Poverty Traps and the Social Protection Paradox

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Social Protection & Poverty Dynamics

- Means-tested cash transfers have emerged as the instrument of choice, spreading from middle income early adopters (Mexico, South Africa) to lower income countries
- Kenya established the HSNP cash transfer in 2009 in the risk-prone pastoral regions that are the backdrop for this study
  - Means-tested bi-monthly transfer of about $15/family
  - Hurrell & Sabates-Wheeler (2013) find that HSNP helped families tread water at best
  - Not unlike findings out of some Latin American programs ("second generation problem"), with Gertler *et al.* (2012) being perhaps exceptional evidence

Social Protection & Poverty Dynamics

- Two weaknesses to HSNP and cash transfer programs as comprehensive poverty program:
  - Do little to enhance capacities & incentives for poor households to accumulate & graduate from cash transfer dependence
  - Do not address the vulnerability of near poor
- In high risk environment like the pastoral regions of Kenya, these weaknesses would imply a growth in the number of transfer eligible households, bringing:
  - Slow dilution of benefits to the poor if social protection budget fixed; or,
  - Budgetary sink if benefit levels are protected

Social Protection & Poverty Dynamics

- In this kind of environment where there is empirical evidence of poverty traps (e.g., McPeak & Barrett 2001; Lybbert *et al.* 2004), might social protection based on contingent (insurance-like) transfers targeted at vulnerable, non-poor have a larger impact on poverty dynamics than purely progressive cash transfers?
- To answer this question, employ a stylized poverty trap model calibrated to the Northern Kenya environment:
  - Missing financial markets for credit & risk, meaning households must self-insure and self-finance all accumulation
  - Non-convex production technology
  - Skill or technical efficiency heterogeneity (more and less able)
- Generates two sorts of poverty traps:
  - Single equilibrium poverty trap that applies to those who are less able
  - Multiple equilibrium poverty trap for middle ability households, creating the prospect for what we term unnecessary deprivation

Summary of Findings

- Social protection paradox: Compared to a conventional cash transfer targeting, the extent & depth of poverty are lower in the medium term when a limited social protection budget is used to first target the vulnerable non-poor in preference to the poor
- Anticipation of contingent transfers can promote upward mobility by the poor (an *ex ante* effect of social insurance)
- But, anticipation can also reduce accumulation by others (standard moral hazard)
- Implementing contingent social protection as a partially subsidized index insurance program can overcome distortion created by moral hazard

Model Structure & Intuition

- Assume the following structure of production:

$$f(\alpha_j, k_{jt}) = \alpha_j \max[f_H(k_{jt}), f_L(k_{jt})]$$

  where $f_L(\alpha_j, k_{jt}) = \alpha k_{jt}^{\gamma_L}$, $f_H(\alpha_j, k_{jt}) = \alpha k_{jt}^{\gamma_H} - E$, $E > 0$ and $0 < \gamma_L < \gamma_H < 1$.
- Denote as $\hat{k}(\alpha)$ as the value of capital where it becomes worthwhile to switch to the more productive technology (i.e., $\widehat{k}(\alpha_j) = \{k | f_L(\alpha_j, k) = f_H(\alpha_j, k)\}$).

Model Structure & Intuition

- While $\hat{k}(\alpha)$ is technically determined, we know from Buera's (2009) non-stochastic model that there may be a *behavioral* threshold level of capital around which accumulation dynamics bifurcate
- Let $k_L^*(\alpha_j)$ denote the steady state level of capital that would obtain if only the low technology were available
- Consider an individual j with $k_L^*(\alpha_j) < k_{j0} < \widehat{k}(\alpha_j)$.

Model Structure & Intuition

- Note that because j is already beyond the low level steady state, marginal returns to investment are low and discourage further investment financed with foregone consumption
- Nonetheless, if j is 'close' to the technological frontier, then would likely be dynamically optimal to sacrifice in the short term and reach the point where returns to capital jump.
- But if j is further away, might there exist a critical asset threshold $\widetilde{k}(\alpha_j)$, below which j rationally retreats to the low equilibrium, and above which she will accumulate and strive to reach the high equilibrium?
- Risk accentuates this problem (certain cost, uncertain benefits)
- Following Zimmerman & Carter (2002), we will call this threshold (if it exists) the Micawber threshold or (in 2-dimensional space) the Micawber frontier

Dynamic Model under Financial Autarchy

$$\max_{c_{jt}} \quad E_\theta \sum_{t=0}^{\infty} \beta^t u(c_{jt})$$

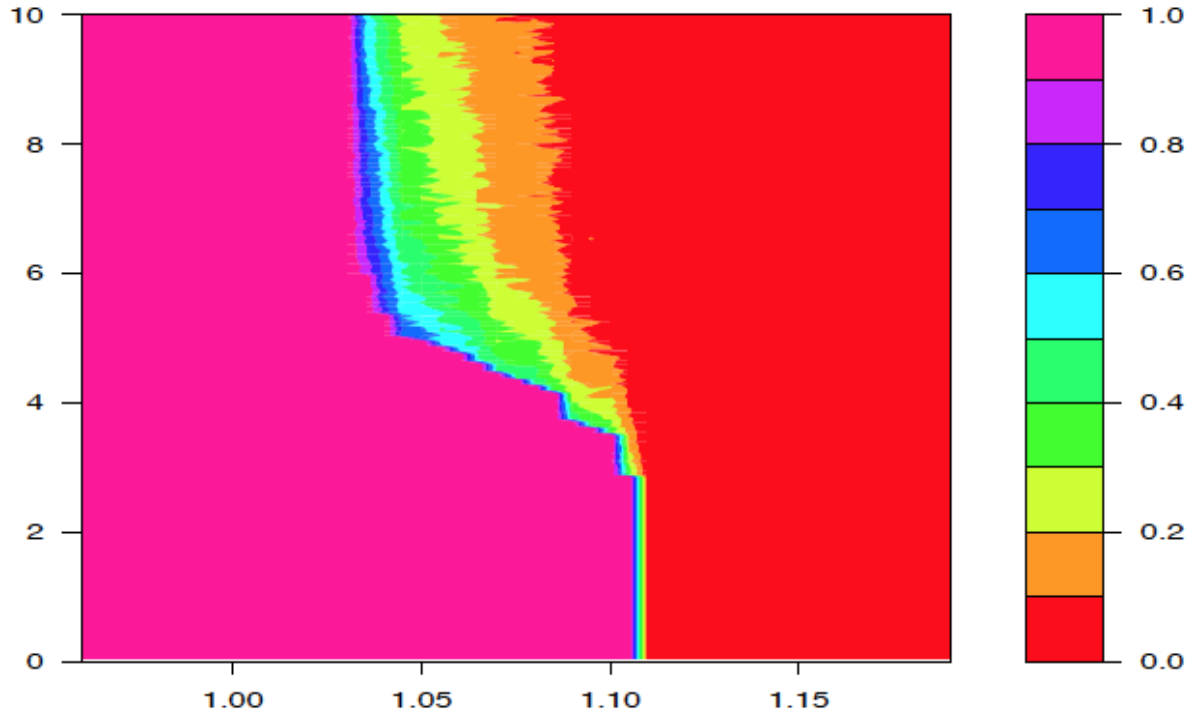
subject to:

$$c_{jt} \leq k_{jt} + f(k_{jt})$$
$$f(\alpha_j, k_{jt}) = \alpha_j \max[f_H(k_{jt}), f_L(k_{jt})]$$
$$k_{jt+1} = (k_{jt} + f(k_{jt}) - c_{jt})(\theta_{jt+1} - \delta)$$
$$k_{jt} \geq 0$$

- Note what is missing from this problem!

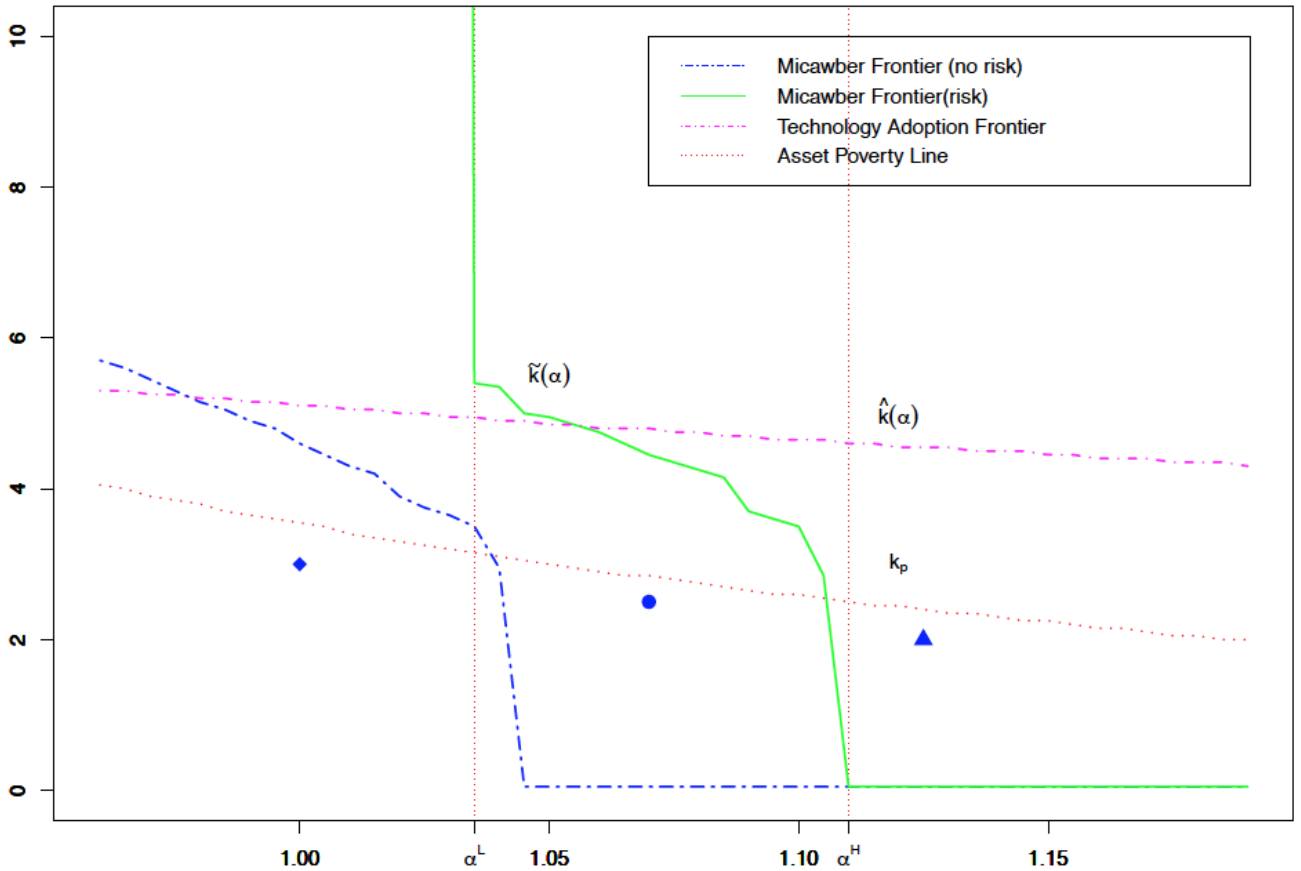
Numerical Analysis: Probability of Chronic Poverty

- Using a stochastic structure meant to mimic the reality of Northern Kenya, we employ dynamic programming methods to identify the Micawber Frontier:



- Labeling those at the low equilibrium as poor, see that the model supports two sorts of chronic poverty or poverty traps:
  - Single equilibrium ($\alpha_j < 1.04$)
  - Multiple equilibrium ($1.04 < \alpha_j < 1.11$)

Risk, Shocks & Chronic Poverty



- *Ex post* effects or realized shocks
- *Ex ante* effects of anticipation of shocks
- Carter & Ikegami (2009) showed the ex ante effects weigh more heavily on the middle ability groups
- Let's now explore impacts of social protection policies

Stylized Economy & Performance Measures

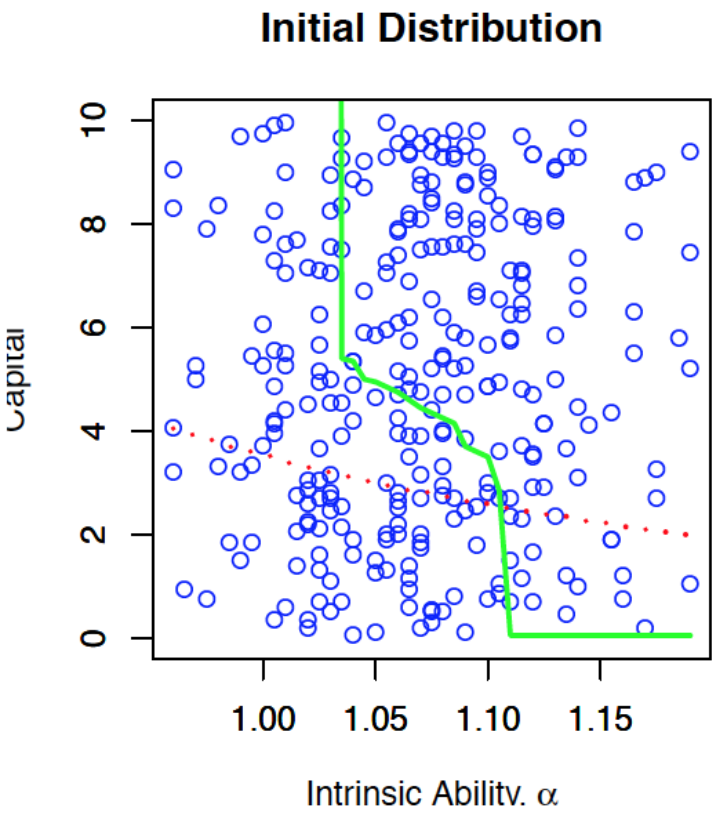
- Let's consider an economy comprised of households who behave according to the dynamic model above distributed across the ability-capital space
- Let's track evolution of standard FGT poverty measures as as well as a measure of unnecessary deprivation:

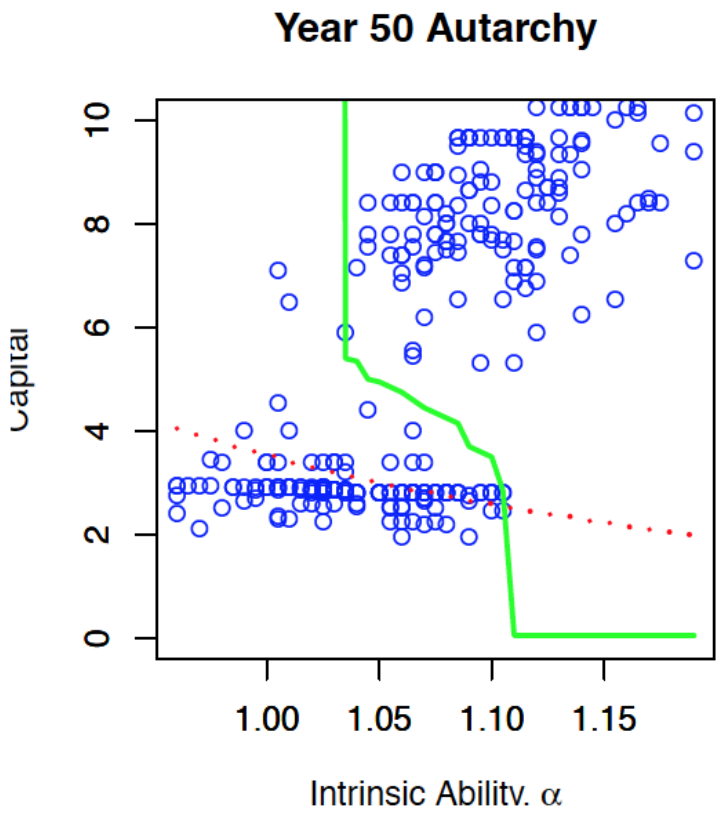
$$D_{\gamma}^{y} = \frac{1}{n} \sum_{\substack{y_j < y_p \\ y_j < f(\alpha_j, \overline{k}^*(\alpha_j))}} \left(\frac{f(\alpha_i, \overline{k}^*(\alpha_j)) - y_j}{f(\alpha_i, \overline{k}^*(\alpha_j))} \right)^{\gamma}$$

where $f(\alpha_j, \overline{k}^*(\alpha_j))$ is your maximal potential income given ability.

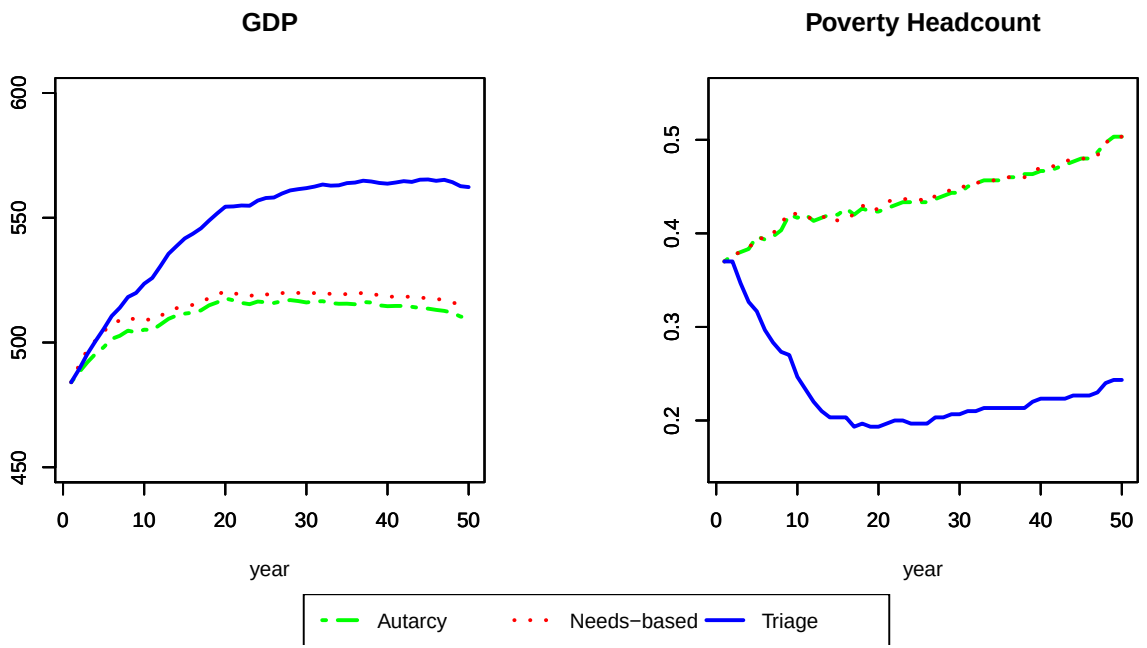
- Varying γ, can get a suite of headcount and gap measures a la Foster-Greer-Thorbecke

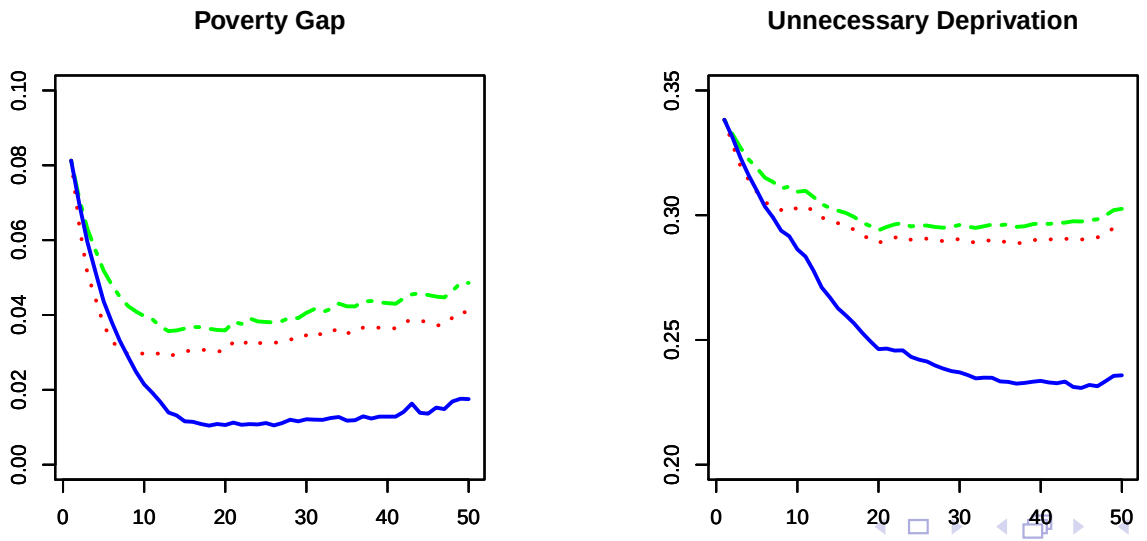
Initial & 'Terminal' Distributions in Stylized Economy





Pre-transfer Income Poverty & Growth Measures

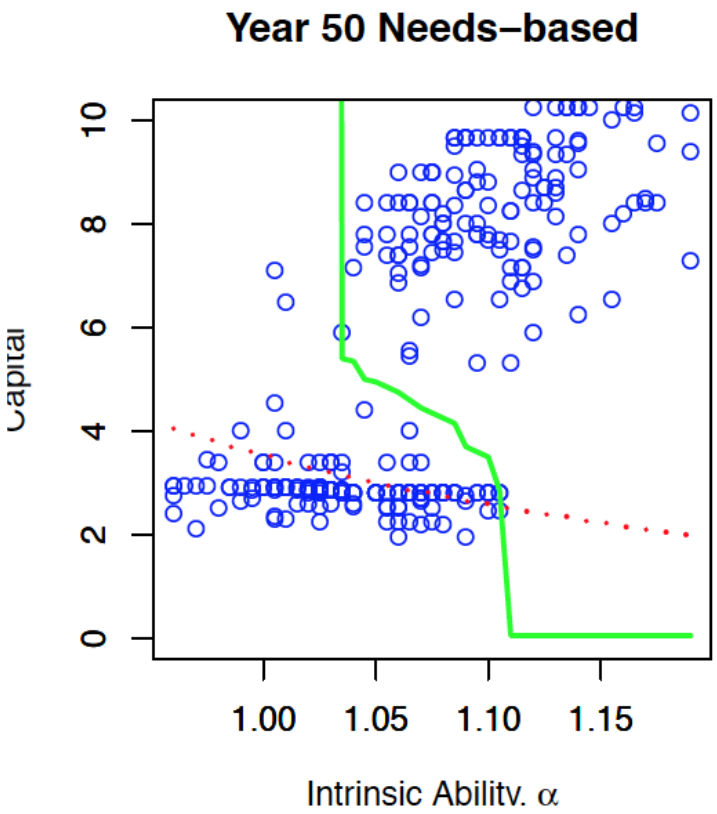


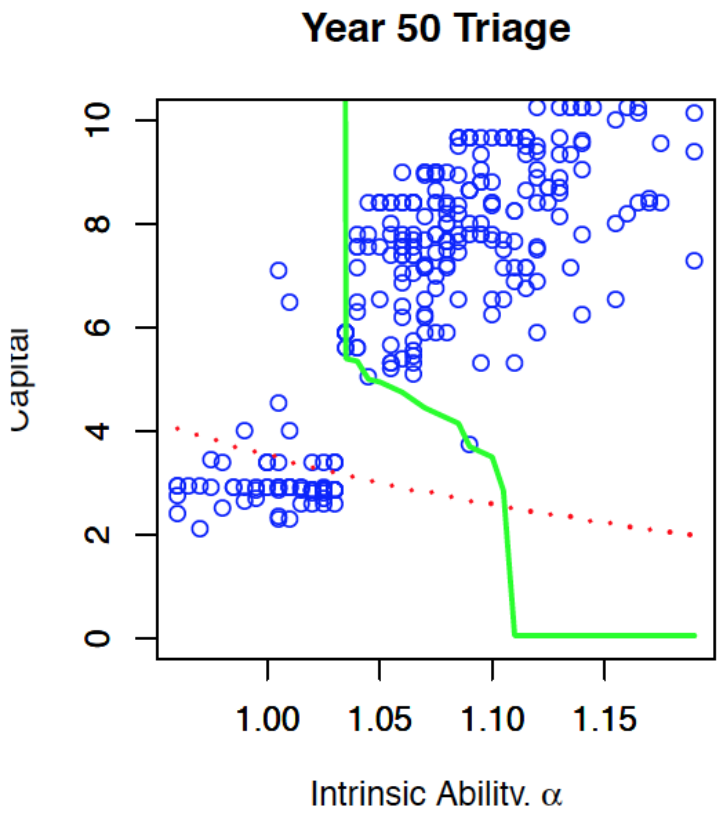


Impacts of Cash Transfers

- Define the total poverty gap as $S = \sum_{y_j < y_p} (y_p - y_j)$
- Set budget, B, such that initially $\frac{B}{S} = 1$
- If $\frac{B}{S} > 1$, then full information cash transfers are made to completely close the consumption poverty gap for all households.
- Otherwise, if $\frac{B}{S} < 1$, then transfers move everyone to $\frac{B}{S} y_p$
- Note that targeting is progressive in the sense that poorest households receive the largest transfers.
- So what happens over time with this kind of social protection in our stylized poverty trap world?

Impacts of Cash Transfers





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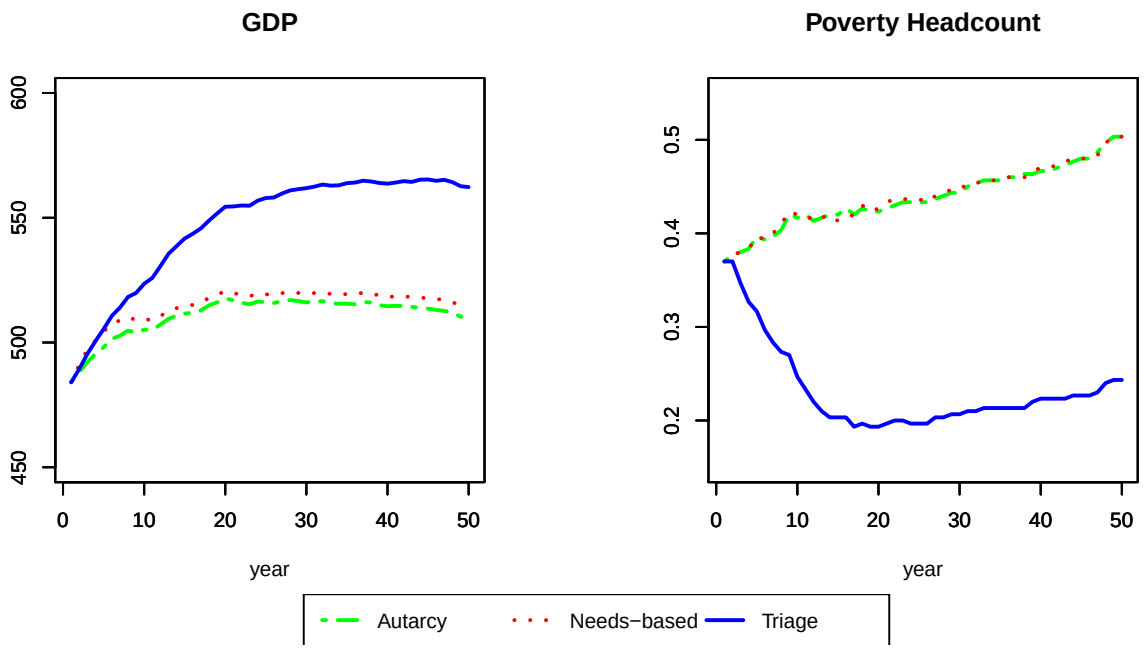
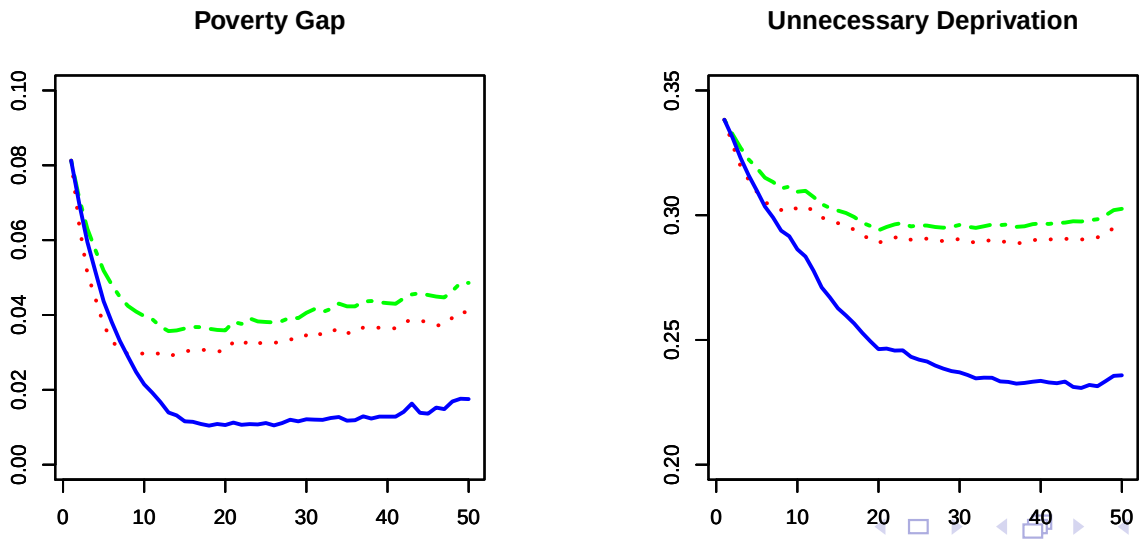




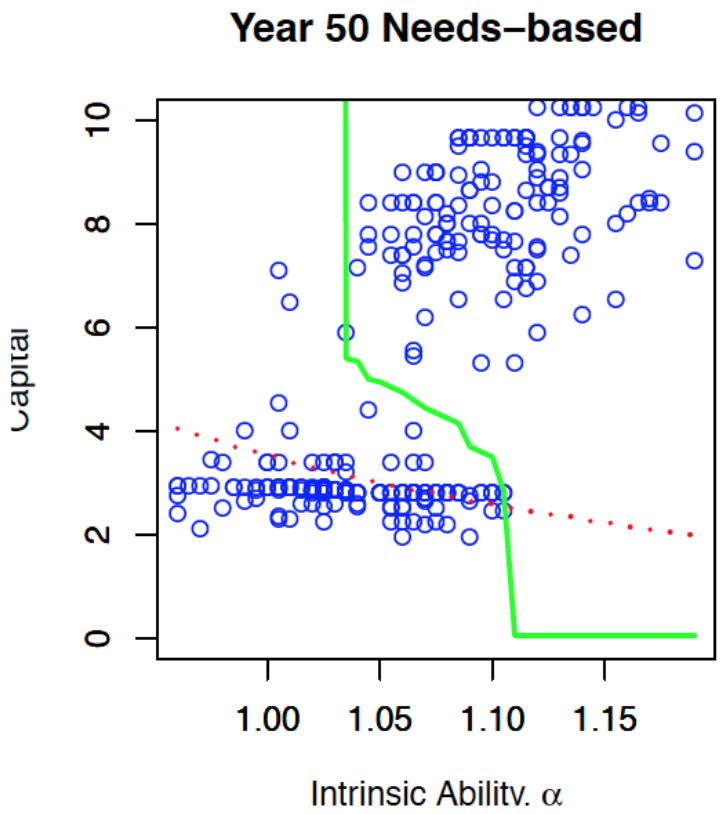
Vulnerability-targeted Contingent Transfers

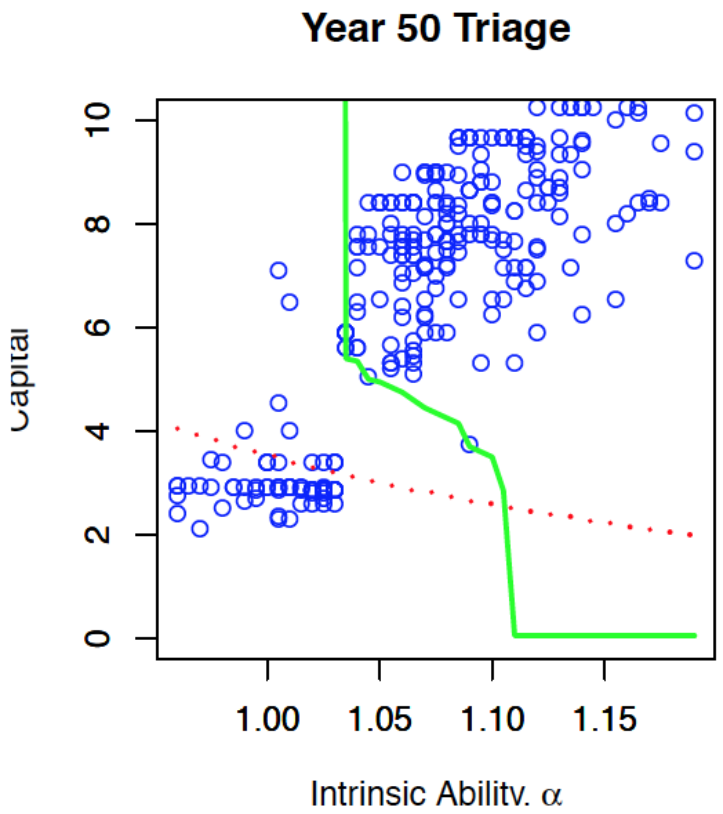
- See that conventional cash transfers confront a large uptick in the extent and depth of poverty, including substantial unnecessary deprivation
- Consider a full information vulnerability-target contingent transfer scheme:

$$VTCT_j = \begin{cases} max\left[0, \tilde{k}(\alpha_j) - \theta_t[i_{jt} + (1-\delta)k_{jt}]\right] \text{ if } i_{jt} + (1-\delta)k_{jt} > \tilde{k}(\alpha_j) \\ 0, \text{ otherwise} \end{cases}$$

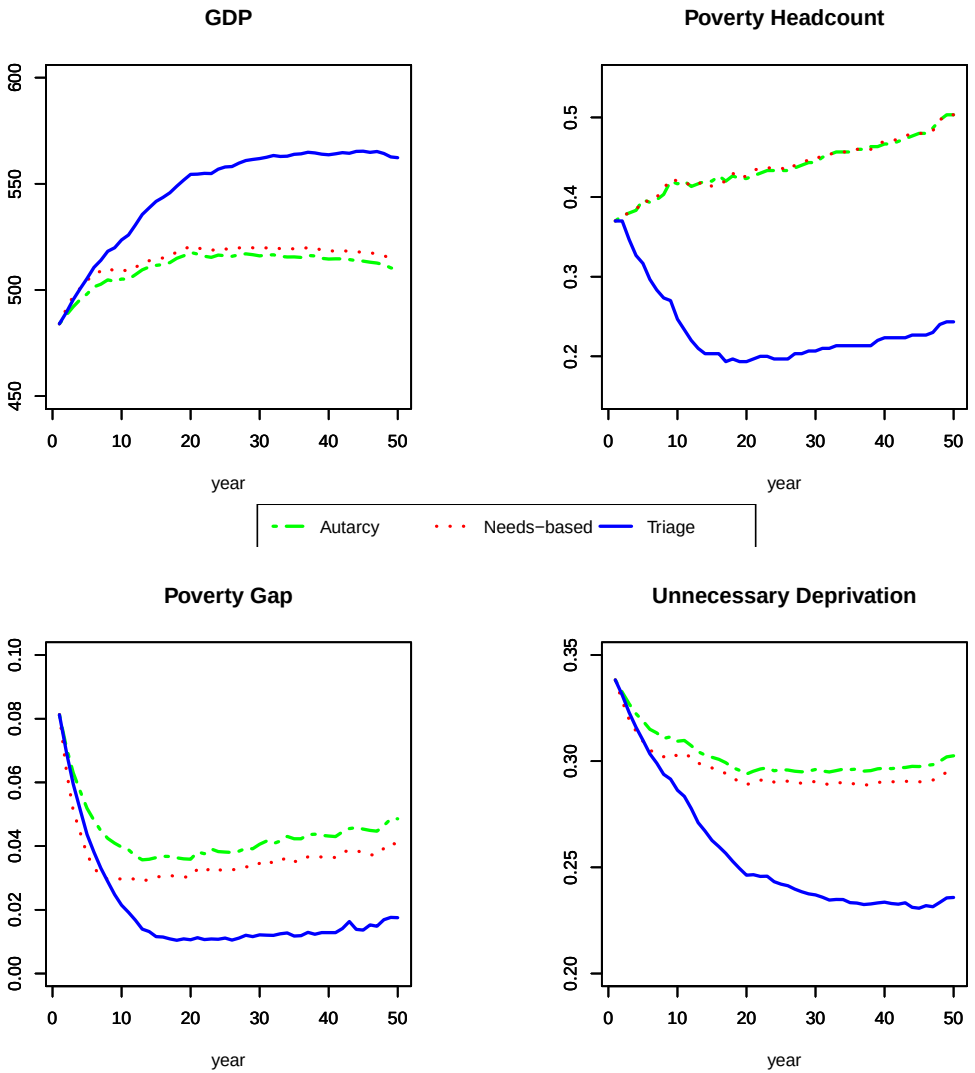
- To draw out the contrast with conventional transfers, consider following expenditure priorities (triage):
  - VTCT first fully funded;
  - Cargo net transfers to middle ability funded second
  - Conventional cash transfer funded with any residual budget

Vulnerability-targeting & Paradox of Social Protection





Vulnerability-targeting & Paradox of Social Protection



Anticipation of Social Protection

- So far seen what happens if use social protection to target vulnerability, removing ex post impacts
- Upward mobility driven by cargo nets (and sustained by VTSP), but no *ex ante* because analysis so far assumes contingent transfers not anticipated
- To allow for anticipation, rewrite dynamic model as:

$$\max_{c_{jt}} \quad E_\theta \sum_{t=0}^{\infty} \beta^t u(c_{jt})$$

subject to:

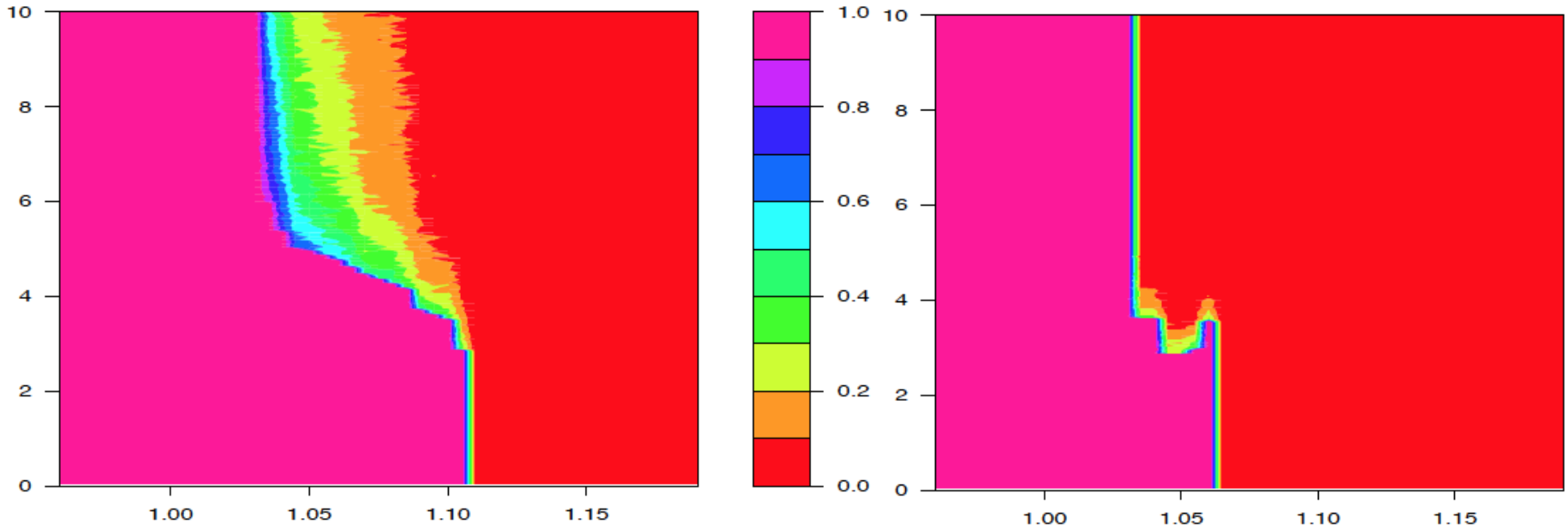
$$c_{jt} \leq k_{jt} + f(k_{jt})$$

$$f(\alpha_j, k_{jt}) = \alpha_j \max[f_H(k_{jt}), f_L(k_{jt})]$$

$$k_{jt+1} = \begin{cases} \tilde{k}(\alpha_j) \text{ if } (f(k_{jt}) - c_{jt}) + (1-\delta)k_t > \tilde{k}(\alpha_j) \text{ and } (k_{jt} \\ (k_{jt} + f(k_{jt}) - c_{jt})(\theta_{jt+1} - \delta) \text{ otherwise} \end{cases}$$

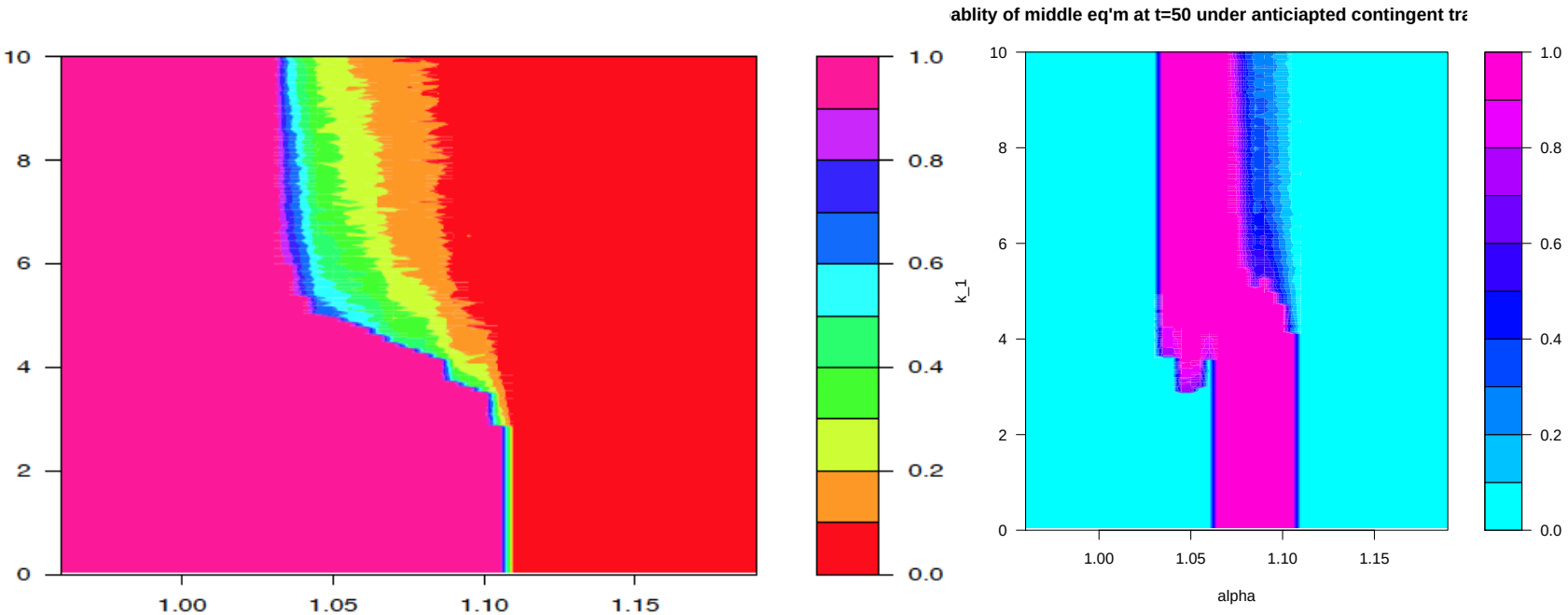
$$k_{jt} \geq 0$$

Shift in Micawber Frontier: "Positive" Moral Hazard



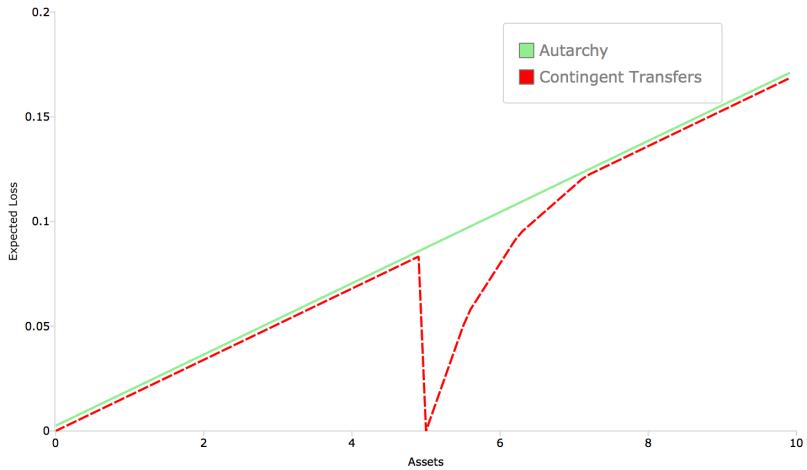
Shift in Micawber Frontier: "Negative" Moral Hazard

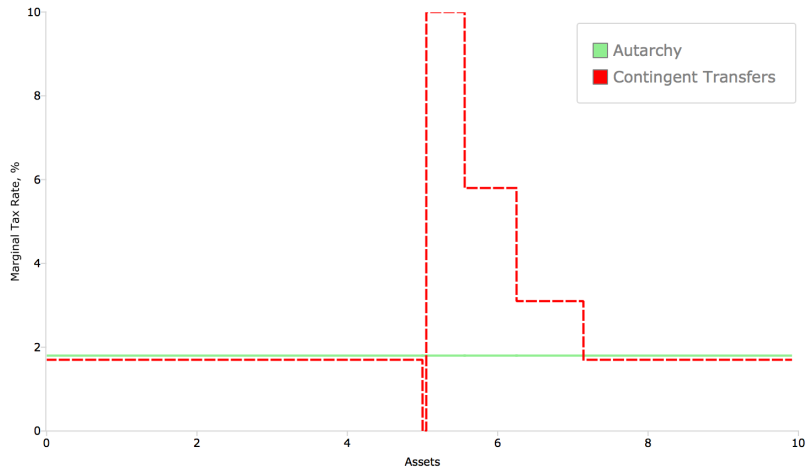
- However, get a set of "dole bludgers" that sit at the insured point, $\tilde{k}(\alpha_j)$



Shift in Micawber Frontier: "Negative" Moral Hazard

- Precise targeting of vulnerability transfers discourages further investment

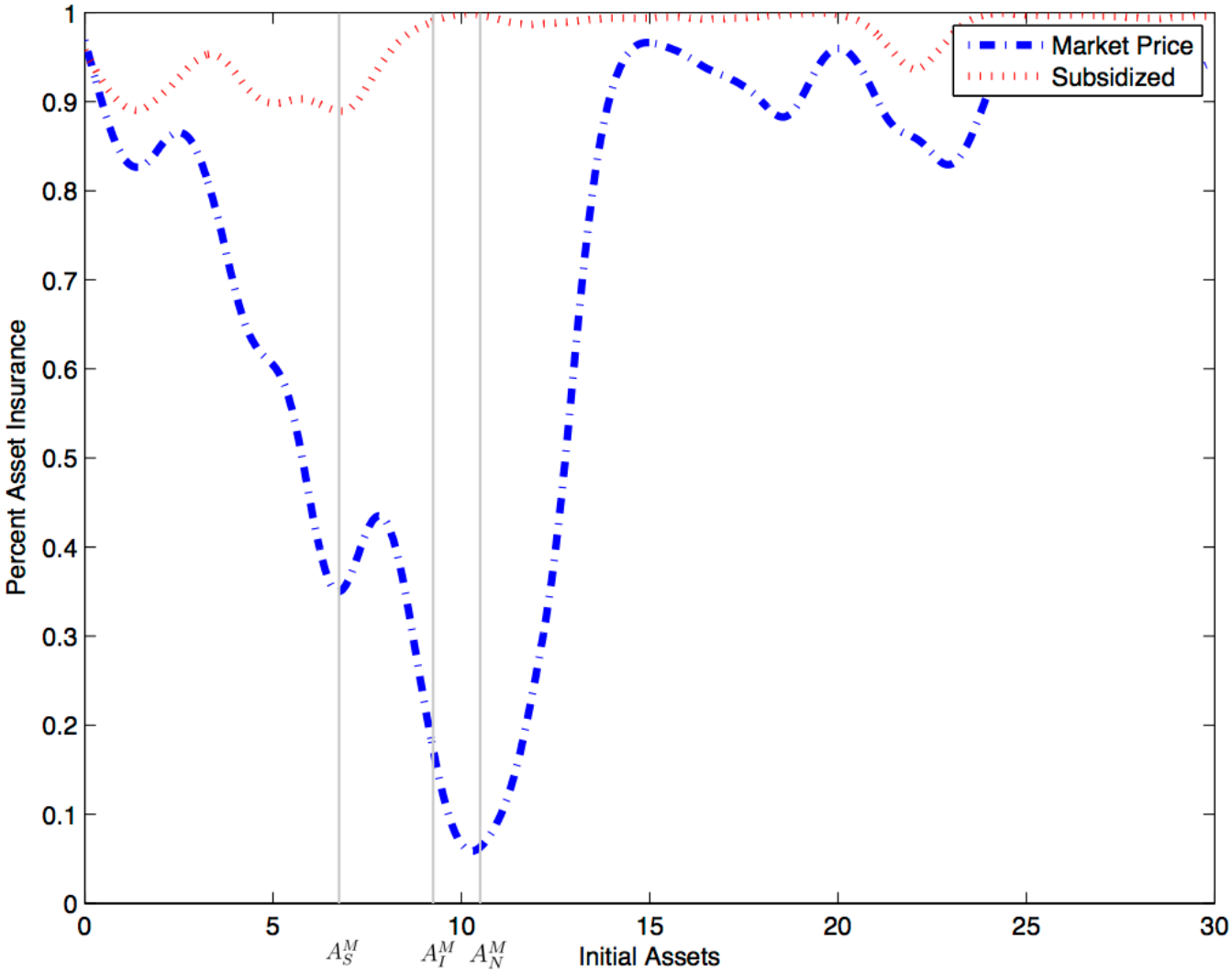




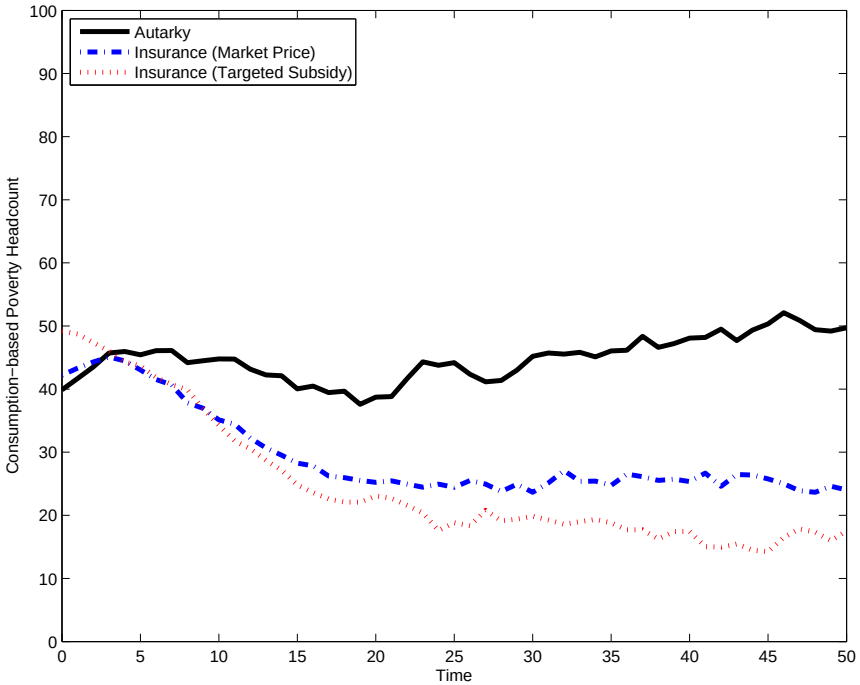
Improving the Functioning of Vulnerability-Targeted SP

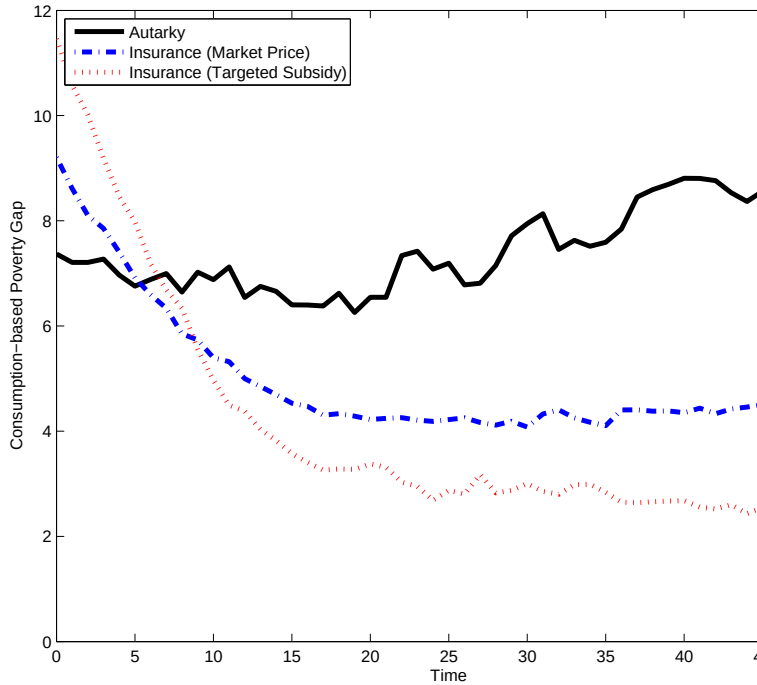
- In earlier versions of this work, we considered a 'fuzzy' safety net as well as sunset clauses intended to move households away from $\tilde{k}(\alpha_j)$
- Instead building on work of Janzen et al. (2016), ask if can more effectively implement contingent social protection as a partially subsidized index insurance scheme:
  - Co-pay may changes incentives to sit at $\tilde{k}(\alpha_j)$
  - Because it is index insurance, maintains accumulation incentives
  - Could be implemented relying on self-selection
  - Cost savings may permit poorly targeted subsidy
- Let's look at just a few complementary results from the Janzen work

Demand for Insurance with & without Subsidy

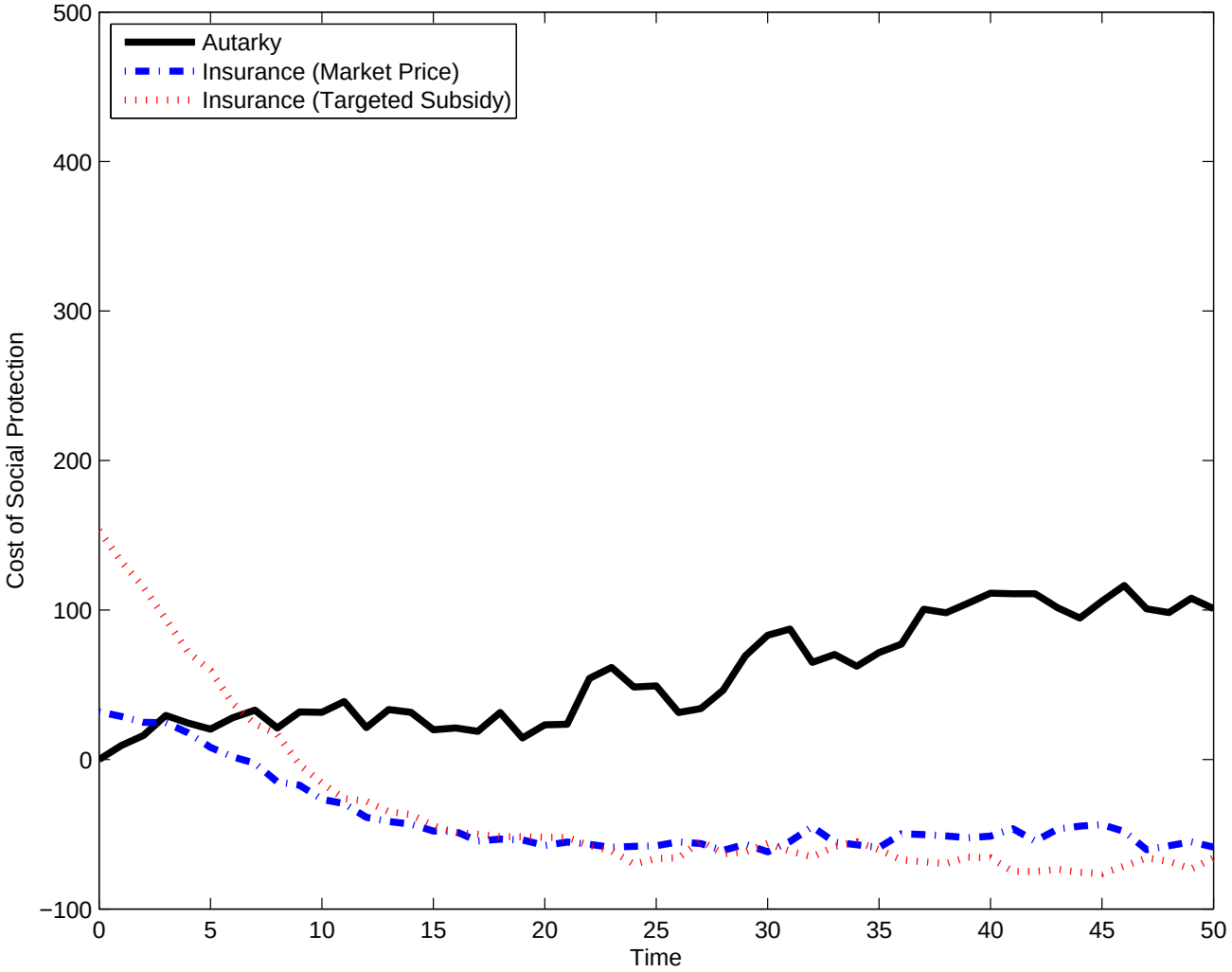


Impacts of Insurance on Poverty





Cost Effectiveness of Insurance

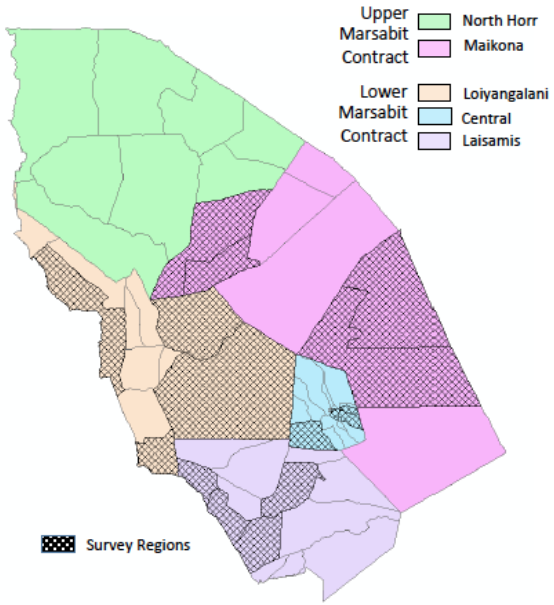


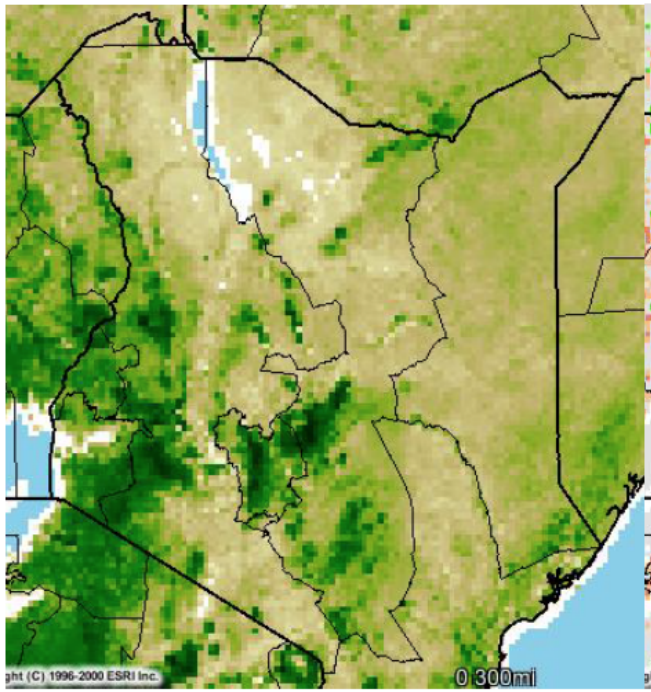
Conclusions

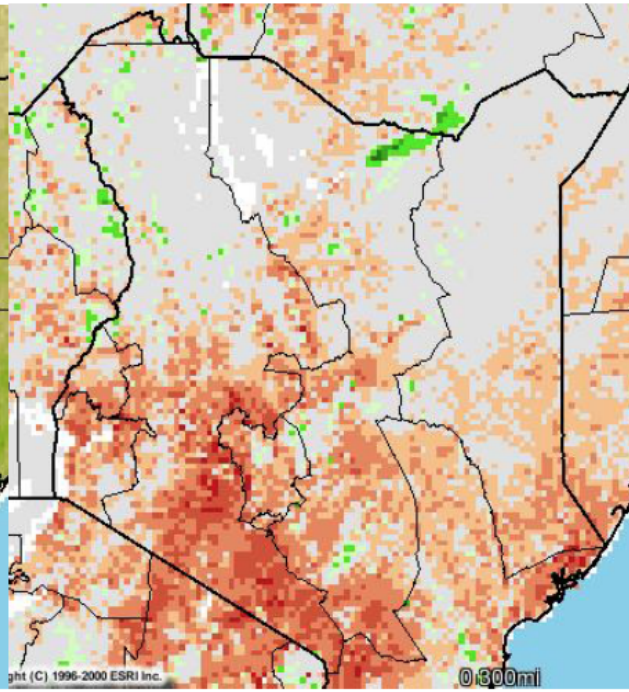
- In world with missing financial markets and severe risk, conventional social protection can result in unnecessary deprivation
- Even using the well-being of the poor as a metric, there is a medium term logic to targeting scarce budget to the vulnerable rather than only to the poor
- Insurance may be a cost-effective way to implement vulnerability targeted social protection
- Long-running IBLI (index based livestock insurance) pilot in Northern Kenya shows some promise (with evidence of both ex ante [Jensen et al.] and ex post impacts [Janzen & Carter] of insurance provision)
- Newly launched Government of Kenya program builds further on these ideas
- Stay tuned for impact evaluation results

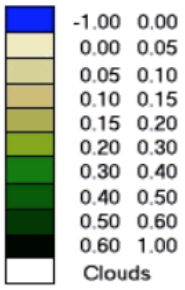
IBLI Contract Design

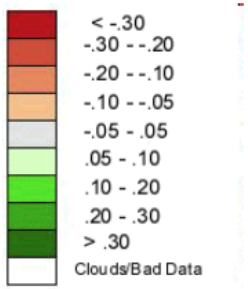
Image credit: TerraMetric, Google



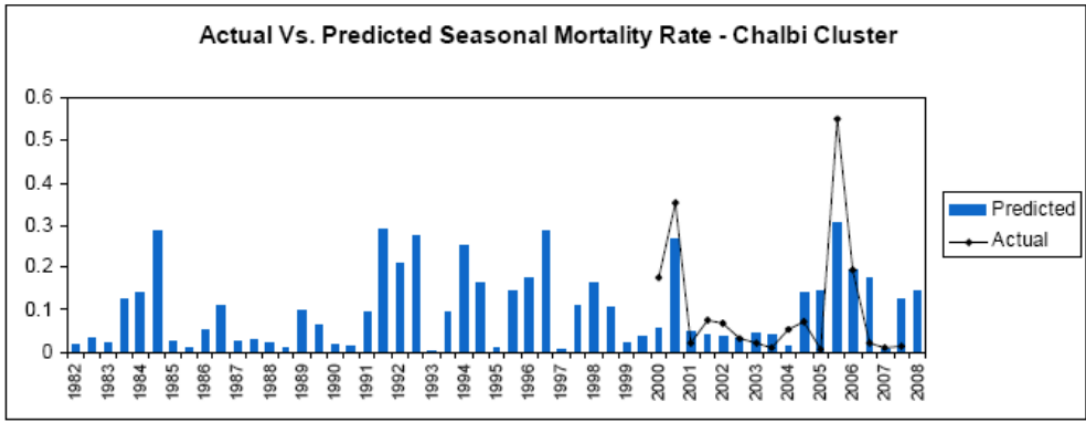


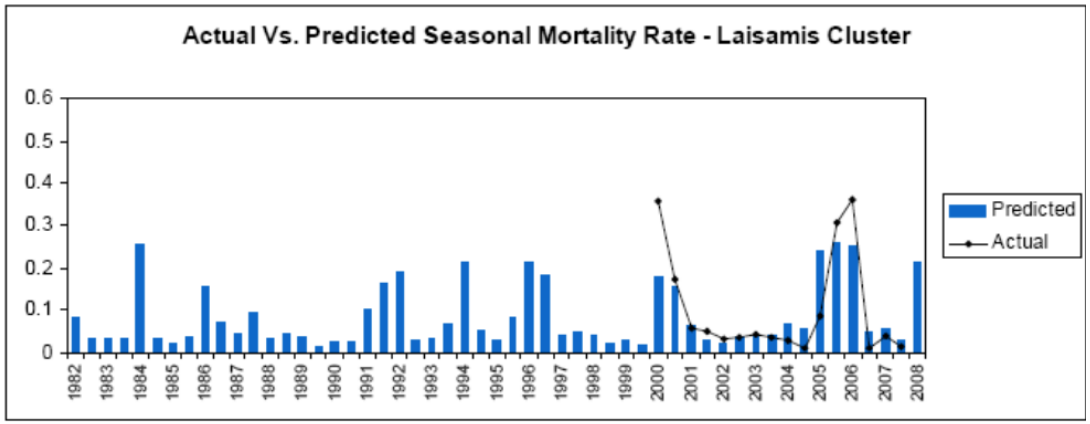






Ground-truthing of IBLI Design





- Ground-truthing based on average mortality loss in community
- More recent work by Jensen et al. suggests idiosyncratic risk important