



Vulnerability to Poverty in Southeast Asia

Tobias Lechtenfeld
Felix Povel

April 9, 2008
Thammasat University, Bangkok



Introduction

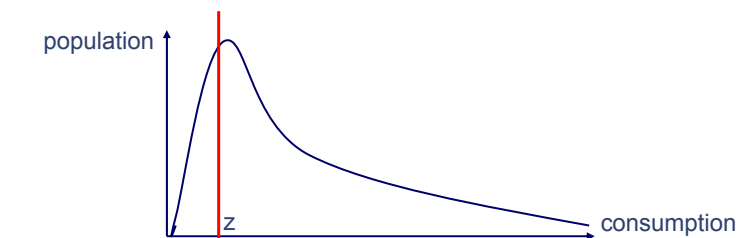
1. Introduction
2. Vulnerability Concept
3. Research Project Thailand
4. Work in Progress
5. Outlook

2. Vulnerability Concept

Vulnerability Concept

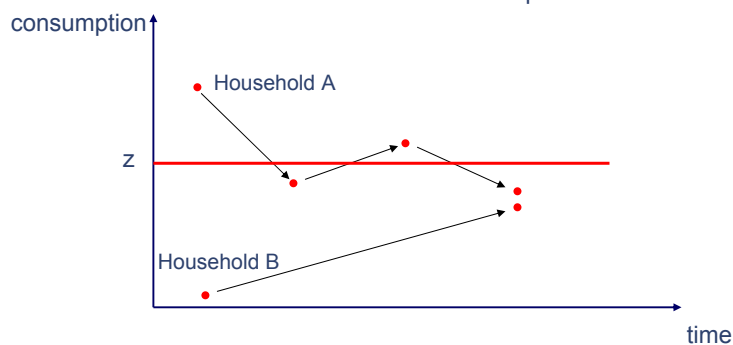
Starting Point: Poverty

- Most common approach: money metric
 - income or consumption
 - Alternative concepts of poverty: nutrition, body mass index, assets, freedom
- Rank households by consumption
- Set arbitrary poverty line z



Chronic vs. Transient Poverty

Household status within one period



What determines moves?

Reasons for moves out of poverty

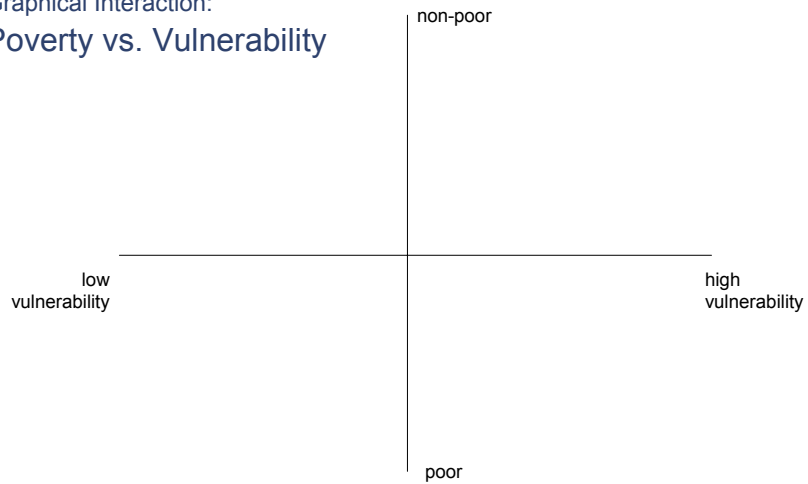
- Increased available income
 - Harvest, better paid work, remittances, etc

Reasons for moves into poverty

- Shocks
 - Illness, Flood, Drought, etc
- Dynamic analysis of determinants of poverty
- Vulnerability Analysis

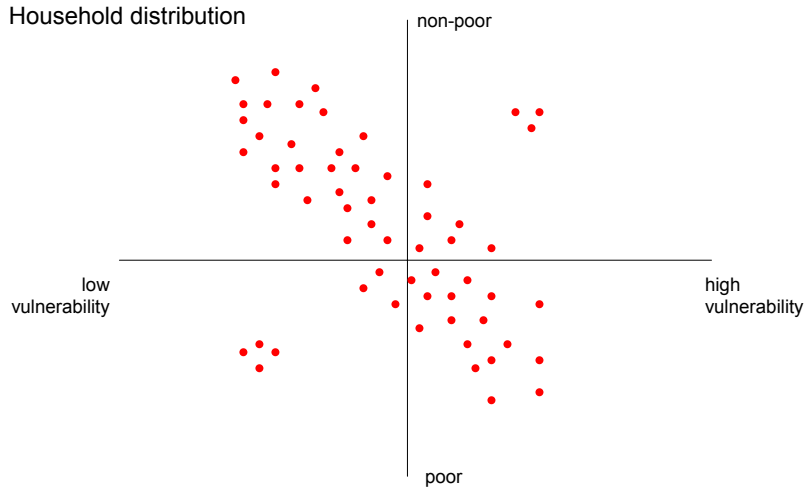
Vulnerability Concept

Graphical Interaction:
Poverty vs. Vulnerability



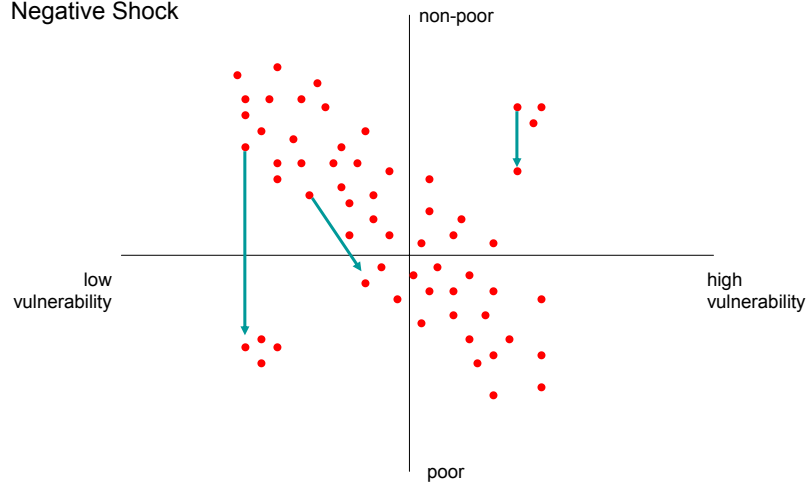
Vulnerability Concept

Household distribution



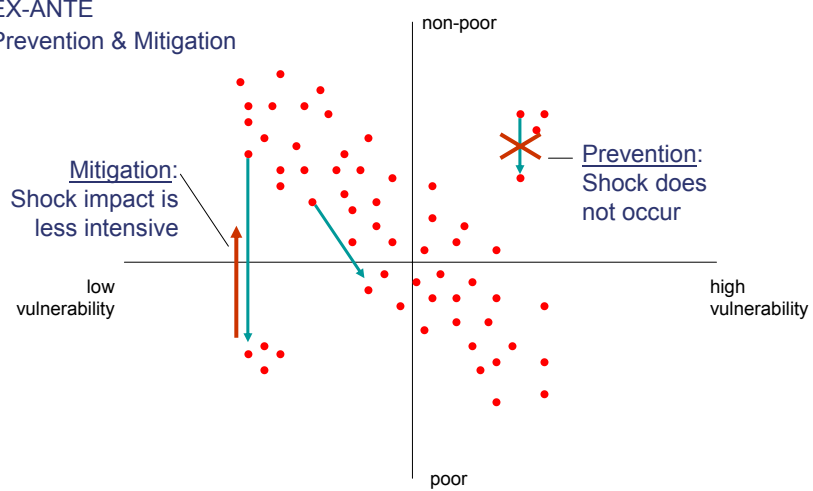
Vulnerability Concept

Negative Shock

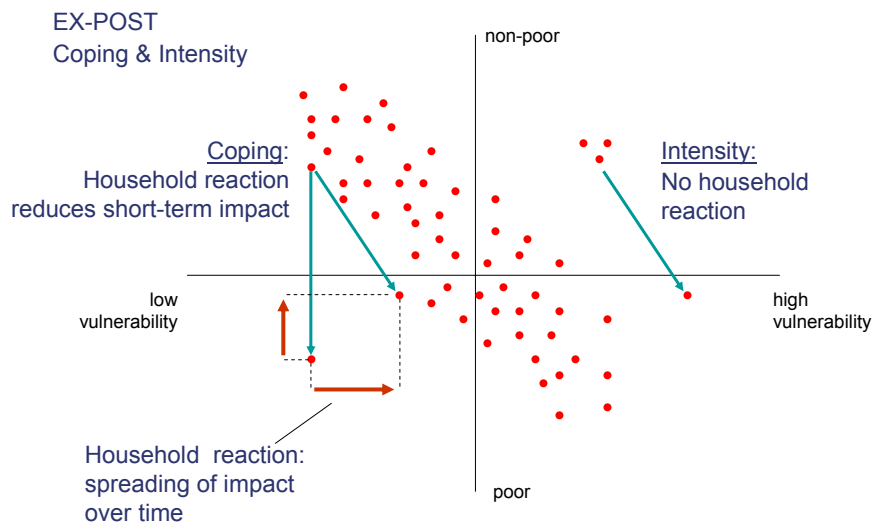


Vulnerability Concept

EX-ANTE
Prevention & Mitigation



Vulnerability Concept



Vulnerability Concept

- What is Vulnerability Analysis useful for?
 - Policy design
 - Social risk management requires identification of determinants of dynamic processes
 - E.g. What can increase the effectiveness of prevention, mitigation and coping mechanisms?
 - Social Risk Management
 - Identify priorities for prevention
 - E.g. Investment in damn may be better than paying for flood damage
 - Market stimulation
 - Reliable (testable) models needed to get insurance firms to enter market at bottom of the pyramid
 - E.g. Private rainfall insurance for the poor

3. Research Project Thailand

Research Project



Research Design

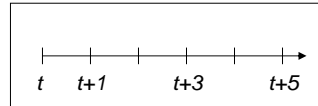
- 2 countries and 6 provinces
- Thailand
 - Buri Ram
 - Nakhon Phanom
 - Ubon Ratchathani
- Vietnam
 - Ha Thien
 - Thua Thien Hue
 - Dac Lac

Research Project

Survey Design

- Panel Approach

	<i>time</i>
▪ Baseline: Spring 2007	<i>t</i>
▪ 2 nd Wave: Spring 2008	<i>t+1</i>
▪ 3 rd Wave: Spring 2010	<i>t+3</i>
▪ 4 th Wave: Spring 2012	<i>t+5</i>
- Sample Size
 - N=4381 Households during first wave (2186 in Thailand)
 - N<4381 in later waves due to attrition
- Sampling Frame
 - Multistage clustered sample
 - Clusters at each stage > *Sampling Method*
 1. Stage: Provinces > non-random by poverty level
 2. Stage: Districts > random proportional to size
 3. Stage: Villages > random proportional to size
 4. Stage: Households > random equal weights



Research Project

Instrument Design

- Accommodate Interdisciplinary Focus
 - Development Economics (University of Goettingen)
 - Agricultural Economics (University of Hannover)
 - Money & International Finance (Frankfurt University)
 - Economic Geography (University of Hannover)
- 8 Professors, 1 Post-Doc, 12 PhD students
 - Advantage: Complementing fields
 - Disadvantage: Time intensive Questionnaire

Research Project

Instrument Design

1. Location Specific Information

- no variance between individuals of last sampling stage (village)
- Example: village size, village infrastructure (schools, health facilities, market access)
- Village Head Questionnaire

2. Household Specific Information

- no variation between household members
- Example: type of housing, household assets and wealth
- Household Questionnaire

3. Individual Specific Information

- variation between household members expected
- Example: educational level, health, employment and income source
- Roster of Household Members (part of Household Questionnaire)
Challenge: not all members present during interview

Research Project

Instrument Design

- Ordinary Vulnerability Analysis
 - income fluctuations as proxy for income related shocks
 - expenditure fluctuations as proxy for all other shocks
 - asset stock used as proxy
- Questionnaire with special Focus on Shocks and Risks
 - income and asset losses due to shocks
 - who was affected (covariate vs. idiosyncratic)
 - prevention and mitigation strategies
 - coping activities
 - correlation between different shocks
 - income and non-income measures
 - use of insurance and quasi-insurance

Research Project

	Mean	Std. Error	For comparison	Per capita income per month (THB)
Monthly per capita income				
Thailand	2,931	134.3	Thailand	2,676
Buriram	2,669	152	Buriram	2,676
Ubon Rat.	3,437	269	Ubon Rat.	3,201
Nakh. Phanom	2,212	123	Nakh. Phanom	2,900
Viet Nam				
Viet Nam	546.8	27.6		
Ha Tinh	443.1	43.8		
Hue	488.7	30.6		
Dak Lak	678.8	52.6		

Source: Household socio-economic survey 2006, National Statistical Office



	Mean	Std. Error
Annual household income		
Thailand	121,452	5,495
Buriram	110,268	6,714
Ubon Rat.	141,221	10,730
Nakh. Phanom	95,333	5,765
Viet Nam		
Viet Nam	25,692	1,188
Ha Tinh	19,115	1,798
Hue	23,911	1,604
Dak Lak	32,991	2,275

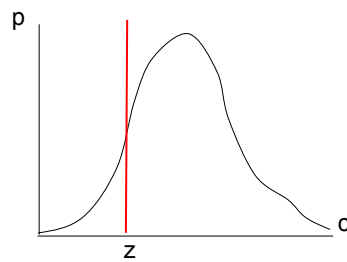
4. Work in Progress

Work in progress

Measurement of vulnerability in Southeast Asia

- Conceptual approach: Vulnerability as expected poverty (e.g. Chaudhuri et al., 2002, Christiaensen and Subbarao, 2004), i.e.

$$V_h = \Pr(\ln C_h < \ln z \mid X)$$



where V_h = vulnerability of household h
 C_h = consumption of household h
 X = bundle of explaining variables
 z = consumption poverty line

Work in progress

Steps to be taken

1. Definition of time horizon
 - $t+1$, i.e. next year
2. Definition of indicator of well-being
 - consumption
3. Definition of threshold for well-being
 - z = consumption poverty line
4. Definition of a probability threshold
 - α ; household is considered vulnerable if its probability of being below z exceeds α

5. Estimation of the ex-ante probability distribution of ex-post consumption

1. Assumption: consumption log-normally distributed

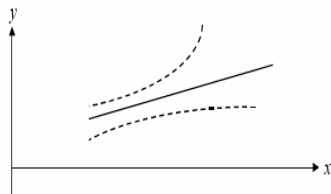
- mean = expected $\log(\text{consumption})$
- variance = inter-temporal variance of $\log(\text{consumption})$

2. Assumption: variance of error term constant over time

Econometric Approach

1. OLS not possible

- variance of error terms correlated with explanatory variables (i.e. heteroskedasticity)
- expected variance of error terms varies across household
- estimation would lead to unbiased but inefficient results



Work in progress

2. Feasible generalized least squares (FGLS)

$$\begin{array}{l} \ln c_h = X_h \beta + e_h \\ \sigma_{e,h}^2 = X_h \theta \end{array} \quad \begin{array}{l} \nearrow \\ \searrow \end{array} \quad \hat{e}_{OLS,h}^2 = X_h \theta + \eta_h \quad \longrightarrow$$

FGLS estimate of efficient θ :
$$\frac{\hat{e}_{OLS,h}^2}{X_h \hat{\theta}_{OLS}} = \left(\frac{X_h}{X_h \hat{\theta}_{OLS}} \right) \theta + \frac{\eta_h}{X_h \hat{\theta}_{OLS}}$$

$$\longrightarrow \hat{\sigma}_{e,h} = \sqrt{X_h \hat{\theta}_{FGLS}} \quad \longrightarrow$$

FGLS estimate of efficient β :
$$\frac{\ln c_h}{\hat{\sigma}_{e,h}} = \left(\frac{X_h}{\hat{\sigma}_{e,h}} \right) \beta + \frac{e_h}{\hat{\sigma}_{e,h}}$$

Work in progress

Expected log consumption

$$\hat{E} [\ln c_h | X_h] = X_h \hat{\beta}$$

Expected variance of log consumption

$$\hat{V} [\ln c_h | X_h] = \hat{\sigma}_{e,h}^2 = X_h \hat{\theta}$$

Household's vulnerability to poverty

$$\hat{v}_h = \hat{\Pr} (\ln c_h < \ln z | X_h) = \Phi \left(\frac{\ln z - X_h \hat{\beta}}{\sqrt{X_h \hat{\theta}}} \right)$$

Shocks and risks as explaining variables

- shocks usually captured by error term
- estimation of impact of shocks on current consumption of household h
- replacement of shocks by risks while using shocks' coefficients as predictors for impact on vulnerability

5. Outlook

Outlook

Possibilities for further Research

- Panel data analysis of Vulnerability
- Application of other approaches to vulnerability
- Extension to non-monetary dimension (weight, etc.)
- Intra-household vulnerability
- Incorporation of information about preventing, mitigating and coping strategies
- Detailed analysis of shocks and risks
 - correlation between different shocks as well as shocks and risks
 - correlation between impact of shocks on consumption and household characteristics
 - effectiveness of preventing, mitigating and coping strategies

Thank you

- **Project Details** (incl. Instruments)
www.vulnerability-asia.uni-hannover.de
- **Contact Details**
Felix Povel: fpovel@uni-goettingen.de
Tobias Lechtenfeld: tlechtenfeld@uni-goettingen.de