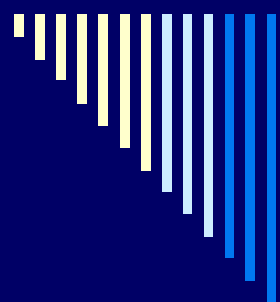


Multidimensional poverty in a risky world

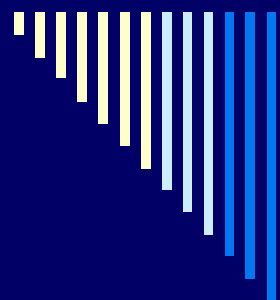
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Outline

1. Why risk matters
2. Focus on downside risk
3. Measurement issues
4. An example: Consumption and leisure.
Peru, 1998-2002
5. Concluding remarks



Part 1

Why risk matters

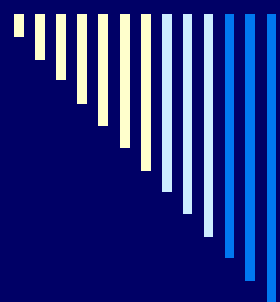


The usual risk-free world

- Think of how (unidimensional) poverty is usually measured:

$$P_i = \left(\frac{z - y_i}{z} \right)^\alpha$$

- y_i (outcome) is 'too low', but certain.
- Is it only a matter of available data?



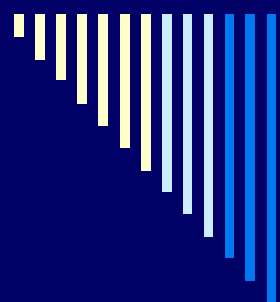
The usual risk-free world

- Is it only a matter of available data?
- The need of a forward-looking approach
 - Policy targets those who will be poor in the 'future' (at the earliest, at the time when programmes are implemented).
 - More importantly, people do look forward, which is why fear exists and deserves attention.



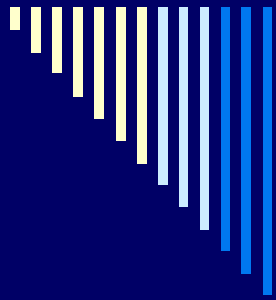
What do we mean by risk?

- Stiglitz and Rothschild (1984)
 - Greater ‘noise’.
 - A shift of weight from the centre to the tails.
 - The choice of a risk-averse individual.
- The individual faces alternative ‘states of the world’ – the i -th state materialises with probability p_i .



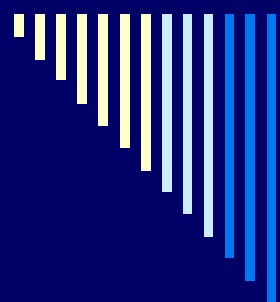
Is this relevant for multidimensional analysis?

- Best not to tread on the wrong steps of others. Let the intuitions behind ‘human security’ shape developments.
- Allow not only ‘other dimensions’ to enter the analysis, but allow also for ‘other states of the world’.



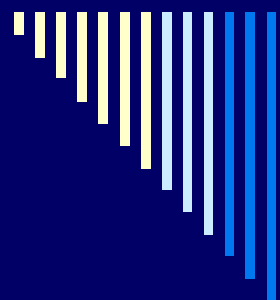
Intuition is on our side

- Even mainstream economics assumes risk-aversion as the usual case.
- ‘Voices of the poor’ studies:
 - *“Security is peace of mind and the possibility to sleep relaxed”.*
 - *“After one poor crop we need three good harvests to return to normal”.*
 - *“Only the well-off truly can believe in tomorrow”.*



Not only an efficiency argument

- By reducing her wealth, a large shock may lock a household into a poverty trap; '*ex-post* effect'. Galor and Zeira (1993) and any other multiple-equilibria model.
- Risk exposure may induce fearful, unproductive behaviours; '*ex-ante* effect'. Cattle in Rosenweig and Wolpin (1993), sweet potatoes in Dercon (1996).
 - 'The two poverties' of Banerjee (2000).
- But we are talking about something else.



Part 2

Focus on downside risk



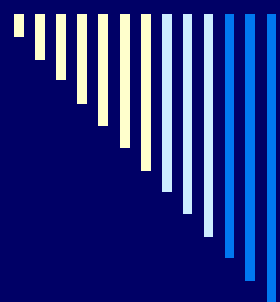
The threat of hardship

- Qualitative evidence points towards something slightly different from ‘risk’: it is about ‘downside risk’, about the fear to face hardship, about the burden of a threat.
- Imagine $z=100$. Take a person with $y_i=120$ when it rains ($p_{RA}=50\%$) and $y_i=60$ in a drought ($p_{DR}=50\%$). Take another with $y_i=90$ regardless of the weather.



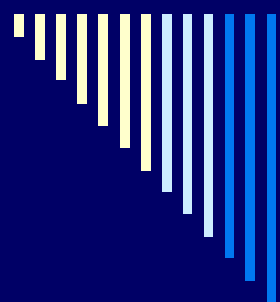
Vulnerability to poverty

- This threat may be large even for those above the poverty threshold.
- Backward-looking vs forward-looking. Let us use 'vulnerability to future poverty'.
- Two key questions:
 - a) how likely are poor outcomes?
 - b) how poor are these poor outcomes?



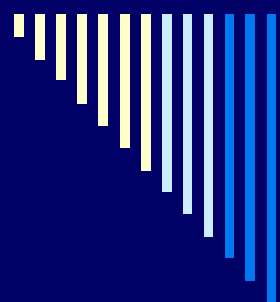
Two benchmarks

- Vulnerability has been viewed as ‘expected poverty’ (Ravallion 1998).
 - This matters for policy planning, but risk is only a measurement technicality.
 - Choice of parameters actually implied risk-loving preferences!
- Vulnerability is also seen as risk-induced loss in well-being (Ligon and Schechter 2003).
 - But then the ‘poverty threshold’ plays no role.
 - Recall the farmer and imagine $y_i = 150$ if it rains.



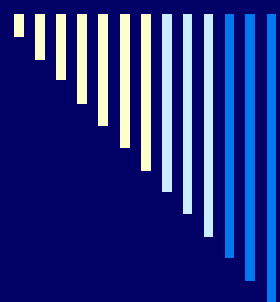
A multidimensional framework strengthens the argument

- When does a person face deprivation in some particular dimension of her well-being (e.g. 'peace of mind')?
- Vulnerability to future poverty is not unrelated with other dimensions (e.g. 'social exclusion' jeopardises risk-sharing opportunities).



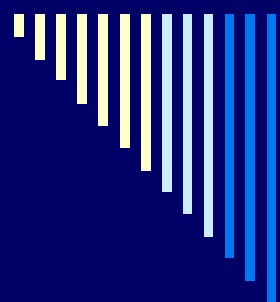
Part 3

Measurement issues



The hurdles

- How to choose dimensions.
- How to combine dimensions.
- How to focus on downside risk.
- How to capture the welfare loss due to risk.
- Forward-looking concept, but backward-looking data.



Two key intuitions

- Failure to reach some outcome level ('poverty').
- Variability across states of the world ('risk').



An axiomatic approach

- NO COMPENSATION: Good states do not compensate for states of hardship.
 - Uncertainty only matters if it is strong enough to entail that poverty is an actual threat.
- RISK SENSITIVITY (as defined by Rothschild-Stiglitz).
- A number of other desiderata: Normalisation, Probability-transfers, etc.

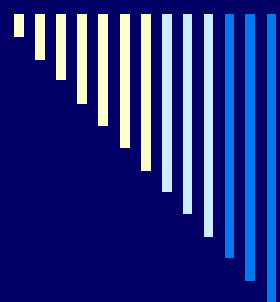


A measure of VUP

$$VUP_i = 1 - E \left[x_i^\alpha \right]$$

$$x_i = \frac{\text{Min}(y_i, z)}{z}$$

$$0 < \alpha < 1$$



What this needs in practice

- Note expected values do not suffice.
- A forward-looking concept needs a value for each 'state of the world', even for those which never materialise.
- Some strong assumption about probability distributions will be necessary.



Vulnerability to multidimensional poverty

- A slightly wild analogy, using a CES-like aggregator

$$VMP_i = 1 - E \left[\left(\sum_{j=1}^J \gamma_j x_{ij}^\rho \right)^{\frac{\alpha}{\rho}} \right]$$

$$\sum_{j=1}^J \gamma_j = 1$$
$$0 < \alpha < 1; 0 \leq \rho \leq 1$$

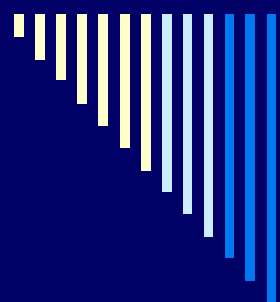
- See Bourguignon and Chakravarty (2003), Deutsch and Silber (2005).



Correlations over a population

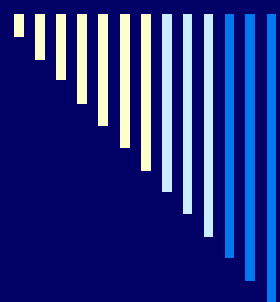
- In the risk-free setting, correlations over a given population matter.
- The cross-derivative criterion:

$$\frac{\partial^2 VMP_i}{\partial x_{i1} \partial x_{i2}} = \alpha(\rho - \alpha) \gamma_1 \gamma_2 (x_{i1} x_{i2})^{\rho-1} \left(\sum_{j=1}^J \gamma_j x_{ij}^\rho \right)^{\frac{\alpha}{\rho}-2}$$



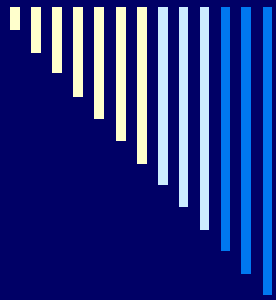
Correlations over states of the world

- $\rho = \alpha$: weighted average. Covariances do not matter.
- $\rho > \alpha$: substitutes. A positive covariance adds to their suffering (raises *VUP*).
- $\rho < \alpha$: complements. A positive covariance helps (reduces *VUP*).
- We could have allowed dimensions to relate to each other differently.



Part 4

An example: Consumption and leisure. Peru, 1998-2002



The data

- 1998-2002: Many reasons for uncertainty.
- 272-household, hardly representative panel.
- Consumption, with the usual poverty line.
- Leisure, with 48 working hours per week as the threshold (or 0 for those aged below 17 or above 65).

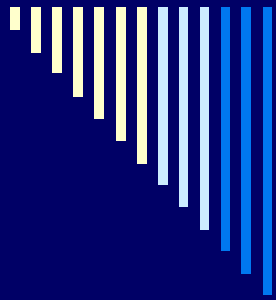


Basic empirical strategy

- To exploit the (short) time dimension of the panel, let

$$y_{i,t} = \mu_i + \beta_{i,t}t + \eta_t + \varepsilon_{i,t}$$

- μ_i : Household-specific fixed effects.
 - $\beta_{i,t}$: Household-specific trends.
 - η_t : Time-specific, covariant shocks (ignored in simulations).
 - $\varepsilon_{i,t}$: Idiosyncratic shocks
- We cannot afford lagged explanatory variables.



A probability distribution for $\varepsilon_{i,t}$

- Note we need each household to differ in its degree of risk exposure.
- Assume a discrete uniform distribution, with 20% probability for each estimated $\varepsilon_{i,t}$
 - Normality is an obvious alternative.
- Assume the observed pairs are stable (which settles the degree of correlation between dimensions).



Descriptive statistics

Year	Consumption		Leisure	
	Urban	Rural	Urban	Rural
1998	1.68	1.14	1.13	1.08
1999	1.77	1.13	1.13	1.09
2000	1.53	1.06	1.13	1.07
2001	1.37	1.00	1.10	1.08
2002	1.44	0.99	1.11	1.08
Average	1.56	1.07	1.11	1.08



Results (1)

	Consumption		Leisure	
	Urban	Rural	Urban	Rural
Average	1.56	1.07	1.11	1.08
Std Dev of $\varepsilon_{i,t}$	0.24	0.25	0.67	0.57
Corr $\varepsilon_{cons}, \varepsilon_{leis}$	-0.069	-0.093	-	-

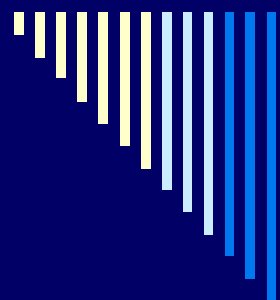
- We should not expect risk to explain much difference between VUP_{cons} and P_{cons} in urban and rural areas.
- Note greater stability in the aggregate is consistent with greater individual uncertainty.



Results (2)

$(\alpha=0.50)$	Urban	Rural
Consumption		
- Average	1.56	1.07
- VUP	0.078	0.126
Leisure		
- Average	1.11	1.08
- VUP	0.018	0.014

- Note risk explains why rural households are less vulnerable to leisure poverty.



Results (3)

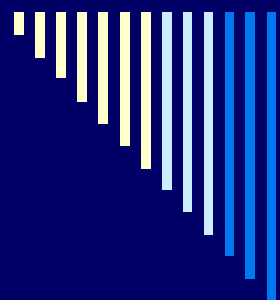
Corr VUP with...	Urban	Rural
Consumption		
- Predicted value	-0.467	-0.397
- Std Dev	0.149	0.213
Leisure		
- Predicted value	-0.652	-0.607
- Std Dev	0.571	0.520



Results (4)

$(\alpha=.050, \gamma=0.50)$	Urban	Rural
VMP ($\rho=0.25$)	0.049	0.073
VMP ($\rho=0.50$)	0.048	0.070
VMP ($\rho=0.75$)	0.046	0.067
VMP ($\rho=0.75$) [certainty]	0.041	0.064

- Vulnerability increases in risk exposure.
- Recall $\text{Corr}(\varepsilon_{cons}, \varepsilon_{leis})$ is stronger in rural areas.



Part 5

Concluding remarks



Concluding remarks

- If we think of ‘peace of mind’ as a relevant well-being dimension, then ‘vulnerability to future multidimensional poverty’ might be the right way forward.
- New issues arise:
 - What dimensions can be best predicted?
 - How do dimensions substitute for each other across states of the world?