

# Simple Poverty Scorecard<sup>®</sup> Poverty-Assessment Tool Vietnam

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## Abstract

The Simple Poverty Scorecard-brand poverty-assessment tool uses 10 low-cost indicators from Vietnam's 2006 Household Living Standards Survey to estimate the likelihood that a household has consumption below a given poverty line. Field workers can collect responses in about ten minutes. The scorecard's accuracy is reported for a range of poverty lines. The scorecard is a practical way for pro-poor programs in Vietnam to measure poverty rates, to track changes in poverty rates over time, and to segment clients for differentiated treatment.

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## Simple Poverty Scorecard<sup>®</sup> Poverty-Assessment Tool

Interview ID: _____	<u>Name</u>	<u>Identifier</u>
Interview date: _____	Participant: _____	_____
Country: _____ VNM	Field agent: _____	_____
Scorecard: _____ 002	Service point: _____	_____
Sampling wgt.: _____	Number of household members: _____	

Indicator	Value	Points	Score
1. How many household members are 14-years-old or younger?	A. Three or more	0	
	B. Two	7	
	C. One	16	
	D. None	23	
2. In the past 12 months, how many household members were self-employed in agriculture, forestry, or aquaculture?	A. Four or more	0	
	B. Two or three	6	
	C. One or none	9	
3. What type is the household's main residence?	A. Makeshift or other	0	
	B. Semi-permanent house	1	
	C. Strong house with a shared kitchen or shared bathroom/toilet	2	
	D. Villa or strong house with a private kitchen and private bathroom/toilet	6	
4. What type of toilet arrangement does the household have?	A. None or other	0	
	B. Double-vault compost latrine, or toilet directly over water	2	
	C. <i>Suilabh</i> , or flush toilet with septic tank or sewage pipes	7	
5. What is the household's main source of water for cooking and drinking?	A. Public tap, deep drilled wells, hand-dug and reinforced/non-reinforced wells, covered wells, protected/unprotected springs, rain, small water tank, water tank, river, lake, pond, or other	0	
	B. Private tap water inside/outside the house, or purchased water (in tank or bottle)	4	
6. What kind of cooker does the household have?	A. None	0	
	B. Electric cooker, rice cooker, or pressurized cooker (no gas cooker)	5	
	C. Gas cooker	16	
7. Does the household have a motorcycle?	A. No	0	
	B. Yes	10	
8. Does the household have a video player?	A. No	0	
	B. Yes	4	
9. Does the household have a wardrobe of any kind?	A. No	0	
	B. Yes	10	
10. Does the household have a refrigerator or freezer?	A. No	0	
	B. Yes	11	

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**Score:**

# Simple Poverty Scorecard<sup>®</sup> Poverty-Assessment Tool Vietnam

## 1. Introduction

Pro-poor programs in Vietnam can use the Simple Poverty Scorecard poverty-assessment tool to estimate the likelihood that a household has consumption below a given poverty line, to estimate a population's poverty rate at a point in time, to track changes in a population's poverty rate over time, and to segment participants for differentiated treatment.

The direct approach to poverty measurement via surveys is difficult and costly, asking households about a lengthy list of consumption categories (such as “In the past 12 months, did your household consume fragrant/specialty rice during the holidays? What quantity and value was bought? What quantity and value were bartered? What quantity and value were self-supplied or received as gifts? Now, in the last 12 months, did your household consume glutinous rice during the holidays? . . .”).

In contrast, the indirect approach via the scorecard is simple, quick, and inexpensive. It uses ten verifiable indicators (such as “What type of toilet arrangement does the household have?” or “Does the household have a motorcycle?”) to get a score that is highly correlated with poverty status as measured by the exhaustive survey.

The scorecard differs from “proxy means tests” (Coady, Grosh, and Hoddinott, 2002) in that it is tailored to the capabilities and purposes not of national governments

but rather of local, pro-poor organizations. The feasible poverty-measurement options for these organizations are typically subjective and relative (such as participatory wealth ranking by skilled field workers) or blunt (such as rules based on land-ownership or housing quality). Results from these approaches are not comparable across organizations nor across countries, they may be costly, and their accuracy and precision are unknown.

Suppose, for example, that an organization wants to know what share of its participants are below a poverty line (say, USD1.25/day at 2005 purchase-power parity for the Millennium Development Goals, or the poorest half of people below the national poverty line as required of USAID microenterprise partners). Or suppose it wants to measure movement across a poverty line (for example, to report to the Microcredit Summit Campaign). In these cases, what is needed is a consumption-based, objective tool with known accuracy. While consumption surveys are costly even for governments, many small, local organizations can implement an inexpensive poverty-assessment tool that can serve for monitoring, management, 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, 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, not because they do not work, but because they are presented (when they are

presented at all) as tables of regression coefficients incomprehensible to lay people (with cryptic indicator names such as “HHSIZE\_2”, negative values, many decimal places, and standard errors). Thanks to the predictive-modeling phenomenon known as the “flat max”, simple scorecards are about as accurate as complex ones.

The technical approach here is also innovative in how it associates scores with poverty likelihoods, in the extent of its accuracy tests, and in how it derives formulas for sample sizes and standard errors. Although these techniques are simple and/or standard, they have rarely or never been applied to poverty-assessment tools.

The scorecard is based on the 2006 Vietnamese Household Living Standards Survey (VHLSS) conducted by Vietnam’s General Statistical Office . Indicators are selected to be:

- Inexpensive to collect, easy to answer quickly, and simple to verify
- Strongly correlated with poverty
- Liable to change over time as poverty status changes

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

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 consumption below a given poverty line.

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

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

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

This paper presents a single scorecard whose indicators and points are derived from household consumption data and the USD1.75/day 2005 PPP line. Scores from this scorecard are calibrated to poverty likelihoods for seven poverty lines.

The scorecard is constructed and calibrated using sub-samples of the data from the 2006 VHLSS. Its accuracy is validated on another sub-sample from the 2006 VHLSS as well as on the entire 2004 VHLSS. While all three scoring estimators are unbiased when applied to the population from which they were derived (that is, they match the true value on average in repeated samples from the same population from which the

scorecard was built), they are—like all predictive models—biased to some extent when applied to a different population.<sup>1</sup>

Thus, while the indirect scoring approach is less costly than the direct survey approach, it is also biased. (The survey approach is unbiased by assumption.) There is bias because scoring must assume that the future relationship between indicators and poverty will be the same as in the data used to build the scorecard.<sup>2</sup> Of course, this assumption—ubiquitous and inevitable in predictive modeling—holds only partly.

When applied to the 2006 validation sample with  $n = 16,384$ , the difference between scorecard estimates of groups' poverty rates and the true rates at a point in time is +0.5 percentage points for the national line, and the average absolute difference is 0.3 percentage points across all seven lines. These differences are due to sampling variation and not bias; the average of each difference would be zero if the whole 2006 VHLSS were to be repeatedly redrawn and divided into sub-samples before repeating the entire scorecard-building process.

When the scorecard built from the 2006 construction and calibration samples is applied to the 2006 validation sample and to the entire 2004 VHLSS with  $n = 16,384$ , the difference between scorecard estimates of changes in groups' poverty rates and the

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<sup>1</sup> In the context of the scorecard, examples of “different populations” include a nationally representative sample at a different point in time or a non-representative sub-group (Tarozzi and Deaton, 2009).

<sup>2</sup> Bias may also result from changes in the quality of data collection, from changes over time to the national poverty lines, from imperfect adjustment of poverty lines to account for differences in cost-of-living across time or geographic regions, or from sampling variation across consumption surveys.

true changes is +1.6 percentage points (national line). Across all seven lines, the average absolute difference is 1.2 percentage points. These differences are due to sampling variation, changes in poverty lines over time, changes in data quality, and changes in the relationship between indicators and poverty.

The 90-percent confidence intervals for these estimates are  $\pm 0.4$  percentage points or less for estimates of a poverty rate at a point in time, and  $\pm 0.6$  percentage points or less for estimates of changes in a poverty rate between two points in time. For  $n = 1,024$ , the 90-percent intervals are  $\pm 1.9$  and  $\pm 2.6$  percentage points or less.

Section 2 below describes data and poverty lines. Section 3 places the scorecard in the context of existing exercises for Vietnam. Sections 4 and 5 describe scorecard construction and offer practical guidelines for use. Sections 6 and 7 detail the estimation of households' poverty likelihoods and of groups' poverty rates at a point in time. Section 8 discusses estimating changes in poverty rates. Section 9 covers targeting. The final section is a summary.



## 2. Data and poverty lines

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

### 2.1 Data

The scorecard is based on data from the 2006 VHLSS, the most recent available national consumption survey in Vietnam. Households are randomly divided into three sub-samples (Figure 2):

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

In addition, the 2004 VHLSS is used in the validation of estimates of changes in poverty rates for two independent representative samples between two points in time.

### 2.2 Poverty rates and poverty lines

#### 2.2.1 Rates

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

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

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

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

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

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

This paper reports poverty rates and poverty lines at both the household-level and the person-level, by urban/rural for all regions in Vietnam (Figures A1 to A4). The scorecard is constructed using the 2006 VHLSS and household-level lines, scores are

calibrated to household-level poverty likelihoods, and accuracy is measured for household-level rates. This use of household-level rates reflects the belief that they are relevant for most pro-poor organizations.

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

### **2.2.2 Poverty lines**

Vietnam's General Statistical Office (Nguyen *et al.*, 2008) defines a food poverty line based on the consumption providing 2100 calories per person per day (VND5,252 at January 2004 prices and VND5,890 at January 2006 prices). As is standard practice, the national poverty lines of VND5,690 and VND7,011 are then defined as the food poverty lines plus non-food consumption by a reference group with food consumption close to the food poverty line.

An alternate set of poverty lines are defined by Vietnam's Ministry of Labor, Invalids, and Social Affairs (MOLISA) for 2006–2010 as VND6,575/person/day for rural areas and VND8,548/person/day for urban areas. The MOLISA lines are based on income, while the General Statistical Office's lines are based on consumption in the VHLSS. The scorecard here is calibrated to both sets of lines, with the MOLISA lines adjusted to January 2004 prices when applied to consumption from the 2006 VHLSS.

For Vietnam as a whole, the household-level poverty rates in the 2006 VHLSS are 13.6 percent for the national line and 8.0 percent for the food line (Figure 2). Compared with the 2004 VHLSS, these are reductions of 3.5 and 5.6 percentage points.

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

- National
- Food
- USAID “extreme”
- USD1.25/day 2005 PPP
- USD1.75/day 2005 PPP
- USD2.50/day 2005 PPP
- MOLISA

The USAID “extreme” line is defined as the median consumption of people (not households) below the national line (U.S. Congress, 2002).

The USD1.25/day 2005 PPP line is derived from:

- 2005 PPP exchange rate for “individual consumption expenditure by households”:<sup>3</sup> VND5,919.89 per USD1.00
- National Monthly Consumer Price Index (CPI) from January 2004 and December 2006<sup>4</sup>. For the purposes of this paper, the monthly CPIs are rescaled so that it is 100 for January 2004. The CPI for January 2006 is then derived as 119.347. The average CPI in 2005, 114.431, is the average of the monthly CPIs in 2005.

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<sup>3</sup> <http://siteresources.worldbank.org/ICPINT/Resources/icp-final-tables.pdf>, accessed March 11, 2009.

<sup>4</sup> [http://www.gso.gov.vn/default\\_en.aspx?tabid=472&idmid=3&ItemID=7656](http://www.gso.gov.vn/default_en.aspx?tabid=472&idmid=3&ItemID=7656), accessed March 11, 2009.

Given all this, the USD1.25/day 2005 PPP lines for Vietnam as a whole for 2004 and 2006 are:<sup>5</sup>

$$\begin{aligned} & (\text{2005 PPP exchange rate}) \cdot \text{USD1.25} \cdot \left( \frac{\text{CPI}_{\text{Jan. 2004}}}{\text{CPI}_{\text{2005 average}}} \right) = \\ & \left( \frac{\text{VND5,919.89}}{\text{USD1.00}} \right) \cdot \text{USD1.25} \cdot \left( \frac{100}{114.431} \right) = \text{VND6,467}. \end{aligned}$$

$$\begin{aligned} & (\text{2005 PPP exchange rate}) \cdot \text{USD1.25} \cdot \left( \frac{\text{CPI}_{\text{Jan. 2006}}}{\text{CPI}_{\text{2005 average}}} \right) = \\ & \left( \frac{\text{VND5,919.89}}{\text{USD1.00}} \right) \cdot \text{USD1.25} \cdot \left( \frac{119.347}{114.431} \right) = \text{VND7,718}. \end{aligned}$$

The USD1.75/day and USD2.50/day 2005 PPP lines are multiples of the USD1.25/day line.

The urban and rural MOLISA lines are deflated to January 2004 prices using:

$$\text{MOLISA}_{\text{urban, 2006}} \cdot \left( \frac{\text{CPI}_{\text{Jan. 2004}}}{\text{CPI}_{\text{2006 average}}} \right) = 8,548 \cdot \left( \frac{100}{122.9} \right) = \text{VND6,955}.$$

$$\text{MOLISA}_{\text{rural, 2006}} \cdot \left( \frac{\text{CPI}_{\text{Jan. 2004}}}{\text{CPI}_{\text{2006 average}}} \right) = 6,575 \cdot \left( \frac{100}{122.9} \right) = \text{VND5,350}.$$

The lines just discussed apply to Vietnam as a whole (or, in the case of the MOLISA lines, to all urban or all rural areas). They are adjusted for regional and urban/rural differences in cost-of-living using:

- $L$ , a given all-Vietnam poverty line at a given point in time
- $p_i$ , population proportion by urban/rural in each region ( $i = 1$  to  $I$ , where  $I = 2 \times$  number of regions)
- $\pi_i$ , price index by urban/rural in each region from the 2006 VHLSS (Figure 14)

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<sup>5</sup> Sillers (2006) provides this formula.

The cost-of-living-adjusted poverty line  $L_i$  for area  $i$  is then:

$$L_i = \frac{L \cdot \pi_i}{\sum_{j=1}^I p_j \cdot \pi_j}.$$

The all-Vietnam line  $L$  is the person-weighted average of local lines  $L_i$ . The differences in local lines reflect the differences in local prices. To deflate the MOLISA all-urban and all-rural lines to regional lines by urban/rural, a similar formula applies.

This paper uses the USD1.75/day 2005 PPP line to construct the scorecard, as this is the line closest to the national line with a household-level poverty rate (36.7 percent in 2006, Figure 2) that provide sufficient information for the statistical analysis.

### 3. Context of poverty-assessment tools for Vietnam

This section reviews four existing poverty-assessment tools for Vietnam. The main aspects of interest are the purpose of the study, methods, relative/absolute poverty estimation, poverty lines, indicators, accuracy, and formula for standard errors.

#### 3.1 Minot

Minot (2000) builds disaggregated poverty maps for targeting in rural Vietnam. Using Probit (akin to the Logit here) and setting the poverty line at the 30th percentile of consumption, Minot first creates a poverty-assessment tool based on the 1992/3 Vietnam Living Standards Survey (VLSS)<sup>6</sup>. All of the tool's indicators appear in both the VLSS and the 1994 Agricultural Census. Each rural district's poverty rate is then estimated by applying the district means of the indicators from the Agricultural Census to the tool. The indicators are:

- Household size
- Structure of household headship
- Ethnic group
- Share of household members of working age
- Main occupation
- Per-capita ownership of farmland
- Farming of perennial crops
- Per-capita annual production of paddy in kilograms
- Ownership of cattle, chickens, and pigs
- Type of residence (permanent or semi-permanent)
- Source of drinking water
- Ownership of televisions, radios, and motorcycles
- Area of residence
- Region

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<sup>6</sup> The VLSS was the predecessor to the VHLSS.

Like the scorecard here, Minot adjusts for regional differences in cost-of-living and uses simple, inexpensive, verifiable indicators (except for paddy production in kilograms and area of residence). Beyond Minot’s estimating poverty rates for districts rather than individuals, the tool differs from the scorecard in this paper in that, due to lack of household-level data from the Agricultural Census, Minot cannot report accuracy nor standard errors.

### **3.2 Baulch**

Baulch (2002) uses the 1997/8 VLSS to build a household-level poverty-assessment tool for monitoring and targeting. Baulch is similar to the scorecard here in its focus and in that it:

- Uses a few simple, inexpensive-to-collect, and verifiable indicators
- Uses only categorical indicators
- Uses “c” to measure of how well the tool ranks households<sup>7</sup>
- Chooses indicators based on both statistics and judgment
- Uses a Probit regression on poverty status (like the Logit here), producing estimates of poverty likelihoods
- Discusses the selection of a targeting cut-off based on the benefits and costs of successful inclusion/exclusion versus mistaken undercoverage/leakage

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<sup>7</sup> Baulch calls “c” the “area under the Receiver Operator Characteristic” curve.



Based a national poverty line of 4,904 dong/person/day, Baulch builds two poverty-assessment tools, one urban (six indicators) and one rural (nine indicators):

- Number of children (urban and rural)
- Number of women (urban and rural)
- Ethnicity (rural)
- Floor of residence (rural)
- Cooking fuel (urban and rural)
- Ownership of consumer durables:
  - Color television (urban and rural)
  - Black-and-white television (urban and rural)
  - Radio (rural)
  - Car or motorcycle (urban and rural)

Overall, the spirit and analysis of Baulch closely resemble that of the paper here.

Still, Baulch does not test accuracy on data different from that used in tool construction, he does not report standard errors, and—despite having a goal that includes monitoring—he does not discuss estimates of poverty rates.

### **3.3 Sahn and Stifel**

Like this paper, Sahn and Stifel (2003) seek a low-cost, practical way to measure poverty. They use factor analysis and the 1992/3 and 1997/8 VLSS to construct an “asset index” that “(a) is consistent with the financial means and technical capabilities of government statistical offices, and (b) provides sufficient information to identify and profile the poor [and] target transfers” (p. 465).

As here, Sahn and Stifle's indicators are simple, inexpensive, and verifiable:

- Ownership of consumer durables:
  - Radio
  - Stereo
  - Television
  - Sewing machine
  - Stove
  - Refrigerator
  - Bicycle
  - Motorcycles or cars
- Residence quality:
  - Source of drinking water
  - Toilet facilities
  - Cooking fuel
  - Quality of construction material of floor
- Human capital (education of the household head)

To check coherency between the asset index and reported consumption<sup>8</sup> and between the asset index and child nutrition, Sahn and Stifel rank Vietnamese households once based on the index and a second time based on consumption (or height-for-age). For each pair of proxies, they judge the coherence of the 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 consumption. They also report that the asset index predicts consumption worse than does a least-squares regression that predicts consumption based on household demographics, education, residence quality, and access to public services.

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<sup>8</sup> They check the index against consumption because it is a common proxy for living standards, not because they believe consumption should be the benchmark.

### 3.4 IRIS Center

USAID commissioned IRIS Center (“IRIS”, 2007a) to build a poverty-assessment tool for their Vietnamese microenterprise partners to use for reporting on their participants’ poverty rates. Thus, IRIS considers only the USAID “extreme” poverty line (3,818 dong/person/day at January 1999 prices), which gives a poverty rate of 14.5 percent. IRIS uses Vietnam’s 1997/8 LSMS data set.

After comparing several statistical approaches, IRIS settles on quantile regression (Koenker and Hallock, 2001). Their indicators<sup>9</sup> are:

- Household size
- Age of household head
- Number of household members with no education
- Number of rooms occupied
- Type of toilet arrangement
- Main source of lighting
- Main cooking fuel
- Type of roof
- Ownership of consumer durables:
  - Refrigerator or freezer
  - Motorcycle
  - Radio, radio receiver, phonograph, or cassette player
  - Gas stove, electric stove, rice cooker, or pressure cooker
  - Television
- Number of chickens owned
- Whether any household member managed agricultural or forestry land or participated in agricultural or forestry cultivation, or raised livestock, or seafood on land managed or used by the household during the past 12 months
- Whether any household member has worked on any annual crop land belonging to the household
- Total land area of all of the plots owned by the household

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<sup>9</sup> IRIS does not report the actual scorecard, only the questionnaire used to collect data, so their actual indicators may differ slightly from those listed here.

With the possible exception of total land area owned, these indicators are simple, inexpensive, and verifiable.

IRIS' preferred measure of accuracy is the "Balanced Poverty Accuracy Criterion" (BPAC), and USAID has adopted BPAC as the criterion for certifying poverty-assessment tools (IRIS Center, 2005). BPAC depends on the difference between the estimated poverty rate and its true value and on *inclusion*, that is, correctly classifying households as "below poverty line" when their per capita consumption is truly below the line. A higher BPAC means more accuracy. The BPAC formula is:

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

For IRIS for the USAID "extreme" line and the 1997/8 VLSS, BPAC is 61.7 (IRIS Center, 2008). For the scorecard with the 2006 VHLSS, BPAC for the national line in the 2006 validation sample is 56.4 (Figure 12).<sup>10</sup> IRIS does not report whether they weight by individuals or households. And while they do not report it, IRIS probably tests the tool on the same data used to build it, a practice that overstates accuracy. Finally, IRIS does not report standard errors of any kind.

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<sup>10</sup> The national line is used because BPAC depends on the population's poverty rate, and the poverty rate for the national line in 2006 (13.6 percent) is close to that of the line IRIS uses for 1997/8 (14.5 percent).

### 3.5 Gwatkin *et al.*

Gwatkin *et al.* (2007) apply to Vietnam an approach used by USAID in 56 countries with Demographic and Health Surveys (Rutstein and Johnson, 2004).

Gwatkin *et al.* use Principal Components Analysis to make a “wealth index” from simple, low-cost indicators available for the 7,048 households in Vietnam’s 2002 DHS.

The index is like the scorecard here except that its accuracy is unknown and it is based on a relative (not absolute) definition of poverty.

The 18 indicators in Gwatkin *et al.* are similar in spirit to those here:

- Characteristics of the residence:
  - Presence of electricity
  - Source of drinking water
  - Type of toilet arrangement
  - Type of floor
  - Type of roof
- Number of people per sleeping room
- Ownership of consumer durables:
  - Radio
  - Television
  - Sewing machine
  - Washing machine
  - Telephone
  - Refrigerator
  - Bicycle
  - Motor scooter
  - Motorcycle
  - Car
  - Boat
  - Ploughing machines

Gwatkin *et al.* have three basic goals for their wealth index:

- Segment people by quintiles in order to see how health, population, and nutrition vary with socio-economic status
- Monitor (via exit surveys) how well health service points reach the poor
- Measure coverage of services via small-scale local surveys

Of course, these last two goals are the same as the monitoring and targeting goals here, and the first goal of ranking households by quintiles is akin to targeting. As here, Gwatkin *et al.* present the index in a format that could be photocopied and taken to the field, although theirs is more difficult to use because the points have 5 decimal places and are sometimes negative (versus all non-negative integers here).

The central contrast between the PCA-based index and the scorecard here is that because the scorecard here is linked to an absolute line, it not only can rank households but can also link them to quantitative levels of consumption. Without being based on data that includes consumption, the PCA index cannot do this and so cannot estimate of poverty rates. Furthermore, relative accuracy (that is, targeting accuracy) is tested more completely here than in Gwatkin *et al.* (where it is not explicitly tested at all); generally, discussion of the accuracy of PCA-based indices rests on how well they produce segments that are correlated with health or education.

### 3.6 Vietnam's scorecard

This study uses the 2004 and 2006 VHLSS to build and test a scorecard. It has seven strengths.

First, it measures accuracy using different data (the 2006 validation sample and the entire 2004 VHLSS) than that used to construct the scorecard (the 2006 construction and calibration samples). This mimics how the scorecard is actually used in practice, and it avoids overstating accuracy. None of the other studies do this.

Second, this study reports scorecard indicators and points. This means that local pro-poor organizations in Vietnam can pick up the scorecard and use it.

Third, the scorecard here is designed to be practical for local pro-poor organizations. It has 10 indicators, all of them categorical and selected not only to be highly predictive of poverty but also verifiable, quick to answer, and liable to change over time. This facilitates data collection and improves data quality, which in turn improves accuracy. Baulch, Sahn and Stifel, IRIS, and Gwatkin *et al.* also use simple and inexpensive indicators; Minot includes some indicators that are difficult to verify. The scorecard here also has the most straightforward derivation and the simplest point scheme.

Fourth, the scorecard here uses an absolute poverty line. While Minot, Baulch, and IRIS also do this, Sahn and Stifle and Gwatkin *et al.* do not. While this means that their index can be built without consumption data, it also means that it cannot be used to estimate poverty rates or changes in poverty rates. Also, indices cannot be compared across countries (unless built with pooled data as in Sahn and Stifle, 2000).

Fifth, this study adjusts poverty lines for differences in cost-of-living across urban/rural and regions. Also, this study considers seven poverty lines, providing users with the flexibility to use the line most relevant for their purposes.

Sixth, this study reports formulas for standard errors, and seventh, it uses the most recent data.



## 4. Scorecard construction

About 150 potential indicators are initially prepared in the areas of:

- Family composition (such as household size and female headship)
- Education (such as school attendance of children)
- Housing (such as the type of the main residence)
- Ownership of durable goods (such as wardrobes and motorcycle)

Each indicator is first screened with the entropy-based “uncertainty coefficient” (Goodman and Kruskal, 1979) that measures how well the indicator predicts poverty on its own. Figure 3 lists the best candidate indicators, ranked by uncertainty coefficient. Responses for each indicator in Figure 3 are ordered starting with those most strongly linked with higher poverty likelihoods.

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

The scorecard itself is built using the USD1.75/day line and Logit regression on the construction sub-sample (Figure 2). Indicator selection uses both judgment and statistics (forward stepwise, based on “c”). The first step is to use Logit to build one scorecard for each candidate indicator. Each scorecard’s accuracy is taken as “c”, a measure of ability to rank by poverty status (SAS Institute Inc., 2004).

One of these one-indicator scorecards is then selected based on several factors (Schreiner *et al.*, 2004; Zeller, 2004), including improvement in accuracy, likelihood of acceptance by users (determined by simplicity, cost of collection, and “face validity” in terms of experience, theory, and common sense), sensitivity to changes in poverty status, variety among indicators, and verifiability.

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

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

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

The single scorecard here applies to all of Vietnam. Evidence from India and Mexico (Schreiner, 2006 and 2005a), Sri Lanka (Narayan and Yoshida, 2005), and Jamaica (Grosh and Baker, 1995) suggests that segmenting scorecards by urban/rural does not improve accuracy much.

## 5. 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 predict tolerably well, thanks to the empirical phenomenon known as the “flat max” (Hand, 2006; Baesens *et al.*, 2003; Lovie and Lovie, 1986; Kolesar and Showers, 1985; Stillwell, Barron, and Edwards, 1983; Dawes, 1979; Wainer, 1976; Myers and Forgy, 1963). The bottleneck is less technical and more human, not statistics but organizational change management. Accuracy is easier to achieve than adoption.

The scorecard here is designed to encourage understanding and trust so that users will adopt it and use it properly. Of course, accuracy matters, but it is balanced against simplicity, ease-of-use, and “face validity”. Programs are more likely to collect data, compute scores, and pay attention to the results if, in their view, scoring does not make a lot of “extra” 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. “Extra” work is minimized; non-specialists can compute scores by hand in the field because the scorecard has:

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

The scorecard is ready to be photocopied. A field worker using the paper scorecard would:

- Record participant identifiers and household size
- Read each 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 filing or data entry

Of course, field workers must be trained. Quality outputs depend on quality inputs. If organizations or field workers gather their own data and 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).<sup>11</sup> IRIS Center (2007b) and Toohig (2008) are useful nuts-and-bolts guides for budgeting, training field workers and supervisors, logistics, sampling, interviewing, piloting, recording data, and controlling quality.

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

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<sup>11</sup> If an organization does not want field workers to know the points associated with indicators, then they can use the version of Figure 1 without points and apply the points later in a spreadsheet or database at the central office.

2006). In Mexico, however, Martinelli and Parker (2007) find that errors by interviewers and lies by respondents have negligible effects on targeting accuracy. For now, it is unknown whether these results are universal or country-specific.

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

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

- Employees of the organization
- Third-party contractors

Responses, scores, and poverty likelihoods can be recorded:

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

The subjects to be scored can be:

- All participants (or all new participants)
- A representative sample of all participants (or of all new participants)
- All participants (or all new participants) in a representative sample of branches
- A representative sample of all participants (or of all new participants) in a representative sample of branches

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

Frequency of application can be:

- At in-take of new clients only (precluding measuring change in poverty rates)
- As a once-off project for current participants (precluding measuring change)
- Once a year (or at some other fixed time interval, allowing measuring change)
- Each time a field 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 were made by BRAC and ASA, two microlenders in Bangladesh (each with 7 million participants) who have stated their intention to use the Simple Poverty Scorecard tool for Bangladesh (Schreiner, 2013). Their design is that loan officers in a random sample of branches will score all participants each time they visit a homestead (about once a year) as part of their standard due diligence prior to loan disbursement. Responses are recorded on paper in the field before being sent to a central office to be entered into a database. ASA's and BRAC's sampling plans cover 50,000–100,000 participants each.

## 6. Estimates of household poverty likelihoods

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

To get absolute units, scores must be converted to *poverty likelihoods*, that is, probabilities of being below a poverty line. This is done via simple look-up tables. For the example of the national line, scores of 10–14 have a poverty likelihood of 74.5 percent, and scores of 40–44 have a poverty likelihood of 10.8 percent (Figure 4).

The poverty likelihood associated with a score varies by poverty line. For example, scores of 40–44 are associated with a poverty likelihood of 10.8 percent for the national line but 4.7 percent for the food line.<sup>12</sup>

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<sup>12</sup> Starting with Figure 4, most figures have fourteen versions, one for each of the seven poverty lines for the scorecard applied to the validation sample in the 2006 VHLSS, and one for each of the seven poverty lines for the scorecard applied to the entire 2004 VHLSS. To keep them straight, they are grouped by poverty line. Single tables that pertain to all poverty lines are placed with the first group of tables for the national line.

## 6.1 Calibrating scores with poverty likelihoods

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

For the example of the national line (Figure 5), there are 3,351 (normalized) households in the calibration sub-sample with a score of 20–24, of whom 1,858 (normalized) are below the poverty line. The estimated poverty likelihood associated with a score of 20–24 is then 55.4 percent, because  $1,858 \div 3,351 = 55.4$  percent.

To illustrate with the national line and a score of 40–44, there are 8,956 (normalized) households in the calibration sample, of whom 964 (normalized) are below the line (Figure 5). Thus, the poverty likelihood for this score is  $964 \div 8,956 = 10.8$  percent.

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

Figure 6 shows, for all scores, the likelihood that consumption falls in a range demarcated by two adjacent poverty lines. For example, the daily consumption of someone with a score of 35–39 falls in the following ranges with probability:

- 10.2 percent below the food line
- 10.6 percent between the food and national lines
- 10.2 percent between the national and USD1.25/day 2005 PPP lines
- 39.3 percent between the USD1.25/day and USD1.75/day 2005 PPP lines
- 20.8 percent between the USD1.75/day and USD2.50/day 2005 PPP lines
- 8.8 percent above the USD2.50/day 2005 PPP line



Even though the scorecard is constructed partly based on judgment, the calibration process produces poverty likelihoods that are objective, that is, derived from survey data on consumption and quantitative poverty lines. The poverty likelihoods would be objective even if indicators and/or points were selected without any data at all. In fact, objective scorecards of proven accuracy are often based only on judgment (Fuller, 2006; Caire, 2004; Schreiner *et al.*, 2004). Of course, the scorecard here is 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 Vietnam scorecard are transformed coefficients from a Logit regression, scores are not converted to poverty likelihoods via the Logit formula of  $2.718281828^{\text{score}} \times (1 + 2.718281828^{\text{score}})^{-1}$ . This is because the Logit formula is esoteric and difficult to compute by hand. Non-specialists find it more intuitive to define the poverty likelihood as the share of households with a given score in the calibration sample who are below a poverty line. In the field, converting scores to poverty likelihoods requires no arithmetic at all, just a look-up table. This non-parametric calibration can also improve accuracy, especially with large calibration samples.

## 6.2 Accuracy of estimates of households' poverty likelihoods

As long as the relationship between indicators and poverty does not change and as long as the scorecard is applied to households from the same population from which it was constructed, then this calibration process produces unbiased estimates of poverty likelihoods. *Unbiased* means that in repeated samples from the same population, the average estimate matches the true poverty likelihood. The scorecard also produces unbiased estimates of poverty rates at a point in time, as well as unbiased estimates of changes in poverty rates between two points in time.<sup>13</sup>

Of course, the relationship between indicators and poverty does change to some unknown extent with time and also across sub-groups in the Vietnam's population, so the scorecard will generally be biased when applied after 2006 (as it must be in practice) or when applied with non-nationally representative groups.

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<sup>13</sup> This follows because these estimates of groups' poverty rates are linear functions of the unbiased estimates of households' poverty likelihoods.

How accurate are estimates of households' poverty likelihoods? To measure, the scorecard is applied to 1,000 bootstrap samples of size  $n = 16,384$  from the validation sub-sample. Bootstrapping entails (Efron and Tibshirani, 1993):

- Score each household in the validation sample
- Draw a new bootstrap sample *with replacement* from the validation sample
- For each score, compute the true poverty likelihood in the bootstrap sample, that is, the share of households with the score and consumption below a poverty line
- For each score, record the difference between the estimated poverty likelihood (Figure 4) and the true poverty likelihood in the bootstrap sample
- Repeat the previous three steps 1,000 times
- For each score, report the average difference between estimated and true poverty likelihoods across the 1,000 bootstrap samples
- For each score, report the two-sided 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 national line in the validation sample, the average poverty likelihood across bootstrap samples for scores of 20–24 in the validation sample is too high by 6.3 percentage points (Figure 7). For scores of 25–29, the estimate is too low by 11.6 percentage points.<sup>14</sup>

The 90-percent confidence interval for the differences for scores of 20–24 is  $\pm 3.7$  percentage points (Figure 7). This means that in 900 of 1,000 bootstraps, the difference

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<sup>14</sup> These differences are not zero, in spite of the estimator's unbiasedness, because the scorecard comes from a single sample. The average difference by score would be zero if samples were repeatedly drawn from the population and split into sub-samples before repeating the entire scorecard-building process.

between the estimate and the true value is between 2.6 and 10.0 percentage points (because  $6.3 - 3.7 = 2.6$ , and  $6.3 + 3.7 = 10.0$ ). In 950 of 1,000 bootstraps (95 percent), the difference is  $6.3 \pm 4.3$  percentage points, and in 990 of 1,000 bootstraps (99 percent), the difference is  $6.3 \pm 5.9$  percentage points.

For almost all score ranges below 65–69, Figure 7 shows differences—sometimes large ones—between estimated poverty likelihoods and true values. This is because the validation sub-sample is a single sample that—thanks to sampling variation—differs in distribution from the construction/calibration sub-samples and from Vietnam’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 9 below looks at targeting accuracy in detail.

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

Another possible source of differences between estimates and true values is overfitting. By construction, the scorecard here is unbiased, but it may still be *overfit* when applied after 2006. That is, it may fit the 2006 VHLSS data so closely that it captures not only some timeless patterns but also some random patterns that, due to sampling variation, show up only in the 2006 VHLSS. Or the scorecard may be overfit

in the sense that it is not robust to changes in the relationships between indicators and poverty 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. Bootstrapping can also mitigate overfitting by reducing (but not eliminating) dependence on a single sampling instance. Combining scorecards can also help, at the cost of greater complexity.

Most errors in individual households' likelihoods, however, cancel out in the estimates of groups' poverty rates (see later sections). Furthermore, at least some of the differences come from non-scorecard sources such as changes in the relationship 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 space. 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).

## 7. 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, 2009 and that they have scores of 20, 30, and 40, corresponding to poverty likelihoods of 55.4, 33.0, and 10.8 percent (national line, Figure 4). The group's estimated poverty rate is the households' average poverty likelihood of  $(55.4 + 33.0 + 10.8) \div 3 = 33.1$  percent.<sup>15</sup>

### 7.1 Accuracy of estimated poverty rates at a point in time

For the Vietnam scorecard applied to the validation sample with  $n = 16,384$ , the absolute differences between the estimated poverty rate at a point in time and the true rate are 0.6 percentage points or less (Figure 8, which summarizes Figure 9 across poverty lines). The average absolute difference across the seven poverty lines is 0.3 percentage points. At least part of these differences is due to sampling variation in the validation sample and in the random division of the 2006 VHLSS into three sub-samples.

In terms of precision, the 90-percent confidence interval for a group's estimated poverty rate at a point in time and with  $n = 16,384$  is 0.4 percentage points or less

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<sup>15</sup> The group's poverty rate is *not* the poverty likelihood associated with the average score. Here, the average score is  $(20 + 30 + 40) \div 3 = 30$ , and the poverty likelihood associated with the average score is 33.0 percent. This is not the 33.1 percent found as the average of the three poverty likelihoods associated with each of the three scores.

(Figure 8). This means that in 900 of 1,000 bootstraps of this size, the difference between the estimate and the true value is within 0.4 percentage points of the average difference. In the specific case of the national line and the validation sample, 90 percent of all samples of  $n = 16,384$  produce estimates that differ from the true value in the range of  $0.5 - 0.4 = 0.1$  to  $0.5 + 0.4 = 0.9$  percentage points. This follows because 0.5 is the average difference, and  $\pm 0.4$  is its 90-percent confidence interval. The average difference is 0.5 because the average scorecard estimate is too high by 0.5 percentage points; it estimates a poverty rate of 13.7 percent for the validation sample, but the true value is 13.2 percent (Figure 2).

## **7.2 Standard errors for estimates of poverty rates at a point in time**

How precise are these point-in-time estimates? For a range of sample sizes, Figure 9 reports average differences between estimated and true poverty rates at a point in time as well as precision (confidence intervals for the differences) for the scorecard applied to 1,000 bootstrap samples from the validation sample. This information can be used to derive formulas for standard errors.

One way to derive this formula is to ask, How many households should an organization sample if it wants to estimate a poverty rate at a point in time for a

desired confidence interval and confidence level? This practical question was first addressed in Schreiner (2008a).<sup>16</sup> As hinted just above, the answer lies in Figure 9.

To derive a formula for sample size (which will then lead to a formula for standard errors), note first that under direct measurement, the poverty rate can be estimated as the number of households observed to be below the poverty line, divided by the number of all observed households. The formula for sample size  $n$  in this textbook case is (Cochran, 1977):

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

where

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

$c$  is the confidence interval as a proportion  
(for example, 0.02 for an interval of  $\pm 2$  percentage points), and

$\hat{p}$  is the expected (before measurement) proportion of households  
below the poverty line.

The scorecard, however, does not measure poverty directly, so this formula is not applicable. To derive a similar sample-size formula for the Vietnam scorecard, consider

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<sup>16</sup> IRIS Center (2007b and 2007c) says that  $n = 300$  is sufficient for USAID reporting. If a scorecard is as precise as direct measurement, if the expected (before measurement) poverty rate is 50 percent, and if the confidence level is 90 percent, then  $n = 300$  implies a confidence interval of  $\pm 2.2$  percentage points. In fact, USAID has not specified confidence levels or intervals. Furthermore, the expected poverty rate may not be 50 percent, and the scorecard could be more or less precise than direct measurement.



the scorecard applied to the validation sample. Figure 2 shows that the expected (before measurement) poverty rate  $\hat{p}$  for the national line is 13.7 percent (that is, the average poverty rate in the construction and calibration sub-samples). In turn, a sample size  $n$  of 16,384 and a 90-percent confidence level correspond to a confidence interval of  $\pm 0.37$  percentage points (Figure 9).<sup>17</sup> Plugging these into the direct-measurement sample-size

formula (1) above gives not  $n = 16,384$  but rather  $n = \left(\frac{1.64}{0.0037}\right)^2 \cdot 0.137 \cdot (1 - 0.137) =$

23,229. The ratio of the sample size for scoring (derived empirically) to the sample size for direct measurement (derived from theory) is  $16,384 \div 23,229 = 0.71$ .

Applying the same method to  $n = 8,192$  (confidence interval of  $\pm 0.47$  percentage points) gives  $n = \left(\frac{1.64}{0.0047}\right)^2 \cdot 0.137 \cdot (1 - 0.137) = 14,396$ . This time, the ratio of the sample size using scoring to the sample size using direct measurement is  $8,192 \div 14,396 = 0.57$ . Applying this same procedure for all  $n \geq 256$  in Figure 9 gives ratios that average to 0.62.

This approach can be used to define a sample-size formula for the scorecard applied to the population in the validation sample:

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

where  $\alpha = 0.62$  and  $z$ ,  $c$ , and  $\hat{p}$  are defined as in (1) above. It is this  $\alpha$  that appears in Figure 8 as “ $\alpha$  for sample size”.

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<sup>17</sup> Due to rounding, Figure 9 displays 0.4, not 0.37.

To illustrate the use of (2), suppose  $c = 0.0263$  (confidence interval of  $\pm 2.63$  percentage points) and  $z = 1.64$  (90-percent confidence). Then (2) gives

$$n = 0.62 \cdot \left( \frac{1.64}{0.0263} \right)^2 \cdot 0.137 \cdot (1 - 0.137) = 286, \text{ which is close to the sample size of 256 for}$$

these parameters in Figure 9.

When the sample-size factor  $\alpha$  is less than 1.0, it means that the scorecard is more precise than direct measurement. This occurs for all of seven poverty lines in Figure 8.

Of course, the sample-size formulas here are specific to Vietnam, its poverty lines, its poverty rates, and this scorecard. The derivation method, however, is valid for any poverty-assessment tool following the approach in this paper.

In practice after 2006, an organization would select a poverty line (say, the national line), select a desired confidence level (say, 90 percent, or  $z = 1.64$ ), select a desired confidence interval (say,  $\pm 2.0$  percentage points, or  $c = 0.02$ ), make an assumption about  $\hat{p}$  (perhaps based on a previous measurement such as the 13.7 percent national average for the 2006 VHLSS in Figure 2), look up  $\alpha$  (here, 0.62 for the national line), assume that the scorecard will still work in the future and/or for non-

nationally representative sub-groups,<sup>18</sup> and then compute the required sample size. In

this illustration,  $n = 0.62 \cdot \left(\frac{1.64}{0.02}\right)^2 \cdot 0.137 \cdot (1 - 0.137) = 493$ .

The standard error  $\sigma$  of estimates of poverty rates at a point in time is

$\sigma = \sqrt{\frac{\alpha \cdot \hat{p} \cdot (1 - \hat{p})}{n}}$ . If the scorecard has already been applied to a sample  $n$ , then  $\hat{p}$  is

the scorecard's estimated poverty rate, and the confidence interval  $c = \pm z \cdot \sigma$ .

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<sup>18</sup> The next sub-section discusses accuracy when applied out-of-sample and out-of-time to the 2004 VHLSS. In general, performance after the 2006 VHLSS will probably resemble that in the 2006 VHLSS, with some deterioration as time passes.

## 8. Estimates of changes in group poverty rates over time

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

### 8.1 Warning: Change is not impact

Scoring can estimate change. Of course, change could be for the better or for the worse, and scoring does not indicate what caused change. This point is often forgotten 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 (Moffitt, 1991). 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. Even measuring simple change usually requires assuming that the population is constant over time and that program drop-outs do not differ from non-drop-outs.

## 8.2 Calculating estimated changes in poverty rates over time

Consider the illustration begun in the previous section. On Jan. 1, 2009, a program samples three households who score 20, 30, and 40 and so have poverty likelihoods of 55.4, 33.0, and 10.8 percent (national line, Figure 4). The group's baseline estimated poverty rate is the households' average poverty likelihood of  $(55.4 + 33.0 + 10.8) \div 3 = 33.1$  percent.

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

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

By way of illustration, suppose that a year later on Jan. 1, 2010, the program samples three additional households who are in the same cohort as the three households originally sampled (or suppose that the program scores the same three original households a second time) and finds that their scores are 25, 35, and 45 (poverty likelihoods of 35.2, 20.8, and 4.9 percent, national line, Figure 4). Their average poverty likelihood at follow-up is now  $(35.2 + 20.8 + 4.9) \div 3 = 20.3$  percent, an improvement of  $33.1 - 20.3 = 12.8$  percentage points.

This suggests that about one of eight participants crossed the poverty line in 2009.<sup>19</sup> Among those who started below the line, about two in five ( $12.8 \div 33.1 = 38.7$  percent) ended up above the line.<sup>20</sup>

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

<sup>20</sup> The scorecard does not reveal the reasons for this change.

### 8.3 Accuracy for estimated change in two independent samples

Given the scorecard built from the construction and calibration samples with the 2006 VHLSS, an estimate of the change in the poverty rate between 2006 and 2004 in Vietnam is the difference between the estimated poverty rate in the validation sample and the estimated poverty rate in the entire 2004 VHLSS. Across the seven poverty lines in Figure 10, the absolute differences between this estimate and the true value are always 2.1 percentage points or less, and the average absolute difference is 1.2 percentage points. These are as good or better than those in the other tests of estimates of change over time (Schreiner, 2009 and 2008; Mathiassen, 2008).

Under direct measurement, the sample-size formula for the estimate of change in poverty rates between two points in time with two independent samples is:

$$n = 2 \cdot \left(\frac{z}{c}\right)^2 \cdot \hat{p} \cdot (1 - \hat{p}), \quad (3)$$

where  $z$ ,  $c$ , and  $\hat{p}$  are defined as in (1). Before measurement,  $\hat{p}$  is assumed equal at both baseline and follow-up.  $n$  is the sample size at both baseline and follow-up.<sup>21</sup>

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<sup>21</sup> 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.

The method developed in the previous section can be used again to derive a sample-size formula for indirect measurement via the scorecard:

$$n = \alpha \cdot 2 \cdot \left(\frac{z}{c}\right)^2 \cdot \hat{p} \cdot (1 - \hat{p}). \quad (4)$$

The corresponding formula for the standard error  $\sigma$  of scoring's estimate of change in two independent group's poverty rate is  $\sigma = \sqrt{\frac{2 \cdot \alpha \cdot \hat{p} \cdot (1 - \hat{p})}{n}}$ .

As before,  $\alpha$  is estimated as the average across sample sizes  $\geq 256$  of the ratio between the empirical sample size required by scoring for a given precision and the theoretical sample size required under direct measurement. For the Vietnam scorecard,  $\alpha$  ranges from 0.53 to 0.88 (Figure 10), suggesting that the indirect measurement of change with scoring is more precise than direct measurement with full-blown consumption surveys.

To illustrate the use of (4) to determine sample size for estimating changes in poverty rates across two independent samples, suppose the desired confidence level is 90 percent ( $z = 1.64$ ), the desired confidence interval is 2 percentage points ( $c = 0.02$ ), the poverty line is the national line, the baseline is 2006, the follow-up is 2010 and  $\alpha = 0.67$  (from Figure 10)<sup>22</sup>, and  $\hat{p} = 0.137$  (from Figure 2). Then the baseline sample size is

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<sup>22</sup> While there is no particular reason to assume that the alpha for 2006 to 2010 is the same as the alpha for 2006 to 2004, it seems better than any alternative assumptions.

$n = 0.67 \cdot 2 \cdot \left(\frac{1.64}{0.02}\right)^2 \cdot 0.137 \cdot (1 - 0.137) = 1,066$ , and the follow-up sample size is also 1,066.

## 8.4 Accuracy for estimated change for one sample, scored twice

In general, the direct-measurement sample-size formula for this case is:<sup>23</sup>

$$n = \left(\frac{z}{c}\right)^2 \cdot [\hat{p}_{12} \cdot (1 - \hat{p}_{12}) + \hat{p}_{21} \cdot (1 - \hat{p}_{21}) + 2 \cdot \hat{p}_{12} \cdot \hat{p}_{21}], \quad (5)$$

where  $z$  and  $c$  are defined as in (1),  $\hat{p}_{12}$  is the expected (before measurement) share of all sampled cases that move from below the poverty line to above it, and  $\hat{p}_{21}$  is the expected share of all sampled cases that move from above the line to below it.

How can a user set  $\hat{p}_{12}$  and  $\hat{p}_{21}$ ? Before measurement, a reasonable assumption is that the change in the poverty rate is zero. Then  $\hat{p}_{12} = \hat{p}_{21} = \hat{p}_*$  and (5) becomes:

$$n = 2 \cdot \left(\frac{z}{c}\right)^2 \hat{p}_*. \quad (6)$$

Still,  $\hat{p}_*$  could be anything between 0–1, so (6) is not enough to compute sample size. The estimate of  $\hat{p}_*$  must be based on data available before baseline measurement.

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<sup>23</sup> See McNemar (1947) and Johnson (2007). John Pezzullo helped find this formula.



Suppose that the observed relationship between  $\hat{p}_*$ , the number of years between baseline and follow-up  $y$ , and the variance of the baseline poverty rate  $p_{baseline} \cdot (1 - p_{baseline})$  is—as in Peru, see Schreiner (2009)—close to  $\hat{p}_* = -0.02 + 0.016 \cdot y + 0.47 \cdot [p_{baseline} \cdot (1 - p_{baseline})]$ . Of course,  $p_{baseline}$  is not known before baseline measurement, but it is reasonable to use as its expected value a previously observed poverty rate. Given this and a poverty line, a sample-size formula for a single sample scored twice for Vietnam (once after 2006 and then again  $y$  years later) is:

$$n = \alpha \cdot 2 \cdot \left(\frac{z}{c}\right)^2 \cdot \{-0.02 + 0.016 \cdot y + 0.47 \cdot [p_{baseline} \cdot (1 - p_{baseline})]\}. \quad (7)$$

The standard error of scoring's estimate of change in a single group's poverty rate is then  $\sigma = \sqrt{\frac{\alpha \cdot 2 \cdot \{-0.02 + 0.016 \cdot y + 0.47 \cdot [p_{baseline} \cdot (1 - p_{baseline})]\}}{n}}$ .

In Peru (the only other country for which there is an estimate, Schreiner, 2009), the average  $\alpha$  across years and poverty lines is about 1.1.

To illustrate the use of (7), suppose the desired confidence level is 90 percent ( $z = 1.64$ ), the desired confidence interval is 2.0 percentage points ( $c = 0.02$ ), the poverty line is the national line, and the sample will first be scored in 2009 and then again in 2012 ( $y = 3$ ). The before-baseline poverty rate is 13.6 percent ( $p_{2006} = 0.136$ , Figure 2), and suppose  $\alpha = 1.1$ . Then the baseline sample size in 2009 is

$$n = 1.1 \cdot 2 \cdot \left(\frac{1.64}{0.02}\right)^2 \cdot \{-0.02 + 0.016 \cdot 3 + 0.47 \cdot [0.136 \cdot (1 - 0.136)]\} = 1,232. \text{ Of course, the}$$

same group of 1,232 households is scored at follow-up in 2012 as well.

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

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

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

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

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

- Inclusion: 11.1 percent are below the line and correctly targeted
- Undercoverage: 2.2 percent are below the line and mistakenly not targeted
- Leakage: 17.1 percent are above the line and mistakenly targeted
- Exclusion: 69.6 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: 12.6 percent are below the line and correctly targeted
- Undercoverage: 0.6 percent are below the line and mistakenly not targeted
- Leakage: 24.6 percent are above the line and mistakenly targeted
- Exclusion: 62.2 percent are above the line and correctly not targeted

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

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

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

- Assign benefits and costs to possible outcomes, based on its values and mission
- Tally total net benefits for each cut-off using Figure 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. Any program that uses targeting—with or without scoring—should thoughtfully consider how it values successful inclusion or exclusion versus errors of undercoverage and

leakage. It is healthy to go through a process of thinking explicitly and intentionally about how possible targeting outcomes are valued.

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

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

Figure 12 shows “Total Accuracy” for all cut-offs for the Vietnam scorecard. For the national line in the validation sample, total net benefit is greatest (89.8) for a cut-off of 15–19, with about nine in ten Vietnamese households 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  $(2 \times \text{Households correctly included}) + (1 \times \text{Households correctly excluded})$ .

As an alternative to assigning benefits and costs to targeting outcomes and then choosing a cut-off to maximize total net benefit, a program could set a cut-off to achieve a desired poverty rate among targeted households. The third column of Figure 13 (“% targeted who are poor”) shows, for the Vietnam scorecard applied to the validation sample, the expected poverty rate among households who score at or below a given cut-off. For the example of the national line in the validation sample, targeting

households who score 35–39 or less would target 28.2 percent of all households and produce a poverty rate among those targeted of 39.2 percent.

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 national line in the validation sample and a cut-off of 35–39, 83.6 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 national line in the validation sample and a cut-off of 35–39, covering 0.6 poor households means leaking to 1 non-poor household.

## 10. Conclusion

Pro-poor programs in Vietnam can use the scorecard to segment clients for differentiated treatment as well as to estimate:

- The likelihood that a household has consumption below a given poverty line
- The poverty rate of a population at a point in time
- The change in the poverty rate of a population over time

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

The scorecard is built with a sub-sample of data from the 2006 VHLSS, tested on a different sub-sample from the 2006 VHLSS and on the entire 2004 VHLSS, and calibrated to seven poverty lines (national, food, USAID “extreme”, USD1.25/day 2005 PPP, USD1.75/day 2005 PPP, USD2.50/day 2005 PPP, and MOLISA).

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

When the scorecard is applied to the validation sample with  $n = 16,384$ , the absolute difference between estimates versus true poverty rates for groups of households at a point in time is always less than 0.6 percentage points and averages—across the seven poverty lines—about 0.3 percentage points. For  $n = 16,384$  and 90-percent confidence, the precision of these differences is  $\pm 0.4$  percentage points or better, and for

$n = 1,024$ , precision is  $\pm 1.9$  percentage points or less. In general, the scorecard is more precise than direct measurement.

When used to measure change across independent samples of  $n = 16,384$  in the 2006 and 2004 VHLSS, the average absolute difference between estimates and true changes is 1.2 percentage points, with a 90-percent confidence interval of  $\pm 0.6$  percentage points or less.

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

Although the statistical technique is innovative, and although technical accuracy is important, the design of the scorecard here focuses on transparency and ease-of-use. After all, a perfectly accurate scorecard is worthless if programs feel so daunted by its complexity or its cost that they do not even try to use it. For this reason, the 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 sum, the scorecard is a practical, objective way for pro-poor programs in Vietnam to monitor poverty rates, track changes in poverty rates over time, and target services. The same approach can be applied to any country with similar data from a national consumption survey.



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

Sub-sample	Year	Households	% with expenditure below a poverty line						
			National	National	USAID	International 2005 PPP			MOLISA
				Food	'Extreme'	\$1.25/day	\$1.75/day	\$2.50/day	
<b>All Vietnam</b>	2006	9,189	13.6	8.0	6.5	17.7	36.7	59.7	12.2
	2004	9,189	17.1	13.6	8.2	23.9	45.4	66.1	15.4
<b>Construction</b>									
Selecting indicators and weights	2006	3,092	13.7	8.1	6.4	17.8	36.6	59.8	12.0
<b>Calibration</b>									
Associating scores with likelihoods	2006	3,116	13.7	7.8	6.5	17.8	36.9	59.6	12.0
<b>Validation</b>									
Measuring accuracy	2006	2,981	13.2	8.2	6.6	17.4	36.6	59.8	12.8
<b>Change in poverty rate (percentage points)</b>									
From construction/calibration to validation in 2006			+0.5	-0.2	-0.2	+0.4	+0.2	-0.1	-0.8
From 2006 to 2004, all Vietnam			-3.5	-5.6	-1.8	-6.2	-8.7	-6.4	-3.2

Source: 2004 and 2006 VHLSS. Poverty rates at the household level.

**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>
241	What kind of cooker does the household have? (None; Electric cooker, rice cooker, or pressurized cooker (no gas cooker); Gas cooker)
185	What type of toilet arrangement does the household have? (None or other; Double-vault compost latrine, or toilet directly over water; <i>Suilabh</i> , or flush toilet with septic tank or sewage pipes)
180	Does the household have a telephone set? (No; Yes)
137	Does the household have a refrigerator or freezer? (No; Yes)
135	What is the highest educational level completed by any household member? (None; Primary school; Lower secondary school; Upper secondary school; Junior college or higher)
114	Does the household have a motorcycle? (No; Yes)
107	What is the total living area of the household (including bedrooms, dining rooms, living rooms, study rooms, and playing rooms, but excluding bathrooms, toilets, kitchens, storerooms, areas for business activities, and counting half of any attic space)? (50 m <sup>2</sup> or less; more than 50 m <sup>2</sup> and 100 m <sup>2</sup> or less; More than 100 m <sup>2</sup> )
102	Does the household have a color television? (No; Yes)
100	Does the household have a mobile phone? (No; Yes)
96	In the past 12 months, how many household members were self-employed in agriculture, forestry, or aquaculture? (Four or more; Two or three; One or none)
95	Does the household have a wardrobe of any kind? (No; Yes)
95	In the past 12 months, how has the household disposed of garbage? (Dumped in rivers/lakes, dumped in a site nearby, or other; Collected)
85	What type is the household's main residence? (Makeshift or other; Semi-permanent house; Strong house with a shared kitchen or shared bathroom/toilet; Villa or strong house with a private kitchen and private bathroom/toilet)
74	How many household members are 14-years-old or younger? (Three or more; Two; One; None)
74	What is the household's main source of water for cooking and drinking? (Public tap, deep drilled wells, hand-dug and reinforced/non-reinforced wells, covered wells, protected/unprotected springs, rain, small water tank, water tank, river, lake, pond, or other; Private tap water inside/outside the house, or purchased water (in tank or bottle)

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

<u>Uncertainty coefficient</u>	<u>Indicator (Answers ordered starting with those most strongly strongly linked with higher poverty likelihoods)</u>
72	Does the household use a filter or chemicals to purify water for daily use? (No; Yes)
71	In the last 12 months, has your household used or managed agricultural land? (No; Yes)
62	Do all children in the household ages 6 to 16 attend school? (No; Yes; No children ages 6 to 16)
61	In the past 12 months, was the female head/spouse self-employed in agriculture, forestry, aquaculture? (Yes; No)
61	Does the household have any fruit blenders or juicers? (No; Yes)
60	Does the household have a video player? (No; Yes)
56	Does the household use a filter or chemicals to purify water for cooking/drinking? (No; Yes)
55	Does the household have any washing machines or dryers? (No; Yes)
54	Is any household member a state employee? (No; Yes)
53	Does the household have a computer? (No; Yes)
52	In the past 12 months, was the male head/spouse self-employed in agriculture, forestry, aquaculture? (Yes; No)
49	Does the household have any tables, chairs, or sofas? (No; Yes)
42	Does the household have any cattle for drawing, plowing, or breeding? (No; Yes)
41	Does the household have a water heater? (No; Yes)
40	Does the household have an electric fan? (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>
31	Is any household member literate? (No; Yes)
29	Does the household have a pump? (No; Yes)
27	Does the household have any multi-tier stereos? (No; Yes)
19	Does the household have an air-conditioner? (No; Yes)
16	Does the household have a black and white television? (No; Yes)
16	What is the household's main source of lighting? (Gas, oil, kerosene lamps, or other; Electricity from the public grid, or power from batteries or generators)
13	In the past 12 months, how many household members have worked? (Five or more; Two, three, or four; One or none)
13	Does the household have any sewing, weaving, or embroidering machines? (No; Yes)
12	Does the household have a camera or camcorder? (No; Yes)
11	Does the household have a radio or cassette player? (No; Yes)
10	Does the household have a computer connected to the internet? (No; Yes)
9	Does the household have any breeding facilities? (No; Yes)
8	Does the household have any microwaves or conventional ovens? (No; Yes)
6	Does the household have any carts? (No; Yes)
5	Does the household have any breeding pigs? (No; Yes)

**National Poverty Line Tables**  
**(and Tables Pertaining to All Seven Poverty Lines)**  
**for 2006 Scorecard Applied to 2006 Validation Sample**

**Figure 4 (National poverty 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	93.0
5-9	90.0
10-14	74.5
15-19	70.9
20-24	55.4
25-29	35.2
30-34	33.0
35-39	20.8
40-44	10.8
45-49	4.9
50-54	3.3
55-59	1.2
60-64	1.2
65-69	0.5
70-74	0.5
75-79	0.0
80-84	0.0
85-89	0.0
90-94	0.0
95-100	0.0

Surveyed cases weighted to represent households in the Vietnam.

Based on the 2006 VHLSS.

**Figure 5 (National poverty line): Derivation of estimated poverty likelihoods associated with scores**

Score	Households below poverty line		All households at score		Poverty likelihood (estimated, %)
0-4	413	÷	444	=	93.0
5-9	1,370	÷	1,523	=	90.0
10-14	1,151	÷	1,544	=	74.5
15-19	1,824	÷	2,571	=	70.9
20-24	1,858	÷	3,351	=	55.4
25-29	1,599	÷	4,540	=	35.2
30-34	2,242	÷	6,791	=	33.0
35-39	1,549	÷	7,441	=	20.8
40-44	964	÷	8,956	=	10.8
45-49	418	÷	8,466	=	4.9
50-54	261	÷	7,830	=	3.3
55-59	73	÷	6,240	=	1.2
60-64	80	÷	6,713	=	1.2
65-69	26	÷	4,816	=	0.5
70-74	32	÷	5,896	=	0.5
75-79	0	÷	5,479	=	0.0
80-84	0	÷	6,198	=	0.0
85-89	0	÷	4,064	=	0.0
90-94	0	÷	3,607	=	0.0
95-100	0	÷	3,532	=	0.0

Surveyed cases weighted to represent households in the Vietnam.

Based on the 2006 VHLSS.

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

**Figure 6 (All poverty lines): Distribution of household poverty likelihoods across consumption ranges demarcated by poverty lines**

Score	Likelihood of having expenditure in range demarcated by poverty lines per day per capita					
	<Food	=>Food and <National	=>National and <\$1.25/day	=>\$1.25/day and <\$1.75/day	=>\$1.75/day and <\$2.50/day	=>\$2.50/day
	<5,890 dong	=>5,890 dong and <7,011 dong	=>7,011 dong and <7,718 dong	=>7,718 dong and <10,805 dong	=>10,805 dong and <15,435 dong	=>15,435 dong
0-4	78.9	14.1	0.0	7.0	0.0	0.0
5-9	78.5	11.5	0.0	6.6	3.5	0.0
10-14	60.9	13.6	10.2	13.0	2.3	0.0
15-19	52.4	18.6	8.2	17.0	3.9	0.0
20-24	30.7	24.7	10.1	23.8	7.3	3.3
25-29	15.4	19.8	8.8	35.5	16.1	4.4
30-34	17.0	16.0	10.4	38.6	12.9	5.0
35-39	10.2	10.6	10.2	39.3	20.8	8.8
40-44	4.7	6.1	7.0	34.2	34.5	13.5
45-49	0.9	4.0	6.7	31.2	33.0	24.2
50-54	0.4	3.0	0.8	21.1	39.8	35.1
55-59	0.9	0.3	0.7	14.5	40.6	43.0
60-64	0.0	1.2	1.0	11.8	35.3	50.7
65-69	0.5	0.0	0.0	10.2	37.7	51.5
70-74	0.5	0.0	0.0	4.7	27.5	67.3
75-79	0.0	0.0	0.0	3.6	15.4	81.0
80-84	0.0	0.0	0.0	0.5	7.6	91.9
85-89	0.0	0.0	0.0	0.0	7.2	92.8
90-94	0.0	0.0	0.0	0.0	0.8	99.2
95-100	0.0	0.0	0.0	0.0	1.4	98.6

Note: All poverty likelihoods in percentage units.

The USAID 'extreme' and MOLISA lines are omitted because they are very close to the food line and national line respectively.

**Figure 7 (National poverty line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ( $n = 16,384$ ) from the validation sample, with confidence intervals, 2006 scorecard applied to validation sample**

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	-7.0	3.5	3.5	3.5
5-9	+13.6	5.3	6.3	7.9
10-14	+1.9	4.9	5.9	7.2
15-19	+1.5	4.1	4.8	6.4
20-24	+6.3	3.7	4.3	5.9
25-29	-11.6	7.4	7.7	8.2
30-34	+7.4	2.3	2.8	3.6
35-39	+5.6	1.8	2.1	2.6
40-44	-6.1	3.9	4.0	4.3
45-49	+2.6	0.6	0.7	1.0
50-54	+0.2	1.0	1.1	1.4
55-59	-1.6	1.3	1.4	1.6
60-64	+1.2	0.0	0.0	0.0
65-69	+0.5	0.0	0.0	0.0
70-74	+0.5	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	-0.4	0.4	0.4	0.5
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

**Figure 8 (All poverty lines): Differences, precision of differences, and sample-size  $\alpha$  for bootstrapped estimates of poverty rates for groups of households at a point in time, 2006 scorecard applied to validation sample**

	Poverty line						
	National	National	USAID	International (2005 PPP)			MOLISA
		Food	'Extreme'	\$1.25/day	\$1.75/day	\$2.50/day	
<b><u>Estimate minus true value</u></b>							
2006 applied to 2006 validation	+0.5	-0.3	-0.1	+0.6	+0.2	-0.1	-0.6
2006 applied to 2004	+2.1	-1.7	+1.3	+0.3	+0.2	+1.7	+1.5
<b><u>Precision of difference</u></b>							
2006 applied to 2006 validation	0.4	0.3	0.3	0.4	0.4	0.4	0.4
2006 applied to 2004	0.5	0.5	0.4	0.5	0.5	0.5	0.5
<b><u><math>\alpha</math> for sample size</u></b>							
2006 applied to 2006 validation	0.62	0.78	0.81	0.57	0.51	0.51	0.73
2006 applied to 2004	0.73	0.87	0.89	0.98	0.69	0.66	0.69

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

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

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

**Figure 9 (National poverty line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2006 scorecard applied to validation sample**

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	+0.9	50.0	67.3	83.3
4	+0.4	22.5	28.6	42.1
8	+0.4	15.3	18.8	27.9
16	+0.4	11.1	13.4	17.1
32	+0.7	8.0	9.4	12.4
64	+0.5	5.3	6.4	8.9
128	+0.5	4.0	4.8	6.2
256	+0.5	2.6	3.2	4.2
512	+0.6	1.7	2.0	2.6
1,024	+0.5	1.4	1.6	2.1
2,048	+0.5	1.0	1.2	1.6
4,096	+0.5	0.7	0.8	1.1
8,192	+0.5	0.5	0.6	0.7
16,384	+0.5	0.4	0.4	0.6



**Figure 10 (All poverty lines): Differences, precision of differences, and sample-size  $\alpha$  for bootstrapped estimates of poverty rates for independent groups of households at two points in time for the 2006 scorecard applied to the validation sample in 2006 and the entire sample in 2004**

	National	National	USAID	International (2005 PPP)			MOLISA
		Food	'Extreme'	\$1.25/day	\$1.75/day	\$2.50/day	
<b><u>Estimate minus true value</u></b>							
2006 minus 2004	+1.6	-1.4	+1.4	-0.3	+0.0	+1.9	+2.1
<b><u>Precision of difference</u></b>							
2006 minus 2004	0.5	0.4	0.4	0.6	0.6	0.6	0.5
<b><u><math>\alpha</math> for sample size</u></b>							
2006 minus 2004	0.67	0.88	0.79	0.63	0.53	0.53	0.73

Scorecard is based on 2006 VHLSS and applied to households in 2006 validation sample and all households in 2004 VHLSS.

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

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

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

**Figure 11 (All poverty lines): Possible types of outcomes from targeting by poverty score**

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

**Figure 12 (National poverty line): Households by targeting classification and score, along with “Total Accuracy” and BPAC, 2006 scorecard applied to 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	0.4	12.8	0.0	86.8	87.2	-93.3
5-9	1.7	11.6	0.3	86.5	88.1	-72.6
10-14	2.8	10.4	0.7	86.0	88.8	-52.4
15-19	4.5	8.7	1.5	85.2	89.8	-19.6
20-24	6.2	7.0	3.3	83.5	89.7	+18.0
25-29	8.2	5.0	5.8	81.0	89.2	+56.4
30-34	10.0	3.2	10.8	76.0	86.0	+18.4
35-39	11.1	2.2	17.1	69.6	80.7	-29.7
40-44	12.6	0.6	24.6	62.2	74.8	-86.0
45-49	12.8	0.4	32.8	54.0	66.8	-148.1
50-54	13.0	0.2	40.4	46.4	59.4	-205.8
55-59	13.2	0.0	46.5	40.3	53.5	-251.8
60-64	13.2	0.0	53.2	33.6	46.8	-302.6
65-69	13.2	0.0	58.0	28.7	41.9	-339.0
70-74	13.2	0.0	63.9	22.9	36.0	-383.6
75-79	13.2	0.0	69.4	17.4	30.6	-425.0
80-84	13.2	0.0	75.6	11.2	24.4	-471.9
85-89	13.2	0.0	79.6	7.1	20.4	-502.5
90-94	13.2	0.0	83.2	3.5	16.8	-529.8
95-100	13.2	0.0	86.8	0.0	13.2	-556.5

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

**Figure 13 (National poverty 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 successful targeted (coverage) per non-poor household mistakenly targeted (leakage), 2006 scorecard applied to 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	0.4	100.0	3.4	Only poor targeted
5-9	2.0	84.3	12.5	5.4:1
10-14	3.5	79.1	21.0	3.8:1
15-19	6.1	74.8	34.4	3.0:1
20-24	9.4	65.4	46.7	1.9:1
25-29	14.0	58.8	62.1	1.4:1
30-34	20.8	48.0	75.4	0.9:1
35-39	28.2	39.2	83.6	0.6:1
40-44	37.2	33.8	95.1	0.5:1
45-49	45.6	28.1	97.0	0.4:1
50-54	53.5	24.4	98.5	0.3:1
55-59	59.7	22.1	99.8	0.3:1
60-64	66.4	19.9	99.8	0.2:1
65-69	71.2	18.5	99.8	0.2:1
70-74	77.1	17.1	99.8	0.2:1
75-79	82.6	16.0	99.8	0.2:1
80-84	88.8	14.9	99.8	0.2:1
85-89	92.9	14.2	100.0	0.2:1
90-94	96.5	13.7	100.0	0.2:1
95-100	100.0	13.2	100.0	0.2:1

**Figure 14 (National poverty line): Regional overall price index by urban/rural for the 2006 VHLSS**

<b>Region</b>	<b>Regional overall price index</b>			
	<b>2004</b>		<b>2006</b>	
	<b>Urban</b>	<b>Rural</b>	<b>Urban</b>	<b>Rural</b>
Red River Delta	1.017	0.948	1.084	1.007
North East	1.008	0.974	0.963	0.908
North West	1.061	1.030	1.020	0.989
North Central Coast	1.004	0.974	0.996	0.862
South Central Coast	1.013	0.996	1.073	0.976
Central Highlands	1.059	1.043	1.036	0.931
South East	1.043	1.033	1.234	1.061
Mekong River Delta	1.018	1.015	1.096	0.958

Source: 2004 and 2006 VHLSS.

**National Food Poverty Line Tables**  
**for 2006 Scorecard Applied to 2006 Validation Sample**

**Figure 4 (National food poverty 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	78.9
5-9	78.5
10-14	60.9
15-19	52.4
20-24	30.7
25-29	15.4
30-34	17.0
35-39	10.2
40-44	4.7
45-49	0.9
50-54	0.4
55-59	0.9
60-64	0.0
65-69	0.5
70-74	0.5
75-79	0.0
80-84	0.0
85-89	0.0
90-94	0.0
95-100	0.0

Surveyed cases weighted to represent households in the Vietnam.

Based on the 2006 VHLSS.

**Figure 5 (National food poverty line): Derivation of estimated poverty likelihoods associated with scores**

Score	Households below poverty line		All households at score		Poverty likelihood (estimated, %)
0-4	350	÷	444	=	78.9
5-9	1,195	÷	1,523	=	78.5
10-14	940	÷	1,544	=	60.9
15-19	1,346	÷	2,571	=	52.4
20-24	1,030	÷	3,351	=	30.7
25-29	698	÷	4,540	=	15.4
30-34	1,154	÷	6,791	=	17.0
35-39	760	÷	7,441	=	10.2
40-44	421	÷	8,956	=	4.7
45-49	76	÷	8,466	=	0.9
50-54	29	÷	7,830	=	0.4
55-59	57	÷	6,240	=	0.9
60-64	0	÷	6,713	=	0.0
65-69	26	÷	4,816	=	0.5
70-74	32	÷	5,896	=	0.5
75-79	0	÷	5,479	=	0.0
80-84	0	÷	6,198	=	0.0
85-89	0	÷	4,064	=	0.0
90-94	0	÷	3,607	=	0.0
95-100	0	÷	3,532	=	0.0

Surveyed cases weighted to represent households in the Vietnam.

Based on the 2006 VHLSS.

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



**Figure 7 (National food poverty line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ( $n = 16,384$ ) from the validation sample, with confidence intervals, 2006 scorecard applied to validation sample**

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	-16.5	9.7	10.0	10.3
5-9	+20.9	5.9	7.2	9.0
10-14	+7.0	5.6	6.7	8.9
15-19	+4.2	4.4	5.3	7.1
20-24	+4.1	3.2	3.7	5.1
25-29	-15.8	9.5	9.9	10.3
30-34	+2.7	1.9	2.3	3.1
35-39	-0.4	1.5	1.8	2.5
40-44	-2.7	1.9	2.1	2.5
45-49	+0.1	0.4	0.4	0.6
50-54	-2.0	1.5	1.6	1.7
55-59	+0.9	0.0	0.0	0.0
60-64	+0.0	0.0	0.0	0.0
65-69	+0.5	0.0	0.0	0.0
70-74	+0.5	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	-0.4	0.4	0.4	0.5
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

**Figure 9 (National food poverty line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2006 scorecard applied to 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	32.3	57.7	86.9
4	-0.2	20.2	24.6	36.3
8	-0.4	13.8	17.2	23.2
16	-0.2	9.6	12.4	16.3
32	-0.1	6.7	8.2	10.6
64	-0.2	4.8	5.5	8.1
128	-0.2	3.5	4.1	6.0
256	-0.2	2.3	2.8	4.0
512	-0.2	1.6	1.8	2.5
1,024	-0.3	1.2	1.5	1.9
2,048	-0.3	0.9	1.0	1.4
4,096	-0.3	0.6	0.7	0.9
8,192	-0.3	0.4	0.5	0.7
16,384	-0.3	0.3	0.4	0.5

**Figure 12 (National food poverty line): Households by targeting classification and score, along with “Total Accuracy” and BPAC, 2006 scorecard applied to 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	0.4	7.8	0.0	91.8	92.2	-89.6
5-9	1.3	6.9	0.6	91.2	92.5	-59.7
10-14	2.2	6.0	1.4	90.5	92.6	-30.7
15-19	3.4	4.8	2.7	89.1	92.5	+15.7
20-24	4.3	3.8	5.1	86.7	91.1	+37.9
25-29	5.7	2.5	8.3	83.5	89.2	-1.6
30-34	6.6	1.6	14.2	77.7	84.3	-72.8
35-39	7.3	0.8	20.9	71.0	78.3	-154.7
40-44	7.9	0.2	29.2	62.6	70.5	-256.9
45-49	8.0	0.2	37.6	54.2	62.2	-359.2
50-54	8.2	0.0	45.3	46.5	54.7	-453.2
55-59	8.2	0.0	51.5	40.3	48.4	-529.4
60-64	8.2	0.0	58.2	33.6	41.7	-611.4
65-69	8.2	0.0	63.1	28.7	36.9	-670.3
70-74	8.2	0.0	69.0	22.9	31.0	-742.3
75-79	8.2	0.0	74.4	17.4	25.5	-809.2
80-84	8.2	0.0	80.6	11.2	19.3	-884.9
85-89	8.2	0.0	84.7	7.1	15.3	-934.2
90-94	8.2	0.0	88.3	3.5	11.7	-978.2
95-100	8.2	0.0	91.8	0.0	8.2	-1,021.4

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

**Figure 13 (National food poverty 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 successful targeted (coverage) per non-poor household mistakenly targeted (leakage) , 2006 scorecard applied to 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	0.4	91.6	5.0	10.9:1
5-9	2.0	67.8	16.3	2.1:1
10-14	3.5	61.5	26.4	1.6:1
15-19	6.1	55.7	41.4	1.3:1
20-24	9.4	46.1	53.1	0.9:1
25-29	14.0	40.5	69.1	0.7:1
30-34	20.8	31.8	80.8	0.5:1
35-39	28.2	26.1	89.7	0.4:1
40-44	37.2	21.4	97.0	0.3:1
45-49	45.6	17.6	98.0	0.2:1
50-54	53.5	15.3	99.7	0.2:1
55-59	59.7	13.7	99.7	0.2:1
60-64	66.4	12.3	99.7	0.1:1
65-69	71.2	11.5	99.7	0.1:1
70-74	77.1	10.6	99.7	0.1:1
75-79	82.6	9.9	99.7	0.1:1
80-84	88.8	9.2	99.7	0.1:1
85-89	92.9	8.8	100.0	0.1:1
90-94	96.5	8.5	100.0	0.1:1
95-100	100.0	8.2	100.0	0.1:1

**USAID “Extreme” Poverty Line Tables**  
**for 2006 Scorecard Applied to 2006 Validation Sample**

**Figure 4 (USAID “Extreme” poverty 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	78.9
5–9	68.1
10–14	52.4
15–19	37.9
20–24	26.8
25–29	12.2
30–34	13.2
35–39	8.3
40–44	4.3
45–49	0.7
50–54	0.8
55–59	0.9
60–64	0.0
65–69	0.0
70–74	0.5
75–79	0.0
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Surveyed cases weighted to represent households in the Vietnam.

Based on the 2006 VHLSS.

**Figure 5 (USAID “Extreme” poverty line): Derivation of estimated poverty likelihoods associated with scores**

Score	Households below poverty line		All households at score		Poverty likelihood (estimated, %)
0–4	350	÷	444	=	78.9
5–9	1,038	÷	1,523	=	68.1
10–14	809	÷	1,544	=	52.4
15–19	975	÷	2,571	=	37.9
20–24	897	÷	3,351	=	26.8
25–29	554	÷	4,540	=	12.2
30–34	898	÷	6,791	=	13.2
35–39	617	÷	7,441	=	8.3
40–44	389	÷	8,956	=	4.3
45–49	58	÷	8,466	=	0.7
50–54	64	÷	7,830	=	0.8
55–59	57	÷	6,240	=	0.9
60–64	0	÷	6,713	=	0.0
65–69	0	÷	4,816	=	0.0
70–74	32	÷	5,896	=	0.5
75–79	0	÷	5,479	=	0.0
80–84	0	÷	6,198	=	0.0
85–89	0	÷	4,064	=	0.0
90–94	0	÷	3,607	=	0.0
95–100	0	÷	3,532	=	0.0

Surveyed cases weighted to represent households in the Vietnam.

Based on the 2006 VHLSS.

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

**Figure 7 (USAID “Extreme” poverty line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ( $n = 16,384$ ) from the validation sample, with confidence intervals, 2006 scorecard applied to validation sample**

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	-15.0	9.2	9.5	10.0
5-9	+21.2	5.9	7.1	9.8
10-14	+15.7	5.7	6.7	8.6
15-19	-1.7	4.4	5.2	6.7
20-24	+5.5	3.0	3.5	5.0
25-29	-10.3	6.5	6.7	7.3
30-34	+0.8	1.7	2.0	2.8
35-39	-0.5	1.4	1.7	2.2
40-44	-2.3	1.8	1.8	2.1
45-49	-0.2	0.4	0.4	0.6
50-54	-1.3	1.1	1.2	1.3
55-59	+0.6	0.2	0.2	0.3
60-64	+0.0	0.0	0.0	0.0
65-69	+0.0	0.0	0.0	0.0
70-74	+0.5	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	-0.4	0.4	0.4	0.5
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0



**Figure 9 (USAID “Extreme” poverty line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2006 scorecard applied to 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	37.2	66.5	81.9
4	-0.3	18.9	23.6	35.0
8	-0.5	13.1	16.4	26.4
16	-0.3	9.6	11.8	14.8
32	-0.2	6.3	7.9	10.2
64	-0.2	4.4	5.4	7.7
128	-0.1	3.2	3.8	5.4
256	-0.1	2.1	2.7	3.9
512	-0.1	1.5	1.8	2.3
1,024	-0.1	1.2	1.4	1.7
2,048	-0.1	0.8	0.9	1.2
4,096	-0.1	0.6	0.7	0.8
8,192	-0.1	0.4	0.5	0.6
16,384	-0.1	0.3	0.4	0.5

**Figure 12 (USAID “Extreme” poverty line): Households by targeting classification and score, along with “Total Accuracy” and BPAC, 2006 scorecard applied to 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	0.4	6.2	0.1	93.3	93.7	–87.3
5–9	1.1	5.5	0.8	92.6	93.7	–53.1
10–14	1.6	5.0	1.9	91.5	93.2	–22.0
15–19	2.6	4.0	3.5	89.9	92.5	+31.6
20–24	3.3	3.3	6.1	87.3	90.7	+7.8
25–29	4.4	2.2	9.6	83.8	88.2	–44.9
30–34	5.2	1.4	15.6	77.8	83.0	–135.8
35–39	5.8	0.8	22.4	71.0	76.8	–239.4
40–44	6.4	0.2	30.8	62.6	68.9	–366.8
45–49	6.4	0.2	39.2	54.2	60.7	–493.8
50–54	6.5	0.1	46.9	46.5	53.0	–610.8
55–59	6.6	0.0	53.1	40.3	46.8	–705.0
60–64	6.6	0.0	59.8	33.6	40.1	–806.7
65–69	6.6	0.0	64.7	28.7	35.3	–879.7
70–74	6.6	0.0	70.5	22.9	29.4	–969.0
75–79	6.6	0.0	76.0	17.4	23.9	–1,052.1
80–84	6.6	0.0	82.2	11.2	17.7	–1,146.0
85–89	6.6	0.0	86.3	7.1	13.7	–1,207.1
90–94	6.6	0.0	89.9	3.5	10.1	–1,261.8
95–100	6.6	0.0	93.4	0.0	6.6	–1,315.3

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

**Figure 13 (USAID “Extreme” poverty 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 successful targeted (coverage) per non-poor household mistakenly targeted (leakage) , 2006 scorecard applied to 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	0.4	88.1	5.9	7.4:1
5-9	2.0	57.3	17.1	1.3:1
10-14	3.5	46.5	24.8	0.9:1
15-19	6.1	42.8	39.5	0.7:1
20-24	9.4	35.5	50.7	0.6:1
25-29	14.0	31.5	66.8	0.5:1
30-34	20.8	25.1	78.9	0.3:1
35-39	28.2	20.6	88.0	0.3:1
40-44	37.2	17.1	96.3	0.2:1
45-49	45.6	14.1	97.6	0.2:1
50-54	53.5	12.2	99.2	0.1:1
55-59	59.7	11.0	99.6	0.1:1
60-64	66.4	9.9	99.6	0.1:1
65-69	71.2	9.2	99.6	0.1:1
70-74	77.1	8.5	99.6	0.1:1
75-79	82.6	8.0	99.6	0.1:1
80-84	88.8	7.4	99.6	0.1:1
85-89	92.9	7.1	100.0	0.1:1
90-94	96.5	6.8	100.0	0.1:1
95-100	100.0	6.6	100.0	0.1:1

**USD1.25/Day 2005 PPP Poverty Line Tables**  
**for 2006 Scorecard Applied to 2006 Validation Sample**

**Figure 4 (USD1.25/day 2005 PPP line): Estimated poverty likelihoods associated with scores**

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0-4	93.0
5-9	90.0
10-14	84.7
15-19	79.2
20-24	65.5
25-29	44.0
30-34	43.4
35-39	31.1
40-44	17.8
45-49	11.7
50-54	4.1
55-59	1.9
60-64	2.2
65-69	0.5
70-74	0.5
75-79	0.0
80-84	0.0
85-89	0.0
90-94	0.0
95-100	0.0

Surveyed cases weighted to represent households in the Vietnam.

Based on the 2006 VHLSS.

**Figure 5 (USD1.25/day 2005 PPP line): Derivation of estimated poverty likelihoods associated with scores**

Score	Households below poverty line		All households at score		Poverty likelihood (estimated, %)
0-4	413	÷	444	=	93.0
5-9	1,370	÷	1,523	=	90.0
10-14	1,308	÷	1,544	=	84.7
15-19	2,035	÷	2,571	=	79.2
20-24	2,195	÷	3,351	=	65.5
25-29	1,998	÷	4,540	=	44.0
30-34	2,949	÷	6,791	=	43.4
35-39	2,311	÷	7,441	=	31.1
40-44	1,594	÷	8,956	=	17.8
45-49	989	÷	8,466	=	11.7
50-54	322	÷	7,830	=	4.1
55-59	119	÷	6,240	=	1.9
60-64	150	÷	6,713	=	2.2
65-69	26	÷	4,816	=	0.5
70-74	32	÷	5,896	=	0.5
75-79	0	÷	5,479	=	0.0
80-84	0	÷	6,198	=	0.0
85-89	0	÷	4,064	=	0.0
90-94	0	÷	3,607	=	0.0
95-100	0	÷	3,532	=	0.0

Surveyed cases weighted to represent households in the Vietnam.

Based on the 2006 VHLSS.

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

**Figure 7 (USD1.25/day 2005 PPP line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ( $n = 16,384$ ) from the validation sample, with confidence intervals, 2006 scorecard applied to validation sample**

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	-7.0	3.5	3.5	3.5
5-9	+7.7	5.0	5.7	7.6
10-14	+0.3	4.3	5.1	6.7
15-19	+1.2	3.8	4.4	6.0
20-24	+5.1	3.5	4.2	6.0
25-29	-16.7	9.9	10.1	10.7
30-34	+9.0	2.5	3.1	4.1
35-39	+6.0	2.1	2.5	3.1
40-44	-5.7	3.8	4.0	4.4
45-49	+6.7	0.9	1.0	1.4
50-54	-1.3	1.2	1.4	1.8
55-59	-1.8	1.4	1.6	1.8
60-64	+2.2	0.0	0.0	0.0
65-69	+0.0	0.4	0.4	0.6
70-74	-0.1	0.4	0.5	0.6
75-79	+0.0	0.0	0.0	0.0
80-84	+0.0	0.0	0.0	0.0
85-89	-0.4	0.4	0.4	0.5
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

**Figure 9 (USD1.25/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2006 scorecard applied to 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	56.2	63.1	84.1
4	+0.3	24.5	31.0	43.6
8	+0.5	15.9	19.1	27.6
16	+0.6	11.7	13.7	17.9
32	+0.6	8.3	9.7	12.4
64	+0.5	5.7	7.1	9.2
128	+0.6	4.2	5.0	6.2
256	+0.5	2.9	3.4	4.4
512	+0.6	1.9	2.2	2.8
1,024	+0.6	1.5	1.7	2.2
2,048	+0.6	1.1	1.3	1.6
4,096	+0.6	0.7	0.9	1.1
8,192	+0.6	0.5	0.6	0.8
16,384	+0.6	0.4	0.5	0.6



**Figure 12 (USD1.25/day 2005 PPP line): Households by targeting classification and score, along with “Total Accuracy” and BPAC, 2006 scorecard applied to 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	0.4	16.9	0.0	82.6	83.1	–94.9
5–9	1.8	15.6	0.2	82.4	84.2	–78.5
10–14	3.1	14.3	0.4	82.2	85.3	–61.9
15–19	5.1	12.2	0.9	81.7	86.9	–35.3
20–24	7.1	10.2	2.3	80.4	87.5	–4.5
25–29	9.8	7.5	4.1	78.5	88.4	+37.2
30–34	12.2	5.2	8.6	74.1	86.3	+50.7
35–39	14.0	3.3	14.2	68.5	82.5	+18.4
40–44	16.1	1.2	21.0	61.6	77.8	–21.1
45–49	16.6	0.7	29.0	53.7	70.3	–67.0
50–54	17.1	0.3	36.4	46.2	63.3	–109.7
55–59	17.3	0.1	42.4	40.2	57.5	–144.5
60–64	17.3	0.1	49.1	33.5	50.8	–183.1
65–69	17.3	0.1	53.9	28.7	46.0	–210.7
70–74	17.3	0.0	59.8	22.9	40.2	–244.5
75–79	17.3	0.0	65.3	17.4	34.7	–276.0
80–84	17.3	0.0	71.5	11.2	28.5	–311.7
85–89	17.4	0.0	75.5	7.1	24.5	–335.0
90–94	17.4	0.0	79.1	3.5	20.9	–355.8
95–100	17.4	0.0	82.6	0.0	17.4	–376.1

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

**Figure 13 (USD1.25/day 2005 PPP 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 successful targeted (coverage) per non-poor household mistakenly targeted (leakage) , 2006 scorecard applied to 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	0.4	100.0	2.6	Only poor targeted
5-9	2.0	89.5	10.1	8.5:1
10-14	3.5	88.4	17.9	7.6:1
15-19	6.1	84.7	29.7	5.5:1
20-24	9.4	75.7	41.2	3.1:1
25-29	14.0	70.5	56.7	2.4:1
30-34	20.8	58.8	70.3	1.4:1
35-39	28.2	49.8	80.8	1.0:1
40-44	37.2	43.4	93.0	0.8:1
45-49	45.6	36.5	95.9	0.6:1
50-54	53.5	31.9	98.2	0.5:1
55-59	59.7	28.9	99.5	0.4:1
60-64	66.4	26.0	99.5	0.4:1
65-69	71.2	24.3	99.6	0.3:1
70-74	77.1	22.5	99.8	0.3:1
75-79	82.6	21.0	99.8	0.3:1
80-84	88.8	19.5	99.8	0.2:1
85-89	92.9	18.7	100.0	0.2:1
90-94	96.5	18.0	100.0	0.2:1
95-100	100.0	17.4	100.0	0.2:1

**USD1.75/Day 2005 PPP Poverty Line Tables**  
**for 2006 Scorecard Applied to 2006 Validation Sample**

**Figure 4 (USD1.75/day 2005 PPP line): Estimated poverty likelihoods associated with scores**

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0-4	100.0
5-9	96.5
10-14	97.7
15-19	96.1
20-24	89.4
25-29	79.5
30-34	82.0
35-39	70.3
40-44	52.0
45-49	42.8
50-54	25.2
55-59	16.4
60-64	14.1
65-69	10.8
70-74	5.2
75-79	3.6
80-84	0.5
85-89	0.0
90-94	0.0
95-100	0.0

Surveyed cases weighted to represent households in the Vietnam.

Based on the 2006 VHLSS.

**Figure 5 (USD1.75/day 2005 PPP line): Derivation of estimated poverty likelihoods associated with scores**

Score	Households below poverty line		All households at score		Poverty likelihood (estimated, %)
0-4	444	÷	444	=	100.0
5-9	1,470	÷	1,523	=	96.5
10-14	1,508	÷	1,544	=	97.7
15-19	2,472	÷	2,571	=	96.1
20-24	2,994	÷	3,351	=	89.4
25-29	3,608	÷	4,540	=	79.5
30-34	5,570	÷	6,791	=	82.0
35-39	5,233	÷	7,441	=	70.3
40-44	4,660	÷	8,956	=	52.0
45-49	3,626	÷	8,466	=	42.8
50-54	1,970	÷	7,830	=	25.2
55-59	1,025	÷	6,240	=	16.4
60-64	945	÷	6,713	=	14.1
65-69	519	÷	4,816	=	10.8
70-74	307	÷	5,896	=	5.2
75-79	199	÷	5,479	=	3.6
80-84	28	÷	6,198	=	0.5
85-89	0	÷	4,064	=	0.0
90-94	0	÷	3,607	=	0.0
95-100	0	÷	3,532	=	0.0

Surveyed cases weighted to represent households in the Vietnam.

Based on the 2006 VHLSS.

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

**Figure 7 (USD1.75/day 2005 PPP line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ( $n = 16,384$ ) from the validation sample, with confidence intervals, 2006 scorecard applied to 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	-3.5	1.7	1.7	1.7
10-14	-2.3	1.1	1.1	1.1
15-19	+2.4	2.6	3.2	3.9
20-24	-7.1	4.2	4.4	4.5
25-29	-11.0	6.3	6.5	6.8
30-34	+7.0	2.2	2.6	3.3
35-39	+7.7	2.5	2.9	3.6
40-44	+0.1	2.1	2.5	3.6
45-49	+2.3	2.2	2.6	3.5
50-54	-7.1	4.8	4.9	5.2
55-59	-2.9	2.5	2.7	3.1
60-64	+4.5	1.5	1.8	2.4
65-69	-0.2	1.9	2.3	2.9
70-74	+2.6	0.8	1.0	1.2
75-79	+0.5	0.9	1.0	1.2
80-84	-1.2	0.9	0.9	1.1
85-89	-0.4	0.4	0.4	0.5
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

**Figure 9 (USD1.75/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2006 scorecard applied to 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	59.2	77.0	85.6
4	-0.2	29.0	35.2	48.7
8	-0.0	20.6	24.6	31.1
16	+0.0	14.3	16.8	22.3
32	+0.1	10.0	11.8	16.5
64	+0.1	7.1	8.5	11.5
128	+0.2	5.0	5.9	7.6
256	+0.2	3.6	4.3	5.2
512	+0.2	2.3	2.8	3.6
1,024	+0.2	1.7	2.1	2.9
2,048	+0.2	1.3	1.5	1.8
4,096	+0.2	0.9	1.0	1.4
8,192	+0.2	0.6	0.7	1.0
16,384	+0.2	0.4	0.5	0.7

**Figure 12 (USD1.75/day 2005 PPP line): Households by targeting classification and score, along with “Total Accuracy” and BPAC, 2006 scorecard applied to 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	0.4	36.2	0.0	63.4	63.8	-97.6
5-9	2.0	34.6	0.0	63.4	65.4	-89.3
10-14	3.5	33.1	0.0	63.4	66.9	-80.8
15-19	6.0	30.6	0.1	63.3	69.3	-67.1
20-24	9.2	27.4	0.2	63.2	72.4	-49.1
25-29	13.3	23.3	0.7	62.7	76.0	-25.6
30-34	18.3	18.3	2.4	61.0	79.3	+6.8
35-39	22.9	13.7	5.3	58.1	80.9	+39.5
40-44	27.5	9.1	9.6	53.8	81.3	+73.7
45-49	31.0	5.6	14.6	48.8	79.8	+60.1
50-54	33.7	3.0	19.8	43.6	77.2	+45.9
55-59	34.8	1.8	24.9	38.5	73.3	+32.0
60-64	35.5	1.1	30.9	32.5	67.9	+15.5
65-69	36.0	0.6	35.2	28.2	64.2	+3.9
70-74	36.2	0.4	40.9	22.5	58.7	-11.7
75-79	36.4	0.2	46.2	17.2	53.7	-26.0
80-84	36.6	0.0	52.2	11.2	47.8	-42.6
85-89	36.6	0.0	56.2	7.1	43.8	-53.6
90-94	36.6	0.0	59.9	3.5	40.1	-63.5
95-100	36.6	0.0	63.4	0.0	36.6	-73.1

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



**Figure 13 (USD1.75/day 2005 PPP 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 successful targeted (coverage) per non-poor household mistakenly targeted (leakage) , 2006 scorecard applied to 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	0.4	100.0	1.2	Only poor targeted
5-9	2.0	100.0	5.4	Only poor targeted
10-14	3.5	100.0	9.6	Only poor targeted
15-19	6.1	98.4	16.3	60.4:1
20-24	9.4	97.7	25.2	42.3:1
25-29	14.0	95.0	36.2	19.0:1
30-34	20.8	88.4	50.1	7.6:1
35-39	28.2	81.1	62.5	4.3:1
40-44	37.2	74.1	75.2	2.9:1
45-49	45.6	67.9	84.7	2.1:1
50-54	53.5	63.0	91.9	1.7:1
55-59	59.7	58.3	95.0	1.4:1
60-64	66.4	53.4	96.9	1.1:1
65-69	71.2	50.6	98.4	1.0:1
70-74	77.1	47.0	98.9	0.9:1
75-79	82.6	44.1	99.5	0.8:1
80-84	88.8	41.2	99.9	0.7:1
85-89	92.9	39.4	100.0	0.7:1
90-94	96.5	38.0	100.0	0.6:1
95-100	100.0	36.6	100.0	0.6:1

**USD2.50/Day 2005 PPP Poverty Line Tables**  
**for 2006 Scorecard Applied to 2006 Validation Sample**

**Figure 4 (USD2.50/day 2005 PPP line): Estimated poverty likelihoods associated with scores**

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0-4	100.0
5-9	100.0
10-14	100.0
15-19	100.0
20-24	96.7
25-29	95.6
30-34	95.0
35-39	91.2
40-44	86.6
45-49	75.8
50-54	64.9
55-59	57.1
60-64	49.4
65-69	48.5
70-74	32.7
75-79	19.0
80-84	8.1
85-89	7.2
90-94	0.8
95-100	1.4

Surveyed cases weighted to represent households in the Vietnam.

Based on the 2006 VHLSS.

**Figure 5 (USD2.50/day 2005 PPP line): Derivation of estimated poverty likelihoods associated with scores**

Score	Households below poverty line		All households at score		Poverty likelihood (estimated, %)
0-4	444	÷	444	=	100.0
5-9	1,523	÷	1,523	=	100.0
10-14	1,544	÷	1,544	=	100.0
15-19	2,571	÷	2,571	=	100.0
20-24	3,241	÷	3,351	=	96.7
25-29	4,341	÷	4,540	=	95.6
30-34	6,448	÷	6,791	=	95.0
35-39	6,783	÷	7,441	=	91.2
40-44	7,751	÷	8,956	=	86.6
45-49	6,418	÷	8,466	=	75.8
50-54	5,085	÷	7,830	=	64.9
55-59	3,560	÷	6,240	=	57.1
60-64	3,313	÷	6,713	=	49.4
65-69	2,334	÷	4,816	=	48.5
70-74	1,928	÷	5,896	=	32.7
75-79	1,041	÷	5,479	=	19.0
80-84	501	÷	6,198	=	8.1
85-89	292	÷	4,064	=	7.2
90-94	27	÷	3,607	=	0.8
95-100	48	÷	3,532	=	1.4

Surveyed cases weighted to represent households in the Vietnam.

Based on the 2006 VHLSS.

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

**Figure 7 (USD2.50/day 2005 PPP line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ( $n = 16,384$ ) from the validation sample, with confidence intervals, 2006 scorecard applied to 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	+0.0	0.0	0.0	0.0
10-14	+0.0	0.0	0.0	0.0
15-19	+1.2	0.8	0.9	1.2
20-24	-3.3	1.6	1.6	1.6
25-29	-2.3	1.6	1.6	1.8
30-34	-1.6	1.2	1.3	1.4
35-39	+1.3	1.4	1.6	2.3
40-44	-1.1	1.4	1.6	2.2
45-49	+1.9	2.1	2.5	3.3
50-54	-10.3	6.2	6.3	6.6
55-59	-8.1	5.3	5.5	6.0
60-64	+5.7	2.6	3.2	4.0
65-69	+9.9	3.1	3.6	4.9
70-74	+8.1	2.3	2.7	3.6
75-79	-2.6	2.5	2.7	3.7
80-84	-0.4	1.5	1.8	2.3
85-89	+0.9	1.5	1.7	2.4
90-94	-0.4	0.6	0.7	1.0
95-100	+1.4	0.0	0.0	0.0

**Figure 9 (USD2.50/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2006 scorecard applied to 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	60.7	80.3	93.4
4	-0.5	30.9	36.3	49.6
8	-0.3	21.5	25.1	33.3
16	-0.3	15.1	17.4	24.8
32	-0.2	10.8	12.5	16.8
64	-0.1	7.7	9.1	12.2
128	-0.1	5.4	6.4	8.2
256	-0.1	3.5	4.2	6.1
512	-0.1	2.4	2.9	4.0
1,024	-0.1	1.9	2.2	2.9
2,048	-0.1	1.3	1.6	2.0
4,096	-0.1	0.9	1.0	1.4
8,192	-0.1	0.6	0.8	1.0
16,384	-0.1	0.4	0.5	0.8

**Figure 12 (USD2.50/day 2005 PPP line): Households by targeting classification and score, along with “Total Accuracy” and BPAC, 2006 scorecard applied to 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	0.4	59.4	0.0	40.2	40.6	–98.5
5–9	2.0	57.9	0.0	40.2	42.1	–93.4
10–14	3.5	56.3	0.0	40.2	43.7	–88.3
15–19	6.0	53.8	0.0	40.1	46.2	–79.7
20–24	9.4	50.4	0.0	40.1	49.5	–68.5
25–29	13.8	46.0	0.1	40.0	53.9	–53.5
30–34	20.3	39.5	0.4	39.7	60.1	–31.3
35–39	27.0	32.9	1.2	38.9	65.9	–7.8
40–44	34.8	25.1	2.4	37.8	72.6	+20.2
45–49	41.3	18.6	4.4	35.8	77.0	+45.2
50–54	47.1	12.8	6.4	33.8	80.9	+68.0
55–59	51.0	8.8	8.7	31.5	82.5	+85.1
60–64	54.0	5.8	12.4	27.8	81.8	+79.3
65–69	55.9	3.9	15.3	24.9	80.8	+74.4
70–74	57.5	2.3	19.6	20.6	78.1	+67.3
75–79	58.8	1.0	23.7	16.4	75.3	+60.3
80–84	59.4	0.4	29.4	10.8	70.2	+50.9
85–89	59.8	0.1	33.1	7.1	66.8	+44.7
90–94	59.8	0.0	36.6	3.5	63.4	+38.8
95–100	59.8	0.0	40.2	0.0	59.8	+32.9

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

**Figure 13 (USD2.50/day 2005 PPP 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 successful targeted (coverage) per non-poor household mistakenly targeted (leakage) , 2006 scorecard applied to 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	0.4	100.0	0.7	Only poor targeted
5-9	2.0	100.0	3.3	Only poor targeted
10-14	3.5	100.0	5.9	Only poor targeted
15-19	6.1	99.5	10.1	187.1:1
20-24	9.4	99.7	15.7	290.8:1
25-29	14.0	99.1	23.1	104.9:1
30-34	20.8	98.0	34.0	49.1:1
35-39	28.2	95.7	45.1	22.2:1
40-44	37.2	93.6	58.1	14.6:1
45-49	45.6	90.4	68.9	9.4:1
50-54	53.5	88.1	78.7	7.4:1
55-59	59.7	85.5	85.3	5.9:1
60-64	66.4	81.4	90.3	4.4:1
65-69	71.2	78.5	93.4	3.7:1
70-74	77.1	74.6	96.2	2.9:1
75-79	82.6	71.2	98.3	2.5:1
80-84	88.8	66.9	99.3	2.0:1
85-89	92.9	64.4	99.9	1.8:1
90-94	96.5	62.0	100.0	1.6:1
95-100	100.0	59.8	100.0	1.5:1



**Molisa Poverty Line Tables**  
**for 2006 Scorecard Applied to 2006 Validation Sample**

**Figure 4 (MOLISA 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	83.1
5-9	90.0
10-14	67.7
15-19	67.8
20-24	47.5
25-29	26.6
30-34	27.1
35-39	15.7
40-44	8.9
45-49	4.5
50-54	3.7
55-59	0.9
60-64	2.3
65-69	1.0
70-74	0.5
75-79	1.2
80-84	0.0
85-89	0.0
90-94	0.0
95-100	0.0

Surveyed cases weighted to represent households in the Vietnam.

Based on the 2006 VHLSS.

**Figure 5 (MOLISA line): Derivation of estimated poverty likelihoods associated with scores**

Score	Households below poverty line		All households at score		Poverty likelihood (estimated, %)
0-4	369	÷	444	=	83.1
5-9	1,370	÷	1,523	=	90.0
10-14	1,045	÷	1,544	=	67.7
15-19	1,743	÷	2,571	=	67.8
20-24	1,592	÷	3,351	=	47.5
25-29	1,205	÷	4,540	=	26.6
30-34	1,839	÷	6,791	=	27.1
35-39	1,170	÷	7,441	=	15.7
40-44	800	÷	8,956	=	8.9
45-49	384	÷	8,466	=	4.5
50-54	291	÷	7,830	=	3.7
55-59	57	÷	6,240	=	0.9
60-64	156	÷	6,713	=	2.3
65-69	48	÷	4,816	=	1.0
70-74	32	÷	5,896	=	0.5
75-79	66	÷	5,479	=	1.2
80-84	0	÷	6,198	=	0.0
85-89	0	÷	4,064	=	0.0
90-94	0	÷	3,607	=	0.0
95-100	0	÷	3,532	=	0.0

Surveyed cases weighted to represent households in the Vietnam.

Based on the 2006 VHLSS.

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

**Figure 7 (MOLISA line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ( $n = 16,384$ ) from the validation sample, with confidence intervals, 2006 scorecard applied to validation sample**

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	-16.9	8.5	8.5	8.5
5-9	+16.5	5.3	6.4	8.6
10-14	+4.6	5.2	6.4	8.0
15-19	+3.0	4.2	5.1	6.7
20-24	+1.2	3.7	4.4	6.0
25-29	-19.2	11.2	11.6	12.2
30-34	+4.6	2.2	2.8	3.5
35-39	+2.2	1.7	2.0	2.6
40-44	-6.1	3.9	4.0	4.3
45-49	-0.8	0.9	1.1	1.4
50-54	-2.0	1.6	1.7	1.9
55-59	-1.1	1.0	1.1	1.3
60-64	+2.3	0.0	0.0	0.0
65-69	+1.0	0.0	0.0	0.0
70-74	+0.5	0.0	0.0	0.0
75-79	+0.8	0.3	0.4	0.5
80-84	+0.0	0.0	0.0	0.0
85-89	-0.4	0.4	0.4	0.5
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

**Figure 9 (MOLISA line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2006 scorecard applied to validation sample**

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	-0.4	50.3	65.9	81.6
4	-0.8	21.5	28.1	41.5
8	-0.7	15.3	18.9	26.5
16	-0.6	10.8	13.4	17.3
32	-0.5	7.9	9.5	13.5
64	-0.7	5.6	7.0	9.1
128	-0.5	4.1	4.7	6.7
256	-0.6	2.7	3.2	4.4
512	-0.5	1.8	2.1	2.7
1,024	-0.5	1.4	1.7	2.2
2,048	-0.5	1.1	1.2	1.6
4,096	-0.6	0.7	0.8	1.1
8,192	-0.6	0.5	0.6	0.8
16,384	-0.6	0.4	0.5	0.6

**Figure 12 (MOLISA line): Households by targeting classification and score, along with “Total Accuracy” and BPAC, 2006 scorecard applied to 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	0.4	12.3	0.0	87.2	87.7	-93.0
5-9	1.6	11.2	0.4	86.9	88.5	-72.0
10-14	2.6	10.2	0.9	86.3	88.9	-52.3
15-19	4.3	8.5	1.8	85.4	89.7	-18.8
20-24	5.8	6.9	3.6	83.6	89.4	+19.5
25-29	7.8	4.9	6.2	81.1	88.9	+51.8
30-34	9.3	3.4	11.4	75.8	85.1	+10.5
35-39	10.3	2.4	17.9	69.4	79.7	-40.1
40-44	11.7	1.1	25.5	61.7	73.4	-99.9
45-49	12.2	0.6	33.5	53.8	66.0	-162.1
50-54	12.6	0.2	40.9	46.4	59.0	-220.2
55-59	12.7	0.1	47.0	40.2	52.9	-268.3
60-64	12.7	0.1	53.7	33.5	46.2	-320.9
65-69	12.7	0.1	58.5	28.7	41.4	-358.6
70-74	12.7	0.1	64.4	22.8	35.5	-404.8
75-79	12.7	0.0	69.9	17.4	30.1	-447.5
80-84	12.7	0.0	76.1	11.2	23.9	-496.0
85-89	12.8	0.0	80.1	7.1	19.9	-527.7
90-94	12.8	0.0	83.7	3.5	16.3	-555.9
95-100	12.8	0.0	87.2	0.0	12.8	-583.6

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

**Figure 13 (MOLISA 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 successful targeted (coverage) per non-poor household mistakenly targeted (leakage), 2006 scorecard applied to 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	0.4	100.0	3.5	Only poor targeted
5-9	2.0	81.6	12.6	4.4:1
10-14	3.5	73.6	20.2	2.8:1
15-19	6.1	70.5	33.6	2.4:1
20-24	9.4	61.6	45.6	1.6:1
25-29	14.0	55.9	61.2	1.3:1
30-34	20.8	45.0	73.2	0.8:1
35-39	28.2	36.6	80.9	0.6:1
40-44	37.2	31.4	91.3	0.5:1
45-49	45.6	26.7	95.4	0.4:1
50-54	53.5	23.6	98.7	0.3:1
55-59	59.7	21.3	99.5	0.3:1
60-64	66.4	19.1	99.5	0.2:1
65-69	71.2	17.8	99.5	0.2:1
70-74	77.1	16.5	99.5	0.2:1
75-79	82.6	15.4	99.8	0.2:1
80-84	88.8	14.3	99.8	0.2:1
85-89	92.9	13.7	100.0	0.2:1
90-94	96.5	13.2	100.0	0.2:1
95-100	100.0	12.8	100.0	0.1:1

**National Poverty Line Tables  
for 2006 Scorecard Applied to 2004 VHLSS**



**Figure 7 (National line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ( $n = 16,384$ ) from the validation sample, with confidence intervals, 2006 scorecard applied to 2004 VHLSS**

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	+10.7	6.5	7.8	10.3
5-9	+4.7	3.7	4.1	4.9
10-14	+5.6	3.8	4.5	6.0
15-19	+10.3	3.2	3.9	5.0
20-24	+6.5	3.0	3.6	4.7
25-29	+0.8	2.5	2.9	4.1
30-34	+6.7	2.0	2.4	3.0
35-39	+5.2	1.7	2.0	2.9
40-44	+0.7	1.2	1.5	2.1
45-49	+0.5	1.0	1.1	1.5
50-54	-0.1	0.9	1.1	1.4
55-59	-0.2	0.6	0.7	0.9
60-64	+0.8	0.4	0.4	0.5
65-69	+0.3	0.2	0.3	0.4
70-74	+0.5	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 9 (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, 2006 scorecard applied to 2004 VHLSS**

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	+0.9	61.2	75.1	92.9
4	+2.1	22.8	28.9	44.2
8	+2.3	16.8	19.8	26.9
16	+2.2	12.2	14.8	19.2
32	+2.1	8.3	10.1	13.0
64	+2.0	6.3	7.3	9.2
128	+2.1	4.4	5.3	7.0
256	+2.2	3.0	3.6	4.7
512	+2.2	2.0	2.3	3.1
1,024	+2.2	1.5	1.8	2.3
2,048	+2.1	1.1	1.3	1.7
4,096	+2.1	0.8	0.9	1.1
8,192	+2.1	0.6	0.7	0.9
16,384	+2.1	0.4	0.5	0.6

**Figure 12 (National line): Households by targeting classification and score, along with “Total Accuracy” and BPAC, 2006 scorecard applied to 2004 VHLSS**

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	0.6	16.4	0.1	82.8	83.4	-92.1
5-9	2.4	14.7	0.4	82.5	84.9	-69.7
10-14	4.4	12.7	1.3	81.7	86.0	-41.5
15-19	6.9	10.1	2.9	80.1	87.0	-1.7
20-24	9.4	7.7	5.4	77.6	86.9	+41.4
25-29	11.7	5.4	9.8	73.1	84.8	+42.4
30-34	14.0	3.0	16.5	66.5	80.5	+3.4
35-39	15.3	1.8	22.9	60.0	75.3	-34.5
40-44	16.3	0.7	32.0	51.0	67.3	-87.5
45-49	16.7	0.4	39.9	43.0	59.7	-134.1
50-54	16.9	0.1	47.4	35.5	52.5	-178.0
55-59	17.0	0.0	53.1	29.8	46.8	-211.6
60-64	17.0	0.0	58.2	24.7	41.8	-241.4
65-69	17.1	0.0	62.2	20.7	37.8	-265.0
70-74	17.1	0.0	66.5	16.5	33.5	-289.9
75-79	17.1	0.0	70.5	12.5	29.5	-313.4
80-84	17.1	0.0	74.5	8.4	25.5	-337.0
85-89	17.1	0.0	77.7	5.2	22.3	-355.7
90-94	17.1	0.0	80.3	2.7	19.7	-370.7
95-100	17.1	0.0	82.9	0.0	17.1	-386.4

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

**Figure 13 (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 successful targeted (coverage) per non-poor household mistakenly targeted (leakage), 2006 scorecard applied to 2004 VHLSS

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	0.7	84.5	3.6	5.5:1
5-9	2.8	85.5	13.9	5.9:1
10-14	5.6	77.4	25.5	3.4:1
15-19	9.8	70.6	40.7	2.4:1
20-24	14.7	63.5	54.9	1.7:1
25-29	21.5	54.3	68.5	1.2:1
30-34	30.5	46.0	82.3	0.9:1
35-39	38.2	40.0	89.7	0.7:1
40-44	48.3	33.8	95.7	0.5:1
45-49	56.6	29.5	97.8	0.4:1
50-54	64.4	26.3	99.3	0.4:1
55-59	70.2	24.3	99.8	0.3:1
60-64	75.3	22.6	99.9	0.3:1
65-69	79.3	21.5	100.0	0.3:1
70-74	83.5	20.4	100.0	0.3:1
75-79	87.5	19.5	100.0	0.2:1
80-84	91.6	18.6	100.0	0.2:1
85-89	94.8	18.0	100.0	0.2:1
90-94	97.3	17.5	100.0	0.2:1
95-100	100.0	17.1	100.0	0.2:1

**National Food Poverty Line Tables**  
**for 2006 Scorecard Applied to 2004 VHLSS**

**Figure 7 (Food line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ( $n = 16,384$ ) from the validation sample, with confidence intervals, 2006 scorecard applied to 2004 VHLSS**

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	+2.7	6.8	8.5	10.6
5-9	-3.6	3.7	4.4	5.9
10-14	+0.1	4.0	4.8	6.6
15-19	+4.3	3.2	3.8	5.2
20-24	-8.9	5.9	6.2	6.7
25-29	-10.9	6.6	6.7	7.3
30-34	-3.1	2.4	2.6	3.0
35-39	-1.2	1.5	1.8	2.5
40-44	-2.0	1.6	1.7	1.8
45-49	-1.7	1.3	1.3	1.4
50-54	-1.2	0.9	1.0	1.1
55-59	+0.5	0.3	0.4	0.5
60-64	-0.1	0.1	0.1	0.1
65-69	+0.5	0.0	0.0	0.0
70-74	+0.5	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 9 (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, 2006 scorecard applied to 2004 VHLSS**

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	-1.9	56.9	71.1	86.9
4	-1.5	21.3	26.3	37.6
8	-1.5	15.0	18.3	24.9
16	-1.6	10.6	12.9	17.4
32	-1.7	7.4	8.6	11.8
64	-1.8	5.6	6.8	8.7
128	-1.7	4.1	4.9	6.3
256	-1.7	2.8	3.3	4.3
512	-1.7	1.7	2.1	2.8
1,024	-1.7	1.4	1.6	2.1
2,048	-1.7	1.0	1.2	1.6
4,096	-1.7	0.7	0.8	1.1
8,192	-1.7	0.5	0.6	0.8
16,384	-1.7	0.4	0.4	0.5

**Figure 12 (Food line): Households by targeting classification and score, along with “Total Accuracy” and BPAC, 2006 scorecard applied to 2004 VHLSS**

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	0.6	13.0	0.2	86.2	86.8	–90.5
5–9	2.3	11.3	0.5	85.9	88.1	–62.9
10–14	4.0	9.6	1.6	84.8	88.8	–29.2
15–19	6.1	7.5	3.7	82.7	88.7	+17.0
20–24	8.0	5.5	6.7	79.7	87.8	+50.7
25–29	9.8	3.8	11.7	74.7	84.5	+13.9
30–34	11.6	2.0	18.9	67.5	79.1	–39.0
35–39	12.5	1.1	25.7	60.7	73.2	–89.1
40–44	13.2	0.4	35.1	51.3	64.6	–158.0
45–49	13.4	0.2	43.2	43.2	56.7	–217.6
50–54	13.6	0.0	50.8	35.6	49.2	–273.6
55–59	13.6	0.0	56.6	29.8	43.4	–316.1
60–64	13.6	0.0	61.7	24.7	38.3	–353.6
65–69	13.6	0.0	65.7	20.7	34.3	–383.3
70–74	13.6	0.0	69.9	16.5	30.1	–414.5
75–79	13.6	0.0	74.0	12.5	26.0	–444.0
80–84	13.6	0.0	78.0	8.4	22.0	–473.6
85–89	13.6	0.0	81.2	5.2	18.8	–497.0
90–94	13.6	0.0	83.7	2.7	16.3	–515.8
95–100	13.6	0.0	86.4	0.0	13.6	–535.6

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



**Figure 13 (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 successful targeted (coverage) per non-poor household mistakenly targeted (leakage), 2006 scorecard applied to 2004 VHLSS

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	0.7	78.1	4.2	3.6:1
5-9	2.8	81.3	16.6	4.3:1
10-14	5.6	71.2	29.5	2.5:1
15-19	9.8	61.9	44.7	1.6:1
20-24	14.7	54.6	59.2	1.2:1
25-29	21.5	45.6	72.1	0.8:1
30-34	30.5	38.1	85.4	0.6:1
35-39	38.2	32.8	92.2	0.5:1
40-44	48.3	27.4	97.2	0.4:1
45-49	56.6	23.7	98.8	0.3:1
50-54	64.4	21.1	99.7	0.3:1
55-59	70.2	19.4	100.0	0.2:1
60-64	75.3	18.1	100.0	0.2:1
65-69	79.3	17.1	100.0	0.2:1
70-74	83.5	16.3	100.0	0.2:1
75-79	87.5	15.5	100.0	0.2:1
80-84	91.6	14.8	100.0	0.2:1
85-89	94.8	14.3	100.0	0.2:1
90-94	97.3	14.0	100.0	0.2:1
95-100	100.0	13.6	100.0	0.2:1

**USAID “Extreme” Poverty Line Tables  
for 2006 Scorecard Applied to 2004 VHLSS**

**Figure 7 (USAID “extreme” line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ( $n = 16,384$ ) from the validation sample, with confidence intervals, 2006 scorecard applied to 2004 VHLSS**

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	+14.3	7.5	8.9	12.4
5-9	+1.0	4.8	5.6	7.4
10-14	+15.2	4.0	4.7	6.5
15-19	+7.0	3.1	3.6	4.8
20-24	+4.6	2.4	3.0	3.6
25-29	-2.2	2.1	2.2	2.9
30-34	+2.4	1.4	1.7	2.1
35-39	+1.5	1.2	1.4	1.9
40-44	+1.8	0.7	0.8	0.9
45-49	-0.6	0.6	0.6	0.8
50-54	+0.2	0.4	0.5	0.6
55-59	+0.8	0.2	0.2	0.2
60-64	-0.1	0.1	0.1	0.1
65-69	+0.0	0.0	0.0	0.0
70-74	+0.5	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 9 (USAID “extreme” line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2006 scorecard applied to 2004 VHLSS**

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	+2.3	50.0	69.6	82.6
4	+1.5	20.0	23.5	35.7
8	+1.7	13.1	17.1	24.4
16	+1.7	9.2	11.1	16.0
32	+1.6	6.4	7.8	11.5
64	+1.4	4.7	5.6	7.2
128	+1.3	3.4	4.1	5.3
256	+1.3	2.3	2.7	3.5
512	+1.3	1.5	1.7	2.2
1,024	+1.3	1.1	1.3	1.7
2,048	+1.3	0.8	1.0	1.4
4,096	+1.3	0.6	0.7	0.9
8,192	+1.3	0.4	0.5	0.7
16,384	+1.3	0.3	0.3	0.4

**Figure 12 (USAID “extreme” line): Households by targeting classification and score, along with “Total Accuracy” and BPAC, 2006 scorecard applied to 2004 VHLSS**

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	0.5	7.8	0.2	91.5	92.0	-85.4
5-9	1.9	6.4	0.9	90.9	92.7	-43.6
10-14	2.9	5.3	2.7	89.1	92.0	+3.8
15-19	4.3	4.0	5.6	86.2	90.5	+32.3
20-24	5.4	2.9	9.4	82.4	87.8	-13.8
25-29	6.3	1.9	15.2	76.6	82.9	-84.4
30-34	7.3	1.0	23.2	68.5	75.8	-182.1
35-39	7.8	0.4	30.4	61.3	69.1	-269.7
40-44	8.1	0.2	40.2	51.5	59.6	-388.6
45-49	8.2	0.1	48.4	43.3	51.5	-488.3
50-54	8.2	0.0	56.1	35.6	43.9	-581.9
55-59	8.2	0.0	61.9	29.8	38.1	-652.4
60-64	8.2	0.0	67.0	24.7	33.0	-714.3
65-69	8.2	0.0	71.1	20.7	28.9	-763.2
70-74	8.2	0.0	75.3	16.5	24.7	-814.7
75-79	8.2	0.0	79.3	12.5	20.7	-863.5
80-84	8.2	0.0	83.3	8.4	16.7	-912.4
85-89	8.2	0.0	86.5	5.2	13.5	-951.0
90-94	8.2	0.0	89.1	2.7	10.9	-982.1
95-100	8.2	0.0	91.8	0.0	8.2	-1,014.8

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

**Figure 13 (USAID “extreme” 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 successful targeted (coverage) per non-poor household mistakenly targeted (leakage), 2006 scorecard applied to 2004 VHLSS

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	0.7	65.8	5.8	1.9:1
5-9	2.8	67.0	22.6	2.0:1
10-14	5.6	52.1	35.6	1.1:1
15-19	9.8	43.3	51.7	0.8:1
20-24	14.7	36.5	65.3	0.6:1
25-29	21.5	29.4	76.8	0.4:1
30-34	30.5	23.9	88.4	0.3:1
35-39	38.2	20.4	94.8	0.3:1
40-44	48.3	16.7	97.9	0.2:1
45-49	56.6	14.4	99.3	0.2:1
50-54	64.4	12.8	99.8	0.1:1
55-59	70.2	11.7	99.9	0.1:1
60-64	75.3	10.9	100.0	0.1:1
65-69	79.3	10.4	100.0	0.1:1
70-74	83.5	9.9	100.0	0.1:1
75-79	87.5	9.4	100.0	0.1:1
80-84	91.6	9.0	100.0	0.1:1
85-89	94.8	8.7	100.0	0.1:1
90-94	97.3	8.5	100.0	0.1:1
95-100	100.0	8.2	100.0	0.1:1

**USD1.25/day 2005 PPP Poverty Line Tables**  
**for 2006 Scorecard Applied to 2004 VHLSS**

**Figure 7 (USD1.25/day 2005 PPP line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ( $n = 16,384$ ) from the validation sample, with confidence intervals, 2006 scorecard applied to 2004 VHLSS**

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	+3.8	5.3	6.5	8.7
5-9	-3.2	2.8	2.9	3.8
10-14	+2.5	2.9	3.5	4.6
15-19	+5.4	3.0	3.4	4.5
20-24	+2.9	2.9	3.6	4.7
25-29	-5.0	3.8	4.0	4.6
30-34	+4.5	2.2	2.5	3.3
35-39	+2.2	2.2	2.5	3.5
40-44	-2.3	1.9	2.1	2.6
45-49	+2.2	1.4	1.6	2.0
50-54	-2.3	1.8	1.9	2.2
55-59	-1.4	1.3	1.4	1.5
60-64	+0.1	0.8	1.0	1.2
65-69	-0.3	0.6	0.7	0.9
70-74	+0.5	0.0	0.0	0.0
75-79	+0.0	0.0	0.0	0.0
80-84	-0.1	0.1	0.2	0.2
85-89	+0.0	0.0	0.0	0.0
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0



**Figure 9 (USD1.25/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2006 scorecard applied to 2004 VHLSS**

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	-2.1	56.5	73.9	87.5
4	+0.0	26.0	33.1	44.5
8	-0.1	18.9	22.0	30.1
16	+0.2	13.4	15.7	20.7
32	+0.2	9.4	11.5	14.8
64	+0.2	6.8	8.4	10.5
128	+0.3	4.8	5.9	8.1
256	+0.3	3.5	4.0	5.4
512	+0.3	2.3	2.7	3.5
1,024	+0.3	1.7	2.0	2.6
2,048	+0.3	1.2	1.4	2.0
4,096	+0.3	0.8	1.0	1.3
8,192	+0.3	0.6	0.7	1.0
16,384	+0.3	0.4	0.5	0.6

**Figure 12 (USD1.25/day 2005 PPP line): Households by targeting classification and score, along with “Total Accuracy” and BPAC, 2006 scorecard applied to 2004 VHLSS**

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	0.7	23.2	0.1	76.1	76.7	–94.2
5–9	2.6	21.3	0.2	75.9	78.5	–77.6
10–14	4.9	19.0	0.7	75.4	80.3	–55.9
15–19	8.0	15.8	1.8	74.3	82.4	–25.1
20–24	11.2	12.7	3.6	72.6	83.7	+8.6
25–29	14.5	9.4	7.0	69.1	83.6	+50.8
30–34	18.0	5.9	12.5	63.6	81.6	+47.5
35–39	20.2	3.6	18.0	58.1	78.4	+24.5
40–44	22.2	1.6	26.1	50.1	72.3	–9.2
45–49	23.0	0.8	33.6	42.6	65.6	–40.8
50–54	23.5	0.3	40.8	35.3	58.8	–71.2
55–59	23.7	0.1	46.5	29.7	53.4	–94.7
60–64	23.8	0.0	51.5	24.7	48.5	–115.7
65–69	23.8	0.0	55.4	20.7	44.6	–132.4
70–74	23.8	0.0	59.7	16.5	40.3	–150.2
75–79	23.8	0.0	63.7	12.4	36.3	–167.0
80–84	23.9	0.0	67.7	8.4	32.3	–183.8
85–89	23.9	0.0	70.9	5.2	29.1	–197.2
90–94	23.9	0.0	73.5	2.7	26.5	–207.9
95–100	23.9	0.0	76.1	0.0	23.9	–219.1

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

**Figure 13 (USD1.25/day 2005 PPP 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 successful targeted (coverage) per non-poor household mistakenly targeted (leakage), 2006 scorecard applied to 2004 VHLSS

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	0.7	90.7	2.8	9.7:1
5-9	2.8	92.5	10.8	12.3:1
10-14	5.6	87.2	20.5	6.8:1
15-19	9.8	81.7	33.7	4.5:1
20-24	14.7	75.7	46.8	3.1:1
25-29	21.5	67.3	60.7	2.1:1
30-34	30.5	59.0	75.4	1.4:1
35-39	38.2	52.9	84.8	1.1:1
40-44	48.3	46.0	93.2	0.9:1
45-49	56.6	40.7	96.5	0.7:1
50-54	64.4	36.5	98.5	0.6:1
55-59	70.2	33.8	99.4	0.5:1
60-64	75.3	31.6	99.8	0.5:1
65-69	79.3	30.1	100.0	0.4:1
70-74	83.5	28.6	100.0	0.4:1
75-79	87.5	27.2	100.0	0.4:1
80-84	91.6	26.1	100.0	0.4:1
85-89	94.8	25.2	100.0	0.3:1
90-94	97.3	24.5	100.0	0.3:1
95-100	100.0	23.9	100.0	0.3:1

**USD1.75/day 2005 PPP Poverty Line Tables**  
**for 2006 Scorecard Applied to 2004 VHLSS**

**Figure 7 (USD1.75/day 2005 PPP line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ( $n = 16,384$ ) from the validation sample, with confidence intervals, 2006 scorecard applied to 2004 VHLSS**

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	-3.1	1.7	1.7	1.7
10-14	-1.2	0.9	1.0	1.2
15-19	+2.3	1.7	2.0	2.6
20-24	-1.9	1.8	2.1	2.9
25-29	-4.2	3.0	3.2	3.4
30-34	+7.6	2.0	2.3	3.0
35-39	+5.4	2.3	2.8	3.5
40-44	-5.5	3.8	4.0	4.4
45-49	+1.6	2.2	2.7	3.5
50-54	-3.3	2.7	2.9	3.2
55-59	-2.9	2.5	2.8	3.4
60-64	-0.5	2.1	2.5	3.2
65-69	+3.5	1.8	2.1	2.6
70-74	+1.6	1.2	1.4	1.9
75-79	+2.7	0.6	0.7	0.9
80-84	-0.1	0.3	0.4	0.5
85-89	+0.0	0.0	0.0	0.0
90-94	-0.2	0.3	0.3	0.3
95-100	+0.0	0.0	0.0	0.0

**Figure 9 (USD1.75/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2006 scorecard applied to 2004 VHLSS**

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	-0.8	63.8	78.4	87.6
4	-0.3	31.7	38.3	50.8
8	-0.3	21.4	26.1	33.8
16	+0.2	15.1	17.6	21.6
32	+0.0	10.6	13.3	16.7
64	+0.0	7.7	9.3	12.9
128	+0.1	5.3	6.3	8.1
256	+0.2	3.8	4.5	5.6
512	+0.2	2.5	3.0	4.1
1,024	+0.2	1.9	2.3	3.1
2,048	+0.2	1.4	1.7	2.3
4,096	+0.2	1.0	1.1	1.5
8,192	+0.2	0.7	0.8	1.0
16,384	+0.2	0.5	0.6	0.7

**Figure 12 (USD1.75/day 2005 PPP line): Households by targeting classification and score, along with “Total Accuracy” and BPAC, 2006 scorecard applied to 2004 VHLSS**

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	0.7	44.7	0.0	54.6	55.3	–96.8
5–9	2.8	42.6	0.0	54.6	57.3	–87.8
10–14	5.6	39.8	0.0	54.5	60.1	–75.3
15–19	9.5	35.9	0.3	54.3	63.9	–57.3
20–24	14.0	31.4	0.7	53.9	67.9	–36.6
25–29	19.7	25.7	1.8	52.8	72.5	–9.2
30–34	26.5	19.0	4.1	50.5	77.0	+25.4
35–39	31.5	13.9	6.7	47.9	79.4	+53.6
40–44	37.3	8.1	11.0	43.6	81.0	+75.9
45–49	40.7	4.7	15.9	38.7	79.4	+65.0
50–54	43.0	2.4	21.4	33.2	76.2	+52.9
55–59	44.2	1.3	26.0	28.6	72.7	+42.7
60–64	44.9	0.5	30.4	24.2	69.1	+33.1
65–69	45.2	0.2	34.1	20.5	65.6	+24.9
70–74	45.3	0.1	38.2	16.4	61.7	+15.9
75–79	45.4	0.0	42.2	12.4	57.8	+7.1
80–84	45.4	0.0	46.2	8.4	53.8	–1.6
85–89	45.4	0.0	49.3	5.2	50.6	–8.7
90–94	45.4	0.0	51.9	2.7	48.1	–14.3
95–100	45.4	0.0	54.6	0.0	45.4	–20.2

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

**Figure 13 (USD1.75/day 2005 PPP 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 successful targeted (coverage) per non-poor household mistakenly targeted (leakage), 2006 scorecard applied to 2004 VHLSS

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	0.7	100.0	1.6	Only poor targeted
5-9	2.8	99.7	6.1	295.8:1
10-14	5.6	99.2	12.3	120.9:1
15-19	9.8	97.2	21.0	34.3:1
20-24	14.7	95.3	30.9	20.2:1
25-29	21.5	91.8	43.4	11.1:1
30-34	30.5	86.7	58.2	6.5:1
35-39	38.2	82.5	69.5	4.7:1
40-44	48.3	77.3	82.2	3.4:1
45-49	56.6	71.9	89.7	2.6:1
50-54	64.4	66.8	94.6	2.0:1
55-59	70.2	62.9	97.2	1.7:1
60-64	75.3	59.6	98.8	1.5:1
65-69	79.3	57.0	99.5	1.3:1
70-74	83.5	54.3	99.8	1.2:1
75-79	87.5	51.8	99.9	1.1:1
80-84	91.6	49.6	100.0	1.0:1
85-89	94.8	47.9	100.0	0.9:1
90-94	97.3	46.7	100.0	0.9:1
95-100	100.0	45.4	100.0	0.8:1



**USD2.50/day 2005 PPP Poverty Line Tables**  
**for 2006 Scorecard Applied to 2004 VHLSS**

**Figure 7 (USD2.50/day 2005 PPP line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ( $n = 16,384$ ) from the validation sample, with confidence intervals, 2006 scorecard applied to 2004 VHLSS**

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	+0.0	0.0	0.0	0.0
10-14	+0.6	0.5	0.7	0.8
15-19	+0.8	0.7	0.8	1.0
20-24	-2.7	1.5	1.5	1.6
25-29	-0.9	1.0	1.1	1.3
30-34	+0.9	1.1	1.2	1.6
35-39	+1.8	1.5	1.8	2.3
40-44	+0.7	1.5	1.7	2.1
45-49	-0.8	2.0	2.4	2.9
50-54	-2.2	2.3	2.6	3.6
55-59	+2.2	2.8	3.4	4.6
60-64	+3.2	3.0	3.6	4.7
65-69	+17.3	3.2	3.6	4.6
70-74	+7.3	3.0	3.5	4.5
75-79	+8.6	2.0	2.4	3.2
80-84	-2.2	2.1	2.3	3.1
85-89	+4.2	1.1	1.3	1.7
90-94	+0.4	0.4	0.5	0.6
95-100	+0.6	0.5	0.6	0.8

**Figure 9 (USD2.50/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2006 scorecard applied to 2004 VHLSS**

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	+1.6	53.9	73.0	90.7
4	+2.2	28.2	33.0	46.1
8	+1.9	20.4	25.3	32.0
16	+1.9	14.0	17.7	23.8
32	+1.9	10.5	12.7	17.3
64	+1.8	7.1	8.7	12.4
128	+1.8	5.2	6.0	8.3
256	+1.9	3.5	4.3	5.4
512	+1.8	2.4	2.9	3.9
1,024	+1.8	1.9	2.3	2.9
2,048	+1.7	1.3	1.6	2.0
4,096	+1.8	0.9	1.0	1.4
8,192	+1.7	0.7	0.8	0.9
16,384	+1.7	0.5	0.5	0.7

**Figure 12 (USD2.50/day 2005 PPP line): Households by targeting classification and score, along with “Total Accuracy” and BPAC, 2006 scorecard applied to 2004 VHLSS**

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	0.7	65.4	0.0	33.9	34.6	–97.8
5–9	2.8	63.3	0.0	33.9	36.7	–91.6
10–14	5.6	60.5	0.0	33.9	39.5	–83.0
15–19	9.8	56.3	0.0	33.8	43.6	–70.3
20–24	14.7	51.5	0.1	33.8	48.5	–55.5
25–29	21.2	44.9	0.3	33.6	54.8	–35.4
30–34	29.6	36.5	0.9	33.0	62.7	–9.0
35–39	36.6	29.5	1.7	32.2	68.8	+13.2
40–44	45.3	20.9	3.0	30.9	76.1	+41.5
45–49	51.6	14.5	5.0	28.9	80.6	+63.7
50–54	56.8	9.3	7.5	26.4	83.2	+83.3
55–59	60.1	6.0	10.0	23.9	84.0	+84.9
60–64	62.5	3.6	12.7	21.1	83.7	+80.7
65–69	63.8	2.3	15.5	18.4	82.3	+76.6
70–74	65.0	1.2	18.6	15.3	80.3	+71.9
75–79	65.5	0.7	22.1	11.8	77.3	+66.6
80–84	65.9	0.2	25.6	8.2	74.2	+61.2
85–89	66.1	0.1	28.7	5.2	71.3	+56.6
90–94	66.1	0.0	31.2	2.7	68.7	+52.8
95–100	66.1	0.0	33.9	0.0	66.1	+48.8

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

**Figure 13 (USD2.50/day 2005 PPP 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 successful targeted (coverage) per non-poor household mistakenly targeted (leakage), 2006 scorecard applied to 2004 VHLSS**

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	0.7	100.0	1.1	Only poor targeted
5-9	2.8	100.0	4.2	Only poor targeted
10-14	5.6	99.7	8.5	303.1:1
15-19	9.8	99.5	14.8	220.3:1
20-24	14.7	99.5	22.2	181.8:1
25-29	21.5	98.5	32.0	67.3:1
30-34	30.5	97.2	44.8	34.5:1
35-39	38.2	95.7	55.3	22.1:1
40-44	48.3	93.7	68.4	15.0:1
45-49	56.6	91.2	78.1	10.4:1
50-54	64.4	88.3	86.0	7.6:1
55-59	70.2	85.7	91.0	6.0:1
60-64	75.3	83.1	94.6	4.9:1
65-69	79.3	80.5	96.5	4.1:1
70-74	83.5	77.8	98.2	3.5:1
75-79	87.5	74.8	99.0	3.0:1
80-84	91.6	72.0	99.7	2.6:1
85-89	94.8	69.7	99.9	2.3:1
90-94	97.3	67.9	99.9	2.1:1
95-100	100.0	66.1	100.0	2.0:1

**MOLISA Poverty Line Tables**  
**for 2006 Scorecard Applied to 2004 VHLSS**

**Figure 7 (MOLISA line): Bootstrapped differences between estimated and true poverty likelihoods for households in a large sample ( $n = 16,384$ ) from the validation sample, with confidence intervals, 2006 scorecard applied to 2004 VHLSS**

Score	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
0-4	+6.9	6.8	8.5	10.6
5-9	+6.6	3.7	4.3	5.6
10-14	+1.0	3.9	4.6	6.1
15-19	+16.0	3.1	3.7	5.0
20-24	+4.3	2.8	3.3	5.0
25-29	-3.9	3.2	3.4	3.8
30-34	+4.5	1.8	2.1	2.9
35-39	+1.0	1.7	2.1	2.6
40-44	+0.1	1.2	1.4	1.8
45-49	+0.7	0.9	1.0	1.4
50-54	+1.0	0.7	0.9	1.2
55-59	-0.2	0.5	0.6	0.8
60-64	+2.0	0.4	0.4	0.5
65-69	+0.8	0.2	0.2	0.3
70-74	+0.5	0.0	0.0	0.0
75-79	+1.2	0.0	0.0	0.0
80-84	+0.0	0.0	0.0	0.0
85-89	+0.0	0.0	0.0	0.0
90-94	+0.0	0.0	0.0	0.0
95-100	+0.0	0.0	0.0	0.0

**Figure 9 (MOLISA line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2006 scorecard applied to 2004 VHLSS**

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/- percentage points)		
		90-percent	95-percent	99-percent
1	+1.1	60.5	76.0	91.4
4	+1.5	23.1	29.3	42.8
8	+1.5	16.7	21.1	26.3
16	+1.5	11.7	13.7	18.4
32	+1.4	8.0	9.4	12.8
64	+1.4	6.0	7.0	9.2
128	+1.5	4.0	5.0	6.8
256	+1.5	2.8	3.4	4.6
512	+1.5	1.9	2.3	2.8
1,024	+1.5	1.4	1.7	2.3
2,048	+1.5	1.0	1.3	1.7
4,096	+1.5	0.8	0.9	1.1
8,192	+1.5	0.5	0.7	0.9
16,384	+1.5	0.4	0.5	0.6



**Figure 12 (MOLISA line): Households by targeting classification and score, along with “Total Accuracy” and BPAC, 2006 scorecard applied to 2004 VHLSS**

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	0.6	14.9	0.2	84.4	85.0	-91.6
5-9	2.3	13.2	0.5	84.1	86.4	-67.2
10-14	4.2	11.3	1.4	83.1	87.3	-36.5
15-19	6.4	9.0	3.4	81.2	87.6	+5.2
20-24	8.6	6.9	6.2	78.4	87.0	+51.0
25-29	10.6	4.8	10.9	73.7	84.3	+29.5
30-34	12.7	2.7	17.8	66.7	79.4	-15.3
35-39	13.9	1.6	24.3	60.2	74.1	-57.7
40-44	14.8	0.7	33.5	51.0	65.8	-117.0
45-49	15.1	0.3	41.5	43.1	58.2	-168.7
50-54	15.3	0.1	49.0	35.5	50.9	-217.4
55-59	15.4	0.0	54.8	29.8	45.2	-254.5
60-64	15.4	0.0	59.8	24.7	40.2	-287.4
65-69	15.4	0.0	63.8	20.7	36.2	-313.4
70-74	15.4	0.0	68.1	16.5	31.9	-340.9
75-79	15.4	0.0	72.1	12.5	27.9	-366.9
80-84	15.4	0.0	76.1	8.4	23.9	-393.0
85-89	15.4	0.0	79.3	5.2	20.7	-413.6
90-94	15.4	0.0	81.9	2.7	18.1	-430.1
95-100	15.4	0.0	84.6	0.0	15.4	-447.5

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

**Figure 13 (MOLISA 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 successful targeted (coverage) per non-poor household mistakenly targeted (leakage), 2006 scorecard applied to 2004 VHLSS**

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	0.7	78.1	3.7	3.6:1
5-9	2.8	82.2	14.8	4.6:1
10-14	5.6	74.6	27.1	2.9:1
15-19	9.8	65.4	41.6	1.9:1
20-24	14.7	58.2	55.6	1.4:1
25-29	21.5	49.4	68.7	1.0:1
30-34	30.5	41.6	82.2	0.7:1
35-39	38.2	36.3	89.9	0.6:1
40-44	48.3	30.6	95.7	0.4:1
45-49	56.6	26.7	97.9	0.4:1
50-54	64.4	23.8	99.3	0.3:1
55-59	70.2	22.0	99.8	0.3:1
60-64	75.3	20.5	99.9	0.3:1
65-69	79.3	19.5	100.0	0.2:1
70-74	83.5	18.5	100.0	0.2:1
75-79	87.5	17.6	100.0	0.2:1
80-84	91.6	16.9	100.0	0.2:1
85-89	94.8	16.3	100.0	0.2:1
90-94	97.3	15.9	100.0	0.2:1
95-100	100.0	15.4	100.0	0.2:1

**Poverty Lines and Poverty Rates,  
by Region,  
by Urban/Rural, and  
by Household-Level/Person-Level**

**Figure A1: Poverty lines and poverty rates, by region and by urban/rural, at the household level, 2006**

		Poverty line (dong/person/day) and poverty rate (%)													
Region	Line or rate	National		National Food		USAID 'Extreme'		International 2005 PPP						MOLISA	
		Urban	Rural	Urban	Rural	Urban	Rural	\$1.25/day		\$1.75/day		\$2.50/day		Urban	Rural
								Urban	Rural	Urban	Rural	Urban	Rural		
Red River Delta	Line	7,601	7,063	6,386	5,934	5,895	6,057	8,367	7,775	11,714	10,885	16,734	15,550	8,341	6,904
	Rate	2.4	10.4	1.2	4.9	1.2	5.4	3.5	14.9	9.9	40.0	20.7	71.2	4.3	7.7
North East	Line	6,752	6,363	5,673	5,346	5,497	5,625	7,433	7,005	10,406	9,806	14,865	14,009	7,409	6,220
	Rate	4.7	25.5	2.8	14.8	1.9	12.1	6.0	32.9	12.5	59.3	27.1	81.4	8.3	21.7
North West	Line	7,153	6,932	6,010	5,824	6,675	4,870	7,874	7,630	11,024	10,682	15,749	15,261	7,850	6,775
	Rate	2.6	51.3	0.9	38.8	1.7	23.0	2.6	60.7	16.0	79.1	22.4	92.1	7.8	47.1
North Central Coast	Line	6,984	6,040	5,868	5,075	6,316	5,242	7,688	6,649	10,764	9,309	15,376	13,299	7,664	5,904
	Rate	2.0	29.2	0.0	19.1	0.5	13.5	3.0	35.0	8.3	63.0	35.1	86.2	4.8	25.3
South Central Coast	Line	7,522	6,845	6,320	5,751	6,270	5,790	8,280	7,535	11,592	10,549	16,560	15,071	8,254	6,691
	Rate	1.6	16.0	0.4	8.8	0.9	8.1	2.6	21.3	12.4	50.7	31.5	77.0	5.0	12.5
Central Highlands	Line	7,262	6,528	6,101	5,485	5,084	4,890	7,994	7,186	11,192	10,061	15,988	14,372	7,969	6,381
	Rate	11.5	29.2	8.9	21.3	4.0	12.5	14.4	35.0	23.9	51.8	40.8	74.2	16.9	25.7
South East	Line	8,652	7,438	7,269	6,249	5,787	5,572	9,524	8,187	13,334	11,462	19,049	16,374	9,494	7,270
	Rate	1.3	8.5	0.8	4.4	0.7	4.1	2.1	11.1	6.1	25.9	18.5	50.9	3.1	6.9
Mekong River Delta	Line	7,686	6,720	6,458	5,646	5,696	5,921	8,461	7,397	11,845	10,356	16,921	14,794	8,434	6,568
	Rate	4.4	10.3	2.4	5.0	2.1	5.4	7.0	14.8	16.5	36.8	38.3	63.8	9.3	8.0
<b>All Vietnam</b>	Line	7,782	6,734	6,538	5,658	5,825	5,686	8,566	7,413	11,992	10,378	17,132	14,826	8,539	6,582
	Rate	3.0	17.6	1.7	10.4	1.3	8.4	4.3	22.7	11.0	46.5	26.5	72.4	6.0	14.6

Source: 2006 VHLSS

**Figure A2: Poverty lines and poverty rates, by region and by urban/rural, at the person level, 2006**

		Poverty line (dong/person/day) and poverty rate (%)													
Region	Line or rate	National		National Food		USAID 'Extreme'		International 2005 PPP						MOLISA	
		Urban	Rural	Urban	Rural	Urban	Rural	\$1.25/day		\$1.75/day		\$2.50/day		Urban	Rural
								Urban	Rural	Urban	Rural	Urban	Rural		
Red River Delta	Line	7,601	7,063	6,386	5,934	5,895	6,057	8,367	7,775	11,714	10,885	16,734	15,550	8,341	6,904
	Rate	2.4	11.0	1.0	5.0	1.0	5.5	3.7	15.6	10.1	42.6	21.3	73.1	4.4	8.0
North East	Line	6,752	6,363	5,673	5,346	5,497	5,625	7,433	7,005	10,406	9,806	14,865	14,009	7,409	6,220
	Rate	5.4	29.9	3.7	17.6	2.7	14.9	6.9	37.4	13.8	63.3	28.1	83.8	9.5	25.3
North West	Line	7,153	6,932	6,010	5,824	6,675	4,870	7,874	7,630	11,024	10,682	15,749	15,261	7,850	6,775
	Rate	3.0	56.4	1.2	44.4	2.1	28.3	3.0	66.5	17.4	83.1	24.0	94.3	9.9	52.5
North Central Coast	Line	6,984	6,040	5,868	5,075	6,316	5,242	7,688	6,649	10,764	9,309	15,376	13,299	7,664	5,904
	Rate	3.9	33.1	0.0	22.4	0.6	16.4	5.2	38.9	10.2	67.5	37.8	88.7	6.8	28.9
South Central Coast	Line	7,522	6,845	6,320	5,751	6,270	5,790	8,280	7,535	11,592	10,549	16,560	15,071	8,254	6,691
	Rate	2.3	17.1	0.8	9.1	1.5	8.6	3.3	23.6	12.8	53.0	33.5	77.9	5.8	13.2
Central Highlands	Line	7,262	6,528	6,101	5,485	5,084	4,890	7,994	7,186	11,192	10,061	15,988	14,372	7,969	6,381
	Rate	14.9	34.4	12.4	26.4	6.4	16.7	17.6	39.9	26.4	56.6	43.9	77.6	19.8	31.3
South East	Line	8,652	7,438	7,269	6,249	5,787	5,572	9,524	8,187	13,334	11,462	19,049	16,374	9,494	7,270
	Rate	2.1	9.9	1.1	5.2	0.9	5.0	3.2	12.5	7.6	28.1	21.6	53.3	4.4	8.2
Mekong River Delta	Line	7,686	6,720	6,458	5,646	5,696	5,921	8,461	7,397	11,845	10,356	16,921	14,794	8,434	6,568
	Rate	4.8	11.8	3.0	5.6	2.6	6.0	7.8	16.5	18.6	39.9	42.6	67.1	10.5	9.0
<b>All Vietnam</b>	Line	7,790	6,727	6,545	5,652	5,820	5,663	8,575	7,405	12,005	10,367	17,150	14,810	8,548	6,575
	Rate	3.9	20.4	2.2	12.5	1.8	10.2	5.4	25.8	12.4	50.1	29.1	74.9	7.2	17.1

Source: 2006 VHLSS

**Figure A3: Poverty lines and poverty rates, by region and by urban/rural, at the household level, 2004**

		Poverty line (dong/person/day) and poverty rate (%)													
Region	Line or rate	National		National Food		USAID 'Extreme'		International 2005 PPP						MOLISA	
		Urban	Rural	Urban	Rural	Urban	Rural	\$1.25/day		\$1.75/day		\$2.50/day		Urban	Rural
								Urban	Rural	Urban	Rural	Urban	Rural		
Red River Delta	Line	5,786	5,394	5,340	4,979	5,007	4,881	6,576	6,130	9,206	8,583	13,151	12,261	6,886	5,120
	Rate	2.8	14.5	1.8	11.0	1.6	7.5	3.8	22.6	14.4	50.3	25.6	78.0	6.2	11.9
North East	Line	5,734	5,544	5,293	5,117	4,641	4,371	6,517	6,301	9,123	8,821	13,034	12,601	6,824	5,262
	Rate	5.3	30.2	3.4	24.5	2.3	14.1	7.3	41.2	16.8	68.7	36.8	85.2	10.1	25.9
North West	Line	6,040	5,861	5,574	5,410	4,858	3,695	6,864	6,661	9,609	9,325	13,728	13,322	7,188	5,563
	Rate	8.9	60.6	7.6	54.3	4.5	28.6	16.4	70.3	30.3	85.2	47.9	93.7	18.3	55.2
North Central Coast	Line	5,711	5,544	5,271	5,117	5,597	4,340	6,491	6,301	9,087	8,821	12,981	12,601	6,797	5,262
	Rate	1.8	33.7	0.4	27.7	0.9	15.9	3.1	43.7	21.5	69.4	39.2	87.6	7.0	29.1
South Central Coast	Line	5,763	5,665	5,319	5,229	4,386	4,366	6,550	6,438	9,169	9,013	13,099	12,876	6,858	5,377
	Rate	3.9	22.6	3.4	18.2	1.1	10.6	6.4	30.9	16.5	62.0	35.0	84.0	6.4	19.2
Central Highlands	Line	6,028	5,936	5,564	5,479	3,639	3,886	6,851	6,746	9,591	9,444	13,702	13,492	7,174	5,634
	Rate	9.3	35.8	7.0	31.4	3.3	17.7	11.2	47.0	22.9	67.4	50.4	86.7	13.1	32.2
South East	Line	5,936	5,878	5,479	5,426	4,383	4,685	6,746	6,681	9,444	9,353	13,492	13,361	7,064	5,580
	Rate	0.6	8.8	0.6	7.2	0.2	4.1	0.8	12.9	2.9	32.0	11.0	60.9	1.3	7.2
Mekong River Delta	Line	5,792	5,775	5,346	5,330	4,885	4,803	6,582	6,563	9,215	9,188	13,165	13,125	6,893	5,481
	Rate	6.0	15.8	4.6	11.3	3.6	7.7	11.0	24.1	26.8	51.2	48.5	75.6	13.9	12.1
<b>All Vietnam</b>	Line	5,841	5,626	5,391	5,193	4,658	4,579	6,638	6,394	9,294	8,951	13,276	12,788	6,951	5,340
	Rate	3.3	22.0	2.4	17.6	1.6	10.6	5.1	30.6	14.2	56.7	28.9	79.5	6.8	18.6

Source: 2004 VHLSS

**Figure A4: Poverty lines and poverty rates, by region and by urban/rural, at the person level, 2004**

		Poverty line (dong/person/day) and poverty rate (%)													
Region	Line or rate	National		National Food		USAID 'Extreme'		International 2005 PPP						MOLISA	
		Urban	Rural	Urban	Rural	Urban	Rural	\$1.25/day		\$1.75/day		\$2.50/day		Urban	Rural
								Urban	Rural	Urban	Rural	Urban	Rural		
Red River Delta	Line	5,786	5,394	5,340	4,979	5,007	4,881	6,576	6,130	9,206	8,583	13,151	12,261	6,886	5,120
	Rate	2.0	15.0	1.1	11.4	1.0	7.5	3.2	23.4	15.0	51.6	26.6	80.2	5.7	12.4
North East	Line	5,734	5,544	5,293	5,117	4,641	4,371	6,517	6,301	9,123	8,821	13,034	12,601	6,824	5,262
	Rate	5.8	34.8	4.1	28.7	2.7	17.3	8.2	46.0	18.5	72.8	40.0	87.5	11.7	30.4
North West	Line	6,040	5,861	5,574	5,410	4,858	3,695	6,864	6,661	9,609	9,325	13,728	13,322	7,188	5,563
	Rate	11.9	65.5	10.6	59.5	6.3	32.9	20.6	74.7	36.9	88.4	52.4	95.8	22.1	60.3
North Central Coast	Line	5,711	5,544	5,271	5,117	5,597	4,340	6,491	6,301	9,087	8,821	12,981	12,601	6,797	5,262
	Rate	2.4	36.4	0.6	30.4	1.8	18.2	3.5	47.1	24.3	73.4	44.3	89.8	7.7	31.8
South Central Coast	Line	5,763	5,665	5,319	5,229	4,386	4,366	6,550	6,438	9,169	9,013	13,099	12,876	6,858	5,377
	Rate	4.0	25.0	3.7	20.6	1.8	12.6	6.3	33.6	18.0	65.5	37.1	86.2	6.3	21.4
Central Highlands	Line	6,028	5,936	5,564	5,479	3,639	3,886	6,851	6,746	9,591	9,444	13,702	13,492	7,174	5,634
	Rate	11.6	41.3	9.2	36.6	4.8	21.0	13.2	53.0	24.3	72.4	53.3	89.7	14.6	37.7
South East	Line	5,936	5,878	5,479	5,426	4,383	4,685	6,746	6,681	9,444	9,353	13,492	13,361	7,064	5,580
	Rate	0.7	10.9	0.7	8.7	0.3	5.4	0.9	15.9	3.7	36.9	11.9	66.2	1.6	8.7
Mekong River Delta	Line	5,792	5,775	5,346	5,330	4,885	4,803	6,582	6,563	9,215	9,188	13,165	13,125	6,893	5,481
	Rate	6.6	18.1	4.8	13.1	3.8	9.1	12.3	27.2	29.7	54.9	52.1	78.9	16.1	14.2
<b>All Vietnam</b>	Line	5,845	5,637	5,394	5,203	4,643	4,561	6,642	6,406	9,299	8,968	13,284	12,812	6,955	5,350
	Rate	3.6	25.0	2.7	20.4	1.8	12.5	5.5	34.2	15.6	60.4	31.0	82.5	7.5	21.4

Source: 2004 VHLSS