On-line Course on Advanced Poverty Analysis – Poverty Dynamics  
Summer 2013

Exercise, Module 7

Jonathan Haughton

This is an exercise in measuring vulnerability to poverty. The first question develops the principles using a small simple dataset. The second question asks you to measure vulnerability with some actual numbers.

Please either post the answers to the course web site or send them to me at jhaughton@suffolk.edu.

1. **Basic Measurement of Vulnerability to Poverty**

We have the following information on the income of five households. Fill in the blanks. [Hint: Use Excel for this.]

<table>
<thead>
<tr>
<th>Income</th>
<th>Poverty line</th>
<th>SD of income</th>
<th>Probability of poverty next year</th>
<th>Vulnerability*</th>
<th>Probability of poverty at least once in next two years</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>125</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>120</td>
<td>125</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>130</td>
<td>125</td>
<td>22</td>
<td></td>
<td></td>
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<tr>
<td>160</td>
<td>125</td>
<td>20</td>
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</tr>
<tr>
<td>220</td>
<td>125</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Highly vulnerable: If probability of poverty next year is > 0.5.
2. Somewhat vulnerable: If probability of poverty next year is >P0 but <= 0.5.
3. Not vulnerable: If probability of poverty next year is <=P0.

2. **Measuring Vulnerability with Data from Bangladesh**

[This is the Stata version; for the SPSS version, go to http://web.cas.suffolk.edu/faculty/jhaughton/

Measure the proportion of households in Bangladesh who were “highly vulnerable to poverty” in 1998. Here are the steps that you will probably want to take:

i. Start Stata, and then open the file called final.dta. The idea is to use the data to construct and estimate a regression model where the dependent variable is the log of consumption per capita.

ii. Create a variable called lpcexp that is the (natural) log of per capita expenditure.

iii. Regress this variable on those variables that might reasonably be expected to predict a household’s per capita expenditure level. This would include the age, education, and gender of the head, size of the household, amount of land owned, assets owned, whether the household has electricity, distance from the nearest road, and distance from the nearest bank. Include dummy variables for the districts (thana); a good way to do this is to include in your regressors the term i.thana.

iv. Keep the predicted output (lpcexphat) and residuals (resid). For this, use the commands

```
predict lpcexp, xb
predict resid, r
```

v. Create a variable called resid2 that is the square of the residuals.

vi. Regress the square of the residuals on the same variables as in iii. and save the predicted value (estvar).

vii. Replace any negative values of estvar with resid2.
viii. Construct a variable (call it \( flessc \)) that is \((\text{log of food poverty line} - \text{estimated log of consumption})/\text{(square root of estimated variance)}\).

ix. Compute the probability of poverty for each household using \( \text{normal}(flessc) \).

x. Construct a variable called \( vull \) that is =1 if the household has at least a 50% probability of being poor next year.

xi. Tabulate and report the results.

xii. [Optional, but challenging] Redo this exercise on the assumption that the age of the household head has risen by 5 and the household assets have increased by 20%. Hint: You do not need to re-run the regressions, but you will need to generate new predictions of \( lpcexphat \) and \( estvar1 \).