# Does vulnerability create poverty traps?

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## Abstract

The paper discusses whether vulnerability generates poverty traps. It contains a review of models of poverty traps and a discussion of whether these can accommodate vulnerability; it also includes a discussion of the empirical evidence available in support of these models and a discussion of their policy implications.

The conclusions of this study delineate an important area of research, to which the CPRC is in a position to make a significant contribution. A clearer perspective on how to approach the linkages between vulnerability and persistent poverty, and a stronger, and comparative, body of evidence are needed to make the case that risk and vulnerability are significant factors behind poverty traps.

The research planned under the Insecurity, Risk and Vulnerability theme of the CPRC will aim to develop a conceptual framework for examining the links between insecurity and vulnerability on the one hand and chronic poverty on the other. Special attention will be given to developing research in two areas: household dynamics and informality. The effectiveness of policy options will be assessed.

**Keywords:** Vulnerability; poverty traps; chronic poverty.

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## 1. Introduction

An emerging literature considers the linkages between vulnerability and poverty.[1] This literature defines vulnerability as 'vulnerability to poverty', the likelihood that individuals, households or communities will be in poverty in the future. It involves a prospective or 'ex ante' assessment of poverty, based on current or past information. This paper discusses whether vulnerability creates poverty traps, what empirical evidence is available, and what policy implications emerge. At the theoretical level, we are interested in exploring the claim that vulnerability constitutes a factor explaining poverty persistence, and to identify what kind of evidence can be put forward to provide an empirical basis for this claim. At a policy level, the issue is to consider what instruments might be effective in reducing vulnerability and, therefore, poverty traps.

The scope and format of the paper need clarification. The paper falls between a selective review of the literature on vulnerability and poverty traps with the aim of extracting whatever findings it can yield on persistent poverty; and a scoping paper for the research programme on vulnerability, risk and insecurity which the CPRC is developing. It will be very selective in the range of literature examined, and it is not intended to provide a comprehensive literature review.[2] Some of the economic literature on poverty traps can be quite technical, but the paper will focus on a presentation that aims to be accessible to all. To that effect, the models discussed in the paper are simplified, and empirics and policy will be tackled explicitly.

The paper aims to make a contribution to the CPRC's work on insecurity, risk and vulnerability, through identifying key questions, issues and approaches. The focus on this area follows from the findings emerging from the first five years of CPRC work, to the effect that 'insecurity and vulnerability at the micro and macro level – related to macroeconomic crises, ill-health, crime, accidents, household dynamics, natural hazards, financial crisis, or violent conflict – are responsible for individuals, households and communities sliding into long-term poverty; maintain the poor in poverty; and ensure responses, in the form of economic behaviours and activities, that reduce investment, asset formation and economic growth'. This led the CPRC to identify *Insecurity, Risk and Vulnerability* as one of its research priorities for 2005-10. The core objectives for this research programme are:

- to identify the linkages between risk and vulnerability on the one hand, and chronic poverty on the other; and
- to identify the conditions under which social protection can effectively tackle chronic poverty.

The paper is divided into seven sections. Section 2 takes a first cut of the literature, identifying the main channels through which vulnerability could impact on poverty. Section 3 considers the extent to which available definitions of chronic poverty make room for vulnerability. Section 4 questions whether vulnerability generates poverty traps, and identifies the main issues for discussion. Section 5 focuses on 'thin' models of the linkages between vulnerability and chronic poverty. The reference to 'thin' models reflects the fact that these rely on market failure alone. This section reviews the literature interpreting poverty traps in the context of non-linear income dynamics and discusses asset threshold models. It also considers credit market failure as a source of poverty traps, mainly in the context of overlapping generation models of household investment in the human capital of children. Section 6 focuses on identifying what a 'thick' model of the linkages between vulnerability

[1] See S. Dercon's book on Insurance Against Poverty (Dercon, 2005a); and a Special Issue of the European Journal of Development Research on Chronic Poverty and Social Protection (Barrientos and Hulme, 2005).

[2] The paper does not cover institutional and coordination failure explanations for poverty traps, because these are much less vulnerability-friendly. For a discussion of these see Bowles *et al.* (2006).

and poverty traps would look like. The basis for a 'thick' model of the linkages between vulnerability and chronic poverty can be found in capability theory. Focusing on a broader perspective on the production of well-being can offer a different basis for explaining poverty traps arising from vulnerability. The last section provides a conclusion and draws out some of the implications of the analysis in the paper for CPRC future work in this area.

## 2. A first cut of the literature: direct effects, indirect effects, and buffers

There is a fast growing literature examining the effects of vulnerability on well-being in developing countries (Dercon, 2003a, 2003b, 2005b). It is useful to group the literature into three sets:

1. The majority of studies focus on making the connection between the onset of crises, shocks and stresses and subsequent descent into poverty. The findings point to the fact that economic crises, health shocks, unexpected changes in household composition, unemployment, or natural disasters, to name the most important, are followed by poverty spells among those affected. Shocks and crises will generate flows of non-poor into poverty, as well as persistence of poverty among those already poor (Suryahadi and Sumarto, 2001). These studies therefore focus on the direct effects of shocks on well-being. The link to chronic poverty arises because of the depth, strength or repeated nature of the shocks.
2. A smaller number of studies consider the quality and availability of buffers protecting households against shocks and crises. It is assumed that households are risk-averse and strive to reduce their exposure to shocks in a variety of ways: accumulating assets, collecting entitlements, participating in networks, etc. The studies in this set make the point that the livelihoods of poorer people are highly vulnerable in large measure because they have fewer buffers, or because the range and effectiveness of the buffers available to them provide inadequate protection (Chambers and Conway, 1992). The fact that shocks and crises occur and that they have a strong impact upon poorer groups is a necessary condition for the rise in measured poverty following shocks, but not a sufficient condition. It is also required that poorer groups lack effective buffers. The evidence provided in these studies supports the claim that the limited access to buffers is also responsible for maintaining those already poor in persistent poverty.
3. There is a third group of studies, smaller than the other two, focusing on the way in which households respond to insecurity and vulnerability. These studies suggest that, faced with rising vulnerability and insecurity, households may adopt behavioural responses that help to keep them in poverty. These responses cover a wide range including reducing the number and quality of meals; postponing health-related expenditure; withdrawing children from school and/or engaging in child labour; engaging in informal employment; and resorting to adverse incorporation as a means of protection. There is a much longer list of possible responses that fit into this category. These feedback effects are familiar from poverty profiles, what is different in the current literature is the suggestion that these indirect effects from vulnerability might be dominant in explaining persistent poverty (Elbers *et al.*, 2003).

Most vulnerability assessments identify these effects: the mapping of 'risks' (this refers to hazards, i.e. events which, if they materialise, have adverse effects on well-being; and risk proper, i.e. the probability that they will materialise); and the mapping of protective instruments. The indirect effects are harder to measure and are seldom included.

*Key challenges*

Although there is a growing body of research suggesting that vulnerability generates poverty traps, this statement is far from incontrovertible. There are important gaps and weaknesses in this literature. There are no standard methodologies and no cross-disciplinary paradigm. Supporting evidence is patchy and inconclusive. As Ravallion notes, "some of the evidence suggests large long-term costs to the poor from uninsured risk, but some does not" (Ravallion, 2003). A clearer perspective on how to approach the linkages existing between vulnerability and persistent poverty, and a stronger, and comparative, body of evidence are needed to make the case that risk and vulnerability are significant factors behind poverty traps.

At the policy level, the CPRC is beginning to make an impact in drawing attention to the need to focus policy interventions on the duration of poverty. There is an emerging consensus around the view that social protection constitutes an effective response to risk and vulnerability. Social protection is defined as 'all interventions from public, private, voluntary organisations and social networks, to support communities, households and individuals in their efforts to prevent, manage and overcome a defined set of risks and vulnerability'.

Research on the nature of the linkages between insecurity and vulnerability and chronic poverty are essential to provide robust foundations for policy analysis. There is much that the research could do to provide the foundations for stronger and more effective policy. From the first cut of the literature above three different handles for policy emerge: reducing hazards, building buffers, and discouraging dysfunctional behavioural responses to vulnerability. It is important to know which are more important and why. It is important to develop a strong body of evidence to show that social protection interventions focused on the poor, and especially on the chronically and persistent poor, are desirable, affordable and effective. It is also important to develop and apply analytical tools for identifying and measuring the impact of social protection interventions (programmes and policies) on the dynamics of poverty, and especially upon the chronically poor. This will provide knowledge of the types of interventions likely to be effective in reducing and mitigating the impact of risk and vulnerability on chronic poverty. This research could help in the development of an understanding of stripped-down techniques for evaluating the costs and benefits of alternative policy options. Careful evaluation of policy options, based on the analysis of evidence from a handful of existing programmes will help to make a strong case.

## 3. Some approaches to chronic poverty are vulnerability-friendly, others are not

*What do we mean by chronic poverty?*

Chronic poverty can be identified by its persistence over time (Hulme and Shepherd, 2003). An individual, or household, is chronically poor if observed welfare over an observed length of time is below the minimum social norm.[3] There are three main operational definitions of chronic poverty emerging from the literature (these are defined more precisely in Table 1):

- One approach focuses on the duration of poverty spells and defines a chronically poor household as one which shows per capita levels of income or consumption at or below the poverty line at each, or most, observation points (Baulch and Hoddinott 2000; Baulch and Masset, 2003). The chronically poor are identified as those found to be persistently

[3] Notions of structural poverty are not considered here, but will be referred to below. Structural poverty refers to households lacking time invariant assets needed to generate welfare levels above the poverty line (Carter and Barrett, 2005). This is not strictly a duration-based approach to chronic poverty.

below the poverty line. Households in transient poverty are those which show variation in income or consumption around the poverty line, but with most observations above the line.

- A second approach focuses on income or consumption shortfall over a period of time. In line with the permanent income hypothesis, it suggests income and consumption have constant and fluctuating components, which can be distinguished empirically (Ravallion, 1988; Jalan and Ravallion, 2001).[4] A household is said to be chronically poor if its constant (permanent) component of income or consumption is at, or below, the poverty line.
- A third approach focuses on the probability of deficient future consumption. It combines knowledge of current income or consumption with its variance across households to estimate the probability that future income or consumption is below the poverty line (Pritchett *et al.*, 2000; Chaudhuri and Datt, 2001; Chaudhuri *et al.*, 2001; Chaudhuri, 2002). This approach makes the strong assumption that variability in consumption across households can proxy variability in household consumption over time. It defines a household as chronically poor if its current consumption is at or below the poverty line and, on the basis of current information, has a high probability that future consumption will also be at or below the poverty line.

**Table 1. Vulnerability in operational measures of chronic poverty**

| Operational definitions of chronic poverty | Vulnerability a factor? |
|---|---|
| Duration approach:<br>CP1 : max $(y_{it}, y_{it+1}, \ldots, y_{iT}) \leq z$<br>where y is a measure of consumption or income, i indexes households, t indexes observation points, and z is the poverty line | no |
| Shortfall approach:<br>CP2 : $\hat{y}_i \leq z$ ,<br>where $\hat{y}_i = [(\Sigma_{t=1}^{T} y_{it})/T]$, i.e. $\hat{y}_i$ is time-mean | no |
| Predicted consumption approach:<br>CP2 : $(y_{it}, E_t[y_{it+1}\|v_{it} > n]) \leq z$<br>where $v_{it}$ is a measure of vulnerability to future poverty and n is a threshold | yes through E[.] and v |

It is interesting that two out of the three operational definitions of chronic poverty explicitly exclude vulnerability as a relevant factor (Barrientos *et al.*, 2005). The duration approach excludes vulnerability as a relevant factor in the identification of the chronically poor, in that while exposure to shocks might have been a factor leading to a household falling into poverty in the first place, this is not an especially relevant issue. Vulnerability is neither a necessary, nor a sufficient, condition for a household to be identified as chronically poor, because the variability of consumption or income is not relevant to this identification of chronic poverty.[5] The shortfall approach goes further in excluding vulnerability as a factor in chronic poverty. In this approach, income or consumption are decomposed into a permanent and a fluctuating component. Chronic poverty is associated solely with the permanent component, whilst

[4] Jalan and Ravallion, for example, "define transient poverty as the contribution of consumption variability over time to expected consumption poverty. The non-transient component is the poverty that remains when inter-temporal variability in consumption has been smoothed out" (2001, p.83).

[5] This applies even where the chronically poor are defined as those poor in some, or most, observations. In the context of a panel with six observation points, with consumption collapsed to a [0,1] range and with the chronically poor defined as those with at least three poverty spells, households with consumption patterns [0,0,0,0,0,0], [0,0,0,1,1,1], or [0,1,0,1,0,1] are observationally equivalent.

transient poverty is fully identified with the fluctuating component.[6] The predicted consumption approach does incorporate vulnerability into the identification of the chronically poor. The variance of income or consumption across households of a particular type is used in the prediction of future consumption and a threshold probability of future consumption focuses on downside outcomes. As a consequence, vulnerability enters directly into the identification of the chronically poor. Of the three operational measures of chronic poverty, only the last one incorporates vulnerability explicitly.

This conclusion flows from the fact that the duration and shortfall approaches are essentially ex-post, while the predicted consumption approach is ex-ante. It might be possible to incorporate vulnerability more explicitly in the duration and shortfall approaches by taking account of households' past exposure to hazards and available buffers. It remains a challenge to work out how to incorporate feedback effects of vulnerability into these two approaches, as these effectively exclude these more dynamic effects. It is an empirical question as to how important feedback effects are as a determinant of chronic poverty, but as long as the main empirical approaches used in the literature explicitly rule them out, we shall never know.[7]

## 4. Does vulnerability generate poverty traps? First impressions

Despite the intuitive appeal of the link postulated to exist between vulnerability and persistent poverty, the empirical basis for making this link is ahead of us, and it may be useful to begin by acknowledging this fact.

Studies focusing on the direct and buffers effects of vulnerability on poverty have been successful in establishing a direct link between shocks and poverty. Shocks (understood as the realisation of hazards, which may or may not be 'surprising') push households into poverty. Illness, unemployment, macroeconomic and financial crises, conflict, policy change (as in structural adjustment), or natural disasters are associated with a higher incidence of poverty among the affected households. The literature also shows that the incidence of poverty following shocks is higher among households with fewer buffers to protect their living standards. Poorer household with fewer assets and entitlements are therefore more exposed to the possibility that shocks will make them poor. Shocks generate poverty, and uninsured shocks are more likely to lead to poverty than insured ones.

However, when focusing on chronic poverty, the question becomes whether shocks can lead to persistent poverty, i.e. whether shocks generate poverty traps.[8] To an important extent, this poses a different set of questions which have not been sufficiently well researched. This is in part due to the limitations of longitudinal data in developing countries, which explains why the theoretical literature on these outnumbers the empirical literature. However, as noted in the previous section, it is also due to the fact that empirical studies of chronic poverty neglect feedback effects from expected vulnerability to household strategies.

[6] This is more in line with a structural poverty approach.

[7] The only attempt at measuring feedback effects quantitatively I am aware of is Elbers *et al.* (2003), which used a sample from rural Zimbabwe. They conclude that risk reduces capital stock by 46%, and that "about two-thirds of the impact of risk is due to the ex ante effects (i.e. the behavioural response to risk) which is usually not taken into account in policy design".

[8] Poverty persistence and poverty traps are taken to be synonymous in this paper, although some differences exist when these terms are used in the economics literature. There, poverty traps are equilibrium states, but poverty persistence may reflect a longer-term disequilibrium state. In the paper, they are taken to be synonymous in the sense that both have in common the fact that long-term poverty is an absorbing state.

Does exposure to shocks generate long-term, lasting effects on the affected households? Using a six wave dataset from rural China, Jalan and Ravallion measure the extent of recovery from shocks of different strengths (Jalan and Ravallion, 2005). The information is summarised in Table 2. The main finding is that shocks in rural China can generate a significant fall in consumption levels, but that recovery is possible for most households affected. Over one half of households sustaining a fall in consumption levels after a shock recover within the year, and less than one in five take longer than four years to recover. There is a link between the depth of the shock and the recovery time. Households suffering a more pronounced shock will take a great deal longer to recover than those suffering more superficial drops in consumption.

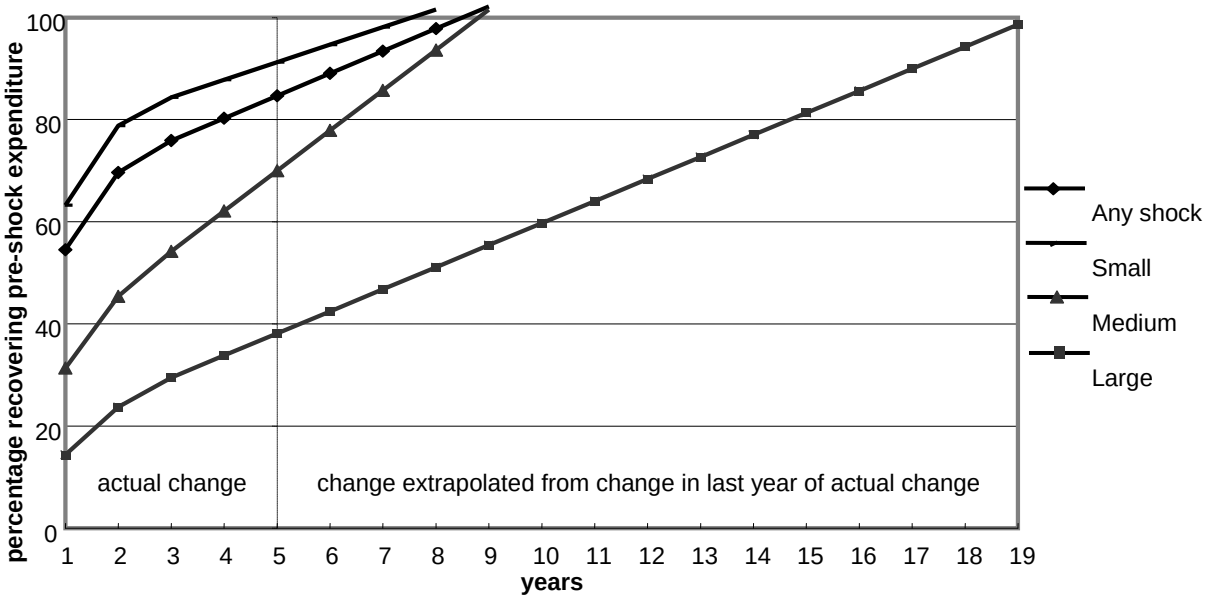
**Table 2. Recovery from an initial fall in expenditure (percentage of households)**

| Recovery time after shock | Any | Small shock | Medium | Large |
|---|---|---|---|---|
| One year | 54.53 | 63.23 | 31.35 | 14.39 |
| Two years | 15.14 | 15.58 | 14.05 | 9.35 |
| Three years | 6.24 | 5.57 | 8.84 | 5.76 |
| Four years | 4.38 | 3.44 | 7.88 | 4.32 |
| Never recovered within the period | 19.71 | 12.18 | 37.14 | 66.19 |
| Depth of shock determined by percentage fall in household expenditure: Small: if fall is 5% or lower; Medium: if fall is between 5-10%; Large: if fall is 10% or higher | | | | |

*Data Source: Jalan and Ravallion (2005)*

Figure 1 extrapolates the share of households who recover in the fourth year into the future.[9] Assuming the process of recovery can be extrapolated in this way, recovery from any shock will take on average nine years, eight years for small shocks, nine years for medium shocks, and nineteen years from large shocks.

**Figure 1. Recovering from a shock-induced drop in consumption**




*From data in Jalan and Ravallion (2005).*

First impressions therefore suggest that small and medium size shocks may not generate, by themselves, poverty persistence. There is a measure of resilience in the households

[9] The proportion recovering shows a concave shape, so extrapolating from the last year of actual change is likely to overestimate recovery time.

surveyed. However, large shocks could be responsible for pushing households into persistent poverty and, to the extent that this is an absorbing state, into poverty traps. Recovery takes longer from large shocks, and for households with fewer buffers.

## 5. Vulnerability and 'thin' models of poverty traps

This section reviews a selection of models of poverty traps relying on market failure ('thin' models), and considers how vulnerability can be grafted onto them. The discussion below pays special attention to supporting evidence for, and the policy implications from, the models.

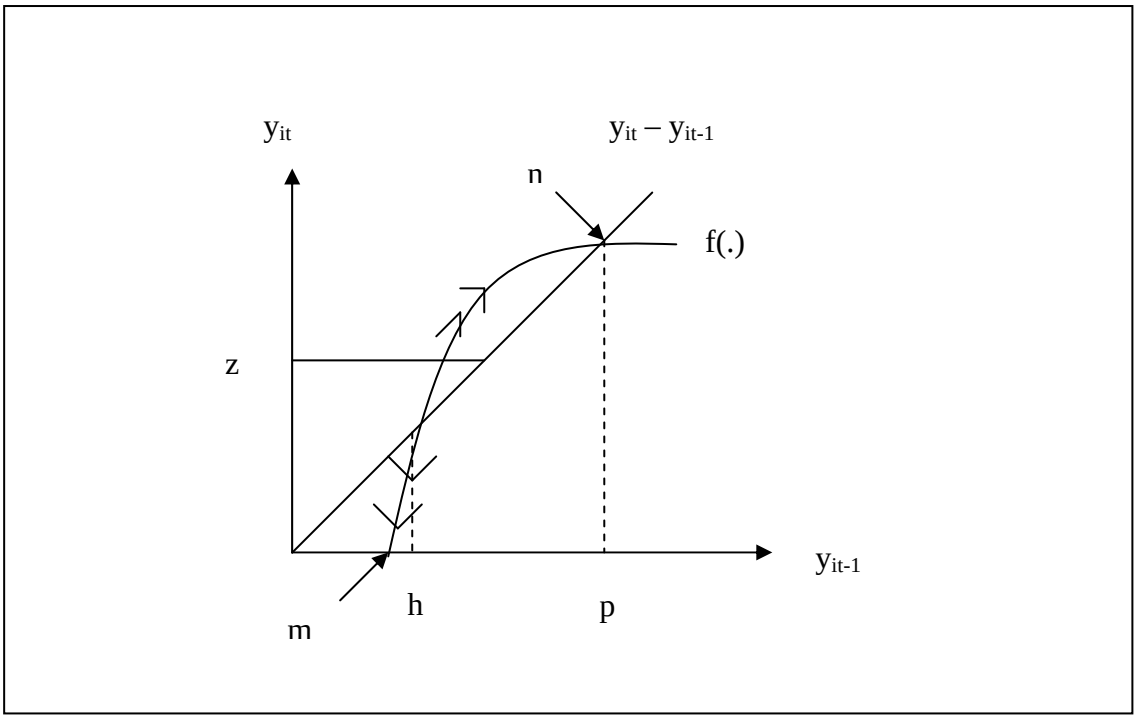
### 5.1 Non-linear income dynamics

The simplest model of poverty traps relies on linking current household income[10] to past household income, so that

$$y_{it} = f(y_{it-1}, X_{it})$$

where $y_{it}$ stands for the income y of household i at time t. This is taken to depend on household income in the previous period, $y_{it-1}$ and on a vector of endogenous characteristics $X_{it}$. Assuming that f(.) is decreasing and concave in $y_{it}$ for all positive household income, then the process of current household income generation can be depicted as in Figure 2.

**Figure 2. Non-linear income dynamics and poverty traps**




The concavity shown by f(.) suggests two attractors, i.e. points at which equilibrium is reached, one at m and another at n, such that household income will gravitate towards one

[10] This section focuses on income to facilitate the exposition, but, as will be explored below, the same argumentation applies to consumption, or assets.

of these. For current household income below h, past income is not sufficient to support the same level of income in the present, and the household will sink further and further into poverty until it reaches point m. This is a poverty trap. For points above h and below n, households can support current income higher than past income and will therefore be set in a prosperity cycle until reaching point n.

Efficiency wage models applied to developing countries provided one of the earliest illustrations of non-linear income dynamics. Assume that the productivity of an average worker depends on proteins and calories needed to enable the worker to perform physical work. If the worker is badly paid so that she is not able to purchase food with the minimum level of proteins and calories required to replenish those absorbed through physical work (say h in Figure 2), her productivity will decline.[11] Given pay is related to productivity, her productivity decline leads to lower pay and therefore lower nutrition, with a poverty trap setting in.

The direct and buffers effects of vulnerability on poverty traps can be easily incorporated into this simple model. Say a large shock shifts a household from point n to just below point h, in the absence of any form of social protection, that household will now be set into a downward income path, a poverty trap. Hazards that push households below this threshold level will become absorbed into poverty.

The potential role of social protection, more explicitly safety nets[12] or income maintenance schemes, can also be seen from this simple model. An income maintenance scheme that ensures household income will not fall below h will preclude poverty traps. Social protection will ensure that hazards do not have longer term effects on the income of households. Furthermore, there is a promotional role for social protection. By shifting shock affected households just above h, it will be possible to set them on a prosperity income path. In this context, social protection can generate growth (assuming that the resources needed to finance social protection do not have alternative uses with higher pay-offs).[13]

There are implications for the poverty line. Setting an arbitrary poverty line at *z* does not take into account the income dynamics in f(.), so that some of the poor will be on an upward income path, while others will be on a downward path. A poverty line set at the threshold level *h* does take into account the process of income generation and will be effective in precluding households from being absorbed into poverty, but may not be sufficient to set affected households onto a prosperity path. However, a poverty line set at a point just above h will produce this effect.

### 5.2 Asset thresholds and poverty traps

The model above can easily be expanded to include assets, e.g. as in:

$$y_{it} = f(y_{it-1}, rA_{it-1}, X_{it})$$

where $A_{it-1}$ denotes household i assets at time t-1, and r is a liquidity parameter indicating the rate at which assets can be transformed into income (in the standard case, r could stand for the returns on the assets).

[11] See Dasgupta (1997) for a review of the evidence.

[12] In this paper I define safety nets as contingent and temporary transfers, contingent because they depend on the materialisation of hazards and temporary because they are simply focused on compensating for the effects of hazards on household income, consumption, or assets – ideally lump sum, one-off transfers.

[13] As Jalan and Ravallion put it, "An effective safety net will then be a long-term investment, and with a potentially high return" (p.114).

Carter and Barrett (2005) develop an asset-based approach to identifying poverty traps and chronic poverty. They make a case for focusing on assets as a means to distinguish between the structurally poor and the stochastically poor. Households who are structurally poor have asset profiles which are insufficient to generate livelihoods above the poverty line. Households who are stochastically poor have asset profiles sufficient to take them above the poverty line, but they may find themselves in poverty at survey observation points due to stochastic variations in the returns to their assets. Even with longitudinal survey data, they argue, it may be difficult to differentiate between these two groups of the poor when focusing solely on income or expenditure, but focusing on assets enables the researcher to distinguish between these two groups.

Distinguishing between the structurally poor and the stochastically poor is important for both analytical and policy reasons. At the analytical level, structural poverty raises questions about the nature of the relationship between assets and utility or livelihoods. To the extent that assets and livelihoods show a continuous, monotonic, linear relationship, escape from structural poverty can be guaranteed to poor households able to accumulate assets, even through a slow and gradual process. The structurally poor will in due time catch up with the non-poor. But if this relationship is non-linear, poverty traps may set in. For example, if production technologies require a minimum level of initial investment, such that only wealthier households may take advantage; or if patterns of social exclusion deny entry to certain occupations or markets to certain groups; or if financial markets provide loans conditional on collateral wealth. In these cases, poorer groups may become trapped in structural poverty, as their wealth accumulation is restricted to projects with small-scale/low-return technology; or to low status occupations; or restricted in their capacity to take advantage of opportunities by their inability to reduce their consumption in order to save.

As with the previous case, the core explanation for poverty traps relies on a non-linear relationship, but in this case it is the relationship between assets and livelihoods (utility in the authors' model). The non-linearity in the livelihood function therefore deserves our full attention. The examples above point to different factors: the nature of production technologies, market segmentation based on non-economic characteristics; and failures in financial markets. However, these can all be traced to market failures of one type or another (increasing returns, information costs or information asymmetry).

In a series of papers, Barrett, Carter and others expand on their explanation for poverty traps (Barrett 2005; Barrett and McPeak, 2005; Barrett and Swallow, 2005). There are many insights which can be gained from this literature (and the empirical literature cited there) but the following points will be especially helpful for our purposes.

- The papers show some concern with incorporating the endogeneity/household behaviour/agency explanations of poverty traps, but this is hard to do in their framework. Barrett (2005) emphasises the endogenous nature of the explanation for poverty traps, "a poverty gap exists when a household optimal strategy does not lead to such [continued] accumulation, when the feasible choice set essentially precludes accumulation" (p.12).
- Risk plays a very important role in explaining poverty traps. Risk can lead to households selecting low-risk/low-return economic activity because the downside for the poor is worse than for the rich; or because the poor face higher risk; or because of their proximity to subsistence levels of consumption, below which irreversible adverse effects set in.
- The factors explaining the non-linear relationship between assets and livelihoods extend to human capital accumulation and especially health (Barrett, 2005), especially in the presence of irreversible, large scale damage from health risk.

- The papers make the point that safety nets are important in smoothing these non-linearities in asset accumulation (more on this below).

### 5.3 Non-linearity in income and assets as explanations for poverty traps.

Postulating a non-linear relationship for income and assets provides a simple, but very effective, explanation for poverty traps. In the context of economics, this has the advantage that it fits in well with the notion that market failures generate multiple equilibria, and gaps or restrictions in the choice set. There is scope within this explanation for narratives of market failure that go outside strictly economic factors, such as exclusion, and there is some potential here for poverty traps to accommodate a wider range of potential factors. However, these non-economic factors must be 'translated' into market failure to fit the model (e.g. social exclusion is 'translated' into information failure, for example, women receive lower labour earnings because their 'work commitment' is difficult to assess by potential employers!). Another advantage from this approach, in the context of the focus of this paper, is that it can easily accommodate vulnerability as a source of poverty traps, in terms of the direct and buffer effects of hazards on assets and consequent asset depletion, although the indirect effects of vulnerability are more difficult to incorporate.

However, there is very limited empirical support for this explanation. Jalan and Ravallion (2005) test the presence of non-linearity in income with a six wave panel of rural households in China. Their findings are that while there is some evidence of non-linearity emerging from a dynamic panel model in which current income depends on past income, this does not apply to low levels of income, and therefore that there is no evidence of poverty traps. Antman and McKenzie (2005), use a Mexican panel of earnings and also find evidence of non-linearity in earnings but this is less in evidence at low levels of earnings, suggesting no poverty traps in labour earnings. The absence of empirical support is problematic for this explanation of poverty traps.

In the context of the asset approach, empirical work has focused mainly on non-parametric estimates of the livelihood function, a specification of the relationship existing between a measure of assets and utility or income (finding breaks in the function which could be interpreted as threshold effects). Carter and Barrett (2005) suggest ways in which the asset-based approach could be tested; while Barrett (2005) reviews empirical studies on pastoralists in Africa. In part due to constraints on data, the methodological approach pursued relies on flexible non-parametric models using an asset index. Using data on pastoralists reduces to a minimum the difficulties associated with household heterogeneity and multiple asset portfolios, and it is able to show some non-linearities in the livelihood function. However, it is hard to extrapolate these results to more heterogeneous and complex economies.

A significant barrier to finding evidence for poverty traps can be understood on the basis of Figure 2. With the two attractors at m and n, it is always going to be difficult to observe households in the neighbourhood of point h. It would be fair to say that empirical support for the asset-based explanation of poverty traps is ahead of us.

What about the policy implications from this approach to poverty traps? It has already been noted above that a case for safety nets springs directly from this explanation of poverty traps. Safety nets assist the poor and generate growth. However, it is crucial to note that the models privilege a specific type of safety net. It is not surprising that asset-based models conclude that there exists a minimum configuration of assets required for households to escape structural poverty (Carter and Barrett, 2005), given that their focus is on assets thresholds. Asset-based models presume that assets provide a time-invariant (less stochastic?) basis for identifying the structural poor, and there may be some advantages to

this approach in the context of economies with one or two key assets, such as pastoralists. But the fact that they collapse assets into 'one-dimensional' and 'non-problematic' indexes is itself problematic. A more critical perspective is needed before using this pared down view of assets as the focus and basis of policy. For policy purposes, assets need to be taken as multidimensional and problematic, and the large literature on the relative (in?)-effectiveness of microfinance in reducing extreme poverty should be kept in mind here.

Another troubling issue is that non-linear income or asset models of poverty traps suggest that social protection interventions ensuring anything less than the income or asset threshold will prove ineffective. In Figure 2, a cash or asset transfer less than h will not allow structurally poor households to escape the downward path. There is a minimum level of income or assets which ensures their effectiveness. But this unique level is hard to identify empirically. The complications associated with testing non-linear poverty trap models, that few households will be observed at the threshold point because it is not an equilibrium point, also apply here. Moreover, if threshold points are household specific, or if household heterogeneity is significant, designing appropriate interventions will be at least as difficult as empirical testing the models. In the context of asset transfer interventions, it may prove easier to set threshold/support points for the moderately-poor than for the chronically or extreme poor.[14]

### 5.4 Initial conditions, failing markets and poverty traps

A different perspective on poverty traps focuses on initial conditions plus failing or missing markets. If the very poor lack any assets and the capacity to borrow in financial markets, they will find themselves trapped in poverty. This can even extend across generations within a household. This approach has a great deal in common with the one examined in the previous section, it also makes use of the notion of multiple equilibria and failing markets, but it is not reliant on non-linearities in income or assets. An important difference is that this approach relies on overlapping generation models to illustrate the main points.

It will be useful to focus on a simplified version of a model of child labour developed by Baland and Robinson (2000) to explain why a level of child labour might be an optimal strategy for poor households. Take a simple overlapping generations model with two time periods. In period 1, parents decide on the amount of work *l* and schooling *(1-l)* for their only child jointly with decisions about savings *s* and bequests *b.* In period 2, the child becomes an adult and leaves home. To simplify matters, assume that parents' labour supply is fixed and yields income *m*, and that the wage is set at 1. With consumption *c* and household income *y*, parents' consumption in periods 1 and 2 is:

$$c_1 = m_1 + l_c - s$$

$$c_2 = m_2 + s - b$$

ignoring for simplicity both interest and discount rates. The parents' utility function is

$$U_p = U_p [c_1, c_2, U_c(\varphi_c)]$$

where *p* and *c* index parents and child and $\varphi_c$ captures the child's well-being,

$$\varphi_c = z(1-l_c) + b$$

[14] Barrett makes a case for "the need for triage in transfer programs…directing transfers away from not only the non-poor, but also away from a sub-population of the poor who are unlikely to benefit significantly from the transfer" (Barrett, 2005, pp.14-15). He also provides an example in the context of herd restocking for pastoralists: "providing one or two cattle to a herder who has just lost his entire herd is unlikely to enable resumption of extensive pastoralism. Rather, he is likely to lose one of the animals in short order as he settles into a new, lower, sedentarized equilibrium…".

where $z$ is the return to schooling. The optimal proportion of the child's time to be spent in work is given by $z'(1-l_c^*) = 1$, the point where the wage equals the returns to schooling. For Baland and Robinson, at this point the amount of work $l_c^*$ is privately efficient (it may not be socially efficient as there are additional benefits to society from schooling).[15] Better off households may use their accumulated savings or assets to achieve $l_c^*$. For households without sufficient initial resources, well functioning financial markets will enable them to shift resources across the two periods to achieve $l_c^*$. But this is problematic for poorer households for whom $m_1$ and $m_2$ are low and child labour is essential to maintaining adequate consumption levels. For them, the ability to borrow in period 1 to finance the schooling of their child is crucial. However, if financial markets are missing or fail to work for the poor, so that $s \geq 0$ (savings are constrained to be positive as they are unable to borrow = negative savings), then parents will only be in a position to invest in their children's education if they can use their own resources. Poor households unable to self-finance their children's education will adopt inefficient levels of child labour $z'(1-l_c^*) > 1$, and will consequently under-invest in their schooling, thus ensuring poverty persists among younger generations.

Bequests can also provide a mechanism for ensuring privately efficient child labour. Parents could use bequests to raise the well-being of children when adults and this could compensate for inefficient child labour. Put differently, children could forego bequests to compensate their parents for reduced consumption in period 1 to finance schooling. However, for poorer households bequests are not feasible and $b = 0$, and therefore child labour will be inefficiently high and schooling inefficiently low. The key point is that liquidity and credit constraints on poor households prevent them from transferring resources from period 2 to period 1 and ensure initial conditions are repeated in time. This simple model leads to the conclusion that initial conditions and failing credit markets could generate poverty traps extending across overlapping generations.[16]

There is some evidence to support the view that credit or liquidity constraints applying to poorer households can explain excessive child labour and underinvestment in schooling (Dehejia and Gatti, 2002). Emerson and Portela Souza (2003) show for Brazil that the likelihood of child labour is affected by whether parents themselves experienced child labour or poor schooling. The likelihood of child labour is higher the earliest their parents entered the labour force and the lower is their educational attainment. They conclude that "there appears to be an intergenerational effect of child labour over and above that which is transmitted through household income and parental education" (p.39). There is rapidly growing literature showing that regular cash transfers can reduce child labour and increase schooling (Carvalho, 2000; Ravallion and Wodon, 2000; Bourguignon *et al.*, 2002; Cardoso and Portela Souza, 2003; Sedlacek, 2003; Edmonds, 2004). Making a broad generalisation, and in the context of the model above, cash transfers would mainly operate to reduce

[15] From the perspective of parents, at $lc^*$ the marginal cost to them in terms of foregone consumption equals the marginal benefits to the child from schooling. To simplify matters I have assumed that the child's time can only be allocated to work or schooling. In fact, there are also other possible activities, such as play and idleness.

[16] Banerjee (2005) uses an overlapping generations model to distinguish between two types of poverty traps. He relies on initial conditions and failing markets to generate poverty traps, but distinguishes one type of poverty trap arising from 'desperation' from another based on 'vulnerability'. The very poor are very close to the minimum basic subsistence and access to borrowing is limited because of the potential for default given their desperate situation. The 'desperate' poor fail to invest because they cannot raise finance because they will default if their consumption drops below a minimum. A second poverty trap is associated with 'vulnerability', that is concern with the risk of sustaining a large drop in living standards that leads poor households to restrict investment to low-risk/low-return projects. Note that the first poverty trap arises because poor households have little to lose, the second arises because they have a lot to lose. In a policy context, the two poverty traps may lead to policy inconsistency. Raising safety nets helps the 'vulnerable poor' to higher levels of investment, but reduces the investment options of the 'desperate poor'.

liquidity constraints.[17] There is very mixed evidence on whether micro-finance can lead to a reduction in child labour and to an increase in schooling, this is because there is a high incidence of child labour in micro-enterprises which may cancel out the positive impact on child labour from lifting credit constraints (Wydick, 1999; Hazarika and Sarangi, 2005).

It would be easy to incorporate vulnerability into this model by noting the effect of hazards on initial conditions. The model above suggests that an unanticipated fall in parents' income (direct effect of hazards) would be compensated for by increases in child labour (in the absence of buffers). It follows directly from this that hazards threatening parents' income will strengthen intergenerational poverty traps. There is a great deal of evidence that economic and financial crises, as well as idiosyncratic shocks such as sickness, unemployment, or death affecting the breadwinner will lead poorer households to take children out of school and increase their paid work (Guarcello *et al.*, 2003). There is growing evidence that cash transfer programmes could have a protective effect in reducing the impact of such hazards and shocks on child labour (Carvalho, 2000; Edmonds, 2004; Sadoulet *et al.*, 2004).

There are interesting policy implications from this model that merit further discussion. Social protection can play a role in protecting household consumption, thus preventing the direct effects of hazards from resulting in inefficient child labour, which could lead to intergenerational poverty persistence. The type of social protection which could be effective here is more along the lines of regular transfers, and not contingent transfers.[18] Regular transfers could ensure sustained investment in schooling. This also raises the issue of schooling conditionalities as a component of the social protection intervention. The literature reviewing the effectiveness of alternative policies aimed at reducing child labour suggest that regulation/legislation has not been effective in the past, and that supply-side policy in developing schooling infrastructure has not by itself generated reductions in the incidence of child labour (Brown *et al.*, 2001). These findings are consistent with the predictions of this model. The model predicts that transfers to parents could reduce child labour to a privately efficient level, but may not eradicate it. It could be argued that a minimum level of schooling is desirable because of the social benefits of schooling, say secondary schooling for girls improves nutrition and productivity of their future off-spring or that secondary schooling ensures improved governance through political participation. If this is the case, then socially efficient child labour will be below the privately efficient level. In this case schooling conditionalities may be justified and will be binding (Barrientos and DeJong, forthcoming).

## 6. Vulnerability and 'thick' models of poverty traps

A common characteristic of the models discussed in the previous section is that market failures are a necessary condition for poverty traps, either arising from increasing economies of scale, information gaps and asymmetry and which ensure non-linear production techniques, market segmentation or failures in financial markets. As a basis for the explanation of poverty traps, this can be unduly restrictive. This section explores whether 'thick' models of poverty traps might be less restrictive, and whether in this context, the different vulnerability effects on poverty persistence could be more easily incorporated. This section is more speculative than the previous one since 'thick' models of poverty traps incorporating vulnerability have not been fully explored in the literature.

[17] This is a generalisation because there is evidence that regular cash transfers increase the credit-worthiness of beneficiary households and therefore may also lift credit constraints (Barrientos and DeJong, 2006).

[18] Bourguignon (2004) makes the point that regular transfers may also generate redistribution of wealth with net positive effects on growth.

Capability theory (Sen, 1985, 1997, 1999) offers a good basis for developing a 'thick' model of the links between vulnerability and poverty traps. Capability theory seeks to explain the production of well-being, and provides guidance on the most appropriate methods to measure well-being. Compared with the models examined in the previous section, capability theory provides a more direct analysis of poverty and vulnerability, as it focuses on well-being directly, as opposed to income, consumption, or assets, which are instruments or proxies of well-being.[19] The capability approach suggests that well being can be better understood and evaluated if the focus is on functionings and capabilities. Functionings are defined as the possible beings and doings available to individuals and households, and they reflect well-being more accurately because "...how well a person is must be a matter of what kind of life he or she is living, and what the person is succeeding in 'doing' or 'being'" (Sen, 1985). Capabilities, on the other hand additionally reflect the role of agency in the selection of 'beings' and 'doings' that a person performs in line with her values. The capability approach is "primarily concerned with value-objects, and see the evaluative space in terms of functionings and capability to function" (Sen, 1985, p.45).

Figure 3 provides a stylised description of the production of well-being which emerges from the capability approach. It will be useful to identify different stages in the production of well-being and to identify vulnerabilities associated with each stage. In the figure, the production of well-being includes both processes, gathered in the transformative tools row, and outcomes, located in the evaluative space. The third row provides examples of potential vulnerabilities associated with the different stages. Starting from the left hand side, individuals and households have assets and entitlements. Through processes of production and exchange, households are able to convert their assets and entitlements into commodities for consumption or accumulation. This conversion critically depends on markets and the rights system. Poorly operating markets or uncertain rights systems introduce important vulnerabilities. Livestock, for example, can be depleted by natural disasters, conflict or changes in demand. Uncertainty over entitlements, due to lack of information, bureaucratic filters, or corruption, may render them valueless. Commodities have properties which can support consumption, for example foodstuff which can be used for the preparation of meals. With due attention to the constituent properties of these commodities, households are able to convert commodities into functionings, understood as 'beings' and 'doings'. Sets of commodities can support a range of potential functionings, vegetables can be used for meals or medicines, computers can be used for learning, entertainment, or political participation. Vulnerability associated with this stage in the production of well-being can reflect deficits in commodities and/or difficulties in converting these commodities into functionings. The latter is highly heterogeneous across population groups and stages in the life-cycle, for example, expectant mothers need more calcium than non-expectant mothers of the same age and community and poor health is another way of describing difficulties in transforming commodities into well-being. Finally, selecting from the set of available functionings those that are in line with the life that individuals or households value engages agency. Autonomy is crucial here, for example deficits in voice and participation by women in household decisions will make them especially vulnerable.

This stylised description of the production of well-being and associated vulnerabilities can support a 'thick' model of poverty traps. The capability approach is more general than the approaches reviewed above, as can be seen from Figure 3. Asset-based poverty traps focus on the first evaluative space. Credit market failure-based models of poverty traps focus on the first transformative stage. Life-cycle explanations of poverty focus on the second transformative stage. These can be incorporated within a thicker model. Social exclusion explanations of poverty traps, which could not be incorporated easily into 'thin' models relate to the third transformative stage focusing on agency.

[19] As Sen notes, this "particularly important in considering and evaluating public action aimed at reducing inequality and poverty" (Sen 1999, p.88).

**Figure 3. The capability approach and vulnerability**

| ***Evaluation space*** | assets and entitlements | | commodities | | functionings | | capability |
|---|---|---|---|---|---|---|---|
| ***Transformative tools*** | | markets and rights systems | | properties | | agency | |
| ***Vulnerability*** | asset depletion<br>uncertain entitlements | asset price volatility<br>political risk and exclusion | consumption deficits | life course capacities | failure to achieve basic functionings | autonomy deficits | short lives |

Focusing on capability expands and re-focuses the approach to vulnerability and poverty traps in important ways. The role of transformative tools and especially agency, enable a richer and more complete perspective on vulnerability. Poverty traps may arise not just as a consequence of direct effects from shocks, and the limitations of available buffers, but also from the interconnectedness of vulnerabilities. It is possible that vulnerabilities may combine and compound their effects on well-being, for example old age poverty reflects compounding of asset depletion and reduction in life course capacity in converting commodities into functionings. The feedback effects of vulnerability can be explained more clearly in terms of households trading vulnerabilities against each other. Adverse incorporation trades off autonomy for greater security, especially security against vulnerabilities in the rights and market systems.[20]

Overall, the capability approach could also provide a better grounding for social protection. Note that the policy implications emerging from the stylised description of the capability approach above are that integrated, multi-vulnerability interventions will be needed to engineer escape from poverty traps. Interventions might be required to ensure all the transformative tools work for the poor and vulnerable.

## 7. Conclusions and further research

There is a measure of agreement around the view that vulnerability generates poverty, through the direct effects of shocks on well-being, as well as through deficits in buffers available to households to protect their living standards. There is a growing body of evidence suggesting that poverty incidence rises with uninsured shocks. There is much less agreement on whether shocks have long-term and lasting effects leading to poverty traps. The limited empirical literature suggests that shock-affected households bounce back, but that households affected by large shocks take a long time to recover offering some support for a link existing between vulnerability and poverty traps. A blind spot in the literature is feedback effects of vulnerability on household strategies leading to persistent poverty.

The paper has examined whether vulnerability generates poverty traps. It has considered 'thin' models of poverty traps and whether these can accommodate vulnerability. Models explaining poverty traps as resulting from non-linear income dynamics, asset thresholds and credit market failures were outlined and discussed. The main conclusion is that these models can accommodate vulnerability effects, but mainly direct and buffer effects. However there is

[20] See Wood (2001).

limited empirical evidence to support these explanations of poverty traps. Empirical testing of non-linear income dynamics concludes that there is no support for the view that it leads to poverty traps. Limited empirical examination of the asset threshold model suggests, in the context of pastoralists, that asset-livelihood functions show discontinuities that can be explained by asset thresholds. There is a measure of support for the view that credit market failures are responsible for intergenerational poverty traps through insufficient investment in schooling and inefficient levels of child labour. The policy implications are model-specific. The non-linear income dynamics model suggests contingent safety nets ensuring poverty traps are avoided, while asset-based models specify minimum asset transfers and protection. Discontinuities in the livelihood function recommend that anything less than threshold level transfers will be ineffective, but determining these thresholds in practice is hugely problematic. Poverty traps associated with credit market failures in the context of child labour and schooling can be prevented with regular transfers supporting parents' consumption and perhaps with schooling conditionalities where social returns to schooling are significant.

The paper has also sketched a 'thick' model of poverty traps incorporating vulnerability. This is more speculative, as there is very little literature on this approach, and very limited empirical evidence. An advantage of this approach is that it encompasses a broader range of vulnerabilities and their interaction as potential explanations of poverty traps. It also enables greater scope for agency and non-economic factors. Further research is needed to develop this approach incorporating vulnerability and focused on poverty persistence. The policy implications from this approach are that integrated interventions, at different stages of the production of well-being, might be necessary to avoid poverty traps.

These conclusions delineate an important area for research, to which the CPRC is in a position to make a significant contribution. A clearer perspective on how to approach the linkages existing between vulnerability and persistent poverty, and a stronger, and comparative, body of evidence are needed to make the case that risk and vulnerability are significant factors behind poverty traps. Research on the nature of the linkages between insecurity and vulnerability and chronic poverty are essential to provide robust foundations for policy analysis. There is much that the research could do to provide the foundations for stronger and more effective policy. It is important to develop a strong body of evidence to show that social protection interventions focused on the poor, and especially on the chronically and persistent poor, are desirable, affordable and effective. It is also important to develop and apply analytical tools for identifying and measuring the impact of social protection interventions (programmes and policies) on the dynamics of poverty, and especially upon the chronically poor. This will provide knowledge of the types of interventions likely to be effective in reducing and mitigating the impact of risk and vulnerability on chronic poverty.

The research planned under the *Insecurity, risk and vulnerability* CPRC research theme will aim to develop a conceptual framework for examining the links between insecurity and vulnerability on the one hand and chronic poverty on the other. It will also focus on developing a strong and comparative body of evidence on these links, and to assess the effectiveness of policy options. Special attention will be given to developing research in two key areas: household dynamics and informality. Household dynamics, for example as a result of births or deaths, can be an important source of vulnerability, leading to poverty persistence. It can also represent a response to vulnerability, and provide a means of escaping chronic poverty. The same applies to informality. Examining the link between vulnerability and chronic poverty in the context of household dynamics and informality will generate important insights into the nature of this link and into appropriate conceptual frameworks to analyse it.

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