Extreme'	\$1.25	\$2.50	\$3.75	\$5.00
Poverty line (COP/person/day)	Old	220,954	3,876	9,244	13,867	18,489	5,416	1,863	3,726	5,590	7,453
	New		2,730	6,004	9,006	12,007	3,761	1,863	3,727	5,590	7,454
<u>All Colombia poverty rates (%)</u>											
Household level	Old	220,954	14.3	39.3	55.9	67.2	19.5	10.2	24.0	37.3	47.8
Person level	Old	220,954	16.4	45.5	63.0	73.9	22.7	11.7	28.4	43.6	54.7
Household level	New	220,954	11.4	33.3	50.0	62.1	15.9	5.4	17.0	30.2	41.8
Person level	New	220,954	14.4	40.2	57.9	69.9	20.0	6.7	21.2	36.9	49.6
<u>Construction and calibration: Selecting indicators and points, and associating scores with likelihoods</u>											
Household level	Old	110,335	14.4	39.2	55.8	67.1	19.5	10.1	24.0	37.3	47.8
Person level	Old	110,335	16.4	45.3	63.0	73.8	22.7	11.6	28.4	43.4	54.6
Household level	New	110,335	11.3	33.4	50.0	62.0	15.9	5.3	17.0	30.3	41.9
Person level	New	110,335	14.2	40.1	58.0	69.7	19.9	6.6	21.1	36.9	49.6
<u>Validation: Measuring accuracy</u>											
Household level	Old	110,619	14.2	39.5	56.0	67.3	19.6	10.3	23.9	37.4	47.7
Person level	Old	110,619	16.3	45.7	63.1	74.0	22.8	11.8	28.5	43.7	54.7
Household level	New	110,619	11.5	33.2	49.9	62.1	16.0	5.5	17.0	30.1	41.7
Person level	New	110,619	14.6	40.3	57.9	70.0	20.2	6.7	21.3	36.9	49.6

Source: 2009 *Gran Encuesta Integrada de Hogares*

The food line, the national poverty lines, and the USAID "extreme" line for the old definition of poverty status are compared with income that is adjusted to national accounts. The international 2005 PPP poverty lines for the old definition of poverty status are compared with income that do not include this adjustment. All poverty lines for the new definition of poverty status are compared with the new definition of income. Poverty rates for the international 2005 PPP lines differ between the old and new definitions (even though the all-Colombia 2005 PPP poverty lines are the same) because the definition of income differs, because poverty-line regions differ, and because the price adjustments across poverty-line regions differ.

Figure 2 (Old definition): Poverty lines and poverty rates at the household and person level by old poverty-line region

Region	Poverty line (COP/person/day) and poverty rate (%)								
	Food	National			USAID 'Extreme'	International 2005 PPP			
		100%	150%	200%		\$1.25	\$2.50	\$3.75	\$5.00
All Colombia									
Poverty line	3,876	9,244	13,867	18,489	5,416	1,863	3,726	5,590	7,453
Household-level poverty rate	14.3	39.3	55.9	67.2	19.5	10.2	24.0	37.3	47.8
Person-level poverty rate	16.4	45.5	63.0	73.9	22.7	11.7	28.4	43.6	54.7
Barranquilla									
Poverty line	4,201	9,348	14,022	18,696	6,068	1,893	3,787	5,681	7,575
Household-level poverty rate	9.0	35.6	55.9	68.6	17.9	4.9	17.6	35.3	49.3
Person-level poverty rate	9.9	40.7	62.4	74.6	20.3	5.4	20.8	41.2	55.9
Bucaramanga									
Poverty line	4,109	11,028	16,543	22,057	8,153	1,900	3,801	5,702	7,603
Household-level poverty rate	2.2	15.7	32.6	47.6	8.1	1.2	3.7	9.3	17.8
Person-level poverty rate	2.2	18.5	38.0	54.3	9.3	1.2	4.0	11.1	21.4
Bogotá									
Poverty line	3,972	10,014	15,021	20,029	6,727	1,821	3,643	5,464	7,286
Household-level poverty rate	4.2	19.0	34.8	48.2	9.7	2.5	6.6	13.8	22.0
Person-level poverty rate	4.1	22.0	40.3	54.7	11.0	2.2	7.2	16.2	25.9
Manizales									
Poverty line	4,571	12,817	19,225	25,634	7,259	1,824	3,648	5,473	7,297
Household-level poverty rate	10.3	39.3	56.8	67.9	19.3	4.9	11.9	22.1	32.2
Person-level poverty rate	11.7	45.4	63.8	74.3	22.7	5.1	14.0	26.4	38.1
Medellín									
Poverty line	4,631	12,532	18,799	25,065	7,329	1,849	3,698	5,547	7,397
Household-level poverty rate	9.6	33.4	50.8	62.5	16.8	5.7	11.7	19.9	28.5
Person-level poverty rate	10.2	38.4	57.0	68.5	19.2	5.6	13.0	23.1	32.9
Cali									
Poverty line	4,028	9,689	14,533	19,378	6,049	1,828	3,656	5,485	7,313
Household-level poverty rate	9.2	28.6	44.9	58.1	14.5	5.6	12.7	22.6	33.1
Person-level poverty rate	9.8	32.6	50.7	64.6	16.3	5.6	14.1	26.0	38.0
Pasto									
Poverty line	3,298	8,658	12,987	17,316	5,485	1,816	3,632	5,448	7,264
Household-level poverty rate	6.3	3.5	51.7	63.1	17.5	4.4	18.2	33.8	45.5
Person-level poverty rate	7.1	39.8	56.9	67.7	19.8	4.8	21.1	39.0	51.2

Source: 2009 *Gran Encuesta Integrada de Hogares*

Figure 2 (Old definition, cont.): Poverty lines and poverty rates at the household and person level by old poverty-line region

Region	Poverty line (COP/person/day) and poverty rate (%)								
	Food	National			USAID	International 2005 PPP			
		100%	150%	200%	'Extreme'	\$1.25	\$2.50	\$3.75	\$5.00
<u>Villavicencio</u>									
Poverty line	3,792	9,936	14,904	19,873	6,369	1,867	3,734	5,601	7,468
Household-level poverty rate	6.5	27.0	44.7	58.1	13.4	4.3	11.3	22.0	33.0
Person-level poverty rate	6.5	31.2	50.9	65.0	15.6	4.1	13.1	26.0	38.6
<u>Pereira</u>									
Poverty line	4,435	11,752	17,628	23,504	7,469	1,887	3,774	5,661	7,548
Household-level poverty rate	7.0	35.2	54.3	66.9	17.0	2.6	9.0	20.4	32.6
Person-level poverty rate	8.7	42.9	63.0	75.2	21.4	3.0	11.7	25.9	40.3
<u>Cúcuta</u>									
Poverty line	3,977	9,006	13,509	18,013	6,084	1,961	3,922	5,884	7,845
Household-level poverty rate	7.6	29.9	49.2	63.2	15.4	4.3	14.5	30.2	44.0
Person-level poverty rate	7.7	33.6	54.6	68.4	16.8	4.2	16.3	34.4	49.6
<u>Cartagena</u>									
Poverty line	4,462	9,090	13,635	18,180	6,130	1,902	3,805	5,708	7,611
Household-level poverty rate	7.9	31.2	50.9	63.9	15.3	4.0	14.8	31.6	45.1
Person-level poverty rate	8.9	36.0	57.1	69.9	18.0	4.4	17.8	37.0	51.4
<u>Neiva/Ibagué</u>									
Poverty line	4,144	9,560	14,340	19,120	6,384	1,948	3,897	5,845	7,794
Household-level poverty rate	6.2	26.5	43.2	56.5	13.1	3.1	10.6	22.0	34.0
Person-level poverty rate	7.0	31.2	49.9	63.9	15.6	3.5	13.0	26.8	40.6
<u>Montería</u>									
Poverty line	4,028	9,499	14,239	18,999	6,304	1,841	3,683	5,524	7,366
Household-level poverty rate	7.9	35.7	55.0	66.7	18.1	3.7	16.1	32.4	45.9
Person-level poverty rate	8.3	40.6	60.7	71.9	20.3	3.9	18.5	37.5	52.1
<u>Other central cities</u>									
Poverty line	4,114	9,560	14,340	19,120	5,139	1,872	3,744	5,616	7,488
Household-level poverty rate	17.9	46.2	61.9	72.2	23.1	10.3	26.1	41.9	53.0
Person-level poverty rate	20.0	52.7	68.7	78.4	26.3	11.3	30.5	48.5	60.3
<u>Rest of rural</u>									
Poverty line	3,052	6,712	10,069	13,425	3,359	1,872	3,744	5,616	7,488
Household-level poverty rate	24.9	56.6	73.7	82.6	27.5	23.1	49.3	67.0	77.7
Person-level poverty rate	29.1	64.3	80.9	88.6	32.1	27.0	56.9	74.5	84.4

Source: 2009 *Gran Encuesta Integrada de Hogares*

Figure 2 (New definition): Poverty lines and poverty rates at the household and person level by new poverty-line region

Region	Poverty line (COP/person/day) and poverty rate (%)								
	Food	National			USAID	International 2005 PPP			
		100%	150%	200%	'Extreme'	\$1.25	\$2.50	\$3.75	\$5.00
All Colombia									
Poverty line	2,730	6,004	9,006	12,007	3,761	1,863	3,727	5,590	7,454
Household-level poverty rate	11.4	33.3	50.0	62.1	15.9	5.4	17.0	30.2	41.8
Person-level poverty rate	14.4	40.2	57.9	69.9	20.0	6.7	21.2	36.9	49.6
Armenia									
Poverty line	2,826	6,641	9,961	13,281	3,945	2,061	4,122	6,183	8,244
Household-level poverty rate	11.1	35.4	50.8	62.2	17.1	7.0	18.5	31.9	43.4
Person-level poverty rate	13.8	42.9	59.0	70.0	21.2	8.2	22.8	39.3	51.4
Barranquilla y área metropolitana									
Poverty line	2,926	6,674	10,011	13,348	4,521	2,071	4,143	6,214	8,286
Household-level poverty rate	6.6	35.6	56.0	68.7	17.1	2.9	14.7	31.1	46.2
Person-level poverty rate	8.3	42.4	63.4	75.5	20.9	3.4	18.0	37.6	53.7
Bogotá									
Poverty line	2,834	6,593	9,890	13,186	4,603	2,046	4,093	6,139	8,186
Household-level poverty rate	2.9	15.3	29.9	43.1	7.5	1.9	5.9	13.1	22.0
Person-level poverty rate	3.2	18.3	35.6	50.2	9.0	1.9	7.0	15.9	26.6
Bucaramanga y área metropolitana									
Poverty line	2,869	6,705	10,058	13,410	5,260	2,081	4,162	6,243	8,324
Household-level poverty rate	1.5	11.1	25.3	39.7	5.4	0.8	3.3	8.9	17.3
Person-level poverty rate	1.7	13.9	30.8	47.2	6.8	0.8	3.9	11.1	21.4
Cali y área metropolitana									
Poverty line	2,823	6,631	9,947	13,263	4,274	2,058	4,117	6,175	8,233
Household-level poverty rate	6.4	23.9	40.2	53.4	11.8	4.0	11.3	21.2	31.7
Person-level poverty rate	7.4	28.4	46.6	60.9	14.1	4.4	13.5	25.5	37.6
Cartagena									
Poverty line	2,965	6,765	10,148	13,531	4,603	2,100	4,200	6,299	8,399
Household-level poverty rate	5.5	32.5	52.8	65.4	15.4	2.4	13.1	28.5	43.4
Person-level poverty rate	6.9	38.5	60.0	72.1	19.1	2.8	16.2	34.4	50.2

Source: 2009 *Gran Encuesta Integrada de Hogares*

Figure 2 (New definition, cont.): Poverty lines and poverty rates at the household and person level by new poverty-line region

Region	Poverty line (COP/person/day) and poverty rate (%)								
	Food	National			USAID	International 2005 PPP			
		100%	150%	200%	'Extreme'	\$1.25	\$2.50	\$3.75	\$5.00
Cúcuta y área metropolitana									
Poverty line	2,926	6,860	10,291	13,721	4,650	2,129	4,259	6,388	8,517
Household-level poverty rate	6.0	32.9	52.7	66.3	16.0	3.4	13.6	28.4	43.2
Person-level poverty rate	6.9	38.2	59.1	72.1	19.0	3.5	16.2	33.7	49.6
Florencia									
Poverty line	2,867	6,636	9,954	13,272	4,199	2,060	4,119	6,179	8,239
Household-level poverty rate	6.1	35.3	54.8	66.3	16.2	2.8	15.4	31.6	46.0
Person-level poverty rate	8.7	43.6	63.6	74.2	21.8	4.0	20.8	39.5	55.2
Ibagué									
Poverty line	2,865	6,665	9,997	13,330	4,563	2,069	4,137	6,206	8,275
Household-level poverty rate	4.0	23.1	40.5	54.4	10.9	2.1	8.9	19.7	32.0
Person-level poverty rate	5.1	28.7	48.0	62.6	14.3	2.5	11.7	24.9	38.9
Manizales y área metropolitana									
Poverty line	2,806	6,550	9,825	13,100	4,143	2,033	4,066	6,099	8,132
Household-level poverty rate	5.3	21.9	38.2	51.2	10.9	3.1	10.0	19.8	29.7
Person-level poverty rate	6.7	27.3	45.5	59.2	13.6	3.9	12.6	24.7	35.9
Medellín y área metropolitana									
Poverty line	2,833	6,662	9,992	13,323	4,384	2,068	4,135	6,203	8,271
Household-level poverty rate	5.2	19.7	34.2	47.1	9.7	3.4	9.1	17.3	26.7
Person-level poverty rate	6.2	23.9	40.5	54.2	11.9	3.8	11.0	21.2	31.9
Montería y área metropolitana									
Poverty line	2,825	6,598	9,896	13,195	4,548	2,048	4,096	6,143	8,191
Household-level poverty rate	4.9	32.0	52.3	64.3	15.7	2.1	12.7	28.4	42.8
Person-level poverty rate	5.9	38.4	59.3	70.6	19.2	2.5	15.6	34.0	49.9
Neiva									
Poverty line	2,944	6,871	10,306	13,742	4,594	2,133	4,265	6,398	8,530
Household-level poverty rate	5.0	25.2	41.3	54.1	12.2	2.7	10.7	22.1	33.5
Person-level poverty rate	6.3	31.1	48.9	62.0	15.5	3.2	13.7	27.7	40.4

Source: 2009 *Gran Encuesta Integrada de Hogares*

Figure 2 (New definition, cont.): Poverty lines and poverty rates at the household and person level by new poverty-line region

Region	Poverty line (COP/person/day) and poverty rate (%)								
	Food	National			USAID	International 2005 PPP			
		100%	150%	200%	'Extreme'	\$1.25	\$2.50	\$3.75	\$5.00
Otras cabeceras									
Poverty line	2,843	6,647	9,970	13,294	3,770	2,063	4,126	6,189	8,252
Household-level poverty rate	14.0	44.7	60.8	71.4	21.3	8.2	24.7	41.2	53.2
Person-level poverty rate	17.5	52.3	68.5	78.2	26.1	10.0	30.1	48.8	61.1
Pasto									
Poverty line	2,909	6,678	10,016	13,355	4,110	2,073	4,145	6,218	8,290
Household-level poverty rate	8.6	36.6	53.4	65.5	17.2	4.0	18.1	33.0	45.3
Person-level poverty rate	10.6	42.2	59.3	71.2	20.6	4.7	21.6	38.7	51.4
Pereira y área metropolitana									
Poverty line	2,849	6,672	10,009	13,345	4,675	2,071	4,142	6,213	8,284
Household-level poverty rate	3.5	21.9	40.4	54.3	10.4	1.8	8.2	18.8	31.9
Person-level poverty rate	4.6	28.4	49.7	64.0	14.2	2.3	11.0	24.6	40.2
Popayán									
Poverty line	2,867	6,665	9,998	13,330	4,110	2,069	4,137	6,206	8,275
Household-level poverty rate	9.0	33.9	49.8	61.8	16.4	5.2	17.1	30.5	42.3
Person-level poverty rate	10.7	39.8	56.3	68.1	19.8	5.9	20.7	36.4	48.6
Quibdó									
Poverty line	2,848	6,576	9,864	13,152	3,205	2,041	4,082	6,123	8,164
Household-level poverty rate	18.3	47.7	62.8	71.4	21.5	11.7	29.3	44.9	56.1
Person-level poverty rate	24.9	58.5	73.2	80.3	29.2	15.9	38.7	55.7	66.8
Resto rural									
Poverty line	2,343	3,971	5,957	7,942	2,219	1,233	2,465	3,698	4,930
Household-level poverty rate	23.3	45.4	64.0	75.7	21.6	8.3	25.2	42.1	55.6
Person-level poverty rate	29.0	54.2	72.7	83.4	27.0	10.4	31.2	50.7	64.6
Río Hacha									
Poverty line	2,864	6,593	9,890	13,187	3,507	2,046	4,093	6,139	8,186
Household-level poverty rate	16.1	46.3	61.0	70.0	22.1	9.4	26.8	43.7	54.0
Person-level poverty rate	20.1	54.8	69.3	77.1	27.3	11.8	33.0	52.1	62.7

Source: 2009 *Gran Encuesta Integrada de Hogares*

Figure 2 (New definition, cont.): Poverty lines and poverty rates at the household and person level by new poverty-line region

Region	Poverty line (COP/person/day) and poverty rate (%)								
	Food	National			USAID	International 2005 PPP			
		100%	150%	200%	'Extreme'	\$1.25	\$2.50	\$3.75	\$5.00
<u>Santa Marta</u>									
Poverty line	2,874	6,644	9,966	13,288	4,274	2,062	4,124	6,186	8,249
Household-level poverty rate	8.2	35.6	53.6	65.8	17.2	4.3	16.4	31.9	44.9
Person-level poverty rate	9.9	42.1	61.4	73.2	21.0	5.2	19.9	38.1	52.4
<u>Sincelejo</u>									
Poverty line	2,929	6,681	10,022	13,362	3,945	2,074	4,147	6,221	8,295
Household-level poverty rate	10.9	45.1	62.8	73.5	20.0	4.5	22.6	41.0	54.5
Person-level poverty rate	14.8	54.4	71.3	80.3	26.6	6.1	29.6	50.3	63.6
<u>Tunja</u>									
Poverty line	2,898	6,680	10,020	13,360	4,603	2,073	4,147	6,220	8,294
Household-level poverty rate	3.1	19.6	35.4	48.7	9.0	1.7	7.5	16.6	27.8
Person-level poverty rate	3.9	25.0	43.0	57.0	12.2	2.0	10.0	21.7	34.8
<u>Valledupar</u>									
Poverty line	2,902	6,678	10,017	13,356	4,110	2,073	4,145	6,218	8,291
Household-level poverty rate	10.2	40.2	57.9	68.7	19.0	5.6	19.9	36.3	49.7
Person-level poverty rate	12.1	46.9	65.2	75.4	23.1	6.2	24.0	42.9	57.2
<u>Villavicencio</u>									
Poverty line	2,813	6,583	9,875	13,167	4,418	2,043	4,087	6,130	8,173
Household-level poverty rate	4.7	22.8	40.3	54.3	11.0	2.8	9.4	19.4	30.2
Person-level poverty rate	5.4	27.6	47.6	62.3	13.8	2.9	11.8	23.9	36.7

Source: 2009 *Gran Encuesta Integrada de Hogares*

Figure 3: Poverty indicators by uncertainty coefficient

<u>Uncertainty coefficient</u>	<u>Indicator (Answers ordered starting with those most strongly linked with higher poverty likelihoods)</u>
1138	What is the main material of the floors of the residence? (Earth, or sand; Cement, gravel, rough-hewn wood, planks, or other plant matter; Synthetic floor tile, bricks, linoleum, other synthetic materials, marble, finished wood, or wall-to-wall carpet)
985	How many household members are 18-years-old or younger? (Four or more; Three; Two; One; None)
985	What is the highest educational level reached by the female head/spouse? (None, or pre-school; Primary or middle school; High school; No female head/spouse; Post-secondary or college (1 to 4 years); Post-secondary or college (5 years or more))
964	How many household members are 17-years-old or younger? (Three or more; Two; One; None)
936	How many household members are 16-years-old or younger? (Three or more; Two; One; None)
930	Does the household have a working clothes washing machine? (No; Yes)
930	How many household members are 15-years-old or younger? (Three or more; Two; One; None)
909	How many household members are 14-years-old or younger? (Three or more; Two; One; None)
902	In their main line of work, do any household members have a written contract for an indefinite period of time? (No; Yes)
894	What is the highest degree or diploma that female head/spouse has received? (Less than high school; There is no female head/spouse; None; High school; Technical degree; College degree; Graduate degree)
893	What is the residence's rate class for electricity? (No class or zero (no connection, pirated connection, or generator), one, or two; Three; Four, five, or six)
874	How many household members are 13-years-old or younger? (Three or more; Two; One; None)
824	How many household members are 12-years-old or younger? (Three or more; Two; One; None)
811	Does the household have a working computer for its own use? (No; Yes)

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

<u>Uncertainty coefficient</u>	<u>Indicator (Answers ordered starting with those most strongly linked with higher poverty likelihoods)</u>
799	What is the highest educational level reached by the male head/spouse, and what is the highest grade or year completed at that level? (None, or pre-school; Grade school (grades 1 to 4); There is no male head/spouse; Grade school (grade 5), middle school (grades 6 to 9), or high school (grade 10); High school (grade 11 or higher), or college or university (year 1 or higher))
795	How many household members are 11-years-old or younger? (Three or more; Two; One; None)
788	Does the household have a land-line telephone? (No; Sí)
764	In her main line of work, does the female head/spouse have any type of contract written or oral, for an indefinite period of time or for a fixed period? (Does not work; Does not have a contract; There is no female head/spouse; Oral for an indefinite period, oral for a fixed period, or written for a fixed period; Written for an indefinite period)
700	Does the household have a color television and a DVD player? (No color television; Color television, without DVD; Color television, with DVD)
699	How many household members attend a public school? (Three or more; Two; One; None)
698	What is the highest degree or diploma that male head/spouse has received? (Less than high school; There is no male head/spouse; None; High school; Technical degree; College degree, or graduate degree)
694	In their main line of work, how many household members work as wage or salary employees for a private firm or the government? (None; One; Two or more)
656	What does the female head/spouse do in her main line of work? (Agriculture and forestry workers, fishers, and hunters, or others; Service workers; Non-agricultural operators and workers, machine operators, and drivers; Retailers and wholesalers; There is no female head/spouse; Clerical workers and similar; Professionals, technicians, and similar workers, directors, and upper-level civil servants)
656	Does the household have working cable television or a satellite dish? (No; Yes)

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

<u>Uncertainty coefficient</u>	<u>Indicator (Answers ordered starting with those most strongly linked with higher poverty likelihoods)</u>
654	Does the household have a working bicycle, motorcycle and/or a car for its own use? (None; Only bicycle; Motorcycle (no car, regardless of bicycle); Car (regardless of bicycle or motorcycle))
652	Does the household have a motorcycle and/or a car for its own use? (None; Motorcycle only; Car (regardless of motorcycle))
632	What fuel or energy source does the household usually cook with? (Firewood, wood, charcoal, coal, electricity, gasoline, petroleum, kerosene, alcohol, or waste material; LPG from a cylinder or tank; Natural gas from a public network; Does not cook)
621	In her main line of work, the female head/spouse is . . . ? (Unpaid family worker, unpaid worker in the businesses of other households, day laborer, or other; Domestic worker; Self-employed without employees; There is no female head/spouse; Wage or salary employee of a private firm; Wage or salary employee of the government, or self-employed with employees)
613	Does the household have working internet service? (No; Yes)
597	Do all household members ages 6 to 13 currently attend pre-school, grade school, high-school, or college? (No; All attend a public school; All attend school, and at least some go to a private school; No members are ages 6 to 13)
586	Do all household members ages 6 to 15 currently attend pre-school, grade school, high-school, or college? (No; All attend a public school; All attend school, and at least some go to a private school; No members are ages 6 to 15)
584	Do all household members ages 6 to 14 currently attend pre-school, grade school, high-school, or college? (No; All attend a public school; All attend school, and at least some go to a private school; No members are ages 6 to 14)
579	Do all household members ages 6 to 12 currently attend pre-school, grade school, high-school, or college? (No; All attend a public school; All attend school, and at least some go to a private school; No members are ages 6 to 12)

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

<u>Uncertainty coefficient</u>	<u>Indicator (Answers ordered starting with those most strongly linked with higher poverty likelihoods)</u>
564	Do all household members ages 6 to 17 currently attend pre-school, grade school, high-school, or college? (No; All attend a public school; All attend school, and at least some go to a private school; No members are ages 6 to 17)
557	Does the household have a working automobile for its own use? (No; Yes)
552	Do all household members ages 6 to 16 currently attend pre-school, grade school, high-school, or college? (No; All attend a public school; All attend school, and at least some go to a private school; No members are ages 6 to 16)
549	Do all household members ages 6 to 11 currently attend pre-school, grade school, high-school, or college? (No; All attend a public school; All attend school, and at least some go to a private school; No members are ages 6 to 11)
546	Do all household members ages 6 to 18 currently attend pre-school, grade school, high-school, or college? (No; All attend a public school; All attend school, and at least some go to a private school; No members are ages 6 to 18)
543	What does the male head/spouse do in his main line of work? (Agriculture and forestry workers, fishers, and hunters, or others; There is no male head/spouse; Non-agricultural operators and workers, machine operators, and drivers; Retailers and wholesalers, or service workers; Clerical workers and similar; Professionals, technicians, and similar workers, directors, and upper-level civil servants)
538	Does the household have a working stereo system? (No; Yes)
534	Does the household have a working gas or electric oven? (No; Yes)
507	What type of toilet arrangement does the household use? (Latrine, latrine over water, or none; Flush toilet that drains to the surface; Flush toilet connected to a septic tank; Flush toilet connected to a sewer)
489	How many household members are 6-years-old or younger? (Two or more; One; None)
480	Does the household have a working microwave? (No; Yes)
472	Does the household have a working gas or electric hot-water heater or an electric shower heater? (No; Yes)

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

<u>Uncertainty coefficient</u>	<u>Indicator (Answers ordered starting with those most strongly linked with higher poverty likelihoods)</u>
460	What is the main activity of the business in which the male head/spouse works? (Agriculture, fishing, animal husbandry, hunting, or forestry, or mining and quarrying; There is no male head/spouse; Construction; Logistics, storage, and communications; Trade, hotels, and restaurants; Manufacturing, or supply of electricity, gas, and water; Community, social, and personal services; Financial intermediation, or real estate)
455	How many members does the household have? (Six or more; Five; Four; Three; Two; One)
443	Does the household have a working refrigerator or freezer? (No; Yes)
438	Does the residence have sewer service? (No; Yes)
417	Does the household have a working blender? (No; Yes)
410	What did the female head/spouse do for most of the time last week? (Not working; Working; There is no female head/spouse)
402	What is the main activity of the business in which the female head/spouse works? (Agriculture, fishing, animal husbandry, hunting, forestry, or mining and quarrying; Manufacturing; Trade, hotels, and restaurants; Community, social, and personal services; There is no female head/spouse; Supply of electricity, gas, and water, construction, logistics, storage, and communications, financial intermediation, and real estate)
397	In his main line of work, does the male head/spouse have any type of contract written or oral, for an indefinite period of time or for a fixed period? (There is no male head/spouse; No contract; Oral for an indefinite period, oral for a fixed period, or written for a fixed period; Written for an indefinite period)
394	Does the household have a working gas or electric stove? (No; Yes)
387	Do all household members ages 6 to 17 currently attend pre-school, grade school, high-school, or college? (No; Yes; No members in this age range)
385	Do all household members ages 6 to 15 currently attend pre-school, grade school, high-school, or college? (No; Yes; No members in this age range)

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

<u>Uncertainty coefficient</u>	<u>Indicator (Answers ordered starting with those most strongly linked with higher poverty likelihoods)</u>
375	Do all household members ages 6 to 14 currently attend pre-school, grade school, high-school, or college? (No; Yes; No members in this age range)
366	Do all household members ages 6 to 16 currently attend pre-school, grade school, high-school, or college? (No; Yes; No members in this age range)
365	Does the residence have garbage pick-up? (No; Yes)
363	What is the main way in which the household disposes of its garbage? (Other; Private or public collection)
361	Do all household members ages 6 to 18 currently attend pre-school, grade school, high-school, or college? (No; Yes; No members in this age range)
361	Do all household members ages 6 to 13 currently attend pre-school, grade school, high-school, or college? (No; Yes; No members in this age range)
349	Do all household members ages 6 to 11 currently attend pre-school, grade school, high-school, or college? (No; Yes; No members in this age range)
348	Do all household members ages 6 to 12 currently attend pre-school, grade school, high-school, or college? (No; Yes; No members in this age range)
339	Including the front room/dining room, how many rooms does the household use (excluding kitchens, bathrooms, garages, and rooms used only for business purposes)? (None; One; Two; Three; Four; Five or more)
338	What is the main material of the external walls of the residence? (Adobe or molded earth, wattle and daub, rough-hewn wood or planks, bamboo, cane, woven leaves, other plant matter, tin, tarp, cardboard, cans, refuse, plastic, or no walls)
291	In his main line of work, the male head/spouse is . . . ? (Does not work, unpaid family worker, unpaid worker in the businesses of other households, day laborer, or other; There is no male head/spouse; Self-employed without employees, or domestic worker; Wage or salary employee of a private firm; Wage or salary employee of the government, or self-employed with employees)
288	Does the household have a working color television? (No; Yes)
288	Does the household have a working DVD player? (No; Yes)

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

<u>Uncertainty coefficient</u>	<u>Indicator (Answers ordered starting with those most strongly linked with higher poverty likelihoods)</u>
279	Where do the members of the household cook their food? (In a room that is also used for sleeping, in a dining room without a sink, in the yard, hallway, shack, or open air; In a room used only for cooking, or in a dining room with a sink; Nowhere, do not cook)
271	Do any household members attend a non-public school? (No; Yes)
261	What type of residence does the household live in? (Detached house, indigenous dwelling, rented room(s), rooms in some other type of structure, other dwelling (tent, trailer, boat, cave, natural refuge, etc.)); Apartment)
254	How many household members spent most of the past week working? (None; One; Two or more)
248	What is the current marital status of the female head/spouse? (Not married but cohabiting for two years or more; Separated or divorced; Widowed, or not married but cohabiting for less than two years; Single, never-married; Married; There is no female head/spouse)
237	Can the female head/spouse read and write? (No; Yes; There is no female head/spouse)
234	The residence occupied by the household is . . . ? (Owned without a title (<i>de facto</i> occupant) or collectively owned; Held in usufruct; Owned free-and-clear; Rented or sub-let; Owned with a mortgage outstanding)
230	What is the current marital status of the male head/spouse? (Not married but cohabiting for two years or more; There is no male head/spouse; Not married but cohabiting for less than two years; Widowed; Married; Separated or divorced; Single, never-married)
210	What is the main source of drinking water for the household? (Piped, not from public system, well with a pump, without a pump from a well, cistern, tank, or borehole, rainwater, river, stream, spring, or artesian well, from a public standpipe, water truck, or personal water-delivery service; Piped from public system, or bottled or bagged water)
188	Does the residence have piped-in water? (No; Yes)

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

<u>Uncertainty coefficient</u>	<u>Indicator (Answers ordered starting with those most strongly linked with higher poverty likelihoods)</u>
187	Can the male head/spouse read and write? (No; There is no male head/spouse; Yes)
152	The toilet arrangement of the household is exclusively for the use of household members (No; Yes)
123	Does the household have a working bicycle and/or a motorcycle? (Neither; Only bicycle; Only motorcycle; Both)
111	Does the household have a working motorcycle? (No; Yes)
91	What is the structure of household headship? (Female head/spouse only; Both male and female heads/spouses; Male head/spouse only)
58	How many rooms are used for sleeping by household members? (One; Two; Three; Four or more)
54	What did the male head/spouse do for most of the time last week? (There is no male head/spouse; Did not work; Worked)
34	In their main line of work, are any household members domestic workers, unpaid workers (in a family business or elsewhere), or as agricultural day laborers? (Yes; No)
22	Does the household have a working bicycle? (No; Yes)
20	Can any household member can read and write? (No; Yes)
2	In their main line of work, how many household members work as employers/bosses or are self-employed? (None; One; Two or more)
1	Does the household have a working fan or ventilator? (No; Yes)

Source: 2009 GEIH and the national poverty line

**Tables for
the National Poverty Line,
Old Definition**

**(and tables pertaining to all nine poverty lines,
old and new definitions)**

Figure 4 (National line, old definition): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0-4	100.0
5-9	99.7
10-14	97.1
15-19	95.5
20-24	89.6
25-29	82.6
30-34	69.4
35-39	53.4
40-44	37.3
45-49	24.9
50-54	14.0
55-59	7.6
60-64	4.1
65-69	1.7
70-74	0.9
75-79	0.6
80-84	0.4
85-89	0.1
90-94	0.0
95-100	0.0

Figure 5 (National line, old definition): Derivation of estimated poverty likelihoods associated with scores

Score	Households below poverty line		All households at score		Poverty likelihood (estimated, %)
0-4	81	÷	81	=	100.0
5-9	389	÷	390	=	99.7
10-14	1,310	÷	1,350	=	97.1
15-19	2,633	÷	2,758	=	95.5
20-24	4,532	÷	5,058	=	89.6
25-29	6,511	÷	7,880	=	82.6
30-34	6,955	÷	10,027	=	69.4
35-39	6,218	÷	11,639	=	53.4
40-44	5,079	÷	13,628	=	37.3
45-49	3,175	÷	12,773	=	24.9
50-54	1,444	÷	10,335	=	14.0
55-59	588	÷	7,763	=	7.6
60-64	216	÷	5,337	=	4.1
65-69	69	÷	4,071	=	1.7
70-74	22	÷	2,596	=	0.9
75-79	12	÷	1,904	=	0.6
80-84	5	÷	1,102	=	0.4
85-89	0	÷	766	=	0.1
90-94	0	÷	395	=	0.0
95-100	0	÷	147	=	0.0

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

Figure 6a (old definition): Distribution of household poverty likelihoods across income ranges demarcated by national poverty lines

Score	Likelihood of having income in ranges demarcated by national poverty lines per day per capita					
	<Food	=>Food and <USAID	=>USAID and <100% Natl.	=>100% Natl. and <150% Natl.	=>150% Natl. and <200% Natl.	=>200% Natl.
	<COP3,876	=>COP3,876 and <COP5,416	=>COP5,416 and <COP9,244	=>COP9,244 and <COP13,867	=>COP13,867 and <COP18,489	=>COP18,489
0-4	98.1	1.9	0.0	0.0	0.0	0.0
5-9	87.3	2.5	9.9	0.3	0.0	0.0
10-14	77.8	6.2	13.1	1.6	0.5	0.8
15-19	60.7	8.2	26.6	3.8	0.5	0.2
20-24	46.1	11.9	31.7	7.6	1.9	0.8
25-29	36.3	10.8	35.5	11.2	3.4	2.7
30-34	23.4	10.7	35.2	18.2	6.5	5.9
35-39	13.9	8.0	31.6	24.0	10.6	12.1
40-44	8.6	5.0	23.7	24.7	14.9	23.2
45-49	4.7	2.8	17.4	24.9	16.9	33.4
50-54	2.4	1.5	10.1	19.0	19.0	48.0
55-59	1.2	1.2	5.1	15.3	17.7	59.4
60-64	0.9	0.5	2.7	10.8	15.1	70.1
65-69	0.4	0.2	1.1	6.0	10.8	81.5
70-74	0.2	0.1	0.5	3.3	5.1	90.8
75-79	0.1	0.1	0.5	1.1	3.8	94.5
80-84	0.3	0.0	0.1	0.3	1.2	98.1
85-89	0.0	0.0	0.0	0.1	1.8	98.1
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 6b (old definition): Distribution of household poverty likelihoods across income ranges demarcated by international 2005 PPP poverty lines

Score	Likelihood of having income in ranges demarcated international 2005 PPP poverty lines per day per capita					by
		=>\$1.25	=>\$2.50	=>\$3.75		=>\$5.00
	<\$1.25	and	and	and		
		<\$2.50	<\$3.75	<\$5.00		
	=>COP1,863	=>COP3,726	=>COP5,590		=>COP7,453	
	<COP1,863	and	and	and		
		<COP3,726	<COP5,590	<COP7,453		
0-4	81.1	18.9	0.0	0.0	0.0	
5-9	71.6	26.1	1.4	0.9	0.1	
10-14	64.4	29.4	3.8	1.1	1.3	
15-19	45.7	42.1	9.2	2.1	0.8	
20-24	33.7	40.3	17.6	5.6	2.8	
25-29	24.7	36.0	22.4	9.2	7.6	
30-34	15.9	26.7	27.0	13.3	17.1	
35-39	8.9	17.9	24.5	17.8	31.0	
40-44	6.1	10.7	18.2	17.2	47.8	
45-49	3.2	5.9	11.0	15.2	64.8	
50-54	1.3	2.3	5.2	9.9	81.3	
55-59	0.8	1.4	2.3	5.7	89.8	
60-64	0.5	0.6	1.4	2.8	94.7	
65-69	0.1	0.3	0.4	1.4	97.7	
70-74	0.1	0.1	0.3	0.5	98.9	
75-79	0.0	0.0	0.1	0.5	99.3	
80-84	0.1	0.2	0.1	0.1	99.5	
85-89	0.0	0.0	0.0	0.1	100.0	
90-94	0.0	0.0	0.0	0.0	100.0	
95-100	0.0	0.0	0.0	0.0	100.0	

Note: All poverty likelihoods in percentage units.

Figure 6 (new definition): Distribution of household poverty likelihoods across income ranges demarcated by poverty lines

Score	Likelihood of having income in ranges demarcated by poverty lines per day per capita								
	=>\$1.25/day	=>Food	=>\$2.50/day	=>\$3.75/day	=>100% Natl.	=>\$5.00/day	=>150% Natl.		
	<\$1.25/day	and	and	and	and	and	and	and	=>200% Natl.
	<Food	<\$2.50/day	<\$3.75/day	<100% Natl.	<\$5.00/day	<150% Natl.	<200% Natl.		
	=>COP1,863	=>COP2,730	=>COP3,727	=>COP5,590	=>COP6,004	=>COP7,454	=>COP9,006		
	<COP1,863	and	and	and	and	and	and	and	=>COP12,007
		<COP2,730	<COP3,727	<COP5,590	<COP6,004	<COP7,454	<COP9,006	<COP12,007	
0-4	62.8	25.9	2.0	5.4	0.0	0.0	0.0	0.0	3.8
5-9	49.8	29.9	5.0	12.9	0.6	1.8	0.1	0.0	0.0
10-14	46.1	28.8	9.6	10.4	1.7	0.8	1.0	1.0	0.7
15-19	28.4	28.9	10.6	22.7	2.4	4.4	1.4	1.0	0.3
20-24	19.6	22.6	14.3	25.1	3.6	6.4	3.5	3.3	1.6
25-29	12.8	16.0	14.4	25.2	4.5	10.6	6.8	5.3	4.3
30-34	7.4	10.2	11.8	27.0	4.5	12.9	8.2	9.5	8.6
35-39	3.8	5.4	8.7	21.9	5.2	14.3	11.6	12.4	16.9
40-44	2.3	3.3	4.8	14.9	4.3	12.7	12.0	16.4	29.3
45-49	1.3	1.3	2.5	9.3	3.8	10.4	13.0	19.0	39.3
50-54	0.6	0.4	1.5	4.2	1.9	7.3	10.1	17.8	56.1
55-59	0.4	0.2	0.5	2.3	0.9	4.0	6.2	16.9	68.6
60-64	0.3	0.1	0.2	0.7	0.6	2.0	3.9	12.1	80.2
65-69	0.0	0.0	0.2	0.6	0.3	0.7	2.1	7.7	88.5
70-74	0.0	0.0	0.0	0.1	0.1	0.4	0.9	2.7	95.8
75-79	0.0	0.0	0.1	0.1	0.0	0.1	0.1	2.3	97.4
80-84	0.1	0.0	0.0	0.0	0.0	0.1	0.1	1.1	98.7
85-89	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	99.7
90-94	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
95-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

Note: All poverty likelihoods in percentage units. Poverty status determined by Colombia's new definition.

The USAID "Extreme" line is omitted because, unlike the rest of the lines, it is relative, not absolute.

Figure 7 (National line, old definition): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16,384$) with confidence intervals, scorecard applied to the validation sample

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	+0.0	0.0	0.2	0.3
5-9	-0.3	0.2	0.2	0.2
10-14	-1.7	1.3	1.4	1.6
15-19	-0.2	2.0	2.3	3.0
20-24	+0.6	2.6	3.0	4.0
25-29	-2.3	2.1	2.5	3.2
30-34	-0.6	2.6	3.0	3.8
35-39	-2.1	2.6	3.2	4.3
40-44	+2.7	2.0	2.4	3.5
45-49	+2.0	2.0	2.4	3.2
50-54	+2.2	1.5	1.9	2.4
55-59	-1.0	1.8	2.1	2.8
60-64	-0.2	1.4	1.7	2.5
65-69	-0.3	1.0	1.2	1.7
70-74	+0.2	0.7	0.8	1.1
75-79	-0.1	0.9	1.0	1.2
80-84	-0.9	1.7	2.0	2.5
85-89	-0.1	0.3	0.4	0.6
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

Figure 8 (National line, old definition): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, scorecard applied to the validation sample

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	+1.8	58.1	72.3	87.5
4	-0.6	38.0	45.5	62.4
8	+0.6	27.1	32.8	45.4
16	+0.4	19.1	23.7	31.9
32	+0.4	13.8	16.6	21.7
64	+0.5	10.2	12.1	15.8
128	+0.4	7.5	9.0	11.5
256	+0.4	5.3	6.2	8.0
512	+0.4	3.6	4.3	5.5
1,024	+0.3	2.6	3.1	4.1
2,048	+0.3	1.8	2.1	2.8
4,096	+0.3	1.3	1.6	1.9
8,192	+0.3	0.9	1.1	1.4
16,384	+0.3	0.7	0.8	1.0

Figure 9 (All poverty lines, old definition): Differences, precision of differences, and the α factor for bootstrapped estimates of poverty rates for groups of households at a point in time, scorecard applied to the validation sample

	Poverty line										
	Food	National			USAID	International 2005 PPP					
		100%	150%	200%	'Extreme'	\$1.25	\$2.50	\$3.75	\$5.00		
<u>Estimate minus true value</u>											
Scorecard applied to validation sample	+0.0	+0.3	+1.1	+1.2	+0.3	-0.4	-0.4	-0.6	+0.2		
<u>Precision of difference</u>											
Scorecard applied to validation sample	0.6	0.7	0.7	0.6	0.6	0.5	0.6	0.7	0.6		
<u>α factor for standard errors</u>											
Scorecard applied to validation sample	1.21	1.04	1.04	1.02	1.16	1.28	1.13	1.03	0.99		
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 $n = 256, 512, 1,024, 2,048, 4,096, 8,192, \text{ and } 16,384$.											

Figure 9 (All poverty lines, new definition): Differences, precision of differences, and the α factor for bootstrapped estimates of poverty rates for groups of households at a point in time, scorecard applied to the validation sample

	Poverty line										
	Food	National			USAID	International 2005 PPP					
		100%	150%	200%	'Extreme'	\$1.25	\$2.50	\$3.75	\$5.00		
<u>Estimate minus true value</u>											
Scorecard applied to validation sample	-0.4	+1.2	+1.5	+1.4	+0.7	-0.2	+0.5	+1.0	+1.6		
<u>Precision of difference</u>											
Scorecard applied to validation sample	0.5	0.6	0.6	0.7	0.6	0.4	0.6	0.6	0.7		
<u>α factor for standard errors</u>											
Scorecard applied to validation sample	1.28	1.05	1.02	1.03	1.20	1.41	1.21	1.06	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 $n = 256, 512, 1,024, 2,048, 4,096, 8,192, \text{ and } 16,384$.											

**Figure 10 (All poverty lines, old and new definitions):
Possible types of outcomes from targeting by
poverty score**

		<u>Targeting segment</u>	
		<u>Targeted</u>	<u>Non-targeted</u>
<u>True poverty status</u>	<u>Below poverty line</u>	<u>Inclusion</u> Under poverty line Correctly Targeted	<u>Undercoverage</u> Under poverty line Mistakenly Non-targeted
	<u>Above poverty line</u>	<u>Leakage</u> Above poverty line Mistakenly Targeted	<u>Exclusion</u> Above poverty line Correctly Non-targeted

Figure 11 (National line, old definition): Households by targeting classification and score, along with “Total Accuracy” and BPAC, scorecard applied to the validation sample

Score	<u>Inclusion:</u>	<u>Undercoverage:</u>	<u>Leakage:</u>	<u>Exclusion:</u>	<u>Total Accuracy</u>	<u>BPAC</u>
	< poverty line correctly targeted	< poverty line mistakenly non-targeted	=> poverty line mistakenly targeted	=> poverty line non-targeted	Inclusion + Exclusion	See text
0–4	0.1	39.4	0.0	60.5	60.6	–99.6
5–9	0.5	39.0	0.0	60.5	61.0	–97.6
10–14	1.8	37.7	0.0	60.5	62.3	–90.8
15–19	4.4	35.0	0.2	60.4	64.8	–77.2
20–24	9.0	30.5	0.7	59.9	68.8	–52.9
25–29	15.5	24.0	2.0	58.5	74.0	–16.3
30–34	22.6	16.9	5.0	55.6	78.1	+27.0
35–39	28.8	10.6	10.4	50.2	79.0	+72.3
40–44	33.9	5.6	18.9	41.6	75.5	+52.1
45–49	37.0	2.5	28.6	31.9	68.9	+27.4
50–54	38.4	1.1	37.5	23.0	61.4	+4.9
55–59	39.1	0.4	44.6	15.9	55.0	–13.1
60–64	39.3	0.2	49.7	10.8	50.1	–26.0
65–69	39.4	0.1	53.7	6.9	46.3	–36.0
70–74	39.4	0.0	56.3	4.3	43.7	–42.6
75–79	39.4	0.0	58.1	2.4	41.8	–47.3
80–84	39.5	0.0	59.2	1.3	40.8	–50.1
85–89	39.5	0.0	60.0	0.5	40.0	–52.0
90–94	39.5	0.0	60.4	0.1	39.6	–53.0
95–100	39.5	0.0	60.5	0.0	39.5	–53.4

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

Figure 12 (National line, old definition): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successful targeted (coverage) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0-4	0.1	99.8	0.2	608.7:1
5-9	0.5	100.0	1.2	3,537.0:1
10-14	1.8	98.5	4.5	65.9:1
15-19	4.6	96.6	11.2	28.1:1
20-24	9.6	93.0	22.7	13.3:1
25-29	17.5	88.5	39.3	7.7:1
30-34	27.5	81.9	57.2	4.5:1
35-39	39.2	73.6	73.1	2.8:1
40-44	52.8	64.2	85.9	1.8:1
45-49	65.6	56.3	93.6	1.3:1
50-54	75.9	50.6	97.3	1.0:1
55-59	83.7	46.7	99.0	0.9:1
60-64	89.0	44.2	99.6	0.8:1
65-69	93.1	42.3	99.9	0.7:1
70-74	95.7	41.2	99.9	0.7:1
75-79	97.6	40.4	100.0	0.7:1
80-84	98.7	40.0	100.0	0.7:1
85-89	99.5	39.7	100.0	0.7:1
90-94	99.9	39.5	100.0	0.7:1
95-100	100.0	39.5	100.0	0.7:1

**Tables for
the Food Poverty Line,
Old Definition**

Figure 4 (Food line, old definition): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0-4	98.1
5-9	87.3
10-14	77.8
15-19	60.7
20-24	46.1
25-29	36.3
30-34	23.4
35-39	13.9
40-44	8.6
45-49	4.7
50-54	2.4
55-59	1.2
60-64	0.9
65-69	0.4
70-74	0.2
75-79	0.1
80-84	0.3
85-89	0.0
90-94	0.0
95-100	0.0

Figure 7 (Food line, old definition): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16,384$) with confidence intervals, scorecard applied to the validation sample

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	+5.2	10.9	12.3	17.1
5-9	-4.6	7.4	8.9	11.8
10-14	+2.2	5.7	6.9	9.1
15-19	-6.7	5.5	5.9	7.1
20-24	+1.4	3.9	4.6	5.8
25-29	+4.3	2.8	3.4	4.5
30-34	-1.6	2.4	2.8	3.7
35-39	-1.9	2.0	2.4	3.4
40-44	-0.1	1.3	1.6	2.1
45-49	+1.1	0.8	1.0	1.3
50-54	+0.5	0.7	0.8	1.1
55-59	+0.1	0.6	0.7	0.8
60-64	+0.5	0.3	0.4	0.5
65-69	-0.2	0.6	0.7	0.9
70-74	+0.1	0.2	0.3	0.3
75-79	-0.2	0.5	0.6	0.8
80-84	-0.5	1.2	1.5	1.8
85-89	-0.1	0.3	0.4	0.6
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

Figure 8 (Food line, old definition): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, scorecard applied to the validation sample

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	+0.0	56.5	66.1	77.1
4	-0.8	32.0	38.6	53.8
8	-0.6	23.2	27.5	35.4
16	-0.4	16.6	20.0	26.4
32	-0.2	12.1	14.4	19.9
64	+0.0	8.6	10.2	14.4
128	+0.1	6.0	7.3	9.6
256	-0.0	4.3	5.2	7.0
512	-0.0	3.0	3.6	4.7
1,024	+0.0	2.1	2.5	3.4
2,048	+0.0	1.6	1.8	2.4
4,096	+0.0	1.1	1.3	1.7
8,192	+0.1	0.7	0.9	1.2
16,384	+0.0	0.6	0.6	0.9

Figure 11 (Food line, old definition): Households by targeting classification and score, along with “Total Accuracy” and BPAC, scorecard applied to the validation sample

Score	Inclusion:	Undercoverage:	Leakage:	Exclusion:	Total Accuracy	BPAC
	< poverty line correctly targeted	< poverty line mistakenly non-targeted	=> poverty line mistakenly targeted	=> poverty line correctly non-targeted	Inclusion + Exclusion	See text
0–4	0.1	14.1	0.0	85.8	85.9	–98.9
5–9	0.4	13.7	0.0	85.8	86.2	–93.6
10–14	1.4	12.7	0.4	85.5	86.9	–77.0
15–19	3.2	11.0	1.4	84.4	87.6	–45.4
20–24	5.4	8.7	4.2	81.6	87.0	+6.3
25–29	8.1	6.0	9.4	76.4	84.6	+33.7
30–34	10.5	3.7	17.1	68.8	79.2	–20.4
35–39	12.1	2.1	27.1	58.8	70.9	–91.1
40–44	13.3	0.9	39.5	46.3	59.6	–179.1
45–49	13.8	0.4	51.8	34.0	47.8	–265.6
50–54	14.0	0.2	61.9	23.9	37.9	–337.1
55–59	14.1	0.1	69.6	16.2	30.3	–391.2
60–64	14.1	0.0	74.9	10.9	25.1	–428.6
65–69	14.2	0.0	78.9	6.9	21.0	–457.1
70–74	14.2	0.0	81.5	4.3	18.5	–475.4
75–79	14.2	0.0	83.4	2.4	16.6	–488.8
80–84	14.2	0.0	84.5	1.3	15.5	–496.6
85–89	14.2	0.0	85.3	0.5	14.7	–502.0
90–94	14.2	0.0	85.7	0.1	14.3	–504.7
95–100	14.2	0.0	85.8	0.0	14.2	–505.8

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

Figure 12 (Food line, old definition): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successful targeted (coverage) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0-4	0.1	92.9	0.5	13.2:1
5-9	0.5	91.5	3.0	10.7:1
10-14	1.8	79.1	10.2	3.8:1
15-19	4.6	68.9	22.3	2.2:1
20-24	9.6	56.3	38.3	1.3:1
25-29	17.5	46.4	57.3	0.9:1
30-34	27.5	38.1	74.0	0.6:1
35-39	39.2	30.9	85.5	0.4:1
40-44	52.8	25.1	93.7	0.3:1
45-49	65.6	21.0	97.3	0.3:1
50-54	75.9	18.4	98.8	0.2:1
55-59	83.7	16.8	99.5	0.2:1
60-64	89.0	15.9	99.7	0.2:1
65-69	93.1	15.2	99.9	0.2:1
70-74	95.7	14.8	99.9	0.2:1
75-79	97.6	14.5	100.0	0.2:1
80-84	98.7	14.4	100.0	0.2:1
85-89	99.5	14.2	100.0	0.2:1
90-94	99.9	14.2	100.0	0.2:1
95-100	100.0	14.2	100.0	0.2:1

**Tables for
150% of the National Poverty Line,
Old Definition**

**Figure 4 (150% of the national line, old definition):
 Estimated poverty likelihoods associated with scores**

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0-4	100.0
5-9	100.0
10-14	98.7
15-19	99.3
20-24	97.2
25-29	93.9
30-34	87.6
35-39	77.4
40-44	61.9
45-49	49.7
50-54	33.0
55-59	22.9
60-64	14.9
65-69	7.7
70-74	4.1
75-79	1.7
80-84	0.7
85-89	0.1
90-94	0.0
95-100	0.0

Figure 7 (150% of the national line, old definition):

Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16,384$) with confidence intervals, scorecard applied to the validation sample

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	+0.0	0.0	0.2	0.3
5-9	+0.0	0.0	0.0	0.0
10-14	-0.7	0.7	0.8	1.0
15-19	+1.4	1.4	1.7	2.0
20-24	+0.6	1.6	1.9	2.6
25-29	-0.2	1.4	1.6	2.0
30-34	-1.2	1.7	2.0	2.8
35-39	-0.8	2.1	2.5	3.4
40-44	+1.7	2.4	2.7	3.7
45-49	+4.1	2.3	2.8	3.8
50-54	+2.6	2.4	2.8	3.6
55-59	+0.8	2.5	3.1	4.2
60-64	+1.8	2.4	2.8	3.7
65-69	+0.9	1.8	2.2	2.9
70-74	+1.6	1.2	1.5	2.2
75-79	+0.4	1.1	1.3	1.8
80-84	-0.7	1.7	2.1	2.7
85-89	-0.4	1.0	1.2	1.5
90-94	-0.1	0.3	0.3	0.5
95-100	+0.0	0.0	0.0	0.0

**Figure 8 (150% of the national line, old definition):
Differences and precision of differences for
bootstrapped estimates of poverty rates for groups of
households at a point in time, by sample size,
scorecard applied to the validation sample**

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	+2.7	63.8	72.2	89.5
4	+0.4	36.3	43.9	65.2
8	+1.1	27.4	31.5	42.9
16	+0.9	18.8	23.0	32.2
32	+0.8	14.1	16.6	21.7
64	+0.9	10.5	12.3	15.9
128	+1.0	7.4	8.9	11.2
256	+1.1	5.2	6.1	7.7
512	+1.1	3.6	4.3	5.5
1,024	+1.1	2.7	3.0	4.0
2,048	+1.1	1.9	2.2	3.1
4,096	+1.1	1.3	1.5	2.0
8,192	+1.1	0.9	1.2	1.5
16,384	+1.1	0.7	0.8	1.0

Figure 11 (150% of the national line, old definition): Households by targeting classification and score, along with “Total Accuracy” and BPAC, scorecard applied to the validation sample

Score	Inclusion:	Undercoverage:	Leakage:	Exclusion:	Total Accuracy	BPAC
	< poverty line correctly targeted	< poverty line mistakenly non-targeted	=> poverty line mistakenly targeted	=> poverty line correctly non-targeted	Inclusion + Exclusion	See text
0–4	0.1	56.0	0.0	44.0	44.0	–99.7
5–9	0.5	55.6	0.0	44.0	44.4	–98.3
10–14	1.8	54.2	0.0	43.9	45.8	–93.5
15–19	4.5	51.5	0.1	43.9	48.4	–83.8
20–24	9.4	46.6	0.2	43.7	53.2	–66.0
25–29	16.8	39.2	0.7	43.2	60.0	–38.8
30–34	25.7	30.4	1.9	42.1	67.8	–5.0
35–39	34.7	21.3	4.5	39.5	74.2	+31.9
40–44	43.2	12.8	9.6	34.4	77.6	+71.3
45–49	49.4	6.7	16.2	27.7	77.1	+71.1
50–54	52.9	3.1	23.0	20.9	73.9	+58.9
55–59	54.8	1.3	28.9	15.0	69.8	+48.4
60–64	55.5	0.5	33.5	10.5	66.0	+40.3
65–69	55.9	0.2	37.2	6.7	62.6	+33.6
70–74	56.0	0.1	39.7	4.3	60.2	+29.2
75–79	56.0	0.0	41.6	2.4	58.4	+25.8
80–84	56.0	0.0	42.6	1.3	57.3	+23.9
85–89	56.0	0.0	43.4	0.5	56.6	+22.5
90–94	56.0	0.0	43.8	0.1	56.2	+21.8
95–100	56.0	0.0	44.0	0.0	56.0	+21.6

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

Figure 12 (150% of the national line, old definition): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successful targeted (coverage) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0-4	0.1	99.8	0.1	608.7:1
5-9	0.5	100.0	0.8	3,537.0:1
10-14	1.8	99.4	3.2	168.7:1
15-19	4.6	98.6	8.1	68.9:1
20-24	9.6	97.7	16.8	43.2:1
25-29	17.5	95.9	30.0	23.5:1
30-34	27.5	93.3	45.8	13.9:1
35-39	39.2	88.6	62.0	7.8:1
40-44	52.8	81.8	77.1	4.5:1
45-49	65.6	75.3	88.1	3.0:1
50-54	75.9	69.7	94.4	2.3:1
55-59	83.7	65.4	97.7	1.9:1
60-64	89.0	62.4	99.1	1.7:1
65-69	93.1	60.0	99.7	1.5:1
70-74	95.7	58.5	99.9	1.4:1
75-79	97.6	57.4	100.0	1.3:1
80-84	98.7	56.8	100.0	1.3:1
85-89	99.5	56.4	100.0	1.3:1
90-94	99.9	56.1	100.0	1.3:1
95-100	100.0	56.0	100.0	1.3:1

**Tables for
200% of the National Poverty Line,
Old Definition**

Figure 4 (200% of the national line, old definition):
Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0-4	100.0
5-9	100.0
10-14	99.3
15-19	99.8
20-24	99.2
25-29	97.3
30-34	94.1
35-39	87.9
40-44	76.8
45-49	66.6
50-54	52.0
55-59	40.6
60-64	29.9
65-69	18.5
70-74	9.2
75-79	5.5
80-84	1.9
85-89	1.9
90-94	0.0
95-100	0.0

Figure 7 (200% of the national line, old definition):

Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16,384$) with confidence intervals, scorecard applied to the validation sample

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	+0.0	0.0	0.2	0.3
5-9	+0.0	0.0	0.0	0.0
10-14	-0.6	0.4	0.4	0.5
15-19	+0.7	0.9	1.1	1.3
20-24	+0.1	0.7	0.9	1.2
25-29	-0.4	0.8	0.9	1.2
30-34	-1.0	1.1	1.3	1.7
35-39	-1.3	1.5	1.8	2.3
40-44	-0.3	2.0	2.3	3.4
45-49	+6.4	2.3	2.8	3.5
50-54	+3.9	2.6	3.1	4.0
55-59	+0.3	2.9	3.4	4.7
60-64	+4.0	3.1	3.7	4.7
65-69	+0.6	3.2	3.7	4.8
70-74	+1.6	2.4	2.9	3.8
75-79	+1.6	2.0	2.3	3.1
80-84	-0.6	2.4	2.7	3.4
85-89	+0.7	1.7	2.0	2.6
90-94	-0.6	1.1	1.3	1.8
95-100	+0.0	0.0	0.0	0.0

**Figure 8 (200% of the national line, old definition):
Differences and precision of differences for
bootstrapped estimates of poverty rates for groups of
households at a point in time, by sample size,
scorecard applied to the validation sample**

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	+3.0	62.4	73.7	87.8
4	+0.6	34.9	41.5	58.7
8	+1.5	26.1	31.8	40.6
16	+1.1	18.6	21.8	28.2
32	+0.9	13.4	15.9	20.8
64	+1.0	9.3	11.5	15.1
128	+1.1	6.7	8.2	9.8
256	+1.3	4.6	5.4	7.1
512	+1.3	3.5	4.0	5.2
1,024	+1.2	2.5	3.0	3.8
2,048	+1.2	1.8	2.1	2.6
4,096	+1.2	1.2	1.5	2.0
8,192	+1.2	0.9	1.1	1.4
16,384	+1.2	0.6	0.7	0.9

Figure 11 (200% of the national line, old definition): Households by targeting classification and score, along with “Total Accuracy” and BPAC, scorecard applied to the validation sample

Score	Inclusion:	Undercoverage:	Leakage:	Exclusion:	Total Accuracy	BPAC
	< poverty line correctly targeted	< poverty line mistakenly non-targeted	=> poverty line mistakenly targeted	=> poverty line non-targeted	Inclusion + Exclusion	See text
0-4	0.1	67.2	0.0	32.7	32.8	-99.8
5-9	0.5	66.8	0.0	32.7	33.2	-98.6
10-14	1.8	65.4	0.0	32.7	34.6	-94.6
15-19	4.6	62.7	0.0	32.7	37.3	-86.4
20-24	9.6	57.7	0.1	32.7	42.2	-71.5
25-29	17.2	50.0	0.3	32.5	49.7	-48.4
30-34	26.7	40.6	0.9	31.9	58.6	-19.4
35-39	37.0	30.3	2.2	30.6	67.6	+13.3
40-44	47.6	19.6	5.2	27.6	75.2	+49.3
45-49	55.8	11.4	9.8	23.0	78.8	+80.5
50-54	61.2	6.0	14.7	18.0	79.2	+78.1
55-59	64.5	2.7	19.2	13.6	78.1	+71.5
60-64	66.1	1.2	23.0	9.8	75.8	+65.9
65-69	66.9	0.4	26.2	6.5	73.4	+61.0
70-74	67.1	0.2	28.6	4.2	71.3	+57.5
75-79	67.2	0.1	30.4	2.4	69.6	+54.8
80-84	67.2	0.0	31.5	1.3	68.5	+53.2
85-89	67.2	0.0	32.2	0.5	67.8	+52.1
90-94	67.3	0.0	32.6	0.1	67.4	+51.5
95-100	67.3	0.0	32.7	0.0	67.3	+51.3

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

Figure 12 (200% of the national line, old definition): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successful targeted (coverage) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0-4	0.1	99.8	0.1	608.7:1
5-9	0.5	100.0	0.7	3,537.0:1
10-14	1.8	99.8	2.7	457.2:1
15-19	4.6	99.4	6.8	180.3:1
20-24	9.6	99.2	14.2	120.1:1
25-29	17.5	98.3	25.6	57.6:1
30-34	27.5	96.9	39.7	31.2:1
35-39	39.2	94.4	55.0	16.9:1
40-44	52.8	90.2	70.8	9.2:1
45-49	65.6	85.1	83.0	5.7:1
50-54	75.9	80.6	91.0	4.2:1
55-59	83.7	77.1	95.9	3.4:1
60-64	89.0	74.2	98.2	2.9:1
65-69	93.1	71.8	99.4	2.5:1
70-74	95.7	70.1	99.8	2.3:1
75-79	97.6	68.9	99.9	2.2:1
80-84	98.7	68.1	100.0	2.1:1
85-89	99.5	67.6	100.0	2.1:1
90-94	99.9	67.3	100.0	2.1:1
95-100	100.0	67.3	100.0	2.1:1

**Tables for
USAID “Extreme” Poverty Line,
Old Definition**

Figure 4 (USAID “extreme” line, old definition):
Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	100.0
5–9	89.8
10–14	84.0
15–19	68.9
20–24	58.0
25–29	47.1
30–34	34.2
35–39	21.9
40–44	13.6
45–49	7.5
50–54	3.9
55–59	2.5
60–64	1.4
65–69	0.6
70–74	0.3
75–79	0.1
80–84	0.3
85–89	0.0
90–94	0.0
95–100	0.0

Figure 7 (USAID “extreme” line, old definition):

Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16,384$) with confidence intervals, scorecard applied to the validation sample

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	+6.6	10.6	11.7	17.1
5-9	-3.0	7.3	8.7	11.3
10-14	+2.0	5.1	5.8	8.0
15-19	-6.1	5.0	5.5	7.1
20-24	+3.3	3.8	4.4	6.1
25-29	+2.5	3.1	3.7	4.7
30-34	+0.2	2.6	3.1	4.2
35-39	-1.6	2.3	2.7	3.6
40-44	+0.6	1.5	1.7	2.3
45-49	+0.7	1.2	1.5	2.0
50-54	+0.7	0.9	1.0	1.4
55-59	-0.1	0.9	1.0	1.3
60-64	+0.5	0.5	0.6	0.9
65-69	-0.1	0.7	0.8	1.0
70-74	+0.2	0.2	0.3	0.4
75-79	-0.2	0.5	0.6	0.8
80-84	-0.6	1.2	1.5	1.9
85-89	-0.1	0.3	0.4	0.6
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

**Figure 8 (USAID “extreme” line, old definition):
Differences and precision of differences for
bootstrapped estimates of poverty rates for groups of
households at a point in time, by sample size,
scorecard applied to the validation sample**

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	+0.0	62.6	68.1	80.7
4	-0.9	35.0	42.0	54.0
8	-0.5	24.6	29.8	37.8
16	-0.1	18.0	21.4	27.5
32	+0.1	13.3	16.4	20.9
64	+0.4	9.4	10.9	15.2
128	+0.5	6.9	8.1	10.8
256	+0.3	4.9	5.7	7.5
512	+0.3	3.3	3.9	5.1
1,024	+0.3	2.4	2.9	3.8
2,048	+0.3	1.7	2.0	2.5
4,096	+0.3	1.2	1.3	1.9
8,192	+0.3	0.8	1.0	1.3
16,384	+0.3	0.6	0.7	0.9

Figure 11 (USAID “extreme” line, old definition): Households by targeting classification and score, along with “Total Accuracy” and BPAC, scorecard applied to the validation sample

Score	Inclusion:	Undercoverage:	Leakage:	Exclusion:	Total Accuracy	BPAC
	< poverty line correctly targeted	< poverty line mistakenly non-targeted	=> poverty line mistakenly targeted	=> poverty line non-targeted	Inclusion + Exclusion	See text
0–4	0.1	19.5	0.0	80.4	80.5	–99.2
5–9	0.4	19.2	0.0	80.4	80.8	–95.4
10–14	1.5	18.1	0.3	80.1	81.7	–82.8
15–19	3.5	16.1	1.1	79.3	82.9	–58.7
20–24	6.4	13.2	3.3	77.1	83.5	–18.4
25–29	10.0	9.6	7.5	72.9	82.9	+40.5
30–34	13.5	6.1	14.1	66.3	79.8	+28.3
35–39	16.1	3.5	23.1	57.3	73.3	–18.0
40–44	18.0	1.6	34.8	45.6	63.5	–77.8
45–49	18.9	0.7	46.7	33.7	52.6	–138.3
50–54	19.3	0.3	56.6	23.8	43.0	–189.0
55–59	19.5	0.1	64.2	16.2	35.7	–227.6
60–64	19.5	0.1	69.5	10.9	30.5	–254.5
65–69	19.6	0.0	73.5	6.9	26.5	–275.1
70–74	19.6	0.0	76.1	4.3	23.9	–288.3
75–79	19.6	0.0	78.0	2.4	22.0	–298.0
80–84	19.6	0.0	79.1	1.3	20.9	–303.6
85–89	19.6	0.0	79.9	0.5	20.1	–307.5
90–94	19.6	0.0	80.3	0.1	19.7	–309.5
95–100	19.6	0.0	80.4	0.0	19.6	–310.3

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

Figure 12 (USAID “extreme” line, old definition): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successful targeted (coverage) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	0.1	94.0	0.4	15.8:1
5–9	0.5	93.2	2.2	13.7:1
10–14	1.8	84.7	7.9	5.5:1
15–19	4.6	76.7	17.9	3.3:1
20–24	9.6	65.9	32.4	1.9:1
25–29	17.5	57.2	51.2	1.3:1
30–34	27.5	49.0	68.8	1.0:1
35–39	39.2	41.0	82.0	0.7:1
40–44	52.8	34.0	91.7	0.5:1
45–49	65.6	28.8	96.3	0.4:1
50–54	75.9	25.4	98.4	0.3:1
55–59	83.7	23.3	99.4	0.3:1
60–64	89.0	22.0	99.7	0.3:1
65–69	93.1	21.0	99.9	0.3:1
70–74	95.7	20.5	99.9	0.3:1
75–79	97.6	20.1	100.0	0.3:1
80–84	98.7	19.9	100.0	0.2:1
85–89	99.5	19.7	100.0	0.2:1
90–94	99.9	19.6	100.0	0.2:1
95–100	100.0	19.6	100.0	0.2:1

**Tables for
\$1.25/day 2005 PPP Poverty Line,
Old Definition**

Figure 4 (\$1.25/day 2005 PPP line, old definition):
Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0-4	81.1
5-9	71.6
10-14	64.4
15-19	45.7
20-24	33.7
25-29	24.7
30-34	15.9
35-39	8.9
40-44	6.1
45-49	3.2
50-54	1.3
55-59	0.8
60-64	0.5
65-69	0.1
70-74	0.1
75-79	0.0
80-84	0.1
85-89	0.0
90-94	0.0
95-100	0.0

Figure 7 (\$1.25/day 2005 PPP line, old definition):

Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16,384$) with confidence intervals, scorecard applied to the validation sample

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	-4.1	17.7	19.9	23.1
5-9	-10.8	9.9	11.5	14.7
10-14	+2.0	6.4	7.6	10.2
15-19	-6.6	5.9	6.3	8.7
20-24	+0.2	3.6	4.3	5.6
25-29	+1.2	2.4	3.0	3.8
30-34	-0.8	2.1	2.5	3.1
35-39	-2.1	1.9	2.1	2.6
40-44	+0.0	1.1	1.3	1.6
45-49	+0.6	0.7	0.8	1.1
50-54	-0.1	0.7	0.8	1.0
55-59	-0.1	0.5	0.6	0.7
60-64	+0.1	0.3	0.4	0.5
65-69	-0.4	0.6	0.7	0.9
70-74	-0.0	0.2	0.3	0.3
75-79	-0.3	0.5	0.6	0.8
80-84	-0.6	1.2	1.5	1.8
85-89	-0.1	0.3	0.4	0.6
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

**Figure 8 (\$1.25/day 2005 PPP line, old definition):
Differences and precision of differences for
bootstrapped estimates of poverty rates for groups of
households at a point in time, by sample size,
scorecard applied to the validation sample**

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	-0.2	54.5	58.9	79.2
4	-1.5	29.8	36.4	51.3
8	-0.8	20.7	25.5	33.5
16	-0.6	14.9	18.1	24.5
32	-0.4	10.7	13.0	17.5
64	-0.5	7.6	9.5	12.7
128	-0.5	5.8	6.9	9.2
256	-0.5	4.1	4.8	6.1
512	-0.5	2.9	3.5	4.5
1,024	-0.5	2.0	2.4	3.3
2,048	-0.4	1.4	1.6	2.2
4,096	-0.4	1.0	1.1	1.6
8,192	-0.4	0.7	0.8	1.1
16,384	-0.4	0.5	0.6	0.8

Figure 11 (\$1.25/day 2005 PPP line, old definition): Households by targeting classification and score, along with “Total Accuracy” and BPAC, scorecard applied to the validation sample

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
	0-4	0.1	10.2	0.0	89.7	89.8	-98.5
5-9	0.4	9.9	0.1	89.7	90.0	-91.7
10-14	1.2	9.0	0.6	89.1	90.3	-70.5
15-19	2.6	7.7	2.0	87.7	90.3	-30.3
20-24	4.3	6.0	5.4	84.4	88.6	+35.6
25-29	6.2	4.1	11.4	78.4	84.6	-10.8
30-34	7.7	2.5	19.8	69.9	77.7	-93.2
35-39	8.8	1.4	30.3	59.4	68.3	-196.0
40-44	9.6	0.6	43.2	46.6	56.2	-321.3
45-49	10.0	0.3	55.6	34.1	44.1	-442.4
50-54	10.1	0.1	65.8	23.9	34.1	-541.9
55-59	10.2	0.1	73.5	16.3	26.4	-617.0
60-64	10.2	0.0	78.8	10.9	21.2	-668.8
65-69	10.2	0.0	82.9	6.9	17.1	-708.3
70-74	10.2	0.0	85.4	4.3	14.5	-733.6
75-79	10.2	0.0	87.3	2.4	12.6	-752.1
80-84	10.2	0.0	88.4	1.3	11.6	-762.8
85-89	10.3	0.0	89.2	0.5	10.8	-770.3
90-94	10.3	0.0	89.6	0.1	10.4	-774.1
95-100	10.3	0.0	89.7	0.0	10.3	-775.6

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

Figure 12 (\$1.25/day 2005 PPP line, old definition): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successful targeted (coverage) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0-4	0.1	84.0	0.7	5.3:1
5-9	0.5	80.0	3.7	4.0:1
10-14	1.8	66.1	11.7	2.0:1
15-19	4.6	56.1	25.1	1.3:1
20-24	9.6	44.2	41.5	0.8:1
25-29	17.5	35.2	60.1	0.5:1
30-34	27.5	28.1	75.5	0.4:1
35-39	39.2	22.6	86.3	0.3:1
40-44	52.8	18.2	93.9	0.2:1
45-49	65.6	15.2	97.4	0.2:1
50-54	75.9	13.3	98.7	0.2:1
55-59	83.7	12.2	99.4	0.1:1
60-64	89.0	11.5	99.7	0.1:1
65-69	93.1	11.0	99.8	0.1:1
70-74	95.7	10.7	99.9	0.1:1
75-79	97.6	10.5	99.9	0.1:1
80-84	98.7	10.4	100.0	0.1:1
85-89	99.5	10.3	100.0	0.1:1
90-94	99.9	10.3	100.0	0.1:1
95-100	100.0	10.3	100.0	0.1:1

**Tables for
\$2.50/day 2005 PPP Poverty Line,
Old Definition**

Figure 4 (\$2.50/day 2005 PPP line, old definition):
Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0-4	100.0
5-9	97.7
10-14	93.8
15-19	87.9
20-24	74.0
25-29	60.7
30-34	42.6
35-39	26.7
40-44	16.8
45-49	9.1
50-54	3.6
55-59	2.1
60-64	1.1
65-69	0.4
70-74	0.3
75-79	0.1
80-84	0.3
85-89	0.0
90-94	0.0
95-100	0.0

Figure 5 (\$2.50/day 2005 PPP line, old definition):

Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16,384$) with confidence intervals, scorecard applied to the validation sample

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	+3.1	6.0	7.7	10.9
5-9	+2.5	6.4	7.5	10.2
10-14	-1.4	2.6	3.0	4.0
15-19	-2.2	2.8	3.3	4.6
20-24	+1.6	3.5	4.3	5.7
25-29	-1.2	3.0	3.6	4.7
30-34	+0.7	2.9	3.3	4.0
35-39	-5.5	4.1	4.4	4.9
40-44	+0.5	1.6	2.0	2.4
45-49	+1.1	1.3	1.5	2.1
50-54	+0.2	0.9	1.1	1.4
55-59	-0.5	0.9	1.1	1.5
60-64	+0.6	0.4	0.4	0.5
65-69	-0.3	0.7	0.8	1.0
70-74	+0.1	0.2	0.3	0.3
75-79	-0.2	0.5	0.6	0.8
80-84	-0.5	1.2	1.5	1.8
85-89	-0.1	0.3	0.4	0.6
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

**Figure 8 (\$2.50/day 2005 PPP line, old definition):
Differences and precision of differences for
bootstrapped estimates of poverty rates for groups of
households at a point in time, by sample size,
scorecard applied to the validation sample**

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	+1.1	58.0	72.0	83.8
4	-1.1	33.7	42.1	57.2
8	-0.6	25.0	29.7	43.6
16	-0.7	18.1	21.1	28.1
32	-0.5	13.5	15.9	20.4
64	-0.6	9.2	11.0	14.5
128	-0.4	6.7	8.0	10.3
256	-0.5	5.0	6.0	7.5
512	-0.4	3.5	4.2	5.5
1,024	-0.5	2.5	3.0	4.0
2,048	-0.4	1.7	2.0	2.6
4,096	-0.4	1.2	1.4	1.8
8,192	-0.4	0.9	1.0	1.3
16,384	-0.4	0.6	0.7	0.9

Figure 11 (\$2.50/day 2005 PPP line, old definition): Households by targeting classification and score, along with “Total Accuracy” and BPAC, scorecard applied to the validation sample

Score	Inclusion:	Undercoverage:	Leakage:	Exclusion:	Total Accuracy	BPAC
	< poverty line correctly targeted	< poverty line mistakenly non-targeted	=> poverty line mistakenly targeted	=> poverty line correctly non-targeted	Inclusion + Exclusion	See text
0–4	0.1	23.8	0.0	76.1	76.2	–99.3
5–9	0.5	23.5	0.0	76.1	76.5	–96.1
10–14	1.7	22.2	0.1	76.0	77.7	–85.2
15–19	4.2	19.8	0.4	75.6	79.8	–63.5
20–24	7.9	16.1	1.8	74.3	82.2	–26.9
25–29	12.6	11.3	4.9	71.2	83.7	+25.9
30–34	16.8	7.1	10.8	65.3	82.1	+55.0
35–39	20.0	4.0	19.2	56.9	76.8	+19.7
40–44	22.2	1.7	30.6	45.5	67.7	–27.8
45–49	23.2	0.7	42.3	33.7	57.0	–77.0
50–54	23.7	0.3	52.3	23.8	47.5	–118.5
55–59	23.8	0.1	59.9	16.2	40.1	–150.2
60–64	23.9	0.0	65.1	10.9	34.8	–172.3
65–69	23.9	0.0	69.2	6.9	30.8	–189.2
70–74	23.9	0.0	71.8	4.3	28.2	–200.0
75–79	23.9	0.0	73.7	2.4	26.3	–208.0
80–84	23.9	0.0	74.8	1.3	25.2	–212.5
85–89	23.9	0.0	75.5	0.5	24.5	–215.7
90–94	23.9	0.0	75.9	0.1	24.1	–217.4
95–100	23.9	0.0	76.1	0.0	23.9	–218.0

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

Figure 12 (\$2.50/day 2005 PPP line, old definition): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successful targeted (coverage) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0-4	0.1	95.6	0.3	21.5:1
5-9	0.5	96.8	1.9	29.9:1
10-14	1.8	94.7	7.2	17.7:1
15-19	4.6	90.7	17.4	9.7:1
20-24	9.6	81.5	32.8	4.4:1
25-29	17.5	71.9	52.6	2.6:1
30-34	27.5	60.9	70.2	1.6:1
35-39	39.2	50.9	83.4	1.0:1
40-44	52.8	42.1	93.0	0.7:1
45-49	65.6	35.4	97.2	0.5:1
50-54	75.9	31.2	98.9	0.5:1
55-59	83.7	28.5	99.6	0.4:1
60-64	89.0	26.8	99.8	0.4:1
65-69	93.1	25.7	99.9	0.3:1
70-74	95.7	25.0	99.9	0.3:1
75-79	97.6	24.5	100.0	0.3:1
80-84	98.7	24.2	100.0	0.3:1
85-89	99.5	24.1	100.0	0.3:1
90-94	99.9	24.0	100.0	0.3:1
95-100	100.0	23.9	100.0	0.3:1

**Tables for
\$3.75/day 2005 PPP Poverty Line,
Old Definition**

Figure 4 (\$3.75/day 2005 PPP line, old definition):
Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0-4	100.0
5-9	99.1
10-14	97.6
15-19	97.1
20-24	91.5
25-29	83.1
30-34	69.6
35-39	51.2
40-44	35.0
45-49	20.0
50-54	8.8
55-59	4.4
60-64	2.5
65-69	0.9
70-74	0.6
75-79	0.2
80-84	0.4
85-89	0.0
90-94	0.0
95-100	0.0

Figure 7 (\$3.75/day 2005 PPP line, old definition):

Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16,384$) with confidence intervals, scorecard applied to the validation sample

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	+2.4	5.6	6.9	10.2
5-9	-0.9	0.5	0.5	0.5
10-14	+0.1	1.9	2.3	3.0
15-19	+0.2	1.5	1.8	2.3
20-24	-0.4	2.2	2.7	3.6
25-29	-1.2	2.2	2.6	3.3
30-34	-1.1	2.5	3.1	3.9
35-39	-3.4	2.9	3.2	4.2
40-44	+0.7	2.1	2.6	3.3
45-49	+0.8	1.9	2.3	3.0
50-54	-1.0	1.5	1.7	2.4
55-59	-0.7	1.4	1.6	2.0
60-64	-0.4	1.3	1.5	2.0
65-69	+0.0	0.7	0.8	1.0
70-74	+0.4	0.3	0.3	0.4
75-79	-0.2	0.6	0.7	0.9
80-84	-0.9	1.7	1.9	2.5
85-89	-0.6	1.0	1.2	1.5
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

**Figure 8 (\$3.75/day 2005 PPP line, old definition):
Differences and precision of differences for
bootstrapped estimates of poverty rates for groups of
households at a point in time, by sample size,
scorecard applied to the validation sample**

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	+1.1	58.1	74.8	88.2
4	-0.5	36.3	43.4	57.1
8	-0.4	26.9	32.6	44.6
16	-0.6	18.4	23.0	33.0
32	-0.7	13.4	16.6	22.1
64	-0.6	9.7	11.3	15.6
128	-0.6	7.2	8.6	11.4
256	-0.5	5.2	6.0	8.1
512	-0.5	3.5	4.3	5.5
1,024	-0.6	2.5	3.1	4.0
2,048	-0.6	1.8	2.2	3.0
4,096	-0.6	1.3	1.5	2.0
8,192	-0.6	0.9	1.1	1.5
16,384	-0.6	0.7	0.8	1.0

Figure 11 (\$3.75/day 2005 PPP line, old definition): Households by targeting classification and score, along with “Total Accuracy” and BPAC, scorecard applied to the validation sample

Score	Inclusion:	Undercoverage:	Leakage:	Exclusion:	Total Accuracy	BPAC
	< poverty line correctly targeted	< poverty line mistakenly non-targeted	=> poverty line mistakenly targeted	=> poverty line non-targeted	Inclusion + Exclusion	See text
0–4	0.1	37.3	0.0	62.6	62.7	–99.6
5–9	0.5	36.9	0.0	62.6	63.1	–97.5
10–14	1.8	35.6	0.0	62.6	64.3	–90.4
15–19	4.4	33.0	0.1	62.5	66.9	–75.9
20–24	9.1	28.3	0.5	62.1	71.2	–49.9
25–29	15.7	21.8	1.9	60.7	76.4	–11.3
30–34	22.6	14.8	4.9	57.7	80.3	+34.1
35–39	28.6	8.8	10.6	52.0	80.6	+71.7
40–44	33.4	4.1	19.5	43.1	76.5	+48.0
45–49	35.7	1.7	29.8	32.7	68.5	+20.2
50–54	36.8	0.6	39.1	23.5	60.3	–4.6
55–59	37.2	0.2	46.5	16.1	53.3	–24.3
60–64	37.3	0.1	51.7	10.9	48.2	–38.2
65–69	37.4	0.0	55.7	6.9	44.2	–48.9
70–74	37.4	0.0	58.3	4.3	41.7	–55.8
75–79	37.4	0.0	60.2	2.4	39.8	–60.9
80–84	37.4	0.0	61.3	1.3	38.7	–63.8
85–89	37.4	0.0	62.0	0.5	38.0	–65.9
90–94	37.4	0.0	62.4	0.1	37.6	–66.9
95–100	37.4	0.0	62.6	0.0	37.4	–67.3

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

Figure 12 (\$3.75/day 2005 PPP line, old definition): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successful targeted (coverage) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0-4	0.1	97.5	0.2	39.0:1
5-9	0.5	99.6	1.3	231.0:1
10-14	1.8	98.1	4.8	50.4:1
15-19	4.6	97.0	11.9	32.7:1
20-24	9.6	94.4	24.3	17.0:1
25-29	17.5	89.4	41.9	8.4:1
30-34	27.5	82.2	60.5	4.6:1
35-39	39.2	73.0	76.4	2.7:1
40-44	52.8	63.2	89.1	1.7:1
45-49	65.6	54.5	95.5	1.2:1
50-54	75.9	48.5	98.4	0.9:1
55-59	83.7	44.4	99.4	0.8:1
60-64	89.0	41.9	99.8	0.7:1
65-69	93.1	40.1	99.9	0.7:1
70-74	95.7	39.1	99.9	0.6:1
75-79	97.6	38.3	100.0	0.6:1
80-84	98.7	37.9	100.0	0.6:1
85-89	99.5	37.6	100.0	0.6:1
90-94	99.9	37.5	100.0	0.6:1
95-100	100.0	37.4	100.0	0.6:1

**Tables for
\$5.00/day 2005 PPP Poverty Line,
Old Definition**

**Figure 4 (\$5.00/day 2005 PPP line, old definition):
 Estimated poverty likelihoods associated with scores**

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0-4	100.0
5-9	99.9
10-14	98.7
15-19	99.2
20-24	97.2
25-29	92.4
30-34	82.9
35-39	69.0
40-44	52.2
45-49	35.2
50-54	18.7
55-59	10.2
60-64	5.3
65-69	2.3
70-74	1.1
75-79	0.7
80-84	0.5
85-89	0.1
90-94	0.0
95-100	0.0

Figure 7 (\$5.00/day 2005 PPP line, old definition):

Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16,384$) with confidence intervals, scorecard applied to the validation sample

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	+2.4	5.6	6.9	10.2
5-9	-0.1	0.0	0.0	0.0
10-14	-0.6	0.8	1.0	1.2
15-19	+0.7	1.1	1.3	1.6
20-24	+1.6	1.9	2.3	3.2
25-29	-0.6	1.4	1.6	2.1
30-34	-2.7	2.4	2.6	3.1
35-39	-1.9	2.3	2.7	3.6
40-44	+2.7	2.3	2.8	3.3
45-49	+2.7	2.3	2.7	3.3
50-54	+1.0	1.8	2.2	3.2
55-59	-1.6	2.1	2.5	3.2
60-64	-1.0	1.9	2.3	2.8
65-69	-0.5	1.2	1.6	2.0
70-74	+0.7	0.4	0.5	0.6
75-79	+0.2	0.6	0.7	0.9
80-84	-0.8	1.7	2.0	2.5
85-89	-0.5	1.0	1.3	1.5
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

**Figure 8 (\$5.00/day 2005 PPP line, old definition):
Differences and precision of differences for
bootstrapped estimates of poverty rates for groups of
households at a point in time, by sample size,
scorecard applied to the validation sample**

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	+1.1	66.9	66.9	86.4
4	-0.4	36.0	44.9	63.4
8	+0.4	26.1	31.0	39.6
16	-0.2	18.7	22.4	31.2
32	+0.2	13.3	16.1	21.1
64	+0.4	10.2	12.3	15.8
128	+0.3	7.3	8.7	11.6
256	+0.3	5.2	6.1	7.8
512	+0.3	3.5	4.1	5.4
1,024	+0.3	2.5	3.0	3.9
2,048	+0.2	1.9	2.2	2.8
4,096	+0.2	1.3	1.5	2.1
8,192	+0.2	0.9	1.1	1.4
16,384	+0.2	0.6	0.8	1.0

Figure 11 (\$5.00/day 2005 PPP line, old definition): Households by targeting classification and score, along with “Total Accuracy” and BPAC, scorecard applied to the validation sample

Score	Inclusion:	Undercoverage:	Leakage:	Exclusion:	Total Accuracy	BPAC
	< poverty line correctly targeted	< poverty line mistakenly non-targeted	=> poverty line mistakenly targeted	=> poverty line non-targeted	Inclusion + Exclusion	See text
0-4	0.1	47.6	0.0	52.3	52.4	-99.7
5-9	0.5	47.3	0.0	52.3	52.7	-98.0
10-14	1.8	45.9	0.0	52.3	54.1	-92.4
15-19	4.5	43.2	0.1	52.2	56.7	-80.9
20-24	9.4	38.3	0.2	52.0	61.4	-60.1
25-29	16.6	31.1	0.9	51.4	68.0	-28.4
30-34	25.1	22.6	2.4	49.8	74.9	+10.3
35-39	33.2	14.6	6.0	46.2	79.4	+51.6
40-44	40.1	7.6	12.7	39.6	79.7	+73.4
45-49	44.4	3.3	21.2	31.1	75.4	+55.6
50-54	46.4	1.3	29.5	22.7	69.1	+38.1
55-59	47.2	0.5	36.4	15.8	63.1	+23.6
60-64	47.5	0.2	41.5	10.8	58.3	+13.1
65-69	47.7	0.1	45.4	6.9	54.5	+4.8
70-74	47.7	0.0	48.0	4.3	52.0	-0.6
75-79	47.7	0.0	49.9	2.4	50.1	-4.5
80-84	47.7	0.0	51.0	1.3	49.0	-6.8
85-89	47.7	0.0	51.7	0.5	48.3	-8.4
90-94	47.7	0.0	52.1	0.1	47.9	-9.2
95-100	47.7	0.0	52.3	0.0	47.7	-9.6

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

Figure 12 (\$5.00/day 2005 PPP line, old definition): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successful targeted (coverage) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0-4	0.1	97.5	0.2	39.0:1
5-9	0.5	99.6	1.0	231.0:1
10-14	1.8	99.2	3.8	124.9:1
15-19	4.6	98.7	9.5	74.3:1
20-24	9.6	97.5	19.7	38.5:1
25-29	17.5	95.0	34.9	19.0:1
30-34	27.5	91.1	52.6	10.3:1
35-39	39.2	84.6	69.5	5.5:1
40-44	52.8	76.0	84.1	3.2:1
45-49	65.6	67.7	93.0	2.1:1
50-54	75.9	61.1	97.2	1.6:1
55-59	83.7	56.4	99.0	1.3:1
60-64	89.0	53.4	99.6	1.1:1
65-69	93.1	51.2	99.9	1.0:1
70-74	95.7	49.8	99.9	1.0:1
75-79	97.6	48.9	100.0	1.0:1
80-84	98.7	48.3	100.0	0.9:1
85-89	99.5	48.0	100.0	0.9:1
90-94	99.9	47.8	100.0	0.9:1
95-100	100.0	47.7	100.0	0.9:1

**Tables for
the National Poverty Line,
New Definition**

Figure 4 (National line, new definition): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0-4	96.2
5-9	98.2
10-14	96.5
15-19	92.9
20-24	85.2
25-29	72.9
30-34	60.9
35-39	45.0
40-44	29.6
45-49	18.2
50-54	8.6
55-59	4.3
60-64	1.9
65-69	1.1
70-74	0.2
75-79	0.2
80-84	0.1
85-89	0.0
90-94	0.0
95-100	0.0

Figure 5 (National line, new definition): Derivation of estimated poverty likelihoods associated with scores

Score	Households below poverty line		All households at score		Poverty likelihood (estimated, %)
0-4	78	÷	81	=	96.2
5-9	383	÷	390	=	98.2
10-14	1,303	÷	1,350	=	96.5
15-19	2,562	÷	2,758	=	92.9
20-24	4,311	÷	5,058	=	85.2
25-29	5,748	÷	7,880	=	72.9
30-34	6,104	÷	10,027	=	60.9
35-39	5,232	÷	11,639	=	45.0
40-44	4,030	÷	13,628	=	29.6
45-49	2,325	÷	12,773	=	18.2
50-54	893	÷	10,335	=	8.6
55-59	331	÷	7,763	=	4.3
60-64	101	÷	5,337	=	1.9
65-69	45	÷	4,071	=	1.1
70-74	6	÷	2,596	=	0.2
75-79	4	÷	1,904	=	0.2
80-84	1	÷	1,102	=	0.1
85-89	0	÷	766	=	0.0
90-94	0	÷	395	=	0.0
95-100	0	÷	147	=	0.0

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

Figure 7 (National line, new definition): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16,384$) with confidence intervals, scorecard applied to the validation sample

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	-1.5	5.6	6.9	10.2
5-9	+3.2	6.5	7.8	10.5
10-14	-1.1	1.6	1.9	2.9
15-19	-0.8	2.4	2.8	3.7
20-24	+2.8	3.0	3.7	4.9
25-29	-0.7	2.6	3.1	3.9
30-34	+3.0	2.8	3.4	4.3
35-39	+2.3	2.5	2.9	3.8
40-44	+2.9	2.0	2.4	3.1
45-49	+0.5	1.9	2.2	2.8
50-54	+0.3	1.4	1.6	2.1
55-59	+0.0	1.2	1.4	1.8
60-64	-0.1	1.1	1.3	1.7
65-69	-0.1	0.9	1.1	1.3
70-74	-0.1	0.5	0.7	0.8
75-79	+0.1	0.2	0.3	0.4
80-84	+0.1	0.1	0.1	0.1
85-89	-0.5	0.9	1.1	1.5
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

Figure 8 (National line, new definition): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, scorecard applied to the validation sample

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	+1.5	65.7	77.4	90.5
4	+0.3	37.0	45.7	58.7
8	+1.0	27.3	33.2	44.3
16	+0.8	19.1	23.9	32.6
32	+1.2	14.4	17.2	21.3
64	+1.3	10.3	12.1	14.7
128	+1.2	7.4	8.7	10.7
256	+1.1	5.0	6.1	7.8
512	+1.2	3.7	4.4	5.7
1,024	+1.2	2.6	3.2	4.0
2,048	+1.2	1.8	2.1	2.7
4,096	+1.2	1.2	1.5	2.0
8,192	+1.2	0.9	1.1	1.5
16,384	+1.2	0.6	0.8	1.0

Figure 11 (National line, new definition): Households by targeting classification and score, along with “Total Accuracy” and BPAC, scorecard applied to the validation sample

Score	Inclusion:	Undercoverage:	Leakage:	Exclusion:	Total Accuracy	BPAC
	< poverty line correctly targeted	< poverty line mistakenly non-targeted	=> poverty line mistakenly targeted	=> poverty line correctly non-targeted	Inclusion + Exclusion	See text
0–4	0.1	33.2	0.0	66.8	66.8	–99.5
5–9	0.5	32.8	0.0	66.7	67.2	–97.2
10–14	1.8	31.5	0.1	66.7	68.5	–89.2
15–19	4.3	28.9	0.2	66.5	70.9	–73.2
20–24	8.6	24.6	1.0	65.7	74.3	–45.2
25–29	14.4	18.8	3.1	63.7	78.1	–3.9
30–34	20.4	12.8	7.1	59.7	80.1	+44.4
35–39	25.6	7.6	13.6	53.2	78.8	+59.2
40–44	29.6	3.7	23.3	43.5	73.1	+30.0
45–49	31.8	1.5	33.8	32.9	64.7	–1.7
50–54	32.7	0.5	43.2	23.6	56.3	–29.9
55–59	33.1	0.2	50.6	16.1	49.2	–52.3
60–64	33.2	0.1	55.8	10.9	44.1	–68.0
65–69	33.2	0.0	59.9	6.9	40.1	–80.1
70–74	33.2	0.0	62.5	4.3	37.5	–87.9
75–79	33.2	0.0	64.4	2.4	35.6	–93.6
80–84	33.2	0.0	65.5	1.3	34.5	–96.9
85–89	33.2	0.0	66.2	0.5	33.8	–99.2
90–94	33.2	0.0	66.6	0.1	33.4	–100.4
95–100	33.2	0.0	66.8	0.0	33.2	–100.9

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

Figure 12 (National line, new definition): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successful targeted (coverage) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0-4	0.1	97.5	0.2	39.0:1
5-9	0.5	97.4	1.4	36.8:1
10-14	1.8	97.0	5.3	31.8:1
15-19	4.6	94.9	13.1	18.4:1
20-24	9.6	89.2	25.9	8.2:1
25-29	17.5	82.3	43.4	4.6:1
30-34	27.5	74.2	61.5	2.9:1
35-39	39.2	65.4	77.1	1.9:1
40-44	52.8	56.0	88.9	1.3:1
45-49	65.6	48.4	95.6	0.9:1
50-54	75.9	43.1	98.5	0.8:1
55-59	83.7	39.5	99.5	0.7:1
60-64	89.0	37.3	99.8	0.6:1
65-69	93.1	35.7	99.9	0.6:1
70-74	95.7	34.7	100.0	0.5:1
75-79	97.6	34.1	100.0	0.5:1
80-84	98.7	33.7	100.0	0.5:1
85-89	99.5	33.4	100.0	0.5:1
90-94	99.9	33.3	100.0	0.5:1
95-100	100.0	33.2	100.0	0.5:1

**Tables for
the Food Poverty Line,
New Definition**

Figure 4 (Food line, new definition): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0-4	88.7
5-9	79.7
10-14	74.9
15-19	57.2
20-24	42.2
25-29	28.8
30-34	17.5
35-39	9.2
40-44	5.6
45-49	2.6
50-54	1.0
55-59	0.6
60-64	0.4
65-69	0.1
70-74	0.0
75-79	0.0
80-84	0.1
85-89	0.0
90-94	0.0
95-100	0.0

Figure 7 (Food line, new definition): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16,384$) with confidence intervals, scorecard applied to the validation sample

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	-1.2	13.5	14.9	20.2
5-9	-7.5	8.8	10.5	13.5
10-14	+6.7	6.8	7.9	10.0
15-19	-10.2	7.4	7.9	8.9
20-24	+0.5	3.7	4.5	5.8
25-29	+2.2	2.6	3.1	4.2
30-34	-0.5	2.1	2.6	3.3
35-39	-2.4	2.1	2.3	3.1
40-44	+0.0	1.0	1.3	1.7
45-49	+0.0	0.8	1.0	1.3
50-54	-0.2	0.6	0.7	0.9
55-59	+0.4	0.2	0.2	0.3
60-64	+0.2	0.2	0.2	0.3
65-69	-0.3	0.6	0.6	0.8
70-74	+0.0	0.0	0.0	0.0
75-79	+0.0	0.0	0.0	0.0
80-84	+0.1	0.0	0.0	0.0
85-89	+0.0	0.0	0.0	0.0
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

Figure 8 (Food line, new definition): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, scorecard applied to the validation sample

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	+0.6	53.4	62.4	80.2
4	-0.8	29.1	37.0	51.7
8	-0.9	21.0	26.2	35.2
16	-0.8	15.4	18.9	27.3
32	-0.4	11.0	13.5	17.8
64	-0.3	7.9	9.4	12.8
128	-0.3	5.6	6.9	8.8
256	-0.5	4.2	5.0	6.6
512	-0.4	3.0	3.6	4.6
1,024	-0.4	2.1	2.5	3.4
2,048	-0.4	1.5	1.7	2.3
4,096	-0.4	1.0	1.2	1.6
8,192	-0.4	0.7	0.9	1.1
16,384	-0.4	0.5	0.6	0.8

Figure 11 (Food line, new definition): Households by targeting classification and score, along with “Total Accuracy” and BPAC, scorecard applied to the validation sample

Score	Inclusion:	Undercoverage:	Leakage:	Exclusion:	Total Accuracy	BPAC
	< poverty line correctly targeted	< poverty line mistakenly non-targeted	=> poverty line mistakenly targeted	=> poverty line correctly non-targeted	Inclusion + Exclusion	See text
0–4	0.1	11.4	0.0	88.5	88.6	–98.7
5–9	0.4	11.0	0.1	88.5	88.9	–92.3
10–14	1.4	10.1	0.4	88.1	89.5	–72.1
15–19	3.1	8.4	1.5	87.0	90.1	–33.2
20–24	5.2	6.3	4.5	84.1	89.3	+29.5
25–29	7.4	4.1	10.1	78.4	85.8	+11.5
30–34	9.1	2.3	18.4	70.1	79.2	–61.0
35–39	10.3	1.2	28.9	59.6	69.9	–152.7
40–44	11.0	0.5	41.8	46.7	57.7	–265.3
45–49	11.3	0.2	54.3	34.2	45.5	–374.4
50–54	11.4	0.1	64.5	24.0	35.4	–463.7
55–59	11.4	0.0	72.3	16.3	27.7	–531.3
60–64	11.4	0.0	77.6	11.0	22.4	–577.8
65–69	11.4	0.0	81.6	6.9	18.4	–613.2
70–74	11.4	0.0	84.2	4.3	15.8	–635.9
75–79	11.4	0.0	86.1	2.4	13.9	–652.5
80–84	11.4	0.0	87.2	1.3	12.8	–662.2
85–89	11.4	0.0	88.0	0.5	12.0	–668.9
90–94	11.4	0.0	88.4	0.1	11.6	–672.3
95–100	11.4	0.0	88.6	0.0	11.4	–673.6

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

Figure 12 (Food line, new definition): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successful targeted (coverage) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0-4	0.1	88.5	0.6	7.7:1
5-9	0.5	86.9	3.6	6.6:1
10-14	1.8	75.6	12.0	3.1:1
15-19	4.6	67.1	26.8	2.0:1
20-24	9.6	53.8	45.3	1.2:1
25-29	17.5	42.2	64.5	0.7:1
30-34	27.5	33.1	79.7	0.5:1
35-39	39.2	26.2	89.6	0.4:1
40-44	52.8	20.8	96.0	0.3:1
45-49	65.6	17.2	98.5	0.2:1
50-54	75.9	15.0	99.5	0.2:1
55-59	83.7	13.6	99.7	0.2:1
60-64	89.0	12.8	99.9	0.1:1
65-69	93.1	12.3	100.0	0.1:1
70-74	95.7	12.0	100.0	0.1:1
75-79	97.6	11.7	100.0	0.1:1
80-84	98.7	11.6	100.0	0.1:1
85-89	99.5	11.5	100.0	0.1:1
90-94	99.9	11.5	100.0	0.1:1
95-100	100.0	11.4	100.0	0.1:1

**Tables for
150% of the National Poverty Line,
New Definition**

**Figure 4 (150% of the national line, new definition):
 Estimated poverty likelihoods associated with scores**

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0-4	96.2
5-9	100.0
10-14	98.3
15-19	98.7
20-24	95.1
25-29	90.4
30-34	81.9
35-39	70.8
40-44	54.3
45-49	41.7
50-54	26.1
55-59	14.5
60-64	7.7
65-69	3.8
70-74	1.5
75-79	0.4
80-84	0.2
85-89	0.0
90-94	0.0
95-100	0.0

Figure 7 (150% of the national line, new definition):
Bootstrapped differences between estimated and true
poverty likelihoods for households in a large sample
($n = 16,384$) with confidence intervals, scorecard
applied to the validation sample

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	-3.8	1.9	1.9	1.9
5-9	+0.0	0.0	0.0	0.0
10-14	-1.1	0.9	0.9	1.0
15-19	+1.5	1.5	1.8	2.2
20-24	-0.6	1.5	1.8	2.3
25-29	+0.6	1.8	2.1	2.7
30-34	+0.9	2.2	2.6	3.3
35-39	+1.7	2.3	2.8	3.7
40-44	+2.9	2.3	2.7	3.8
45-49	+4.1	2.3	2.8	3.8
50-54	+2.9	2.1	2.4	3.4
55-59	-0.3	2.3	2.8	3.7
60-64	-0.0	1.9	2.4	3.5
65-69	+0.1	1.4	1.6	2.0
70-74	-0.1	1.2	1.4	1.8
75-79	-0.4	0.9	1.0	1.3
80-84	-1.3	1.8	2.0	2.7
85-89	-0.5	1.0	1.1	1.5
90-94	-0.1	0.3	0.3	0.5
95-100	+0.0	0.0	0.0	0.0

**Figure 8 (150% of the national line, new definition):
Differences and precision of differences for
bootstrapped estimates of poverty rates for groups of
households at a point in time, by sample size,
scorecard applied to the validation sample**

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	+1.8	64.6	64.6	88.0
4	+0.9	37.6	45.4	62.6
8	+1.6	27.2	32.5	44.7
16	+1.4	19.7	24.3	33.2
32	+1.4	14.0	16.6	22.2
64	+1.5	10.6	12.7	16.9
128	+1.5	7.5	8.9	11.2
256	+1.5	5.2	6.0	7.9
512	+1.5	3.7	4.5	5.7
1,024	+1.6	2.6	3.1	4.2
2,048	+1.5	1.9	2.3	3.0
4,096	+1.5	1.3	1.5	2.2
8,192	+1.5	0.9	1.1	1.5
16,384	+1.5	0.6	0.8	1.1

Figure 11 (150% of the national line, new definition): Households by targeting classification and score, along with “Total Accuracy” and BPAC, scorecard applied to the validation sample

Score	Inclusion:	Undercoverage:	Leakage:	Exclusion:	Total Accuracy	BPAC
	< poverty line correctly targeted	< poverty line mistakenly non-targeted	=> poverty line mistakenly targeted	=> poverty line correctly non-targeted	Inclusion + Exclusion	See text
0-4	0.1	49.8	0.0	50.1	50.2	-99.7
5-9	0.5	49.4	0.0	50.1	50.6	-98.1
10-14	1.8	48.1	0.0	50.1	51.9	-92.7
15-19	4.5	45.4	0.1	50.0	54.5	-81.8
20-24	9.3	40.6	0.3	49.8	59.1	-62.0
25-29	16.4	33.5	1.1	49.0	65.4	-32.1
30-34	24.6	25.3	2.9	47.2	71.8	+4.6
35-39	32.8	17.1	6.3	43.8	76.6	+44.3
40-44	40.3	9.6	12.5	37.6	77.9	+74.9
45-49	45.4	4.5	20.2	29.9	75.2	+59.5
50-54	48.0	1.9	27.9	22.2	70.2	+44.1
55-59	49.2	0.7	34.5	15.6	64.8	+30.9
60-64	49.7	0.3	39.4	10.7	60.4	+21.1
65-69	49.8	0.1	43.3	6.8	56.7	+13.3
70-74	49.9	0.0	45.8	4.3	54.2	+8.2
75-79	49.9	0.0	47.7	2.4	52.3	+4.4
80-84	49.9	0.0	48.8	1.3	51.2	+2.2
85-89	49.9	0.0	49.6	0.5	50.4	+0.7
90-94	49.9	0.0	49.9	0.1	50.1	-0.1
95-100	49.9	0.0	50.1	0.0	49.9	-0.4

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

Figure 12 (150% of the national line, new definition): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successful targeted (coverage) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0-4	0.1	99.8	0.2	608.7:1
5-9	0.5	100.0	0.9	3,537.0:1
10-14	1.8	99.3	3.6	136.2:1
15-19	4.6	98.0	9.0	48.9:1
20-24	9.6	96.7	18.7	29.8:1
25-29	17.5	93.6	32.8	14.6:1
30-34	27.5	89.5	49.4	8.5:1
35-39	39.2	83.8	65.8	5.2:1
40-44	52.8	76.3	80.8	3.2:1
45-49	65.6	69.2	90.9	2.2:1
50-54	75.9	63.2	96.2	1.7:1
55-59	83.7	58.8	98.6	1.4:1
60-64	89.0	55.8	99.5	1.3:1
65-69	93.1	53.5	99.8	1.2:1
70-74	95.7	52.1	99.9	1.1:1
75-79	97.6	51.1	100.0	1.0:1
80-84	98.7	50.6	100.0	1.0:1
85-89	99.5	50.2	100.0	1.0:1
90-94	99.9	50.0	100.0	1.0:1
95-100	100.0	49.9	100.0	1.0:1

**Tables for
200% of the National Poverty Line,
New Definition**

**Figure 4 (200% of the national line, new definition):
 Estimated poverty likelihoods associated with scores**

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0-4	96.2
5-9	100.0
10-14	99.3
15-19	99.7
20-24	98.4
25-29	95.7
30-34	91.4
35-39	83.2
40-44	70.7
45-49	60.7
50-54	43.9
55-59	31.4
60-64	19.8
65-69	11.5
70-74	4.2
75-79	2.6
80-84	1.3
85-89	0.3
90-94	0.0
95-100	0.0

Figure 7 (200% of the national line, new definition):
Bootstrapped differences between estimated and true
poverty likelihoods for households in a large sample
($n = 16,384$) with confidence intervals, scorecard
applied to the validation sample

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	-3.8	1.9	1.9	1.9
5-9	+0.0	0.0	0.0	0.0
10-14	-0.5	0.4	0.4	0.5
15-19	+1.1	1.1	1.3	1.7
20-24	+0.8	1.2	1.5	1.8
25-29	+0.0	1.1	1.3	1.7
30-34	+0.9	1.7	2.1	2.7
35-39	+0.6	1.9	2.3	3.0
40-44	+1.4	2.1	2.6	3.5
45-49	+4.6	2.4	2.9	3.7
50-54	+2.9	2.5	3.0	3.9
55-59	-0.5	2.8	3.3	4.2
60-64	+1.5	2.8	3.5	4.4
65-69	+0.7	2.4	2.8	3.6
70-74	+1.0	1.6	1.9	2.4
75-79	+1.4	1.1	1.2	1.8
80-84	-0.3	1.8	2.2	2.8
85-89	-0.7	1.5	1.7	2.2
90-94	-0.1	0.3	0.4	0.5
95-100	+0.0	0.0	0.0	0.0

**Figure 8 (200% of the national line, new definition):
Differences and precision of differences for
bootstrapped estimates of poverty rates for groups of
households at a point in time, by sample size,
scorecard applied to the validation sample**

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	+2.6	63.4	75.9	85.8
4	+0.7	38.3	45.4	61.0
8	+1.7	28.6	32.9	41.6
16	+1.3	20.2	24.5	32.4
32	+1.2	14.2	17.0	21.2
64	+1.2	10.3	12.1	16.0
128	+1.3	7.4	8.7	11.8
256	+1.4	5.3	6.1	7.6
512	+1.4	3.5	4.3	5.5
1,024	+1.4	2.5	3.0	3.9
2,048	+1.4	1.8	2.2	2.7
4,096	+1.4	1.3	1.6	2.2
8,192	+1.4	0.9	1.1	1.5
16,384	+1.4	0.7	0.8	1.0

Figure 11 (200% of the national line, new definition): Households by targeting classification and score, along with “Total Accuracy” and BPAC, scorecard applied to the validation sample

Score	Inclusion:	Undercoverage:	Leakage:	Exclusion:	Total Accuracy	BPAC
	< poverty line correctly targeted	< poverty line mistakenly non-targeted	=> poverty line mistakenly targeted	=> poverty line correctly non-targeted	Inclusion + Exclusion	See text
0–4	0.1	62.1	0.0	37.9	37.9	–99.7
5–9	0.5	61.7	0.0	37.9	38.3	–98.5
10–14	1.8	60.3	0.0	37.9	39.7	–94.1
15–19	4.5	57.6	0.0	37.8	42.4	–85.3
20–24	9.5	52.6	0.1	37.7	47.2	–69.2
25–29	17.0	45.1	0.5	37.4	54.4	–44.4
30–34	26.2	36.0	1.4	36.5	62.7	–13.6
35–39	35.9	26.3	3.3	34.5	70.4	+20.8
40–44	45.6	16.5	7.2	30.7	76.3	+58.4
45–49	53.3	8.9	12.3	25.5	78.8	+80.2
50–54	57.9	4.2	18.0	19.8	77.8	+71.0
55–59	60.5	1.7	23.2	14.6	75.1	+62.6
60–64	61.5	0.7	27.5	10.3	71.8	+55.7
65–69	62.0	0.2	31.1	6.7	68.7	+49.9
70–74	62.1	0.1	33.6	4.3	66.3	+45.9
75–79	62.1	0.0	35.5	2.4	64.5	+42.9
80–84	62.1	0.0	36.6	1.3	63.4	+41.2
85–89	62.1	0.0	37.3	0.5	62.7	+40.0
90–94	62.1	0.0	37.7	0.1	62.3	+39.3
95–100	62.1	0.0	37.9	0.0	62.1	+39.1

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

Figure 12 (200% of the national line, new definition): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successful targeted (coverage) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0-4	0.1	99.8	0.1	608.7:1
5-9	0.5	100.0	0.8	3,537.0:1
10-14	1.8	99.7	2.9	333.9:1
15-19	4.6	99.2	7.3	120.0:1
20-24	9.6	98.6	15.3	71.3:1
25-29	17.5	97.1	27.4	33.7:1
30-34	27.5	95.0	42.1	19.1:1
35-39	39.2	91.5	57.7	10.8:1
40-44	52.8	86.4	73.5	6.4:1
45-49	65.6	81.2	85.7	4.3:1
50-54	75.9	76.3	93.2	3.2:1
55-59	83.7	72.2	97.3	2.6:1
60-64	89.0	69.1	98.9	2.2:1
65-69	93.1	66.6	99.7	2.0:1
70-74	95.7	64.9	99.9	1.8:1
75-79	97.6	63.7	100.0	1.8:1
80-84	98.7	63.0	100.0	1.7:1
85-89	99.5	62.5	100.0	1.7:1
90-94	99.9	62.2	100.0	1.6:1
95-100	100.0	62.1	100.0	1.6:1

**Tables for
USAID “Extreme” Poverty Line,
New Definition**

**Figure 4 (USAID “extreme” line, new definition):
 Estimated poverty likelihoods associated with scores**

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	88.8
5–9	83.0
10–14	78.8
15–19	63.9
20–24	51.8
25–29	40.2
30–34	27.6
35–39	16.3
40–44	9.9
45–49	4.9
50–54	2.2
55–59	1.2
60–64	0.7
65–69	0.2
70–74	0.0
75–79	0.0
80–84	0.1
85–89	0.0
90–94	0.0
95–100	0.0

Figure 7 (USAID “extreme” line, new definition):

Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16,384$) with confidence intervals, scorecard applied to the validation sample

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	-1.4	13.4	14.7	19.4
5-9	-3.5	9.0	10.7	13.5
10-14	+7.4	6.2	7.3	10.0
15-19	-4.2	4.7	5.6	7.3
20-24	+4.4	3.8	4.6	5.9
25-29	+3.5	2.9	3.4	4.7
30-34	+2.7	2.4	2.8	3.6
35-39	-1.7	2.1	2.5	3.3
40-44	+1.1	1.3	1.6	2.0
45-49	-0.4	1.2	1.4	1.9
50-54	+0.4	0.7	0.8	1.1
55-59	-0.0	0.6	0.8	1.0
60-64	+0.3	0.3	0.4	0.5
65-69	-0.2	0.6	0.6	0.9
70-74	-0.3	0.5	0.6	0.7
75-79	-0.1	0.2	0.3	0.4
80-84	+0.1	0.0	0.0	0.0
85-89	+0.0	0.0	0.0	0.0
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

**Figure 8 (USAID “extreme” line, new definition):
Differences and precision of differences for
bootstrapped estimates of poverty rates for groups of
households at a point in time, by sample size,
scorecard applied to the validation sample**

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	+1.3	56.3	67.7	79.5
4	+0.1	33.1	40.6	55.4
8	+0.4	24.1	29.0	39.6
16	+0.5	17.4	20.1	28.2
32	+0.8	12.4	15.0	19.5
64	+1.0	9.1	10.7	14.4
128	+0.9	6.3	7.7	10.1
256	+0.7	4.6	5.4	6.9
512	+0.7	3.3	4.0	5.1
1,024	+0.7	2.4	2.8	3.7
2,048	+0.7	1.6	2.0	2.6
4,096	+0.7	1.1	1.3	1.8
8,192	+0.7	0.8	0.9	1.2
16,384	+0.7	0.6	0.7	0.9

Figure 11 (USAID “extreme” line, new definition): Households by targeting classification and score, along with “Total Accuracy” and BPAC, scorecard applied to the validation sample

Score	Inclusion:	Undercoverage:	Leakage:	Exclusion:	Total Accuracy	BPAC
	< poverty line correctly targeted	< poverty line mistakenly non-targeted	=> poverty line mistakenly targeted	=> poverty line non-targeted	Inclusion + Exclusion	See text
0–4	0.1	15.9	0.0	84.0	84.1	–99.0
5–9	0.4	15.6	0.1	84.0	84.4	–94.5
10–14	1.4	14.6	0.4	83.6	85.0	–79.7
15–19	3.3	12.7	1.3	82.7	86.0	–50.8
20–24	5.9	10.1	3.8	80.2	86.1	–3.1
25–29	9.0	7.0	8.5	75.5	84.4	+46.5
30–34	11.7	4.3	15.9	68.1	79.8	+0.8
35–39	13.7	2.3	25.5	58.5	72.2	–59.5
40–44	15.0	1.0	37.8	46.2	61.2	–136.4
45–49	15.6	0.4	50.0	34.1	49.7	–212.5
50–54	15.8	0.1	60.1	23.9	39.8	–275.8
55–59	15.9	0.1	67.7	16.3	32.2	–323.7
60–64	16.0	0.0	73.1	11.0	26.9	–356.9
65–69	16.0	0.0	77.1	6.9	22.9	–382.3
70–74	16.0	0.0	79.7	4.3	20.3	–398.5
75–79	16.0	0.0	81.6	2.4	18.4	–410.4
80–84	16.0	0.0	82.7	1.3	17.3	–417.3
85–89	16.0	0.0	83.5	0.5	16.5	–422.1
90–94	16.0	0.0	83.9	0.1	16.1	–424.5
95–100	16.0	0.0	84.0	0.0	16.0	–425.4

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

Figure 12 (USAID “extreme” line, new definition): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successful targeted (coverage) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0-4	0.1	89.6	0.5	8.7:1
5-9	0.5	87.5	2.6	7.0:1
10-14	1.8	77.8	8.9	3.5:1
15-19	4.6	71.9	20.6	2.6:1
20-24	9.6	60.8	36.6	1.5:1
25-29	17.5	51.2	56.1	1.0:1
30-34	27.5	42.4	73.0	0.7:1
35-39	39.2	34.9	85.6	0.5:1
40-44	52.8	28.4	93.9	0.4:1
45-49	65.6	23.8	97.7	0.3:1
50-54	75.9	20.9	99.1	0.3:1
55-59	83.7	19.0	99.7	0.2:1
60-64	89.0	17.9	99.9	0.2:1
65-69	93.1	17.2	99.9	0.2:1
70-74	95.7	16.7	100.0	0.2:1
75-79	97.6	16.4	100.0	0.2:1
80-84	98.7	16.2	100.0	0.2:1
85-89	99.5	16.1	100.0	0.2:1
90-94	99.9	16.0	100.0	0.2:1
95-100	100.0	16.0	100.0	0.2:1

**Tables for
\$1.25/day 2005 PPP Poverty Line,
New Definition**

Figure 4 (\$1.25/day 2005 PPP line, new definition):
Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0-4	62.8
5-9	49.8
10-14	46.1
15-19	28.4
20-24	19.6
25-29	12.8
30-34	7.4
35-39	3.8
40-44	2.3
45-49	1.3
50-54	0.6
55-59	0.4
60-64	0.3
65-69	0.0
70-74	0.0
75-79	0.0
80-84	0.1
85-89	0.0
90-94	0.0
95-100	0.0

Figure 7 (\$1.25/day 2005 PPP line, new definition):
Bootstrapped differences between estimated and true
poverty likelihoods for households in a large sample
($n = 16,384$) with confidence intervals, scorecard
applied to the validation sample

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	-11.1	23.0	28.4	33.0
5-9	+6.1	13.0	15.2	21.0
10-14	+15.7	6.3	7.1	9.2
15-19	-1.7	4.6	5.3	7.3
20-24	-1.3	3.3	3.9	5.2
25-29	+0.7	1.9	2.3	3.1
30-34	-0.9	1.5	1.7	2.2
35-39	-1.5	1.4	1.6	2.1
40-44	-0.9	0.9	1.1	1.4
45-49	-0.2	0.7	0.8	1.0
50-54	-0.3	0.6	0.7	0.9
55-59	+0.3	0.2	0.2	0.3
60-64	+0.1	0.2	0.2	0.3
65-69	-0.4	0.6	0.6	0.8
70-74	+0.0	0.0	0.0	0.0
75-79	+0.0	0.0	0.0	0.0
80-84	+0.1	0.0	0.0	0.0
85-89	+0.0	0.0	0.0	0.0
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

**Figure 8 (\$1.25/day 2005 PPP line, new definition):
Differences and precision of differences for
bootstrapped estimates of poverty rates for groups of
households at a point in time, by sample size,
scorecard applied to the validation sample**

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	+0.0	36.8	57.8	71.2
4	-0.4	24.3	31.3	43.1
8	-0.3	17.2	21.5	31.6
16	-0.3	11.7	15.3	22.7
32	-0.2	8.7	10.6	14.1
64	-0.2	6.3	7.6	10.6
128	-0.2	4.6	5.6	7.3
256	-0.3	3.2	3.8	5.0
512	-0.2	2.3	2.8	3.5
1,024	-0.3	1.7	1.9	2.5
2,048	-0.2	1.2	1.4	1.8
4,096	-0.2	0.8	0.9	1.2
8,192	-0.2	0.6	0.7	0.9
16,384	-0.2	0.4	0.5	0.6

Figure 11 (\$1.25/day 2005 PPP line, new definition): Households by targeting classification and score, along with “Total Accuracy” and BPAC, scorecard applied to the validation sample

Score	Inclusion:	Undercoverage:	Leakage:	Exclusion:	Total Accuracy	BPAC
	< poverty line correctly targeted	< poverty line mistakenly non-targeted	=> poverty line mistakenly targeted	=> poverty line correctly non-targeted	Inclusion + Exclusion	See text
0-4	0.1	5.5	0.0	94.5	94.5	-97.5
5-9	0.3	5.3	0.2	94.3	94.5	-86.6
10-14	0.7	4.8	1.1	93.4	94.1	-53.5
15-19	1.6	3.9	3.0	91.5	93.1	+11.5
20-24	2.6	2.9	7.0	87.4	90.0	-27.6
25-29	3.6	1.9	13.9	80.6	84.2	-152.2
30-34	4.4	1.1	23.2	71.3	75.7	-319.4
35-39	4.9	0.6	34.3	60.2	65.1	-521.3
40-44	5.3	0.3	47.6	46.9	52.2	-761.6
45-49	5.4	0.1	60.2	34.3	39.7	-990.2
50-54	5.5	0.0	70.4	24.0	29.5	-1,176.2
55-59	5.5	0.0	78.2	16.3	21.8	-1,316.6
60-64	5.5	0.0	83.5	11.0	16.5	-1,413.0
65-69	5.5	0.0	87.6	6.9	12.4	-1,486.6
70-74	5.5	0.0	90.2	4.3	9.8	-1,533.6
75-79	5.5	0.0	92.1	2.4	7.9	-1,568.1
80-84	5.5	0.0	93.2	1.3	6.8	-1,588.0
85-89	5.5	0.0	93.9	0.5	6.1	-1,601.9
90-94	5.5	0.0	94.3	0.1	5.7	-1,609.1
95-100	5.5	0.0	94.5	0.0	5.5	-1,611.7

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

Figure 12 (\$1.25/day 2005 PPP line, new definition): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successful targeted (coverage) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0-4	0.1	72.0	1.1	2.6:1
5-9	0.5	57.0	4.9	1.3:1
10-14	1.8	40.8	13.5	0.7:1
15-19	4.6	34.4	28.6	0.5:1
20-24	9.6	26.9	47.0	0.4:1
25-29	17.5	20.5	65.2	0.3:1
30-34	27.5	15.9	79.6	0.2:1
35-39	39.2	12.5	88.5	0.1:1
40-44	52.8	9.9	95.2	0.1:1
45-49	65.6	8.2	98.0	0.1:1
50-54	75.9	7.2	99.2	0.1:1
55-59	83.7	6.6	99.5	0.1:1
60-64	89.0	6.2	99.8	0.1:1
65-69	93.1	5.9	100.0	0.1:1
70-74	95.7	5.8	100.0	0.1:1
75-79	97.6	5.7	100.0	0.1:1
80-84	98.7	5.6	100.0	0.1:1
85-89	99.5	5.5	100.0	0.1:1
90-94	99.9	5.5	100.0	0.1:1
95-100	100.0	5.5	100.0	0.1:1

**Tables for
\$2.50/day 2005 PPP Poverty Line,
New Definition**

**Figure 4 (\$2.50/day 2005 PPP line, new definition):
 Estimated poverty likelihoods associated with scores**

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0-4	90.7
5-9	84.7
10-14	84.5
15-19	67.8
20-24	56.5
25-29	43.2
30-34	29.3
35-39	17.9
40-44	10.4
45-49	5.1
50-54	2.5
55-59	1.1
60-64	0.6
65-69	0.2
70-74	0.0
75-79	0.1
80-84	0.1
85-89	0.0
90-94	0.0
95-100	0.0

Figure 5 (\$2.50/day 2005 PPP line, new definition):
Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16,384$) with confidence intervals, scorecard applied to the validation sample

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	+0.6	13.4	14.7	19.4
5-9	-4.1	8.5	10.0	13.1
10-14	+6.6	5.8	7.2	9.3
15-19	-8.9	6.5	6.9	7.7
20-24	+4.8	3.8	4.7	6.3
25-29	+3.2	3.1	3.6	4.7
30-34	+1.5	2.5	3.0	3.9
35-39	-1.4	2.1	2.5	3.5
40-44	+1.2	1.3	1.6	2.1
45-49	-0.4	1.2	1.4	1.9
50-54	+0.4	0.8	0.9	1.1
55-59	+0.1	0.6	0.7	1.0
60-64	+0.3	0.3	0.3	0.4
65-69	-0.2	0.6	0.6	0.9
70-74	+0.0	0.0	0.0	0.0
75-79	-0.1	0.2	0.3	0.4
80-84	+0.1	0.0	0.0	0.0
85-89	+0.0	0.0	0.0	0.0
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

**Figure 8 (\$2.50/day 2005 PPP line, new definition):
Differences and precision of differences for
bootstrapped estimates of poverty rates for groups of
households at a point in time, by sample size,
scorecard applied to the validation sample**

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	+2.0	56.9	69.3	81.4
4	+0.3	33.2	40.7	57.1
8	+0.2	23.9	30.2	40.2
16	+0.2	17.7	21.6	29.2
32	+0.5	13.1	15.3	20.0
64	+0.8	9.2	11.0	14.2
128	+0.7	6.6	7.6	10.4
256	+0.5	4.8	5.7	7.7
512	+0.5	3.4	4.0	5.2
1,024	+0.5	2.3	2.8	3.8
2,048	+0.5	1.7	2.0	2.6
4,096	+0.5	1.2	1.3	1.7
8,192	+0.5	0.8	1.0	1.3
16,384	+0.5	0.6	0.7	0.9

Figure 11 (\$2.50/day 2005 PPP line, new definition): Households by targeting classification and score, along with “Total Accuracy” and BPAC, scorecard applied to the validation sample

Score	Inclusion:	Undercoverage:	Leakage:	Exclusion:	Total Accuracy	BPAC
	< poverty line correctly targeted	< poverty line mistakenly non-targeted	=> poverty line mistakenly targeted	=> poverty line correctly non-targeted	Inclusion + Exclusion	See text
0–4	0.1	16.9	0.0	83.0	83.1	–99.1
5–9	0.4	16.5	0.0	83.0	83.4	–94.7
10–14	1.5	15.4	0.3	82.7	84.2	–80.4
15–19	3.5	13.4	1.0	82.0	85.5	–52.2
20–24	6.3	10.6	3.3	79.7	86.0	–5.9
25–29	9.7	7.3	7.8	75.2	84.9	+53.8
30–34	12.5	4.4	15.0	68.1	80.6	+11.5
35–39	14.6	2.3	24.6	58.5	73.1	–44.9
40–44	16.0	1.0	36.9	46.2	62.2	–117.4
45–49	16.6	0.4	49.0	34.1	50.6	–189.0
50–54	16.8	0.1	59.1	24.0	40.8	–248.6
55–59	16.9	0.0	66.8	16.3	33.2	–294.0
60–64	16.9	0.0	72.1	11.0	27.9	–325.3
65–69	16.9	0.0	76.1	6.9	23.9	–349.2
70–74	16.9	0.0	78.7	4.3	21.3	–364.5
75–79	17.0	0.0	80.6	2.4	19.4	–375.7
80–84	17.0	0.0	81.7	1.3	18.3	–382.2
85–89	17.0	0.0	82.5	0.5	17.5	–386.8
90–94	17.0	0.0	82.9	0.1	17.1	–389.1
95–100	17.0	0.0	83.0	0.0	17.0	–390.0

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

Figure 12 (\$2.50/day 2005 PPP line, new definition): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successful targeted (coverage) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0-4	0.1	89.6	0.4	8.7:1
5-9	0.5	89.4	2.5	8.4:1
10-14	1.8	82.8	8.9	4.8:1
15-19	4.6	77.1	20.8	3.4:1
20-24	9.6	65.5	37.3	1.9:1
25-29	17.5	55.3	57.1	1.2:1
30-34	27.5	45.5	74.0	0.8:1
35-39	39.2	37.3	86.2	0.6:1
40-44	52.8	30.2	94.1	0.4:1
45-49	65.6	25.3	97.9	0.3:1
50-54	75.9	22.2	99.2	0.3:1
55-59	83.7	20.2	99.7	0.3:1
60-64	89.0	19.0	99.9	0.2:1
65-69	93.1	18.2	100.0	0.2:1
70-74	95.7	17.7	100.0	0.2:1
75-79	97.6	17.4	100.0	0.2:1
80-84	98.7	17.2	100.0	0.2:1
85-89	99.5	17.0	100.0	0.2:1
90-94	99.9	17.0	100.0	0.2:1
95-100	100.0	17.0	100.0	0.2:1

**Tables for
\$3.75/day 2005 PPP Poverty Line,
New Definition**

**Figure 4 (\$3.75/day 2005 PPP line, new definition):
 Estimated poverty likelihoods associated with scores**

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0-4	96.2
5-9	97.6
10-14	94.8
15-19	90.5
20-24	81.6
25-29	68.4
30-34	56.3
35-39	39.8
40-44	25.3
45-49	14.4
50-54	6.7
55-59	3.3
60-64	1.3
65-69	0.8
70-74	0.2
75-79	0.2
80-84	0.1
85-89	0.0
90-94	0.0
95-100	0.0

Figure 7 (\$3.75/day 2005 PPP line, new definition):
Bootstrapped differences between estimated and true
poverty likelihoods for households in a large sample
($n = 16,384$) with confidence intervals, scorecard
applied to the validation sample

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	+2.8	10.6	11.7	17.1
5-9	+2.7	6.5	7.8	10.5
10-14	-2.2	1.9	2.1	3.1
15-19	-1.6	2.5	3.1	4.0
20-24	+3.2	3.2	3.8	5.0
25-29	-0.2	2.9	3.4	4.5
30-34	+3.8	2.8	3.3	4.1
35-39	+1.2	2.4	2.8	3.6
40-44	+2.6	1.9	2.2	3.1
45-49	-0.4	1.7	2.1	2.8
50-54	+0.4	1.2	1.4	1.9
55-59	-0.2	1.2	1.3	1.7
60-64	+0.0	0.9	1.0	1.3
65-69	+0.2	0.6	0.8	1.0
70-74	-0.2	0.5	0.7	0.8
75-79	+0.1	0.2	0.3	0.4
80-84	+0.1	0.1	0.1	0.1
85-89	-0.5	0.9	1.1	1.5
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

**Figure 8 (\$3.75/day 2005 PPP line, new definition):
Differences and precision of differences for
bootstrapped estimates of poverty rates for groups of
households at a point in time, by sample size,
scorecard applied to the validation sample**

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	+1.7	65.5	74.3	87.5
4	+0.1	36.7	44.6	57.7
8	+0.6	27.8	32.5	43.8
16	+0.5	19.4	23.4	30.5
32	+1.0	14.4	17.1	20.8
64	+1.2	9.8	11.6	14.7
128	+1.2	7.0	8.3	10.2
256	+1.0	5.0	5.9	8.0
512	+1.1	3.6	4.3	5.8
1,024	+1.0	2.6	3.0	4.2
2,048	+1.0	1.8	2.0	2.6
4,096	+1.0	1.2	1.5	1.9
8,192	+1.0	0.9	1.1	1.3
16,384	+1.0	0.6	0.7	1.0

Figure 11 (\$3.75/day 2005 PPP line, new definition): Households by targeting classification and score, along with “Total Accuracy” and BPAC, scorecard applied to the validation sample

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	0.1	30.0	0.0	69.9	70.0	–99.5
5–9	0.5	29.7	0.0	69.9	70.3	–96.9
10–14	1.7	28.4	0.1	69.8	71.6	–88.1
15–19	4.3	25.8	0.3	69.6	73.9	–70.6
20–24	8.3	21.8	1.3	68.6	76.9	–40.3
25–29	13.8	16.3	3.7	66.2	80.0	+4.0
30–34	19.3	10.9	8.3	61.6	80.9	+55.4
35–39	23.8	6.3	15.4	54.5	78.4	+49.0
40–44	27.2	2.9	25.6	44.3	71.4	+14.8
45–49	29.0	1.1	36.6	33.3	62.3	–21.5
50–54	29.7	0.4	46.2	23.7	53.4	–53.5
55–59	30.0	0.1	53.7	16.2	46.2	–78.4
60–64	30.1	0.0	59.0	10.9	41.0	–95.8
65–69	30.1	0.0	63.0	6.9	37.0	–109.2
70–74	30.1	0.0	65.6	4.3	34.4	–117.8
75–79	30.1	0.0	67.5	2.4	32.5	–124.1
80–84	30.1	0.0	68.6	1.3	31.4	–127.8
85–89	30.1	0.0	69.3	0.5	30.7	–130.3
90–94	30.1	0.0	69.7	0.1	30.3	–131.6
95–100	30.1	0.0	69.9	0.0	30.1	–132.1

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

Figure 12 (\$3.75/day 2005 PPP line, new definition): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successful targeted (coverage) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0-4	0.1	94.0	0.3	15.8:1
5-9	0.5	96.8	1.5	29.8:1
10-14	1.8	96.0	5.8	24.1:1
15-19	4.6	93.3	14.2	14.0:1
20-24	9.6	86.4	27.7	6.4:1
25-29	17.5	78.8	45.8	3.7:1
30-34	27.5	69.9	64.0	2.3:1
35-39	39.2	60.8	79.1	1.6:1
40-44	52.8	51.5	90.2	1.1:1
45-49	65.6	44.2	96.3	0.8:1
50-54	75.9	39.1	98.7	0.6:1
55-59	83.7	35.8	99.6	0.6:1
60-64	89.0	33.8	99.8	0.5:1
65-69	93.1	32.3	99.9	0.5:1
70-74	95.7	31.5	100.0	0.5:1
75-79	97.6	30.8	100.0	0.4:1
80-84	98.7	30.5	100.0	0.4:1
85-89	99.5	30.3	100.0	0.4:1
90-94	99.9	30.2	100.0	0.4:1
95-100	100.0	30.1	100.0	0.4:1

**Tables for
\$5.00/day 2005 PPP Poverty Line,
New Definition**

**Figure 4 (\$5.00/day 2005 PPP line, new definition):
 Estimated poverty likelihoods associated with scores**

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0-4	96.2
5-9	99.9
10-14	97.3
15-19	97.3
20-24	91.7
25-29	83.6
30-34	73.7
35-39	59.2
40-44	42.3
45-49	28.6
50-54	16.0
55-59	8.2
60-64	3.9
65-69	1.8
70-74	0.6
75-79	0.3
80-84	0.1
85-89	0.0
90-94	0.0
95-100	0.0

Figure 7 (\$5.00/day 2005 PPP line, new definition):
Bootstrapped differences between estimated and true
poverty likelihoods for households in a large sample
($n = 16,384$) with confidence intervals, scorecard
applied to the validation sample

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	-3.8	1.9	1.9	1.9
5-9	-0.1	0.0	0.0	0.0
10-14	-1.3	1.4	1.7	2.1
15-19	+0.9	1.7	1.9	2.7
20-24	-0.6	2.1	2.5	3.2
25-29	-0.4	2.2	2.6	3.3
30-34	+3.0	2.6	3.1	4.0
35-39	+2.3	2.5	3.0	3.9
40-44	+3.8	2.2	2.6	3.4
45-49	+2.3	2.2	2.5	3.3
50-54	+2.0	1.7	2.1	2.6
55-59	+0.2	1.6	1.9	2.7
60-64	-0.2	1.5	1.7	2.3
65-69	+0.2	0.9	1.1	1.4
70-74	-0.2	0.9	1.0	1.2
75-79	-0.1	0.6	0.7	0.9
80-84	-0.6	1.2	1.5	1.8
85-89	-0.5	1.0	1.1	1.5
90-94	-0.1	0.3	0.3	0.5
95-100	+0.0	0.0	0.0	0.0

**Figure 8 (\$5.00/day 2005 PPP line, new definition):
Differences and precision of differences for
bootstrapped estimates of poverty rates for groups of
households at a point in time, by sample size,
scorecard applied to the validation sample**

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	+1.5	65.3	72.6	91.7
4	+1.2	38.9	46.4	65.8
8	+1.7	27.4	33.1	43.6
16	+1.3	19.7	23.3	32.7
32	+1.7	14.1	17.1	21.9
64	+1.8	10.0	12.0	15.7
128	+1.8	7.3	9.0	11.8
256	+1.7	5.3	6.4	8.7
512	+1.6	3.8	4.6	6.0
1,024	+1.6	2.6	3.1	3.9
2,048	+1.6	1.9	2.3	2.9
4,096	+1.6	1.3	1.6	2.0
8,192	+1.6	0.9	1.1	1.5
16,384	+1.6	0.7	0.8	1.1

Figure 11 (\$5.00/day 2005 PPP line, new definition): Households by targeting classification and score, along with “Total Accuracy” and BPAC, scorecard applied to the validation sample

Score	Inclusion:	Undercoverage:	Leakage:	Exclusion:	Total Accuracy	BPAC
	< poverty line correctly targeted	< poverty line mistakenly non-targeted	=> poverty line mistakenly targeted	=> poverty line correctly non-targeted	Inclusion + Exclusion	See text
0–4	0.1	41.7	0.0	58.3	58.3	–99.6
5–9	0.5	41.3	0.0	58.3	58.7	–97.7
10–14	1.8	39.9	0.0	58.2	60.0	–91.3
15–19	4.5	37.3	0.1	58.1	62.6	–78.4
20–24	9.1	32.6	0.5	57.7	66.9	–55.1
25–29	15.7	26.0	1.8	56.5	72.2	–20.4
30–34	23.1	18.7	4.5	53.8	76.8	+21.2
35–39	29.8	11.9	9.4	48.9	78.7	+65.3
40–44	35.5	6.2	17.3	41.0	76.5	+58.6
45–49	39.0	2.7	26.5	31.7	70.8	+36.4
50–54	40.7	1.0	35.2	23.1	63.8	+15.7
55–59	41.4	0.4	42.3	16.0	57.4	–1.3
60–64	41.6	0.1	47.4	10.9	52.5	–13.6
65–69	41.7	0.0	51.4	6.9	48.6	–23.1
70–74	41.7	0.0	54.0	4.3	46.0	–29.3
75–79	41.7	0.0	55.9	2.4	44.1	–33.8
80–84	41.7	0.0	57.0	1.3	43.0	–36.5
85–89	41.7	0.0	57.7	0.5	42.3	–38.3
90–94	41.7	0.0	58.1	0.1	41.9	–39.2
95–100	41.7	0.0	58.3	0.0	41.7	–39.6

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

Figure 12 (\$5.00/day 2005 PPP line, new definition): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successful targeted (coverage) per non-poor household mistakenly targeted (leakage), scorecard applied to the validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0-4	0.1	99.8	0.2	608.7:1
5-9	0.5	100.0	1.1	3,537.0:1
10-14	1.8	98.7	4.3	76.6:1
15-19	4.6	97.2	10.7	34.8:1
20-24	9.6	94.6	21.8	17.6:1
25-29	17.5	89.7	37.7	8.7:1
30-34	27.5	83.7	55.2	5.1:1
35-39	39.2	76.1	71.4	3.2:1
40-44	52.8	67.2	85.1	2.1:1
45-49	65.6	59.5	93.6	1.5:1
50-54	75.9	53.6	97.6	1.2:1
55-59	83.7	49.5	99.2	1.0:1
60-64	89.0	46.7	99.7	0.9:1
65-69	93.1	44.8	99.9	0.8:1
70-74	95.7	43.6	100.0	0.8:1
75-79	97.6	42.8	100.0	0.7:1
80-84	98.7	42.3	100.0	0.7:1
85-89	99.5	42.0	100.0	0.7:1
90-94	99.9	41.8	100.0	0.7:1
95-100	100.0	41.7	100.0	0.7:1