

The [Easter Island](#) census is easy this year because only ten people are left on the Island (though Jared Diamond's account in [Collapse](#) may be wrong). The two poorest town residents get and spend \$300 per year; while two very poor rural households spend just \$200 annually. The big landowner spends \$3000 and pays her house sitter \$500 annually. The sole taxi driver makes \$800, while the still optimistic tour guide earns \$1000. [La Selve café's](#) owner spends \$2000 and a local NGO program leader earns \$1700 per year. This means total island consumption and income is \$10,000. All island residents live alone, no one saves.

1. The incidence and burden of poverty or how many are poor, and can the non-poor afford to help them? Suppose the official poverty line in consumption, call it y_p , is \$400 per year per person (just over a \$1/day). Sort the households by income, then plot the first six household consumption totals from left to right (lowest to highest) with a bar or line graph. Now draw in the poverty line at \$400. A) How many people are poor? b) What is the island poverty rate or headcount ratio (H)? (c) Compute the **poverty deficit**, that is, how much money it would take to raise all the poor's income to \$400 reported as a % of total consumption or income. d) Why is it helpful to compute these two percentages (poverty measures) as opposed to just counting the number of poor people?

2. The "depth" of poverty or on average, how poor are poor households? To answer this question, we compute the income gap or average income shortfall, $I = (y_p - y_{avg})/y_p$ where y_{avg} is the average income of the poor only. Then multiply $H*I$ to get the Island **poverty gap**. (a) What are the income gap (I), H, and the poverty gap ($H*I$) for Easter Island? What would they be if all the poor had incomes of (b) \$360 per year or (c) \$200 per year? (d) What do the income gap (I) and poverty gap ($H*I$) tell us that the poverty rate, H, does not? Why is this important? (e) *Optional: show the income gap, I, in diagram from #1 above (shade the missing).*

3. How does economic growth affect absolute poverty measures? One year a tourism boom raises everyone's income by 10%: those who spent \$200 now get and spend \$220 and so on. The good weather holds and the boom lasts for for five years raising everyone's income and spending goes up by about 50%: \$200 households now have \$300; all \$300 incomes go to \$450 and so on. Fill in Table 1 below with H, I, and $H*I$. The first row of the table is based on the initial pre boom incomes so write the H, I and $H*I$ from #1 and #2 above. The next row is H, I and $H*I$ after 10% growth (households with 200 now have 220, the poverty line still at 400), and finally the last row is the same three poverty measures after 50% income growth. Which poverty measures always fall with economic growth? EC: *show economic growth using the diagram from #2: what happens to the income line with equal income growth? What if the income of the poor grows more slowly than that of the rich?*

Table 1: Absolute Poverty & Economic Growth				*Poverty Deficit	*Average income of the poor
PL: \$400	H	I	H*I		
base case					
10% growth					
50% growth					
welfare reform					

*Optional, but interesting

4. How does inequality among the poor affect H, I or H*I? —or getting credit for welfare reform: A new peace Corps worker is shocked to find the poor living in the town are receiving \$100 in assistance from CRS raising their \$200 incomes to \$300, while poor rural households get no assistance. The Peace Corps volunteer pushes through a welfare reform to make sure that all four poor families, rural and urban, now get a \$50 cash payment. A) Compute the new H, I and H*I and add it to the “welfare reform” row of Table 1. Does welfare reform reduce H, I or H*I? B) In what sense has this welfare reform reduced poverty, in what sense has it not reduced poverty? (hint: severity of poverty)

5. What about relative poverty? Suppose the house sitter elopes with a European tourist who also convinces the naïve aid worker to switch to an EU style relative poverty line: 1/2 the median consumption. a) Compute the new H and I for this new poverty line, using original income levels for the Island. True total consumption is now \$9,500 and the population is 9, but just ignore these changes and use 10 and \$10,000. Using this relative poverty line, compute H, I, and H*I for the base case and the 50% economic growth scenario. b) How does income growth affect relative poverty, as measured by H and I? c) Briefly, list some pros and cons of relative vs. absolute poverty lines – EC refer to the [Bourguignon](#) and Sen’s [Poor relatively speaking](#). Draw the diagram from #3 to show how economic growth affects the poverty rate when you use a relative poverty line—the before and after picture is very instructive in the case.

Table 2: Relative Poverty & Economic Growth

	PL= 1/2 the median consumption	H	I	H*I
base case				
10% growth				
50% growth				

Terms for Review: Relative vs. Absolute Poverty; Define the poverty line as y_p and the average income as y_{avg} . This means the Average Income Shortfall or Gap, $I = (y_p - y_{avg})/y_p$ or for a individual or i^{th} household $I_i = (y_p - y_i)/y_p$. The Headcount poverty rate is $H = [(\# \text{ of Poor}) \div (\text{total population})] * 100$ or the # of poor as % of the total population; the poverty gap is $H*I$ (a % sort of: it tells us what % of the population is I % below the poverty line—if either the incidence of the depth of poverty increases, the poverty gap goes up. It is our most comprehensive poverty measure so far).

Absolute Poverty Measures:	Is this poverty measure sensitive to the:					Other Names	ILO Poverty Compendium Name
	Incidence of Poverty	depth of Poverty	Severity of Poverty	Income** of poorest	incomes of non-poor		
Headcount or Poverty Rate (H)	Yes	No	No	No	No	Headcount Ratio	p(0)
Average Income shortfall (I)	No	Yes	No	No	No	Income Gap	
Poverty Gap (H*I)	Yes	Yes	No	No	No		p(1)
Sen Severity Index (S)	Yes	Yes	yes	No	No		
Gap Squared-aka *FGT($\alpha = 2$)	Yes	Yes	yes	Yes	No	FGT index	p(2)
Poverty Deficit	No	Yes	No	No	yes		
Relative poverty rate (H, I, H*I)	Yes	Yes	no		yes		

*FGT: Foster-Greer-Thorbeck Index

**most sensitive to income of poorest families