The Economics of Asset Accumulation and Poverty Traps

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****PRELIMINARY VERSION****

1. Introduction

While the world has seen much progress in economic growth and poverty reduction over the last few decades, the persistence of extreme poverty and its increased concentration in specific places, in particular sub-Saharan Africa, has stimulated renewed interest in the processes of economic development. Attention has focused on improving our understanding how households accumulate assets and increase their productivity and earning potential, as well as the conditions under which some individuals, groups, and economies struggle to escape poverty, and when and why adverse shocks have persistent welfare consequences. The underlying processes are inherently dynamic, stochastic and complex.

It is equally clear that stimulating asset accumulation (broadly defined to include social, physical, natural, human and financial capital) can improve household living standards and that investment incentives vary significantly across households, among locations, and over time. Likewise, adoption of improved technologies or participation in more remunerative markets that increase the returns to existing asset holdings foster income growth, yet the incentives to technology adoption and market participation vary dramatically. While much research has investigated these issues, our understanding of the complexities of asset and well-being dynamics and their intrinsic heterogeneity across households remains incomplete. Further scholarly review and evaluation is needed of the factors affecting (multi-dimensional) capital formation and resulting productivity and income dynamics.

This need is especially pressing given world leaders' commitment to eliminate 'extreme poverty' by 2030 as part of the Sustainable Development Goals. The World Bank defines the 'extreme' poor as those who live on US$1.90/day per person or less in 2011 purchasing power parity(PPP)-adjusted terms. The Bank's most recent estimates[1], for 2013, report that 766 million people worldwide live in extreme poverty, just under 11% of the global population and 12.6% of the world's six developing regions.[2] Extreme poverty has fallen quickly and dramatically. One generation earlier, in 1993, the comparable rates were 33% of world population and more than 40% within the six developing regions. Global progress over the past generation has been nothing short of remarkable.

That progress is highly uneven, however. Ultra-poverty, defined as living on half or less of the global extreme poverty line, i.e., those who live on US$0.95/day or less in 2011 PPP-adjusted terms, has likewise fallen sharply from 1993 to 2013, from 9.6% to just 2.6% of the population of the six developing world regions. But ultra-poverty has also become extremely spatially concentrated, with more than 83% of the world's ultra-poor resident in sub-Saharan Africa, up from just 33% in 1993. The absolute number of the ultra-poor in sub-Saharan Africa decreased just 13% from 1993-2013. It is possible that this spatial concentration merely represents average growth from a lower initial conditions, thus necessarily taking longer to cross a fixed, global extreme (or ultra) poverty line. But

[1] These and other figures are available through the World Bank's Povcalnet data portal: http://iresearch.worldbank.org/PovcalNet/home.aspx.

[2] The World Bank defines the developing regions as: East Asia and Pacific, Europe and Central Asia, Latin America and the Caribbean, Middle East and North Africa, South Asia, and Sub-Saharan Africa.

that seems an overly simplistic explanation given that Sub-Saharan Africa was at least as wealthy as Asia a half century ago and in light of the region's slow progress relative to even the ultra-poverty line.

The destitution reflected by ultra-poverty commonly correlates strongly with a range of other indicators of ill-being: poor physical and mental health, limited education, poor political representation, unusually high rates of exposure to crime, violence, disease and uninsured risks, etc. The problem of poverty transcends limited monetary income. Deprivation manifests itself in a host of mutually reinforcing indicators of human suffering, reflecting the multiple dimensions of financial, human, manufactured, natural and social capital – cumulatively, 'assets' – that people can accumulate or decumulate. This multi-dimensionality also reflects the correspondence among flow indicators– e.g., of income, expenditures, nutrient intake, cognitive performance – and stock measures – e.g., anthropometric scores, wealth, educational attainment – that is intrinsic to any dynamical system.

Furthermore, the poorest populations typically live their entire lives in abject deprivation, suffering chronic or persistent poverty. This is not true worldwide. For example, even during the early 1990s recession, poverty in the United States was remarkably transitory, with a median spell length in poverty – the duration of time between falling into and exiting poverty – of just 4.5 months (Naifeh 1998).[3] By contrast, we have no idea of the comparable median spell lengths in extreme poverty in the low income world. In most longitudinal data sets we have not yet seen half the population exit extreme poverty.

The depth and persistence of extreme and ultra-poverty raises the prospect of poverty traps, which arise when poverty becomes self-reinforcing when the poor's equilibrium behaviors perpetuate low standards of living. The poverty traps hypothesis has major policy implications. As Ghatak (this volume) emphasizes, if no traps exist and most poverty is merely transitory (Baulch and Hoddinott 2000), perhaps due to temporary, adverse income shocks to a non-poor expected standard of living – what Carter and May (2001) term 'stochastic poverty' – or easily overcome through migration (Kraay and McKenzie 2014), or just reflecting a slow, uneven climb out of poor initial conditions, then costly and imperfectly targeted interventions may impede rather than accelerate escapes from poverty. The strength of the argument for intervention rises with the strength of the evidence of poverty traps. If poverty is a dynamic equilibrium outcome, i.e., a trap exists, then a strong economic and moral argument exists to experiment with interventions and to implement and scale interventions demonstrated to generate sustained improvements in standards of living. Indeed, Of course, complex political economy considerations can arise in introducing policies targeted effectively to marginalized populations, and of sun-setting policies that are needed for only a fixed period of time. But perhaps especially where poverty arises due to the existence of multiple equilibria, making some poverty unnecessary and avoidable, policy response will often prove both ethically compulsory and economically attractive (Barrett and Carter 2013).

The papers in this volume, which were first presented at a National Bureau for Economic Research (NBER) conference in Washington, DC, in June 2016, extend the range of the mechanisms hypothesized to generate poverty traps, offer empirical evidence that highlights both the insights and limits of a poverty traps lens on the contemporary policy commitment to achieve zero extreme

[3] The Great Recession of the past decade may well represent a shift in the balance between persistent and transitory poverty in high-income economies. But we know of no compelling evidence on this point to date.

poverty by 2030. In this introductory essay we aim to frame these contributions in a simple, integrative model meant to capture the key features of most of the papers. Mechanisms include poor nutrition and health, endogenous behavioral patterns (e.g., risk and time preferences), poorly functioning capital markets, large uninsured risk exposure, weak institutions of governance of natural resources, etc. The papers presented in this book examine these factors in detail. The empirical analyses most of the papers offer inform us about the factors affecting the prospects for household productivity and income growth, with a special focus on how these effects can be heterogeneous across household types and economic/policy environments. They also offer important findings on the effectiveness of programs and policies designed to address persistent extreme poverty, such as cash transfers and microfinance.

2. Towards an Integrative Theory of Poverty Traps

As Ghatak (this volume) and several other contributors emphasize, it is essential to have a clear theoretical framework to help isolate better the relationships between specific anti-poverty programs and particular mechanisms that cause poverty to persist. Economists' interest in the topic of poverty traps has waxed and waned over the decades. Economists have long known that coordination failures and market failures can each lead to situations of multiple equilibria characterized by both locally increasing returns that are conducive to capital accumulation and rapid income growth, as well as regions of rapidly diminishing returns where people face weak incentives to invest, even at low standards of living. A range of largely-unintegrated theories exist to explain patterns of differential investment that lead to persistent poverty in equilibrium (Nelson 1956, Mazumdar 1959, Stiglitz 1976, Loury 1981, Dasgupta and Ray 1986, 1987, Banerjee and Newman 1993, Dasgupta 1993, Barham et al. 1995).[4] Whatever the theorized mechanism, the essence of a poverty trap is that equilibrium behavior leads predictably to expected poverty indefinitely, given preferences and the constraints and incentives an agent faces, including the set of markets and technologies (un)available to her. Azariadis and Stachurski (2005) therefore define a poverty trap as a "self-reinforcing mechanism, which causes poverty to persist." The contributions to this volume reflect on four candidate poverty trap mechanisms:

- Multiple financial market failures that impede both investment in and savings for asset accumulation as well as insurance against asset loss.
- Psychological feedback loops in which poverty undercuts human cognitive and pro-social capabilities and performance, in turn entrenching one's poverty;
- Deteriorations in health and human capital brought on by uninsured shocks and poverty; and,
- Bio-physical feedback loops in which environmental shocks and poverty undercut the productive capacity of natural resource systems.

The chapters in this volume offer an array of theoretical reflection and empirical evidence on these various mechanisms, and in several cases evaluate the impacts of policies and programs intended to reduce persistent poverty through various lenses.

[4] For reasonably complete reviews of the poverty traps literature through the early 2000s, see Azariadis and Stachurski (2005). Barrett, Garg and McBride (2016) provide an updated summary of the literature.

One of the challenges analysts and policymakers face is that within a given poor population, multiple of these mechanisms might be in play simultaneously. As Leo Tolstoy put it in the opening sentence of *Anna Karenina*, "All happy families are alike; each unhappy family is unhappy in its own way." Analytical models that focus attention tightly on a single mechanism can yield important theoretical insights and yet prove ill-suited to isolating patterns in data originating from a decidedly more complex, real world setting.

One theme that emerged clearly from the NBER conference was the importance of both integrating analytically and disentangling empirically the multiplicity of mechanisms potentially at work in situations of persistent extreme or ultra poverty. The empirical challenge gets complicated further because inevitably the mixture distribution that draws from different mechanisms with different frequencies evolves over space and time, making empirical identification of poverty traps and association of specific individuals with particular mechanisms especially difficult. Yet, as reflected in this collection of papers, there is considerable new activity on this topic, by some of the profession's most promising young scholars, and significant new insights are advancing our ability to inform policy through more nuanced, rigorous, theory-guided research.

In this chapter we strive to build an integrative framework for understanding the different mechanisms explored in the papers that follow. The four mechanisms above, the interactions among them, and the potential impacts of policy that targets chronic poverty, can be most easily explained using a general theoretical framework that encompasses the model used in several contributions to this volume. First, consider the following model of income generation for a household[5] i in time period t:

$$y_{it} = f_i(\alpha_{it}, k_{it}, \theta_{it}), \quad (1)$$

where k_{it} is standard accumulable productive asset – buildings, land, livestock, machinery, money in the bank, or other forms of capital – and α_{it} is a measure of (perceived) human capability, a term we use to be general enough to encompass such concepts as skill, human capital and self-efficacy. θ_{it} is a random variable that captures the shocks that may affect the household in any time period. For the moment we abstract from social interconnections, multiple technologies or markets, etc., to which we return below.

The contributions to this volume can then be placed in the α, k space shown in Figure 1. Movements in that space can be voluntary (*e.g.*, optimal capital accumulation) or involuntary (*e.g.*, destruction of assets by climatic shocks, or psychological reactions to shocks or poverty that reduce self-efficacy and effective human capabilities). Focusing first on the former, the $k_i^*(\alpha)$ curve in Figure 1 traces out the steady state capital holdings implied by a standard model of inter-temporal choice in the presence of missing capital and insurance markets:

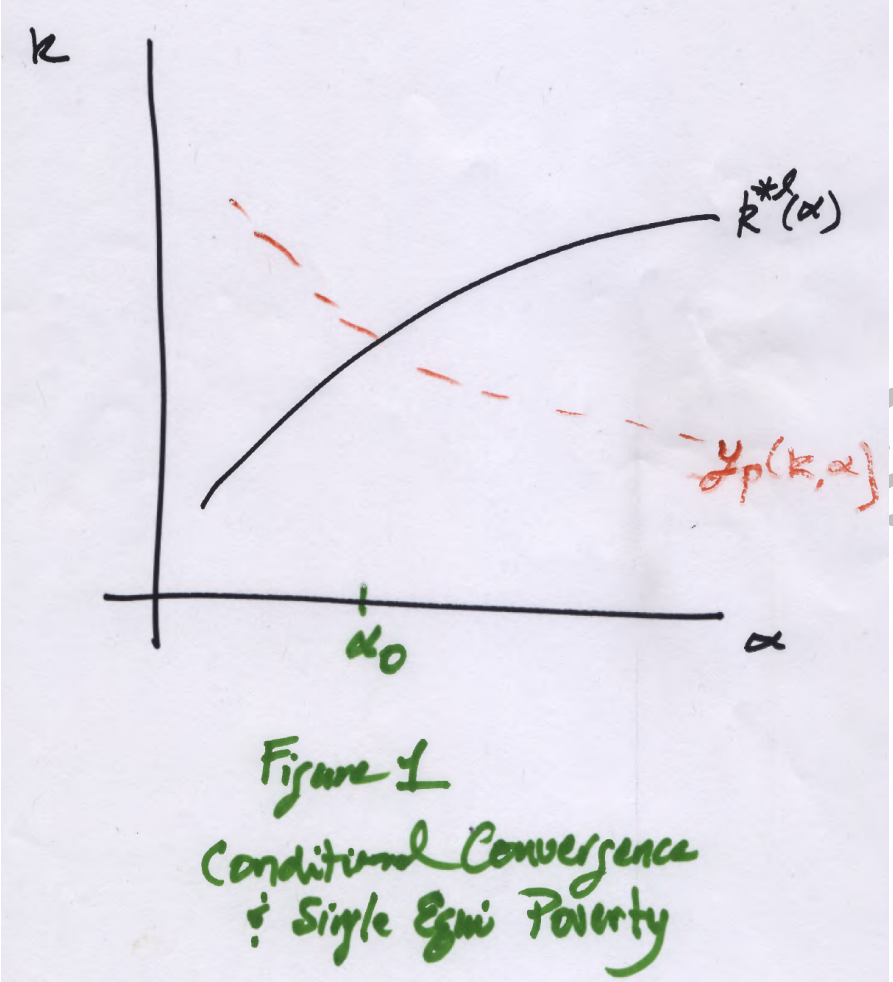
[5] We write using the household as the unit of analysis, fully recognizing that we abstract here from important issues of intra-household bargaining. This could equally be an individual or a more aggregate unit of analysis. Since most micro data on poverty exist at household level, we use this terminology to maximize correspondence with the empirical evidence offered in this volume and elsewhere.

$$Max_{c_{it},k_{it}} E_\theta \sum_{t=0}^{\infty} \beta^t u(c_{it}) \quad (2)$$

$$\begin{aligned} &subject\ to: \\ &c_{it} \leq p_{kt}k_{it} + y_{it} \\ &y_{it} = f_l(\alpha_{it}, k_{it}, \theta_{it}) \\ &y_{it} = f_l(\alpha_{it}, k_{it}, \theta_{it}) \\ &k_{it+1} = \big(1 - \delta(\theta_{it})\big)(k_{it} + y_{it} - c_{it}) \\ &k_{it} \geq 0 \end{aligned}$$

where c_{it} represents consumption of a numeraire composite good, β is a discount rate, p_k is the price of capital, and $\delta(\theta_{it})$ is the (perhaps) stochastic rate of depreciation of capital.[6] Note that consumption in each time period is restricted to be no more than cash on hand ($p_{kt}k_{it} + y_{it}$), reflecting the absence of financial markets in this model. As explored in detail by Deaton (1991) and Zimmerman and Carter (2003), the multiple financial markets failures generate discontinuities in intertemporal tradeoffs – e.g., kinks in the standard Euler equations – and thus thresholds where optimal behaviors bifurcate conditional on wealth. Furthermore, given heterogeneity in non-tradable human endowments, α_{it}, steady state capital holding is necessarily increasing in human capabilities, generating one further dimension of variation in optimal asset accumulation. If one treats capabilities as fixed over time, this model implies a type of conditional convergence, with the more capable enjoying a higher steady state level of capital and income than the less capable.

[6] One could usefully distinguish between shocks to (i) productivity and income flows, and (ii) asset stocks to generate a richer model in which households face tradeoffs in managing imperfectly correlated asset and income risk (McPeak 2004). In the interests of parsimony, we treat the two as equivalent here.



To relate this discussion to poverty, define the locus $y_p(\alpha_{it}, k_{it})$ as combinations of α and k that in expectation yield an income equal to an (arbitrary) money-metric poverty line, y_p. Note that $y_p(\alpha_{it}, k_{it})$ will be downward sloping in α, k space. For a relatively poor and unproductive economy, we might expect y_p to cut the steady capital curve, k_l^*, from above as shown in Figure 1.[7] Under this configuration, those with $\alpha_{it} < \alpha_0$ will be chronically poor, trapped by their own low level of capabilities in this conditional convergence model. Cash or other forms of non-human capital alone cannot free the household from poverty over time, as the Buera, Kaboski and Shin and the Ikegami, Carter, Barrett and Janzen chapters highlight. The barriers can arise not sociocultural limits imposed on human capabilities due, for example, to race (Fang and Loury 2005) or caste (Naschold 2012). This poverty trap mechanism exemplifies what Barrett and Carter (2013) call a single equilibrium poverty trap.

Opening this model up to involuntary shifts in capabilities, α_{it}, begins to expand the array of potential poverty trap mechanisms. Both the de Quidt and Haushofer and the Dean, Schilbach and

[7] Ikegami, Carter, Barrett and Janzen (this volume) describe in greater detail the model and computational methods used to generate figures such as those used illustratively in this chapter.

Schofield papers raise the possibility that income or asset shocks that push an individual away from her steady state values may induce depression or deterioration in cognitive functioning that would depress effective capabilities, shifting the individual to the west in Figure 1. The Frankenberg and Thomas chapter and Hoddinott comment raise the possibility that shocks might have persistent effects on human capital, through education, health and nutrition mechanisms.[8] Whatever the pathway, were human capabilities to fall below α_0 in the wake of a shock, then an individual could move from a non-poor to a poor steady state even in this relatively simple model.

The basic model becomes richer if we add a second, more productive income generating technology, f_h, which is characterized by fixed costs or a minimum project size such that $f_h > f_l \; \forall \; k > \widehat{k}$. The non-convex production set for the household thus becomes:

$$y_{it} = max[f_l(\alpha_{it}, k_{it}, \theta_{it}), f_h(\alpha_{it}, k_{it}, \theta_{it})] \tag{3}$$

and we denote as $k_h^*(\alpha)$ the steady state capital values implied by the inter-temporal optimization problem above for those households who choose to accumulate capital beyond $\hat{k}$. As noted by Skiba (1978), this kind of non-convex production set can lead to multiple equilibria with an individual choosing to accumulate to $k_l^*(\alpha)$ or $k_h^*(\alpha)$ depending on her initial endowment of capital. Subsequently, other authors have generalized this class of model to include skill heterogeneity (Buera, 2007, 2009) and skill heterogeneity and risk (Carter and Ikegami, 2009, Ikegami, Carter, Barrett and Janzen, this volume, Santos and Barrett, this volume). Skill or capabilities heterogeneity combined with a non-convex production set then generates a richer set of equilibrium possibilities.

[8] Some effects could result from intra-household bargaining power differentials (Hoddinott 2006).

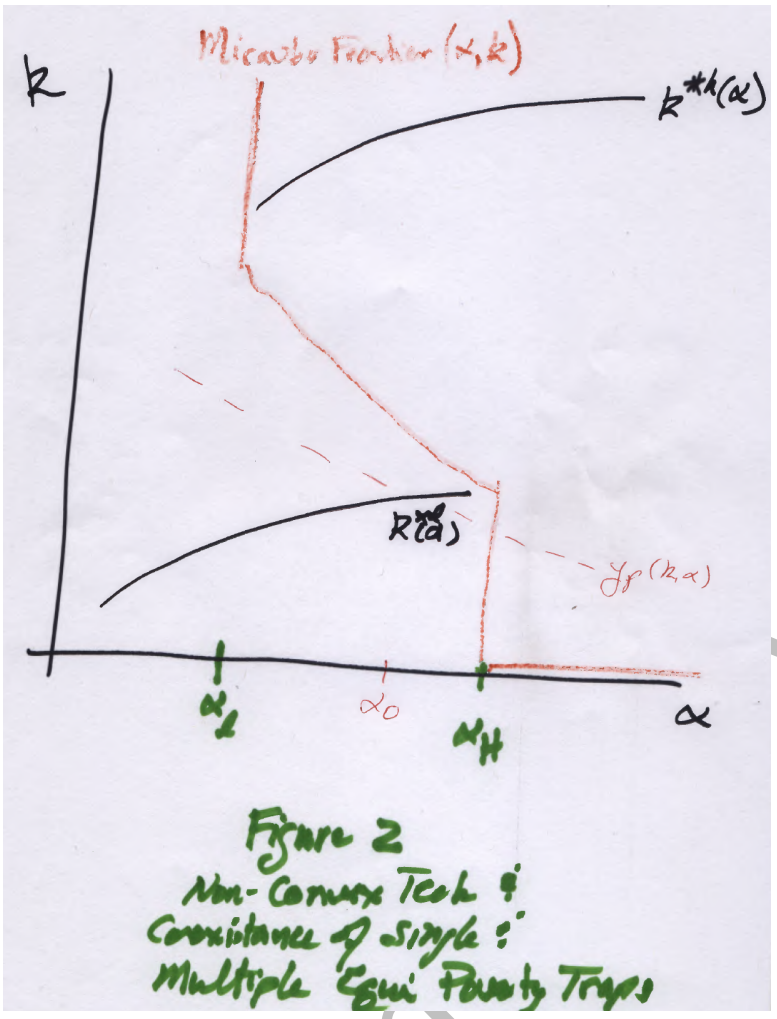


Figure 2
Non-Convex Tech & Coexistence of Simple & Multiple Equi Poverty Traps

As Figure 2 illustrates, this type of model can (in the presence of the financial constraints shown in the problem above) generate two critical skill values, denoted α_l and α_h. Individuals below α_l will find it optimal to tend to the low technology steady state. Above α_h, individuals will always strive for the high technology steady state, k_h^*. In between ($\alpha_l < \alpha < \alpha_h$), individuals will split depending on whether they find themselves below or above the downward sloping frontier "Micawber" frontier, denoted $m(\alpha, k)$.[9] As discussed in greater detail in Carter and Ikegami (2009), an increase in risk will shift α_l and α_h to the east and the Micawber frontier, $m(\alpha, k)$ to the northeast. Those in this middle ability group thus face what Barrett and Carter (2013) call a multiple equilibrium poverty trap. Treating capabilities as fixed, those born either above α_h or $m(\alpha, k)$ will place themselves on an optimal trajectory to reach k_h^*. However, a sufficiently large negative shock to the wealth on hand of those in the middle ability group may push them below $m(\alpha, k)$ and into a permanently poor standard of living at $k_l^*(\alpha)$. Indeed, as Ikegami, Carter, Barrett and Janzen (this volume)

[9] This usage, inspired by Ravallion and Lipton (1994) and adopted to the context of poverty trap models by Zimmerman and Carter (2002), harkens to asset levels below which it is not optimal to strive to save and become non-poor, belying the folk wisdom of Charles Dickens' fictional character Wilkins Micawber who urged David Copperfield and others to supersede their poor circumstances through careful capital accumulation.

illustrate, those above $m(\alpha, k)$ will only probabilistically approach the high equilibrium, with that probability increasing in their distance above that frontier. Santos and Barrett (this volume) provide empirical evidence of this mixed structure in the risk-prone regions of the horn of Africa.

When we allow for human capabilities to evolve endogenously, the dynamics become richer still. The constrained optimization problem in (2) now becomes subject to a second law of motion describing the evolution of α_{it}:

$$\alpha_{it+1} = (1 - \varphi(\theta_{it}, \alpha_{it}) + h(\alpha_{it}, c_{it}))\, \alpha_{it},^{10} \quad (4)$$

where $\varphi(\cdot)$ and $h(\cdot)$ reflect the effects of exogenous adverse shocks and purposeful consumption choices (e.g., of food and educational services), respectively, on human capabilities. Each may have differential effects on human capabilities depending on one's starting condition, α_{it}. For example, as Frankenberg and Thomas (this volume) demonstrate in the case of catastrophic economic and natural disasters in Indonesia, the impacts of shocks on children's ultimate educational attainment may vary depending on their stage of schooling when the shock occurred. A vast literature similarly demonstrates the differential effects on child growth of nutrient shortfalls and health insults due to disease (Victora et al. 2008).

In the presence of psychological feedback loops, stress and depression (among other psychological phenomena) may affect cognitive function and thus earnings, resulting in low income that reinforces stress and depression, just as high hopes and aspirations may induce extra effort and investment, leading to self-fulfilling expectations (de Quidt and Haushofer this volume, Dean, Schilbach and Schofield this volume, Lybbert and Wydick this volume). In the presence of such reinforcing feedback, exogenous shocks and endogenous consumption behaviors can jointly influence individuals' psychological state – e.g., feelings of depression or hope – and cognitive and physical functioning, which in turn affect future productivity and optimal investment behaviors. For example, negative shocks may lead to overly pessimistic assessments of the return to effort, leading to lower effort and investment, which leaves one worse off and more vulnerable to further shocks (de Quidt and Haushofer this volume).

The central problem, from an economic perspective, is the non-tradability of human capabilities. One cannot simply buy hope or (mental or physical) health or cognitive capacity. The possibility of absorbing states – e.g., blindness, permanent amnesia or paralysis, death – implies nonstationary stochastic processes that naturally lead to multiple steady states if human capabilities are essential complements to non-human capital in income generation. The same multiplicity of equilibria arise as occurs with tradable forms of capital in the presence of multiple financial markets failures. The crucial difference is that the cognitive, psychological, sociocultural (e.g., gender, race) and even some physical elements of human capabilities are intrinsically internal constraints on human agency, in contrast to the external constraints posed by market failures that may impede accumulation of other financial or physical assets.

[10] One could imagine α_{it+1} evolving as a distributed lag process in past shocks if trauma has persistent effects independent of the most recent realizations α_{it} and c_{it}, as might be true with post-traumatic stress disorder, for example. See Rockmore, Barrett and Annan (2016) for an example from post-conflict northern Uganda. For present purposes, we assume away this more complex dynamic feedback.

This stochastic dynamical system, with multiple time-varying assets, quickly becomes complex and nonlinear. As the chapter by Chavas explains nicely, stochastic dynamical systems lend themselves to distinct zones defined by the current state of asset holdings, (α_{it}, k_{it}), with some zones undesirable and difficult to escape – a poverty trap – others undesirable but relatively easy to escape – poor but resilient – and others desirable – non-poor. Identifying those zones in data, however, is a terribly complex task (Barrett and Carter 2013).

One reason is that if people recognize the dynamic consequences of shocks, then households may alter behaviors so as to protect productive human and non-human assets and thereby defend future productivity and consumption, even if it entails some short-run sacrifice. Such 'asset smoothing' behaviors arise endogenously in the presence of systems with feedback and multiple equilibria (Hoddinott 2006, Carter and Lybbert 2012, Barrett and Carter 2013). Such behaviors stand in striking juxtaposition to the familiar consumption smoothing that prevails when income follows a stationary stochastic process, leading to a single dynamic equilibrium.

Shocks can degrade non-human capital as well as human capabilities. Since most of the world's extreme poor live in rural areas and work in agriculture, exogenous shocks to agricultural productivity – due to extreme weather and other phenomena – can be especially important. Rosenzweig and Binswanger (1993) and Carter (1997) showed how risk preferences can induce poor agricultural households that lack access to credit and insurance markets to choose low-risk, low-return livelihoods as a way of self-insuring against weather risk.

The experience of shocks to natural capital, such as soils and rangeland vegetation, can also strongly influence accumulation of capital, k_{it}, as described in both the Santos and Barrett chapter on east African pastoralists and the Chavas contribution on the resilience of farmers in the US Midwest following the Dust Bowl experience of the 1930s. A Micawber threshold may exist in natural capital space, for example in soils that become excessively degraded, making investment in fertilizer application or conservation structures unprofitable (Marenya and Barrett 2009, Barrett and Bevis 2015). As Barbier's contribution emphasizes, the environmental and geographic conditions faced by poor households fundamentally shape investment incentives, especially in fragile agro-ecosystems subject to extreme external environmental shocks.

The model sketched out in this paper abstracts away from social interconnections among individuals. If multiple financial market failures are a central reason why individuals might optimally opt not to invest in asset accumulation, then social connections can obviate those market failures. As the chapter by Frankenberg and Thomas nicely demonstrates, extended family and other social support networks can cushion the blow of shocks that might otherwise drive vulnerable people into poverty traps. Social networks might also matter to individuals' self-efficacy, as both the Lybbert and Wydick and Macours and Vakis chapters suggest. Given that material poverty may affect pro-social behavior and social connectivity (Adato et al. 2006, Andreoni et al. 2017), there may be significant spillover effects of interventions (Mogues and Carter 2005, Chantarat and Barrett 2011, Macours and Vakis, this volume).[11] As Macours and Vakis (this volume) demonstrate nicely in their evaluation of the medium-term impacts of a short-term transfer program in Nicaragua, the possibility of non-trivial social multiplier effects may matter to the effectiveness of interventions, especially if it is difficult to target individuals appropriately due to incomplete information.

[11] Social connections can likewise generate the opposite sort of reinforcing feedback through the ecology of infectious diseases (Bonds et al. 2010, Ngonghala et al. 2014).

This integrative framework also helps us to recognize the many settings where poverty traps are less likely to occur. Where financial markets are largely accessible at reasonable cost to most people, where social protection programs effectively safeguard the mental and physical health of poor populations and ensure the development of children's human capital through their formative years, and where geographic and intersectoral migration is reasonably low cost, the likelihood of a poverty trap is far smaller. Moreover, history is not necessarily destiny. Forward-looking behaviors can obviate the adverse effects of even massive shocks. Many poor populations prove amazingly resilient, as the chapters by Frankenberg and Thomas and by Chavas so nicely demonstrate. The aim of poverty traps research is to help render the concept increasingly irrelevant.

3. Implications for policy and project design

The highly stylized integrative model we offer not only reflects several crucial features outlined in the mechanism-specific papers that comprise most of this volume, it also captures several key policy implications of the emergent poverty traps literature.

First, it underscores the challenge of targeting poverty reduction programs in systems where multiple mechanisms might exist simultaneously. It is not enough to know that someone is poor. We need to know why they are poor in order to target effective interventions. For some whose human capabilities are permanently compromised, such that $\alpha_{it} < \alpha_0 \; \forall \; t$, they may face permanent poverty in the absence of an ongoing social safety net that provides regular transfers to supplement their meagre earnings. By contrast, other poor people may be able to pull themselves out of poverty through asset accumulation and thereafter maintain a non-poor standard of living if given a brief boost. With fixed budgets, policymakers face tradeoffs between these two poor sub-populations, which leads to the 'social protection paradox' explained in the chapter by Ikegami, Carter, Barrett and Janzen. Spending on short-term poverty reduction may aggravate longer-term poverty, even for near-term beneficiaries, if inadequate attention is paid to preventing the collapse of the vulnerable non-poor beneath the Micawber frontier and into chronic poverty.

Second, the multiplicity of mechanisms potentially in play can also lead to striking heterogeneity in the impact of programs and interventions that target financial markets, physical assets, human capabilities and even aspirations or preferences. Internal constraints associated with a range of human attributes can impede the effectiveness of, for example, microfinance interventions for some subpopulations of interventions that generate significant benefits for others (Buera, Kaboski and Shin, this volume). Moreover, as Lajaaj's thoughtful comment underscores, the risk-reward profile of different interventions may not be similar. Projects can easily have adverse unintended consequences, perhaps especially those that aim to relieve internal psycho-social constraints on asset accumulation.

A third key policy implication is that because market failures are the root cause of poverty traps, systemic interventions that address the underlying structural issues are likely to generate general equilibrium benefits – e.g., in wage labor markets – that almost surely dominate small-scale interventions that benefit just a few direct program participants. Whether the dominant poverty trap mechanism revolves around fundamentally nontradable human attributes like hope or depression – for which market failures appear insurmountable – or originates from credit and insurance market failures that impede accumulation of physical assets like livestock or machinery, the core challenge

to escaping persistent poverty boils down to overcoming the market failures that impede asset accumulation of whichever forms are most essential in a specific context. It is easy to lose sight of the structural underpinnings of persistent poverty in the rush to generate cleanly identified reduced form impacts of interventions.

Fourth, this integrative framework also helps underscore why multi-faceted interventions have become so popular. The interdependence of co-evolving human capabilities and capital stocks, each potentially impeded by financial (and other) market failures, means that interventions that couple financial interventions with skills training, the strengthening of social networks, etc. become especially promising. Indeed, growing evidence suggests that even one-off interventions that remove barriers that impede accumulation of productive assets can lead to sustainable poverty reduction (Banerjee et al. 2015, Bandiera et al. forthcoming). Pure cash interventions, even when conditioned on behaviors such as keeping children in school, may have only small and short-term results, as Araujo, Bosch and Schady (this volume) find in their study of the multi-year effects of Ecuador's conditional cash transfer program.

Fifth, the emphasis so many of the papers place on shocks, whether these are economic, environmental, or psychological, underscores the critical role safety nets play in poverty reduction. As Smith (this volume) eloquently puts it, "as we move toward fully addressing the zero-poverty goal of the Sustainable Development Goals (SDGs), as also embraced by the World Bank, USAID and other key development agencies, it is very helpful to have an enhanced focus on preventing people from falling into poverty. At least from a poverty headcount or income shortfall perspective, ultimately we may view this as equally important to pulling people out of poverty."

Finally, the interdependent laws of motion of different forms of (financial, human, natural, physical and social) capital necessitate multi-dimensional thinking in policy deliberations. Familiar models with a single state variable (unidimensional capital) lend themselves to overly simplistic diagnoses and prescriptions that fail to capture many of the ways in which deprivation manifests in the lives of the poor. We hope that just as the conference where the papers in this volume originated forced all of us in attendance to grapple simultaneously with these complexities, so too do we hope the slightly more nuanced framework we advance here helps readers of this volume think in more integrative ways about the challenges facing the world's poorest populations today. We need to cultivate greater and more widespread skill in diagnosing different causal mechanisms that can underpin persistent poverty. As we increase our understanding of the market failure phenomena that give rise to unnecessary human suffering, our ability to more effectively design, target and evaluate policy and project interventions will grow, helping economists and other social scientists become more effective partners for the poor.

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