Investigating resilience thresholds in Sub-Saharan Africa

Lucy Scott (ODI)

with Debbie Hillier (Oxfam) and Helen Underhill (ODI)

April 2014

CONTENTS

SUMMARY

The post-2015 development agenda is leading to a focus on eradicating extreme poverty by 2030 – or 'getting to zero.' This is a very important aim. But poverty in this case is defined as $1.25 per person per day which is indeed highly extreme. And as people cross this line 'absolutely nothing special happens' (Pritchett, 2013).

In particular, people who live just above the poverty line are vulnerable to be pushed back into poverty due to shocks and stresses. 75% of people living in developing countries, around four billion people, live on less than $4 a day (World Bank, 2013) and are exposed to individual or household shocks (such as ill-health, loss of job, death and theft) or shocks experienced by the whole community (such as drought or flooding). According to the 2014 World Development Report, 'There is growing evidence that adverse shocks - above all, health and weather shocks and economic crises - play a major role in pushing households below the poverty line and keeping them there' (ibid). And some of these shocks, including climate-related events and economic shocks are likely to increase in the future.

Getting to zero, and staying there, involves not just ensuring that people currently in poverty escape from living in it but also that people do not fall into poverty in the future. Of course, households have varied ways of coping with such shocks – some may experience only a transitory impact; for others this can be long term. For households in low-income countries, the most effective safeguard is a large asset base that they can draw upon, but poorest households are the least likely to have sufficient income, savings, and assets to do so (del Ninno et al., 2001) and may resort to negative coping strategies, forced into sacrificing long term gain for immediate survival needs.

This raises the question as to whether there is a 'resilience threshold' or 'security from poverty line' (Sumner, 2013): a line that, once people are living over, means that they are highly unlikely to live in poverty in the future. If there is such a threshold, what form would it take? For instance, would it be based on achieving a certain level of income/ expenditure; a particular number of years of education or access to a particular type of (informal) insurance arrangement?

This research explores these questions for several countries in sub-Saharan Africa in two distinct ways. Firstly, the link between poverty and key variables - consumption, education, land and diversified sources of income – was explored using regression analysis on panel data from Ethiopia, Uganda, South Africa and Tanzania. Secondly, a qualitative assessment of life histories was undertaken, using histories from Ghana, Kenya, Tanzania and Uganda.

The key findings are:

- There is a clear correlation between the level of household per capita **income/expenditure** and a reduced likelihood of living in poverty in the future. However, it is difficult to identify an income/expenditure *threshold*, a particular point at which there is a step-change in the likelihood of a household living in poverty in the future.
- The study explored what level of income would be necessary to predict that households would not be in poverty in the future (more precisely, a 10% chance of being in poverty in the next survey round). It found that households in rural South Africa would need a per capita expenditure of 23 times the national poverty line; in rural Uganda this would need to be five times. This is probably too high to be of policy relevance.
- The level of income required to reduce the probability of future poverty to 10% is significantly higher in the sub-Saharan African countries studied here than in Latin America (see work by

López-Calva and Oritz-Juarex, 2011). This is perhaps not surprising given the more limited government safety nets and reduced access to free health-care in the region.

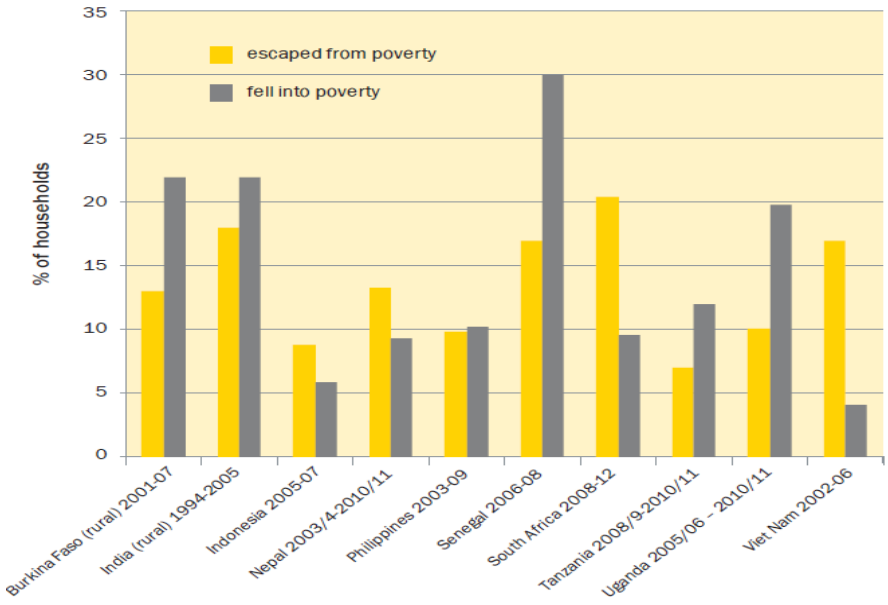
- Panel data analysis reveals that **education** is important for resilience. The more years of education a household head has, the less likely a household is to live in poverty in the future. However, it is unrealistic to expect the vast majority of households to achieve the level of education required to reduce the probability of living in poverty in the next survey round to 10%.
- Nevertheless, education, and specifically the number of years of education of the household head, emerges strongly from life history analysis as important for resilience. In general, post-primary education and/or technical training is necessary. This has clear implications for development and humanitarian actors, who should assess their support for education, both long term and in crisis situations.
- Life histories show that people strongly believe resilience to be linked with **livelihood diversification,** particularly diversification into non-farm sources of income. Important aspects for households to diversify their income are access to credit and loans, and family networks, along with education.
- Any **resilience thresholds will ultimately be context-specific**, and thus difficult to identify through analysis of national panel data. There is scope to analyse more fine-grained data representative of specific livelihoods zones and urban settings to search further for a resilience threshold, potentially using data from Household Economy Analysis.
- **Resilience is clearly a multi-dimensional issue**, as is poverty. It may, however, be possible to formulate a simple, proxy measure for resilience – just as poverty lines based on national consumption, whilst imperfect, provide a useful function. More work is required to explore and test such a threshold but could possibly incorporate: (1) more than 8 years of education of head of household, (2) income greater than national poverty line and (3) diversified sources of income (including one source of non-farm income).

INTRODUCTION

The world is on the cusp of agreeing to a post-2015 development agenda, which will commit national governments to eradicate extreme poverty by 2030: to 'get to zero'. As the recent Chronic Poverty Report highlights, 'getting to zero', and staying there, involves a three-pronged approach of: tackling chronic poverty (or the poverty experienced by people over many years, sometimes over a lifetime); stopping impoverishment and sustaining poverty escapes (Shepherd et al., 2014).

Impoverishment is already a significant phenomenon, with descents into poverty outnumbering escapes from it in some countries and over certain periods of time (Shepherd et al., 2014; Figure 1). If impoverishment is not prevented, this will, at a minimum, slowdown progress to zero extreme poverty.

Figure 1: Over specific periods of time and in certain contexts descents into poverty can outnumber escapes



As the world has seen success at reducing extreme poverty (the numbers of people living on less than $1.25 per day), so the number of people living on $2-$4 a day has increased, both in terms of total numbers and proportions (Sumner, 2012). Thus 75% of people living in developing countries now live on less than US$4 a day (World Bank, 2013). According to the 2014 World Bank report on *Managing Risk for Development*, 'There is growing evidence that adverse shocks - above all, health and weather shocks and economic crises - play a major role in pushing households below the poverty line and keeping them there' (World Bank, 2013).

This raises the question as to whether there is a certain threshold, beyond which people are significantly less likely to fall into poverty in the future. Alongside tackling chronic poverty and preventing impoverishment, one aim of anti-poverty policies would then be to promote people to living at a level above that threshold.

This work draws on analysis of panel data and life histories to investigate the idea of a 'resilience threshold'. In particular, if households live above a certain level (of assets, consumption or education), then they are less likely to live in poverty in the future. The specific questions it sets out to answer are: (1) Is there a threshold above which households are significantly less likely to live in poverty in the future? (2) If so, what is the nature and level of that threshold? (3) Is this a general finding or are thresholds, if they exist, context specific?

THE BASIS FOR 'RESILIENCE THRESHOLDS'

The concept of resilience was originally applied in the context of the environmental and natural sciences to refer to the ability of a system to 'bounce back' following a disturbance. The notion of a resilience threshold also stems from environmental science to mean a point between different regimes in an ecological system. When a threshold is passed then the nature and extent of feedbacks change so that there is a change in the direction in which the system moves (Resilience Alliance and Santa Fe Institute, 2004).

Resilience has since widely been applied to development studies (often with a more transformative approach than simply 'bouncing back' to the original state) and it may be that the idea of a resilience threshold can also have a useful application in the conversations around poverty reduction. In particular, a 'resilience threshold' could refer to the idea that once a person's welfare has moved beyond a certain level then they are less likely to fall into poverty in the future, and instead are rather more likely to be on a trajectory of future welfare improvement.

Conceptually the notion of a resilience threshold, or a 'security from poverty line' (Sumner, 2013) is plausible. Recent analysis has highlighted the importance of achieving a certain level of income in order to reduce the likelihood of being poor in the future i.e. to achieve resilience. For instance, studies from Latin America argue that people living between a level of $1.25 and $10 a day are the 'new poor' who remain vulnerable to falling back into poverty and so are yet to be a part of the secure middle class (Birdsall et al., 2013). Work on the role of environmental disasters in poverty dynamics, specifically in Ethiopia and Andhra Pradesh (India), shows how the probability of subsequently falling into poverty decreases as the current level of household income increases above the poverty line (Shepherd et al., 2013). Linked to this is a concern that escapes from poverty are of a poor quality; that households are moving to living at a level of expenditure just above the poverty line, rather than being on an upwards trajectory where they see real improvements in their lives (Krishna, 2010). The poor quality of poverty escapes is one reason why households in South Africa and Uganda had previously escaped poverty subsequently returned to living in it (Scott et al., 2014)[1].

Work in Latin America (Brazil, Chile and Mexico) and Indonesia has attempted to pin down the specific income level that may represent an income-based resilience threshold. For instance, it is estimated that the risk of falling back into poverty in Latin America falls to about 10% when per capita income is $10 per day (or just more than double a $4-5 Latin American poverty line; López-Calva and Oritz-Juarex, 2011). $10 per person per day is also associated with completion of secondary school across Latin America (Birdsall, 2012). Work in Indonesia is investigating further the relationship between a consumption-based poverty line and a resilience threshold (Sumner and Yusuf, forthcoming).

Extensive work highlights the importance of assets in buffering households against the negative effects of certain shocks. Work on rural livelihoods during the 1990s highlighted how rural households have a range of assets at their disposal (human, natural, social, physical and economic capital) and that the nature of these assets, the interplay between them and the activities that they enable a household to pursue, in part determines how resilient they are in the face of a range of shocks (e.g. Ellis 1999). Little et al. (2006) suggest that asset ownership 'is a better predictor of long-term welfare

[1] In South Africa 30% of households which escaped poverty between 2008 and 2010 had returned to living in poverty in 2012. In Uganda almost 50% of households which escaped poverty between 2005/06 and 2009/10 were once again living in poverty in 2010/11.

and household viability than is consumption, income, or other 'flow' variables that are subject to massive measurement problems and dramatic, short-term changes. Asset endowments (social and economic) largely determine a household's or individual's future capacity to earn income and withstand shocks.'

Livelihoods diversification is often associated with risk-spreading and buffering households against a range of shocks. It could therefore be possible that there is a resilience threshold associated with the number of income sources that a household receives. However, to be effective, these livelihoods need to be unlinked. So in rural areas, a household may have two income sources - one from selling their own agricultural produce and the other from casual agricultural labour – but both of these are vulnerable to weather-related shocks and declines in agricultural production (Boudreau et al., 2013).

A resilience threshold could be conceived as the opposite to a poverty trap - a situation where households are stuck in a vicious circle of poverty, which means that they are unable to improve their situation through their own hard work (McKay and Perge, 2013). Poverty traps have been identified in contexts where one form of asset dominates, particularly livestock in the case of East Africa (Lybbert et al., 2004). However, the evidence is much less strong where asset bases are more diverse. A multi-country assessment of asset-based poverty traps using panel data failed to find evidence for their existence (McKay and Perge, 2013). This analysis showed that while in almost all cases chronically or persistently poor households have significantly fewer assets than those that live in transient poverty, or are non-poor, there does not seem to be a poverty trap (ibid). This conclusion also holds when examining different combinations of household assets. Analysis of panel data, though, is just one approach to investigate poverty traps or resilience thresholds.

Education, in particular, is a 'portable asset' and one which cannot be lost, and so is a particularly important asset in ensuring resilient escapes from poverty (Bird et al., 2010). Analysis of panel data that tracks the same households across three points in time indicates the importance of education in sustaining escapes from poverty. In particular, it reveals that households where the head has four years or more of education are more likely to remain out of poverty, having escaped it, than those households that escape poverty and have a household head with either no education or just the first four years of primary school (Scott et al., 2014). Is it possible that there is a resilience threshold associated with having a certain number of years of education?

The idea of a 'threshold' is used in the Household Economy Approach (HEA), a systems-based approach developed twenty years ago for assessing household food security. This approach identifies two thresholds: the survival threshold and the livelihoods protection threshold. The latter is the most comparable with a 'resilience threshold' – it represents what it costs to maintain the locally specific livelihoods system. This means the total expenditure to:

- ensure basic survival;
- maintain access to basic services (e.g. routine medical and schooling expenses);
- sustain livelihoods in the medium to longer term (e.g. regular purchases of seeds, fertiliser, veterinary drugs);
- achieve a minimum locally acceptable standard of living (e.g. purchase of basic clothing, coffee/tea).

These livelihoods protection thresholds vary by livelihood zone and also wealth group (Boudreau et al., 2013). The context-specificity of the threshold means that they may be difficult to identify from national-level datasets. Taking a different approach, and investigating what a resilience threshold may mean to communities themselves, work in Niger identifies the following as a threshold:

- 3 meals a day and food available at all times for children;
- clothes for family members including clothes for celebrations;
- a reserve fund for exceptional needs such as health care (Venton, 2013).

METHODOLOGY

It is likely that a mixed-methods approach, combining both qualitative and quantitative methods, is necessary to investigate further the idea of a 'resilience threshold'. This paper combines analysis of panel data (see Table 1 for studies used) with analysis of life histories.

PANEL DATA

It is recognised that most of the data analysed in this study is rural. Where possible, distinctions were made for urban contexts, and a separate study will be required to explore urban contexts more fully.

Table 1: The panel studies analysed

	Dates Analysed	Note on representativeness	Number of households
Ethiopian Rural Household Survey (ERHS)	1999 and 2004	Largely representative of rural Ethiopia in 1994	943
Uganda National Panel Survey (UNPS)	2005/06 and 2009/10	Nationally representative of Uganda in 2005	1416
KwaZulu Natal Income Dynamics Study (KIDS)	1993 and 1998	Representative of KwaZulu Natal in 1993	864
Kagera Health and Development Survey	1991 and 2004	Largely representative of Kagera region	653
National Income Dynamics Study (South Africa) (NIDS)	2008 and 2012	Nationally representative of South Africa in 2008 (whites under-represented in later rounds)	6523

This paper presents results from logistic regression models which incorporate a range of explanatory variables at baseline to investigate the likelihood of being poor in wave 2. For those continuous explanatory variables that are significant, it plots the values of these against the probability of being poor in the future. A threshold could be seen by a marked change in the shape of the curve or line.

It also examines the level required, in terms of these variables at baseline, for a household to have less than a 10%, or less than a 5% probability of being in poverty in wave 2. While these levels of probability are slightly arbitrary, they are both less than the poverty headcount in wave 2 and less than the proportion of households falling into poverty between baseline and wave 2 (with the exception of South Africa, Table 2).

Table 2: Poverty dynamics in the panel datasets

	Time period	Poverty headcount at baseline	Fell into poverty	Stayed in poverty	Moved out of poverty	Poverty headcount at wave 2
ERHS Ethiopia	1999-04	37%	18%	19%	18%	37%
Kagera Tanzania	1991-04	61%	18%	39%	23%	57%
KIDS KwaZulu Natal	1993-98	51%	17%	40%	11%	57%
NIDS South Africa	2008-2012 (wave 1-3[2])	60%	6%	29%	31%	35% (wave 3)
UNPS Uganda	2005-09	30%	12%	14%	16%	26%

Table 2 also shows that for all data sets apart from NIDS South Africa, the poverty headcount at baseline and wave 2 were broadly comparable, but the numbers of people falling and moving out of poverty were significant, showing the transitory nature of climbing above the poverty line.

LIFE HISTORY ANALYSIS

This paper draws on the bank of life histories collected in Tanzania, Ghana, Kenya and Uganda by the Chronic Poverty Research Centre (CPRC) (See Table 3).

Table 3: Life histories analysed

	Number of life histories	Note on geographical coverage
Ghana	30	Rural and urban areas
Kenya	22	Rural areas
Tanzania	155	Rural and peri-urban areas
Uganda	60	Rural, many post-conflict

It adopts several approaches to life history analysis:

- A comparison between two households, in the same context, which experienced the same, or a similar shock, one of which the shock sent onto a trajectory of downwards mobility, the other household being able to recover.
- An assessment of the factors that households themselves reported as making them feel more secure about their future.
- An overview of life histories with upwards mobility and a subjective assessment of the factors that contribute to the household's (sometimes, potential) on-going improvement.

[2] Waves 1-3 used, due to the short time-period between wave 1 and wave 2 (2 years)

RESULTS

FINDINGS FROM PANEL DATA

The Annex presents the results of the logistic regression, which examines the factors in wave 1 that are associated with living in poverty in wave 2. The significant results are given in Table 4.

Table 4: Significant explanatory variables, at baseline, associated with being in poverty in wave 2

		Significant continuous explanatory variables	Significant categorical variables
ERHS Ethiopia	Rural	Household per capita expenditure (log) (-) Own land cultivated (log) (-) Livestock value (log) (-) Household size (+)	Female headed household (+) Household head in agriculture Household head has second four years of primary education (-) Household head has secondary education or higher (-) (base category no education) Regional dummies
Kagera Tanzania	Rural	Household per capita expenditure (log) (-)	Household head has secondary education (base category no education)
KIDS KwaZulu Natal	Rural	Household per capita expenditure (log) (-) Household size (+) Age household head (-) Years education household head (log) (-) Remittance value (log) (+)	
	Urban	No individual variables significant	
NIDS South Africa	Rural	Household per capita expenditure (log) (-) Share of elderly (+) Share of children (+)	Household head has senior high or tertiary education (-) Regional dummies
	Urban	Household per capita expenditure (Log)(-) Age of household head (-) Share of unemployed members (+)	Household head has senior high or tertiary education (-) Electricity (-) Street light (-) Regional dummies
UNPS Uganda	Rural	Household per capita expenditure (log) (-) Share of children (+) Years of education of household head (log) (-)	Regional dummies Household head in agriculture (+) All-weather access road (-)
	Urban	Household size (-) Household per capita expenditure (log) (-) Years education of household head (log) ($p<0.1$) (-) Value of (non-agricultural) enterprise equipment (log) (+)	Regional dummies Household head in agriculture (-) All-weather access road (-)

Notes for Table 4:
Significant if $p < 0.05$
(-) as the level of the continuous explanatory variable increases, so the likelihood of being poor in wave 2 decreases. That factor being present reduces the likelihood of being poor in wave 2.
(+) as the level of the continuous explanatory variable increases, so the likelihood of being poor in wave 2 increases. That factor being present increases the likelihood of being poor in wave 2.

Consumption

For each of the models run above, with the exception of urban KwaZulu Natal[3], the level of per capita consumption at baseline is significantly related to the likelihood of being in poverty in wave 2. In other words, the higher the level of per capita consumption at baseline, the less likely it is that an individual or household will have a level of consumption below the poverty line in the future. This would seem to be intuitive.

Tables 5 and 6 give the level of consumption relative to the poverty line, above which there is a 10% or less, or less than 5% chance of an individual being in poverty. This varies dramatically across contexts. In terms of having a 10% or less chance of being in poverty, in rural South Africa household per capita expenditure needs to be 23 times the poverty line, while in rural Uganda it is 5 times. Note that separate rural and urban poverty lines are not used in this analysis.

Table 5: For a household to have a 10% or less chance of living in poverty in wave 2

		Consumption relative to national poverty line	Level of monthly per capita consumption	Proportion of population above this level	Mean monthly per capita consumption in sample
Ethiopia	**Rural**	N/A		0%	
KwaZulu Natal	**Rural**	25*	8103 Rand (at 2000 prices)	0.1%	438 Rand (at 2000 prices)
	Urban	Level of consumption at baseline not significantly related to poverty in wave 2			
South Africa	**Rural**	23*	17 154 Rand (at 2008 prices)	0.1%	442 Rand (at 2008 prices)
	Urban	1.4*	2 697 Rand (at 2008 prices)	27%	1119 Rand (at 2008 prices)
Uganda	**Rural**	5*	98 714 shillings	6%	40 508 shillings (at 2005/06 prices)
	Urban	3*	56 954 shillings	45%	79 318 shillings (at 2005/06 prices)

[3] In urban KwaZulu Natal it is still the case that as the level of household consumption increases, so the household is less likely to live in poverty in the next survey round. However, this relationship is not significant. This potentially reflects the importance of access to employment in the context of urban South Africa. Previous analysis of the KIDS dataset highlights the high degree of employment volatility and how the loss of formal sector employment often explains the difference between being non-poor and poor (Aliber, 2001).

Table 6: For a household to have a 5% or less chance of living in poverty in wave 2

		Consumption relative to poverty line	Level of monthly per capita consumption	Proportion of population above this level	Mean monthly per capita consumption in sample
Ethiopia	**Rural**	N/A		0%	
KwaZulu Natal	**Rural**	46*	14 765 Rand (at 2000 prices)	0%	438 Rand (at 2000 prices)
	Urban	Level of consumption at baseline not significantly related to poverty in wave 2			
South Africa	**Rural**	131*	98 716 Rand (at 2008 prices)	0%	442 Rand (at 2008 prices)
	Urban	4*	2 697 Rand (at 2008 prices)	10%	1119 Rand (at 2008 prices)
Uganda	**Rural**	8*	162 753 shillings (at 2005/06 prices)	1%	40 508 shillings (at 2005/06 prices)
	Urban	4*	84 964 shillings	27%	79 318 (at 2005/06 prices)

It is, however, difficult to argue that there is a 'threshold', or at least a threshold that could realistically be reached. Figures 1 to 5 give the probability of being poor in wave 2 on the y-axis, against the log of per capita consumption in wave 1, on the x axis. In rural Ethiopia the relationship between consumption in wave 1 and poverty in wave 2 is a straight line (Figure 2). For rural Kagera and KwaZulu Natal the relationship is flattened at the top and bottom of the distribution (Figure 3 and Figure 4), as it is in urban Uganda (Figure 6). Meanwhile in rural and urban South Africa and rural Uganda the curve is exponential (Figure 5 and Figure 6). If there were a threshold you would expect to see a marked change in the shape of the curve or line.

Figure 2: Rural Ethiopia: The probability of being in poverty in 2004 by consumption (logged) in 1999

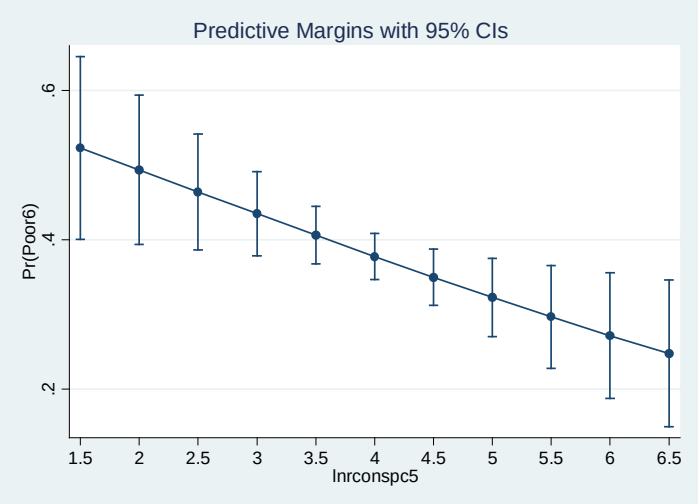


Figure 3: Rural Kagera: the probability of being in poverty in 2004 by consumption (logged) in 1991

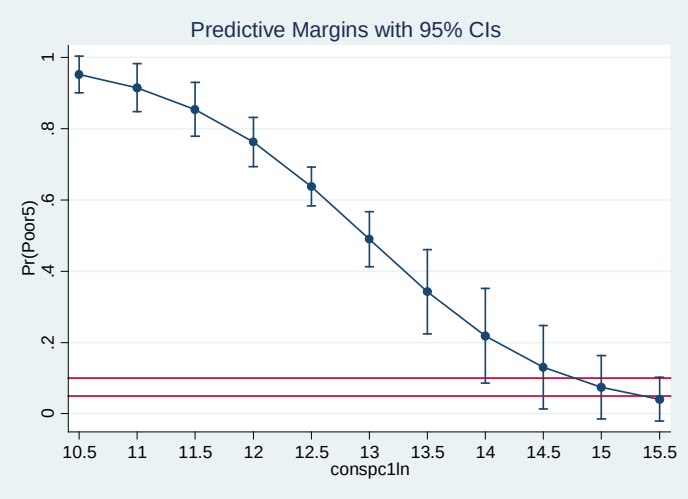


Figure 4: Rural KwaZulu Natal: the probability of being poor in 1998 by consumption (logged) in 1993

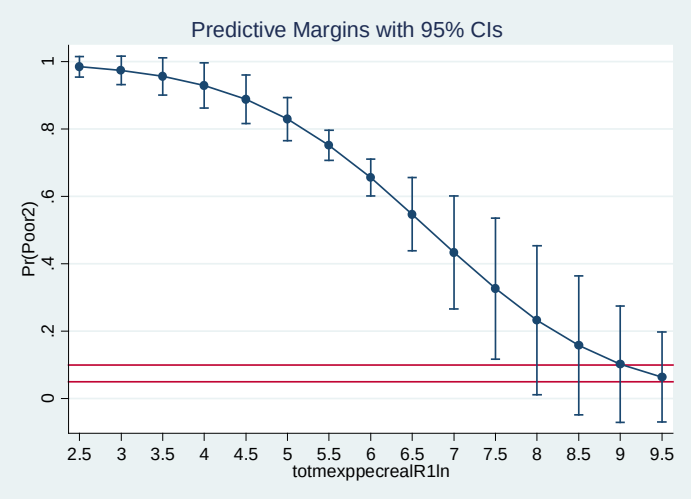
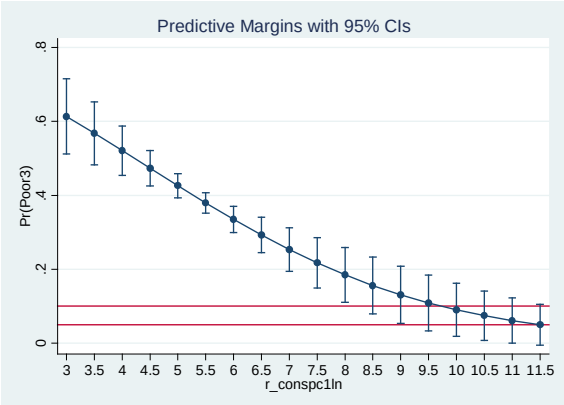


Figure 5: South Africa: The probability of being in poverty in 2012 by consumption (logged) in 2008

Rural areas



Urban areas

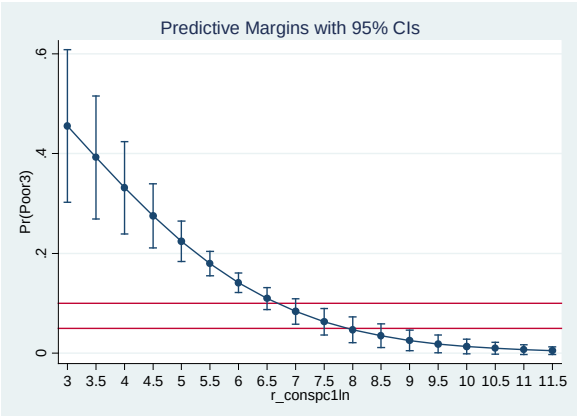
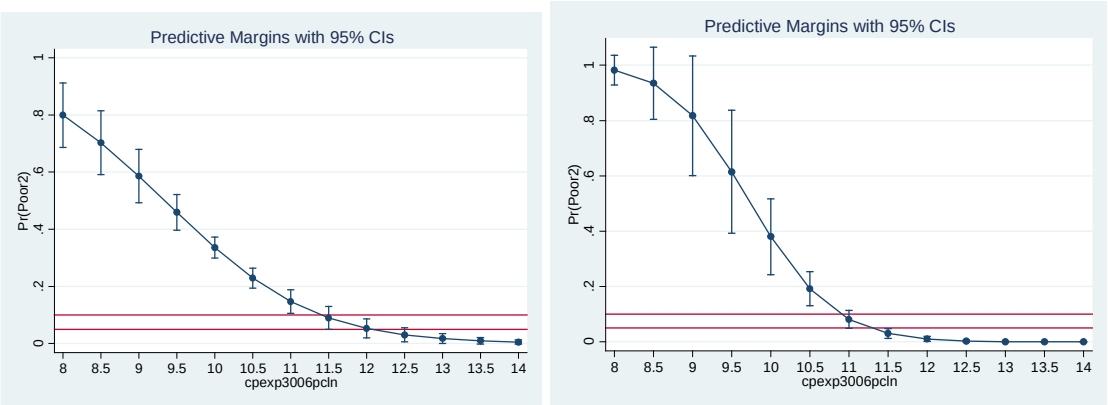


Figure 6: Uganda: The probability of being in poverty in 2009 by consumption (logged) in 2006

Rural areas **Urban areas**



In summary, while there is a relationship between household consumption and the probability of living in poverty in the future (with the exception of in urban KwaZulu Natal), there does not seem to be a consumption threshold as such.

Education

Further investigation of education reveals that as the number of years of education of the household head increases, so the probability of living in poverty in the future decreases. However, it is a large number of years of education that are needed in order for education to reduce the probability of living in poverty in the future to less than 10% (Table 7, Figure 7 and Figure 8).

Some of the surveys just ask about the level of education which the household head has completed, rather than the number of years of education received. As Table 4 shows, a household having an educated head significantly reduces the likelihood of being poor in the next survey round. In rural and urban South Africa households where the head has senior high or tertiary education are significantly less likely than those where the head has no education to be in poverty in the future. In rural Kagera this is the case when the household head has secondary education and in rural Ethiopia where the head has attended the second four years of primary school or more.

Table 7: The years of education[4] of a household head in wave 1 to have a certain probability of being in poverty in wave 2

		To have a 10% or less chance of living in poverty in wave 2		To have a 5% or less chance of living in poverty in wave 2	
		Years of education	**% households where head has this level of education**	**Years of education**	**% households where head has this level of education**
KIDS KwaZulu Natal	**Rural**	The level of education required is off the scale of Figure 6			
	Urban	Level of education at baseline not significantly related to being in poverty in wave 2			
UNPS Uganda	**Rural**	The level of education required is off the scale of Figure 7			
	Urban	14 years	4%	N/A	

[4] ERHS, Kagera and NIDS do not have information on years of schooling completed

Figure 7: Rural KwaZulu Natal: The probability of being in poverty in 1998 by household head education (logged) in 1993

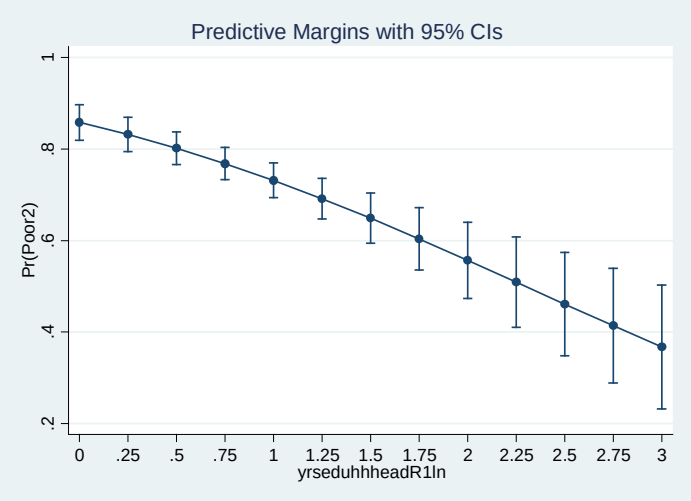
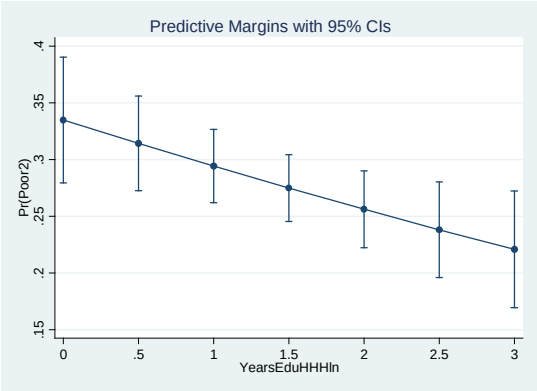
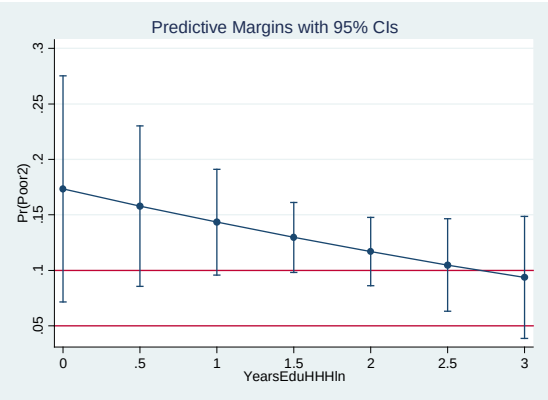


Figure 8: Uganda: The probability of being in poverty in 2009 by household head education (logged) in 2006

Rural areas



Urban areas



Land[5]

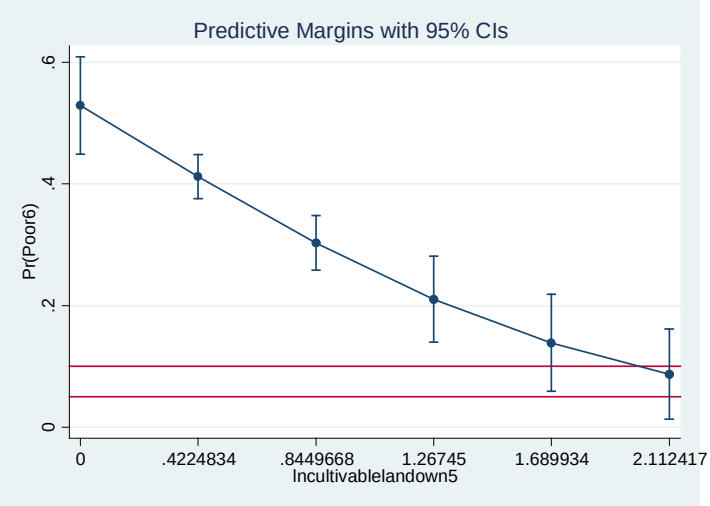
Land owned at baseline did not emerge as being significantly related to living in poverty in wave 2, with the exception of rural Ethiopia. However, even here the amount of land that a household needs to own to reduce their chance of living in poverty in wave 2 to less than 10% needs to be greater than that owned by 0.1% of the sample (Table 8). Again, it is difficult to argue that there is a policy-relevant threshold (Figure 9). Potential reasons why the area of land that a household owns, or has access to, is not a significant determinant of future poverty could include: because the quality of that land is low; because a household does not have the resources to cultivate it (including labour, access to credit or inputs) and because of the often risky nature of agriculture.

[5] NIDS does not have information on land at baseline

Table 8: Land ownership at baseline and living in poverty in wave 2

		To have a 10% or less chance of living in poverty in wave 2		To have a 5% or less chance of living in poverty in wave 2	
		Amount of land (ha)	% households with this amount of land	Amount of land (ha)	% households with this amount of land
ERHS Ethiopia	**Rural**	6.39	0.1%	N/A	
Kagera Tanzania	**Rural**	Land not a significant explanatory variable behind poverty in wave 2			
KIDS KwaZulu Natal	**Rural**	Land not a significant explanatory variable behind poverty in wave 2			
	Urban				
UNPS Uganda	**Rural**	Land not a significant explanatory variable behind poverty in wave 2			
	Urban				

Figure 9: Rural Ethiopia: Probability of being in poverty in wave 2 by area of land cultivated at baseline



Diversified sources of income

Poor households typically do not have access to formal insurance, but rather rely on informal insurance mechanisms, including diversified incomes (particularly remittances) and social networks to tide them over during hard times. Counterintuitively, in rural KwaZulu Natal more remittance income at baseline is associated with living in poverty in wave 2. However, a significant relationship between measures of insurance and living in poverty in the future was not found in the other panel studies (Table 9). This perhaps reflects a difference between measures of wealth (against which poverty is assessed) and measures of resilience.

Table 9: Measures of diversified incomes examined in the different surveys

	Measure at baseline	Relationship with poverty in wave 2
ERHS Ethiopia	Number of income sources	No significant relationship
Kagera Tanzania	Number of income sources	No significant relationship
KIDS KwaZulu Natal	Amount of remittance income	The higher the level of remittance income a rural household receives at baseline the more likely it is to be in poverty in wave 2 ($p < 0.05$). For urban areas this is not significant.
NIDS South Africa	Share of remittance income to total income	No significant relationship
UNPS Uganda	Amount of remittance income	No significant relationship

FINDINGS FROM LIFE HISTORY ANALYSIS

Life history analysis reveals the challenge of identifying a resilience threshold by just the level of income or one asset alone. In particular, it underlines the difficulties of looking for a 'silver bullet', for it tends to be a combination of factors that enable an individual to be resilient. Table 10 gives an overview of the factors that emerged, though overall, not many of the life histories reveal resilient lives. Those that do, highlight among other factors, the importance of post-primary education, of diversified livelihood activities (including salaried work), access to credit and loans, contraception and a small family size as well as family networks for achieving resilience.

Table 10: Factors associated with resilience to future poverty in individual life histories

	Proportion Achieving Resilience	Factors Associated with Resilience (cases reporting this)	Proportion Experiencing Downwards Mobility	Drivers of Downwards Mobility (cases reporting this)
Tanzania 155 people Rural and peri-urban	18% (twenty eight individuals)	Family networks and inheritance (8) Social networks (2) Small family (2) Livelihoods diversification (including non-farm income) (13) Migration (4) Salaried job (6) Post-primary education (5) Access to loans (3) Formal savings (3)	23% (thirty five individuals)	Steady decline as mismatch between income and expenditure (3) High price of agricultural inputs (1) Death of livestock (1) Old-age (1) Death of income earner (4) Illness of income earner (4) Medical costs (8) Illness increasing dependency (3) Large number of child dependents (2) Loss of business (3) Bewitchment (3) Alcohol abuse (3) Divorce/ separation (3) Polygamy (4) Land division (1)

				Declining fertility of land (1) Destruction from fire (2)
Uganda 60 people Rural	3% (two individuals	Education as a tool for resilience after conflict Diverse livelihoods Engagement in non-farm activities	23% (fourteen individuals)	Conflict (6) Impact of Aids (3) Death (1) Changing household dependency ratios (3) Witchcraft (1) Alcohol abuse (2) Family conflict (1) Poor health (1) Cattle raiding (1)
Ghana 30 people Rural and urban	3% (one individual)	Savings in bank (1) Member of workers association (1)	13% (four individuals)	Robbery (1) Death (2) Contested land division (1)
Kenya 22 people Rural	9% (two individuals)	Vocational training (2) Access to credit and loans (2) Livelihoods diversification (including migration, non-farm activities and both husband and wife working) (2)	14% (three individuals)	Theft (1) Poor investment decisions (1) Imprisonment (1) Decrease in agricultural output prices (1)

Life history interviews were undertaken with a man and a woman within the same household and the analysis reveals the different factors that men and women associate both with resilience, and as drivers of downwards mobility. This is particularly stark in terms of negative events, for it is always women who report alcoholism, polygamy and abandonment as drivers of poverty. However, there are also some differences in the factors reported as sources of resilience and opinions as to whether livelihoods have a degree of resilience. A common disagreement between husband and wife is over children. In rural Tanzania, Remmy feels that his household's well-being is improving, due to success with cattle rearing, house building and the family's bicycle repair business, but his wife Monica feels that their situation has stagnated, and is even perhaps declining, as they have too many children (Box 1).

Box 1: Differing perceptions among husbands and wives about a household's improving situation in Tanzania

Remmy says that over the past 10 years the household has seen a significant improvement in their standard of living. He points to the fact that the price of cotton is now high and they own 70 sheep, nine cows and a calf. The family started with one sheep, which reproduced twice in one year. Then, using the proceeds from farming cotton, Remmy bought two to three more sheep. After he had accumulated a few sheep he then sold them to buy a cow. As well as farming cotton and rearing livestock, Remmy also builds houses and has established a small bicycle repair shop. He used to have to work as a casual agricultural labourer, but now no longer does. However, despite appearing to have successfully diversified his income away from agriculture, Remmy says that work is seasonal and hard to find in certain seasons of the year. People only pay him to build houses just after the harvesting season, when they have received the proceeds from selling cotton. Sometimes he has to sell sheep during the lean season.

In contrast to Remmy's positive story of improvement over the last 10 years to the present day, his wife Monica reports that over the last three years their situation has stagnated and life is becoming tough. This is because the number of children they have is increasing. Their youngest child is 6 months old and they also have a three year-old and a six year old. Their eldest daughter got married last year and they received a bride price of five cows, some of which they have already sold for necessities. Her daughter is still living at home and now has a baby. Her husband works in town and visits her occasionally.

Life histories frequently reveal the importance of diversified incomes, migration and diversified assets for resilient poverty escapes. This finding is in part contrast to the findings from panel data analysis, which does not show a linear relationship between increased number of income sources and greater resilience (perhaps because having too many income sources is associated with desperation and survival rather than resilience). Life history analysis does reveal though, that there is a level of livelihoods diversification which household members themselves associate with resilience. A common story of resilience building illustrates the importance of access to loans to enable households to diversify their incomes. The story of Maisara (Box 2) shows how education qualified her to gain access to a salaried job, which in turn increased her access to finance. With the family's additional rental income they are able to withstand any unexpected loss of salary. As well as savings and loans being an important route to livelihoods diversification, they are also an important resource for households to draw upon to cope with shocks.

Box 2: Education and access to loans to build resilience in Tanzania

Maisara's education has been critical for the resilience of her family. Her father sold his assets to invest in his daughters' education, specifically encouraging them to get government jobs; Maisara is a hospital worker.

Maisara's family has been able to withstand the crisis of early, unmarried pregnancy and crisis in the year her husband lost his income for one year due to an administrative error. Her job enabled her, together with her husband, to pay for the education of the five children, which grew considerably in price with her younger children. This investment enabled intergenerational transmission of resilience. She also said 'education is like water, you just have to pay the cost no matter what the sacrifice is'. Finally, her income and her connections in the hospital union enabled her to convince her husband that they should take loans and build extensions on their house in order to create an additional rental income. They are thriving now as most of their children have finished school and their guesthouses are growing in number.

Another finding from life histories is the importance of social networks for resilient escapes (Boxes 3 and 4), with connections being important as a source of loans (both improving the ability of a household to cope with shocks and also to diversify into non-farm activities) and casual labour.

Box 3: The importance of social networks (and non-farm income) in Tanzania

Resilience requires good social networks. While being able to build assets from agriculture demands hard work and good conditions for crop production, making more significant improvement also depends on mutual support from other farmers and traders for loans and casual labour. Being able to take loans without interest enables investment in a range of livelihoods.

Hilari's home life as a child was good in that he and his three siblings had good relations with their parents. However, they ate two meals a day and none of the children completed primary school because of the cost of uniforms and lack of adequate food. At the age of 11, Hilari started agricultural production, focusing on cotton and rice. After a particularly good harvest, aged 16, he was able to pay a bride price, buy clothes, rent farm land and buy a bicycle. With the mutual

support of loans from friends and fellow traders, he gradually accumulated assets and started a business in petroleum and diesel. This business has enabled him to diversify his income away from being reliant on agricultural income, particularly at a time when the costs for producing cotton were rising while the price for selling was declining.

With 8 children and a wife with an on-going illness, Hilari's position is not secure. However, he has made steps to become less reliant on agricultural livelihoods and recognises the importance of education for young people to become self-employed or gain salaried employment. He chooses to spend his limited resources on schooling for his children, and one has completed secondary education.

Box 4: Social networks can improve access to loans, which enable diversification and improved resilience in Tanzania

At marriage, Zaituni and her husband, Hussein, had nothing but one goat and strong family networks. However, in the last 20 years they have steadily improved their situation and degree of resilience. When they first married, Zaituni's income was based on casual labour while her husband worked on commission selling clothes. Since then, her husband has encouraged her to work and to diversify: she makes and sells samosas, sells textiles, farms and still engages in casual labour.

While Zaituni has found many sources of income, her husband's entrepreneurial skills, access to loans on reasonably favourable terms from his family and ability to move between many different livelihoods has been significant in the couple's success. As well as farming cashew and intercropping groundnuts, Hussein used loans to open his own second-hand clothing business and to buy a cashew farm, a motorbike and a shop.

Zaituni and Hussein worked intensively on the cashew farm for three months. The profits from a bumper harvest enabled them to purchase a small cassava/maize farm, pay back loans and Hussein started a small businesses importing and exporting products. All three of their daughters are in school, and she is proud that her eldest is now in secondary school.

Panel data analysis revealed the importance of education for household resilience and this is confirmed from the life histories. In particular, post-primary education and technical training play an important role in improving returns from non-farm self-employment activities (including running a small business). For instance, attending a college course was the start of Jane's entrepreneurial ventures and upward mobility. She now has a number of business ventures and plans for more, and is able to support her family, including her father (See Box 5). Meanwhile, secondary education, or higher, is key to gaining a salaried job, another important element of resilience (see Box 6).

Box 5: Education and access to finance to improve self-employed income and build resilience in Kenya

Jane's life history is an example of how a solid education, financial credit and an entrepreneurial spirit can build and sustain an escape from poverty. Having seen her parents painfully save the income from agricultural labour and making and selling charcoal to buy a plot of land, Jane decided to pursue business in her adult life.

Jane reported leaving secondary school after two years in order for her family to receive a dowry. With two children, this marriage ended two years later. Before marrying again, Jane completed a two-year college course in Nairobi and opened her first saloon business, aged 25. She diversified into second-hand clothing and, later, opened a grocery. Despite having to relocate twice, Jane

continued to build her businesses and has plans to open a fourth M-Pesa outlet (mobile money transfers). Credit and loans have been central to Jane's success. She has borrowed from a local micro-finance institution and Equity Bank, and is a member of a local women's savings group. She provides regular remittances to her father and, at the age of 43, plans to develop a recently purchased plot and become a landlady.

Box 6: Improved access to salaried work through post-primary education in Tanzania

Education has been central to building the resilience Selemani, 50, and his wife now experience. They both benefited from free education and fathers who believed in the importance of schooling, and both secured government jobs with steady incomes and access to government worker loans. Despite the significant increase in cost since their youth, they have invested heavily in educating all five of their children, two of whom have progressed to college. They used government loans of building products to build three extensions on their home for generating a supplementary rental income. This government scheme was attractive to the couple because products do not devalue like money and repayments were taken directly from their salaries.

Although Selemani was fortunate to be born into a family with a productive farm, he feels his father's attitude of valuing education has been instrumental in the positive improvement of his position. 13 years after his first college course, he gained a diploma in agro-veterinary science, enabling him to perform veterinary work and get paid at a higher level. By saving their incomes carefully and using their farm and chickens for consumption, they coped for a year without Selemani's salary and were able to meet the rising costs of their educating their children. Selemani chose to pass the land he inherited from his father as the eldest son to his mother, illustrating their perceived resilience and positivity about the future. Soon, they will have finished paying school fees and their increasing income from rental houses continues to contribute to their upward mobility.

Another important way by which education contributes to resilience is through the fact that it is a 'portable asset' and so, unlike other physical assets is much less likely to be lost, including during large-scale periods of crisis including natural disasters and conflict (Box 7).

Box 7: Education as a tool for resilience after conflict in northern Uganda

The experiences of Ethel, the wife of a primary school teacher, illustrate two ways in which education has supported resilience. Education enabled people to leave the conflict zone in northern Uganda and, post-conflict, it provided a steady income, enabling the rebuilding of farm-based livelihoods.

During the worst of the conflict, Ethel's husband moved to Busoga to escape the fighting, and he worked as a teacher there. She was not able to join him there immediately, because of the danger of ambush on the roads. But she travelled to join him when there was a lull in the fighting in 2003, and stayed in Busoga for over a year, before returning to their home village. By doing this she avoided having to live in an IDP camp, unlike others from her community, and thereby also retained her family's income. Once back home she began to rebuild her house and farm, working hard and was joined by labourers paid for with her husband's teaching salary.

CONCLUSIONS

The idea of a resilience threshold is conceptually plausible. However, in practice they have proven difficult to find using national-level panel data. It is difficult to find that 'kink in the graph.' In particular, investigating the levels of consumption, education and land ownership required to have just a 10% or 5% chance of living in poverty in the future reveals the extremely high levels required. That the vast majority of the population live below that level makes it largely irrelevant for policy makers. The panel data analysis presented in this report, however, only covers sub-Saharan Africa. It may well be that if there is an income threshold it would be higher in sub-Saharan Africa than the levels reported for Latin America to compensate for more limited government safety nets and health coverage.

It could also be that having a 10% or 5% chance of living in poverty in the future is too low in contexts characterised by high levels of risk and few formal insurance mechanisms (including accessible and affordable health-care systems). Across the studies, between 26% (Uganda) and 57% (KwaZulu Natal and Kagera) of households lived in poverty in wave 2, and so any intervention that reduces the probability of being in poverty in wave 2 to a level below that headcount would, arguably, be worthwhile.

The household economy approach has highlighted how thresholds are likely to be highly context specific (Boudreau et al., 2013) and this may be one reason why they are difficult to track-down using national data. How effective education would be at ensuring resilience for instance, depends upon the context and in particular the functioning of the labour market. Other sources of quantitative data, including that collected under the Household Economy Approach and also that collected by the WFP as part of its Comprehensive Food Security and Vulnerability Analysis (CFSVA) project may be more appropriate. This is because the design of both of these surveys enables analysis at the level of particular livelihoods zones.

Life history analysis highlights how it is a combination of assets and activities which are associated with resilience, rather than there being one silver bullet. These factors include diversified income sources (including a mixture of farm and non-farm activities), access to savings and loans and family networks (these both enabling livelihoods diversification and also being called-upon to cope with shocks) as well as education. Post-primary education and technical training can build resilience through increasing returns from a non-farm business, improving access to salaried work and because it is a 'portable asset' which is unlikely to be lost in the wake of shocks. This has clear implications for development and humanitarian actors who should consider their support for education, both long term and in crisis situations.

It may make more sense then, to speak of a multi-dimensional resilience threshold which would comprise the key elements emerging from the life history analysis. More work could investigate further the components of a multi-dimensional threshold, which could possibly incorporate (1) more than 8 years of education of head of household (2) income greater than national poverty line and (3) diversified sources of income (including one source of non-farm income).

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ANNEX: RESULTS OF LOGISTIC REGRESSION

Kagera (rural)

EQUATION	EXPLANATORY VARIABLES	coef	se	pval
poor5	Household per capita consumption (log)	-1.270***	(0.273)	0.000
	Household size (log)	-0.010	(0.378)	0.979
	Child dependency ratio	-0.001	(0.001)	0.407
	Elderly dependency ratio	-0.001	(0.004)	0.735
	Female headed household	-0.018	(0.222)	0.934
	Age of hh head (log)	-0.230	(0.310)	0.457
	Age of hh head (centred)	0.000	(0.001)	0.879
	1.eduhead1	-0.046	(0.270)	0.865
	2.eduhead1	-0.407	(0.266)	0.125
	3.eduhead1	-1.891***	(0.664)	0.004
	5.eduhead1	-0.659	(0.607)	0.277
	Head in agriculture	0.350	(0.297)	0.239
	Value of livestock (log)	0.029	(0.038)	0.440
	Land area (log)	-0.082	(0.179)	0.648
	Number of income sources	0.015	(0.269)	0.955
	Episode illness (2004)	-0.003	(0.069)	0.971
	Constant	17.361***	(3.802)	0.000
	Observations	486		
	Wald Chi2	68.65		
	Prob <χ^2	0		
	Pseudo R2	0.1023		

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

ERHS Ethiopia (rural)

EQUATION	EXPLANATORY VARIABLES	coef	se	Pval
poor2	Hh per capita monthly consumption (Log)	-0.295**	(0.121)	0.015
	Household Size (Log)	0.970***	(0.278)	0.000
	Child Dependency Ratio	0.000	(0.001)	0.792
	Old-age Dependency Ratio	-0.001	(0.005)	0.914
	Female Head	0.522**	(0.231)	0.024
	Age of head (Log)	-0.129	(0.400)	0.746
	Age of Head Squared (Centered)	-0.000	(0.000)	0.915
	First 4 Years of Primary Education	0.153	(0.231)	0.508
	Second 4 Years of Primary Education	-0.550**	(0.271)	0.043
	Secondary and Higher Education	-0.858***	(0.302)	0.005
	Informal Education (Adult Literacy, Religious)	0.204	(0.254)	0.421
	Head Working in Agriculture	0.455**	(0.195)	0.019
	Livestock Value (Log)	-0.080**	(0.035)	0.023
	Cultivable Land Area (Log)	-1.365***	(0.326)	0.000
	Amount of Cereals, Crops and Pulses stored (kg) (Log)	-0.007	(0.033)	0.820
	Total Amount (Birr) Spent on Housing (Log)	-0.044	(0.027)	0.108
	Number of income sources	0.248	(0.187)	0.185
	Distance to Nearest Town (Log)	-0.222	(0.156)	0.156
	Days Lost to Illness, 2004 (Log)	-0.106*	(0.062)	0.088
	Region: Amhara	0.152	(0.314)	0.629
	Region: Oromya	1.635***	(0.368)	0.000
	Region: SNNPR	1.657***	(0.355)	0.000
	1st Month (Ethiopian Calendar)	-0.666**	(0.289)	0.021
	11th Month (Ethiopian Calendar)	-0.355	(0.464)	0.444
	12th Month (Ethiopian Calendar)	1.201***	(0.284)	0.000
	Constant	-0.293	(1.602)	0.855
	Observations	947		
	Wald Chi2 (25)	269.6		
	Prob <χ^2	0		
	Pseudo R2	0.177		

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

KIDS KwaZulu Natal

Rural:

EQUATION	EXPLANATORY VARIABLE	coef	se	pval
Poor2	Hh monthly per capita consumption (log)	-1.085***	(0.311)	0.000
	Household size	0.089**	(0.044)	0.045
	Share of elderly members	0.843	(0.901)	0.349
	Share of children	-0.142	(0.470)	0.763
	Female head	0.113	(0.266)	0.673
	Years education of hh head (log)	-0.919***	(0.143)	0.000
	Age of head (log)	-1.650***	(0.471)	0.000
	Head receives regular wage	0.402	(0.300)	0.181
	Value of remittances received (log)	0.080**	(0.032)	0.011
	Hh in self-employment beyond agriculture	0.203	(0.376)	0.589
	Illness or death, 1998	-0.196	(0.205)	0.339
	Rooms per household member (log)	-0.035	(0.161)	0.830
	Electricity	-0.235	(0.363)	0.516
	Piped water	-0.003	(0.216)	0.990
	Toilet	-0.501	(0.460)	0.276
	Area land cultivated (log)	-0.189	(0.319)	0.553
	Number of cattle (log)	-0.111	(0.140)	0.429
	Permanent road	-0.433	(0.309)	0.161
	Daily market in cluster	0.133	(0.240)	0.581
	Constant	14.246***	(3.087)	0.000
	Observations	567		
	Wald Chi2 (19)	164.4		
	Prob <χ^2	0		
	Pseudo R2	0.206		

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Urban:

EQUATION	EXPLANATORY VARIABLE	coef	se	pval
poor2	Hh monthly per capita consumption (log)	-0.800	(0.612)	0.191
	Household size	0.171	(0.108)	0.113
	Share of elderly members	-5.467	(3.636)	0.133
	Share of children	0.447	(1.198)	0.709
	Female head	-0.166	(0.397)	0.676
	Years education of hh head (log)	-0.083	(0.263)	0.752
	Age of head (log)	1.506*	(0.827)	0.068
	Head receives regular wage	-0.201	(0.486)	0.679
	Value of remittances received (log)	0.050	(0.067)	0.457
	Hh in self-employment beyond agriculture	0.053	(0.455)	0.907
	Illness or death, 1998	0.113	(0.359)	0.754
	Rooms per household member (log)	0.228	(0.532)	0.667
	Electricity	-1.275*	(0.690)	0.064
	Area land cultivated (log)	-1.824	(1.711)	0.287
	Permanent road	-0.718	(0.858)	0.402
	Daily market in cluster	-0.202	(0.775)	0.794
	Constant	-1.574	(5.401)	0.771

	Observations	290
	Wald Chi2 (16)	226.9
	Prob <χ^2	0
	Pseudo R2	0.2889

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

NIDS South Africa

Rural:

EQUATION	VARIABLES	coef	se	Pval
poor3	Hh per capita consumption (Log)	0.437***	(0.097)	0.000
	Household size (Log)	0.208	(0.136)	0.127
	Age household head (Log)	-0.366	(0.266)	0.169
	Female headed hh	0.075	(0.121)	0.532
	Share elderly	1.216**	(0.562)	0.031
	share children	1.900***	(0.302)	0.000
	Head primary junior school	-0.162	(0.151)	0.283
	Head senior primary school	-0.232	(0.167)	0.163
	Head junior high school	-0.241	(0.206)	0.242
	Head senior high school	0.891***	(0.245)	0.000
	Head tertiary education	1.612***	(0.503)	0.001
	Share of unemployed members	-0.060	(0.224)	0.788
	Own dwelling	0.246	(0.207)	0.235
	Remittance share of income	-0.552	(0.362)	0.127
	Subsistence agriculture as share of income	-0.233	(0.973)	0.810
	Owns computer	-0.530	(0.340)	0.119
	Toilet	-0.452	(0.321)	0.159
	Water	-0.058	(0.157)	0.713
	Electricity	-0.137	(0.146)	0.347
	Street light	0.129	(0.252)	0.608
	Tropical livestock units	0.019	(0.015)	0.205
	1.WCape	0.905*	(0.481)	0.060
	1.ECape	0.809***	(0.190)	0.000
	1.NCape	1.003**	(0.480)	0.036
	1.FState	1.199***	(0.460)	0.009
	1.KZN	1.214***	(0.167)	0.000
	1.NW	0.682***	(0.258)	0.008
	1.Mpm	1.484***	(0.253)	0.000
	1.Limpopo	1.111***	(0.210)	0.000
	Constant	1.423	(1.183)	0.229
	Observations	3,452		
	Wald Chi2(29)	910.4		
	Prob > Chi2	0.00		
	Pseudo R2	0.1381		

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Urban:

EQUATION	VARIABLES	coef	se	Pval
poor3	Hh per capita consumption (Log)	0.668***	(0.129)	0.000
	Household size (Log)	0.408**	(0.167)	0.014
	Age household head (Log)	0.901***	(0.342)	0.008
	Female headed hh	0.019	(0.132)	0.883
	Share elderly	0.016	(0.788)	0.984
	share children	1.431***	(0.458)	0.002
	Head primary junior school	-0.492	(0.341)	0.149
	Head senior primary school	-0.252	(0.337)	0.454
	Head junior high school	-0.515	(0.432)	0.233
	Head senior high school	1.457***	(0.452)	0.001
	Head tertiary education	2.486***	(0.488)	0.000
	Share of unemployed members	0.495**	(0.225)	0.028
	Own dwelling	0.225	(0.188)	0.233
	Remittance share of income	0.267	(0.454)	0.556
	Subsistence agriculture as share of income	-0.612	(5.991)	0.919
	Owns computer	-0.379	(0.515)	0.462
	Toilet	-0.026	(0.218)	0.906
	Water	-0.195	(0.276)	0.480
	Electricity	-0.444**	(0.218)	0.042
	Street light	-0.303*	(0.178)	0.089
	Tropical livestock units	-0.442**	(0.218)	0.043
	1.WCape	0.550	(0.396)	0.165
	1.ECape	0.757***	(0.288)	0.009
	1.NCape	0.995***	(0.238)	0.000
	1.FState	0.209	(0.226)	0.356
	1.KZN	1.339***	(0.283)	0.000
	1.NW	0.685*	(0.407)	0.093
	1.Mpm	0.647	(0.480)	0.178
	1.Limpopo	0.525	(0.463)	0.256
	Constant	5.483***	(1.603)	0.001
	Observations	3,071		
	Wald Chi2 (29)	443.9		
	Prob > Chi2	0		
	Pseudo R2	0.2659		

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

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Rural:

EQUATION	EXPLANATORY VARIABLES	coef	se	pval
poor2	HH per capita expenditure	-1.174***	(0.178)	0.000
	Household size	-0.060	(0.043)	0.163
	Share of elderly members	-1.103	(0.751)	0.142
	Share of children	0.790**	(0.401)	0.049
	Age of head (log)	0.038	(0.312)	0.903
	Female head	-0.290	(0.227)	0.202
	Years of education of hh head (log)	-0.225**	(0.094)	0.016
	Central	-1.644***	(0.287)	0.000
	Eastern	-0.796***	(0.250)	0.001
	Northern	-0.364	(0.269)	0.176
	Permanent community access road	-0.370**	(0.182)	0.042
	Episode of illness (2009)	-0.319	(0.222)	0.151
	Drought/ irregular rain (2009)	-0.076	(0.150)	0.611
	Value enterprise equipment (non- agricultural) (log)	0.019	(0.022)	0.394
	Value agricultural equipment (log)	0.009	(0.040)	0.828
	Value cattle (log)	0.002	(0.015)	0.906
	Area land owned (log)	-0.135	(0.112)	0.228
	Value of remittances received (log)	0.023	(0.015)	0.128
	Head works in agriculture	0.493**	(0.212)	0.020
	Number of rooms per person (log)	0.041	(0.435)	0.924
	Toilet	-0.232	(0.196)	0.237
	Protected water	0.197	(0.171)	0.248
	Constant	11.875***	(2.074)	0.000
	Observations	1,250		
	Wald Chi2 (22)	114.9		
	Prob <χ^2	0		
	Pseudo R2	0.17		

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Urban:

EQUATION	EXPLANATORY VARIABLES	coef	Se	pval
poor2	HH per capita expenditure	-3.218***	(0.907)	0.000
	Household size	-0.394***	(0.139)	0.005
	Share of elderly members	1.561	(1.776)	0.379
	Share of children	0.793	(1.246)	0.525
	Age of head (log)	-0.098	(0.905)	0.914
	Female head	-1.093	(0.694)	0.115
	Years of education of hh head (log)	-0.662*	(0.382)	0.083
	Central	-2.545***	(0.697)	0.000
	Eastern	-2.918***	(0.999)	0.004
	Northern	-0.369	(0.799)	0.644
	Permanent community access road	-1.195**	(0.537)	0.026
	Episode of illness (2009)	1.743**	(0.764)	0.023
	Drought/ irregular rain (2009)	1.048	(0.750)	0.162
	Value enterprise equipment (non-agricultural) (log)	0.247***	(0.070)	0.000
	Value agricultural equipment (log)	0.025	(0.091)	0.784
	Value cattle (log)	0.075	(0.063)	0.233
	Area land owned (log)	0.179	(0.625)	0.774
	Value of remittances received (log)	0.052	(0.058)	0.365
	Head works in agriculture	-1.989**	(0.977)	0.042
	Number of rooms per person (log)	0.138	(1.471)	0.925
	Toilet	-0.862	(0.726)	0.235
	Protected water	0.423	(1.293)	0.743
	Constant	36.079***	(10.211)	0.000
	Observations	248		
	Wald Chi2 (22)	81.06		
	Prob <χ^2	0		
	Pseudo R2	0.5		

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

First published by Oxfam GB for Oxfam International and Overseas Development Institute, May 2014
Published online by Oxfam GB under ISBN 978-1-78077-603-3

This Research Report is the outcome of a joint project between Oxfam GB and Chronic Poverty Advisory Network. The research was funded by Oxfam GB.

It was written to share research results, to contribute to public debate and to invite feedback on development and humanitarian policy and practice. It does not necessarily reflect the policy positions of the organizations jointly publishing it. The views expressed are those of the author and not necessarily those of the individual organizations.

For more information, or to comment on this report, email dhillier@oxfam.org.uk

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