



# Global absolute and 'weakly relative' poverty revisited

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# Introduction

- In 2008, World Bank revised its absolute global poverty estimates using a new international poverty line (\$1.25 a day in 2005PPP rather than \$1.08 in 1993PPP);
- Result: Poverty rate increases from 17 to 25%, number of poor from 940 million to 1.37 billion.
- 2011: Ravallion and Chen propose new 'weakly relative' poverty concept, where international poverty line is constant up to certain level and rises with per capita income after that;
- Poverty line always average of a sample of poor countries but estimation sample changed in 2008.
- This paper: review methods of generating absolute and weakly relative poverty line, suggest modifications.

# Drivers of Change in Global Absolute Poverty

- Most observers: change driven by higher prices in ICP2005;
- Deaton (2010): mostly due to changed poverty line (ICP would lower consumption and poverty line!);
- Simple exercise: take old sample of countries, new ICP to calculate poverty line: \$1.05 in 2005 ICP (lower due to higher prices which lowers poverty line when translated into \$);
- Using this line, poverty in 2005 would be 980 million;
- Deaton correct: The setting of the poverty line (sample and methods) is the issue!

# Starting point for international poverty line

Figure 1a. Threshold model for log(consumption).

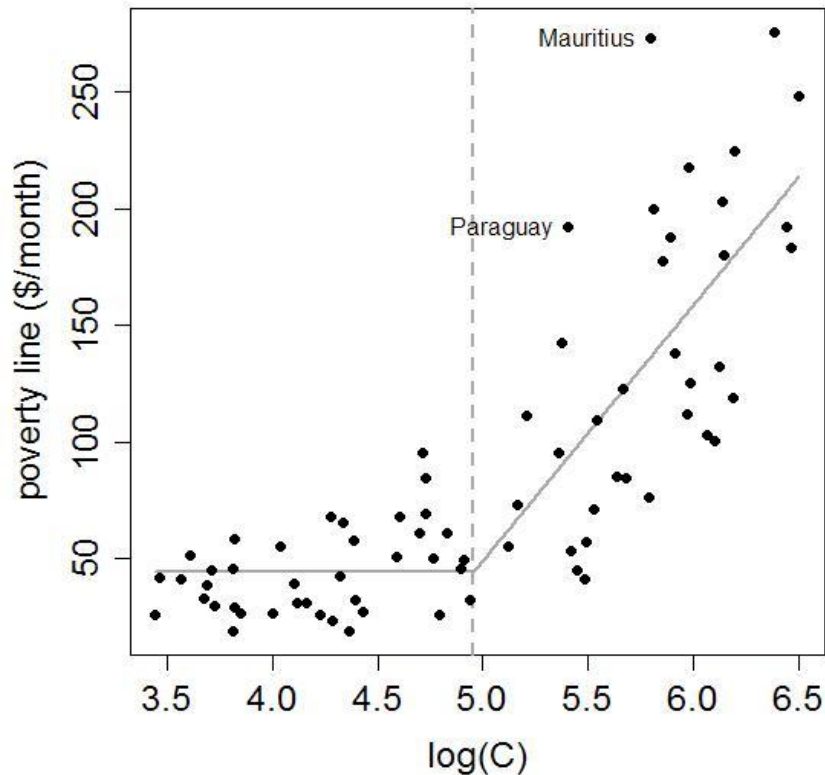
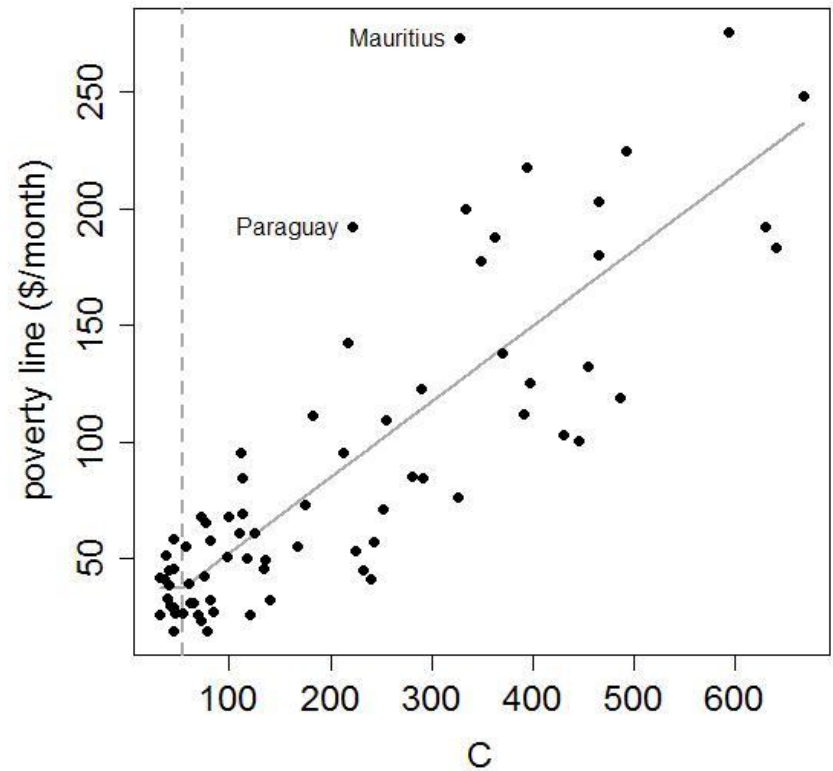


Figure 1b. Threshold model for consumption.



## Procedure to calculate international poverty line

- Poor countries have ‚absolute‘ lines, richer countries ‚weakly relative‘ ones; threshold separates the two;
- Need to estimate a model containing a threshold (simplest: piece-wise linear);
- Key questions:
  - Is there a significant threshold?
  - Where is the threshold? Determines ‚reference group‘ of countries for international poverty line;
  - How to extend it to calculate a ‚weakly‘ relative poverty line?

## Ravallion, Chen and Sangraula (RCS 2009)

- Sample of 74 countries with national poverty lines and per capita consumption (from national accounts);
- Estimate non-linear model with indicator variable  $I_i$ ;  
$$Z_i = Z^*I_i + f(C_i)(1 - I_i) + \varepsilon_i$$
- Use procedure by Hansen (2002) to endogenize threshold, check for consistency and continuity;
- 15 poorest countries are below threshold (‘reference group’), determine \$1.25 poverty line.
- All done on  $C$ , not  $\log C$  (‘better fit’);
- **But no evidence of significant threshold when  $C$  is used!**

## **,'Weakly Relative' Poverty Line**

- Concept: Fixed costs of social inclusion plus costs that vary with per capita income;
- Empirical implementation: positive y-intercept and constant slope in C-Z diagram;
- Implies rising elasticity of poverty line to mean income, (but always below 1);
- Mix of absolute-weakly relative line: absolute until threshold, weakly relative above;

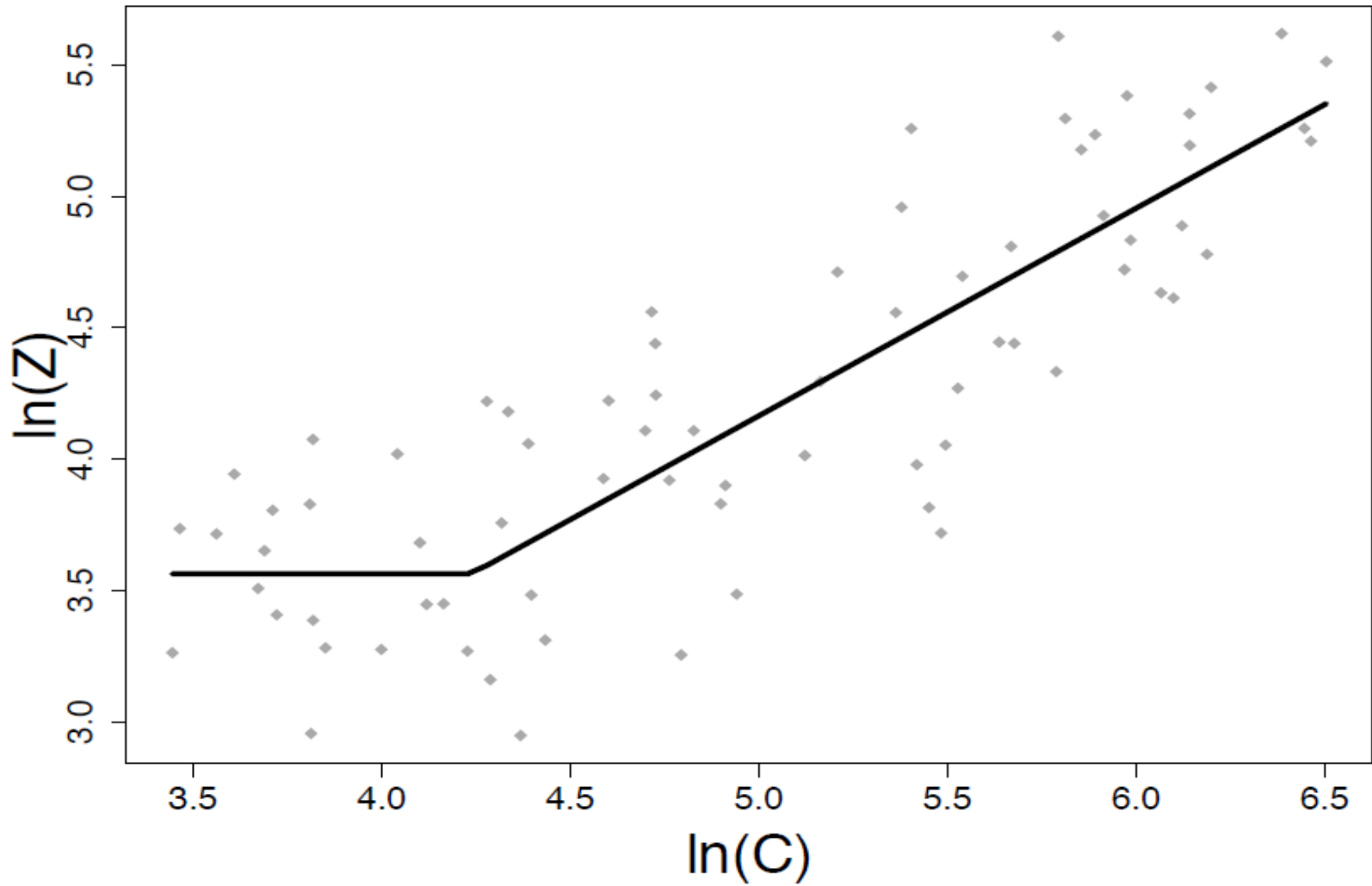
$$Z_{it} \equiv \max[\$ 1.25, \$0.60 + M_{it} / 3] = \$0.60 + \max[\$0.65, M_{it} / 3]$$

- **Our critique: why mix absolute-weakly relative line? Poverty is everywhere ,weakly relative', estimate entire function.**

## Our approach

- Initially focused on Z-Log C space (Greb et al. 2011), but data distribution not normal (gamma distribution), cannot sensibly estimate relationship in this space;
- Best to transform data to LocZ-LogC space. Here data are normally distributed, evidence of a significant threshold;
- 2 analyses:
  - Repeat derivation of absolute poverty line in logZ-logC space;
  - Estimate a unified curve for ‚weakly relative poverty‘ using polynomials or non-parametric regressions;



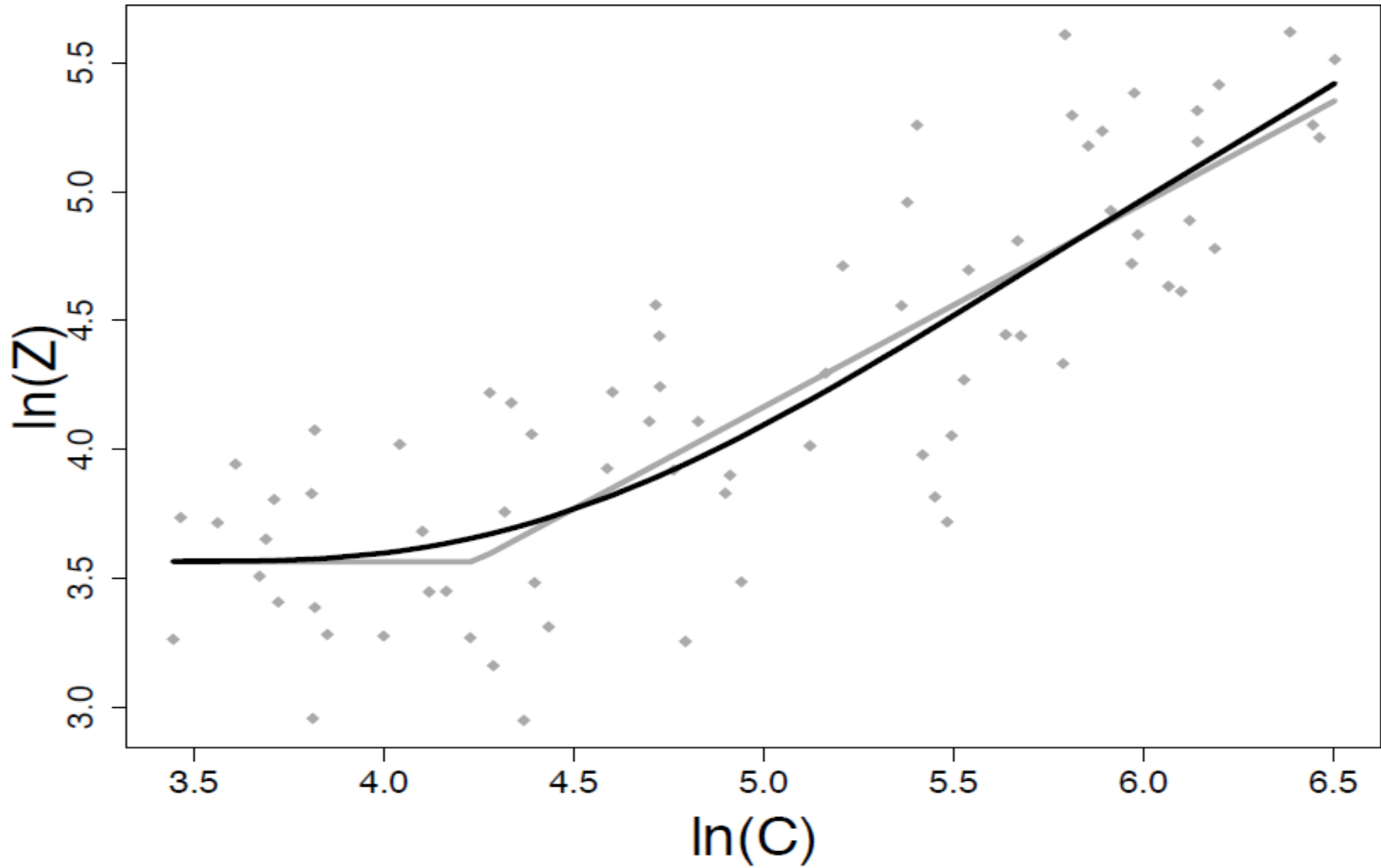


## Absolute Poverty Line:

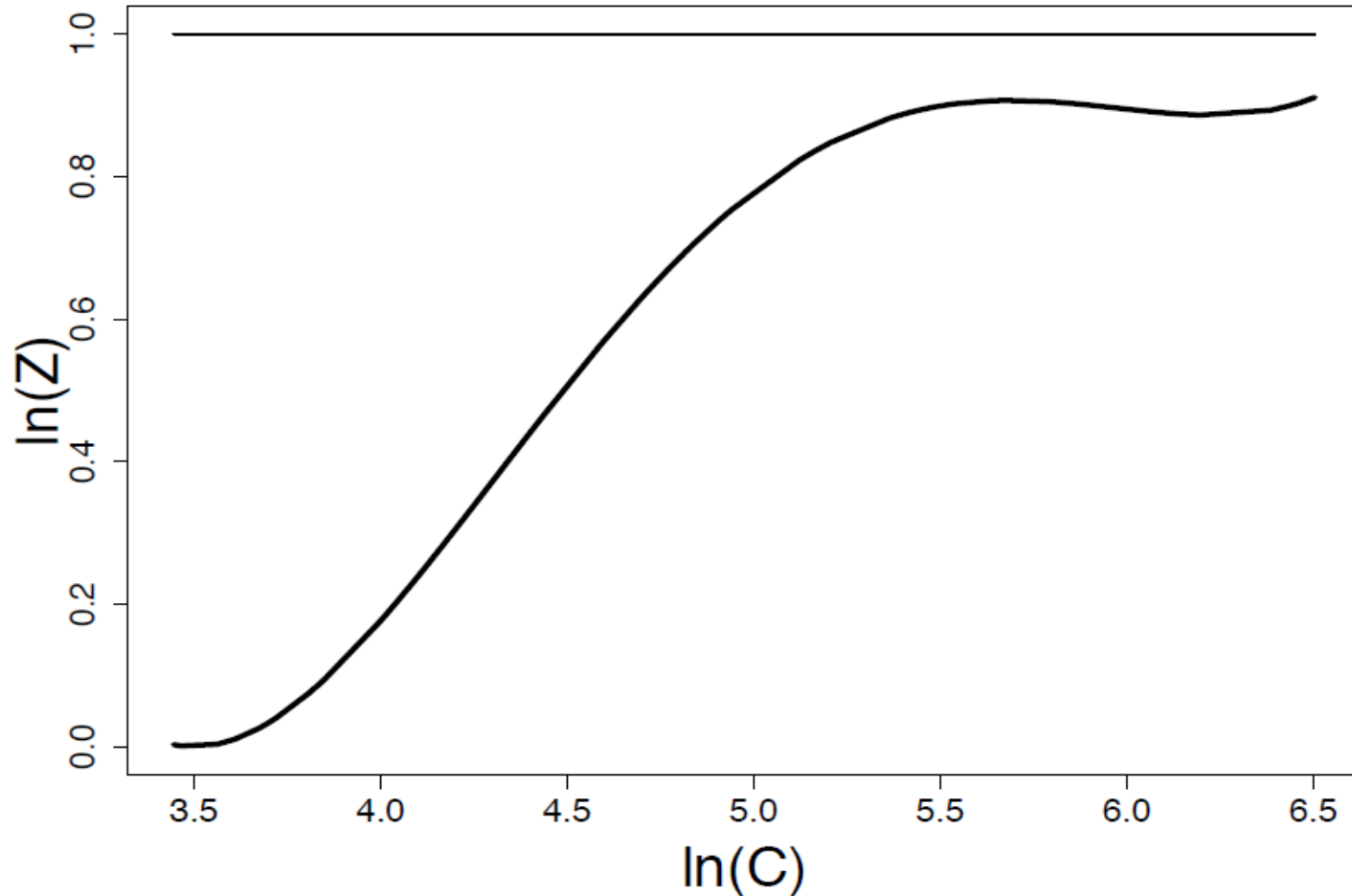
- OLS estimation of threshold model (Hansen):
  - Impose continuity and 0 slope conditions,  
minimize
$$\sum_{i=0}^n [\ln Z_i - \ln Z^* I_i - f(\ln C_i(1 - I_i))]^2$$
- Best Model:  $\log Z = 3.56 + 0.789 * (\log C - 4.236)$
- Reference group of 19 countries, poverty line at \$1.25 (so no change).

# Weakly Relative Poverty Line

- No advantage to non-parametric regressions;
- Order 5 monotone polynomial provides best fit and reasonable estimates of elasticities;
- Rightly note that there is a ‚relative‘ element to poverty even at low income levels;
- Implied elasticities are reasonable (rise but stay below 1);
- We find somewhat lower poverty as a result;



## Implied Elasticities



Comparison for 2005	Our method		Ravallion (2009)		Ravallion (2012)	
Region	Headcount	Number	Headcount	Number	Headcount	Number
East Asia and Pacific	33.6	651.2	37.7	709.5	38.5	746.3
Eastern Europe and Central Asia	33.8	159.1			35.2	165.7
Latin America and Caribbean	47.6	261.9	45.1	248.1	47.3	260
Middle East and North Africa	32.3	97.9			35.9	109
South Asia	59.5	902.9	63.2	932.5	64.2	974.2
Sub-Saharan Africa	57.3	432.7	55.6	424.2	57.6	434.9
Total	45.3	2505.8	47.4	2586.6	48.6	2689.8

## Conclusions

- International poverty line based on econometrically shaky foundations;
- We provided a statistically cleaner way to estimate the absolute poverty line, which changes the reference group but has little impact on the location of the line;
- We provide a theoretically and empirically more convincing approach to estimating ‚weakly relative poverty‘; results impact on global poverty estimates;
- Many uncertainties remain: PPPs, origin and reliability of poverty lines, updating of poverty lines, interpretation of ‚error‘ distribution;