POVERTY PROFILES

Serbia National Poverty Analysis Workshop
March 31 – April 4, 2008

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PLAN OF THE LECTURE

1) The Many Facets of a Poverty Profile
2) Robustness Analysis
3) Poverty Comparisons
A poverty profile shows how a measure of poverty varies across subgroups of a population (e.g. region of residence) and compares key characteristics of the poor versus non-poor.

Main purposes:
1. to identify poverty patterns
2. to formulate poverty reduction strategies
3. to monitor poverty changes
POVERTY PROFILE
questions addressed

- Poverty profiles help answer questions such as:
  1. **how many** are the poor?
  2. **who** are the poor?
  3. **where** do they live?
  4. **what economic sectors** they depend on?
  5. **do they have access to social services**?
  6. ...

- Poverty profiles are highly **sensitive** to the choice of the method for setting poverty lines and poverty measures...
## Poverty Profiles

Methods matter

### Table 2. Alternative Poverty Measures for Indonesia, 1990

<table>
<thead>
<tr>
<th>Poverty measure</th>
<th>Area</th>
<th>Food only</th>
<th>Food plus nonfood</th>
<th>FEI method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head-count index (percent)</td>
<td>Indonesia</td>
<td>7.93</td>
<td>19.65</td>
<td>15.08</td>
</tr>
<tr>
<td></td>
<td>Urban</td>
<td>2.80</td>
<td>10.67</td>
<td>16.75</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>10.20</td>
<td>23.58</td>
<td>14.33</td>
</tr>
<tr>
<td>Poverty gap index (percent)</td>
<td>Indonesia</td>
<td>0.97</td>
<td>3.46</td>
<td>2.42</td>
</tr>
<tr>
<td></td>
<td>Urban</td>
<td>0.31</td>
<td>1.67</td>
<td>3.23</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>1.26</td>
<td>4.25</td>
<td>2.06</td>
</tr>
<tr>
<td>Foster-Greer-Thorbecke $P_2$ index</td>
<td>Indonesia</td>
<td>0.18</td>
<td>0.87</td>
<td>0.66</td>
</tr>
<tr>
<td>(x100)</td>
<td>Urban</td>
<td>0.06</td>
<td>0.40</td>
<td>0.94</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>0.24</td>
<td>1.08</td>
<td>0.53</td>
</tr>
</tbody>
</table>

*Source: For estimates based on the CBN method, authors’ calculations from BPS price data and 1990 SUFENAS data tapes; for estimates based on the FEI method, BPS (1992).*
Croatia: Living Standards Assessment
Volume 1: Promoting Social Inclusion and Regional Equity

November 2006

Poverty Reduction and Economic Management Unit
Europe and Central Asia Region
POVERTY PROFILE
facet 1: graphs (poverty rates by pop. subgroup)

Figure 6 – Poverty Incidence in Croatia by Region

- Zagreb
- Adriatic North
- Adriatic South
- Central
- Eastern

Headcount Poverty Ratio (%)
0 5 10 11.1 15 20
National Average
POVERTY PROFILE
facet 2: graphs (pop. shares accounted for)

Figure 7 – Distribution of Poverty by Region
POVERTY PROFILE
 facet 3: poor versus non-poor persons

Figure 7 – Expenditure Patterns of the Poor and the Nonpoor

- Food: 53% (poor), 37% (nonpoor)
- Other: 17% (poor), 10% (nonpoor)
- Transport and communication: 15% (poor), 8% (nonpoor)
- Utilities: 20% (poor), 13% (nonpoor)
- Clothing: 7% (poor), 3% (nonpoor)
- Durables: 5% (poor), 2% (nonpoor)
- Liqueur and tobacco: 5% (poor), 4% (nonpoor)
POVERTY PROFILE
facet 4: tables

Table 1: Poverty Incidence in Montenegro

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>National absolute poverty line in €/month/equivalent adult</td>
<td>144.68</td>
<td></td>
</tr>
<tr>
<td>Poverty Rate (%)</td>
<td>11.3</td>
<td>11.3</td>
</tr>
<tr>
<td>95% Confidence Interval</td>
<td>[8.5, 14.1]</td>
<td>[8.8, 13.8]</td>
</tr>
<tr>
<td>Poverty Gap (%)</td>
<td>2.1</td>
<td>1.9</td>
</tr>
<tr>
<td>Poverty Severity (%)</td>
<td>0.7</td>
<td>0.6</td>
</tr>
<tr>
<td>Poverty line as a % of average consumption</td>
<td>52.6</td>
<td>53.6</td>
</tr>
<tr>
<td>Average consumption of the poor as a % of average consumption</td>
<td>42.8</td>
<td>44.4</td>
</tr>
<tr>
<td>Average deficit (%)</td>
<td>18.7</td>
<td>17.2</td>
</tr>
<tr>
<td>Estimated population</td>
<td>622,851</td>
<td>625,142</td>
</tr>
<tr>
<td>Estimated number of the poor</td>
<td>70,495</td>
<td>70,686</td>
</tr>
</tbody>
</table>

Note: Poverty line is expressed in monthly terms in 2006 prices. Source: Team estimates using the 2005 and 2006 HBS.

Source: Nestic (2008), Welfare Analysis in Montenegro using the Household Budget Survey Series, mimeo.
In 2006, 8.8% of the population of Serbia was classified as poor.

Central Serbia accounts for 63% of national poverty incidence: Vojvodina 26.5%, Belgrade 10.5%.

Poor hh tend to have larger-than-average size, high child-adult ratios, illiterate breadwinners.

And so forth.

### POVERTY PROFILE

**facet 6: poverty risks**

<table>
<thead>
<tr>
<th>Subgroup FGT index estimates, $FGT(a)$</th>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>urban</strong></td>
<td>a=0</td>
<td>0.66667</td>
<td>0.37500</td>
<td>0.23958</td>
</tr>
<tr>
<td><strong>rural</strong></td>
<td>a=0</td>
<td>0.50000</td>
<td>0.25000</td>
<td>0.13000</td>
</tr>
<tr>
<td><strong>urban</strong></td>
<td>a=2</td>
<td>0.23958</td>
<td>0.13000</td>
<td>0.07790</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Subgroup poverty 'share', $S_k(v_k.FGT_k(a))/FGT(a)$</th>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>urban</strong></td>
<td>a=0</td>
<td>0.66667</td>
<td>0.69231</td>
<td>0.73436</td>
</tr>
<tr>
<td><strong>rural</strong></td>
<td>a=0</td>
<td>0.33333</td>
<td>0.30769</td>
<td>0.26564</td>
</tr>
<tr>
<td><strong>urban</strong></td>
<td>a=2</td>
<td>0.73436</td>
<td>0.26564</td>
<td>0.20845</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Subgroup poverty 'risk' = $FGT_k(a)/FGT(a) = S_k/v_k$</th>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>urban</strong></td>
<td>a=0</td>
<td>1.11111</td>
<td>1.15385</td>
<td>1.22393</td>
</tr>
<tr>
<td><strong>rural</strong></td>
<td>a=0</td>
<td>0.83333</td>
<td>0.76923</td>
<td>0.66411</td>
</tr>
<tr>
<td><strong>urban</strong></td>
<td>a=2</td>
<td>1.22393</td>
<td>0.66411</td>
<td>0.56891</td>
</tr>
</tbody>
</table>
POVERTY PROFILE
facet 7: special reports

- After identifying the poor, in-depth analysis can focus on specific population groups.
POVERTY PROFILE
facet 8: regression analysis

- From **simple** correlations (two-way tables and graphs) to **partial** correlations.
- Estimate (= regress) an econometric model for household expenditure and use it to predict poverty measures.
- Steps:
  1. Estimate regression: \( \log(C_h) = \beta X_h + \varepsilon_h \)
  2. Predict consumption: \( E(C_h | X_h) = \exp(\beta X_h + \sigma^2/2) \)
  3. Calculate poverty rates based on predicted consumption, or calculate probability of being poor.
- Simulations
The process of measuring poverty requires a number of assumptions and decisions to be made (on the welfare aggregate, on poverty lines, and on poverty indices).

Those sceptical as to the conclusion that poverty has increased, for instance, may argue that the choice of a different poverty line could lead to a reversal of the conclusion.

Two solutions:
1) sensitivity analysis
2) stochastic dominance
SENSITIVITY ANALYSIS
bosnia and herzegovina, 2003 (vol. II)

Report No. 25343-BIH

Bosnia and Herzegovina Poverty Assessment

(In Two Volumes) Volume II: Data on Poverty

November 21, 2003

Poverty Reduction and Economic Management Unit
Europe and Central Asia Region
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## Sensitivity Analysis

### Conclusions

### Table 6.2 Key characteristics of poverty and its robustness to measurement assumptions.

<table>
<thead>
<tr>
<th>Characteristics of poverty</th>
<th>Baseline, consumption per capita</th>
<th>OECD I scale</th>
<th>OECD II scale</th>
<th>Higher poverty line</th>
<th>Lower poverty line</th>
<th>Expenditure per capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed (semi-urban) municipalities in RS</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Rural municipalities in FBiH</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>IDPs and Refugees</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Households headed by persons with low education (primary or less)</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Households headed by persons with education above secondary</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Unemployed (ILO) and inactive adults</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Employed according to registration</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Registered unemployed</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Household headed by elderly</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Larger households</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

Source: Staff estimates based on BiH-LSMS 2001.
On the Measurement of Poverty

A. B. Atkinson


Stable URL:
http://links.jstor.org/sici?sici=0012-9682%28198707%2955%3A4%3C749%3AOTMOP%3E2.0.CO%3B2-N
Atkinson (1987) explored the use of stochastic dominance.

Dominance methods test whether one income distribution has more poverty than another for a broad class of poverty measures and a wide range of poverty lines.

Take two income distributions \( A \) and \( B \), characterized by cdfs \( F_A \) and \( F_B \), respectively…
We say that $F_A$ first-order stochastically dominates $F_B$ if and only if, for all positive $x$:

$$F_A(x) \leq F_B(x)$$

For instance, $A$ could be the distribution of PCE for urban households, $B$ for rural.

Source: 2001 Nicaragua LSMS
ATKINSON (1987)
“Condition I”

We are interested in comparing two distributions, $F$ and $F^1$, denoting the difference $\Delta F = F - F^1$.

**Condition I:** For there to be for all $Z \in Z^*$ a reduction, or no increase, in poverty, as measured by the headcount, on moving from the distribution $F^1$ to $F$:

(I) $\Delta F(Z) \leq 0 \quad \text{for all} \quad Z \in [Z^-, Z^+]$.

The poverty ranking of two distributions according to headcount ratio does NOT depend on the choice of the poverty line if and only if one distribution FOD the other.
FOD
“Condition I” in practice

1. All we have to do to test the robustness of the headcount ratio is to plot the CDFs of the two distributions that we are interested in comparing.

2. If one lies above the other over the range of relevant poverty lines, then the choice of poverty line within that range will make no difference to the outcome.
Figure 4 – First-order stochastic dominance test, Madagascar 2001-2005
If two distributions cross within the range of poverty lines \([Z^-, Z^+]\), then FOD does not hold: the choice of different poverty lines combined with the use of the headcount poverty ratio will lead to different rankings of the two distributions.

Can we do any better by adopting a different poverty measure?
To define SOD, we start by defining the **poverty deficit curve** $D(z;F)$:

$$D(z; F) = \int_0^z F(x) dx$$

The poverty deficit curve is the **area under the CDF** up to some poverty line $z$.

If $D_A \leq D_B$ for all $x$ (i.e. the area under $A$ up to $x$ is less the area under $B$ up to $x$), then distribution $A$ is said to **second-order stochastically dominate** distribution $B$. 

SECOND-ORDER STOCHASTIC DOMINANCE (SOD)

Remember the definition:

\[ D(z; F) = \int_0^z F(x)dx \]

\( D_B \leq D_A \)

then

\( B \) SOD \( A \)
ATKINSON (1987)
“Condition II”

**Condition II:** For there to be for all \( Z \in Z^* \) a reduction, or no increase, in poverty, as measured by the poverty deficit, on moving from the distribution \( F^1 \) to \( F \):

\[
(II) \quad \Delta \Phi(Z) = \int_0^Z \Delta F(Y) \, dY \leq 0 \quad \text{for all} \quad Z \in [Z^-, Z^+].
\]

If the poverty deficit curve for one distribution lies above the poverty deficit curve of another, the first distribution will always have more poverty as measured by the poverty gap measure.
All we have to do to test the robustness of the poverty gap index is to plot the PDCs (poverty deficit curves) of the two distributions that we are interested in comparing.

If one lies above the other over the range of relevant poverty lines, then the choice of poverty line within that range will make no difference to the outcome: the first distribution will always have more poverty according to the poverty-gap measure.
POVERTY DEFICIT CURVES
in practice

Deaton (1997:166) shows that:
\[ D(z;F) = z \times PG \]

The PG ratio is higher in 2001 than in 2005, regardless of the poverty line.
COMPARING THE DIFFERENT ORDERS OF DOMINANCE

- FOD ⇒ SOD ⇒ TOD
LIST OF PAPERS CITED
