

Simple Poverty Scorecard[®] Poverty-Assessment Tool Peru

Mark Schreiner

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Abstract

The Simple Poverty Scorecard-brand poverty-assessment tool uses ten low-cost indicators from Peru's 2010 National Household Survey to estimate the likelihood that a household has income below a given poverty line. Field workers can collect responses in about ten minutes. The scorecard's accuracy is reported for a range of poverty lines. The scorecard is a practical way for pro-poor programs in Peru to measure poverty rates, to track changes in poverty rates over time, and to segment clients for targeted services.

Version note

This scorecard uses 2010 data and Peru's new definition of poverty. It replaces Schreiner (2009), which uses 2007 data and Peru's previous definition of poverty. From now on, the new 2010 scorecard here and its new-definition poverty lines should be used. Existing users can still measure change over time using "legacy" poverty lines with a baseline from the 2007 scorecard and a follow-up from the 2010 scorecard.

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Simple Poverty Scorecard® Poverty-Assessment Tool

Interview ID: _____	<u>Name</u> _____	<u>Identifier</u> _____
Interview date: _____	Participant: _____	_____
Country: <u>PER</u>	Field agent: _____	_____
Scorecard: <u>003</u>	Service point: _____	_____
Sampling wgt.: _____	Number of household members: _____	

Indicator	Response	Points	Score
1. How many members does the household have?	A. Seven or more	0	
	B. Six	7	
	C. Five	12	
	D. Four	17	
	E. Three	22	
	F. Two	27	
	G. One	34	
2. In the past week, how many household members ages 14 or older did any work? (not counting household chores)	A. One or none	0	
	B. Two	2	
	C. Three	6	
	D. Four or more	9	
3. What is the highest educational level that the female head/spouse completed?	A. None, pre-school, or kindergarten	0	
	B. Grade school (incomplete)	3	
	C. Grade school (complete), or high school (incomplete)	4	
	D. No female head/spouse	6	
	E. High school (complete), or non-university superior (incomplete)	7	
	F. Non-university superior (complete), or higher	13	
4. How many rooms are used only as bedrooms?	A. None	0	
	B. One	2	
	C. Two	4	
	D. Three or more	8	
5. What is the main material of the exterior walls?	A. Mud, matting, wattle and daub, adobe, stone with mud, or other	0	
	B. Wood, stone, stone blocks with mortar or cement, or brick or cement blocks	4	
6. What fuel does the household most frequently use for cooking?	A. Charcoal, kerosene, or other	0	
	B. Firewood	3	
	C. Gas (LPG or natural), electricity, or does not cook	7	
7. Does the household have a refrigerator/freezer?	A. No	0	
	B. Yes	3	
8. Does the household have a blender?	A. No	0	
	B. Yes	6	
9. How many color televisions does the household have?	A. None	0	
	B. One	5	
	C. Two or more	9	
10. Does the household have a cellular telephone?	A. No	0	
	B. Yes	7	

Back-page Worksheet: Household Roster and Work Status

At the start of the interview, read to the respondent: *Please tell me the names and ages of all household members, that is all people—regardless of blood relationship—who stay or live permanently in the same residence, who share their main meals, and who cooperate together to fulfill their other basic needs. This includes whomever the household head thinks it should include. A household may have just one person. Do not forget absent members or newborns. Do not count live-in domestic servants nor lodgers.*

Write the names and ages all household members. For each member 14-years-old or older, ask whether he/she did any work in the past week (not including household chores).

See the “Guidelines to the Interpretation of Indicators” for more detail about the definitions of *work*, *past week*, and *household member*.

Count the number of household members, write it next to “Household size:” in the scorecard header, and mark the corresponding response to Question 1. Count the number of household members who work, and mark the response for Question 2.

Name of household member	Age	If <name> is 14-years-old or older, then ask: In the past week, did <name> do any work? (not counting household chores)	
1.		No	Yes
2.		No	Yes
3.		No	Yes
4.		No	Yes
5.		No	Yes
6.		No	Yes
7.		No	Yes
8.		No	Yes
9.		No	Yes
10.		No	Yes
11.		No	Yes
12.		No	Yes
13.		No	Yes
14.		No	Yes
15.		No	Yes
Total members:		Total workers:	

**Look-up table to convert scores to poverty likelihoods,
legacy poverty lines**

Score	Poverty likelihood (%)						
	Food	National			Intl. 2005 PPP		
		100%	150%	200%	\$1.25	\$2.50	\$3.75
0–4	74.2	100.0	100.0	100.0	45.4	61.4	100.0
5–9	70.1	98.1	99.2	99.5	7.1	55.7	87.1
10–14	55.2	94.9	98.6	99.3	1.6	37.8	79.6
15–19	43.8	86.6	98.1	99.3	1.6	29.8	72.0
20–24	40.5	80.0	94.5	98.8	1.6	28.2	63.0
25–29	30.7	71.6	92.6	98.7	1.5	18.4	52.4
30–34	18.4	61.8	88.4	97.2	0.5	13.4	39.9
35–39	9.9	47.7	82.7	93.6	0.1	6.7	27.9
40–44	4.3	33.2	71.8	90.8	0.0	3.4	18.8
45–49	1.8	24.3	61.1	82.2	0.0	1.0	10.0
50–54	0.5	14.6	51.7	76.3	0.0	0.5	5.8
55–59	0.0	8.6	37.3	66.7	0.0	0.0	2.2
60–64	0.0	3.1	25.1	54.5	0.0	0.0	1.0
65–69	0.0	1.1	13.1	37.5	0.0	0.0	0.2
70–74	0.0	0.5	6.6	21.4	0.0	0.0	0.0
75–79	0.0	0.0	0.9	9.2	0.0	0.0	0.0
80–84	0.0	0.0	0.2	2.9	0.0	0.0	0.0
85–89	0.0	0.0	0.0	0.0	0.0	0.0	0.0
90–94	0.0	0.0	0.0	0.0	0.0	0.0	0.0
95–100	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Note on measuring changes in poverty rates over time using legacy lines with the 2007 and 2010 scorecards

This paper uses data from the 2010 ENAHO and Peru's new definition of poverty. It replaces Schreiner (2009), which uses 2007 data and Peru's previous definition of poverty. The new 2010 scorecard here should be used from now on.

Some organizations in Peru have already used the 2007 scorecard. After these legacy users switch to the new 2010 scorecard here, they may want to measure changes in poverty rates over time with their existing baseline estimates from the 2007 scorecard and a follow-up estimate from the 2010 scorecard. Legacy users can do this because the 2010 scorecard is calibrated not only to new-definition poverty lines but also to "legacy" poverty lines that use the previous definition of poverty. Hybrid estimates of change based on the two scorecards are valid as long as they use a legacy line. Such hybrid estimates of change are also compatible with future estimates of change based solely on the new-definition lines and the 2010 scorecard.

In sum, both first-time and legacy users should use the new 2010 scorecard and the new-definition poverty lines. Looking forward, this establishes a baseline with the best poverty lines. Looking backward, legacy users can use the legacy lines to salvage existing estimates when measuring change in poverty rates over time.

Simple Poverty Scorecard[®] Poverty-Assessment Tool Peru

1. Introduction

The Simple Poverty Scorecard poverty-assessment tool is a low-cost way for pro-poor programs in Peru to estimate the likelihood that a household has expenditure below a given poverty line, to measure groups' poverty rates at a point in time, to track changes in groups' poverty rates between two points in time, and to target services to households. It also presents the best evidence so far concerning the accuracy of the scorecard's estimates of changes in poverty rates over time.

The new scorecard here uses 2010 data; it replaces Schreiner's (2009) scorecard for Peru that uses 2007 data. For now on, only the new 2010 scorecard should be used because it is based on the latest data and because it is calibrated to Peru's new definition of poverty. The new 2010 scorecard is also calibrated to "legacy" poverty lines that follow Peru's previous definition. Estimates based on the legacy lines are compatible across the two scorecards, so organizations that have already started with the 2007 scorecard do not need to start over from scratch.

The direct approach to poverty measurement via surveys is complex and costly, asking households about a lengthy list of expenditure items. As a case in point, Peru's 2010 National Household Survey (*Encuesta Nacional de Hogares*, ENAHO) runs 77 pages and covers about 400 expenditure items. An example expenditure item is: "In the

past 15 days, did you or anyone in your household obtain, consume, buy, or receive as a gift any *chuño entero negro* (black freeze-dried potato)? If so, how did you obtain it? If you bought it, how frequently did you buy it, how much did you typically buy, and where did you buy it? What was the total value of *chuño entero negro* purchased? Now then, during the last 15 days, did you or any member of your household consume any refined sugar? . . .”

In comparison, the indirect approach via the scorecard is simple, quick, and inexpensive. It uses ten verifiable indicators (such as “How many rooms are used only as bedrooms?” or “How many color televisions does the household have?”). It produces a score that is highly correlated with poverty status as measured by the exhaustive ENAHO survey.

The scorecard differs from “proxy means tests” (Coady, Grosh, and Hoddinott, 2004) 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 blunt (such as rules based on land-ownership or housing quality) or subjective and relative (such as participatory wealth ranking facilitated by skilled field workers). Measurements from these approaches are not comparable across regions nor across organizations nor across time, they may be costly, and their accuracy and precision are unknown.

Peru’s scorecard can be used to measure the share of a pro-poor organization’s participants who are below a given poverty line, such as the Millennium Development

Goals' \$1.25/day at 2005 purchase-power parity. USAID microenterprise partners can use scoring with the new-definition USAID “extreme” poverty line to report how many of their participants are “very poor”.¹ The scorecard can also be used to measure movement across a poverty line over time. In all these cases, the scorecard provides an expenditure-based, objective tool with known accuracy. While expenditure surveys are costly even for governments, some small, local pro-poor organizations may be able to implement a less-expensive 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 the scorecard on their own and apply it to inform their decisions, then they must first trust that it works. Transparency and simplicity build trust. Getting “buy-in” matters; proxy means tests and regressions on the “determinants of poverty” have been around for three decades, but they are rarely used to inform decisions at the local level. This is not because they do not work, but because they are presented (when they are presented at all) as tables of regression coefficients incomprehensible to non-specialists (with cryptic indicator names such as “LGHHSZ_2” and with points with negative values and many decimal places). Thanks to the predictive-modeling phenomenon known as the “flat maximum”, simple scoring approaches can be about as accurate as complex ones (Schreiner, 2012).

¹ USAID defines a household as “very poor” if its per-capita expenditure is below the highest of the new-definition \$1.25/day 2005 PPP line (PEN2.37 for Peru in 2010, Figure 1) or the new-definition USAID “extreme” line (PEN6.72) that divides people in households below Peru’s new-definition national poverty line into two equal-size groups.

Beyond its simplicity and transparency, the scorecard’s technical approach is innovative in how it associates scores with poverty likelihoods, in the extent of its accuracy tests, and in how it derives formulas for standard errors. Although the accuracy testing is simple and commonplace in statistical practice and in the for-profit field of credit-risk scoring, it has rarely been applied to poverty-assessment tools.

The scorecard is based on the 2010 ENAHO conducted by Peru’s *Instituto Nacional de Estadística e Informática* (INEI). Indicators are selected to be:

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

All points in the scorecard are non-negative integers, and total scores range from 0 (most likely below a poverty line) to 100 (least likely below a poverty line). Non-specialists can collect data and tally scores on paper in the field in about ten minutes.

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

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

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

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

This paper presents a single scorecard whose indicators and points are derived from household expenditure data and Peru's new-definition national poverty line. Scores from this one scorecard are calibrated to poverty likelihoods for eight new-definition poverty lines and seven legacy poverty lines.²

The scorecard is constructed and calibrated using half of the data from the 2010 ENAHO. The other half is used to validate the scorecard's accuracy for estimating households' poverty likelihoods, for estimating groups' poverty rates at a point in time, and for targeting. Accuracy for estimating changes in poverty rates over time is validated using annual ENAHO data from 2004 to 2011.

² Section 2 below provides details on these two types of poverty lines.

All three scoring estimators are *unbiased*. That is, they match the true value on average in repeated samples when constructed from (and applied to) the same population from which the scorecard was built. Like all predictive models, the specific scorecard here misses the mark to some extent when constructed from a single sample (such as the 2010 ENAHO) and 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 when applied in practice. (The survey approach is unbiased by definition.) There is bias because scoring must assume that the future relationships between indicators and poverty in all possible groups of households will be the same as the relationships found in the data used to construct the scorecard. Of course, this assumption—ubiquitous and inevitable in predictive modeling—holds only partly.

When applied to the 2010 validation sample with bootstraps of $n = 16,384$ and the new-definition national line, the difference between scorecard estimates of groups' poverty rates and the true rates at a point in time is -0.7 percentage points. The average absolute difference across all eight new-definition lines is 0.4 percentage points, and the maximum absolute difference is 1.3 percentage points. These differences are due to sampling variation and not bias; the average difference would be zero if the whole 2010 ENAHO were to be repeatedly redrawn and divided into sub-samples before repeating the entire process of building and validating scorecards.

³ Important examples include nationally representative samples at different points in time or sub-groups that are not nationally representative (Tarozzi and Deaton, 2009).

For $n = 16,384$, the bootstrapped 90-percent confidence intervals for these new-definition estimates are ± 0.6 percentage points or less. For $n = 1,024$, the 90-percent intervals are ± 2.5 percentage points or less.

The legacy lines have similar accuracy and precision. The average absolute difference across the seven legacy lines in the 2010 validation sample is 0.3 percentage points, and the maximum absolute difference is 0.6 percentage points. Precision for the legacy lines is the same as for the new-definition lines.

The accuracy and precision of estimates of changes in poverty rates over time is validated by applying the new 2010 scorecard to the 2010 validation sample to get a baseline estimate and then by applying the new 2010 scorecard again to the full ENAHO sample from a given year in 2004–09 or 2011 to get a follow-up estimate. The average absolute bootstrapped differences with $n = 16,384$ between these 49 pairs of baseline and follow-up estimates (seven new-definition lines and seven year-pairs for each line) is 1.2 percentage points. The average of the absolute difference between the estimated change and the true change (relative to the true change) across the 49 tests is about 24 percent. This relative error is highest for one-year-out estimates (25 percent for 2010 to 2009, and 55 percent for 2010 to 2011), and decreases as more time passes and the true change in poverty increases (to about 14 percent for six-years-out, 2010 to 2004). Results are similar or better for the legacy lines applied in 2007–10.

These results for this eight-year stretch in Peru—a period when the household-level poverty rate by the new-definition national line decreased from 51.0 percent to 23.1 percent—is the best evidence yet about how well the scorecard can accurately measure change over time.

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 several existing exercises for Peru. Section 10 is a summary.

2. Data and poverty lines

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

2.1 Data

The scorecard is based on 21,496 households in the nationally representative 2010 ENAHO. This is Peru's most recent available national expenditure survey that has poverty lines and expenditure for both the new and previous definitions of poverty.⁴

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

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

2.2 Poverty rates

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

⁴ The 2011 ENAHO is available, but it lacks poverty lines and expenditure by the previous definition of poverty. This paper uses the 2010 data so that it can calibrate scores to legacy lines and thus allow estimates of change in poverty rates with a hybrid of a baseline from the 2007 scorecard and a follow-up from the 2010 scorecard.

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

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

Poverty rates are at either the household-level or the person-level. If the organization defines its participants as households (say, because all household members are affected by any one member's being a participant), then the household level is relevant. The estimated household-level poverty rate is the equal-weighted average of poverty statuses (or estimated poverty likelihoods) for households with participants. 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 households' weights. Each household has a weight of one (1) because the unit of analysis is the household.

Alternatively, a person-level rate is relevant if an organization defines as *participants* all people in households that benefit from its services. In the example here, the person-level rate is the household-size-weighted average of poverty statuses for

households with participants, or $\frac{3 \cdot 1 + 4 \cdot 0}{3 + 4} = \frac{3}{7} = 0.43 = 43$ percent. In the “3 · 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 households’ weights. A household’s weight is its number of members because the unit of analysis is the household member.

As a final example, an organization may count as *participants* only those with whom it deals directly. This means that some—but not all—household members are counted. The person-level rate is now the participant-weighted average of the poverty status of households with clients, or $\frac{1 \cdot 1 + 2 \cdot 0}{1 + 2} = \frac{1}{3} = 0.33 = 33$ percent. The first “1” in the “1 · 1” in the numerator is the first household’s weight because it has one participant, and the second “1” is its poverty status (poor). In the “2 · 0” term in the numerator, the “2” is the second household’s weight because it has two participants, and the zero is its poverty status (non-poor). The “2 + 1” in the denominator is the sum of the households’ weights. Each household’s weight is its number of participants because the unit of analysis is the participant.

In general, 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 have counted as a participant and why.

Figure 1 reports poverty rates and poverty lines (both new and legacy) for Peru as a whole at both the household-level and the person-level for 2004–11. Figure 2 is similar, covering Peru overall and each of its 25 regions by urban/rural/all.⁵

Figures 1 and 2 report person-level poverty rates because these are the types of rates reported by governments and used in most policy discussions. Household-level poverty rates are also reported because—as discussed above—household-level poverty likelihoods can be straightforwardly converted into poverty rates for other units of analysis. This is also why the scorecard is calibrated to household-level poverty likelihoods and why accuracy is measured at the household level.

⁵ Peru adjusts its poverty lines for differences in cost-of-living across seven regions: metropolitan Lima, urban coast, rural coast, urban sierra, rural sierra, urban jungle, and rural jungle. Poverty lines and rates are reported in Figure 2 at the level of the 25 regions (and not at the level of the seven poverty-line regions) because this allows scorecard users to more easily find benchmarks relevant for where they work. Also, associating a particular household with one of the seven poverty-line regions would require referring to census documents, something unlikely to happen in practice.

2.3 Poverty lines

This section presents poverty lines based on Peru’s previous (“legacy”) definition of poverty and on the recent new definition. Each definition has two parts:

- Definition of the measure of aggregate household expenditure
- Definition of poverty lines

The new definition improves on the legacy definition in both aspects.

Nevertheless, the new 2010 scorecard is calibrated to poverty lines (and their associated expenditure) under both definitions. Including legacy lines allows existing users to estimate changes in poverty rates with a hybrid between a baseline from the 2007 scorecard (calibrated only to legacy lines) and a follow-up from the 2010 scorecard (calibrated to both legacy lines and new lines).

First-time users of Peru’s new 2010 scorecard should ignore the legacy lines and use only the new-definition lines. For their part, legacy users should record poverty likelihoods not only for the legacy lines (looking backward to measure change against existing baselines) but also for the new-definition lines (looking forward to establish baselines from now on).

2.3.1 Legacy lines

Peru applied the old-definition legacy lines through the 2010 ENAHO (INEI, 2011). There are two official poverty lines, a “food” line (*línea de pobreza extrema*) and a “national” (food-plus-non-food) line (*línea de pobreza total*).

The derivation of the legacy food line starts with an estimate of a daily Caloric standard: 2,232 for metropolitan Lima, 2,194 for the urban coast, rural coast, and urban

sierra, and 2,133 for everywhere else (INEI, 2011). Next, three food baskets (coast, sierra, and jungle) are defined with the 52 most-important items in the 1993/4 *Encuesta de Propósitos Múltiples* (EPM). Their unit values are taken as the median prices—in each of 25 regions and by urban/rural within each region—reported by a reference group in the 1997 ENAHO, adjusted for inflation over time using a price index for the regional capitals. The single national reference group (derived iteratively as in Pradhan *et al.*, 2001) is made up of households in the 30th and 50th percentiles of per-capita expenditure. The food line is then the cost of the food basket, scaled to meet the caloric standard. In 2010, the average legacy food line was PEN4.88 per person per day. Given sample weights based on Peru’s 1997 census, the poverty rate for the legacy food line is 7.8 percent for households and 9.8 percent for people (Figure 1, matching INEI, 2011).⁶

The legacy national (food-plus-non-food) poverty line is the food line multiplied by the ratio of total expenditure to food expenditure for households in the reference group. In 2010, the average legacy national line is PEN8.67 per person per day, giving a poverty rate of 25.7 percent (households) and 31.3 percent (people, Figure 1, again matching INEI, 2011).

Except for the age of some of the inputs used in the construction of the legacy poverty lines and except for a few of the smaller details, the derivation of the legacy food line and the legacy national line follows standard good practice.

⁶ The per-day lines reported here are INEI’s per-month lines, divided by (365/12).

To allow pro-poor organizations in Peru to use different or various poverty lines, this paper calibrates scores from the new 2010 scorecard to poverty likelihoods for seven legacy lines from Schreiner (2009):⁷

- Legacy food
- Legacy national
- 150 percent of legacy national
- 200 percent of legacy national
- Legacy \$1.25/day 2005 PPP
- Legacy \$2.50/day 2005 PPP
- Legacy \$3.75/day 2005 PPP

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

- 2005 PPP exchange rate for “individual consumption expenditure by households”: PEN1.65 per USD1.00 (World Bank, 2008)
- Average annual Consumer Price Indexes (CPI):⁸
 - 2002: 92.78
 - 2003: 94.91
 - 2004: 98.43
 - 2005: 100.00
 - 2006: 102.00
 - 2007: 103.82
 - 2008: 109.84
 - 2009: 113.02
 - 2010: 114.72

⁷ Scores are not calibrated to a legacy USAID “extreme” line because this is a relative line for which measures of change over time are difficult to interpret.

⁸ See <http://estadisticas.bcrp.gob.pe/consulta.asp?sIdioma=1&sTipo=1&sChkCount=241&sFrecuencia=A>, retrieved 27 October 2012. There are two price indexes, one labelled “IPC (Var. Prom. Anual)” and the other “IPC Var. Anual”. Schreiner (2009) derives the legacy \$1.25/day 2005 PPP line using “IPC (Var. Prom. Anual)”, but it turns out that “IPC Var. Anual” is the year-over-year inflation rate used by the *Banco Central de Reserva del Perú*. For comparability, the derivation in this paper of the legacy \$1.25/day lines for 2008, 2009, and 2010 purposely repeats this mistake. The difference is so small that it does not affect any lines; inflation in 2005–10 using “IPC (Var. Prom. Anual)” is 14.72 percent versus 14.78 percent with “IPC Var. Anual”. The new-definition \$1.25/day line uses “IPC Var. Anual”.

Given this and the formula in Sillers (2006), the legacy \$1.25/day 2005 PPP line for Peru as a whole for the 2010 ENAHO is:

$$(\text{2005 PPP factor}) \cdot \$1.25 \cdot \left(\frac{\text{CPI}_{2010 \text{ average}}}{\text{CPI}_{2005 \text{ average}}} \right) = \left(\frac{\text{PEN}1.65}{\$1.00} \right) \cdot \$1.25 \cdot \left(\frac{114.72}{100.00} \right) = \text{PEN}2.37.$$

The legacy \$2.50/day and legacy \$3.75/day lines are multiples of \$1.25/day.

These legacy 2005 PPP lines apply to Peru as a whole. They are adjusted for cost-of-living differences across Peru's seven poverty-line regions using:

- L , the all-Peru legacy \$1.25/day 2005 PPP poverty line (in 2010, PEN2.37)
- i , an index to a poverty-line region
- π_i , the legacy national poverty line for poverty-line region i
- π , the all-Peru average legacy national poverty line (in 2010, PEN8.67)

The cost-of-living-adjusted 2005 PPP poverty line L_i for region i is then:

$$L_i = L \cdot \frac{\pi_i}{\pi}.$$

There is a final footnote to this sub-section: this paper does not reproduce an error in Schreiner (2009) that affects all the legacy lines. As background, the 2007 ENAHO had a panel component (households interviewed in more than one year, for example, in both 2006 and 2007) and a non-panel component (households interviewed only in 2007). While INEI provides weights that make the combined panel-plus-non-panel data nationally representative and another set of weights that make the panel data by itself nationally representative, it does not provide weights that make the non-panel data by itself nationally representative. Schreiner (2009) mistakenly thought that both the panel by itself and the non-panel by itself were nationally representative when

used with the combined panel-plus-non-panel weights. To allow testing of the accuracy of scoring's estimated changes in poverty rates over time when applied to a panel (that is, when both the baseline and the follow-up cover the same households), Schreiner (2009) constructed and calibrated the 2007 scorecard using only non-panel data with the panel-plus-non-panel weights. The result is that the unbiasedness property of the 2007 scorecard holds only for an unknown population.

Does this unknown population differ much from that of Peru overall? To test, changes in poverty rates for the legacy lines 2007–10 were found in two ways:

- Repeating the earlier mistake of only non-panel data with combined-data weights
- Using correctly the combined data with combined-data weights

The absolute difference between the mistaken and correct ways (averaged across the seven legacy lines from 2010 to 2007) is about 0.7 percentage points, or about 25 percent of the average true change. Thus, the error has but a small impact and so is not been reproduced for this paper. That is, the legacy lines and rates in Figure 1 are derived from the full combined panel-and-non-panel data with the appropriate weights.

2.3.2 New-definition lines

The new-definition lines were introduced with the 2011 ENAHO (INEI, 2012a). INEI also applied the new-definition lines retroactively to 2004–10 to provide a consistent series over time. While both definitions give similar household-level poverty rates for the national line in 2010 (25.6 percent for the new definition versus 25.7 percent for the legacy definition, Figure 1), the new definition implies a much higher

poverty rate in 2004 (51.0 percent versus 40.9 percent) and thus a much faster decrease over 2004–10.

The derivation of the new-definition food line and the new-definition national line follows the previous definition, except that it (INEI, 2012a, 2012b, and 2011):

- Derives sampling weights from the 2007 census (rather than the 1993 census)
- Replaces a 1985 World Health Organization caloric standard with a 2001–4 standard and accounts for the physical size and activity levels of Peruvians
- Draws food-basket items from the 2007 ENAHO (not the 1993/4 EPM) and distinguishes varieties (such as white or wheat) of items (such as bread)
- Refines the nutritional content of the food basket by adding more items and by discounting non-edible parts such as peels
- Changes classes of expenditure to fit Peru’s new 2008 system of national accounts
- Increases the size of the reference group and moves it from the 30th to 50th percentile of per-capita expenditure to the 20th to 40th percentile
- Excludes the cost of home improvements from the measure of expenditure
- Adds the use-value of consumer durables to the measure of expenditure
- Updates the base (2009 rather than 2001) when adjusting for cost-of-living differences across regions, and changes the mathematical formula

Scores from the new 2010 scorecard are calibrated to eight new-definition lines:

- Food
- National
- 150 percent of national
- 200 percent of national
- USAID “extreme”
- \$1.25/day 2005 PPP
- \$2.50/day 2005 PPP
- \$3.75/day 2005 PPP

The new-definition USAID “extreme” line is defined as the median expenditure of people (not households) below the new-definition national line (U.S. Congress, 2004).

The new-definition \$1.25/day 2005 PPP line for a given year is derived like the legacy \$1.25/day line. The only difference is that the CPI series is:

- 2002: 82.12
- 2003: 83.97
- 2004: 87.05
- 2005: 88.46
- 2006: 90.23
- 2007: 91.83
- 2008: 97.15
- 2009: 100.00
- 2010: 101.53
- 2011: 104.95

For example, the new-definition \$1.25/day 2005 PPP line for Peru as a whole for 2010 is:

$$(\text{2005 PPP factor}) \cdot \$1.25 \cdot \left(\frac{\text{CPI}_{2010 \text{ average}}}{\text{CPI}_{2005 \text{ average}}} \right) = \left(\frac{\text{PEN}1.65}{\$1.00} \right) \cdot \$1.25 \cdot \left(\frac{101.53}{88.46} \right) = \text{PEN}2.37.$$

The new-definition 2005 PPP lines are the same as the legacy 2005 PPP lines (Figure 1). Poverty rates differ across the two definitions because Peru's new definition of expenditure differs from its legacy definition.

3. Scorecard construction

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

- Household composition (such as the number of members)
- Education (such as the highest level completed by the female head/spouse)
- Housing (such as wall material)
- Ownership of durable goods (such as color televisions, refrigerators, or blenders)
- Employment (such as the number of household members who work)
- Agriculture (such as the use of agricultural land)
- Receipt of social transfers (such as use of a *Comedor Popular*)

Figure 3 lists the candidate 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, the ownership of a cellular telephone is probably more likely to change in response to changes in poverty than is the age of the male head/spouse.

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

One of these one-indicator scorecards is then selected based on several factors (Schreiner *et al.*, 2004; Zeller, 2004). 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, robustness across regions, and verifiability.

A series of two-indicator scorecards are then built, each based on the one-indicator scorecard selected from the first round, with a second candidate indicator added. The best two-indicator scorecard is then selected, again based on “c” and judgment. 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 for selecting indicators is similar 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, sensible, and acceptable to users.

The single scorecard here applies to all of Peru. Evidence from Indonesia (World Bank, 2012), 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 bias and precision of estimates of poverty rates (Tarozzi and Deaton, 2009).

4. Practical guidelines for scorecard use

The main challenge of scorecard design is not to maximize statistical accuracy but rather to improve the chances that scoring is actually 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 have similar targeting accuracy, thanks to the empirical phenomenon known as the “flat maximum” (Caire and Schreiner, 2012; Hand, 2006; Baesens *et al.*, 2003; Lovie and Lovie, 1986; Kolesar and Showers, 1985; Stillwell, Barron, and Edwards, 1983; Dawes, 1979; Wainer, 1976; Myers and Forgy, 1963). The project-risk 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 a lot of additional work and if the whole process generally seems to make sense.

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

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

A field worker using the paper scorecard would:

- Record participant identifiers
- Read the definition of *household member* from the back-page worksheet to the respondent
- Use the back-page worksheet to record the names of household members, their ages, and whether they work
- Record—based on the back-page worksheet—the number of household members in the scorecard header and mark the responses to questions 1 and 2
- Read each remaining question from the scorecard
- Circle the response and its points
- Write the points in the far-right column
- Add up the points to get the total score
- Implement targeting policy (if any)
- Deliver the paper scorecard to a central office for data entry and filing

Of course, field workers must be trained. The quality of outputs depends on the quality of inputs. If organizations or field workers gather their own data and believe that they have an incentive to exaggerate poverty rates (for example, if funders reward them for higher poverty rates), then it is wise to do on-going quality control via data review and random audits (Matul and Kline, 2003).⁹ IRIS Center (2007a) and Toohig

⁹ If an organization does not want field workers to know the points associated with indicators, then it can use a version of the scorecard without points and apply the points later at the central office. Schreiner (2011) argues that in Colombia (Camacho

(2008) are useful nuts-and-bolts guides for budgeting, training field workers and supervisors, logistics, sampling, interviewing, piloting, recording data, and controlling quality.

In particular, while collecting scorecard indicators is relatively easier than alternatives, it is still absolutely difficult. Training and explicit definitions of terms and concepts in the scorecard is essential, and field workers should scrupulously follow the “Guidelines for the Interpretation of Indicators” found at the end of this paper, as they are an integral part of the scorecard.

For the example of Nigeria, Onwujekwe, Hanson, and Fox-Rushby (2006) find distressingly low inter-rater and test-retest correlations for indicators as seemingly simple and obvious as whether the household owns an automobile. 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 conditional cash-transfer program in Mexico, 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 (or avoided in the first place)

and Conover, 2011), hiding points did little to deter cheating and that cheating by the user’s central office was more damaging than cheating by field agents and respondents.

by field agents who make a home visit, and this is the suggested procedure for the scorecard in Peru.

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

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

In general, the sampling design should follow from the organization's goals for the exercise, the questions to be answered, and the budget.

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

- Employees of the organization
- Third-party contractors

Responses, scores, and poverty likelihoods can be recorded:

- On paper in the field and then filed at a central 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 uploaded to a database

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

- All participants in the relevant population
- A representative sample of all participants in the relevant population
- All participants in the relevant population in a representative sample of relevant field offices
- A representative sample of all participants in the relevant population in a representative sample of relevant field offices

If not determined by other factors, the number of participants to be scored can be derived from sample-size formulas (presented later) for a desired level of confidence and a desired confidence interval.

Frequency of application can be:

- As a once-off project (precluding measuring change)
- Once a year (or at some other time interval, allowing measuring change)
- Each time a field worker 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 are illustrated by BRAC and ASA, two microlenders in Bangladesh who each have more than 7 million participants and who are applying the Simple Poverty Scorecard tool for Bangladesh (Chen and Schreiner, 2009). Their design is that loan officers in a random sample of branches score all participants each time they visit a homestead (about once a year) as part of their standard due diligence prior to loan disbursement. They record responses on paper in the field before sending the forms to a central office to be entered into a database and converted to poverty likelihoods. ASA's and BRAC's sampling plans cover 25,000–50,000 participants each.

5. Estimates of household poverty likelihoods

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

To get absolute units, scores must be converted to *poverty likelihoods*, that is, probabilities of being below a poverty line. This is done via simple look-up tables. For the example of the new-definition national line, scores of 35–39 have a poverty likelihood of 52.0 percent, and scores of 40–44 have a poverty likelihood of 38.9 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 52.0 percent for the national line but of 8.9 percent for the new-definition \$2.50/day 2005 PPP line.¹⁰

¹⁰ Starting with Figure 4, many figures have 15 versions, one for each of the eight new-definition poverty lines and for each of the seven legacy lines. To keep them straight, they are grouped by poverty definition and by poverty line. Single tables pertaining to all poverty lines are placed with the tables for the new-definition national line.

5.1 Calibrating scores with poverty likelihoods

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

For the example of the new-definition national line (Figure 5), there are 7,007 (normalized) households in the calibration sub-sample with a score of 35–39, of whom 3,646 (normalized) are below the poverty line. The estimated poverty likelihood associated with a score of 35–39 is then 52.0 percent, because $3,646 \div 7,007 = 52.0$ percent.

To illustrate with the new-definition national line and a score of 40–44, there are 8,194 (normalized) households in the calibration sample, of whom 3,191 (normalized) are below the line (Figure 5). Thus, the poverty likelihood for this score range is $3,191 \div 8,194 = 38.9$ percent.

The same method is used to calibrate scores with estimated poverty likelihoods for the other 14 poverty lines.¹¹

Figure 6a (for the new-definition poverty lines) and Figure 6b (for the legacy lines) show, for all scores, the likelihood that expenditure falls in a range demarcated by two adjacent poverty lines.

¹¹ To ensure that poverty likelihoods always decrease as scores increase, it is sometimes necessary to combine likelihoods iteratively across series of adjacent scores before grouping scores into ranges. This preserves unbiasedness, and it keeps users from balking when sampling variation in score ranges with few households leads to higher scores being linked with higher poverty likelihoods.

For the example of the new-definition lines in Figure 6a, the daily per-person expenditure of a household with a score of 35–39 falls in the following ranges with probability:

- 0.4 percent below \$1.25/day
- 8.6 percent between \$1.25/day and \$2.50/day
- 25.5 percent between \$2.50/day and \$3.75/day
- 17.6 percent between \$3.75/day and 100% of the national line
- 33.3 percent between 100% and 150% of the national line
- 10.0 percent between 150% and 200% of the national line
- 4.6 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 quantitative poverty lines and from survey data on expenditure. 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 Peru scorecard are transformed coefficients from a Logit regression, (untransformed) scores are not converted to poverty likelihoods via the Logit formula of $2.718281828^{\text{score}} \times (1 + 2.718281828^{\text{score}})^{-1}$. This is because the Logit

formula is esoteric and difficult to compute by hand. It is more intuitive to define the poverty likelihood as the share of households with a given score in the calibration sample who are below a poverty line. In the field, going from scores to poverty likelihoods in this way requires no arithmetic at all, just a look-up table. This non-parametric calibration can also improve accuracy, especially with large samples.

5.2 Accuracy of estimates of households' poverty likelihoods

As long as the relationships between indicators and poverty do not change over time, and as long as the scorecard is applied to households that are representative of the same population from which the scorecard was constructed, then this calibration process produces unbiased estimates of poverty likelihoods. *Unbiased* means that in estimators constructed from repeated samples from the same population, the average estimate matches the true poverty likelihood. The scorecard also produces unbiased estimates of poverty rates at a point in time and 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 Peru's population. Thus the scorecard will generally be biased when applied after December 2010 (the last month of

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

fieldwork for the 2010 ENAHO) or when applied with sub-groups who are not nationally representative.

How accurate are estimates of households' poverty likelihoods, given the assumption of constant relationships between indicators and poverty over time and the assumption of a sample that is representative of Peru overall? To measure, the scorecard is applied to 1,000 bootstrap samples of size $n = 16,384$ from the 2010 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 range, compute the true poverty likelihood in the bootstrap sample, that is, the share of households with the score and with expenditure below a poverty line
- For each score range, 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 range, report the average difference between estimated and true poverty likelihoods across the 1,000 bootstrap samples
- For each score range, report the two-sided interval containing the central 900, 950, or 990 differences between estimated and true poverty likelihoods

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

For the new-definition national line, the average poverty likelihood across bootstrap samples for scores of 35–39 in the validation sample is too high by 1.4

percentage points. For scores of 30–34, the estimate is too low by 2.0 percentage points.¹³

The 90-percent confidence interval for the differences for scores of 35–39 is ± 3.0 percentage points (Figure 7). This means that in 900 of 1,000 bootstraps, the difference between the estimate and the true value is between -1.6 and $+4.4$ percentage points (because $+1.4 - 3.0 = -1.6$ and $+1.4 + 3.0 = +4.4$). In 950 of 1,000 bootstraps (95 percent), the difference is $+1.4 \pm 3.6$ percentage points, and in 990 of 1,000 bootstraps (99 percent), the difference is $+1.4 \pm 4.8$ percentage points.

For a few score ranges, Figure 7 shows non-negligible differences between estimated poverty likelihoods and true values. This is because the validation sub-sample is a single sample that—thanks to sampling variation—differs in distribution from the construction/calibration sub-sample and from Peru’s population. For targeting, however, what matters is less the difference in all score ranges and more the difference in score ranges just above and below the targeting cut-off. This mitigates the effects of bias and sampling variation on targeting (Friedman, 1997). Section 8 below looks at targeting accuracy in detail.

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 range would be zero if samples were repeatedly drawn from the population and split into sub-samples before repeating the entire process of scorecard construction/calibration and validation.

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

Another possible source of differences between estimates and true values is overfitting. The scorecard here is unbiased, but it may still be overfit when applied after the end of the ENAHO fieldwork in December 2010. That is, it may fit the data from the 2010 ENAHO so closely that it captures not only some timeless patterns but also some random patterns that, due to sampling variation, show up only in the 2010 ENAHO. Or the scorecard may be overfit in the sense that it is not robust when relationships between indicators and poverty change over time or when it is applied to non-nationally representative samples.

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

Most errors in individual households' likelihoods do cancel out in the estimates of groups' poverty rates (see later sections). Furthermore, at least some of the differences will come from non-scorecard sources such as changes in the relationships between indicators and poverty, sampling variation, changes in poverty lines, inconsistencies in data quality across time, and imperfections in cost-of-living adjustments across time and regions. These factors can be addressed only by improving data quantity and

quality (which is beyond the scope of the scorecard) or by reducing overfitting (which likely has limited returns, given the scorecard's parsimony).

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

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

To illustrate, suppose a program samples three households on Jan. 1, 2013 and that they have scores of 20, 30, and 40, corresponding to poverty likelihoods of 84.5, 66.9, and 38.9 percent (new-definition national line, Figure 4). The group's estimated poverty rate is the households' average poverty likelihood of $(84.5 + 66.9 + 38.9) \div 3 = 63.4$ percent.

Be careful; the group's poverty rate is *not* the poverty likelihood associated with the average score. Here, the average score is 30, which corresponds to a poverty likelihood of 66.9 percent. This differs from the 63.4 percent found as the average of the three individual poverty likelihoods associated with each of the three scores. Unlike poverty likelihoods, scores are ordinal symbols, like letters in the alphabet or colors in a spectrum. Scores are not cardinal numbers, and so scores cannot be added up or averaged across households. Only three operations are valid for scores: conversion to poverty likelihoods, distributional analysis (Schreiner, 2012), or comparison—if desired—with a cut-off for targeting. The best rule to follow is: Always use poverty likelihoods, never scores.

6.1 Accuracy of estimated poverty rates at a point in time

For the Peru scorecard applied to the 2010 validation sample with $n = 16,384$, the absolute differences between the estimated poverty rate at a point in time and the true rate are 1.3 percentage points or less (Figure 9, summarizing Figure 8 across poverty lines). The average absolute difference across the eight new-definition poverty lines is about 0.6 percentage points. At least part of these differences is due to sampling variation in the division of the 2010 ENAHO into two sub-samples.¹⁴

When estimating poverty rates at a point in time, the bias reported in Figure 9 should be subtracted from the average poverty likelihood to make the estimate unbiased. For Peru's scorecard and the new-definition national line, bias is -0.7 percentage points, so the unbiased estimate in the three-household example above is $63.4 - (-0.7) = 64.1$ percent.

In terms of precision, the 90-percent confidence interval for a group's estimated poverty rate at a point in time for the new-definition lines with $n = 16,384$ is ± 0.6 percentage points or less (Figure 9).¹⁵ This means that in 900 of 1,000 bootstraps of this size, the estimate (after subtracting off bias) is within 0.6 percentage points or less of the true value.

For example, suppose that the average poverty likelihood in a sample of $n = 16,384$ with the Peru scorecard and the new-definition national line is 63.4 percent.

¹⁴ For the legacy lines in Figure 9, the average absolute difference is 0.3 percentage points.

¹⁵ Precision for the legacy lines is similar to that of the new-definition lines.

Then estimates in 90 percent of samples of $n = 16,384$ can be expected to fall in the range of $63.4 - (-0.7) - 0.5 = 63.6$ percent to $63.4 - (-0.7) + 0.5 = 64.6$ percent, with the most likely true value being the unbiased estimate in the middle of this range ($63.4 - (-0.7) = 64.1$ percent). This is because the original (biased) estimate is 63.4 percent, bias is -0.7 percentage points, and the 90-percent confidence interval for the new-definition national line is ± 0.5 percentage points.

6.2 Formula for standard errors for estimates of poverty rates

How precise are the point-in-time estimates? Because they are averages of 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-assessment tools (Schreiner, 2008), first note that the textbook formula (Cochran, 1977) that relates confidence intervals with standard errors in the case of direct measurement of rates is $\pm c = \pm z \cdot \sigma$, where:

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

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

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

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

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

N is the population size, and

n is the sample size.

For example, Peru's 2010 ENAHO estimates a household-level poverty rate for the new-definition national line of $\hat{p} = 25.6$ percent (Figure 1) by direct measurement. If this estimate came from a sample of $n = 16,384$ households from a population N of 7,365,224 (the number of households in Peru in 2010), then the finite population

correction factor ϕ is $\sqrt{\frac{7,365,224 - 16,384}{7,365,224 - 1}} = 0.9989$, which can be taken as one (1). If

the desired confidence level is 90-percent ($z = 1.64$), then the confidence interval $\pm c$ is

$$\pm z \cdot \sqrt{\frac{\hat{p} \cdot (1 - \hat{p})}{n}} \cdot \sqrt{\frac{N - n}{N - 1}} = \pm 1.64 \cdot \sqrt{\frac{0.256 \cdot (1 - 0.256)}{16,384}} \cdot 1 = \pm 0.559 \text{ percentage points.}$$

Scorecards, however, do not measure poverty directly, so this formula is not applicable. To derive a formula for the Peru 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 example, with $n = 16,384$ and the new-definition national line, the 90-percent confidence interval is 0.475 percentage points.¹⁶

¹⁶ Due to rounding, Figure 8 displays 0.5, not 0.475.

Thus, the 90-percent confidence interval with $n = 16,384$ is ± 0.475 percentage points for the Peru scorecard and ± 0.559 percentage points for direct measurement. The ratio of the two intervals is $0.475 \div 0.559 = 0.85$.

Now consider the same case, but with $n = 8,192$. The confidence interval under direct measurement is $\pm 1.64 \cdot \sqrt{\frac{0.256 \cdot (1 - 0.256)}{8,192}} \cdot 1 = \pm 0.791$ percentage points. The empirical confidence interval with the Peru scorecard (Figure 8) is 0.690 percentage points. Thus for $n = 8,192$, the ratio of the two intervals is $0.690 \div 0.791 = 0.87$.

This ratio of 0.87 for $n = 8,192$ is close to the ratio of 0.85 for $n = 16,384$. Across all sample sizes of 256 or more for the new-definition national line in Figure 8, the average ratio turns out to be 0.85, implying that confidence intervals for indirect estimates of poverty rates via the Peru scorecard and this poverty line are 15 percent narrower than confidence intervals for direct estimates via the 2010 ENAHO. This 0.85 appears in Figure 9 as the “ α factor” because if $\alpha = 0.85$, then the formula for confidence intervals c for the Peru scorecard is $\pm c = \pm z \cdot \alpha \cdot \sigma$. That is, the formula for the standard error σ for point-in-time estimates of poverty rates via scoring is

$$\alpha \cdot \sqrt{\frac{\hat{p} \cdot (1 - \hat{p})}{n}} \cdot \sqrt{\frac{N - n}{N - 1}}.$$

In general, α can be more or less than 1.00. When α is less than 1.00, it means that the scorecard is more precise than direct measurement. This occurs in Figure 9 for seven of the eight new-definition poverty lines and for six of the seven legacy lines.

The formula relating confidence intervals with standard errors for the scorecard can be rearranged to give a formula for determining sample size before measurement. If \tilde{p} is the expected poverty rate before measurement, then the formula for sample size n from a population of size N that is based on the desired confidence level that corresponds to z and the desired confidence interval $\pm c$ is

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

If the population N is “large” relative to the sample size n , then the finite population correction factor ϕ can be taken as one, and

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

To illustrate how to use this, suppose the population N is 7,365,224 (the number of households in Peru overall while the 2010 ENAHO was in the field), suppose $c = 0.03845$, $z = 1.64$ (90-percent confidence), and the relevant poverty line is the new-definition national line so that the most sensible expected poverty rate \tilde{p} is Peru’s overall poverty rate in 2010 (25.6 percent, Figure 1) and the α factor is 0.85 (Figure 9). Then the sample-size formula gives

$$n = 7,365,224 \cdot \left(\frac{1.64^2 \cdot 0.85^2 \cdot 0.256 \cdot (1 - 0.256)}{1.64^2 \cdot 0.85^2 \cdot 0.256 \cdot (1 - 0.256) + 0.03845^2 \cdot (7,365,224 - 1)} \right) = 251,$$

which is close to the sample size of 256 observed for these parameters in Figure 8 for the new-definition national line. Taking the finite population correction factor ϕ as one gives the

$$n = \left(\frac{0.85 \cdot 1.64}{0.03845} \right)^2 \cdot 0.256 \cdot (1 - 0.256) = 251.$$

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

In practice after the end of ENAHO fieldwork in December 2010, an organization would select a poverty line (say, the new-definition national line), note their participants' population size (say, $N = 10,000$ participants), select a desired confidence level (say, 90 percent, or $z = 1.64$), select a desired confidence interval (say, ± 2.0 percentage points, or $c = 0.02$), make an assumption about \bar{p} (perhaps based on a previous measurement such as the 25.6-percent national average in the 2010 ENAHO in Figure 1), look up α (here, 0.85, Figure 9), 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,

$$n = 10,000 \cdot \left(\frac{1.64^2 \cdot 0.85^2 \cdot 0.256 \cdot (1 - 0.256)}{1.64^2 \cdot 0.85^2 \cdot 0.256 \cdot (1 - 0.256) + 0.02^2 \cdot (10,000 - 1)} \right) = 847.¹⁸$$

¹⁷ This paper reports accuracy for the scorecard applied to the 2010 validation sample, but it cannot test accuracy for later years or for other groups. Performance after December 2010 will resemble that in the 2010 ENAHO with deterioration to the extent that the relationships between indicators and poverty status change over time.

¹⁸ Although USAID has not specified confidence levels nor intervals, IRIS Center (2007a and 2007b) says that a sample $n = 300$ is sufficient for USAID reporting. In Peru, USAID microenterprise partners should report using the new-definition USAID “extreme” line. Given the α factor of 0.90 for this line (Figure 9), an expected before-measurement household-level poverty rate of 12.3 percent (the all-Peru rate for this line in 2010, Figure 1), and a confidence level of 90 percent (so $z = 1.64$), then $n = 300$ implies a confidence interval of $\pm 0.90 \cdot 1.64 \cdot \sqrt{\frac{0.123 \cdot (1 - 0.123)}{300}} = \pm 2.8$ percentage points.

7. Estimates of changes in poverty rates over time

The change in a group's poverty rate between two points in time is estimated as the change in the average poverty likelihood of the households in the group.

7.1 Warning: Change is not impact

Scoring can estimate change. Of course, poverty could get better or worse, and scoring does not indicate what caused change. This point is often forgotten or confused, so it bears repeating: the scorecard simply estimates change, and it does not, in and of itself, indicate the reason for the change. In particular, estimating the impact of 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, the scorecard can help estimate program impact only if there is some way to know what would have happened in the absence of the program. And that information must come from somewhere beyond the scorecard.

7.2 Calculating estimated changes in poverty rates over time

Consider the illustration begun in the previous section. On Jan. 1, 2013, a program samples three households who score 20, 30, and 40 and so have poverty likelihoods of 84.5, 66.9, and 38.9 percent (new-definition national line, Figure 4).

Adjusting for the known bias of -0.7 percentage points (Figure 9), the group's baseline estimated poverty rate is the households' average poverty likelihood of $[(84.5 + 66.9 + 38.9) \div 3] - (-0.7) = 64.1$ percent.

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

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

By way of illustration, suppose that a year later on Jan. 1, 2014, the program samples three additional households who are in the same population as the three original households (or suppose that the program scores the same three original households a second time) and finds that their scores are 25, 35, and 45 (poverty likelihoods of 77.0, 52.0, and 26.5 percent, new-definition national line, Figure 4).

Adjusting for the known bias, the average poverty likelihood at follow-up is $[(77.0 + 52.0 + 26.5) \div 3] - (-0.7) = 52.5$ percent, an improvement of $64.1 - 52.5 = 11.6$ percentage points.¹⁹

Thus, about one in nine participants in this hypothetical example crossed the poverty line in 2013.²⁰ Among those who started below the line, about one in five or six ($11.6 \div 64.1 = 18.1$ percent) on net ended up above the line.²¹

¹⁹ Of course, such a huge reduction in poverty in one year is highly unlikely, but this is just an example to show how the scorecard can be used to estimate change.

²⁰ This is a net figure; some people start above the line and end below it, and vice versa.

²¹ The scorecard does not reveal the reasons for this change.

7.3 Accuracy for estimated change in two independent samples

Given the new scorecard for Peru built from the construction/calibration sample from the 2010 ENAHO, an estimate of the change in the poverty rate over time from two independent samples is the difference between a baseline estimate from the 2010 validation sample and a follow-up estimate from another given full ENAHO year (2004–9, or 2011).²² This set-up mimics how the scorecard would be used in practice to estimate change. In particular, it is both out-of-sample (the baseline and follow-up estimates are based on data that is not used to construct the scorecard) and out-of-time (the follow-up data is from a different year than the construction data). Of course, the test can only use data from the past, so while it is the best-available guide to future accuracy, it is necessarily imperfect.

For the new-definition and legacy poverty lines, Figure 10 shows the difference between the scorecard’s estimated change in household-level poverty rates and the true change. For the example of the new-definition national poverty line with a baseline of 2010 and a follow-up of 2004, the true change in the poverty rate is 25.4 percentage points (Figure 1), and the scorecard’s estimate of 21.9 percentage points is too low by

²² Peru’s ENAHO data enables this test in several unique ways: the ENAHO is done each year; the questionnaire changed little from 2004–11; the data overall is high-quality; and full data and documentation are available (inei.gob.pe/srienaho/Enaho2011N.asp, retrieved 29 December 2012).

3.5 percentage points (Figure 10).²³ Seen relative to the true change, the error is about $3.5 \div 25.4 = 14$ percent of the true value.

Across the 49 tests with new-definition lines, the average absolute error is about 24 percent of the true change. This relative error is highest for one-year-out estimates when the true change is smallest (about 25 percent for 2010 to 2009, and about 55 percent for 2010 to 2011), and it decreases as the true change gets larger over time (about 19 percent for two- to five-years-out, and about 14 percent for six-years-out). With the legacy lines, accuracy is similar or better.

In terms of precision (as indicated by the α factor for a given line in Figure 10), confidence intervals for estimates of change between two points in time are about 30- to 60-percent wider than for estimates of poverty rates at a point in time (Figure 9). For a given poverty line, precision varies little with the time between baseline and follow-up.

Are scoring's estimates of change over time accurate enough? There is no objective standard for answering this question, as it depends on the context and the goal of the analysis. Perhaps the weakest benchmark is whether the estimates have the right sign. In the tests here, scoring always gets the direction of change correct.

Beyond that low hurdle, another way to help judge whether estimates are likely to be useful is via the relative error (averaging 24 percent, as discussed above). For example, a three-year-out estimated change of, say, -8.6 percentage points (what

²³ Of the 70 year-pair/poverty line tests in Figure 10 (49 for new lines and 21 for legacy lines), 66 have a smaller absolute error than this one.

scoring estimates for the new-definition national line between 2007–10) suggests that the true change is probably in the range of $-8.6 \times 1.25 = -10.8$ to $-8.6 \times 0.75 = -6.5$ percentage points.

Most formally, accuracy can be gauged via the standard statistical concepts of bias (“Estimate minus true value” in Figure 10) and precision (reported in Figure 10 for 1,000 bootstraps with $n = 16,384$ and 90-percent confidence under “Precision of difference” and more generally as formulas for standard errors using the α factor in Figure 10).

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

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

z , c , \hat{p} and N are defined as above, n is the sample size at both baseline and follow-up,²⁴ and α is the average (across a range of bootstrapped sample sizes) of the ratio of the observed confidence interval from a scorecard and the theoretical confidence interval under direct measurement.

²⁴ 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 scorecard, where \tilde{p} is based on previous measurements and is assumed equal at both baseline and follow-up:

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

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

To illustrate the use of 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 ($c = \pm 0.02$), the poverty line is the new-definition national line, $\alpha = 1.13$ (the average α across years for the new-definition national line in Figure 10), $\hat{p} = 0.256$ (from Figure 1), and the population N is large enough relative to the expected sample size n that the finite population correction factor ϕ can be taken as one. Then the baseline sample size is $n = 2 \cdot \left(\frac{1.13 \cdot 1.64}{0.02} \right)^2 \cdot 0.256 \cdot (1 - 0.256) \cdot 1 = 3,271$, and the follow-up sample size is also 3,271.

There can be no general, once-and-for-all answer as to whether the scorecard is accurate enough to be useful for measuring change over time. Nevertheless, the tests for Peru here are the best evidence so far, and they encourage the hope that scoring can be useful for this purpose. Despite concerns that a given scorecard will become increasing

inaccurate as relationships between indicators and poverty change over time and as poverty rates change, accuracy did not degrade much over eight years as household-level poverty rates by the new-definition national line were cut in half (from 51.0 percent in 2004 to 25.6 percent in 2010 and 23.1 percent in 2011). Relative error is low enough to make scoring's estimates informative in terms of sign (that is, whether poverty went up or down) and magnitude (that is, whether poverty went up or down a lot).

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 scorecard to estimate change for a single group of households, all of whom are scored at two points in time, is:²⁵

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

where z , c , α , N , and n are defined as usual, \hat{p}_{12} is the share of all sampled households that move from below the poverty line to above it, and \hat{p}_{21} is the share of all sampled households that move from above the line to below it.

The formula for confidence intervals can be rearranged to give a formula for sample size before measurement. This requires an estimate (based on information available before measurement) of the expected shares of all households who cross the

²⁵ See McNemar (1947) and Johnson (2007). John Pezzullo helped find this formula.

poverty line \tilde{p}_{12} and \tilde{p}_{21} . Before measurement, it is reasonable to assume that the change in the poverty rate will be zero, which implies $\tilde{p}_{12} = \tilde{p}_{21} = \tilde{p}_*$, giving:

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

Because \tilde{p}_* could be anything between 0–0.5, more information is needed to apply this formula. Suppose that the observed relationship between \tilde{p}_* , the number of years y between baseline and follow-up, and $p_{\text{pre-baseline}} \cdot (1 - p_{\text{pre-baseline}})$ is—as in the 2007 EHANO data for Peru (Schreiner, 2009)—close to:²⁶

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

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

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

In Peru’s 2007 ENAHO data (the only source of an estimate, Schreiner 2009), 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 ($c = \pm 0.02$), the poverty line is the new-definition national line, the sample will first be scored in 2013 and then again in 2016 ($y = 3$), and the population N is so large relative

²⁶ As noted earlier, Schreiner (2009) mistakenly constructed Peru’s 2007 scorecard using only non-panel data with combined panel-and-non-panel weights. Nevertheless, the estimates there for the accuracy and precision for out-of-sample test on the panel data are used here because they are only ones available.

to the expected sample size n that the finite population correction factor ϕ can be taken as one. The pre-baseline poverty rate p_{2010} is taken as 25.6 percent (Figure 1), and suppose $\alpha = 1.30$. Then the baseline sample size is

$$n = 2 \cdot \left(\frac{1.30 \cdot 1.64}{0.02} \right)^2 \cdot \left\{ -0.02 + 0.016 \cdot 3 + 0.47 \cdot [0.256 \cdot (1 - 0.256)] \right\} \cdot 1 = 2,671. \text{ The same}$$

group of 2,671 households is scored at follow-up as well.

8. Targeting

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

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

Targeting is successful when households truly below a poverty line are targeted (*inclusion*) and when households truly above a poverty line are not targeted (*exclusion*). Of course, no scorecard is perfect, and targeting is unsuccessful when households truly below a poverty line are not targeted (*undercoverage*) or when households truly above a poverty line are targeted (*leakage*). Figure 11 depicts these four possible targeting outcomes. Targeting accuracy varies by the cut-off score; a higher cut-off has better inclusion (but greater leakage), while a lower cut-off has better exclusion (but higher undercoverage).

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

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

Figure 12 shows the distribution of households by targeting outcome for Peru. For an example cut-off of 35–39, outcomes for the new-definition national line in the 2010 validation sample are:

- Inclusion: 16.4 percent are below the line and correctly targeted
- Undercoverage: 9.2 percent are below the line and mistakenly not targeted
- Leakage: 7.1 percent are above the line and mistakenly targeted
- Exclusion: 67.2 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: 19.6 percent are below the line and correctly targeted
- Undercoverage: 6.0 percent are below the line and mistakenly not targeted
- Leakage: 12.1 percent are above the line and mistakenly targeted
- Exclusion: 62.3 percent are above the line and correctly not targeted

Which cut-off is preferred depends on total net benefit. If each targeting outcome has a per-household benefit or cost, then total net benefit for a given cut-off is:

Benefit per household correctly included	x	Households correctly included	–
Cost per household mistakenly not covered	x	Households mistakenly not covered	–
Cost per household mistakenly leaked	x	Households mistakenly leaked	+
Benefit per household correctly excluded	x	Households correctly excluded.	

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

- Assign benefits and costs to possible outcomes, based on its values and mission
- Tally total net benefits for each cut-off using Figure 12 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 and leakage. It is healthy to go through a process of thinking explicitly and intentionally about how possible targeting outcomes are valued.

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

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

Figure 12 shows “Total Accuracy” for all cut-offs for the Peru scorecard. For the new-definition national line in the 2010 validation sample, total net benefit is greatest (83.6) for a cut-off of 39 or less, with about five in six households in Peru 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 $(2 \times \text{Households correctly included}) + (1 \times \text{Households correctly excluded})$.²⁷

As an alternative to assigning benefits and costs to targeting outcomes and then choosing a cut-off to maximize total net benefit, a program could set a cut-off to

²⁷ Figure 12 also reports “BPAC”, discussed in the next section.

achieve a desired poverty rate among targeted households. The third column of Figure 13 (“% targeted who are poor”) shows, for the Peru scorecard applied to the 2010 validation sample, the expected poverty rate among households who score at or below a given cut-off. For the example of the new-definition national line, targeting households who score 39 or less would target 23.6 percent of all households (second column) and produce a poverty rate among those targeted of 69.7 percent (third column).

Figure 13 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-definition national line with the 2010 validation sample and a cut-off of 39 or less, 64.1 percent of all poor households are covered.

The final targeting measure in Figure 13 is the number of successfully targeted poor households for each non-poor household mistakenly targeted (right-most column). For the new-definition national line with the 2010 validation sample and a cut-off of 39 or less, covering 2.3 poor households means leaking to 1 non-poor household.

9. Context of poverty-assessment tools for Peru

This section discusses five existing poverty-assessment tools for Peru in terms of their goals, data, methods, poverty lines, indicators, bias, precision, and targeting accuracy.²⁸

Compared with alternatives, the new scorecard here is unique and valuable in that it:

- Uses the latest nationally representative data
- Supports Peru’s new-definition poverty lines
- Tests its estimates out-of-sample and—when relevant—out-of-time
- Reports formulas for standard errors
- Checks accuracy for estimates of changes in poverty rates over time
- Is about as accurate as alternatives in terms of targeting and in terms of estimating poverty rates at a point in time
- Is feasible for local, pro-poor organizations due to its simplicity and transparency

9.1 Gwatkin *et al.*

Gwatkin *et al.* (2007) construct a poverty-assessment tool for Peru with an approach that they use in 56 countries with Demographic and Health Surveys (Rutstein and Johnson, 2004). They use Principal Components Analysis to make an asset index from simple, low-cost indicators available for the 28,900 households in Peru’s 2000 DHS.

²⁸ Several other poverty-assessment tools for Peru are not reviewed here because they appear in work that does not focus on the tool, because they are less comparable to the scorecard here, or because they were reviewed in Schreiner (2009) and have since been superceded (Bollen, Glanville, and Stecklov, 2007; IRIS Center (2007c); Johannsen, 2006; Zeller *et al.* (2006b); Zeller, Alcaraz V., and Johannsen, 2005; Copestake *et al.*, 2005; Ferguson *et al.*, 2003; and Meyer, Nagarajan, and Dunn, 2000.)

The PCA index is like the scorecard here except that, because the DHS does not collect data on expenditure, it is based on a different conception of poverty, its accuracy vis-à-vis expenditure-based poverty is unknown, and it can only be assumed to be a proxy for long-term wealth/economic status.²⁹ Well-known examples of the PCA asset-index approach include Filmer and Scott (2012), Stifel and Christiaensen (2007), Zeller *et al.* (2006a), Filmer and Pritchett (2001), and Sahn and Stifel (2000).

The 19 indicators in Gwatkin *et al.* are similar to those in the new scorecard here in terms of their simplicity, low cost, and verifiability:

- Characteristics of the residence:
 - Type of floors
 - Type of walls
 - Type of roof
 - Number of rooms
 - Number of people per sleeping room
 - Type of cooking fuel
 - Source of drinking water
 - Type of toilet arrangement
 - Presence of electricity
- Ownership of consumer durables:
 - Radios
 - Televisions
 - Refrigerators
 - Telephones
 - Computers
 - Bicycles

²⁹ Nevertheless, the indicators are similar and the “flat maximum” is important, so carefully built PCA indexes and expenditure-based poverty-assessment tools may pick up the same underlying construct (perhaps “permanent income”, see Bollen, Glanville, and Stecklov, 2007), and they may rank households much the same. Tests of how well rankings correspond between PCA indexes and expenditure-based poverty-assessment tools include Lindelow (2006), Wagstaff and Watanabe (2003), and Montgomery *et al.* (2000).

- Motorcycles
- Cars
- Whether the household has a domestic servant
- Whether any household members work their own or family’s agricultural land

Gwatkin *et al.* propose 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 PCA index are similar to those of the scorecard here.

Still, the Gwatkin *et al.* index is more difficult and costly to use because it cannot be computed by hand in the field. In particular, finding a household’s index value requires adding up 62 point values, half of which are negative and all of which have five decimal places.

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

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

The asset-index approach defines people as *poor* if their assets (physical, human, financial, and social) fall below a threshold. Arguments for the asset-based view include Carter and Barrett (2006), Schreiner and Sherraden (2006), Sahn and Stifel (2003), and Sherraden (1991). The main points in its favor are that:

- Asset ownership is easier to measure accurately than expenditure
- Access to resources in the long term—and thus capacity to produce income and to consume—depends on the control of assets
- Assets get at capability more directly, the difference between, say, “Does your income permit adequate sanitation?” versus “Does your toilet have a septic tank?”

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

9.2 Sahn and Stifel

Like Gwatkin *et al.* and this paper, Sahn and Stifel (2003) seek a low-cost, practical way to measure poverty. They build an asset index using factor analysis (like PCA) using the 3,623 households in Peru’s 1994 ENAHO. They seek “to see if there exist simpler and less demanding alternatives to collecting data on expenditure for purposes of measuring economic welfare and ranking households” (p. 484). Their motivation is similar to that of the scorecard here: they want tools that are affordable and feasible given constraints on budgets and non-specialists’ technical resources, and

they want to make comparisons over time and countries without the complications and assumptions required for direct measurement via expenditure surveys. Like this paper, they also seek a tool for targeting.

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

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

To check coherency between the asset index and reported expenditure in the 1994 ENAHO³⁰ and between the asset index and child nutrition, Sahn and Stifel rank households in Peru based on the index, on expenditure, and on height-for-age. For each pair, they judge the coherence of the two rankings by the distance between a given household's decile ranks. They conclude that the asset index predicts long-term nutritional status no worse than does current expenditure, and does so more inexpensively and simply. They also report that the asset index predicts expenditure worse than does a scorecard (that is, a least-squares regression that predicts expenditure based on household demographics, education, residence quality, and access

³⁰ Sahn and Stifel check the index against expenditure because it is a common proxy for living standards, not because they believe expenditure should be the benchmark.

to public services). Finally, they find that measurement error is worse for expenditure than for their index.

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

Sahn and Stifel do not report measures that would allow a comparison of the ranking ability—with expenditure as the benchmark—of their asset index versus the scorecard here.

9.3 Madueño, and Llanos and Rosas

Madueño (2006) and Llanos and Rosas (2010) test targeting accuracy for a PCA asset index—derived from ENAHO data—meant to standardize targeting for social-transfer programs in Peru and “to reduce the targeting errors that have been rampant” (Llanos and Rosas, p. 27). Both papers use ENAHO data to compare the index’s in-sample targeting accuracy against old-definition poverty by the national line.³¹

³¹ Like the asset indexes in Gwatkin *et al.* (2007) and Sahn and Stifel (2003), the SISFOH index defines poverty in terms of its own indicators and points. Madueño and

Madueño’s index is constructed from data that combines the 2001–4 ENAHO surveys, and Llanos and Rosas use the 2008 ENAHO. When these authors wrote, Peru’s Household Targeting System (*Sistema de Focalización de Hogares*, SISFOH) was still mostly unused, but it seems to be ramping up now.³²

Responses to indicators are collected via a “single socio-economic scorecard” (*Ficha Socioeconómica Unica*, FSU), which asks about the following 40 indicators drawn from the ENAHO surveys:³³

- Household demographics:
 - Number of household members
 - Males
 - Females
 - Relationship of each household member to the household head
 - Sex of each household member
 - Marital status of each household member
- Education (for each household member):
 - Literacy
 - Highest level and grade/year passed
- Employment (for each household member):
 - Main occupation
 - Sector of activity in which the member works in his/her main occupation
- Characteristics of the residence:
 - Type
 - Tenancy status
 - Type of floor
 - Type of wall
 - Type of roof
 - Number of rooms

Llanos and Rosas compare its rankings against those by expenditure-based poverty status not because expenditure-based poverty status is the gold standard but rather to check the level of coherence between the two definitions.

³² sisfoh.gob.pe/index.shtml, retrieved 30 December 2012.

³³ The FSU is at sisfoh.gob.pe/descargas/ficha_2011_pcm.pdf, retrieved 30 December 2012. The exact indicators and points in the index are not made public.

- Type of cooking fuel
- Source of drinking water
- Type of toilet arrangement
- Source of energy for lighting
- Whether the household has a water account
- Whether the household has an electricity account
- Hours required to travel to the district capital
- Ownership of durable assets:
 - Stereo system
 - Color television
 - DVD
 - Cable television
 - Refrigerator/freezer
 - Gas stove
 - Microwave oven
 - Blender
 - Electric iron
 - Clothes-washing machine
 - Computer
 - Internet
 - Land-line telephone
 - Cellular telephone
- Health:
 - Coverage by health insurance
 - Whether any household member has a handicap
- Whether any household member is a beneficiary of a social-transfer program

All 10 of the indicators in the new scorecard here can be derived from the data collected on the FSU. The FSU requires much more time to complete than does the new scorecard here.

Which tool ranks households better by expenditure-based poverty status? Llanos and Rosas report SISFOH's targeting accuracy by urban and rural areas in the 2008

ENAH0.³⁴ In urban areas (with a household-level poverty rate by 100% of the legacy national line of 18.5 percent), inclusion is 12.2 percent, and exclusion is 61.7 percent. For urban areas with the new scorecard here, inclusion in 2008 is a little lower (11.9 percent) and exclusion is a lot higher (71.9 percent).

In rural areas (poverty rate of 52.3 percent), SISFOH has inclusion of 49.5 percent and exclusion of 19.9 percent. The new scorecard again has a little lower inclusion (47.7 percent) and higher exclusion (22.8 percent).

All in all, the new scorecard here targets about as well as the SISFOH tool. This is remarkable because—compared with SISFOH—the scorecard has:

- Fewer indicators (10, versus probably more than 40)
- Fewer tools (one for all of Peru, versus one each for urban and rural)
- Stricter testing (out-of-sample and out-of-time, versus in-sample)

Even if SISFOH comes to cover most relevant households and even if it is widely adopted by the government’s social-transfer programs, the scorecard here may still be useful to local pro-poor organizations because it:

- Estimates expenditure-based poverty rates
- Is simpler and more transparent
- Gives the local pro-poor organization greater control over its poverty data:
 - Can be reapplied when the organization desires
 - Can be applied to whom the organization desires
 - Permits relating poverty with other data that the organization collects

³⁴ Madueño reports targeting accuracy in the 2001–4 ENAH0 data, but this is less relevant than Llanos and Rosas’ tests with the 2008 data.

9.4 Grosh and Baker

Grosh and Baker (1995) built the first poverty-assessment tool for Peru. They use data from the 1990 Living Standards Measurement Survey of 1,500 households in Lima (Glewwe and Hall, 1991). The poverty line is set at the 30th percentile of expenditure. Stepwise regression with ordinary least-squares is used to select 11 simple, verifiable indicators to estimate per-capita household expenditure:

- Household demographics:
 - Number of household members
 - Whether the household head is a male
- Education: Type of schooling
- Characteristics of the residence:
 - Area in Lima
 - Type of walls
 - Type of floor
- Ownership of consumer durables:
 - Radio
 - Television
 - Refrigerator
 - Telephone
 - Car

Grosh and Baker focus on targeting, not estimating poverty rates. Accuracy is measured as undercoverage and leakage (or, equivalently, inclusion and exclusion).

Grosh and Baker also look at who is mistargeted, and by how far.

Grosh and Baker's tool, when targeting households in the lowest three deciles of their index, has inclusion of 13.9 percent and exclusion of 59.5 percent (p. 20). For comparison, the 2010 scorecard here, when applied out-of-sample and out-of-time to the 2008 ENAHO and the new-definition national line (which gives a household level poverty rate of 31.1 percent, comparable to the 30 percent in Grosh and Baker), has

inclusion of 14.4 percent and exclusion of 65.9 percent. Thus, the scorecard here (tested out-of-sample and out-of-time) targets better than Grosh and Baker (tested in-sample).

Grosh and Baker is a seminal paper in the field, and it is the first to document several key properties of poverty-assessment tools:

- Simple statistical techniques can be almost as accurate as complex ones
- Focusing the tool on poorer segments (supposing those segments can be identified in the first place) can improve accuracy
- Accuracy can be robust to households' misrepresentation or to enumerators' errors
- There are rapidly diminishing returns to additional indicators
- Fine-tuning for urban/rural differences has low returns
- "Among all targeting mechanisms, proxy means tests [poverty-assessment tools] produce the best incidence outcomes" (p. 1).

9.5 IRIS Center

USAID commissioned IRIS Center (2011) to build a “Poverty Assessment Tool” (PAT) for use by USAID’s microenterprise partners in Peru when reporting the share of their participants who are “very poor”. The PAT is constructed with three-fourths of the 21,753 households in the 2009 ENAHO; the other one-fourth is reserved for out-of-sample validation. The PAT supports five poverty lines, all based on Peru’s old definition of poverty status:

- Food line (poverty rate not reported)
- USAID “extreme” line, with a reported household-level poverty rate of 15.9 percent
- Halfway between the USAID “extreme” line and the national line (poverty rate not reported)
- National line, with a reported household-level poverty rate of 31.8 percent³⁵
- 150% of the national line (poverty rate not reported)

The PAT in IRIS Center (2011) supercedes an earlier version (IRIS Center, 2007c) that was based on a custom 2004 survey of 800 households. In turn, the earlier PAT built on Johannsen (2006) and Zeller, Alcaraz V., and Johannsen (2005).³⁶ Beyond using more-recent data, the updated PAT improves on earlier versions in a number of ways.

³⁵ IRIS’ 31.8-percent household-level poverty rate for the 2009 legacy national line does not match that in Figure 1 (29.0 percent). INEI (2011) does not report household-level rates, but it does report a person-level poverty rate for the 2009 legacy national line of 34.8 percent (p. 35), which matches Figure 1 and that suggests that the household-level rate in Figure 1 here is probably correct.

³⁶ Schreiner (2009) reviews all three of these predecessors to IRIS (2011).

In general, the PAT is like the scorecard here, except that it:

- Uses slightly older data (2009 rather than 2010)
- Has a few more indicators (15 rather than 10)
- Estimates expenditure quantiles (rather than poverty likelihoods)
- Supports only old-definition poverty lines (rather than also the new definition)
- Hides the tool's points from end-users (rather than making them transparent)
- Does not report formulas for standard errors

After comparing several statistical approaches,³⁷ IRIS settles on quantile regression. The PAT estimates the expected value of the 42nd percentile of the logarithm of per-capita household expenditure, conditional on tool responses. A household is classified as “poor” if this estimate is less than a given poverty line.

The PAT's 15 indicators are simple and verifiable:

- Household demographics:
 - Household size (and its square)
 - Age of the household head (and its square)
 - Marital status of the household head
 - Dependency ratio
- Education:
 - Education of the household head
 - Share of household members with no education
- Characteristics of the residence:
 - Location in a poverty-line region
 - Number of rooms
 - Type of roof
 - Type of cooking fuel
- Number of assets owned:
 - Radios
 - Color televisions
 - Gas stoves
 - Refrigerators/freezers
 - Cars, vans, or pick-up trucks

³⁷ Thanks to the “flat max”, all methods have roughly the same “Total Accuracy”.

IRIS reports accuracy in terms of:

- Bias and precision of estimated poverty rates at a point in time³⁸
- Targeting (inclusion, undercoverage, leakage, and exclusion)
- The Balanced Poverty Accuracy Criterion, USAID’s standard for certifying PATs

BPAC was first proposed in IRIS Center (2005). It considers accuracy in terms of inclusion and in terms of the absolute difference between undercoverage and leakage

(that is, bias). The formula is
$$\text{BPAC} = 100 \cdot \left(\frac{|\text{Inclusion} - |\text{Undercoverage} - \text{Leakage}||}{\text{Inclusion} + \text{Undercoverage}} \right).$$

Because bias is the difference between undercoverage and leakage, and because the normalization term $\frac{100}{\text{Inclusion} + \text{Undercoverage}}$ is not useful unless BPAC is used to compare poverty-assessment tools applied to populations with different poverty rates, the formula can be simplified to $\text{BPAC} = |\text{Inclusion} - |\text{Bias}||$. IRIS maximizes BPAC by choosing the cut-point for its quantile regression so as to make undercoverage the same as leakage (so bias is zero) when the share of households who are targeted is the same as the poverty rate in the population.

Expressing BPAC as $|\text{Inclusion} - |\text{Bias}||$ is useful because it helps to show why BPAC is not useful for comparing the PAT to the scorecard. Regardless of whether undercoverage differs from leakage, the scorecard always produces unbiased estimates of poverty rates. This is because, unlike the PAT’s expenditure-estimation approach, the scorecard does not use a cut-off to classify households (for the purpose of estimating

³⁸ IRIS (2005) calls bias the “Poverty Incidence Error” (PIE) and shows that it is the same in their expenditure-estimation approach as the absolute value of the difference between undercoverage and leakage.

poverty rates) as 100-percent poor or 100-percent non-poor. Instead, households have a poverty likelihood somewhere in the range of 0 to 100 percent. If a user of a scorecard sets a targeting cut-off, then it matters only for targeting, and it does not affect the estimation of poverty rates at all.

Given that both the PAT and the scorecard give unbiased estimates of poverty rates, any distinction between them must relate to targeting accuracy or to the precision of estimates of poverty rates. An apples-to-apples test requires that both tools be applied to a population with the same poverty rate. IRIS reports a household-level poverty rate for the 2009 legacy national line of 31.8 percent, but the rate here (Figure 1) is 29.0 percent. To adjust for this, the 2009 legacy national line is adjusted upward proportionally by about 5 percent to make the rate 31.8 percent.

IRIS also reports in-sample and out-of-sample tests for the 2009 legacy USAID “extreme” line, with a household-level poverty rate of 15.9 percent (half of the rate for IRIS’ legacy national line of 31.8 percent). Although this paper does not report poverty likelihoods for a legacy USAID “extreme” line because measures of change over time for this relative line are difficult to interpret, one was created for the purpose of comparison with the PAT. To match IRIS’ 15.9-percent household-level poverty rate for the legacy USAID “extreme” line requires increasing the national line by another 1 percent as well as having only a single national line rather than seven regional lines.

In its in-sample test for the 2009 legacy national line,³⁹ IRIS reports inclusion of 24.7 percent and exclusion of 60.4 percent. When applied out-of-sample and out-of-time to the full 2009 ENAHO with a cut-off (44 or less) that leads to about the same inclusion (25.2 percent), the new scorecard here has worse exclusion (54.8 percent).

In the PAT's out-of-sample test for the 2009 USAID "extreme" line with its one-fourth validation sample, inclusion is 9.7 percent and exclusion is 77.9 percent. For the scorecard here with the cut-off that gives inclusion of 9.7, exclusion is the same as for the PAT (77.9 percent).

To sum up the comparison of targeting accuracy, the PAT and the scorecard are tied in an out-of-sample test. In an in-sample test, the PAT has better exclusion. Considering the stricter out-of-sample/out-of-time test for the scorecard here and considering that in-sample tests of poverty-assessment tools in Copestake *et al.* (2005) and Johannsen (2006) overstate accuracy by 17 and 8 percent, the PAT and the scorecard probably have about the same targeting accuracy.

In terms of the precision of estimated poverty rates, IRIS reports a 95-percent ($z = 1.96$) confidence interval of $\pm c = \pm(4.35 - 2.30) \div 2 = \pm 1.025$ percentage points for the difference between the PAT's estimates and true values in 1,000 bootstrapped out-of-sample tests (each with $n = 5,438$) for its 2009 legacy USAID "extreme" line and its reported household-level poverty rate of 15.9 percent. With direct measurement, the 95-

³⁹ IRIS does not report out-of-sample results for this line.

percent confidence interval is $\pm 1.96 \cdot \sqrt{\frac{0.159 \cdot (1 - 0.159)}{5,438}} \cdot 1 = \pm 0.972$ percentage points.

Thus, an estimate of the PAT's α factor for this poverty line is $1.025 \div 0.972 = 1.05$.

For the scorecard and this line, the α factor is 0.65. Thus, the PAT's confidence intervals for estimated poverty rates are about 1.6 times wider.

To sum up the accuracy comparison for the PAT versus the scorecard:

- Both approaches give unbiased estimates of poverty rates
- The scorecard gives more precise estimates of poverty rates
- Both approaches have about the same targeting accuracy

Even though IRIS reports targeting accuracy for the PAT and even though the BPAC formula considers targeting accuracy, IRIS says that the PAT should not be used for targeting.⁴⁰

IRIS also doubts that the PAT can be useful for measuring change, 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.”⁴¹

⁴⁰ <http://www.povertytools.org/faq/faq.html#11>, retrieved 19 February 2009.

⁴¹ <http://www.povertytools.org/faq/faq2.html>, retrieved 7 December 2012.

In contrast, these possible uses are supported for the scorecard. This paper reports targeting accuracy as well as margins of error (formula for standard errors) for measures of change over time so that users can decide for themselves whether accuracy is adequate for their purposes.

10. Conclusion

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

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

The scorecard is constructed with data from Peru's 2010 ENAHO and replaces an earlier one based on data from the 2007 ENAHO (Schreiner, 2009). The new 2010 scorecard is calibrated to eight new-definition poverty lines and seven legacy lines. First-time scorecard users should use only the new scorecard with the new-definition lines. Existing users of the 2007 scorecard should also switch to the new scorecard. They should use both the new definition lines (to establish a baseline looking forward), and they can—if desired—use the legacy lines to measure change looking backward from a baseline from the 2007 scorecard to a follow-up with the new 2010 scorecard.

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

When the scorecard is applied to the 2010 validation sample with $n = 16,384$, the absolute difference between estimates versus true poverty rates at a point in time is 1.3 percentage points or less. On average, the absolute differences are about 0.4 percentage points for the new-definition lines and about 0.3 percentage points for the legacy lines. Subtracting this known bias from the original poverty-rate estimates will give unbiased estimates. For $n = 16,384$ and 90-percent confidence, the precision of these differences is ± 0.6 percentage points or better.

The Peru data allow the best test yet of scoring's accuracy for estimating changes in poverty rates between two points in time. The average absolute bootstrapped differences between 49 pairs of baseline and follow-up estimates with the new-definition lines and $n = 16,384$ is 1.2 percentage points. The average absolute error (relative to the true change) is about 24 percent. Relative error is highest for one-year-out estimates but decreases as more time passes and poverty changes more. Results are similar or better for the legacy lines. For all lines, precision with $n = 16,384$ and 90-percent confidence is within ± 1.0 percentage points. Even though poverty rates fell sharply and even though the test data span seven years, accuracy degrades little. While a general conclusion is not possible, the evidence here for Peru encourages the hope that scoring can usefully measure change over time.

If a program wants to use the scorecard for targeting, then the results here provide the information that helps to select a cut-off that fits its values and mission.

Although the statistical technique is innovative, and although technical accuracy is important, the design of the scorecard here focuses on transparency and ease-of-use. After all, even a perfectly accurate scorecard would be worthless if programs feel so daunted by its complexity or its cost that they do not even try to use it. For this reason, the scorecard is kept simple, using ten indicators that are inexpensive to collect and that are straightforward to verify. Points are all zeros or positive integers, and scores range from 0 (most likely below a poverty line) to 100 (least likely below a poverty line). 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 summary, the scorecard is a practical, objective way for pro-poor programs in Peru to estimate expenditure-based poverty rates, track changes in poverty rates over time, and target services. The same approach can be applied to any country with similar data.

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Guidelines for the Interpretation of Scorecard Indicators

The quoted material here comes from:

Instituto Nacional de Estadística e Informática. (2011) *Manual del Encuestador Básico: Encuesta Nacional de Hogares 2011, Condiciones de Vida y Pobreza*, Lima, <http://www.inei.gob.pe/srienahto/descarga/DocumentosZIP/2011-55/Manual-Encuestador.zip>, retrieved 24 December 2012.[the *Manual*]

General guidelines for the interviewer

According to pp. 14–16 in the *Manual*, the enumerator should “strictly follow the instructions in this manual” [including this one]. The enumerator should “personally perform the duties required without delegating them to someone else and without taking anyone with him/her on the interviews who has no business being there. [The enumerator should] personally visit the respondents in their homes to conduct the interview, always following the instructions in this guide carefully. The enumerator should carry this guide at all times.” After finishing the interview, the enumerator should “review the recorded responses . . . to detect and correct possible errors or inconsistencies.” Finally, the enumerator should always “uphold the highest standards of behavior.”

“Do not:

- Falsify data
- Delegate your work to someone else
- Quit your job
- Do other work while you are on the job as an enumerator
- Intimidate respondents or talk about politics, religion, etc.
- Ask for (or accept) gifts (in-kind or in-cash) from respondents
- Disclose any information collected via the survey, except to those authorized for this purpose”

Interviewing tips

According to pp. 16–18 in the *Manual*, “An interview is a dialog between the enumerator and the respondent. Successful interviewing is an art, and as an art it should not be done mechanically. Rather, it should unfold like a normal conversation between two people.”

Beginning the interview

According to pp. 16–17 in the *Manual*, “When the interview begins, the respondent does not know you. Winning the respondent’s good-faith cooperation depends critically on first impressions, including your physical appearance, the first things you do, and your first words.”

“For example, you should be self-confident and always stay in control. At the same time, you should not frighten the respondent, for example, by overemphasizing the official nature of the survey.

“You should be friendly and respectful. Always keep in mind that the respondents are important and that they provide invaluable data.

“You should introduce yourself to the respondent. An example way to do this is: ‘Good morning, my name is [name], and I work for [organization]. Here is my identification badge. I would like to speak with you.’

“When you request permission to do the interview, it is a good idea to be vague about the amount of time needed. If the respondent asks, just provide a rough estimate. Often, respondents who claim ‘I do not have the time’ will end up cooperating if you start asking the questions quickly and efficiently, involving them in the interview process.

“Some specific issues that may arise in an interview are:

- *Respondent is too busy.* If the respondent declares that he/she does not have time for the interview, then you should immediately offer to come back later and try to set up a specific date and time
- *Refuses to cooperate.* Some respondents will refuse to participate. When this happens, you should use all of your skill and every effort to change his/her mind
- *Presence of people who are not household members.* The presence of third parties can reduce the quality of the data, so do what you can to avoid them. The presence of third parties may induce the respondent to give answers based on his/her beliefs and perceptions about what others expect, rather than the reality of his/her own experiences and perspectives

How to motivate the respondent

“Briefly explain that you are surveying participants of [organization] for the purpose of . . . better understanding how they live . . . and that therefore you would like to request his/her cooperation in providing accurate responses.

How to ask the questions

“To conduct the interview quickly and smoothly, you should study the questionnaire until you know it forwards and backwards. To avoid contaminating responses with your own point of view or personality, follow these rules:

- Read the questions exactly as written in the questionnaire
- Follow the order of the questions as laid out in the questionnaire
- Do not lead the respondent in the direction of any particular response, for example, by suggesting one of several alternatives

Confidentiality of the data

“Before asking any questions, assure the respondent that all data collected will be kept confidential. Explain that under no circumstances will their names, addresses, or any other identifying information be associated with their responses. Tell them that the data collected will be used [to improve the management of your organization]. Never show the information that you collect to anyone who is not officially authorized to see it.

Tips for maintaining neutrality

“The questionnaire has been carefully designed to avoid suggesting responses to the respondent. It is, therefore, critical that you remain neutral.

“If you do not read the question carefully, completely, and exactly as it is written, then this neutrality could be destroyed.

If the respondent gives a vague or imprecise response, then you should gently probe—in a neutral way—saying ‘Could you repeat that?’ or ‘I could not hear what you said.’ Never record something that differs from the respondent’s response.

“Never suggest—whether by the expression on your face or by the tone of your voice—that the respondent has made a mistake or said something wrong. Sometimes, a respondent will ask you, the enumerator, for your opinion or point of view. When this happens, say, “It is your opinion that matters for this survey.” If you like, you can talk about your opinions with the respondent for a few minutes, after the interview is over.

Managing the interview

“Be serious about the quality of your work, but do not be so anxious and rigid that you seem to be inflexible.

“From the point of view of the respondent, the interview should seem like an opportunity to share information and to discuss his/her own perspectives. Thus, your remarks should be as brief as possible, serving mainly to encourage the respondent to continue responding to the questions.

“If the respondent rambles on without answering a question, or if the respondent talks about things that do not pertain to the survey, then it is wise to refrain from interrupting. Nevertheless, use tact and try to bring the discussion back on-topic as soon as you can.

Dealing with vague responses

“Be prepared for evasive answers. Sometimes, a respondent will give vague, imprecise, or contradictory answers. Or he/she may just say, “I don’t know” or even refuse to answer outright. When this happens, try to encourage the respondent, build up his/her confidence, and help him/her feel more comfortable before continuing with the next question.

Probe when responses are incomplete or inadequate

“Sometimes, the respondent will give an answer that, from the point of view of the survey, is inadequate. This might happen, for example, if the response is incomplete, off-topic, or if the respondent simply does not know the answer.

“In order to obtain a better response, use follow-up questions. This process of digging deeper is called *probing*. When you probe, be sure to use neutral words so as not to suggest specific answers.

Do not assume that you know what a response will be

“Regardless of the socio-economic or sociological characteristics of the respondent or the location or the quality of the residence, you should not assume that you know any answers without actually asking the question and receiving a response from the respondent.

Do not rush the interview

“Ask questions slowly so that the respondent understands them. After asking a question, wait; give the respondent time to think.

End of the interview

“Once you have completed the survey, do not rush out the door so abruptly that the respondent gets the feeling that he/she has been ‘used’. A few minutes of polite, pleasant conversation will go a long way toward maintaining the respondent’s good will. . . . A little later, thank the respondent for his/her cooperation, and then say good-bye and take your leave.”

Guidelines for specific scorecard indicators

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

According to the cover page of the survey instrument, a *household* is “the person or group of people who eat from the same pot and who cooperate together to fulfill their other basic needs.”

According to p. 52 of the *Manual*, a *household* “is the group of people—regardless of their blood relationship (parents, single children, married children, brothers, uncles, etc.)—who occupy all or part of a residence, who share their main meals, and who work together to meet their basic needs. This group of household members also includes whomever the head of the household considers it to include (such as adopted children, good friends, godparents, etc.). A *household* may consist of a single person.”

According to p. 89 of the *Manual*, the definition of *household* excludes “domestic servants who stay overnight in the household, as well as all lodgers (regardless of how many days they have been staying with the household).”

According to Section 200 of the survey instrument, the enumerator should “remember to record absent household members and newborns.”

2. In the past week, how many household members ages 14 or older did any work? (not counting household chores)
- A. One or none
 - B. Two
 - C. Three
 - D. Four or more

According to p. 96 of the *Manual*, “This question asks about market activities.”

According to pp. 209–211 del *Manual*, the objective is to “determine which people worked during the reference week.

“To determine whether a person works, consider whether the economic activity that the person did is a market activity or a non-market activity.

“An *economic activity* is the production of goods and services as defined in the United Nations’ System of National Accounts. It includes all types of market activities and some types of non-market production. In particular, it includes the production and processing of primary commodities for home consumption, construction work on one’s own residence or other buildings, and other work that produces durable assets for home use. It excludes non-remunerated activities such as unpaid household chores and voluntary service to the community.

“*Market activities* are those that produce of goods or services for the market.

Examples include:

- Sale of newspapers or lottery tickets
- Unpaid work in a family business
- Cooking food and selling it to factory workers
- Paid religious services
- Working as a cashier in a supermarket, bank, etc.

“*Non-market activities (non-remunerated activities)* are those that do not produce goods and services for the market. Included here are voluntary activities for the community and household work in general. Examples include:

- Taking a turn working in a *comedor popular* (people’s diner) without receiving payment (in cash or in kind) in exchange
- Voluntary, unremunerated preaching
- Raising your own children
- Sewing your own clothes
- Washing cars’ windshields at stoplights in return for tips
- Performing for tips in the street
- Patching streets

- Unremunerated work helping another household member—who does not have his/her own business—in the performance of his/her salaried employment
- Unremunerated domestic chores such as cleaning, mowing the lawn, painting the house, or cooking
- Voluntary work for organizations such as hospitals, parent-teacher associations, alumni clubs, or community work to repair local infrastructure or streets, etc.
- Investing in a business without participating in its management or operations, for example, by owning stock in a public company
- Unremunerated work (*el Anyi*) that involves taking turns with others to work together on large projects (such as building a house or raising a barn) or recurrent tasks (such as celebrating special events)
- Doing unremunerated work to fulfill the requirements for a course of studies

“Keep in mind:

- The production and processing of primary commodities for household consumption is to be considered as an *economic activity* only if it makes up more than half of the household’s consumption
- Performing work for one’s self, even when that work happens to be the same type of work that ones does for the market (such as when a bricklayer builds his/her own house), is never considered to be an *economic activity*
- Unpaid apprentices who work in businesses that are not run by members of their own families is not considered to be occupied (working) because they are in training and they are assumed not to produce goods or services for the business
- Someone who works helping a salaried employee in their job is never considered to be *working*. For example, suppose that the respondent helps his uncle in his salaried position as a trash collector for the city. The nephew is not considered to be *working* even if the uncle pays him for his help

According to p. 208 of the *Manual*, “the *past week* is the calendar week (Sunday to Saturday) that preceded the day of the interview. When the interview takes place on a Saturday afternoon, however, the *past week* is considered to be the calendar week that started on the previous Sunday and ends on the same day (Saturday) in which the interview takes place.”

According to the cover page of the survey instrument, a *household* is “the person or group of people who eat from the same pot and who cooperate together to fulfill their other basic needs.”

According to p. 52 of the *Manual*, a *household* “is the group of people—regardless of their blood relationship (parents, single children, married children, brothers, uncles, etc.)—who occupy all or part of a residence, who share their main meals, and who work together to meet their basic needs. This group of household members also includes whomever the head of the household considers it to include (such as adopted children, good friends, godparents, etc.). A *household* may consist of just one person.”

According to p. 89 of the *Manual*, the definition of *household* excludes “domestic servants who stay overnight in the household, as well as all lodgers (regardless of how many days they have been staying with the household).”

3. What is the highest educational level that the female head/spouse completed?
- A. None, pre-school, or kindergarten
 - B. Grade school (incomplete)
 - C. Grade school (complete), or high school (incomplete)
 - D. No female head/spouse
 - E. High school (complete), or non-college post-secondary (incomplete)
 - F. Non-college post-secondary (complete) or higher

According to p. 85 of the *Manual*, “the *household head* is the person who is recognized as such by the other members of the household and who normally lives with the household in its residence. If there is no concensus about who is the head, then use the following criteria to determine a head:

- Provision of the household’s economic sustenance, and/or
- Responsibility for the household’s well-being

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

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

According to pp. 157–160 in the *Manual*, “*educational level* is the highest year or grade of course work passed by someone within the basic or higher educational system. It covers the following levels:

- *None*: Those who have never gone to school
- *Basic or higher education*: Pre-school/kindergarten, grade school, high school, non-college post-secondary, and college
- *Pre-school/kindergarten*: This includes not only pre-school and kindergarten but also PRONOEI, crèche, day-care, *wawawasi*, and PIETBAF. Keep in mind the following definitions:
 - *Pre-school/kindergarten*: Educational programs—whether public or private—that serve children ages three to five
 - *PRONOEI*: This is the National Non-School Pre-School Program. It is administered by the Ministry of Education and focuses on building the skills needed for reading and writing. It is usually found in peri-urban areas and is run by social workers trained as educators
 - *Crèche/Day-care*: These are public or private programs that provide day-care of children from birth through three years of age while their mothers are at work

- *Wawawasi*: Developed by the INABIF and administered by the Ministry of Education, this program seeks to provide a well-rounded pre-school education to children whose mothers work
- *Grade school (incomplete)*: When a person has not completed grade school, whether as a child or adult, given the current definition of *grade school*
- *Grade school (complete)*: When a person has completed grade school, whether as a child or adult, given the current definition of *grade school*
- *High school (incomplete)*: When a person has not completed the five years of high school, whether as a youth or adult, given the current definition of *high school*
- *High school (complete)*: When a person has completed the five years of high school, whether as a youth or adult, given the current definition of *high school*
- *Non-college post-secondary*: This includes teachers' college and post-secondary professional schools (ESEP). It also includes armed-forces enlisted academies, post-secondary schools of business administration, post-secondary technical institutes, and university majors in education (with courses of study of up to five years). A person is counted as having *non-college post-secondary (complete)* if he/she has completed the entire course of studies. Otherwise, the person is counted as having *non-college post-secondary (incomplete)*. Courses of studies generally last at least six academic semesters
- *College*: This encompasses colleges and universities, officers' academies for the police and armed forces, religious seminaries, el *Instituto Superior de Arte del Perú*, the *Instituto Pedagógico Nacional*, nursing college, journalism school, and the *Academia Diplomática del Perú*. In all cases, the course of studies lasts at least four years. A person is counted as having *college (complete)* when he/she has graduated in a course of studies. Otherwise, the person has *college (incomplete)*
- *Post-graduate*: This covers all post-graduate studies such as master's degrees, doctorates, and specializations. In all cases, the post-graduate course of studies lasts for at least one year. *Specializations* are when a college or university graduate takes additional course work in a sub-field within his/her major (such as international economics, banking and finance, etc.). A person is also counted as post-graduate if he/she has graduated from the *Escuela Superior de Administración de Negocios (ESAN)* or the *Centro de Altos Estudios Militares (CAEM)*

“If the respondent has studied up to ‘transition’ (*transición*)”, it counts as as ‘grade school (incomplete)’.

“If the respondent has graduated from SENATI, it counts as ‘non-college post-secondary’ as long as it relates to a three-year course of studies. If the major is shorter than three years, then probe for the last year of studies completed and its level.

“If the highest level completed is special education (*Centros de Educación Especial*), it counts as ‘grade school (incomplete)’ , because the highest level in this case is fourth grade.

“College or university extension classes are not counted as ‘college’, so people for whom this is the highest level reached are counted as ‘high school (complete)’.

For example, “if the respondent finished a three-year course of studies at the level of ‘non-college post-secondary’, and then later completed two years of college but has not graduated, then the highest level completed is ‘non-college post-secondary (incomplete)’.

As another example, suppose that the respondent “completed a three-year course of studies at the level of non-college post-secondary and is currently attending the first year of college. In this case, the highest level completed is, of course, ‘non-college post-secondary (complete)’, because the person has not yet graduated from college.

4. How many rooms are used only as bedrooms?
- A. None
 - B. One
 - C. Two
 - D. Three or more

According to pp. 65–66 of the *Manual*, “if more than one household lives in a residence . . . then count all the rooms in the residence that are used exclusively for sleeping.

“A *room used only as a bedroom* is a space within a residence that is used exclusively for sleeping and that is enclosed by walls that reach from the floor to the ceiling or roof and that has at least enough space to fit an adult-size bed. This definition includes rooms used not only for sleeping but also for other daily activities (such as doing homework or watching television) that do not detract from their basic function as a bedroom.

For example:

- A room is considered to be used only as a bedroom if a student sleeps there and also keeps a television and a computer there for studying, entertainment, and communication
- Rooms are not considered to be used only as bedrooms if they also serve as a kitchen, dining room, or living room—even if someone sleeps there—if the bed being slept on is brought in by night and removed by day

“In rural areas, a space is not counted as a room used only for sleeping if it is used for sleeping and also for storing agricultural produce or work implements. Such a case counts as a multi-purpose room.

“If the household has a domestic servant, then the room where he/she sleeps should be counted as long as it fulfills all the other criteria as a *bedroom*.”

5. What is the main material of the exterior walls?

A. Mud, matting, wattle and daub, adobe, stone with mud, or other

B. Wood, stone, stone blocks with mortar or cement, or brick or cement blocks

According to pp. 61–62 in the *Manual*, “determine the main material of the exterior walls. For example, if 60 percent of the walls of a residence are made of brick or cement blocks, while 40 percent are made of adobe, then mark ‘brick or cement blocks’. If 50 percent of the exterior walls of the residence are made of brick or cement blocks, and the other 50 percent is made of adobe, then mark [the material associated with the highest point value in the scorecard (in this case, ‘brick or cement blocks’)].

“If the main material of the exterior walls is ‘guayaquil cane without mud’”, then count it under ‘other’.

“In some rural areas, some residences do not have walls; they consist only of a palm-leaf roof and columns to support the roof. Count such cases under [other].

“If the respondent’s residence is enclosed by the exterior walls of the residences of adjacent neighbors (which are made of brick), and if the only wall of his/her residence that is not formed by part of some other building is the front wall (made of Triplay), then mark [other].

“The *main material of the external walls* is that material which accounts for the largest share of the walls that make up the perimeter of the residence, *excluding* any walls, fences, or corrals that surround the residence.

For example, “if the walls of the residence are made of bricks, but the fence and the clothesline are made of matting, then record the type of material that accounts for the largest share of the rooms [bricks], without considering the material used to construct the fence and clothesline [matting].”

6. What fuel does the household most frequently use for cooking?
- A. Charcoal, kerosene, or other
 - B. Firewood
 - C. Gas (LPG or natural), electricity, or does not cook

According to pages 77–78 of the *Manual*, “*liquefied petroleum gas (LPG)* is a manufactured product used mainly as a cooking fuel (via tanks) and to power vehicles.

“*Natural gas* is a fossil fuel made up of a simpler type of hydrocarbon [than LPG] found in deposits deep underground. It is used mainly for cooking and heating in residences to which it is delivered via a network of tubes, and as a fuel for powering vehicles, factories, and electrical plants.

“*Other* encompasses other fuels not explicitly listed as options. Examples include leaves, straw, dried dung, etc.

“*Does not cook* applies if a household does not prepare food of any kind.”

7. Does the household own a refrigerator/freezer?

A. No

B. Yes

According to p. 140 of the *Manual*, “If the household owns a refrigerator/freezer but keeps it at a different residence, then count the household as owning it.

“If the household has a refrigerator/freezer in its possession that it does not own (regardless of whether or not the household is using it), then it should not be counted. The objective of this question is to capture the ownership of a refrigerator/freezer.

“Count a broken refrigerator/freezer only if it will be repaired soon.

“Suppose that the household bought a big-ticket consumer durable (such as a car) and received a refrigerator/freezer as a bonus gift from the retailer. Given that the purpose of this question is to find out about the ownership of a refrigerator/freezer, the one received as a gift should be counted.

“Do not count a refrigerator/freezer that the household rents.

“When a refrigerator/freezer is used for *work purposes* in a business that is *run out of the household’s residence*, *only in these exceptional cases* it is to be counted. [Otherwise, refrigerator/freezers used for work purposes should not be counted.]

8. Does the household own a blender?

- A. No
- B. Yes

According to p. 140 of the *Manual*, “If the household owns a blender but keeps it at a different residence, then count the household as owning it.

“If the household has a blender in its possession that it does not own (regardless of whether or not the household is using it), then it should not be counted. The objective of this question is to capture the ownership of a blender.

“Count a broken blender only if it will be repaired soon.

“Suppose that the household bought a big-ticket consumer durable (such as a car) and received a blender as a bonus gift from the retailer. Given that the purpose of this question is to find out about the ownership of a blender, the one received as a gift should be counted.

“Do not count a blender that the household rents.

“When a blender is used for *work purposes* in a business that is *run out of the household’s residence*, *only in these exceptional cases* it is to be counted. [Otherwise, a blender used for work purposes should not be counted.]

9. How many color televisions does the household own?
- A. None
 - B. One
 - C. Two or more

According to p. 140 of the *Manual*, “If the household owns a color television but keeps it at a different residence, then count the household as owning it.

“If the household has color televisions in its possession that it does not own (regardless of whether or not the household is using them), then they should not be counted. The objective of this question is to capture the ownership of color televisions.

“Count broken color televisions only if they will be repaired soon.

“Suppose that the household bought a big-ticket consumer durable (such as a car) and received a color television as a bonus gift from the retailer. Given that the purpose of this question is to find out about the ownership of color televisions, any received as gifts should be counted.

“Do not count color televisions that the household rents.

“When a color television is used for *work purposes* in a business that is *run out of the household’s residence*, *only in these exceptional cases* it is to be counted. [Otherwise, color televisions used for work purposes are not to be counted.]

10. Does the household have a cellular telephone?

- A. No
- B. Yes

According to p. 78 of the *Manual*, “If more than one household lives in a residence, and if one household owns a [cellular] telephone, and if the other households also use the phone and cover part of its costs, then each household that pays for part of the costs is considered to have a [cellular] telephone. What matters is paying part of the costs.

“If, on the other hand, the household that owns the [cellular] telephone pays for all of its costs, then only this household is considered to have a [cellular] telephone.

Likewise, “if a household uses a neighbor’s [cellular] telephone to make and receive calls but does not pay anything for this service, then it is not considered to have a [cellular] telephone.

“If a household pays to use a cellular telephone to make and receive calls, and if the pay phone is installed in a business that is run out of the residence, then the household is not considered to have a [cellular] telephone.

“A household is counted as having a cellular telephone if:

- The household has a cellular telephone that is available for use by all household members
- Any household member has a cellular telephone for his/her personal use”

Figure 1: Sample sizes, poverty lines, and poverty rates for all of Peru by survey year, construction/calibration/validation subsample, poverty line (by the new and legacy definitions of poverty status), and household-level/person-level

Survey year	Line or rate	Person or HH level	# HHs surveyed	% with per-capita daily household expenditure below a poverty line															
				Poverty status by the new definition						Legacy poverty status by the previous definition									
				National			USAID			Intl. 2005 PPP			National				Intl. 2005 PPP		
				Food	100%	150%	200%	'Extreme'	\$1.25	\$2.50	\$3.75	Food	100%	150%	200%	\$1.25	\$2.50	\$3.75	
All Peru																			
2004	Line		19,502	3.49	7.82	11.73	15.64	5.22	2.03	4.06	6.09	—	—	—	—	—	—		
	Rate	HH		13.5	51.0	73.3	83.9	23.6	1.9	16.2	35.8	—	—	—	—	—	—		
	Rate	Person		16.4	58.7	79.8	88.9	29.3	2.3	20.0	42.4	—	—	—	—	—	—		
2005	Line		19,895	3.52	7.76	11.63	15.51	5.21	2.06	4.12	6.19	—	—	—	—	—	—		
	Rate	HH		12.8	47.8	70.8	82.3	22.0	2.1	15.6	34.6	—	—	—	—	—	—		
	Rate	Person		15.8	55.6	78.0	87.6	27.8	2.5	19.5	41.6	—	—	—	—	—	—		
2006	Line		20,577	3.57	7.73	11.60	15.46	5.41	2.10	4.21	6.31	—	—	—	—	—	—		
	Rate	HH		11.2	42.1	65.4	78.7	19.6	1.7	13.6	31.0	—	—	—	—	—	—		
	Rate	Person		13.8	49.1	72.7	84.5	24.5	2.2	16.8	37.3	—	—	—	—	—	—		
2007	Line		22,204	3.70	7.83	11.75	15.66	5.73	2.14	4.28	6.42	3.98	7.54	11.31	15.08	2.14	4.28	6.42	
	Rate	HH		9.1	36.1	59.7	74.2	17.0	1.1	10.4	25.7	10.8	32.8	57.3	72.6	0.9	9.5	24.5	
	Rate	Person		11.2	42.4	66.9	80.3	21.2	1.3	12.8	30.7	13.7	39.3	65.2	79.2	1.1	12.2	29.8	
2008	Line		21,502	4.20	8.23	12.34	16.46	12.34	2.27	4.53	6.80	4.60	8.25	12.38	16.50	2.27	4.53	6.80	
	Rate	HH		8.8	31.3	54.4	71.1	15.0	1.0	8.5	21.7	10.1	29.9	54.4	71.4	0.6	7.3	20.0	
	Rate	Person		10.9	37.3	62.1	77.8	18.6	1.2	10.4	26.4	12.6	36.2	62.5	78.4	0.7	9.2	24.8	
2009	Line		21,753	4.30	8.27	12.41	16.54	6.30	2.33	4.66	6.99	4.74	8.45	12.68	16.90	2.33	4.66	6.99	
	Rate	HH		8.0	28.3	52.8	68.5	13.5	0.8	7.7	20.4	9.4	29.0	53.7	69.8	0.5	6.4	19.0	
	Rate	Person		9.5	33.5	60.0	75.3	16.7	0.9	9.3	24.5	11.5	34.8	61.3	76.9	0.6	7.9	23.4	
2010	Line		21,496	4.42	8.55	12.82	17.09	6.72	2.37	4.73	7.10	4.88	8.67	13.01	17.35	2.37	4.73	7.10	
	Rate	HH		6.2	25.6	49.6	67.3	12.3	0.4	5.8	17.0	7.8	25.7	49.9	68.4	0.3	5.0	16.1	
	Rate	Person		7.6	30.8	56.8	74.2	15.3	0.4	7.2	20.8	9.8	31.3	57.6	75.5	0.3	6.3	20.0	
2011	Line		24,809	4.70	8.95	13.43	17.90	7.03	2.45	4.89	7.34	—	—	—	—	—	—		
	Rate	HH		5.2	23.1	47.7	66.0	11.1	0.4	4.5	14.7	—	—	—	—	—	—		
	Rate	Person		6.3	27.8	55.0	73.0	13.9	0.4	5.6	17.9	—	—	—	—	—	—		
Construction/calibration: Selecting indicators and points, and associating scores with likelihoods																			
2010	Rate	HH	10,732	6.2	25.6	49.6	67.4	12.3	0.4	5.8	16.9	6.4	23.6	47.8	66.7	0.2	4.4	14.4	
Validation: Measuring accuracy of 2010 scorecard																			
2004	Rate	HH	19,502	13.5	51.0	73.3	83.9	—	1.9	16.2	35.8	—	—	—	—	—	—		
2005	Rate	HH	19,895	12.8	47.8	70.8	82.3	—	2.1	15.6	34.6	—	—	—	—	—	—		
2006	Rate	HH	20,577	11.2	42.1	65.4	78.7	—	1.7	13.6	31.0	—	—	—	—	—	—		
2007	Rate	HH	22,204	9.1	36.1	59.7	74.2	—	1.1	10.4	25.7	10.8	32.8	57.3	72.6	0.9	9.5	24.5	
2008	Rate	HH	21,502	8.8	31.3	54.4	71.1	—	1.0	8.5	21.7	10.1	29.9	54.4	71.4	0.6	7.3	20.0	
2009	Rate	HH	21,753	8.0	28.3	52.8	68.5	—	0.8	7.7	20.4	9.4	29.0	53.7	69.8	0.5	6.4	19.0	
2010	Rate	HH	10,764	6.2	25.6	49.6	67.3	12.3	0.4	5.8	17.0	7.8	25.7	49.9	68.4	0.3	5.0	16.1	
2011	Rate	HH	24,809	5.2	23.1	47.7	66.0	—	0.4	4.5	14.7	—	—	—	—	—	—		
Decrease in poverty rates from a given year to 2010 in validation samples																			
2004	Rate	HH		-7.3	-25.4	-23.7	-16.7	—	-1.5	-10.4	-18.8	—	—	—	—	—	—		
2005	Rate	HH		-6.6	-22.1	-21.2	-15.0	—	-1.7	-9.8	-17.6	—	—	—	—	—	—		
2006	Rate	HH		-5.0	-16.4	-15.8	-11.5	—	-1.3	-7.7	-14.0	—	—	—	—	—	—		
2007	Rate	HH		-2.9	-10.5	-10.1	-6.9	—	-0.7	-4.6	-8.8	-3.0	-7.2	-7.4	-4.2	-0.6	-4.4	-8.4	
2008	Rate	HH		-2.6	-5.6	-4.8	-3.9	—	-0.6	-2.6	-4.7	-2.3	-4.3	-4.4	-2.9	-0.3	-2.3	-3.8	
2009	Rate	HH		-1.7	-2.7	-3.1	-1.2	—	-0.4	-1.8	-3.4	-1.6	-3.3	-3.7	-1.4	-0.2	-1.4	-2.9	
2010	Rate	HH		—	—	—	—	—	—	—	—	—	—	—	—	—	—		
2011	Rate	HH		+1.1	+2.6	+1.9	+1.2	—	+0.0	+1.3	+2.3	—	—	—	—	—	—		

Source: 2004 to 2011 *Encuesta Nacional de Hogares*

Poverty lines are in units of PEN per person per day in average prices for the year of a given survey. Poverty rates are percentages.

Decreases in poverty rates from a given year to 2010 in the validation samples are in units of percentage points.

Figure 2 (Ayacucho): Poverty lines/rates by year, region, level, definition of poverty status, and poverty line

Region	Round	Line/rate	n	% with per-capita daily household expenditure below a poverty line														
				Poverty status by 2011 definition						Legacy poverty status by 1997 definition								
				National			USAID	Intl. 2005 PPP		National			Intl. 2005 PPP					
Food	100%	150%	200%	'Extreme'	\$1.25	\$2.50	\$3.75	Food	100%	150%	200%	\$1.25	\$2.50	\$3.75				
Urban	04	Line	371	3.07	7.02	10.53	14.04	4.58	1.82	3.64	5.47	—	—	—	—	—	—	
		Rate (HH)		7.5	50.0	71.2	81.8	24.2	1.1	15.3	34.9	—	—	—	—	—	—	
		Rate (people)		8.3	58.6	81.1	89.3	29.5	0.7	19.6	43.3	—	—	—	—	—	—	
	05	Line	363	3.05	6.87	10.30	13.73	4.52	1.83	3.65	5.48	—	—	—	—	—	—	
		Rate (HH)		15.6	64.2	77.7	85.5	38.6	1.7	23.6	51.6	—	—	—	—	—	—	
		Rate (people)		16.1	69.1	83.4	89.7	40.5	1.2	23.2	53.9	—	—	—	—	—	—	
	06	Line	367	3.12	6.83	10.25	13.67	4.72	1.86	3.72	5.58	—	—	—	—	—	—	
		Rate (HH)		13.8	57.7	79.6	87.2	35.3	0.6	23.3	48.0	—	—	—	—	—	—	
		Rate (people)		15.3	64.7	83.9	90.4	41.8	1.3	27.5	55.1	—	—	—	—	—	—	
	07	Line	357	3.28	6.94	10.42	13.89	4.94	1.90	3.80	5.70	4.10	7.85	11.77	15.69	2.23	4.46	6.68
		Rate (HH)		8.8	43.0	66.3	80.4	25.8	2.2	15.0	33.7	12.9	46.1	70.1	82.7	2.4	16.9	35.9
		Rate (people)		11.0	50.0	71.7	85.3	31.6	1.7	18.4	39.9	16.7	53.4	76.4	88.5	3.4	21.9	43.0
08	Line	339	3.77	7.31	10.97	14.62	5.19	2.01	4.03	6.04	4.70	8.59	12.88	17.17	2.36	4.71	7.07	
	Rate (HH)		7.7	37.3	59.9	76.7	17.6	0.5	8.5	24.8	10.6	39.3	64.9	83.4	1.0	10.3	30.1	
	Rate (people)		8.2	43.6	66.9	82.5	20.2	0.1	9.1	28.3	13.0	47.9	72.5	88.9	1.3	12.5	38.1	
09	Line	347	3.89	7.32	10.99	14.65	5.47	2.06	4.13	6.19	5.35	9.35	14.02	18.70	2.58	5.16	7.73	
	Rate (HH)		6.2	36.0	61.8	72.9	18.6	0.5	7.1	24.8	12.9	43.8	68.8	81.8	0.5	11.4	32.5	
	Rate (people)		7.8	41.0	68.2	77.9	21.0	1.0	8.9	28.8	16.0	50.8	74.0	86.5	0.9	14.2	38.0	
10	Line	337	3.96	7.50	11.26	15.01	5.80	2.08	4.16	6.24	5.05	9.15	13.72	18.29	2.49	4.99	7.48	
	Rate (HH)		4.5	26.6	51.3	67.4	15.0	0.5	5.1	17.1	5.4	30.3	58.4	73.5	0.5	5.1	20.3	
	Rate (people)		5.3	30.7	59.1	74.1	18.5	0.3	5.9	20.7	7.0	37.9	65.7	80.6	0.3	6.3	25.7	
11	Line	347	4.23	7.88	11.82	15.77	6.28	2.15	4.31	6.46	—	—	—	—	—	—	—	
	Rate (HH)		4.0	31.5	59.9	72.5	17.5	1.2	5.1	18.9	—	—	—	—	—	—	—	
	Rate (people)		3.5	36.2	67.6	79.0	19.1	0.9	4.0	21.0	—	—	—	—	—	—	—	
Rural	04	Line	468	2.97	5.80	8.69	11.59	2.81	1.50	3.01	4.51	—	—	—	—	—	—	
		Rate (HH)		28.2	74.2	92.7	96.6	24.91	6.2	29.5	56.9	—	—	—	—	—	—	—
		Rate (people)		34.3	83.5	96.9	98.5	30.45	5.4	36.4	65.5	—	—	—	—	—	—	—
	05	Line	480	2.99	5.71	8.56	11.42	2.81	1.52	3.04	4.56	—	—	—	—	—	—	—
		Rate (HH)		29.1	79.1	91.8	96.7	24.43	3.3	29.7	63.3	—	—	—	—	—	—	—
		Rate (people)		37.3	86.2	95.9	99.0	30.79	3.9	38.2	71.8	—	—	—	—	—	—	—
	06	Line	478	3.05	5.70	8.55	11.40	2.97	1.55	3.10	4.65	—	—	—	—	—	—	—
		Rate (HH)		37.6	79.6	92.4	97.0	33.92	3.1	39.5	69.5	—	—	—	—	—	—	—
		Rate (people)		47.7	87.9	96.4	98.6	42.69	3.9	50.0	79.8	—	—	—	—	—	—	—
	07	Line	526	3.12	5.73	8.59	11.46	3.13	1.57	3.13	4.70	3.86	6.07	9.11	12.14	1.72	3.45	5.17
		Rate (HH)		39.1	79.1	93.3	97.3	38.96	5.8	39.8	68.2	38.3	69.2	88.8	96.0	3.4	28.6	58.4
		Rate (people)		44.7	83.2	96.0	98.6	44.52	6.9	45.7	73.8	46.0	76.2	93.1	98.0	5.0	35.6	66.4
08	Line	517	3.57	6.10	9.14	12.19	3.55	1.68	3.36	5.03	4.46	6.75	10.12	13.50	1.85	3.70	5.56	
	Rate (HH)		33.7	70.9	90.1	95.6	32.16	4.8	27.6	57.8	33.7	64.4	88.7	94.8	2.5	23.2	49.6	
	Rate (people)		37.9	76.6	93.7	97.8	36.01	4.2	31.5	65.0	39.7	73.4	93.7	97.5	2.5	28.5	58.4	
09	Line	525	3.72	6.17	9.26	12.35	3.81	1.74	3.48	5.22	4.58	6.93	10.40	13.87	1.91	3.82	5.74	
	Rate (HH)		25.9	69.8	90.8	96.8	27.95	2.1	21.3	55.8	27.6	61.1	87.8	94.5	0.9	15.8	44.9	
	Rate (people)		28.4	75.6	93.7	98.0	30.76	1.7	23.1	60.8	31.6	68.9	92.7	97.2	0.8	18.0	50.8	
10	Line	527	3.76	6.29	9.43	12.58	4.04	1.74	3.48	5.23	4.95	7.35	11.03	14.71	2.01	4.01	6.02	
	Rate (HH)		24.6	59.0	83.6	94.3	29.15	2.0	19.4	46.2	27.9	56.8	82.7	91.5	0.9	15.7	40.8	
	Rate (people)		28.2	65.0	87.6	96.9	33.72	1.5	22.6	51.8	34.0	65.2	88.8	95.1	1.1	20.0	48.9	
11	Line	563	3.99	6.60	9.90	13.19	4.43	1.80	3.61	5.41	—	—	—	—	—	—	—	
	Rate (HH)		25.7	63.8	85.7	95.2	34.55	2.5	19.8	49.6	—	—	—	—	—	—	—	
	Rate (people)		29.4	69.7	89.6	97.5	39.70	2.9	22.8	56.7	—	—	—	—	—	—	—	
All	04	Line	839	3.02	6.34	9.51	12.68	3.60	1.65	3.29	4.94	—	—	—	—	—	—	
		Rate (HH)		19.5	64.0	83.7	90.4	24.60	4.0	23.5	47.7	—	—	—	—	—	—	—
		Rate (people)		22.7	72.4	89.9	94.4	30.04	3.3	29.0	55.7	—	—	—	—	—	—	—
	05	Line	843	3.02	6.23	9.34	12.45	3.57	1.66	3.31	4.97	—	—	—	—	—	—	—
		Rate (HH)		23.2	72.7	85.7	91.8	30.59	2.6	27.1	58.2	—	—	—	—	—	—	—
		Rate (people)		27.8	78.6	90.3	94.8	35.11	2.7	31.5	63.8	—	—	—	—	—	—	—
	06	Line	845	3.09	6.22	9.33	12.44	3.77	1.69	3.38	5.08	—	—	—	—	—	—	—
		Rate (HH)		27.1	69.9	86.8	92.6	34.53	2.0	32.4	60.0	—	—	—	—	—	—	—
		Rate (people)		32.8	77.3	90.7	94.9	42.27	2.7	39.7	68.5	—	—	—	—	—	—	—
	07	Line	883	3.20	6.30	9.45	12.60	3.98	1.72	3.45	5.17	3.95	6.69	10.03	13.38	1.90	3.80	5.70
		Rate (HH)		24.9	62.2	80.7	89.4	32.79	4.1	28.2	52.1	29.5	61.2	82.3	91.4	3.0	24.5	50.6
		Rate (people)		28.9	67.6	84.6	92.3	38.46	4.5	32.8	57.8	35.8	68.3	87.3	94.7	4.4	30.8	58.3
08	Line	856	3.67	6.67	10.00	13.34	4.32	1.84	3.67	5.51	4.54	7.37	11.06	14.74	2.02	4.05	6.07	
	Rate (HH)		21.4	55.0	75.8	86.7	25.26	2.7	18.5	42.2	25.8	55.8	80.6	90.9	2.0	18.8	42.9	
	Rate (people)		23.9	61.1	81.1	90.6	28.59	2.3	21.0	47.7	30.7	64.8	86.5	94.6	2.1	23.1	51.5	
09	Line	872	3.80	6.73	10.09	13.46	4.61	1.90	3.79	5.69	4.84	7.77	11.65	15.53	2.14	4.28	6.43	
	Rate (HH)		16.5	53.6	76.9	85.3	23.48	1.3	14.5	40.9	22.6	55.2	81.3	90.2	0.8	14.3	40.7	
	Rate (people)		18.4	58.8	81.3	88.3	26.05	1.3	16.2	45.3	26.2	62.6	86.2	93.5	0.8	16.7	46.4	
10	Line	864	3.86	6.88	10.33	13.77	4.90	1.91	3.81	5.72	4.98	7.97	11.95	15.93	2.17	4.35	6.52	
	Rate (HH)		14.5	42.8	67.4	80.8	22.06	1.3	12.3	31.6	20.0	47.5	74.2	85.2	0.8	12.0	33.6	
	Rate (people)		17.0	48.2	73.6	85.8	26.28	0.9	14.5	36.6	24.8	55.9	80.9	90.2	0.8	15.4	41.0	
11	Line	910	4.11	7.25	10.87	14.50	5.37	1.98	3.96	5.94	—	—	—	—	—	—	—	
	Rate (HH)		14.8	47.6	72.7	83.8	25.97	1.9	12.4	34.2	—	—	—	—	—	—	—	
	Rate (people)		16.3	52.7	78.5	88.1	29.28	1.9	13.3	38.6	—	—	—	—	—	—	—	

Figure 2 (Junín): Poverty lines/rates by year, region, level, definition of poverty status, and poverty line

Region	Round	Line/rate	n	% with per-capita daily household expenditure below a poverty line											
				Poverty status by 2011 definition							Legacy poverty status by 1997 definition				
				National			USAID	Intl. 2005 PPP			National			Intl. 2005 PPP	
Food	100%	150%	200%	'Extreme'	\$1.25	\$2.50	\$3.75	Food	100%	150%	200%	\$1.25	\$2.50	\$3.75	
Urban															
04	Line		476	3.14	7.06	10.59	14.12	4.61	1.83	3.66	5.50	—	—	—	—
	Rate (HH)			4.7	40.0	66.3	81.3	15.6	0.0	7.9	24.5	—	—	—	—
	Rate (people)			6.6	46.7	75.5	87.9	20.3	0.0	10.1	29.1	—	—	—	—
05	Line		479	3.12	6.92	10.38	13.84	4.54	1.84	3.68	5.52	—	—	—	—
	Rate (HH)			7.3	41.8	64.3	80.7	17.5	0.5	11.4	26.7	—	—	—	—
	Rate (people)			11.4	52.5	75.5	88.0	23.9	0.9	16.0	35.7	—	—	—	—
06	Line		474	3.20	6.91	10.37	13.82	4.74	1.88	3.76	5.64	—	—	—	—
	Rate (HH)			3.2	31.9	59.3	74.6	13.4	0.0	5.1	22.6	—	—	—	—
	Rate (people)			4.2	38.9	67.4	84.3	17.9	0.0	7.3	29.1	—	—	—	—
07	Line		550	3.34	7.01	10.51	14.01	4.98	1.92	3.83	5.75	4.16	7.75	11.62	15.49
	Rate (HH)			3.1	28.0	50.0	67.8	11.6	0.4	5.1	16.9	5.0	30.8	52.6	70.6
	Rate (people)			4.4	34.7	58.1	76.9	14.3	0.3	7.1	20.6	7.4	37.8	61.5	78.7
08	Line		533	3.81	7.37	11.06	14.74	5.27	2.03	4.06	6.09	4.75	8.46	12.69	16.92
	Rate (HH)			4.4	24.3	47.0	61.6	12.5	0.6	5.6	15.6	6.5	27.5	49.4	66.0
	Rate (people)			6.2	30.3	55.2	70.8	16.9	0.2	8.1	20.4	10.1	34.4	59.2	74.8
09	Line		543	3.92	7.38	11.07	14.76	5.49	2.08	4.16	6.24	4.79	8.61	12.91	17.22
	Rate (HH)			2.6	19.4	44.9	63.3	8.9	0.0	2.8	13.2	4.3	22.9	51.0	70.8
	Rate (people)			2.0	24.5	54.6	72.2	11.7	0.0	2.6	16.7	6.3	30.4	60.5	79.7
10	Line		559	3.99	7.56	11.34	15.12	5.84	2.09	4.19	6.28	5.08	8.98	13.48	17.97
	Rate (HH)			0.3	15.0	38.5	56.9	5.7	0.0	0.3	8.5	3.2	20.5	44.0	64.3
	Rate (people)			0.7	18.5	45.9	64.7	6.8	0.0	0.7	10.4	4.4	25.6	53.4	72.8
11	Line		657	4.28	7.94	11.91	15.89	6.30	2.17	4.34	6.51	—	—	—	—
	Rate (HH)			1.0	13.2	34.3	53.7	4.5	0.0	1.0	5.3	—	—	—	—
	Rate (people)			1.6	17.3	41.1	61.4	5.8	0.0	1.6	7.3	—	—	—	—
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04	Line		390	2.96	5.77	8.66	11.55	2.96	1.50	3.00	4.49	—	—	—	—
	Rate (HH)			16.5	61.0	86.6	94.5	17.01	1.0	17.5	45.9	—	—	—	—
	Rate (people)			21.8	70.3	91.0	96.1	22.28	1.1	23.5	56.0	—	—	—	—
05	Line		421	2.99	5.72	8.58	11.44	2.97	1.52	3.04	4.56	—	—	—	—
	Rate (HH)			19.7	69.1	87.1	94.0	19.98	0.2	20.7	53.6	—	—	—	—
	Rate (people)			24.5	75.7	90.4	96.6	25.08	0.2	25.7	61.6	—	—	—	—
06	Line		423	3.04	5.70	8.56	11.41	3.12	1.55	3.10	4.66	—	—	—	—
	Rate (HH)			13.8	54.3	78.0	89.1	14.69	0.3	15.0	37.9	—	—	—	—
	Rate (people)			20.2	66.2	87.8	95.3	20.20	0.5	21.1	49.1	—	—	—	—
07	Line		399	3.11	5.74	8.61	11.48	3.35	1.57	3.14	4.71	3.66	5.75	8.62	11.50
	Rate (HH)			12.3	52.4	78.4	88.8	15.37	0.4	13.4	35.4	15.2	40.8	73.8	85.6
	Rate (people)			17.0	60.2	84.5	93.0	20.70	0.8	18.5	42.1	21.4	49.8	82.1	91.2
08	Line		384	3.58	6.13	9.20	12.27	3.69	1.69	3.38	5.06	4.59	6.76	10.14	13.52
	Rate (HH)			9.6	38.1	64.3	79.5	11.31	0.4	8.4	26.3	17.0	35.2	64.3	79.5
	Rate (people)			12.4	47.5	74.0	87.0	14.80	0.8	10.7	34.5	21.8	44.6	74.2	86.9
09	Line		394	3.67	6.15	9.23	12.31	3.81	1.73	3.47	5.20	4.40	6.63	9.94	13.25
	Rate (HH)			8.2	37.1	65.9	80.7	10.63	0.4	6.7	26.1	12.7	33.7	64.8	79.5
	Rate (people)			9.8	43.7	71.3	82.9	13.00	0.6	7.8	30.8	14.8	39.4	70.3	82.9
10	Line		396	3.73	6.30	9.45	12.60	4.05	1.74	3.49	5.23	4.58	6.86	10.29	13.72
	Rate (HH)			9.1	38.4	65.4	80.8	13.74	1.2	8.4	27.4	11.3	35.8	62.3	80.9
	Rate (people)			9.4	45.5	73.8	86.4	15.88	0.8	8.7	33.3	13.6	41.5	70.8	86.0
11	Line		472	3.99	6.62	9.93	13.23	4.51	1.81	3.62	5.43	—	—	—	—
	Rate (HH)			7.2	30.4	59.1	76.4	12.16	0.5	6.0	19.1	—	—	—	—
	Rate (people)			8.9	35.8	66.5	83.2	14.89	0.7	7.4	23.5	—	—	—	—
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04	Line		866	3.07	6.54	9.82	13.09	3.95	1.70	3.40	5.09	—	—	—	—
	Rate (HH)			9.4	48.4	74.5	86.6	16.18	0.4	11.8	33.1	—	—	—	—
	Rate (people)			12.7	56.2	81.7	91.2	21.09	0.4	15.5	39.9	—	—	—	—
05	Line		900	3.07	6.44	9.66	12.88	3.91	1.71	3.43	5.14	—	—	—	—
	Rate (HH)			12.2	52.7	73.3	85.9	18.49	0.4	15.1	37.4	—	—	—	—
	Rate (people)			16.6	61.7	81.4	91.4	24.37	0.6	19.9	46.0	—	—	—	—
06	Line		897	3.14	6.44	9.66	12.88	4.11	1.75	3.51	5.26	—	—	—	—
	Rate (HH)			7.4	40.7	66.6	80.3	13.89	0.1	9.0	28.6	—	—	—	—
	Rate (people)			10.4	49.6	75.3	88.6	18.78	0.2	12.7	36.9	—	—	—	—
07	Line		949	3.25	6.52	9.78	13.05	4.36	1.78	3.57	5.35	3.94	6.89	10.33	13.78
	Rate (HH)			6.7	37.4	60.9	75.9	13.06	0.4	8.3	24.1	9.5	35.2	61.9	77.2
	Rate (people)			9.2	44.4	68.2	83.0	16.75	0.5	11.4	28.8	13.4	43.0	70.4	84.1
08	Line		917	3.72	6.90	10.35	13.80	4.67	1.90	3.80	5.70	4.68	7.72	11.58	15.44
	Rate (HH)			6.3	29.2	53.1	67.9	12.07	0.6	6.6	19.4	10.7	30.6	55.4	71.4
	Rate (people)			8.6	36.8	62.3	77.0	16.10	0.4	9.1	25.7	15.1	38.9	65.7	80.0
09	Line		937	3.83	6.91	10.37	13.83	4.85	1.95	3.90	5.85	4.62	7.74	11.61	15.48
	Rate (HH)			4.8	26.3	53.0	70.0	9.55	0.2	4.3	18.2	8.0	27.8	57.2	74.7
	Rate (people)			5.0	31.8	60.9	76.2	12.18	0.2	4.6	22.1	10.0	34.4	64.8	81.1
10	Line		955	3.89	7.09	10.64	14.19	5.18	1.97	3.93	5.90	4.86	8.06	12.10	16.13
	Rate (HH)			3.5	23.4	48.2	65.5	8.59	0.4	3.2	15.3	6.6	27.0	51.7	71.3
	Rate (people)			3.9	28.4	56.2	72.7	10.12	0.3	3.6	18.9	8.4	32.5	60.9	78.5
11	Line		1,129	4.18	7.46	11.19	14.91	5.64	2.04	4.08	6.12	—	—	—	—
	Rate (HH)			3.3	19.5	43.5	62.1	7.33	0.2	2.9	10.4	—	—	—	—
	Rate (people)			4.3	24.1	50.4	69.4	9.12	0.3	3.7	13.2	—	—	—	—

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>
1,970	What fuel does the household most frequently use for cooking? (Charcoal, kerosene, or other; Firewood; Gas (LPG or natural), electricity, or does not cook)
1,950	What is the main material of the floors? (Dirt, or other; Wooden planks, or cement; Parquet or polished wood, linoleum, vinyl, or the like, or tile or the like)
1,610	In the past week, how many household members in their main occupation worked in a business, organization, or firm whose main activity was in agriculture, animal husbandry, hunting, forestry, fishing, or mining? (Three or more; Two; One; None)
1,589	Does the household have a color television, DVD, VCR, or cable? (No color televisions (regardless of anything else); Only one color television; One color television with a DVD (no VCR nor cable); One color television with cable or a VCR (regardless of DVD); Two or more color televisions, and nothing else; Two or more color televisions with a DVD (no VCR nor cable); Two or more color televisions with a VCR or cable (regardless of DVD))
1,574	Does the household have a gas stove, kerosene stove, or a microwave? (None; Only kerosene; Gas, but no microwave (regardless of kerosene); Microwave (regardles of gas or kerosene))
1,512	In the past week, how many household members worked in their main occupation as farmers or skilled farm workers or as day laborers in agriculture, non-agriculture, mining, and non-specified occupations? (One or more; None)
1,510	Does the household have an iron? (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>
1,501	In the past week, what was the main occupation of the female head/spouse? (Day laborer in agriculture, non-agriculture, mining, and non-specified occupations; Farmer and skilled farm worker; Worker in mining, wood, chemicals, or leather, food-service worker, shoemaker, tailor, or carpenter, worker and mechanic for metal, electrical equipment, machines, and instruments, construction worker and fabricator of construction materials, paper products, and graphic artists; Conductor of public transport, domestic servant, cleaner, launderer, messenger, delivery worker, mover, garbage collector, and the like; Driver of motor vehicles, o itinerant vendor; Retail and wholesale stores and trader; Does not work; Armed forces and police, member of the executive and legislative branches, director and upper manager of businesses and organizations, professional, scientist, professor and teacher, mid-level technician, manager and office worker, and skilled worker in personal services; No female head/spouse)
1,488	Where does the toilet drain to? (No toilet; Pit or latrine, or river, ditch, or canal/stream; Septic tank; Public sewer, outside of the residence but inside the building; Public sewer, inside the residence)
1,485	Does the household have a land-line telephone or a cellular telephone? (None; Only cellular, or only land-line; Both)
1,457	If any household members worked in agriculture, animal husbandry, hunting or forestry in the past 12 months, then does the household currently work or control any land for agriculture, animal husbandry, or forestry? (Someone works in agriculture, and the household has land; Someone works in agriculture, but no land; No one works in agriculture)
1,452	What is the main material of the roof? (Straw, or palm leaves; Tile; Corrugated iron, fiberglass, or the like; Matting; Other; Cane or matting with mud seal; Reinforced concrete, or wood)
1,437	Does the household have a color television, DVD, VCR, or cable? (No color TVs (regardless of others); One color TV, and no DVDs, VCRs, or cable; One color television, and a DVD, VCR, or cable; Two or more color televisions, and nothing else; Two or more color televisions, and DVD, VCR, or cable)

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>
1,434	In the past 12 months, did any household members work in agriculture, animal husbandry, hunting or forestry? (Yes; No)
1,419	How many color televisions and how many DVDs does the household have? (No color TVs (regardless of DVDs); One color TV, but no DVDs; One color TV, and a DVD; Two or more color TVs, but no DVD; Two or more color TVs, and a DVD)
1,402	How many color televisions does the household have? (None; One; Two or more)
1,379	What is the highest educational level that the female head/spouse completed? (None, pre-school, or kindergarten; Grade school (incomplete); Grade school (complete), or high school (incomplete); No female head/spouse; High school (complete), or non-university superior (incomplete); Non-university superior (complete) or higher)
1,369	Does the household have a blender? (No; Yes)
1,327	In the past week, how many household members worked in their main occupation as farmers or skilled farm workers? (One or more; None)
1,316	In the past week, what was the main occupation of the male head/spouse? (Farmer and skilled farm worker; Day laborer in agriculture, non-agriculture, mining, and non-specified occupations; No male head/spouse; Worker in mining, wood, chemicals, or leather, food-service worker, shoemaker, tailor, or carpenter, worker and mechanic for metal, electrical equipment, machines, and instruments, construction worker and fabricator of construction materials, paper products, and graphic artist; Driver for public transport, domestic servant, cleaner, launderer, messenger, delivery worker, movers, garbage collector, and the like; Driver of motor vehicles, or itinerant vendor; Does not work; Armed forces and police, member of the executive and legislative branches, director and upper manager of businesses and organizations, professional, scientist, professor and teacher, mid-level technician, manager and office worker, and skilled worker in personal services, or retail and wholesale stores and trader)

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>
1,313	In the past week, what was the main activity of the business, organization, or firm in which the female head/spouse worked in her main occupation? (Agriculture, animal husbandry, forestry, and fishing; Manufacturing; Does not work; Retail and wholesale trade, and repair of vehicles; Mining, distribution of electricity, water, and gas, construction, lodging and restaurants, transport, logistics and telecommunication, financial intermediation, real estate, rentals, and computer science, public administracion and defense, education, health care and social services, other services, domestic service, or international organizations; No female head/spouse)
1,281	Does the household have a refrigerator/freezer? (No; Yes)
1,246	Does the household have a gas stove? (No; Yes)
1,240	In the past week, how many household members worked in their main occupation as day laborers in agriculture, non-agriculture, mining, and non-specified occupations? (Two or more; One; None) En la semana pasada, ¿cuántos miembros del hogar se desempeñaron en su ocupación principal como peones de labranza, peones de agropecuaria, peones de minería, u ocupación no especificado? (Dos o más; Uno; Ninguno)
1,173	What is the highest educational level that the male head/spouse completed? (None, pre-school or kindergarten, or grade school (incomplete); Grade school (complete); High school (incomplete); No male head/spouse; High school (complete); Non-university superior (incomplete); Non-university superior (complete); University superior (incomplete), university superior (complete), or post-graduate university)
1,113	In the past week, what was the main activity of the business, organization, or firm in which the male head/spouse worked in his main occupation? (Agriculture, animal husbandry, forestry, and fishing; Construction; No male head/spouse; Does not work, manufacturing; Transport, logistics and telecommunications, or mining; Distribution of electricity, water, and gas, retail and wholesale trade, and repair of vehicles, lodging and restaurants, financial intermediation, real estate, rentals, and computer science, public administracion and defense, education, health care and social services, other services, domestic service, or international organizations)

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>
1,087	In the past week, what was the female head/spouse in her main line of work? (Unpaid worker in a family business; Self-employed; Wage worker; Does not work, worker in the home, or other; No female head/spouse; Salaried employee, or business owner or employer)
1,064	What is the main material of the exterior walls? Mud, matting, wattle and daub, adobe, stone with mud, or other; Wood, stone, stone blocks with mortar or cement, or brick or cement blocks)
959	How many household members are 18-years-old or younger? (Four or more; Three; Two; One; None)
955	In the last three months, has any member of the household received food aid from an organization or institution such as <i>Vaso de Leche</i> , <i>Comedor Popular</i> , <i>Desayuno Escolar</i> , <i>Papilla</i> o ‘ <i>Yapita</i> ’, <i>PANFAR</i> , etc.?
941	How many household members are 13-years-old or younger? (Three or more; Two; One; None)
935	Does the household have a land-line telephone? (No; Yes)
929	Does the household have a computer? (No; Yes)
927	How many household members are 14-years-old or younger? (Three or more; Two; One; None)
919	In the past week, how many household members worked in their main occupations as members of the armed forces and police, members of the executive and legislative branches, directors and upper managers of businesses and organizations, professionals, scientists, professors and teachers, mid-level technicians, managers and office workers/clerks, or skilled workers in personal services? (None; One; Two or more)
913	What kind of meter does your electrical connection have? If there is no electrical connection, then what is the main source of energy for lighting? (No lighting, candle, gas or kerosene lamp, or other; No meter; Meter that serves various residences; Meter that serves only the residence of the household)
912	What is the main source of energy for lighting? (No lighting, candle, other; Gas or kerosene lamp; Electricity or generator)
903	How many household members are 12-years-old or younger? (Three or more; Two; One; None)

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>
901	How many household members are 17-years-old or younger? (Three or more; Two; One; None)
899	How many household members are 15-years-old or younger? (Three or more; Two; One; None)
894	How many household members are 16-years-old or younger? (Three or more; Two; One; None)
877	What is the source of water used by the household? (River, ditch, spring, or the like; Well, public standpipe, or other; Public network, outside of the residence but inside the building, or water truck or the like; Public network, inside the residence)
871	In the past week, how many household members were salaried employees or business owners/employers in their main line of work? (None; One; Two or more)
857	Does the household have cable TV? (No; Yes)
793	Does the household have a cellular telephone? (No; Yes)
768	Does the household have a stereo system? (No; Yes)
762	Does the household have a washing machine? (No; Yes)
752	In the past week, what was the male head/spouse in his main line of work? (Self-employed; Wage worker; No male head/spouse; Business owner or employer; Does not work, unpaid worker in a family business, worker in the home, or other; Salaried employee)
741	Does the household have a DVD? (No; Yes)
708	Are all household members ages 6 to 13 currently enrolled in school or going to classes of any kind this year in a public or non-public educational institution? (No; Yes, and all go to a public school; No children ages 6 to 13; Yes, and at least one goes to a non-public school)
698	Are all household members ages 6 to 14 currently enrolled in school or going to classes of any kind this year in a public or non-public educational institution? (No; Yes, and all go to a public school; No children ages 6 to 14; Yes, and at least one goes to a non-public school)

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>
689	Are all household members ages 6 to 12 currently enrolled in school or going to classes of any kind this year in a public or non-public educational institution? (No; Yes, and all go to a public school; No children ages 6 to 12; Yes, and at least one goes to a non-public school)
683	Are all household members ages 6 to 11 currently enrolled in school or going to classes of any kind this year in a public or non-public educational institution? (No; Yes, and all go to a public school; No children ages 6 to 11; Yes, and at least one goes to a non-public school)
679	Can the female head/spouse read and write? (No; Yes; No female head/spouse)
669	How many household members are 11-years-old or younger? (Two or more; One; None)
661	Are all household members ages 6 to 15 currently enrolled in school or going to classes of any kind this year in a public or non-public educational institution? (No; Yes, and all go to a public school; No children ages 6 to 15; Yes, and at least one goes to a non-public school)
660	Does the household have a microwave? (No; Yes)
654	Are all household members ages 6 to 16 currently enrolled in school or going to classes of any kind this year in a public or non-public educational institution? (No; Yes, and all go to a public school; No children ages 6 to 16; Yes, and at least one goes to a non-public school)
622	In the past week, how many household members were, in their main line of work, unpaid workers in a family business, workers in the home, or other? (Two or more; One; None)
616	Are all household members ages 6 to 17 currently enrolled in school or going to classes of any kind this year in a public or non-public educational institution? (No; Yes, and all go to a public school; No children ages 6 to 17; Yes, and at least one goes to a non-public school)
603	Does the household have internet? (No; Yes)
581	How many rooms are used only as bedrooms? (None; One; Two; Three or more)
572	Are all household members ages 6 to 18 currently enrolled in school or going to classes of any kind this year in a public or non-public educational institution? (No; Yes, and all go to a public school; No children ages 6 to 18; Yes, and at least one goes to a non-public school)

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>
565	How many household members are 6-years-old or younger? (Two or more; One; None)
544	How many members does the household have? (Seven or more; Six; Five; Four; Three; Two; One)
462	In the past week, how many household members were self-employed in their main line of work? (Two or more; One; None)
458	In the past week, how many household members in their main occupation worked in a business, organization, or firm whose main activity was in education, health care and social services, public administration and defense, distribution of electricity, water, and gas, financial intermediation, real estate, rentals, and computer science, or international organizations? (None; One or more)
453	Do you have formal title to this residence? (No; Sí)
430	Are any household members currently enrolled in school or going to classes of any kind this year in a non-public educational institution? (No; Yes)
394	What language did the female head/spouse learn at home as a child as her mother tongue? (Quechua, Aymara, or other native language; Spanish, English, Portuguese, other foreign language, or is deaf/mute; No female head/spouse)
381	Excluding bathrooms, kitchen, hallways, and garage, how many rooms does the residence have? (One; Two; Three; Four; Five or more)
374	What type of residence does the household live in? (Hut, shack, or cabin, improvised housing, residence not intended for human habitation, or other; Detached house; Apartment as part of a house with shared kitchen and bathroom; Apartment in an apartment building, or apartment as part of a house with an independent kitchen and bathroom)
373	Are all household members ages 6 to 11 currently enrolled in school or going to classes of any kind this year? (No; Yes; No members ages 6 to 11)
369	Are all household members ages 6 to 13 currently enrolled in school or going to classes of any kind this year? (No; Yes; No members ages 6 to 13)

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>
361	Are all household members ages 6 to 12 currently enrolled in school or going to classes of any kind this year? (No; Yes; No members ages 6 to 12)
347	Does the household have a bicycle, tricycle, motorcycle, motortaxi, car, pick-up, or truck? (None; Only bicycle or tricycle; Motorcycle or motortaxi but no car, pick-up, or truck (regardless of bicycle or tricycle); Car, pick-up, or truck (regardless of others))
322	Are all household members ages 6 to 14 currently enrolled in school or going to classes of any kind this year? (No; Yes; No members ages 6 to 14)
299	Are all household members ages 6 to 15 currently enrolled in school or going to classes of any kind this year? (No; Yes; No members ages 6 to 15)
290	Are all household members ages 6 to 16 currently enrolled in school or going to classes of any kind this year? (No; Yes; No members ages 6 to 16)
285	Does the household have a car or pickup? (No; Yes)
272	What language did the male head/spouse learn at home as a child as his mother tongue? (Quechua, Aymara, or other native language; No male head/spouse; Spanish, English, Portuguese, other foreign language, or is deaf/mute)
264	Are all household members ages 6 to 17 currently enrolled in school or going to classes of any kind this year? (No; Yes; No members ages 6 to 17)
245	Can the male head/spouse read and write? (No; Yes; No male head/spouse)
229	Are all household members ages 6 to 18 currently enrolled in school or going to classes of any kind this year? (No; Yes; No members ages 6 to 18)
196	What is the tenancy status of the household in its residence? (Owned free-and-clear, or other; Owned, after squatting; Given by another household or non-employer institution; Rented, owned, with a mortgage outstanding, or given by employer)

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>
152	Does the household have a VCR? (No; Yes)
148	What is the marital status of the male head/spouse? (Co-habiting; Widowed; Married; No male head/spouse; Never-married, divorced, or separated)
134	What is the marital status of the female head/spouse? (Co-habiting; Widowed; Married; Never-married, divorced, or separated; No female head/spouse)
121	In the past week, how many household members in their main occupation worked in a business, organization, or firm whose main activity was in retail and wholesale trade, or repair of vehicles? (None; One or more)
110	In the past week, did the female head/spouse do any work? (not counting household chores) (Yes; No; No female head/spouse)
108	How many household members can read and write? (None; One or more)
91	What is the structure of household headship? (Both male and female heads/spouses; Female head/spouse only; Male head/spouse only)
87	In the past week, how many household members in their main occupation worked in a business, organization, or firm whose main activity was in lodging and restaurants, transport, or logistics and telecommunication? (None; One or more)
83	In the past week, how many household members worked in their main occupation as traders in retail and wholesale stores or as itinerant vendors? (None; One; Two or more)
72	Does the household have a bicycle? (No; Yes)
71	Does the household have a sewing machine? (No; Yes)
69	In the past week, how many household members ages 14 or older did any work? (not counting household chores) (One or none; Two; Three; Four or more)
66	In the past week, did the male head/spouse do any work? (not counting household chores) (Yes; No; No male head/spouse)

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>
52	In the past week, how many household members worked in their main occupation as drivers of motor vehicles? (None; One or more)
51	Does the household have a motorcycle? (No; Yes)
36	Does the household have a radio? (No; Yes)
35	In the past week, how many household members were wage employees in their main line of work? (One or more; None)
22	Does the household share in a residence with one or more other households? (No; Yes)
19	In the past week, how many household members worked in their main occupation as workers in mining, wood, chemicals, or leather, food-service workers, shoemakers, tailors, or carpenters, workers and mechanics for metal, electrical equipment, machines, and instruments, construction workers and fabricators of construction materials, paper products, and graphic artists? (None; One or more)
15	Does the household have a black-and-white television? (Yes; No)
13	In the past week, how many household members in their main occupation worked in a business, organization, or firm whose main activity was in domestic service, or other services? (None; One or more)
13	In the past week, how many household members worked in their main occupation as conductors of public transport, domestic servants, cleaners, launderers, messengers, delivery workers, movers, garbage collectors, and the like? (None; One or more)
12	In the past week, how many household members in their main occupation worked in a business, organization, or firm whose main activity was in manufacturing or construction? (None; One or more)
10	Does the household have a tricycle? (Yes; No)
7	Does the household have a kerosene stove? (No; Yes)
3	Does the household have a truck? (No; Yes)
1	Does the household have a motorcycle taxi? (No; Yes)

Source: 2010 National Household Survey and the new-definition national poverty line

**Tables for
100% of the New-Definition National Poverty Line
(and Tables Pertaining to All 15 Poverty Lines,
both Legacy and New-Definition)**

**Figure 4 (100% of the national line, new definition):
 Estimated poverty likelihoods associated with scores**

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0-4	100.0
5-9	98.5
10-14	95.8
15-19	91.7
20-24	84.5
25-29	77.0
30-34	66.9
35-39	52.0
40-44	38.9
45-49	26.5
50-54	16.8
55-59	8.1
60-64	3.6
65-69	1.5
70-74	0.7
75-79	0.0
80-84	0.0
85-89	0.0
90-94	0.0
95-100	0.0

**Figure 5 (100% of the 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	14	÷	14	=	100.0
5-9	260	÷	264	=	98.5
10-14	819	÷	855	=	95.8
15-19	1,580	÷	1,724	=	91.7
20-24	2,437	÷	2,883	=	84.5
25-29	3,635	÷	4,723	=	77.0
30-34	4,068	÷	6,085	=	66.9
35-39	3,646	÷	7,007	=	52.0
40-44	3,191	÷	8,194	=	38.9
45-49	2,537	÷	9,587	=	26.5
50-54	1,883	÷	11,184	=	16.8
55-59	954	÷	11,852	=	8.1
60-64	453	÷	12,477	=	3.6
65-69	158	÷	10,350	=	1.5
70-74	51	÷	6,956	=	0.7
75-79	0	÷	3,813	=	0.0
80-84	0	÷	1,787	=	0.0
85-89	0	÷	209	=	0.0
90-94	0	÷	36	=	0.0
95-100	0	÷	0	=	0.0

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

Figure 6a: Distribution of household poverty likelihoods across expenditure ranges demarcated by new-definition poverty lines

Score	Likelihood of having expenditure in ranges demarcated by new-definition poverty lines						
		=>\$1.25/day	=>\$2.50/day	=>\$3.75/day	=>100% Natl.	=>150% Natl.	=>200% Natl.
	<\$1.25/day	and	and	and	and	and	
		<\$2.50/day	<\$3.75/day	<100% Natl.	150% Natl.	200% Natl.	
	=>PEN2.45	=>PEN4.89	=>PEN7.34	=>PEN8.95	=>PEN13.43	=>PEN17.90	
	<PEN2.45	and	and	and	and	and	
		<PEN4.89	<PEN7.34	<PEN8.95	<PEN13.43	<PEN17.90	
0-4	45.4	27.2	27.4	0.0	0.0	0.0	0.0
5-9	12.3	54.1	27.3	4.8	1.0	0.5	0.0
10-14	4.7	42.7	42.7	5.7	3.6	0.6	0.0
15-19	2.2	38.1	40.3	11.2	7.7	0.6	0.0
20-24	2.1	33.1	37.4	11.9	12.2	2.9	0.4
25-29	1.9	23.2	36.5	15.4	17.8	4.5	0.7
30-34	1.0	15.8	32.0	18.1	23.9	7.4	1.9
35-39	0.4	8.6	25.5	17.6	33.3	10.0	4.6
40-44	0.3	4.6	18.8	15.3	37.9	16.8	6.4
45-49	0.1	1.8	9.8	14.7	37.5	20.0	16.1
50-54	0.0	0.7	4.5	11.6	36.8	23.6	22.8
55-59	0.0	0.0	2.2	5.8	30.5	29.4	32.1
60-64	0.0	0.0	1.2	2.4	22.2	27.5	46.7
65-69	0.0	0.0	0.3	1.2	13.0	23.8	61.8
70-74	0.0	0.0	0.0	0.7	5.8	13.7	79.8
75-79	0.0	0.0	0.0	0.0	2.1	6.2	91.7
80-84	0.0	0.0	0.0	0.0	0.0	4.5	95.5
85-89	0.0	0.0	0.0	0.0	0.0	0.0	100.0
90-94	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	100.0

Note: All poverty likelihoods in percentage units.

The new-definition food line is omitted from this figure because it is very close to the new-definition \$2.50/day line.

Likewise, the new-definition USAID "extreme" line is omitted from this figure because it is very close to the new-definition \$3.75/day line.

Figure 6b: Distribution of household poverty likelihoods across expenditure ranges demarcated by legacy poverty lines

Score	Likelihood of having expenditure in ranges demarcated by legacy poverty lines						
		=>\$1.25/day	=>\$2.50/day	=>\$3.75/day	=>100% Natl.	=>150% Natl.	=>200% Natl.
	<\$1.25/day	and	and	and	and	and	
		<\$2.50/day	<\$3.75/day	<100% Natl.	150% Natl.	200% Natl.	
	=>PEN2.37	=>PEN4.73	=>PEN7.10	=>PEN8.67	=>PEN13.01	=>PEN17.35	
	<PEN2.37	and	and	and	and	and	
		<PEN4.73	<PEN7.10	<PEN8.67	<PEN13.01	<PEN17.35	
0-4	61.4	38.6	0.0	0.0	0.0	0.0	0.0
5-9	55.7	31.4	0.0	10.9	1.1	0.3	0.5
10-14	37.8	41.9	0.0	15.3	3.7	0.7	0.7
15-19	29.8	42.2	0.0	14.6	11.5	1.2	0.7
20-24	28.2	34.8	0.0	17.0	14.6	4.2	1.2
25-29	18.4	34.0	0.0	19.2	21.0	6.1	1.3
30-34	13.4	26.4	0.0	22.0	26.6	8.8	2.8
35-39	6.7	21.2	0.0	19.9	34.9	10.9	6.4
40-44	3.4	15.4	0.0	14.3	38.6	19.0	9.2
45-49	1.0	9.0	0.0	14.3	36.8	21.1	17.8
50-54	0.5	5.2	0.0	8.8	37.1	24.6	23.7
55-59	0.0	2.2	0.0	6.5	28.7	29.4	33.3
60-64	0.0	1.0	0.0	2.2	22.0	29.4	45.5
65-69	0.0	0.2	0.0	0.8	12.0	24.4	62.5
70-74	0.0	0.0	0.0	0.5	6.2	14.8	78.6
75-79	0.0	0.0	0.0	0.0	0.9	8.2	90.8
80-84	0.0	0.0	0.0	0.0	0.2	2.7	97.1
85-89	0.0	0.0	0.0	0.0	0.0	0.0	100.0
90-94	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	100.0

Note: All poverty likelihoods in percentage units.

The legacy food line is omitted from this figure because it is very close to the legacy \$2.50/day line.

Figure 7 (100% 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 2010 validation sample

Score	Difference between estimate and true value			
	Diff.	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
0-4	+0.0	0.0	0.0	0.0
5-9	-0.5	1.6	1.8	2.4
10-14	-0.6	2.5	2.8	3.7
15-19	-1.0	2.5	3.0	3.9
20-24	-5.1	3.7	3.9	4.3
25-29	+1.5	3.0	3.5	4.6
30-34	-2.0	2.8	3.3	4.4
35-39	+1.4	3.0	3.6	4.8
40-44	+0.3	2.7	3.2	4.1
45-49	+1.3	2.2	2.6	3.3
50-54	-3.4	2.7	2.8	3.2
55-59	-2.7	2.1	2.3	2.6
60-64	-0.6	0.9	1.0	1.4
65-69	+0.2	0.5	0.6	0.7
70-74	+0.1	0.5	0.5	0.7
75-79	+0.0	0.0	0.0	0.0
80-84	+0.0	0.0	0.0	0.0
85-89	+0.0	0.0	0.0	0.0
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

**Figure 8 (100% 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 2010 validation sample**

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
1	+1.2	62.8	80.1	92.2
4	+0.5	28.3	34.8	49.8
8	-0.7	21.3	26.9	35.7
16	-0.5	14.5	17.6	25.8
32	-0.8	10.7	12.7	18.0
64	-0.6	8.1	9.4	12.0
128	-0.6	5.5	6.3	8.2
256	-0.7	3.8	4.5	6.1
512	-0.7	2.8	3.3	4.2
1,024	-0.7	1.9	2.3	3.2
2,048	-0.7	1.3	1.6	2.3
4,096	-0.7	0.9	1.1	1.5
8,192	-0.7	0.7	0.8	1.0
16,384	-0.7	0.5	0.6	0.7

Figure 9 (All lines): 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 2010 validation sample

	Poverty line (new definition or legacy)							
	Food	National			USAID	Intl. 2005 PPP		
		100%	150%	200%	'Extreme'	\$1.25	\$2.50	\$3.75
<u>New-definition poverty lines</u>								
<u>Estimate minus true value</u>								
Scorecard applied to 2010 validation sample	+0.5	-0.7	-0.9	-0.5	-1.3	+0.1	-0.0	-0.5
<u>Precision of difference</u>								
Scorecard applied to 2010 validation sample	0.2	0.5	0.6	0.6	0.4	0.0	0.2	0.4
<u>α factor for standard errors</u>								
Scorecard applied to 2010 validation sample	0.59	0.85	0.97	1.03	0.90	0.50	0.72	0.79
<u>Legacy poverty lines</u>								
<u>Estimate minus true value</u>								
Scorecard applied to 2010 validation sample	+0.2	-0.3	+0.2	+0.4	—	+0.0	-0.1	-0.6
<u>Precision of difference</u>								
Scorecard applied to 2010 validation sample	0.2	0.5	0.6	0.6	—	0.0	0.2	0.4
<u>α factor for standard errors</u>								
Scorecard applied to 2010 validation sample	0.58	0.83	0.95	1.06	—	0.44	0.68	0.78

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

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

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

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

Figure 10 (All lines): Differences, precision of differences, and α factor for bootstrapped estimates of changes in poverty rates for independent, representative samples from a population at two points in time, scorecard applied to the 2010 validation sample and to 2004/5/6/7/8/9/11

	Follow-up	Poverty line (new definition or legacy)						
		Food	National			Intl. 2005 PPP		
			100%	150%	200%	\$1.25	\$2.50	\$3.75
<u>New-definition poverty lines</u>								
<u>Estimate minus true value</u>	2004	+2.2	-3.5	-0.1	+3.6	-0.3	-1.3	-0.5
	2005	+0.7	-5.2	-3.5	-0.2	-0.6	-2.6	-3.7
	2006	+1.5	-1.4	+0.6	+3.0	-0.5	-1.2	-1.5
	2007	+0.9	-1.9	-1.8	-0.1	-0.2	-0.5	-1.3
	2008	-0.1	-1.3	-0.8	-1.0	-0.2	-0.2	-0.6
	2009	-0.3	+0.4	-1.5	+0.5	-0.1	-0.2	-0.5
	2011	+0.3	+1.8	+1.7	+1.0	-0.1	+0.7	+1.4
<u>Precision of difference</u>	2004	0.4	0.8	0.9	1.0	0.1	0.4	0.6
	2005	0.4	0.7	0.9	0.9	0.1	0.4	0.6
	2006	0.4	0.7	0.9	0.9	0.2	0.4	0.6
	2007	0.3	0.7	0.9	0.9	0.1	0.4	0.6
	2008	0.3	0.7	0.9	0.9	0.1	0.3	0.5
	2009	0.3	0.7	0.8	0.8	0.1	0.3	0.6
	2011	0.3	0.7	0.7	1.2	0.0	0.4	0.5
<u>α factor for standard errors</u>	2004	0.83	1.19	1.55	2.03	0.68	0.90	1.04
	2005	0.80	1.13	1.51	1.82	0.74	0.91	1.01
	2006	0.85	1.13	1.43	1.69	0.87	0.90	1.03
	2007	0.80	1.14	1.32	1.50	0.70	0.90	1.02
	2008	0.79	1.15	1.37	1.49	0.75	0.91	1.06
	2009	0.80	1.15	1.31	1.41	0.66	0.92	1.07
	2011	0.80	1.00	1.00	1.25	0.47	0.99	0.91
<u>Legacy poverty lines</u>								
<u>Estimate minus true value</u>	2007	+1.2	+0.5	-0.2	+1.8	-0.2	-0.6	-1.2
	2008	+0.4	-0.5	-1.0	-0.7	-0.1	-0.2	+0.3
	2009	+0.1	-0.2	-2.7	-0.1	-0.1	-0.1	-0.1
<u>Precision of difference</u>	2007	0.3	0.7	0.9	0.9	0.1	0.3	0.5
	2008	0.3	0.7	0.9	0.9	0.1	0.3	0.5
	2009	0.3	0.7	0.8	0.8	0.1	0.3	0.5
<u>α factor for standard errors</u>	2007	0.78	1.12	1.30	1.52	0.62	0.86	0.97
	2008	0.76	1.14	1.32	1.52	0.78	0.88	1.00
	2009	0.80	1.10	1.33	1.46	0.72	0.91	1.05

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

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

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

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

Scorecard applied to 2010 validation sample (baseline) and the validation sample of a given other year (follow-up).

Figure 11 (All lines): 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 12 (100% 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	<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	0.0	25.6	0.0	74.4	74.4	-99.9
5-9	0.3	25.4	0.0	74.4	74.6	-97.9
10-14	1.1	24.5	0.0	74.3	75.4	-91.3
15-19	2.6	23.0	0.2	74.2	76.8	-78.5
20-24	5.2	20.4	0.6	73.8	79.0	-57.4
25-29	8.7	16.9	1.7	72.6	81.3	-25.2
30-34	12.8	12.8	3.8	70.6	83.4	+14.5
35-39	16.4	9.2	7.1	67.2	83.6	+56.0
40-44	19.6	6.0	12.1	62.3	81.9	+52.8
45-49	21.9	3.7	19.4	55.0	76.9	+24.3
50-54	23.9	1.7	28.6	45.8	69.7	-11.6
55-59	24.9	0.7	39.5	34.9	59.8	-54.0
60-64	25.4	0.2	51.4	23.0	48.4	-100.6
65-69	25.6	0.0	61.6	12.8	38.4	-140.4
70-74	25.6	0.0	68.5	5.8	31.5	-167.4
75-79	25.6	0.0	72.3	2.0	27.7	-182.3
80-84	25.6	0.0	74.1	0.2	25.9	-189.2
85-89	25.6	0.0	74.3	0.0	25.7	-190.1
90-94	25.6	0.0	74.4	0.0	25.6	-190.2
95-100	25.6	0.0	74.4	0.0	25.6	-190.2

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

Figure 13 (100% 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 successfully 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	0.0	100.0	0.1	Only poor targeted
5-9	0.3	97.8	1.1	44.5:1
10-14	1.1	95.9	4.2	23.4:1
15-19	2.9	92.8	10.3	12.8:1
20-24	5.7	90.4	20.2	9.4:1
25-29	10.5	83.3	34.0	5.0:1
30-34	16.5	77.3	49.9	3.4:1
35-39	23.6	69.7	64.1	2.3:1
40-44	31.7	61.9	76.6	1.6:1
45-49	41.3	53.1	85.6	1.1:1
50-54	52.5	45.5	93.3	0.8:1
55-59	64.4	38.7	97.2	0.6:1
60-64	76.8	33.1	99.3	0.5:1
65-69	87.2	29.3	99.9	0.4:1
70-74	94.2	27.2	100.0	0.4:1
75-79	98.0	26.2	100.0	0.4:1
80-84	99.8	25.7	100.0	0.3:1
85-89	100.0	25.6	100.0	0.3:1
90-94	100.0	25.6	100.0	0.3:1
95-100	100.0	25.6	100.0	0.3:1

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

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	73.7
5-9	70.6
10-14	57.5
15-19	43.3
20-24	39.7
25-29	27.5
30-34	17.8
35-39	9.5
40-44	4.8
45-49	1.4
50-54	0.6
55-59	0.0
60-64	0.0
65-69	0.0
70-74	0.0
75-79	0.0
80-84	0.0
85-89	0.0
90-94	0.0
95-100	0.0

Figure 7 (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 2010 validation sample

Score	Difference between estimate and true value			
	Diff.	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
0-4	-26.3	13.2	13.2	13.2
5-9	+13.4	13.8	15.9	20.5
10-14	+1.2	7.6	8.9	11.6
15-19	-2.8	6.0	6.9	9.7
20-24	+0.4	4.4	5.1	6.4
25-29	+6.9	2.5	3.0	3.7
30-34	+0.1	2.2	2.6	3.3
35-39	+1.1	1.4	1.7	2.2
40-44	+1.8	0.7	0.9	1.2
45-49	+0.4	0.3	0.4	0.6
50-54	+0.1	0.3	0.4	0.6
55-59	-0.0	0.1	0.1	0.1
60-64	+0.0	0.0	0.0	0.0
65-69	+0.0	0.0	0.0	0.0
70-74	+0.0	0.0	0.0	0.0
75-79	+0.0	0.0	0.0	0.0
80-84	+0.0	0.0	0.0	0.0
85-89	+0.0	0.0	0.0	0.0
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

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 2010 validation sample

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
1	-0.8	43.9	61.0	72.8
4	-0.0	12.7	18.1	31.2
8	-0.1	9.2	12.1	20.2
16	+0.4	5.9	7.8	12.1
32	+0.5	4.3	5.1	7.2
64	+0.5	2.8	3.6	4.6
128	+0.5	2.0	2.6	3.4
256	+0.5	1.5	1.8	2.3
512	+0.5	1.0	1.3	1.7
1,024	+0.5	0.7	0.9	1.1
2,048	+0.5	0.5	0.6	0.8
4,096	+0.5	0.4	0.4	0.6
8,192	+0.5	0.3	0.3	0.4
16,384	+0.5	0.2	0.2	0.3

Figure 12 (Food, 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	0.0	6.2	0.0	93.8	93.8	–99.6
5–9	0.2	6.1	0.1	93.6	93.8	–92.9
10–14	0.6	5.6	0.5	93.3	93.9	–71.4
15–19	1.4	4.8	1.5	92.3	93.7	–31.8
20–24	2.5	3.7	3.2	90.6	93.1	+32.7
25–29	3.8	2.5	6.7	87.1	90.9	–7.2
30–34	4.9	1.3	11.6	82.2	87.1	–86.1
35–39	5.6	0.6	17.9	75.8	81.5	–187.3
40–44	6.0	0.2	25.7	68.0	74.0	–312.8
45–49	6.2	0.1	35.2	58.6	64.8	–463.7
50–54	6.2	0.0	46.3	47.5	53.7	–642.3
55–59	6.2	0.0	58.1	35.6	41.9	–832.1
60–64	6.2	0.0	70.6	23.2	29.4	–1,032.2
65–69	6.2	0.0	81.0	12.8	19.0	–1,198.1
70–74	6.2	0.0	87.9	5.8	12.1	–1,309.6
75–79	6.2	0.0	91.7	2.0	8.3	–1,370.8
80–84	6.2	0.0	93.5	0.2	6.5	–1,399.4
85–89	6.2	0.0	93.7	0.0	6.3	–1,402.8
90–94	6.2	0.0	93.8	0.0	6.2	–1,403.4
95–100	6.2	0.0	93.8	0.0	6.2	–1,403.4

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

Figure 13 (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 successfully 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	0.0	100.0	0.2	Only poor targeted
5-9	0.3	58.8	2.6	1.4:1
10-14	1.1	57.3	10.4	1.3:1
15-19	2.9	48.8	22.4	1.0:1
20-24	5.7	44.2	40.7	0.8:1
25-29	10.5	36.1	60.5	0.6:1
30-34	16.5	29.9	79.2	0.4:1
35-39	23.6	23.9	90.3	0.3:1
40-44	31.7	18.9	96.3	0.2:1
45-49	41.3	14.9	99.0	0.2:1
50-54	52.5	11.9	99.8	0.1:1
55-59	64.4	9.7	100.0	0.1:1
60-64	76.8	8.1	100.0	0.1:1
65-69	87.2	7.2	100.0	0.1:1
70-74	94.2	6.6	100.0	0.1:1
75-79	98.0	6.4	100.0	0.1:1
80-84	99.8	6.3	100.0	0.1:1
85-89	100.0	6.2	100.0	0.1:1
90-94	100.0	6.2	100.0	0.1:1
95-100	100.0	6.2	100.0	0.1:1

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

**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	100.0
5-9	99.5
10-14	99.4
15-19	99.4
20-24	96.7
25-29	94.8
30-34	90.7
35-39	85.3
40-44	76.8
45-49	63.9
50-54	53.6
55-59	38.5
60-64	25.8
65-69	14.5
70-74	6.5
75-79	2.1
80-84	0.0
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 2010 validation sample**

Score	Difference between estimate and true value			
	Diff.	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
0-4	+0.0	0.0	0.0	0.0
5-9	-0.5	0.2	0.2	0.2
10-14	-0.4	0.4	0.5	0.7
15-19	+1.3	1.3	1.7	2.1
20-24	-2.4	1.5	1.5	1.7
25-29	+0.1	1.7	2.0	2.5
30-34	-2.9	2.2	2.4	2.6
35-39	+0.5	2.3	2.7	3.6
40-44	+4.0	2.6	3.0	3.7
45-49	-2.2	2.3	2.8	3.5
50-54	-3.4	2.8	3.0	3.5
55-59	+0.1	2.2	2.6	3.6
60-64	-0.8	1.9	2.3	3.0
65-69	-1.4	1.6	1.9	2.3
70-74	-0.8	1.4	1.7	2.2
75-79	-3.1	2.4	2.6	2.8
80-84	+0.0	0.0	0.0	0.0
85-89	+0.0	0.0	0.0	0.0
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

**Figure 8 (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 2010 validation sample**

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
1	-0.1	65.9	81.2	93.1
4	-0.4	37.0	44.5	55.8
8	-1.0	27.3	32.1	44.1
16	-1.0	19.5	23.3	31.2
32	-1.1	13.8	16.4	21.1
64	-1.1	9.7	11.6	15.4
128	-1.0	6.7	8.2	11.2
256	-1.0	5.0	5.9	8.1
512	-0.8	3.5	4.1	5.5
1,024	-0.9	2.5	3.0	3.9
2,048	-0.9	1.8	2.1	2.6
4,096	-0.9	1.3	1.5	2.0
8,192	-0.9	0.9	1.1	1.4
16,384	-0.9	0.6	0.7	0.9

Figure 12 (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	0.0	49.7	0.0	50.3	50.3	–99.9
5–9	0.3	49.4	0.0	50.3	50.6	–98.9
10–14	1.1	48.5	0.0	50.3	51.5	–95.4
15–19	2.8	46.9	0.0	50.3	53.1	–88.6
20–24	5.7	44.0	0.1	50.3	55.9	–77.0
25–29	10.1	39.5	0.3	50.0	60.2	–58.5
30–34	15.8	33.9	0.7	49.6	65.4	–34.8
35–39	21.8	27.9	1.8	48.6	70.4	–8.7
40–44	27.9	21.8	3.8	46.5	74.4	+20.1
45–49	34.1	15.5	7.2	43.1	77.3	+51.9
50–54	40.2	9.5	12.3	38.0	78.2	+75.1
55–59	44.5	5.2	19.9	30.4	74.9	+59.9
60–64	47.5	2.2	29.4	20.9	68.4	+40.8
65–69	49.1	0.6	38.1	12.2	61.2	+23.2
70–74	49.5	0.1	44.6	5.7	55.2	+10.2
75–79	49.7	0.0	48.3	2.0	51.7	+2.8
80–84	49.7	0.0	50.1	0.2	49.9	–0.8
85–89	49.7	0.0	50.3	0.0	49.7	–1.3
90–94	49.7	0.0	50.3	0.0	49.7	–1.3
95–100	49.7	0.0	50.3	0.0	49.7	–1.3

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

Figure 13 (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 successfully 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	0.0	100.0	0.0	Only poor targeted
5-9	0.3	100.0	0.6	Only poor targeted
10-14	1.1	99.6	2.3	279.9:1
15-19	2.9	98.7	5.7	75.3:1
20-24	5.7	98.7	11.4	77.3:1
25-29	10.5	97.0	20.4	32.5:1
30-34	16.5	95.6	31.8	21.7:1
35-39	23.6	92.5	43.9	12.4:1
40-44	31.7	87.9	56.2	7.3:1
45-49	41.3	82.6	68.7	4.7:1
50-54	52.5	76.5	80.9	3.3:1
55-59	64.4	69.1	89.5	2.2:1
60-64	76.8	61.7	95.5	1.6:1
65-69	87.2	56.3	98.8	1.3:1
70-74	94.2	52.6	99.7	1.1:1
75-79	98.0	50.7	100.0	1.0:1
80-84	99.8	49.8	100.0	1.0:1
85-89	100.0	49.7	100.0	1.0:1
90-94	100.0	49.7	100.0	1.0:1
95-100	100.0	49.7	100.0	1.0:1

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

**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	100.0
5-9	100.0
10-14	100.0
15-19	100.0
20-24	99.6
25-29	99.3
30-34	98.1
35-39	95.4
40-44	93.6
45-49	83.9
50-54	77.2
55-59	67.9
60-64	53.3
65-69	38.3
70-74	20.2
75-79	8.3
80-84	4.5
85-89	0.0
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 2010 validation sample

Score	Difference between estimate and true value			
	Diff.	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
0-4	+0.0	0.0	0.0	0.0
5-9	+0.0	0.0	0.0	0.0
10-14	+0.0	0.0	0.0	0.0
15-19	+1.6	1.3	1.5	2.1
20-24	-0.4	0.2	0.2	0.2
25-29	-0.1	0.4	0.5	0.6
30-34	-0.3	0.8	0.9	1.2
35-39	+1.2	1.9	2.2	2.9
40-44	+5.0	2.0	2.3	3.0
45-49	-2.2	1.9	2.1	2.8
50-54	-5.7	3.7	3.8	4.0
55-59	-2.5	2.3	2.4	3.0
60-64	-1.7	2.0	2.4	3.3
65-69	+3.2	2.2	2.6	3.4
70-74	+1.8	2.2	2.7	3.3
75-79	-0.8	2.2	2.6	3.5
80-84	+3.7	0.9	0.9	1.1
85-89	-18.9	15.8	16.9	19.5
90-94	+0.0	0.0	0.0	0.0
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 2010 validation sample**

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
1	+0.8	69.5	72.8	92.7
4	+0.2	36.3	43.3	56.3
8	-0.2	26.6	31.9	41.3
16	+0.0	20.3	24.0	32.1
32	-0.3	13.6	16.3	22.8
64	-0.6	9.9	11.7	15.7
128	-0.4	6.8	8.3	10.7
256	-0.5	5.0	6.0	7.1
512	-0.3	3.5	4.1	5.2
1,024	-0.4	2.5	3.0	3.8
2,048	-0.5	1.8	2.0	2.6
4,096	-0.5	1.2	1.5	2.2
8,192	-0.5	0.9	1.0	1.4
16,384	-0.5	0.6	0.7	1.0

Figure 12 (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	0.0	67.1	0.0	32.9	32.9	–100.0
5–9	0.3	66.9	0.0	32.9	33.1	–99.2
10–14	1.1	66.0	0.0	32.9	34.0	–96.6
15–19	2.8	64.3	0.0	32.8	35.7	–91.5
20–24	5.7	61.4	0.0	32.8	38.6	–82.9
25–29	10.4	56.7	0.1	32.8	43.2	–68.9
30–34	16.4	50.7	0.1	32.7	49.1	–50.9
35–39	23.1	44.0	0.5	32.4	55.5	–30.5
40–44	30.5	36.7	1.3	31.6	62.1	–7.3
45–49	38.7	28.4	2.6	30.2	68.9	+19.2
50–54	47.6	19.5	4.9	28.0	75.6	+49.2
55–59	55.5	11.6	8.8	24.0	79.6	+78.6
60–64	62.0	5.2	14.9	18.0	80.0	+77.8
65–69	65.5	1.6	21.7	11.2	76.7	+67.7
70–74	66.8	0.4	27.4	5.5	72.3	+59.2
75–79	67.1	0.0	30.9	2.0	69.1	+54.0
80–84	67.1	0.0	32.6	0.2	67.3	+51.4
85–89	67.1	0.0	32.8	0.0	67.2	+51.1
90–94	67.1	0.0	32.9	0.0	67.1	+51.0
95–100	67.1	0.0	32.9	0.0	67.1	+51.0

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

Figure 13 (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 successfully 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	0.0	100.0	0.0	Only poor targeted
5-9	0.3	100.0	0.4	Only poor targeted
10-14	1.1	100.0	1.7	Only poor targeted
15-19	2.9	99.1	4.2	106.3:1
20-24	5.7	99.5	8.5	214.5:1
25-29	10.5	99.5	15.5	182.7:1
30-34	16.5	99.1	24.4	115.0:1
35-39	23.6	98.1	34.4	50.5:1
40-44	31.7	96.0	45.4	23.9:1
45-49	41.3	93.6	57.6	14.7:1
50-54	52.5	90.7	70.9	9.7:1
55-59	64.4	86.3	82.7	6.3:1
60-64	76.8	80.6	92.3	4.2:1
65-69	87.2	75.1	97.6	3.0:1
70-74	94.2	70.9	99.5	2.4:1
75-79	98.0	68.5	99.9	2.2:1
80-84	99.8	67.3	100.0	2.1:1
85-89	100.0	67.2	100.0	2.0:1
90-94	100.0	67.1	100.0	2.0:1
95-100	100.0	67.1	100.0	2.0:1

**Tables for
the New-Definition USAID “Extreme” Poverty Line**

**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	83.5
5–9	78.8
10–14	72.2
15–19	58.2
20–24	53.5
25–29	46.1
30–34	32.3
35–39	22.4
40–44	18.4
45–49	8.0
50–54	4.3
55–59	2.3
60–64	1.0
65–69	0.3
70–74	0.2
75–79	0.0
80–84	0.0
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 2010 validation sample

Score	Difference between estimate and true value			
	Diff.	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
0–4	–16.5	8.3	8.3	8.3
5–9	+2.8	11.4	13.4	17.3
10–14	+0.8	6.7	7.9	10.1
15–19	–10.0	7.4	7.9	8.8
20–24	–2.8	4.3	5.0	6.8
25–29	–5.8	4.7	5.0	5.9
30–34	–7.7	5.4	5.7	6.4
35–39	–3.2	3.0	3.2	4.1
40–44	+0.9	2.3	2.7	3.6
45–49	–2.3	2.0	2.2	2.4
50–54	–1.7	1.4	1.5	1.8
55–59	–0.8	0.9	1.1	1.4
60–64	–0.8	0.7	0.8	0.9
65–69	+0.2	0.1	0.1	0.1
70–74	+0.2	0.0	0.0	0.0
75–79	+0.0	0.0	0.0	0.0
80–84	+0.0	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

**Figure 8 (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 2010 validation sample**

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
1	-0.1	61.8	63.8	80.5
4	-0.6	21.7	28.0	41.2
8	-1.5	16.3	20.2	26.6
16	-1.2	11.2	14.2	18.8
32	-1.3	8.1	10.1	12.8
64	-1.3	5.8	6.8	9.2
128	-1.4	4.0	4.8	6.4
256	-1.3	3.0	3.6	4.5
512	-1.3	2.2	2.6	3.4
1,024	-1.3	1.5	1.8	2.3
2,048	-1.3	1.1	1.2	1.7
4,096	-1.3	0.8	0.9	1.2
8,192	-1.3	0.5	0.6	0.8
16,384	-1.3	0.4	0.5	0.6

Figure 12 (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	0.0	12.4	0.0	87.6	87.6	–99.8
5–9	0.2	12.2	0.1	87.6	87.8	–96.1
10–14	0.8	11.6	0.3	87.3	88.1	–84.4
15–19	1.8	10.5	1.0	86.6	88.5	–62.0
20–24	3.3	9.1	2.4	85.2	88.5	–26.8
25–29	5.4	6.9	5.0	82.6	88.0	+28.4
30–34	7.5	4.8	9.0	78.6	86.1	+27.2
35–39	9.1	3.2	14.4	73.2	82.3	–16.5
40–44	10.4	1.9	21.3	66.3	76.8	–72.1
45–49	11.4	1.0	30.0	57.6	69.0	–142.2
50–54	11.9	0.5	40.6	47.0	58.9	–228.1
55–59	12.2	0.2	52.2	35.4	47.6	–321.7
60–64	12.4	0.0	64.5	23.1	35.5	–421.0
65–69	12.4	0.0	74.8	12.8	25.2	–504.4
70–74	12.4	0.0	81.8	5.8	18.2	–560.6
75–79	12.4	0.0	85.6	2.0	14.4	–591.4
80–84	12.4	0.0	87.4	0.2	12.6	–605.8
85–89	12.4	0.0	87.6	0.0	12.4	–607.5
90–94	12.4	0.0	87.6	0.0	12.4	–607.8
95–100	12.4	0.0	87.6	0.0	12.4	–607.8

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

Figure 13 (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 successfully 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	0.0	100.0	0.1	Only poor targeted
5–9	0.3	75.4	1.7	3.1:1
10–14	1.1	70.1	6.4	2.3:1
15–19	2.9	64.6	14.9	1.8:1
20–24	5.7	58.0	26.9	1.4:1
25–29	10.5	52.0	43.9	1.1:1
30–34	16.5	45.5	60.9	0.8:1
35–39	23.6	38.8	73.8	0.6:1
40–44	31.7	32.9	84.4	0.5:1
45–49	41.3	27.5	91.8	0.4:1
50–54	52.5	22.7	96.2	0.3:1
55–59	64.4	18.9	98.3	0.2:1
60–64	76.8	16.1	99.8	0.2:1
65–69	87.2	14.2	100.0	0.2:1
70–74	94.2	13.1	100.0	0.2:1
75–79	98.0	12.6	100.0	0.1:1
80–84	99.8	12.4	100.0	0.1:1
85–89	100.0	12.4	100.0	0.1:1
90–94	100.0	12.4	100.0	0.1:1
95–100	100.0	12.4	100.0	0.1:1

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

Figure 4 (\$1.25/day 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	45.4
5-9	12.3
10-14	4.7
15-19	2.2
20-24	2.1
25-29	1.9
30-34	1.0
35-39	0.4
40-44	0.3
45-49	0.1
50-54	0.0
55-59	0.0
60-64	0.0
65-69	0.0
70-74	0.0
75-79	0.0
80-84	0.0
85-89	0.0
90-94	0.0
95-100	0.0

Figure 7 (\$1.25/day 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 2010 validation sample

Score	Difference between estimate and true value			
	Diff.	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
0-4	+45.4	0.0	0.0	0.0
5-9	+8.6	4.2	4.9	6.0
10-14	+1.1	2.7	3.3	4.3
15-19	-0.4	1.5	1.8	2.4
20-24	+1.4	0.6	0.7	0.9
25-29	+0.6	0.6	0.7	1.0
30-34	-0.2	0.5	0.6	0.8
35-39	+0.1	0.2	0.2	0.3
40-44	-0.0	0.2	0.2	0.3
45-49	+0.0	0.1	0.1	0.2
50-54	+0.0	0.0	0.0	0.0
55-59	+0.0	0.0	0.0	0.0
60-64	+0.0	0.0	0.0	0.0
65-69	+0.0	0.0	0.0	0.0
70-74	+0.0	0.0	0.0	0.0
75-79	+0.0	0.0	0.0	0.0
80-84	+0.0	0.0	0.0	0.0
85-89	+0.0	0.0	0.0	0.0
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

Figure 8 (\$1.25/day 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 2010 validation sample

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
1	+0.3	1.0	1.1	2.3
4	+0.1	0.5	0.6	7.9
8	+0.0	0.3	2.5	5.2
16	+0.1	1.0	1.5	2.5
32	+0.1	0.8	1.1	1.6
64	+0.1	0.6	0.7	1.2
128	+0.1	0.4	0.5	0.7
256	+0.1	0.3	0.4	0.5
512	+0.1	0.2	0.3	0.4
1,024	+0.1	0.2	0.2	0.2
2,048	+0.1	0.1	0.1	0.2
4,096	+0.1	0.1	0.1	0.1
8,192	+0.1	0.1	0.1	0.1
16,384	+0.1	0.0	0.0	0.1

Figure 12 (\$1.25/day 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	0.0	0.4	0.0	99.6	99.6	–96.6
5–9	0.0	0.4	0.3	99.3	99.3	–27.9
10–14	0.0	0.4	1.1	98.5	98.6	–168.4
15–19	0.1	0.3	2.8	96.8	96.9	–581.6
20–24	0.1	0.3	5.6	94.0	94.1	–1,288.1
25–29	0.2	0.2	10.3	89.3	89.5	–2,439.8
30–34	0.3	0.1	16.2	83.3	83.6	–3,922.5
35–39	0.3	0.1	23.2	76.4	76.7	–5,648.5
40–44	0.4	0.0	31.4	68.2	68.6	–7,665.8
45–49	0.4	0.0	40.9	58.7	59.1	–10,033.4
50–54	0.4	0.0	52.1	47.5	47.9	–12,802.3
55–59	0.4	0.0	64.0	35.6	36.0	–15,736.7
60–64	0.4	0.0	76.4	23.2	23.6	–18,825.6
65–69	0.4	0.0	86.8	12.8	13.2	–21,388.1
70–74	0.4	0.0	93.8	5.8	6.2	–23,110.2
75–79	0.4	0.0	97.6	2.0	2.4	–24,054.2
80–84	0.4	0.0	99.4	0.2	0.6	–24,496.7
85–89	0.4	0.0	99.6	0.0	0.4	–24,548.4
90–94	0.4	0.0	99.6	0.0	0.4	–24,557.3
95–100	0.4	0.0	99.6	0.0	0.4	–24,557.3

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

Figure 13 (\$1.25/day 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 successfully 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	0.0	0.0	0.0	0.0:1
5-9	0.3	5.0	3.4	0.1:1
10-14	1.1	4.2	11.9	0.0:1
15-19	2.9	3.6	25.5	0.0:1
20-24	5.7	2.3	32.8	0.0:1
25-29	10.5	1.9	50.3	0.0:1
30-34	16.5	1.8	74.0	0.0:1
35-39	23.6	1.4	82.8	0.0:1
40-44	31.7	1.2	94.1	0.0:1
45-49	41.3	1.0	100.0	0.0:1
50-54	52.5	0.8	100.0	0.0:1
55-59	64.4	0.6	100.0	0.0:1
60-64	76.8	0.5	100.0	0.0:1
65-69	87.2	0.5	100.0	0.0:1
70-74	94.2	0.4	100.0	0.0:1
75-79	98.0	0.4	100.0	0.0:1
80-84	99.8	0.4	100.0	0.0:1
85-89	100.0	0.4	100.0	0.0:1
90-94	100.0	0.4	100.0	0.0:1
95-100	100.0	0.4	100.0	0.0:1

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

Figure 4 (\$2.50/day 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	72.6
5-9	66.4
10-14	47.4
15-19	40.3
20-24	35.2
25-29	25.1
30-34	16.7
35-39	8.9
40-44	4.8
45-49	1.9
50-54	0.7
55-59	0.0
60-64	0.0
65-69	0.0
70-74	0.0
75-79	0.0
80-84	0.0
85-89	0.0
90-94	0.0
95-100	0.0

Figure 7 (\$2.50/day 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 2010 validation sample

Score	Difference between estimate and true value			
	Diff.	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
0-4	-27.4	13.7	13.7	13.7
5-9	+9.2	13.8	16.0	20.5
10-14	+1.0	7.6	9.1	12.2
15-19	-9.1	7.5	8.0	9.1
20-24	+0.2	4.1	4.9	6.5
25-29	-3.4	3.9	4.6	5.8
30-34	-0.3	2.3	2.7	3.7
35-39	-0.4	1.7	2.0	2.6
40-44	+1.3	0.8	1.0	1.4
45-49	+0.7	0.4	0.4	0.6
50-54	+0.1	0.4	0.4	0.6
55-59	-0.0	0.1	0.1	0.1
60-64	+0.0	0.0	0.0	0.0
65-69	+0.0	0.0	0.0	0.0
70-74	+0.0	0.0	0.0	0.0
75-79	+0.0	0.0	0.0	0.0
80-84	+0.0	0.0	0.0	0.0
85-89	+0.0	0.0	0.0	0.0
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

Figure 8 (\$2.50/day 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 2010 validation sample

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
1	-0.5	42.4	59.2	70.2
4	-0.3	13.0	19.3	30.8
8	-0.4	9.7	13.3	21.9
16	-0.1	6.9	8.9	12.3
32	+0.0	4.7	5.7	7.6
64	+0.0	3.3	3.8	5.7
128	-0.0	2.3	2.8	3.9
256	-0.0	1.7	2.1	2.8
512	-0.0	1.2	1.4	1.9
1,024	-0.0	0.9	1.0	1.3
2,048	-0.0	0.6	0.7	0.9
4,096	-0.0	0.4	0.5	0.7
8,192	-0.0	0.3	0.4	0.5
16,384	-0.0	0.2	0.2	0.3

Figure 12 (\$2.50/day 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	0.0	5.8	0.0	94.2	94.2	–99.5
5–9	0.2	5.7	0.1	94.1	94.2	–92.4
10–14	0.6	5.2	0.6	93.6	94.2	–70.7
15–19	1.3	4.5	1.6	92.6	93.9	–28.6
20–24	2.3	3.5	3.5	90.7	93.0	+37.9
25–29	3.4	2.4	7.0	87.2	90.6	–20.8
30–34	4.5	1.3	12.1	82.1	86.6	–107.6
35–39	5.2	0.7	18.4	75.8	81.0	–216.3
40–44	5.5	0.3	26.2	68.0	73.5	–350.8
45–49	5.7	0.1	35.6	58.6	64.3	–512.3
50–54	5.8	0.0	46.7	47.5	53.3	–703.6
55–59	5.8	0.0	58.6	35.6	41.4	–907.1
60–64	5.8	0.0	71.0	23.2	29.0	–1,121.7
65–69	5.8	0.0	81.4	12.8	18.6	–1,299.7
70–74	5.8	0.0	88.3	5.8	11.7	–1,419.4
75–79	5.8	0.0	92.2	2.0	7.8	–1,484.9
80–84	5.8	0.0	93.9	0.2	6.1	–1,515.7
85–89	5.8	0.0	94.1	0.0	5.9	–1,519.3
90–94	5.8	0.0	94.2	0.0	5.8	–1,519.9
95–100	5.8	0.0	94.2	0.0	5.8	–1,519.9

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

Figure 13 (\$2.50/day 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 successfully 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	0.0	100.0	0.2	Only poor targeted
5-9	0.3	58.8	2.8	1.4:1
10-14	1.1	50.2	9.8	1.0:1
15-19	2.9	45.3	22.2	0.8:1
20-24	5.7	39.7	39.2	0.7:1
25-29	10.5	32.8	59.1	0.5:1
30-34	16.5	27.1	77.0	0.4:1
35-39	23.6	21.9	88.8	0.3:1
40-44	31.7	17.4	95.2	0.2:1
45-49	41.3	13.9	98.7	0.2:1
50-54	52.5	11.0	99.7	0.1:1
55-59	64.4	9.0	100.0	0.1:1
60-64	76.8	7.6	100.0	0.1:1
65-69	87.2	6.7	100.0	0.1:1
70-74	94.2	6.2	100.0	0.1:1
75-79	98.0	5.9	100.0	0.1:1
80-84	99.8	5.8	100.0	0.1:1
85-89	100.0	5.8	100.0	0.1:1
90-94	100.0	5.8	100.0	0.1:1
95-100	100.0	5.8	100.0	0.1:1

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

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

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0-4	100.0
5-9	93.7
10-14	90.1
15-19	80.5
20-24	72.6
25-29	61.5
30-34	48.8
35-39	34.4
40-44	23.6
45-49	11.8
50-54	5.2
55-59	2.3
60-64	1.2
65-69	0.3
70-74	0.0
75-79	0.0
80-84	0.0
85-89	0.0
90-94	0.0
95-100	0.0

Figure 7 (\$3.75/day 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 2010 validation sample

Score	Difference between estimate and true value			
	Diff.	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
0-4	+0.0	0.0	0.0	0.0
5-9	+6.9	8.4	10.1	13.8
10-14	+2.5	4.4	5.3	7.1
15-19	-1.4	3.9	4.6	6.4
20-24	-5.0	4.2	4.5	5.7
25-29	-1.9	3.4	4.0	5.5
30-34	-3.5	3.4	3.8	5.2
35-39	+1.3	2.8	3.4	4.4
40-44	+2.5	2.3	2.8	3.7
45-49	-0.7	1.6	1.9	2.6
50-54	-1.2	1.1	1.3	1.8
55-59	-1.6	1.3	1.4	1.6
60-64	-0.7	0.7	0.7	1.0
65-69	+0.2	0.1	0.1	0.2
70-74	+0.0	0.0	0.0	0.0
75-79	+0.0	0.0	0.0	0.0
80-84	+0.0	0.0	0.0	0.0
85-89	+0.0	0.0	0.0	0.0
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

Figure 8 (\$3.75/day 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 2010 validation sample

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (\pm percentage points)		
		90-percent	95-percent	99-percent
1	-0.3	62.6	69.0	88.4
4	+0.2	22.4	29.9	40.9
8	-0.6	16.2	20.2	28.2
16	-0.3	11.5	14.6	20.8
32	-0.5	8.7	10.6	13.2
64	-0.5	6.0	7.2	9.8
128	-0.5	4.0	4.8	6.4
256	-0.5	3.1	3.6	4.5
512	-0.5	2.2	2.6	3.4
1,024	-0.5	1.5	1.8	2.3
2,048	-0.5	1.1	1.3	1.7
4,096	-0.5	0.8	0.9	1.2
8,192	-0.5	0.5	0.6	0.8
16,384	-0.5	0.4	0.5	0.6

Figure 12 (\$3.75/day 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	0.0	17.1	0.0	82.9	82.9	–99.8
5–9	0.2	16.8	0.0	82.9	83.1	–97.0
10–14	1.0	16.1	0.2	82.8	83.7	–87.7
15–19	2.3	14.7	0.5	82.4	84.7	–69.6
20–24	4.5	12.6	1.2	81.7	86.2	–40.0
25–29	7.3	9.7	3.1	79.8	87.2	+4.3
30–34	10.4	6.7	6.2	76.8	87.1	+57.7
35–39	12.7	4.3	10.8	72.1	84.9	+36.7
40–44	14.6	2.4	17.1	65.8	80.4	–0.3
45–49	15.8	1.2	25.5	57.4	73.3	–49.4
50–54	16.5	0.6	36.0	46.9	63.4	–111.0
55–59	16.8	0.2	47.5	35.4	52.2	–178.5
60–64	17.0	0.0	59.8	23.1	40.2	–250.4
65–69	17.1	0.0	70.1	12.8	29.9	–310.8
70–74	17.1	0.0	77.1	5.8	22.9	–351.6
75–79	17.1	0.0	80.9	2.0	19.1	–373.9
80–84	17.1	0.0	82.7	0.2	17.3	–384.4
85–89	17.1	0.0	82.9	0.0	17.1	–385.6
90–94	17.1	0.0	82.9	0.0	17.1	–385.8
95–100	17.1	0.0	82.9	0.0	17.1	–385.8

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

Figure 13 (\$3.75/day 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 successfully 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	0.0	100.0	0.1	Only poor targeted
5-9	0.3	85.3	1.4	5.8:1
10-14	1.1	86.0	5.7	6.1:1
15-19	2.9	81.7	13.7	4.5:1
20-24	5.7	78.5	26.4	3.7:1
25-29	10.5	70.2	43.0	2.4:1
30-34	16.5	62.7	60.8	1.7:1
35-39	23.6	54.1	74.7	1.2:1
40-44	31.7	46.1	85.7	0.9:1
45-49	41.3	38.3	92.8	0.6:1
50-54	52.5	31.4	96.6	0.5:1
55-59	64.4	26.2	98.6	0.4:1
60-64	76.8	22.2	99.8	0.3:1
65-69	87.2	19.6	100.0	0.2:1
70-74	94.2	18.1	100.0	0.2:1
75-79	98.0	17.4	100.0	0.2:1
80-84	99.8	17.1	100.0	0.2:1
85-89	100.0	17.1	100.0	0.2:1
90-94	100.0	17.1	100.0	0.2:1
95-100	100.0	17.1	100.0	0.2:1

**Tables for the
Legacy Food Poverty Line**

Figure 4 (Legacy food line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0-4	74.2
5-9	70.1
10-14	55.2
15-19	43.8
20-24	40.5
25-29	30.7
30-34	18.4
35-39	9.9
40-44	4.3
45-49	1.8
50-54	0.5
55-59	0.0
60-64	0.0
65-69	0.0
70-74	0.0
75-79	0.0
80-84	0.0
85-89	0.0
90-94	0.0
95-100	0.0

Figure 7 (Legacy food line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16,384$) with confidence intervals, scorecard applied to the 2010 validation sample

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	-25.8	12.9	12.9	12.9
5-9	+8.8	13.4	16.0	20.9
10-14	+3.7	7.6	9.0	11.8
15-19	-7.9	6.7	7.2	9.1
20-24	+4.5	4.2	5.0	6.6
25-29	+2.4	3.4	4.0	5.3
30-34	-2.0	2.4	2.8	3.8
35-39	+1.4	1.4	1.7	2.1
40-44	+1.0	0.8	0.9	1.2
45-49	+0.6	0.4	0.5	0.6
50-54	-0.2	0.4	0.4	0.6
55-59	-0.0	0.0	0.0	0.0
60-64	-0.1	0.1	0.1	0.1
65-69	+0.0	0.0	0.0	0.0
70-74	+0.0	0.0	0.0	0.0
75-79	+0.0	0.0	0.0	0.0
80-84	+0.0	0.0	0.0	0.0
85-89	+0.0	0.0	0.0	0.0
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

Figure 8 (Legacy food line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, scorecard applied to the 2010 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	45.1	61.1	75.4
4	+0.1	13.2	18.3	30.7
8	-0.1	9.3	12.3	21.7
16	+0.1	6.6	8.2	11.7
32	+0.2	4.7	5.6	6.9
64	+0.2	3.1	3.7	5.0
128	+0.2	2.2	2.6	3.7
256	+0.2	1.6	1.9	2.7
512	+0.2	1.1	1.4	1.8
1,024	+0.2	0.8	1.0	1.2
2,048	+0.2	0.6	0.7	0.9
4,096	+0.2	0.4	0.5	0.6
8,192	+0.2	0.3	0.3	0.5
16,384	+0.2	0.2	0.2	0.3

Figure 12 (Legacy food line): 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	0.0	6.6	0.0	93.4	93.4	-99.6
5-9	0.2	6.4	0.1	93.3	93.5	-93.1
10-14	0.6	6.0	0.5	92.9	93.5	-73.1
15-19	1.4	5.2	1.4	92.0	93.4	-34.9
20-24	2.5	4.1	3.2	90.2	92.7	+25.3
25-29	3.9	2.7	6.5	86.9	90.8	+1.4
30-34	5.2	1.4	11.3	82.0	87.2	-71.5
35-39	5.9	0.7	17.6	75.7	81.7	-166.7
40-44	6.3	0.3	25.4	68.0	74.3	-284.6
45-49	6.5	0.1	34.8	58.6	65.1	-426.5
50-54	6.6	0.0	45.9	47.5	54.1	-594.3
55-59	6.6	0.0	57.8	35.6	42.2	-773.5
60-64	6.6	0.0	70.2	23.2	29.8	-961.9
65-69	6.6	0.0	80.6	12.8	19.4	-1,118.4
70-74	6.6	0.0	87.5	5.8	12.5	-1,223.6
75-79	6.6	0.0	91.4	2.0	8.6	-1,281.2
80-84	6.6	0.0	93.1	0.2	6.9	-1,308.2
85-89	6.6	0.0	93.4	0.0	6.6	-1,311.4
90-94	6.6	0.0	93.4	0.0	6.6	-1,311.9
95-100	6.6	0.0	93.4	0.0	6.6	-1,311.9

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

Figure 13 (Legacy food line): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successfully targeted (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	0.0	100.0	0.2	Only poor targeted
5-9	0.3	64.3	2.7	1.8:1
10-14	1.1	56.8	9.7	1.3:1
15-19	2.9	50.7	21.9	1.0:1
20-24	5.7	44.4	38.6	0.8:1
25-29	10.5	37.7	59.6	0.6:1
30-34	16.5	31.5	78.7	0.5:1
35-39	23.6	25.1	89.5	0.3:1
40-44	31.7	19.9	95.4	0.2:1
45-49	41.3	15.8	98.4	0.2:1
50-54	52.5	12.6	99.7	0.1:1
55-59	64.4	10.3	99.8	0.1:1
60-64	76.8	8.6	100.0	0.1:1
65-69	87.2	7.6	100.0	0.1:1
70-74	94.2	7.0	100.0	0.1:1
75-79	98.0	6.8	100.0	0.1:1
80-84	99.8	6.6	100.0	0.1:1
85-89	100.0	6.6	100.0	0.1:1
90-94	100.0	6.6	100.0	0.1:1
95-100	100.0	6.6	100.0	0.1:1

**Tables for
100% of the Legacy National Poverty Line**

Figure 4 (100% of the legacy national line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0-4	100.0
5-9	98.1
10-14	94.9
15-19	86.6
20-24	80.0
25-29	71.6
30-34	61.8
35-39	47.7
40-44	33.2
45-49	24.3
50-54	14.6
55-59	8.6
60-64	3.1
65-69	1.1
70-74	0.5
75-79	0.0
80-84	0.0
85-89	0.0
90-94	0.0
95-100	0.0

Figure 7 (100% of the legacy national line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16,384$) with confidence intervals, scorecard applied to the 2010 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	0.0	0.0
5-9	+8.5	8.1	9.7	12.4
10-14	+4.8	4.4	5.2	7.2
15-19	-3.7	3.2	3.5	4.7
20-24	-2.4	3.1	3.6	4.9
25-29	+0.6	3.2	3.8	4.8
30-34	-2.5	3.0	3.5	4.5
35-39	+1.4	2.9	3.6	4.9
40-44	-2.8	2.8	3.2	4.2
45-49	+2.5	2.1	2.5	3.2
50-54	-1.9	1.8	2.0	2.6
55-59	-0.3	1.4	1.8	2.3
60-64	-0.1	0.7	0.9	1.2
65-69	-0.1	0.4	0.5	0.7
70-74	-0.2	0.5	0.5	0.7
75-79	+0.0	0.0	0.0	0.0
80-84	+0.0	0.0	0.0	0.0
85-89	+0.0	0.0	0.0	0.0
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

Figure 8 (100% of the legacy national line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, scorecard applied to the 2010 validation sample

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	+1.2	57.3	73.6	87.3
4	+0.9	28.4	33.1	46.9
8	-0.5	20.3	25.3	34.2
16	-0.3	14.0	16.6	23.6
32	-0.5	10.0	12.0	16.7
64	-0.3	7.2	8.7	11.6
128	-0.2	5.1	6.4	8.1
256	-0.3	3.6	4.5	5.6
512	-0.3	2.5	3.1	4.0
1,024	-0.3	1.8	2.1	2.9
2,048	-0.3	1.3	1.6	2.3
4,096	-0.4	1.0	1.2	1.5
8,192	-0.3	0.7	0.8	1.0
16,384	-0.3	0.5	0.5	0.7

Figure 12 (100% of the legacy national line): 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	0.0	23.6	0.0	76.4	76.4	-99.9
5-9	0.2	23.3	0.0	76.4	76.6	-97.8
10-14	1.0	22.6	0.1	76.3	77.3	-90.9
15-19	2.5	21.1	0.3	76.1	78.6	-77.2
20-24	4.8	18.7	0.9	75.5	80.4	-55.1
25-29	8.1	15.5	2.3	74.1	82.2	-21.2
30-34	11.9	11.7	4.7	71.7	83.6	+20.5
35-39	15.2	8.4	8.4	68.0	83.2	+64.1
40-44	18.1	5.5	13.6	62.8	80.9	+42.2
45-49	20.3	3.3	21.1	55.3	75.6	+10.6
50-54	22.1	1.5	30.4	46.0	68.1	-29.0
55-59	23.0	0.6	41.4	35.0	58.0	-75.5
60-64	23.4	0.2	53.5	22.9	46.3	-126.7
65-69	23.6	0.0	63.6	12.8	36.3	-169.8
70-74	23.6	0.0	70.6	5.8	29.4	-199.1
75-79	23.6	0.0	74.4	2.0	25.6	-215.3
80-84	23.6	0.0	76.2	0.2	23.8	-222.9
85-89	23.6	0.0	76.4	0.0	23.6	-223.8
90-94	23.6	0.0	76.4	0.0	23.6	-223.9
95-100	23.6	0.0	76.4	0.0	23.6	-223.9

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

Figure 13 (100% of the legacy national line): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successfully targeted (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	0.0	100.0	0.1	Only poor targeted
5-9	0.3	89.9	1.1	8.9:1
10-14	1.1	89.6	4.3	8.7:1
15-19	2.9	88.3	10.7	7.6:1
20-24	5.7	84.4	20.5	5.4:1
25-29	10.5	77.6	34.4	3.5:1
30-34	16.5	71.8	50.4	2.5:1
35-39	23.6	64.3	64.2	1.8:1
40-44	31.7	57.1	76.8	1.3:1
45-49	41.3	49.0	85.9	1.0:1
50-54	52.5	42.1	93.6	0.7:1
55-59	64.4	35.7	97.4	0.6:1
60-64	76.8	30.4	99.1	0.4:1
65-69	87.2	27.0	99.8	0.4:1
70-74	94.2	25.1	100.0	0.3:1
75-79	98.0	24.1	100.0	0.3:1
80-84	99.8	23.6	100.0	0.3:1
85-89	100.0	23.6	100.0	0.3:1
90-94	100.0	23.6	100.0	0.3:1
95-100	100.0	23.6	100.0	0.3:1

**Tables for
150% of the Legacy National Poverty Line**

Figure 4 (150% of the legacy national line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0-4	100.0
5-9	99.2
10-14	98.6
15-19	98.1
20-24	94.5
25-29	92.6
30-34	88.4
35-39	82.7
40-44	71.8
45-49	61.1
50-54	51.7
55-59	37.3
60-64	25.1
65-69	13.1
70-74	6.6
75-79	0.9
80-84	0.2
85-89	0.0
90-94	0.0
95-100	0.0

Figure 7 (150% of the legacy national line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16,384$) with confidence intervals, scorecard applied to the 2010 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	0.0	0.0
5-9	-0.3	1.1	1.2	1.9
10-14	-1.2	0.7	0.7	0.7
15-19	+0.6	1.6	1.9	2.5
20-24	-2.6	1.9	2.0	2.2
25-29	-1.9	1.8	1.9	2.4
30-34	-2.2	1.9	2.1	2.7
35-39	-0.7	2.3	2.7	3.5
40-44	+1.2	2.6	3.2	4.0
45-49	+2.0	2.5	3.0	3.8
50-54	-2.1	2.3	2.6	3.6
55-59	+3.4	2.2	2.6	3.4
60-64	+2.0	1.8	2.1	2.9
65-69	-1.8	1.7	1.8	2.4
70-74	+0.4	1.3	1.6	2.0
75-79	-2.8	2.1	2.2	2.5
80-84	+0.2	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 (150% of the legacy national line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, scorecard applied to the 2010 validation sample

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	-0.3	61.9	76.4	90.9
4	-0.4	37.6	44.4	55.1
8	-0.4	26.1	32.0	43.2
16	-0.2	19.7	23.4	29.7
32	-0.2	14.0	16.6	21.3
64	-0.0	10.2	12.2	16.3
128	+0.2	6.9	8.5	11.0
256	+0.2	5.0	6.0	7.7
512	+0.3	3.4	4.2	5.4
1,024	+0.3	2.3	2.8	3.8
2,048	+0.2	1.8	2.1	2.7
4,096	+0.2	1.2	1.5	1.9
8,192	+0.2	0.9	1.0	1.3
16,384	+0.2	0.6	0.7	1.0

Figure 12 (150% of the legacy national line): 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	0.0	47.7	0.0	52.3	52.3	-99.9
5-9	0.3	47.4	0.0	52.3	52.6	-98.8
10-14	1.1	46.6	0.0	52.3	53.4	-95.3
15-19	2.8	44.9	0.1	52.3	55.1	-88.1
20-24	5.6	42.1	0.1	52.2	57.8	-76.2
25-29	10.0	37.6	0.4	51.9	61.9	-57.0
30-34	15.5	32.2	1.1	51.2	66.7	-32.9
35-39	21.2	26.5	2.4	50.0	71.2	-6.1
40-44	27.1	20.6	4.6	47.7	74.8	+23.4
45-49	32.9	14.8	8.5	43.9	76.7	+55.6
50-54	38.7	8.9	13.8	38.5	77.3	+71.1
55-59	42.8	4.9	21.6	30.7	73.5	+54.7
60-64	45.6	2.1	31.2	21.1	66.7	+34.5
65-69	47.1	0.5	40.1	12.3	59.4	+16.0
70-74	47.6	0.1	46.6	5.7	53.3	+2.3
75-79	47.7	0.0	50.3	2.0	49.7	-5.5
80-84	47.7	0.0	52.1	0.2	47.9	-9.2
85-89	47.7	0.0	52.3	0.0	47.7	-9.7
90-94	47.7	0.0	52.3	0.0	47.7	-9.8
95-100	47.7	0.0	52.3	0.0	47.7	-9.8

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

Figure 13 (150% of the legacy national line): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successfully targeted (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	0.0	100.0	0.0	Only poor targeted
5-9	0.3	98.9	0.6	90.1:1
10-14	1.1	99.4	2.4	159.0:1
15-19	2.9	98.1	5.9	52.9:1
20-24	5.7	97.6	11.7	40.0:1
25-29	10.5	95.9	21.0	23.3:1
30-34	16.5	93.4	32.4	14.1:1
35-39	23.6	90.0	44.5	9.0:1
40-44	31.7	85.4	56.8	5.8:1
45-49	41.3	79.5	68.9	3.9:1
50-54	52.5	73.7	81.2	2.8:1
55-59	64.4	66.4	89.7	2.0:1
60-64	76.8	59.4	95.7	1.5:1
65-69	87.2	54.1	98.9	1.2:1
70-74	94.2	50.5	99.7	1.0:1
75-79	98.0	48.7	100.0	0.9:1
80-84	99.8	47.8	100.0	0.9:1
85-89	100.0	47.7	100.0	0.9:1
90-94	100.0	47.7	100.0	0.9:1
95-100	100.0	47.7	100.0	0.9:1

**Tables for
200% of the Legacy National Poverty Line**

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

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0-4	100.0
5-9	99.5
10-14	99.3
15-19	99.3
20-24	98.8
25-29	98.7
30-34	97.2
35-39	93.6
40-44	90.8
45-49	82.2
50-54	76.3
55-59	66.7
60-64	54.5
65-69	37.5
70-74	21.4
75-79	9.2
80-84	2.9
85-89	0.0
90-94	0.0
95-100	0.0

Figure 7 (200% of the legacy national line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16,384$) with confidence intervals, scorecard applied to the 2010 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	0.0	0.0
5-9	-0.5	0.3	0.3	0.3
10-14	-0.7	0.4	0.4	0.4
15-19	+0.9	1.3	1.5	2.1
20-24	-0.1	0.9	1.0	1.3
25-29	-0.9	0.6	0.6	0.7
30-34	+0.6	1.1	1.3	1.7
35-39	+0.3	1.9	2.2	2.9
40-44	+4.9	2.3	2.7	3.4
45-49	-0.7	2.0	2.5	3.3
50-54	-2.2	2.1	2.2	3.0
55-59	-3.2	2.6	2.8	3.2
60-64	+1.4	2.1	2.5	3.3
65-69	+2.1	2.1	2.4	3.1
70-74	+2.8	2.2	2.6	3.5
75-79	+1.0	1.9	2.3	3.0
80-84	+2.0	0.8	1.0	1.2
85-89	-18.9	15.8	16.9	19.5
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

Figure 8 (200% of the legacy national line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, scorecard applied to the 2010 validation sample

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	+0.5	69.4	72.4	86.1
4	-0.2	37.4	44.0	56.6
8	-0.1	27.4	33.2	43.0
16	+0.4	19.8	24.6	33.5
32	+0.4	14.4	17.1	21.8
64	+0.1	10.3	12.5	16.4
128	+0.3	7.2	8.7	11.6
256	+0.4	5.3	6.1	7.7
512	+0.5	3.6	4.2	5.9
1,024	+0.4	2.5	3.0	3.8
2,048	+0.4	1.8	2.1	2.6
4,096	+0.4	1.3	1.6	2.1
8,192	+0.4	0.9	1.0	1.5
16,384	+0.4	0.6	0.8	1.0

Figure 12 (200% of the legacy national line): 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	0.0	66.7	0.0	33.3	33.3	–100.0
5–9	0.3	66.4	0.0	33.3	33.6	–99.2
10–14	1.1	65.6	0.0	33.3	34.4	–96.6
15–19	2.8	63.9	0.0	33.3	36.1	–91.5
20–24	5.7	61.0	0.1	33.2	38.9	–82.9
25–29	10.4	56.3	0.1	33.2	43.6	–68.8
30–34	16.2	50.4	0.3	33.0	49.3	–50.8
35–39	22.8	43.9	0.7	32.6	55.4	–30.4
40–44	30.0	36.7	1.7	31.6	61.6	–7.4
45–49	38.1	28.6	3.3	30.0	68.1	+19.1
50–54	46.8	19.9	5.7	27.6	74.4	+48.9
55–59	54.8	11.9	9.6	23.7	78.6	+78.7
60–64	61.2	5.4	15.6	17.7	78.9	+76.6
65–69	65.0	1.7	22.2	11.1	76.1	+66.7
70–74	66.3	0.4	27.8	5.5	71.8	+58.2
75–79	66.6	0.1	31.3	2.0	68.6	+53.0
80–84	66.7	0.0	33.1	0.2	66.9	+50.4
85–89	66.7	0.0	33.3	0.0	66.7	+50.1
90–94	66.7	0.0	33.3	0.0	66.7	+50.1
95–100	66.7	0.0	33.3	0.0	66.7	+50.1

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

Figure 13 (200% of the legacy national line): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successfully targeted (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	0.0	100.0	0.0	Only poor targeted
5-9	0.3	100.0	0.4	Only poor targeted
10-14	1.1	100.0	1.7	Only poor targeted
15-19	2.9	99.1	4.2	106.3:1
20-24	5.7	98.9	8.5	93.8:1
25-29	10.5	99.2	15.6	120.2:1
30-34	16.5	98.2	24.4	53.8:1
35-39	23.6	96.9	34.2	31.6:1
40-44	31.7	94.6	45.0	17.5:1
45-49	41.3	92.1	57.1	11.7:1
50-54	52.5	89.1	70.2	8.2:1
55-59	64.4	85.1	82.2	5.7:1
60-64	76.8	79.7	91.8	3.9:1
65-69	87.2	74.5	97.5	2.9:1
70-74	94.2	70.4	99.4	2.4:1
75-79	98.0	68.0	99.9	2.1:1
80-84	99.8	66.8	100.0	2.0:1
85-89	100.0	66.7	100.0	2.0:1
90-94	100.0	66.7	100.0	2.0:1
95-100	100.0	66.7	100.0	2.0:1

**Tables for
the Legacy \$1.25/day 2005 PPP Poverty Line**

Figure 4 (Legacy \$1.25/day line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0-4	45.4
5-9	7.1
10-14	1.6
15-19	1.6
20-24	1.6
25-29	1.5
30-34	0.5
35-39	0.1
40-44	0.0
45-49	0.0
50-54	0.0
55-59	0.0
60-64	0.0
65-69	0.0
70-74	0.0
75-79	0.0
80-84	0.0
85-89	0.0
90-94	0.0
95-100	0.0

Figure 7 (Legacy \$1.25/day line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16,384$) with confidence intervals, scorecard applied to the 2010 validation sample

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	+45.4	0.0	0.0	0.0
5-9	+6.7	0.8	1.0	1.3
10-14	-1.7	2.7	3.2	4.2
15-19	+0.1	1.2	1.4	1.8
20-24	+1.4	0.2	0.3	0.3
25-29	+0.6	0.5	0.6	0.8
30-34	+0.2	0.2	0.3	0.3
35-39	-0.1	0.2	0.2	0.2
40-44	-0.2	0.2	0.2	0.2
45-49	-0.1	0.1	0.1	0.1
50-54	+0.0	0.0	0.0	0.0
55-59	+0.0	0.0	0.0	0.0
60-64	+0.0	0.0	0.0	0.0
65-69	+0.0	0.0	0.0	0.0
70-74	+0.0	0.0	0.0	0.0
75-79	+0.0	0.0	0.0	0.0
80-84	+0.0	0.0	0.0	0.0
85-89	+0.0	0.0	0.0	0.0
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

Figure 8 (Legacy \$1.25/day line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, scorecard applied to the 2010 validation sample

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	+0.1	0.8	0.8	0.8
4	+0.0	0.3	0.4	7.0
8	+0.0	0.2	0.3	3.5
16	+0.0	0.2	0.9	2.2
32	+0.0	0.5	0.9	1.2
64	+0.0	0.5	0.6	1.0
128	+0.0	0.3	0.4	0.7
256	+0.0	0.2	0.3	0.4
512	+0.0	0.2	0.2	0.3
1,024	+0.0	0.1	0.1	0.2
2,048	+0.0	0.1	0.1	0.1
4,096	+0.0	0.1	0.1	0.1
8,192	+0.0	0.0	0.1	0.1
16,384	+0.0	0.0	0.0	0.0

Figure 12 (Legacy \$1.25/day line): 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	0.0	0.2	0.0	99.8	99.8	-93.5
5-9	0.0	0.2	0.3	99.5	99.5	-31.7
10-14	0.0	0.2	1.1	98.7	98.7	-428.5
15-19	0.1	0.1	2.8	97.0	97.1	-1,239.6
20-24	0.1	0.1	5.7	94.1	94.2	-2,615.8
25-29	0.1	0.1	10.3	89.5	89.6	-4,852.8
30-34	0.2	0.0	16.4	83.4	83.6	-7,755.1
35-39	0.2	0.0	23.4	76.4	76.6	-11,108.1
40-44	0.2	0.0	31.5	68.2	68.4	-15,025.9
45-49	0.2	0.0	41.1	58.7	58.9	-19,617.7
50-54	0.2	0.0	52.3	47.5	47.7	-24,980.0
55-59	0.2	0.0	64.2	35.6	35.8	-30,662.5
60-64	0.2	0.0	76.6	23.2	23.4	-36,644.5
65-69	0.2	0.0	87.0	12.8	13.0	-41,606.9
70-74	0.2	0.0	93.9	5.8	6.1	-44,941.9
75-79	0.2	0.0	97.8	2.0	2.2	-46,770.0
80-84	0.2	0.0	99.5	0.2	0.5	-47,626.9
85-89	0.2	0.0	99.8	0.0	0.2	-47,727.1
90-94	0.2	0.0	99.8	0.0	0.2	-47,744.3
95-100	0.2	0.0	99.8	0.0	0.2	-47,744.3

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

Figure 13 (Legacy \$1.25/day line): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successfully targeted (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	0.0	0.0	0.0	0.0:1
5-9	0.3	1.0	1.3	0.0:1
10-14	1.1	2.7	14.4	0.0:1
15-19	2.9	2.2	29.8	0.0:1
20-24	5.7	1.3	35.9	0.0:1
25-29	10.5	1.3	63.1	0.0:1
30-34	16.5	1.0	78.0	0.0:1
35-39	23.6	0.8	84.7	0.0:1
40-44	31.7	0.6	95.4	0.0:1
45-49	41.3	0.5	100.0	0.0:1
50-54	52.5	0.4	100.0	0.0:1
55-59	64.4	0.3	100.0	0.0:1
60-64	76.8	0.3	100.0	0.0:1
65-69	87.2	0.2	100.0	0.0:1
70-74	94.2	0.2	100.0	0.0:1
75-79	98.0	0.2	100.0	0.0:1
80-84	99.8	0.2	100.0	0.0:1
85-89	100.0	0.2	100.0	0.0:1
90-94	100.0	0.2	100.0	0.0:1
95-100	100.0	0.2	100.0	0.0:1

**Tables for
the Legacy \$2.50/day 2005 PPP Poverty Line**

Figure 4 (Legacy \$2.50/day line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0-4	61.4
5-9	55.7
10-14	37.8
15-19	29.8
20-24	28.2
25-29	18.4
30-34	13.4
35-39	6.7
40-44	3.4
45-49	1.0
50-54	0.5
55-59	0.0
60-64	0.0
65-69	0.0
70-74	0.0
75-79	0.0
80-84	0.0
85-89	0.0
90-94	0.0
95-100	0.0

Figure 7 (Legacy \$2.50/day line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16,384$) with confidence intervals, scorecard applied to the 2010 validation sample

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	-38.6	19.3	19.3	19.3
5-9	+14.2	13.0	16.2	22.0
10-14	+4.8	7.0	8.3	11.0
15-19	-9.4	7.8	8.3	10.3
20-24	-4.7	4.6	5.4	6.8
25-29	-3.4	3.5	4.0	5.1
30-34	+1.7	1.9	2.3	3.0
35-39	-0.1	1.4	1.6	2.1
40-44	+1.3	0.7	0.8	1.1
45-49	+0.2	0.3	0.4	0.5
50-54	-0.1	0.4	0.5	0.6
55-59	-0.0	0.0	0.0	0.0
60-64	-0.1	0.1	0.1	0.1
65-69	+0.0	0.0	0.0	0.0
70-74	+0.0	0.0	0.0	0.0
75-79	+0.0	0.0	0.0	0.0
80-84	+0.0	0.0	0.0	0.0
85-89	+0.0	0.0	0.0	0.0
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

Figure 8 (Legacy \$2.50/day line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, scorecard applied to the 2010 validation sample

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	+0.1	9.2	54.9	66.4
4	-0.0	11.7	17.3	27.6
8	-0.3	8.1	12.1	19.6
16	-0.1	6.2	7.6	11.3
32	-0.1	4.1	5.1	7.0
64	-0.0	2.9	3.4	4.4
128	-0.1	2.1	2.5	3.5
256	-0.1	1.5	1.8	2.4
512	-0.1	1.1	1.3	1.7
1,024	-0.1	0.8	0.9	1.2
2,048	-0.1	0.6	0.6	0.8
4,096	-0.1	0.4	0.5	0.6
8,192	-0.1	0.3	0.3	0.4
16,384	-0.1	0.2	0.2	0.3

Figure 12 (Legacy \$2.50/day line): 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	0.0	4.3	0.0	95.7	95.7	-99.4
5-9	0.1	4.2	0.2	95.5	95.6	-90.8
10-14	0.4	3.9	0.7	94.9	95.4	-64.3
15-19	0.9	3.4	1.9	93.8	94.7	-12.2
20-24	1.8	2.6	4.0	91.7	93.4	+8.0
25-29	2.7	1.6	7.8	87.9	90.6	-78.8
30-34	3.4	0.9	13.1	82.5	86.0	-202.8
35-39	3.9	0.4	19.6	76.0	79.9	-353.0
40-44	4.1	0.2	27.6	68.0	72.2	-537.0
45-49	4.2	0.1	37.1	58.6	62.8	-755.4
50-54	4.3	0.0	48.2	47.5	51.8	-1,011.8
55-59	4.3	0.0	60.0	35.6	39.9	-1,285.0
60-64	4.3	0.0	72.5	23.2	27.5	-1,572.5
65-69	4.3	0.0	82.9	12.8	17.1	-1,811.2
70-74	4.3	0.0	89.8	5.8	10.2	-1,971.7
75-79	4.3	0.0	93.6	2.0	6.4	-2,059.6
80-84	4.3	0.0	95.4	0.2	4.6	-2,100.8
85-89	4.3	0.0	95.6	0.0	4.4	-2,105.7
90-94	4.3	0.0	95.7	0.0	4.3	-2,106.5
95-100	4.3	0.0	95.7	0.0	4.3	-2,106.5

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

Figure 13 (Legacy \$2.50/day line): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successfully targeted (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	0.0	100.0	0.3	Only poor targeted
5-9	0.3	43.5	2.8	0.8:1
10-14	1.1	36.8	9.6	0.6:1
15-19	2.9	33.2	21.9	0.5:1
20-24	5.7	30.5	40.4	0.4:1
25-29	10.5	25.9	62.5	0.3:1
30-34	16.5	20.7	78.9	0.3:1
35-39	23.6	16.6	90.3	0.2:1
40-44	31.7	13.0	95.3	0.1:1
45-49	41.3	10.3	98.0	0.1:1
50-54	52.5	8.2	99.6	0.1:1
55-59	64.4	6.7	99.7	0.1:1
60-64	76.8	5.6	100.0	0.1:1
65-69	87.2	5.0	100.0	0.1:1
70-74	94.2	4.6	100.0	0.0:1
75-79	98.0	4.4	100.0	0.0:1
80-84	99.8	4.3	100.0	0.0:1
85-89	100.0	4.3	100.0	0.0:1
90-94	100.0	4.3	100.0	0.0:1
95-100	100.0	4.3	100.0	0.0:1

**Tables for
the Legacy \$3.75/day 2005 PPP Poverty Line**

Figure 4 (Legacy \$3.75/day line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0-4	100.0
5-9	87.1
10-14	79.6
15-19	72.0
20-24	63.0
25-29	52.4
30-34	39.9
35-39	27.9
40-44	18.8
45-49	10.0
50-54	5.8
55-59	2.2
60-64	1.0
65-69	0.2
70-74	0.0
75-79	0.0
80-84	0.0
85-89	0.0
90-94	0.0
95-100	0.0

Figure 7 (Legacy \$3.75/day line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ($n = 16,384$) with confidence intervals, scorecard applied to the 2010 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	0.0	0.0
5-9	+11.1	11.6	13.5	17.1
10-14	-1.6	5.5	6.5	8.5
15-19	-4.5	4.3	5.2	7.0
20-24	-4.7	4.2	4.6	6.0
25-29	-4.5	3.9	4.4	5.8
30-34	-5.7	4.5	4.7	5.3
35-39	+0.6	2.7	3.3	4.2
40-44	+1.9	2.0	2.4	3.3
45-49	-0.6	1.5	1.8	2.5
50-54	+0.9	0.9	1.1	1.6
55-59	-2.3	1.7	1.9	2.1
60-64	-0.4	0.6	0.7	0.9
65-69	+0.1	0.1	0.1	0.2
70-74	-0.0	0.1	0.1	0.1
75-79	+0.0	0.0	0.0	0.0
80-84	+0.0	0.0	0.0	0.0
85-89	+0.0	0.0	0.0	0.0
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

Figure 8 (Legacy \$3.75/day line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, scorecard applied to the 2010 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	56.0	66.8	84.9
4	-0.0	21.7	29.4	41.8
8	-0.9	16.2	20.6	30.1
16	-0.8	11.8	15.0	20.8
32	-0.8	8.4	9.8	12.9
64	-0.7	5.9	7.1	9.5
128	-0.6	4.1	4.8	6.5
256	-0.6	2.8	3.6	4.6
512	-0.6	2.1	2.5	3.4
1,024	-0.6	1.5	1.8	2.3
2,048	-0.6	1.1	1.3	1.6
4,096	-0.6	0.7	0.9	1.2
8,192	-0.6	0.5	0.6	0.8
16,384	-0.6	0.4	0.4	0.6

Figure 12 (Legacy \$3.75/day line): 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	0.0	14.6	0.0	85.4	85.4	-99.8
5-9	0.2	14.4	0.1	85.4	85.6	-96.6
10-14	0.9	13.7	0.2	85.2	86.1	-86.1
15-19	2.1	12.5	0.7	84.7	86.8	-65.9
20-24	4.0	10.6	1.8	83.6	87.6	-33.5
25-29	6.5	8.1	4.0	81.4	87.9	+16.1
30-34	9.0	5.5	7.5	77.9	86.9	+48.5
35-39	11.0	3.6	12.6	72.8	83.8	+13.6
40-44	12.5	2.1	19.2	66.2	78.7	-31.9
45-49	13.5	1.1	27.8	57.6	71.1	-90.8
50-54	14.1	0.5	38.4	47.0	61.1	-163.7
55-59	14.4	0.2	50.0	35.5	49.9	-242.8
60-64	14.5	0.0	62.3	23.1	37.7	-327.5
65-69	14.6	0.0	72.6	12.8	27.4	-398.3
70-74	14.6	0.0	79.6	5.8	20.4	-445.9
75-79	14.6	0.0	83.4	2.0	16.6	-472.1
80-84	14.6	0.0	85.2	0.2	14.8	-484.3
85-89	14.6	0.0	85.4	0.0	14.6	-485.8
90-94	14.6	0.0	85.4	0.0	14.6	-486.0
95-100	14.6	0.0	85.4	0.0	14.6	-486.0

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

Figure 13 (Legacy \$3.75/day line): For a given score cut-off, the percentage of all households who are targeted (that is, have a score equal to or less than the cut-off), the percentage of targeted households who are poor (that is, below the poverty line), the percentage of poor households who are targeted, and the number of poor households who are successfully targeted (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	0.0	100.0	0.1	Only poor targeted
5-9	0.3	76.8	1.5	3.3:1
10-14	1.1	79.1	6.1	3.8:1
15-19	2.9	73.9	14.5	2.8:1
20-24	5.7	68.9	27.1	2.2:1
25-29	10.5	61.7	44.3	1.6:1
30-34	16.5	54.6	62.0	1.2:1
35-39	23.6	46.5	75.1	0.9:1
40-44	31.7	39.4	85.9	0.7:1
45-49	41.3	32.7	92.7	0.5:1
50-54	52.5	26.8	96.6	0.4:1
55-59	64.4	22.4	98.8	0.3:1
60-64	76.8	18.9	99.7	0.2:1
65-69	87.2	16.7	99.9	0.2:1
70-74	94.2	15.5	100.0	0.2:1
75-79	98.0	14.9	100.0	0.2:1
80-84	99.8	14.6	100.0	0.2:1
85-89	100.0	14.6	100.0	0.2:1
90-94	100.0	14.6	100.0	0.2:1
95-100	100.0	14.6	100.0	0.2:1