POVERTY TRAPS

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The Economics of Poverty Traps and Persistent Poverty: An Asset-Based Approach

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ABSTRACT *Longitudinal data on household living standards open the way to a deeper analysis of the nature and extent of poverty. While a number of studies have exploited this type of data to distinguish transitory from more chronic forms of income or expenditure poverty, this paper develops an asset-based approach to poverty analysis that makes it possible to distinguish deep-rooted, persistent structural poverty from poverty that passes naturally with time due to systemic growth processes. Drawing on the economic theory of poverty traps and bifurcated accumulation strategies, this paper briefly discusses some feasible estimation strategies for empirically identifying poverty traps and long-term, persistent structural poverty, as well as relevant extensions of the popular Foster-Greer-Thorbecke class of poverty measures. The paper closes with reflections on how asset-based poverty can be used to underwrite the design of persistent poverty reduction strategies.*

4 generations of poverty measurement

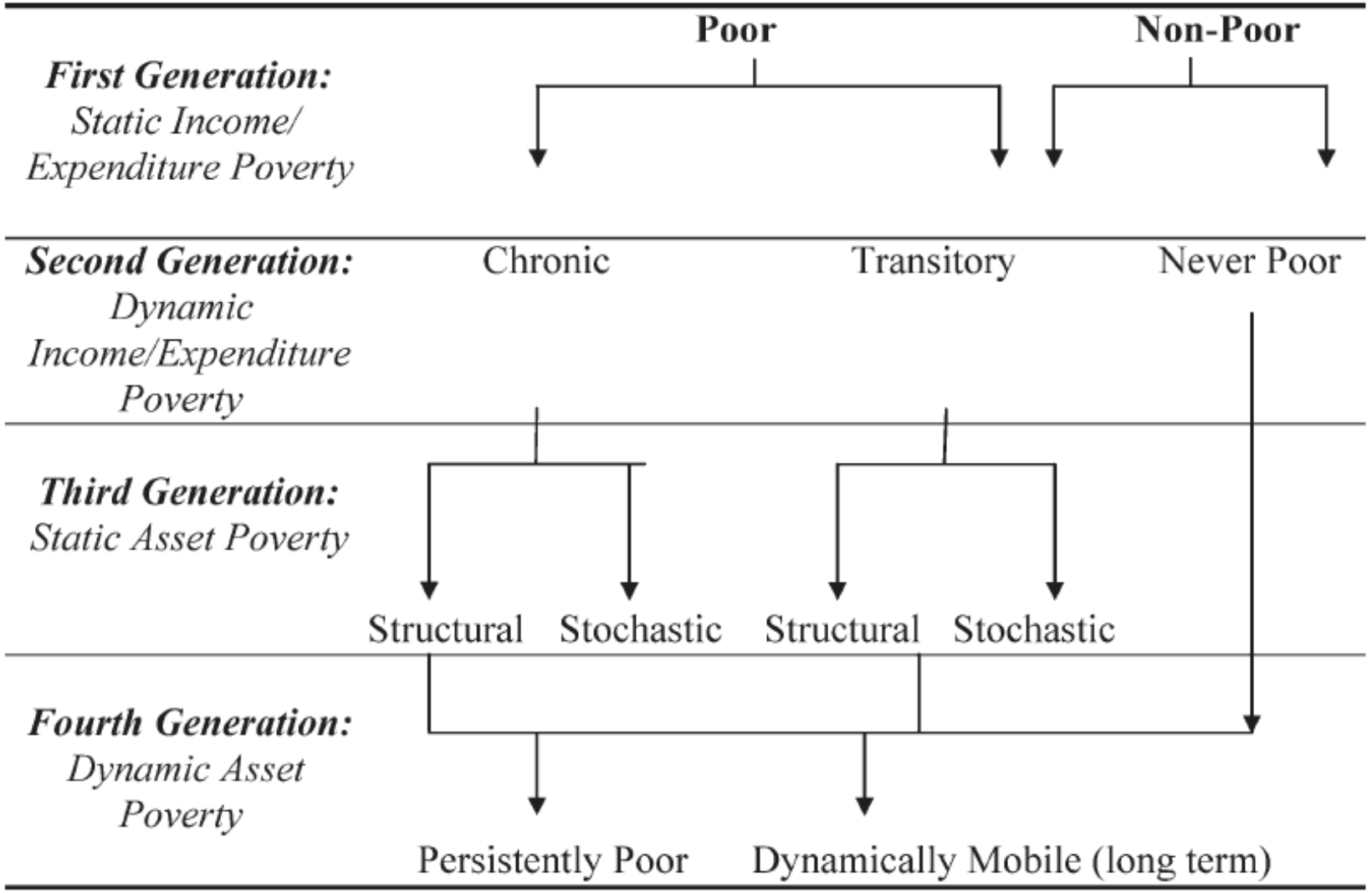


Figure 1. Alternative approaches to poverty measurement

What the 1st generation expenditure-based poverty measures can and cannot tell us

- The most common (first generation) approach to poverty measurement relies on household expenditure (or income) data from a single point in time.
- Cross-sectional poverty measurement is unable to distinguish between two very different patterns of poverty.
- Consecutive cross-sectional findings of a 33 percent poverty headcount ratio could reflect a society in which_____one-third of individuals are persistently poor, period after period.
- Alternatively, repeated observations of the same headcount ratio could reflect a reality in which poverty is a purely_____phenomenon in which individuals routinely swap places.

2nd generation income/expenditure based poverty measurement

- Longitudinal or panel data, offering repeated observations over time on a single cohort of individuals or households, permits a further decomposition of households into three categories:
  - _____;
  - _____;
  - _____.
- Second generation poverty measures cannot distinguish between very distinctive sorts of poverty transitions.

2nd generation income/expenditure based poverty measurement

- People can move from the poor to the non-poor state over time due to either of two markedly different experiences.

- 1) Some may have been initially poor because of bad luck. Their transition to the non-poor state simply reflects a return to an expected non-poor standard of living. This is_____.
- 2) For others, the transition may have been structural, due to the _____of new assets, or enhanced returns to the assets that they already possessed.

2nd generation income/expenditure based poverty measurement

- Those transitorily poor individuals who move from being non-poor to poor, can represent a mix of experiences.
- For some, it could represent a return to an expected standard of living, after a brief non-poor status afforded by a spell of_____.
- For others, it could be a temporary transition caused by _____in a later survey period.
- Finally, for yet others, it could be a _____caused by the loss of assets (due to illness, natural disaster or theft), or by a deterioration in returns to their assets brought on changes in the broader economy (for example, unemployment or declining terms of trade.

What the 2nd generation expenditure-based poverty measures cannot tell us

- Second generation poverty analysis cannot distinguish_____ _____

- This limits its ability to describe how well an economy works for its least well off members.

An asset-based approach

- Poverty measurement that uses income/expenditure is_____looking in the sense that it creates a portrait of who was poor at the time survey data were collected.

- How about poverty measures that can deal with time and poverty transitions?

- Who will likely remain poor into the future?

- _____ Poverty Measurement

- An asset-based approach to poverty analysis might make it possible to distinguish between persistent poverty from poverty that passes naturally with time due to systemic growth processes.

The 3rd generation of poverty measure

- Distinguishing between stochastic and structural transitions requires information on _____and expected levels of well-being.

“Asset”

- The term asset is understood to broadly include conventional, privately held productive and financial wealth, as well as social, geographic and market access positions that confer economic advantage.
- Assets are multi-dimensional.
- Assets can be either tangible or intangible.

The vertical axis measures a standard flow indicator of achieved material well-being (or utility), typically measured as income or expenditure.

_____is the conventional money metric poverty line.

The horizontal axis measures the assets that generate a household's livelihood.

The _____is the relationship between assets and income, expenditures or some other flow measure of well-being.

The asset poverty line _____is the level of assets that predicts a level of well-being equal to the poverty line, $\underline{u}$.

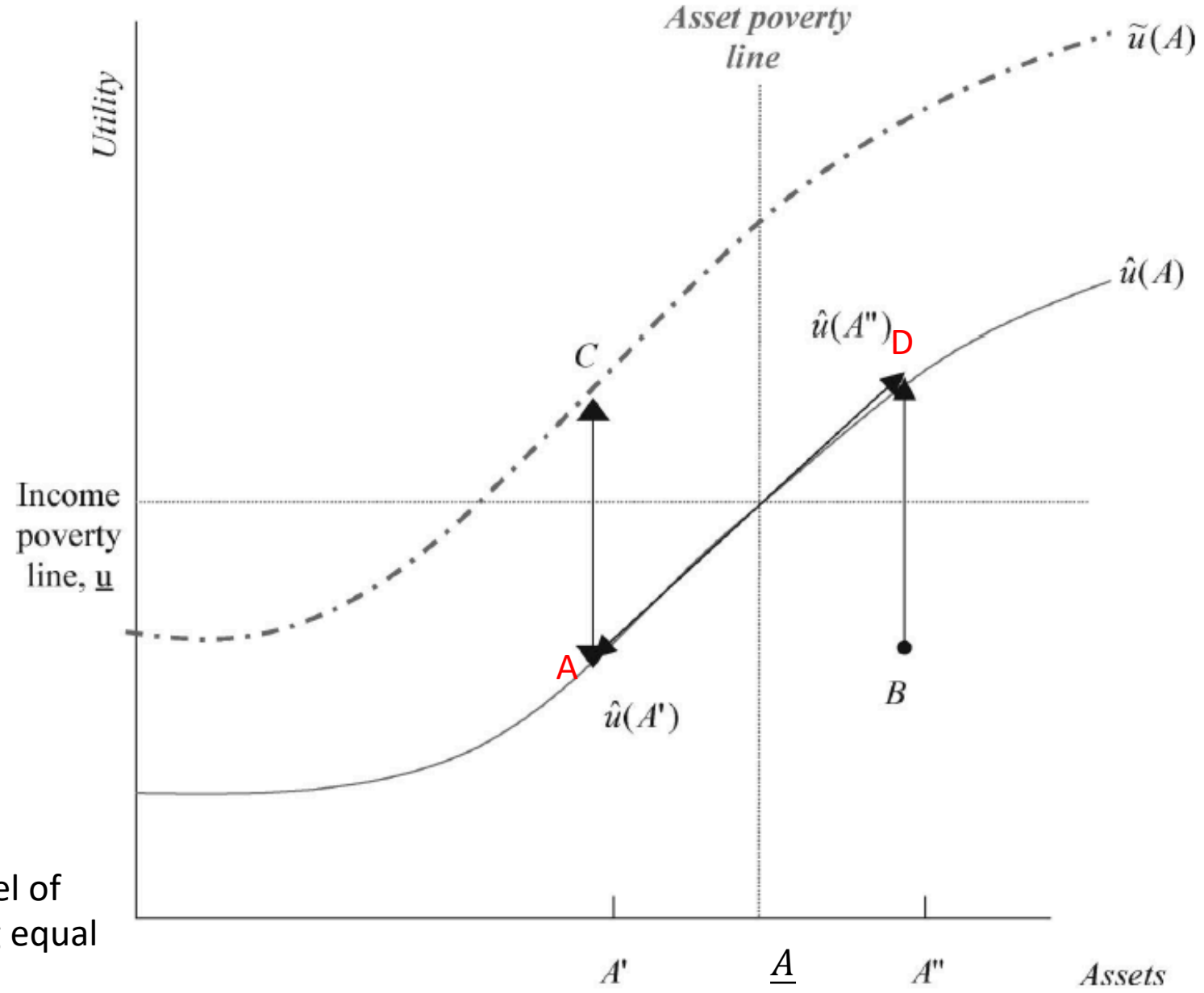


Figure 2. Single period income and asset poverty lines

Stochastically poor vs. Structurally poor

- In any time period, a household is stochastically poor if it holds assets worth at least $\underline{A}$ yet its realised income or expenditure falls stochastically below $\underline{u}$. >> _____
- The household is structurally poor if its stock of assets is less than $\underline{A}$ and its realised income or expenditure level falls, as expected, below $\underline{u}$. >> _____

Stochastic transition vs. Structural transition

- A _____back from being income nonpoor to being income poor is the transition back to its expected status based on household's assets below the asset poverty line.

  >> Transition from Point___to Point____

- A _____from being income nonpoor to being income poor is a structural transition from above to below the asset poverty line due to a loss of assets.

  >> Transition from Point____to Point____

Limitations of the 3rd generation of poverty measure

- The challenge in implementing these ideas results from the need to estimate a livelihood mapping between assets and expenditures (or income) statistically.

- Analysis based on the asset poverty line cannot by itself identify whether the currently structurally poor are likely to _____poor over the longer term, caught in a poverty trap, or indeed whether a subset of the structurally non-poor can sustain their positions over the longer term.

4th generation: Poverty Traps and the Dynamic Asset Poverty Threshold

- Some mechanisms can create _____to asset at the individual level.
- When returns are locally increasing, there will be a_____relation between wealth (level of assets) and the marginal returns to assets.
- At the microeconomic or household level, a positive relationship between wealth and marginal returns can exist for at least three reasons:

Micro-foundations of an asset-based poverty trap

1) Income process (production function) exhibits increasing returns to scale over a range either because the primal technology exhibits locally increasing returns or because_____ (output) prices, or transactions costs are_____(positively) related to scale over some significant range;
2) _____/ minimum project size required to make use of a higher return technology. The production function available to households is non-convex, hence making the frontier of production functions to be non-convex.

3) Insurance and financial market imperfections and risk aversion lead poor households to choose _____income strategies, and to allocate assets to reduce risk exposure.

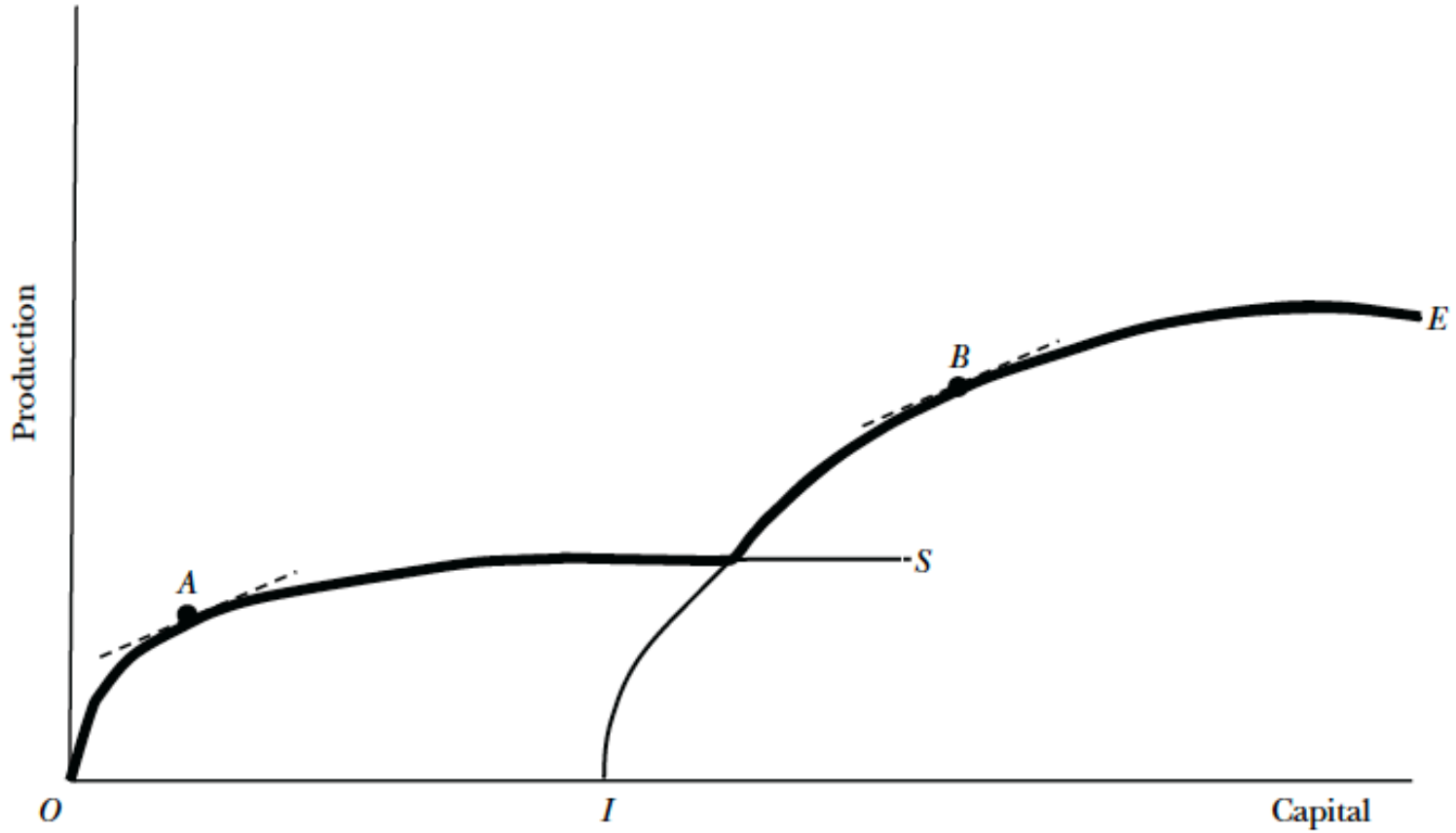
Micro-foundations of an asset-based poverty trap

- Consider the second reason
- Consider the case where a household can allocate its productive wealth to two distinct productive activities, L_1 and L_2.
- Both activities exhibit diminishing returns to wealth.
- However, activity L_2 has a minimum scale of operation due to sunk costs of operation or of switching into L_2 .
- L_2 generates no returns if the wealth dedicated to this activity is below the minimum level

For a given set
of intrinsic
characteristics
(individual time
preferences,
technical efficiency
or skill,
and so forth).

Figure 3

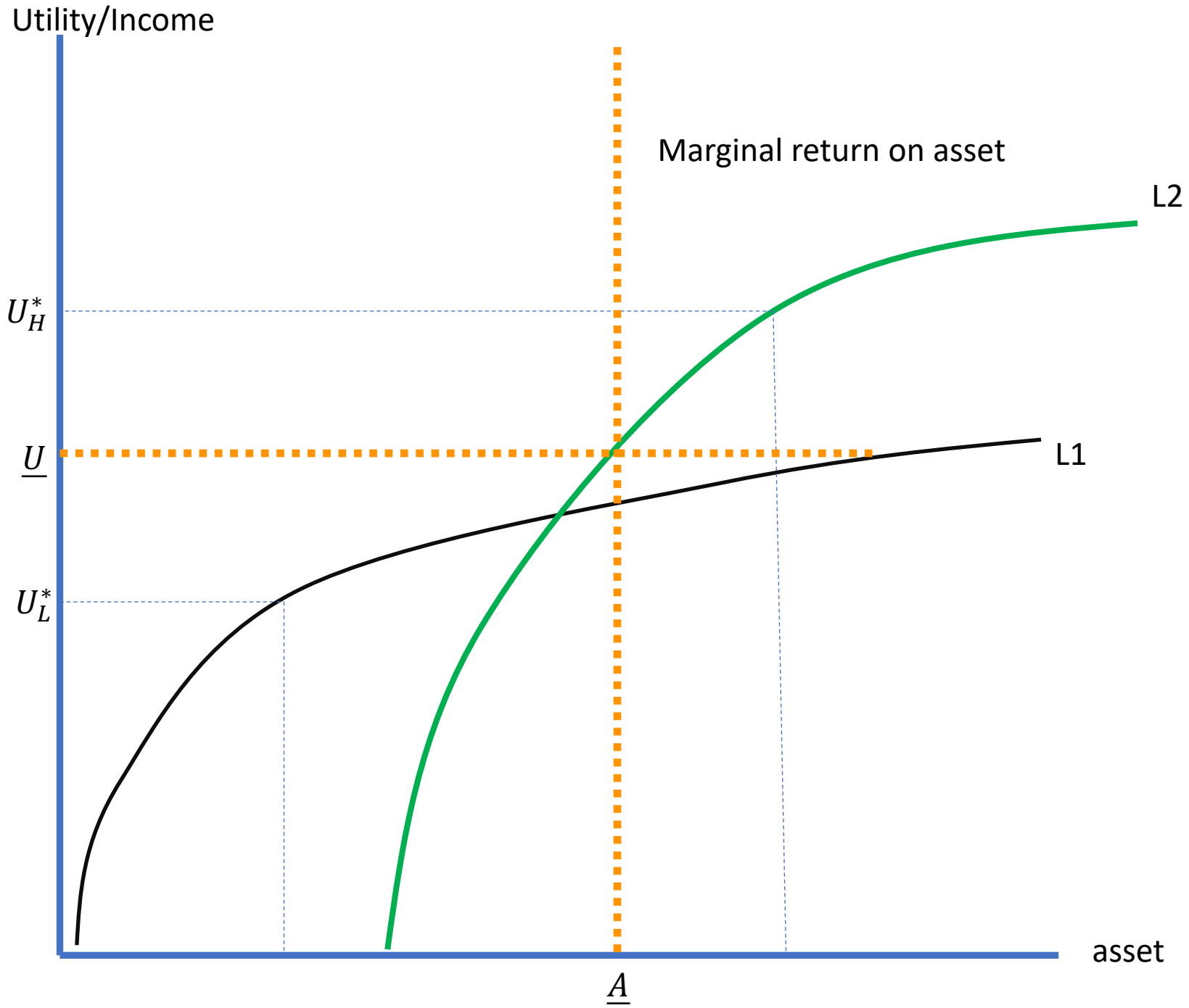
Production Non-convexity Arising from Choice between Two Technologies



Note: Following Banerjee and Duflo (2011), Figure 3 then shows the subsistence production technology (curve *OS*) and entrepreneurial activity (curve *IE*), and the combined nonconvex production set *OE* (the darkened curve).

The value A_1^* denotes the steady state value for a household restricted to livelihood activity L1, yielding income or material well-being level U_L^*.

The value A_2^* denotes the same thing for L2, yielding the higher level steady state income, U_H^*



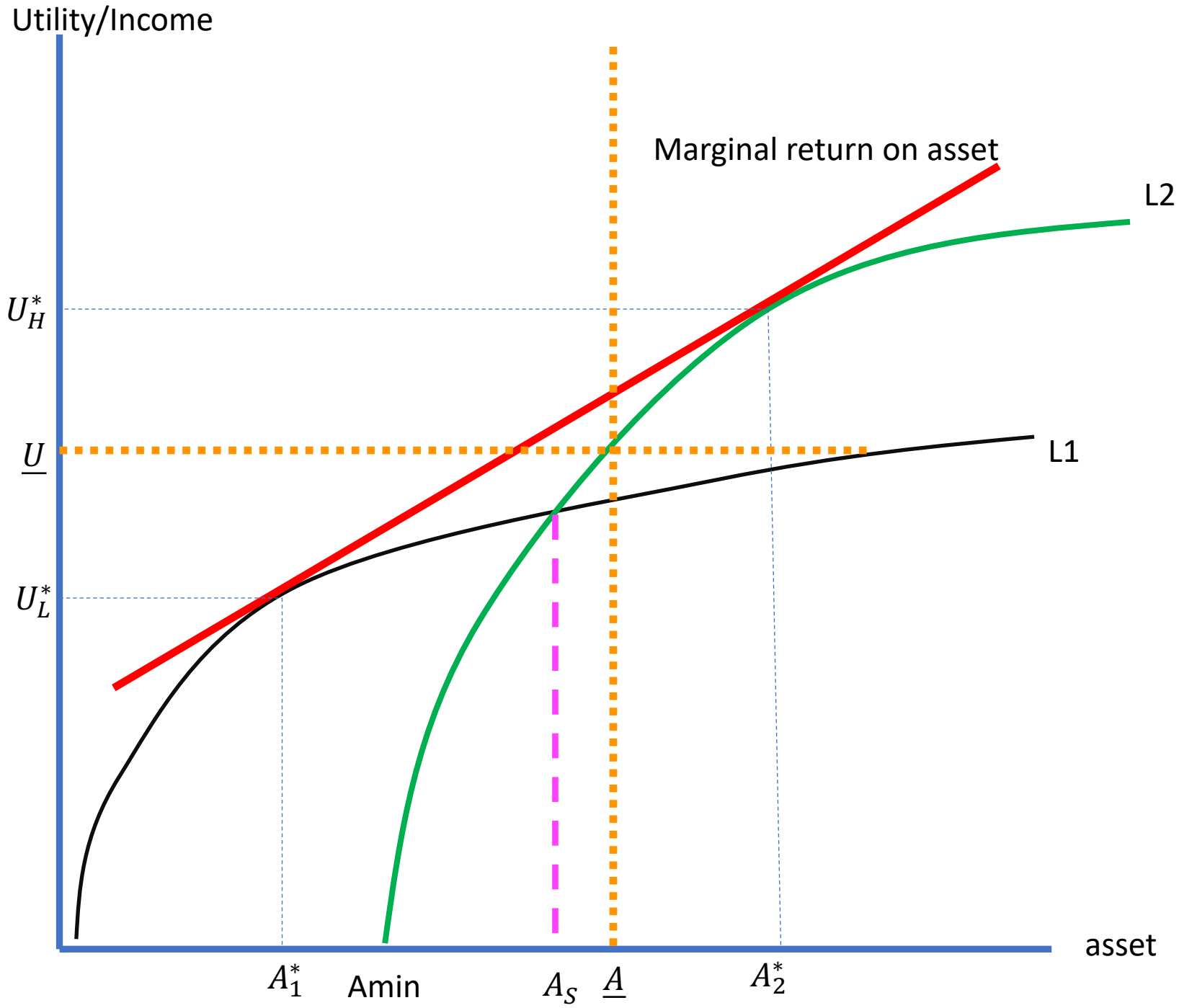
Micro-foundations of an asset-based poverty trap

- Households possessing more assets adopt higher return crop varieties or agronomic practices.
- Wealthier households get skilled salaried employment rather than unskilled casual wage labor.
- Households change from poultry, small ruminants, indigenous cattle to improved dairy cattle and advanced animal husbandry practices.

Can household/individual accumulate asset until A_S?

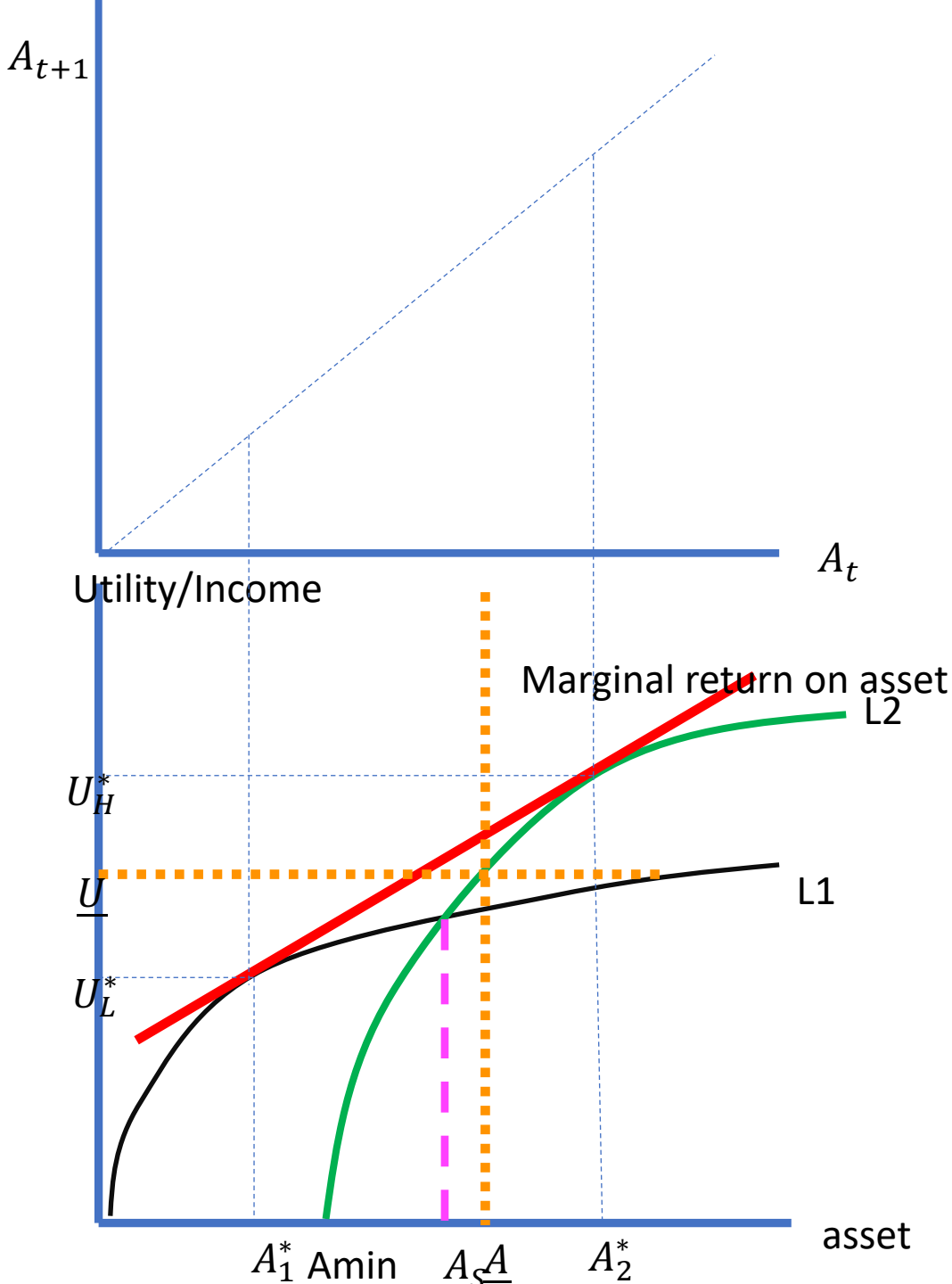
The household's first best option would be to borrow sufficient funds so that it could leap forward to a higher return asset level.

Can household pull through autarchic savings strategy?



Dynamic asset poverty line(a Micawber threshold)
is the critical asset threshold below which it is no longer rational or feasible to pursue the autarchic accumulation strategy.

Households whose assets place them above that threshold would be expected to escape poverty over time, while those below would not. One needs to identify this dynamic asset poverty threshold in order to disaggregate the structurally poor into those expected to escape poverty on their own over time through predictable asset accumulation and those expected to be trapped in poverty indefinitely.



A mathematical model for poverty trap from “Poverty Traps and Social Protection” by Barret, Carter, and Ikegami(2008)

1. Heterogeneity in skills & abilities (α_i) that is unrelated to risk aversion
2. Fixed costs barriers to moving ahead

$$f(\alpha_i, k_{it}) = \begin{cases} f_L(\alpha_i, k_{it}) = \\ f_H(\alpha_i, k_{it}) = \end{cases}$$

3. Borrowing constraints (autarchic accumulation if move ahead)

$$c_{jt} \leq [f(\alpha_j, k_{jt}) + (1-\delta)\theta_t k_{jt}]$$

$$i_{jt} = f(\alpha_j, k_{jt}) - c_{jt}$$

4. Negative asset shocks, but no insurance (formal or informal)

$$k_{it+1} = \theta_t[i_t + (1-\delta)k_{it}],$$

Dynamic choice problem

$$\max_{\underset{\rightarrow}{c},\,\underset{\rightarrow}{i}} \mathrm{E}_\tau \sum_{t=\tau}^{\infty} \beta^{t-\tau} u(c_t)$$

$$\text{s.t.} \quad c_t \leq [f(\alpha, k_t) + (1-\delta)\theta_t k_t]$$

$$i_t = f(\alpha, k_t) - c_t$$

$$k_{t+1} = \theta_t [i_t + (1-\delta) k_t]$$

$$k_\tau \text{ given}$$

Multiple equilibria poverty trap

- A story when there are multiple steady states and thresholds in asset level at which initial condition in asset or shocks matters in determining which steady state households are going to converge to.

- *Poverty trap is a*ny self-reinforcing mechanism that causes poverty to persist(Azariadis & Stachurski, 2005).

Poverty traps: various mechanisms

- Non-convex livelihood functions/production functions
- Coordination failures / multiple market failures that underlie “Big push” theories of development
- Hunger- or nutrition-based poverty traps
- Occupational poverty traps where lumpy investments + borrowing constraints prevent some household-based businesses from growing beyond subsistence.
- When network is formed through indirect means such as occupation and education.
- Poverty perpetuates itself by aggravating self-control problem.

Empirical Strategies to Identify Poverty Dynamics and Critical Asset Thresholds

- Estimation of the asset dynamics to test for the existence of a dynamic asset poverty threshold confronts basic problems.
- The relationship is potentially_____,
- The dynamic asset poverty threshold is an _____equilibrium, away from which households move over time. This means that we would expect few observations in the neighbourhood of the threshold itself in any data set and an unstable equilibrium can easily be mistaken for heteroskedastic errors.
- Most households possess a portfolio comprised of multiple assets. Estimation of asset dynamics must somehow deal with this dimensionality problem.

Micro evidence

"Welfare dynamics in Rural Kenya and Madagascar"

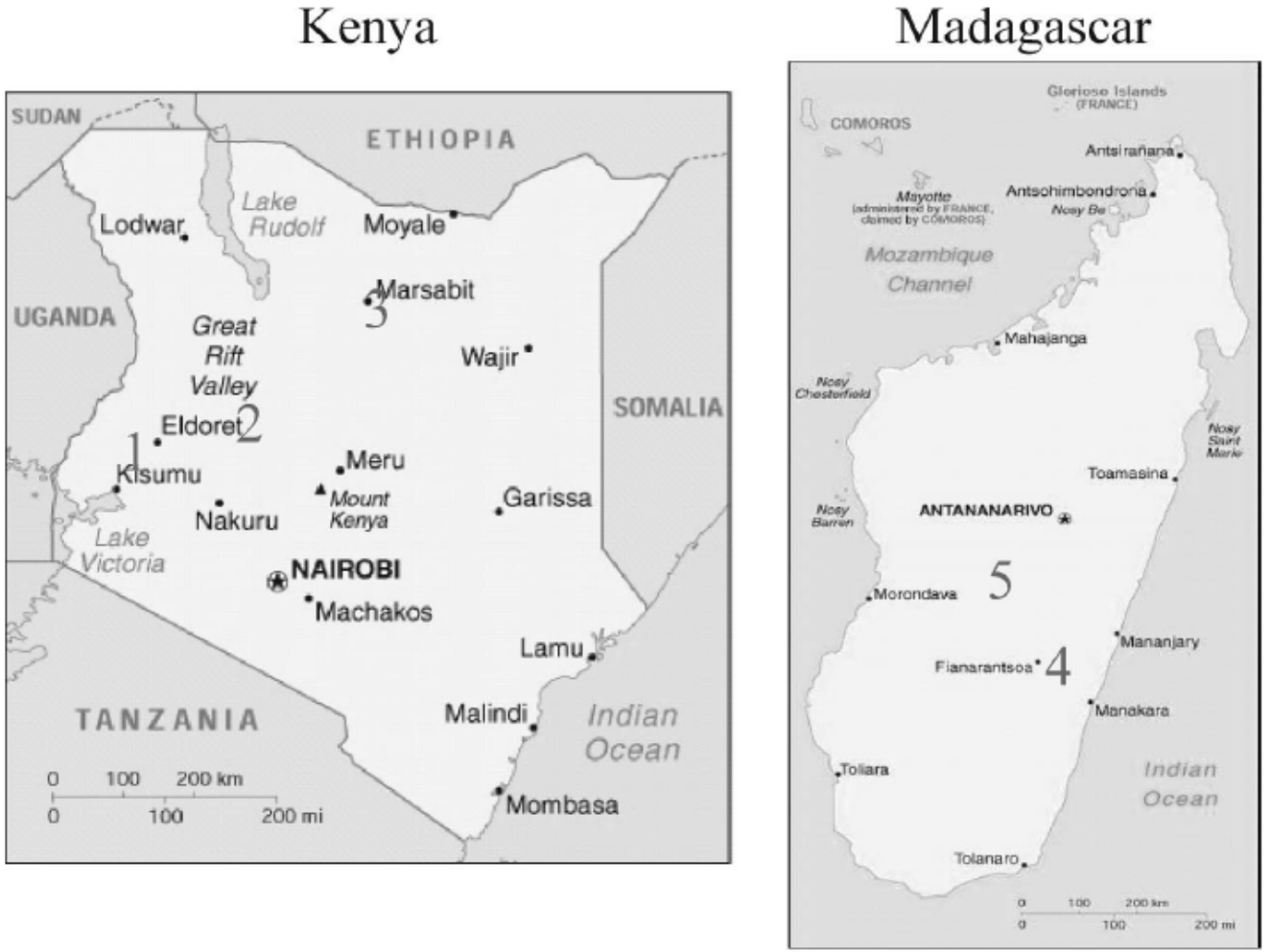
Barrett et al. (2006)

Journal of Development Studies

Empirical test of the model from Carter and Barrett

- Panel data sets from Kenya and Madagascar
- Sample stratified on market access and agro-ecology
- 301 households in total
- Panel length varies from 1989-2002 to 2000-2002

Research sites



1 = Madzuu (Vihiga)

2 = Ng'ambo (Baringo)

3 = Dirib Gombo (Marsabit)

4 = Fianarantsoa

5 = Vakinankaratra

Figure 1. Survey sites in rural Kenya and Madagascar

Dynamic income-based poverty

Table 1. Ultra-poverty transition matrices
As measured against $0.50/day per capita real income ultra-poverty line

	Poor in subsequent period		Non-poor in subsequent period	
Poor in initial period	2000–2002 Dirib Gombo 100.0% **70.8%**	1989–2002 Madzuu 60.7% 1997–2002 Fianarantsoa 82.8%	2000–2002 Dirib Gombo 0.0% **11.2%**	1989–2002 Madzuu 20.2% 1997–2002 Fianarantsoa 10.3%
	2000–2002 Ng'ambo 86.5%	1997–2002 Vakinankaratra 58.5%	2000–2002 Ng'ambo 9.0%	1997–2002 Vakinankaratra 7.4%
Non-poor in initial period	2000–2002 Dirib Gombo 0.0% **11.3%**	1989–2002 Madzuu 10.1% 1997–2002 Fianarantsoa 6.9%	2000–2002 Dirib Gombo 0.0% **6.8%**	1989–2002 Madzuu 9.0% 1997–2002 Fianarantsoa 0.0%
	2000–2002 Ng'ambo 0.0%	1997–2002 Vakinankaratra 22.3%	2000–2002 Ng'ambo 4.5%	1997–2002 Vakinankaratra 11.7%

There exists one unstable dynamic equilibrium between these two stable dynamic equilibria. This nonparametric regression suggests that household-level herd dynamics bifurcate at 5–6 TLU per capita. Above that level, the herd size naturally grows toward the higher equilibrium of 10 TLU per capita. But below the unstable equilibrium, household herd sizes tend to collapse toward the low-level equilibrium of less than one TLU per capita.

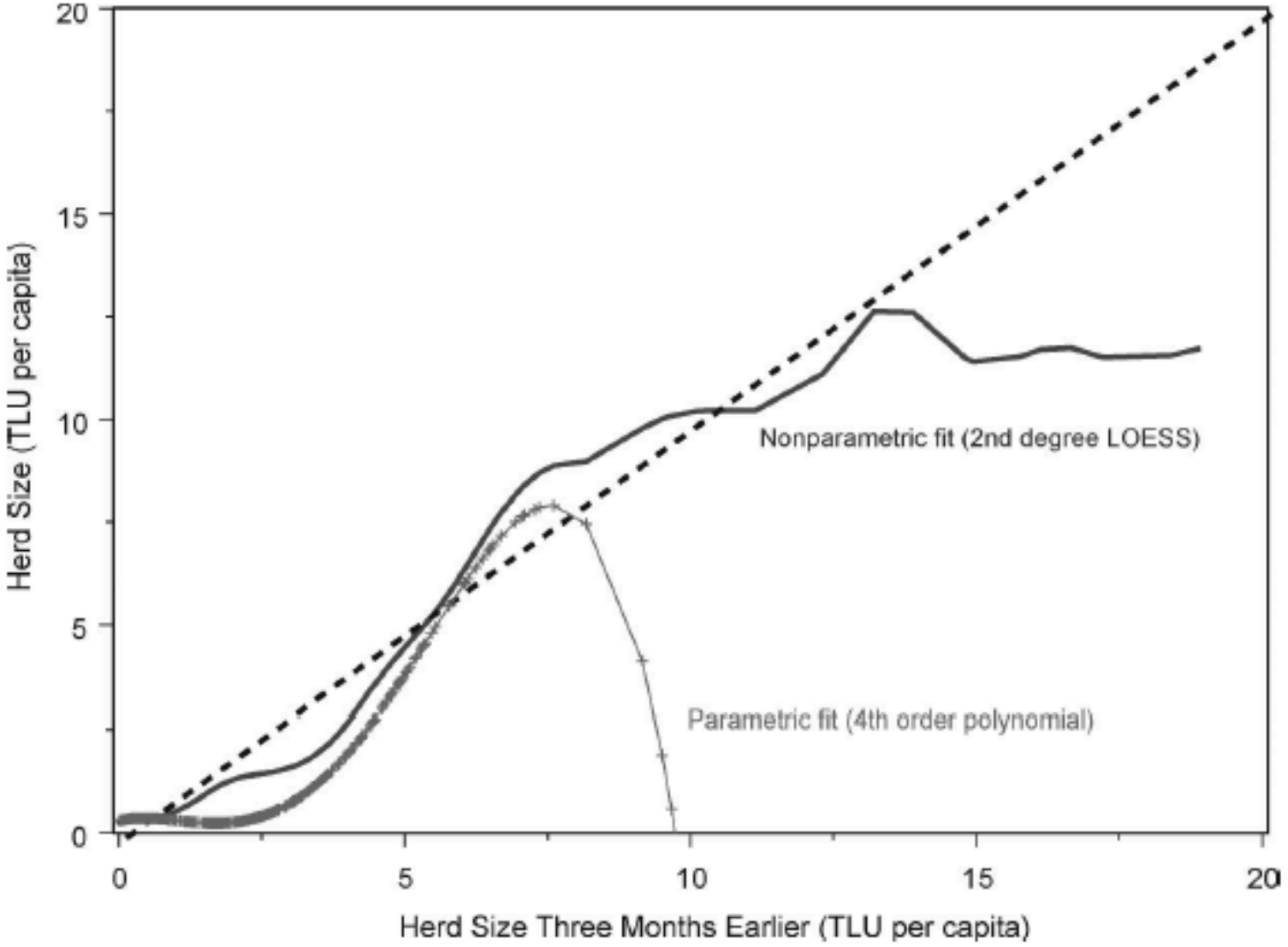


Figure 3. Herd dynamics in Northern Kenya

The TLU represents a standardised measure of metabolic liveweight in animals, enabling aggregation across species according to the formula 1 TLU.1 cattle.0.7 camels.10 goats.11 sheep

Testable asset dynamics (parametric)

$$A_{i,t} = \beta_0 + \beta_1 A_{i,t-1} + \beta_2 A_{i,t-1}^2 + \beta_3 A_{i,t-1}^3 + \beta_4 A_{i,t-1}^4 + \gamma_1 Z_{i,t} + \gamma_2 Z_{i,t} A_{i,t-1} + T_t + \alpha_i + \varepsilon_{i,t}$$

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DESIGNING INDEX-BASED LIVESTOCK INSURANCE FOR MANAGING ASSET RISK IN NORTHERN KENYA

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Andrew G. Mude
Christopher B. Barrett
Michael R. Carter

ABSTRACT

This article describes a novel index-based livestock insurance (IBLI) product piloted among pastoralists in Northern Kenya, where insurance markets are effectively absent and uninsured risk exposure is a main cause of poverty. We describe the methodology used to design the contract and its underlying index of predicted area-average livestock mortality, established statistically using longitudinal observations of household-level herd mortality fit to remotely sensed vegetation data. Household-level performance analysis based on simulations finds that IBLI removes 25–40 percent of total livestock mortality risk. We describe the contract pricing and the risk exposures of the underwriter to establish IBLI's reinsurability on international markets.

Micro evidence

"Stochastic wealth dynamics and risk management among a poor population"

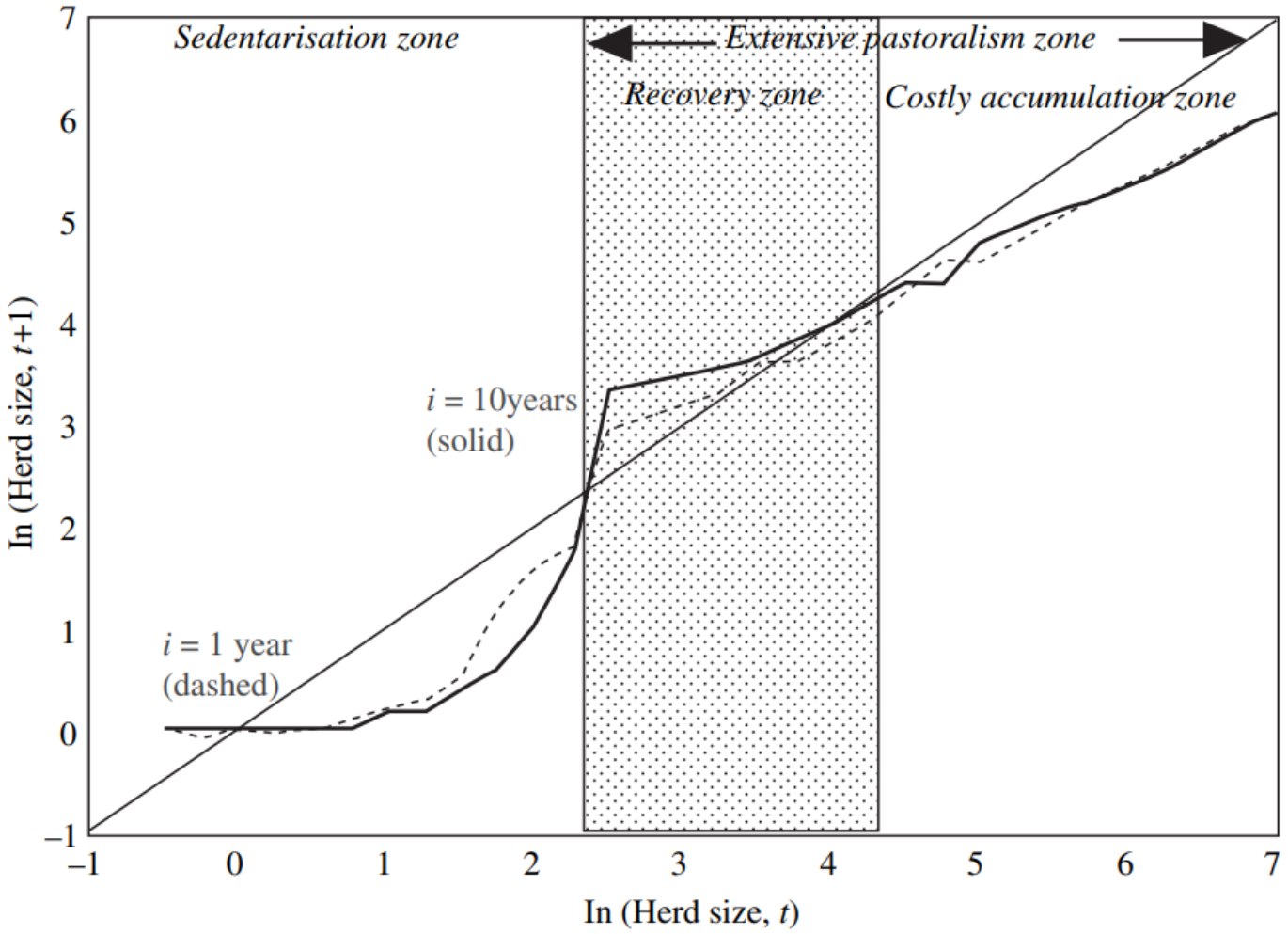
Lybbert et al. (2004)

Economic Journal

17-year panel in southern Ethiopia

Major productive asset
is livestock.

Livestock dynamics was estimated using a non-parametric kernel estimator.
This estimator
is sufficiently flexible to capture high-order non-linearities.



Nadaraya-Watson estimates using Epanechnikov kernel with bandwidth ($h = 1.5$)

Fig. 4. *Nonparametric Estimates of Expected Herd Size Transition Functions*

Final thoughts

- These are some of the strongest positive findings of poverty traps
- Jalan and Ravallion (2002 JAE) find evidence of geographic poverty traps in a different setting (rural China)
- At least one systematic review is more skeptical of multiple equilibrium models of poverty traps (Kraay and McKenzie 2014).
- This is an area ripe for more work using theory and thoughtful analysis of existing data

Journal of Economic Perspectives—Volume 28, Number 3—Summer 2014—Pages 127–148

Do Poverty Traps Exist? Assessing the Evidence†

Aart Kraay and David McKenzie

In 1960, per capita incomes in Burundi, Haiti, and Nicaragua were $347, $1,512, and $2,491, respectively. Despite the sevenfold difference in incomes between Nicaragua and Burundi, all three countries were poor by developed-country standards. Nicaragua's per capita income was just 16 percent of the level enjoyed by citizens of the United States at the time, while Burundi's income was a paltry 2 percent of US levels. Fifty years later in 2010, per capita incomes in these three countries were basically unchanged, at $396, $1,411, and $2,289 respectively

- One should be skeptical of claims that microfinance will be the solution to poverty traps caused by the interaction of financial constraints and lumpy investment technologies or that there are many workers for whom receiving more calories will be the difference between them being stuck working at low productivity or not.