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Dynamics of Poverty in Ethiopia

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Abstract

This paper addresses issues related to the dynamics of income poverty using unique household panel data for urban and rural areas of Ethiopia covering the period 1994-97. The percentage of households that remained in poverty was twice as large in urban areas as in rural areas. This suggests that income variability is a serious problem in rural areas, while the persistence is a key feature of urban poverty. The paper also discusses household characteristics that are correlated with the incidence of chronic poverty as well as vulnerability to poverty. A strategy that promotes consumption smoothing through say access to credit can work well in rural areas, while income or employment generation are required for poverty alleviation in urban areas.

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1 Introduction

There is widespread chronic poverty in Ethiopia, but on top of that households suffer spells of transient poverty. In this paper we attempt to understand the nature and causes of poverty in Ethiopia by analysing some aspects of the dynamics of poverty. Several poverty studies provide a snapshot of the state of poverty in a given period, while they provide limited information about why and how individuals or households experience changes in the poverty status.

The current literature[1] on the dynamics of poverty focuses on the mobility of individuals or households across a given income threshold or poverty line, and it attempts to distinguish chronic poverty from transient poverty. This paper provides an application to the case of Ethiopia of methods that are currently used. We compute exit and entry probabilities out of or into poverty states for different household types. We construct measures of poverty transition based on specific processes characterizing the income generation potential of households. We separate the transitory component of poverty from the chronic one, which is essential for the discussion of policy options to fight poverty. We also analyse the determinants of chronic and transitory poverty, and discuss the policy implications of our results.

2 Some notes on the literature

The issues of definition and measurement of poverty have been extensively discussed in the development literature (Ravallion 1992; Lipton and Ravallion 1995). Poverty for an individual or a household in a narrow sense is defined as a state of having an income or consumption level below a certain standard, usually known as the poverty line. The measure of welfare here is total income or consumption. There are a number of conceptual and empirical difficulties involved in understanding the income or consumption measure of poverty (Ravallion 1998), but in practice researchers use these measures as convenient measures of welfare or utility. In this study we use per capita consumption expenditure by household as our measure of welfare.

Studies that try to understand poverty dynamics base their theoretical frameworks on the notion of the persistence of poverty or poverty traps. We can broadly classify the theoretical literature on poverty traps into those of that emerge from the growth literature and those that use household models, though in substance they are interrelated. The first generally provides conditions under which a national economy can get caught in a poverty trap (Barro and Sala-i-Martin 1995).

Widespread poverty, as is the case in Africa, is associated with market imperfections, indivisibility of investment (fixed cost), and strategic complementarities among economic agents (Lustig *et al.* 2002). Start-up investment requirements are often high relative to the income level of households. Since credit rationing is widespread and prevents people from borrowing, it is very difficult for poor people to invest and to break out of poverty. There may also exist strategic complementarities, where the

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[1] See surveys in Baulch and Hoddinott (2000), Hulme and Shepherd (2003), McKay and Lawson (2003) and Yaqub (2003).

return to one person's strategy depends positively on the activities of other agents, or coordination failures. In those instances there may be multiple equilibria, and the economy may get stuck in a low-level equilibrium. Poverty itself generates risk aversion and reduces the incentive for investment.

For the analysis at the household level, one can start from the notion that the household has a certain set of endowments or assets that it can allocate among activities with certain returns. A household's consumption standard in a specific year will depend on its ownership of assets, returns on those assets, shocks and the ability of the household to translate incomes into consumption. If the household is credit constrained, it will find it hard to cope with negative shocks and smooth consumption. The chronic component of poverty will depend on the household's lack of assets or its limited ability to translate assets into incomes. Incomes change over time by asset accumulation, changes in returns driven by savings behaviour or exogenous shocks.[2] Household income will depend on the schooling, gender and other characteristics of its members, the changing size of the household due to fertility and migration decisions, as well as the characteristics of the labour market. Part of the exercise in poverty dynamics is to investigate how these factors influence the persistence of poverty.

For policy purposes but also for understanding of the processes involved it is useful to make a distinction between chronic and transient poverty.[3] Chronic poverty has generally been assessed in two ways, the *spells approach* focusing on transitions in and out of poverty, and the *components approach*, which tries to isolate the permanent component of poverty from transitory poverty (Hulme and Shepherd 2003). The latter can take, as is done here, the average consumption level over several periods as the indicator of chronic poverty. The spells approach is a powerful tool of understanding also how the transient poor can emerge from poverty if the analysis can clearly identify the factors that underlie transitions. To understand chronic poverty one needs to analyse social structures and mobility, or rather immobility, within them

The discussion of transient poverty also leads on, quite naturally, to the discussion of vulnerability. This is not necessarily captured by current income estimates. What one would need to know is the extent to which households have assets that can serve as buffers against shocks. The shocks can be of several kinds. There may be draughts affecting agricultural output, but they may also come in the form of illness or even death of senior members of the household. Particularly access to liquid assets can help protect households. These could include monetary assets or livestock (although in a

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2 Gunning *et al.* (2000) have investigated the income dynamics in the resettlement areas of Zimbabwe. They had data on asset accumulation over time and combined this with estimates of changes in asset returns in an interesting analysis of a process of income convergence. There is little evidence in the literature on the cumulative income of shocks to households.

3 The households who remain poor over a given period constitute the chronically poor (see e.g. Jalan and Ravallion 1998). Jalan and Ravallion (2000) give two conditions for a household to experience transient poverty: First, the household must be observed to be poor for at least one date in some period of time for which data is available. Second, the household's standard of living must vary over time within the time period. They then propose a decomposition of total poverty into chronic poverty and transient poverty. A slightly different approach was suggested by Rodgers and Rodgers (1991), where permanent income, instead of current consumption is used to measure persistent or chronic poverty.

general crisis the prices of livestock may collapse). Households may also incur debt, sell other assets than livestock, or pull children out of school. They may also draw on their social networks or in the end rely on government support or support from other institutions.

Empirical studies that focus on the dynamics of poverty have been relatively rare in the development literature. Bane and Ellwood (1983: 2-4) looked into approaches that were used early on to analyse the dynamics of poverty. They classified the methods into statistical methods 'which model the level of some variable such as income, allowing for complex lag or error structure; methods using spell durations and exit probabilities and tabulations of the event (poverty) over some fixed timeframe'. More recently, McKay and Lawson (2003) have reviewed the evidence on chronic and transient poverty and note that many studies conclude that transient poverty seems to be much more important than chronic poverty. However, they are sceptical against this conclusion. First they note that sometimes too stringent conditions are imposed for a household to be classified to be chronically poor, and second that there are measurement errors and those may explain why a household at some point in time seems to escape from poverty and thus the class of chronically poor. Yaqub (2003) reports evidence from 23 countries on factors that explain upward mobility. The evidence shows that it is correlated with increased landholdings, higher level of education, while downward mobility is correlated with increased household size and the number of dependants.

Dercon and Krishnan (2000) explored short-term vulnerability of rural households in Ethiopia. They use a framework where households are assumed to maximize inter-temporal utility. If households have a concave utility function, they will prefer to smooth consumption. This may be hard to do given the lack of efficient credit or insurance markets, and therefore in practice there may be considerable swings in consumption. In the analysis of Dercon and Krishnan consumption is influenced by different types of shocks in the form of changes in rainfall or other forms of crop failure, changes in returns to labour and changes in prices. They found that on average year-to-year poverty is very similar over the 18 months over three surveys. Still, the variability of consumption over time is very high and the transition in and out of poverty is relatively high.

Ayalew (2003) tested informal risk-sharing networks in rural Ethiopia. He found that enforcement problems limit the role of credit transactions in risk-sharing arrangements among rural households. Households with better access to land are found to have better access to informal credit, while land-poor households benefit very little from those networks. These results are consistent with those of Dercon and Krishnan, which indicated that particularly land-poor households found it very hard to smooth consumption. For those households the liquidity constraints are severe, and it is thus particularly the poor that need access to credit and insurance arrangements.

3   Approaches to the analysis of poverty dynamics

For our analysis of poverty dynamics in Ethiopia we will use both the methods mentioned above, namely the spells approach and the components approach. First, we employ the spells approach, since our interest is to understand the underlying processes

that move people into or out of poverty over a certain span of time. Second, for the purposes of policy, it is important to distinguish the chronically poor from the temporarily poor, which we can do by using the components approach. This also naturally leads to the analysis of vulnerability.

3.1 Duration analysis

The common practice to capture the poverty spell is to compute the probabilities of falling into poverty given certain states and other characteristics of households (e.g. Stevens 1995, 1996). The elements of interest in this exercise are the estimation of entry and exit probabilities for the state of being in poverty, which can be considered as random variables with known probability distributions (see Antolin *et al.* 1999). More specifically, let X be a random variable indicating the duration of a spell in poverty or the length of time the corresponding individual has been in poverty. Let the distribution function of duration, X, be $F(x)=\text{prob}(x<X)$, for $x>0$ and let the density function be $f(x)=\mathrm{d}F/\mathrm{d}x$. The corresponding hazard or conditional probability is:

$$\theta(x) = pr(x \leq X / X \geq x) = \frac{f(x)}{1 - F(x)}. \tag{1}$$

Assuming that θ follows a logistic structure, we have:

$$\theta(x) = \frac{\exp(x)}{1 + \exp(x)}. \tag{2}$$

The length of poverty spell can be expressed as a function of a set of variables, Z, which vary across spells and time. It includes individual characteristics and other factors that influence the flow of resources to the household or individual. Thus,

$$x_{idt} = \alpha_{id} + \beta\ Z_{it} \tag{3}$$

where subscript i indexes individuals, t indexes time, and d indexes number of years in poverty. The probability of exiting poverty in year x for an individual i with a current duration in poverty of d years is given by the following hazard function:

$$\theta_{idt} = \frac{\exp(\alpha_{id} + \beta_{it} Z_{it})}{1 + \exp(\alpha_{id} + \beta_{it} Z_{it})}. \tag{4}$$

Thus, exit probabilities are functions of duration effects, α_{id}, and other variables, Z, which vary across people and time. Equation (4) is estimated by maximizing the relevant log-likelihood function for all observations. The likelihood function is the product of spells of observed duration, d, and of right-censored observations (that is, observations that are included at the beginning of the spell, but not at the ending date).[4]

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4   See Stevens (1995) for a discussion of estimating multiple spells (that is, including individuals that exit and re-enter the poverty zone in the duration period, d) and the problem of heterogeneity in the spell of exit and entry across individuals.

This approach does not provide an analytical model of poverty dynamics. It does not explain why households or individuals move into or out of poverty in the course of a fixed period of time. The model proposed by Burgess and Propper (1998) goes a step further, since in their approach, the states in which households find themselves are endogenous to their decisions. In future work we intend to extend the analysis in this direction.[5]

3.2 Measuring vulnerability to poverty and chronic poverty

The idea of vulnerability to poverty is being increasingly recognized as an integral part of the analysis of poverty. Besides offering insights into other dimensions of poverty, it determines and foretells future poverty (Duclos 2002). There is close interconnection between vulnerability, risk, insecurity and poverty traps that can be very useful for public policy if studied well (see, for example, Dercon 2000).

Vulnerability to poverty captures the risk of a household falling into poverty at least once in the next few years (Prichett *et al.* 2000). The measures of vulnerability may be regarded as probability distributions with respect to variability in the welfare indicator. Formally, we can express this definition for a typical household as follows:

$$R(n,Z) = 1 - \left[(1 - P(y_{t+1}^h < z) * ... * (1 - P(y_{t+n}^h < z)) \right]$$

Where $R()$ defines vulnerability of a household over n periods, Z is the poverty line and y is total consumption expenditure by household h in each period t. The above expression essentially defines vulnerability as one minus the joint probability of not being in poverty through out the n periods. Operationalizing this measure requires a few assumptions on the distribution of consumption variability and threshold on the probability of being vulnerable. Pritchett *et al.* assume that the vulnerability of a typical household is a function of the probability threshold, p, the poverty line, Z, and the number of periods under consideration. Thus,

$$V_i^h(p,n,Z) = I[(R_i^h(n,Z) > p)]$$

where I is an indicator function. The threshold probability level assumed in Prichett is 0.5. The other assumption needed is to specify distribution on consumption variability. Once we have these, we can have quantitative estimates of vulnerability.

In this paper, to estimate vulnerability we follow Pritchett *et al.* (2000) and McCulloch and Calandrino (2003) and estimate the probability of being poor at any point in time. Pritchett *et al.* define vulnerability as the probability of being below the poverty line in an given year, that is

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$$V_h = P(y_{ht} < z)$$

where V_h is vulnerability, y_{ht} is per capita consumption of household h in year t, and z is the poverty line. To compute the probability of a household being poor at any given time, we assume the distribution of its consumption expenditures is normal, while the variance and means are allowed to vary between households. We compute the mean consumption expenditure of the household $y*$ and the inter-temporal standard deviation of consumption for each household. The probability of consumption falling below the poverty line can then be written as

$$V_h = P\left(\frac{y_{ht} - \mu_h}{\sigma_h} < \frac{z - y*_h}{s_h} \right)$$

where $y*_h$ is the mean consumption expenditure of the household and s_h is the inter-temporal standard deviation of household consumption. This is thus the probability that the standard normal variate will fall below the poverty line normalized by subtracting inter-temporal mean consumption and diving by the inter-temporal standard deviation.

Chronic poverty, a condition of persistent poverty, has been measured in different ways in the recent literature. Some take the number of times an individual has been in poverty to indicate the chronic nature of poverty (for example, McCulloch and Calandrino 2003), and others use expected income over a certain period of time as an indicator of chronic poverty (Jalan and Ravallion 2000; Haddad and Ahmed 2003).

This indicator mainly decomposes the extent of poverty experienced, P_i, into transient component, T_i, and a chronic component C_i, where each are defined over a stream of income, y_{it} for the ith individual within D time period, as follows:

$$P_i = P(y_{i1}, y_{i2}, ... y_{iD})$$

$$C_i = P(Ey_i, Ey_i, ... Ey_i)$$

and

$$T_i = P_i = P(y_{i1}, y_{i2}, ... y_{iD}) - C_i = P(Ey_i, Ey_i, ..., Ey_i).$$

We report in this paper both types of chronic poverty for rural as well as urban households. In addition, we compare the measures of vulnerability with chronic poverty to get an idea of the poverty persistence.

4 Data and variables

The data for this study come from a panel data collected by the Department of Economics, Addis Ababa University, in collaboration with University of Oxford and Göteborg University. The data consist of 3,000 households from urban as well as rural areas divided equally between them. The data cover household living conditions, including income, expenditure, occupation, demographic aspects, health and education

status, occupation, production activities, asset ownership and several other important aspects of the household economy.

The data were collected in four waves for rural households and three waves for urban households. The sampling technique used was stratified sampling to take into account diversities in agroecological factors for rural areas and major urban towns for the urban survey.

In our poverty estimates of household consumption, we adjust for household size by computing per capita consumption. We adjust for price changes over time and location and convert all estimates to 1994 prices using price data collected in connection with the surveys.

For this study we use the following key variables to analyse poverty dynamics:

  — Per capita consumption expenditure
  — Household size and composition
  — Occupation of household head
  — Age of head of the household
  — Education of head of household head
  — Asset ownership (land, livestock, etc.)
  — Distance from major public services (market, banks, etc.)
  — Region of residence
  — Other relevant variables such as type of crop cultivated, etc.

Annex Table 1 provides a list of variables that we used for the analysis, particularly in reporting regression tables.

5   The persistence of poverty

Table 1 shows the percentage distribution of households by the persistence of poverty. We see that a surprisingly small percentage of households are always poor, and it is also noteworthy the persistent poverty is more widespread in urban than in rural areas. This may be due to there being more variability of incomes in rural areas than in urban areas because of the dependence of agricultural incomes on weather and fluctuating output prices. Alternatively, the larger fluctuations in consumption in rural areas may be due to the lack of ability to smooth consumption.

It is interesting to note that the percentage of households consistently non-poor and poor are much higher in urban areas than rural areas, indicating the fact that poverty is more chronic in urban areas than in rural areas.

We try to present some of the socioeconomic characteristics of households by their poverty status during the sample period. Table 2a reports the trends for rural households that give interesting picture consistent with what one would expect regarding the correlates of poverty. In almost all attributes, we observe a clear pattern

underpinning the spell of poverty experienced by households. We observe that household size, age, education of the head of the household, physical asset play significant role in the fortunes of rural households. In Table 2a we see that households, who were always poor, have had on the average two more individuals in the households as compared to those households who were never poor; the heads of the household are relatively older, and female headed, had a significantly lower proportion of people who completed primary school, thrive on a small size of land, most had no more than one ox or owned none, were engaged mainly in off-farm activities. As a result, the value of crops sold and average wealth were significantly lower than households who experienced no poverty during the sample period.

Table 1
Percentage of households by poverty status, 1994-97

Poverty status	Rural	Urban
Always poor	12	22
Sometimes poor	55	37
Never poor	33	41

Table 2a
Descriptive statistics for selected variables by the number of years in poverty, rural households

Variable	Never poor	Poor, once	Poor, twice	Always poor
Household size (numbers)	5.7	6.4	7.0	8.0
Age of head of household (years)	46	49	48	50
Female headed households (%)	20	23	21	27
Household head with primary education (%)	12	9	8	2
Wife completed primary school (%)	3	2	0.6	0.1
Land size (hectare)	1.69	1.4	1.2	0.98
Crop sale (birr)	429	280	186	174
Asset value (birr)	280	192	128	111
Off-farm employment (%)	30	35	42	36
No. of oxen	1.6	1.3	1.0	0.8

Table 2b
Descriptive statistics for selected variables by the number of years in poverty, urban households

Variable	Never poor	Poor, once	Poor, twice	Always poor
Household size (numbers)	5.6	6.0	6.3	7.2
Age of head of households (years)	46	50	49	49
Female headed households (%)	30	40	43	38
Household head with primary education (%)	59	37	27	24
Wife with primary education (%)	32	20	13	9
Private business (%)	3	1	0.1	0.0
Own account employee (%)	20	20	13	16
Civil servant (%)	22	13	8	10
Public sector employee (%)	10	7	4	6
Private sector employee (%)	6	4	4	2
Casual worker (%)	3	6	11	12
Unemployed (%)	3	4	7	7
Resides in the capital (%)	75	84	80	86

Similarly, in Table 2b, the average values for several variables follow a clear pattern along with the poverty status of the household. In urban areas also, size of household, age of the head of the household, the sex of the head of the household, occupation play a significant role in affecting the status of the household. As usual, most chronically poor households have large household size, older household heads, mainly casual labourers, unemployed, own-account workers and those employed by the government. Household heads who run their own private business were not part of the group that experienced poverty in the sample period.

We then go on to look at the geographic dimension of poverty, which may be useful for policy attempting to identify geographic poverty traps. In Tables 3a and 3b we provide estimates of poverty based on current income in the three rounds plus an estimate based on permanent income, which here is the average level of consumption over the three rounds. We note that that there are instances where the headcount ratio using permanent income is fairly low, while at the same time the headcount for an individual year can be extremely high. This suggests that the scope for consumption smoothing is highly restricted, particularly in the rural areas. There is hardly any functioning formal credit market for rural households.

A simple correlation coefficient between the headcount, as measured by the inter-temporal consumption expenditure and current consumption expenditure for the three years shows[6] that the problem of consumption smoothing is not a problem of some regions in rural areas, but, of nearly all regions, if not at the same degree. This makes a case for reducing consumption variability to fight poverty in rural areas.

Table 3a
Percentage of rural households based on permanent income[1] and current income[2] by region

Region	Headcount (CI-1994)	Headcount (CI-1995)	Headcount (CI-1997)	Headcount (PI-1994-97)
Haresaw	70.51	32.05	37.18	31.25
Geblen	89.06	45.31	39.06	53.13
Dinki	65.06	61.45	50.60	50.60
Debre Berhan	15.61	30.06	10.40	6.94
Yetmen	18.97	31.03	17.24	13.56
Shumsheha	19.55	6.77	31.58	5.84
Sirbana Godeti	8.51	15.96	27.66	7.37
Adele Keke	9.68	10.75	15.05	6.38
Korodegaga	85.00	38.72	76.64	61.68
Turufe Kechma	24.24	32.32	41.41	26.00
Imdibir	67.69	80.00	38.46	69.23
Aze Deboba	25.68	44.59	24.32	17.57
Adado	48.78	66.67	29.27	42.28
Gara Godo	76.60	61.70	65.96	69.47
Dommaa	47.69	32.31	43.08	30.30
Total	42.00	37.70	35.50	30.00

Notes: [1] Permanent income is average per capita consumption expenditure for each household in the panel between 1994-97.

[2] Current income is per capita consumption expenditure.

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6 Starting from 1994, respectively the figure is 0,91, 0.822, 0,79

When we look at urban areas, we also observe similar trend with rural households that headcount ratio based on inter-temporal consumption expenditure happens to be much lower than headcount ratio based on current income.

Table 3b
Percentage of urban households based on permanent income[1] and current income[2] by town

Region	Headcount (CI-1994)	Headcount (CI-1995)	Headcount (CI-1997)	Headcount (PI-1994-97)
Addis Ababa	46.81	42.86	35.84	37.37
Awasa	40.00	35.00	28.33	33.33
Bahri Dar	25.37	28.36	26.87	39.40
Dessie	35.00	37.50	36.25	32.50
Dire Dawa	15.63	27.08	35.42	20.83
Jimma	33.33	24.64	36.23	26.09
Mekele	38.46	36.54	32.69	28.95
Total	41.00	39.00	35.00	34.00

Notes: [1]   Permanent income is average per capita consumption expenditure for each household in the panel 1994-97.
          [2]   Current income is per capita consumption expenditure.

6   Transition probabilities

As a first step in our analysis of movements in and out of poverty, we tabulate transition probabilities. These figures provide probabilities of a change in the categorical variables of being poor and non-poor over time. For instance, in rural areas the probabilities of remaining poor and also escaping from poverty are, respectively, 47 per cent and 53 per cent for the sample period. This figure for urban households is, respectively, 64 per cent and 36 per cent. Thus, comparing Tables 4a and 4b we again see that mobility in and out of poverty is much more extensive in the rural areas. Rural households thus experience larger swings in consumption than urban households. Poverty in the urban economy is to a higher degree of a chronic character. The urban poor seem to have small chances of breaking out of poverty. Annex Table 2a and Annex Table 2b provide a finer breakdown of transition probabilities by decile, but the essence of the picture is the same here.

Tables 4a and 4b
Transition probabilities by poverty status

Part A: Poverty status for rural households	Poor	Non-poor	Total
Poor	47.40	52.60	100
Non-poor	29.41	70.59	100
Total	36.56	63.44	100

Part B: Poverty status for urban households	Poor	Non-poor	Total
Poor	64.14	35.86	100
Non-poor	18.71	81.29	100
Total	36.80	63.20	100

When we take the probabilities in general terms (without poverty status), the probabilities of being poor and non-poor are almost the same for households residing in rural as well as urban areas in our sample. This is a crude indicator that again warns us poverty in Ethiopia is not mainly a rural phenomenon alone. Urban areas are equally susceptible to poverty as rural areas.

7 Duration analysis

In this section we extend our discussion of mobility by taking the amount of time or duration in poverty into consideration. As a crude start of a duration analysis, we have estimated hazard ratios for urban and rural households. The exit rates are ratios of individuals who moved out of poverty after one year of being in poverty to those individuals who were at risk of being poor in 1994 (see Antolin *et al.* 1999 for such definition of exit or entry hazards). This is a crude measure of the probability of exiting or entering into poverty, given the initial risk of being in poverty. Re-entry rates are ratios of individuals who were non-poor for at least one year, and, became poor, to those individuals who were poor in 1994. It is important to mention that the maximum number of poverty spells allowed by our sample is one period or 'year'[7] before a household experiences exit or in the case of entry a maximum number of being out of poverty is one period.

We note again that the probability of leaving poverty is higher for a rural household than an urban one, but we also note that the probability of falling back into poverty is higher in the rural sector than in the urban one. The cyclical nature of consumption expenditure is pronounced in Table 5 for rural households. It may be also useful to mention the main events that happened between 1994 and 1997 that could seriously affect livelihood in rural areas. Ethiopia experienced in 1994 a drought that reduced markedly agricultural output (real growth in agriculture was –3.7 per cent), and in 1995 the sector recovered by registering a 3.5 per cent growth rate and a bumper harvest in 1996 with a 14 per cent growth rate, which continued throughout 1997 where it grew by 3.4 per cent (World Bank 2002). In addition, for about two years that started in 1992 there was a boom in the agricultural sector due to high price for coffee, a major export crop in Ethiopia. These events obviously could contribute to the swings in the welfare of rural households during the sample period.

Table 5
Exit and re-entry hazard ratios conditional on duration

	Exit[1]	Re-entry[2]
Rural households	0.50	0.50
Urban households	0.34	0.25

Notes: [1] Exit rates are ratios of individuals who moved out of poverty after one year of being in poverty to the individuals who were poor in 1994.

[2] Re-entry rates are ratios of individuals who were non-poor for at least one year and became poor to individuals who were poor in 1994.

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[7] The period covered by the data is 1994-97, with no information on 1996. Thus, the length of time in poverty after 1995 can be interpreted as period, instead of years.

Marginal effects for the probability of exiting poverty

y = Pr (exit) (predict)

= 0.06184066

Variable	dy/dx	Std err	z	P>|z|	[95% C.I.]		X
hhsize	-0.0044223	0.00155	-2.85	0.004	-0.007462	-0.001383	6.51513
agrozone	0.0305262	0.02449	1.25	0.213	-0.017479	0.078532	2.69907
hhhfem*	-0.0010249	0.16382	-0.01	0.995	-0.322101	0.320051	0.220634
hhhprime*	-0.015096	0.24043	-0.06	0.950	-0.486329	0.456137	0.087920
wifeprim*	-0.0192938	0.54516	-0.04	0.972	-1.08778	1.04919	0.020014
landsz	0.0064275	0.00225	2.86	0.004	0.002016	0.010839	1.41092
meanage	-0.0026709	0.00158	-1.69	0.091	-0.005767	0.000425	25.4901
agehhh	0.0020328	0.00135	1.50	0.132	-0.000615	0.004681	47.8642
assetval	-3.12e-06	0.00001	-0.24	0.814	-0.000029	0.000023	196.468
haresaw*	-0.0195558	0.39412	-0.05	0.960	-0.792015	0.752904	0.054325
geblen*	0.0060522	0.36071	0.02	0.987	-0.700935	0.713039	0.045747
dinki*	0.0107353	0.35133	0.03	0.976	-0.67785	0.699321	0.059328
debreber*	-0.0032891	0.30048	-0.01	0.991	-0.592212	0.585634	0.122945
shumsheh*	-0.0608921	0.47583	-0.13	0.898	-0.993497	0.871713	0.095068
sirbana*	-0.0285347	0.37442	-0.08	0.939	-0.762391	0.705321	0.067191
adele*	-0.0550736	0.53324	-0.10	0.918	-1.1002	0.990048	0.066476
korodega*	-0.0370187	0.36692	-0.10	0.920	-0.75617	0.682133	0.076483
imdibir*	0.1423029	0.41604	0.34	0.732	-0.67313	0.957736	0.046462
azedeboa*	0.0882513	0.41563	0.21	0.832	-0.726375	0.902877	0.052895
adado*	0.1048258	0.41219	0.25	0.799	-0.70305	0.912701	0.087920
garagodo*	0.0380177	0.41019	0.09	0.926	-0.76594	0.841976	0.067191
market	-2.70e-06	0.00000	-1.30	0.192	-6.8e-06	1.4e-06	3530.28
agehhh2	-0.0000127	0.00001	-0.99	0.321	-0.000038	0.000012	2554.17
meanage2	0.0000153	0.00002	0.72	0.474	-0.000027	0.000057	757.523
depndrat	0.0185537	0.02462	0.75	0.451	-0.0297	0.066808	0.221363
offfarm*	0.0008248	0.14073	0.01	0.995	-0.275008	0.276657	0.350965
teff*	-0.0180651	0.20548	-0.09	0.930	-0.420804	0.384674	0.380986
coffee*	-0.0056513	0.25442	-0.02	0.982	-0.504299	0.492996	0.160829
chat*	-0.0031548	0.28099	-0.01	0.991	-0.553876	0.547566	0.072194
oxen	0.0043292	0.00289	1.50	0.134	-0.001339	0.009998	1.25709

Note: (*) dy/dx is for discrete change of dummy variable from 0 to 1.

Next we ran a set of regressions on a set of explanatory variables based on a logit specification described in equations (1)-(4) above, including dummies to control for community-level effects. The rural regressions show that only the marginal coefficients associated with household size, agricultural zone,[8] and size of land are significant. Factors that contributed positively to the probability of exiting poverty were size of land and ownership of oxen. If we take the odd ratios as our guide to the probability of exiting poverty (see Annex Tables 3a-3d), generally households that reside in cereal-growing areas tend to have lower chance of exiting poverty as compared to those in enset-growing areas. Coffee growers had better chance of exiting poverty. The effect

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8   This variable describes if the household is in cereal-growing areas or enset-growing area. Enset is a
     rootcrop derived from false banana.

Table 6b
Marginal effects for the probability of re-entering into poverty for rural households

y = Pr (entry) (predict)
   = 0.0532979

Variable	dy/dx	Std err	z	P>|z|	(95% C.I.)		X
hhsize	-0.0098029	0.00152	-6.46	0.000	-0.012777	-0.006829	6.51513
_lagro~3*	-0.0538503	0.45681	-0.12	0.906	-0.949173	0.841472	0.699071
hhhfem*	-0.0118682	0.16557	-0.07	0.943	-0.336379	0.312642	0.220634
hhhprime*	0.016356	0.24693	0.07	0.947	-0.467611	0.500323	0.087920
wifeprim*	-0.0025449	0.43714	-0.01	0.995	-0.859314	0.854225	0.020014
landsz	0.0070153	0.00204	3.44	0.001	0.00302	0.01101	1.41092
meanage	-0.0020144	0.00173	-1.16	0.245	-0.005411	0.001382	25.4901
agehhh	0.0024747	0.00133	1.86	0.062	-0.000128	0.005077	47.8642
assetval	-1.61e-07	0.00001	-0.01	0.989	-0.000023	0.000022	196.468
haresaw*	0.0630896	0.45033	0.14	0.889	-0.819532	0.945712	0.054325
geblen*	0.0443776	0.43168	0.10	0.918	-0.801704	0.890459	0.045747
dinki*	0.0456616	0.44744	0.10	0.919	-0.83131	0.922634	0.059328
debreber*	-0.0491177	0.35975	-0.14	0.891	-0.754206	0.65597	0.122945
shumsheh*	0.0558974	0.41218	0.14	0.892	-0.751969	0.863764	0.095068
sirbana*	0.0100449	0.31449	0.03	0.975	-0.606343	0.626432	0.067191
adele*	-0.0034963	0.49475	-0.01	0.994	-0.973188	0.966196	0.066476
korodega*	0.0777038	0.29692	0.26	0.794	-0.504239	0.659647	0.076483
imdibir*	-0.0297926	0.62508	-0.05	0.962	-1.25492	1.19534	0.046462
azedeboa*	-0.0056253	0.49155	-0.01	0.991	-0.969053	0.957802	0.052895
adado*	-0.0340355	0.54795	-0.06	0.950	-1.108	1.03993	0.087920
garagodo*	0.012013	0.35772	0.03	0.973	-0.689097	0.713123	0.067191
market	3.99e-06	0.00000	2.01	0.045	9.8e-08	7.9e-06	3530.28
meanage2	-6.47e-06	0.00003	-0.25	0.801	-0.000057	0.000044	757.523
agehhh2	-0.0000103	0.00001	-0.82	0.415	-0.000035	0.000014	2554.17
depndrat	-0.011872	0.02287	-0.52	0.604	-0.056693	0.032949	0.221363
offfarm*	0.0097519	0.14523	0.07	0.946	-0.274894	0.294398	0.350965
teff*	-0.0044426	0.19128	-0.02	0.981	-0.379339	0.370453	0.380986
coffee*	-0.0172854	0.4083	-0.04	0.966	-0.817543	0.782972	0.160829
chat*	-0.0277429	0.50386	-0.06	0.956	-1.01529	0.959806	0.072194
oxen	0.0061103	0.00247	2.47	0.014	0.001261	0.010959	1.25756

Note: (*) dy/dx is for discrete change of dummy variable from 0 to 1.

of chat[9] growing was not significant here, though played important role in keeping people from re-entering into poverty (see Annex Table 3b). As one would expect, household size, being predominantly teff-grower decreased the chance of exiting poverty.

Similarly, Table 6b describes the marginal effect of entering into poverty after the household spent one year under a non-poor category. The coefficients significant in these table are household size, land size, age of the head of the household, distance to nearest market and ownership of oxen. Most carried expected signs except for household size and size of land (which reduce the odds of re-entering into poverty). But

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9 Chat is a stimulant (mild drug) that is widespread in Eastern Africa, mainly Ethiopia, Somalia and Djibouti. It is lucrative crop that has had marked impact on poverty in Ethiopia.

other variables like age of the head of the household, off-farm activity, teff production increase the odds of re-entering into poverty. In addition, as can be seen from Annex Table 3b, if we take into account the odds ratios and the measure of statistical significance associated with the respective variables, we have more variables as being significant in affecting the odds of entering into poverty, including few community level dummies.

For the urban households there are hardly any significant estimates at all, except that to have a civil service job reduces the likelihood of falling into poverty (see also the odds ratios reported in Annex Tables 3c and 3d). Government jobs thus seem to be the best insurance against income losses. This is expected since few households changed their poverty status over the sample period as shown in the hazard table. We also add that this finding is slightly different from Bigsten *et al.* (2003), where in analysing the dynamics of poverty, attention was focused on the status of households at the beginning and the end of the period. Here we focus on what happened in 1995 since it captures the length of the spell in poverty.

As far as re-entry is concerned for urban households, employment in the public sector and civil service seems to reduce the probabilities. Other variables are not so significant in influencing entry probabilities in urban areas. Perhaps the major finding of this section is that there was little mobility among urban households with respect to poverty and that expanding opportunities would be best to fight poverty in this area.

Table 6c
Odds ratio: marginal effects for the probability of exiting poverty for urban households

y = Pr (exit) (predict)
   = 0.04144224

Variable	dy/dx	Std err	z	P>|z|	(95% C.I.)		X
hhsz	0.0006563	0.00139	0.47	0.637	-0.002069	0.003382	6.12693
meanage	0.0005265	0.00134	0.39	0.695	-0.002104	0.003157	26.9050
femhhh*	-0.0025357	0.20378	-0.01	0.990	-0.401938	0.396867	0.362583
agehhh	0.0002663	0.001	0.27	0.790	-0.001696	0.002228	48.0786
hhhprime*	-0.0083229	0.21048	-0.04	0.968	-0.420855	0.404209	0.415563
wifprime*	0.0022463	0.23166	0.01	0.992	-0.451801	0.456294	0.217715
privbuss*	-0.0318132	1.01796	-0.03	0.975	-2.02698	1.96335	0.019040
ownaccnt*	0.0017505	0.22147	0.01	0.994	-0.432325	0.435826	0.178808
civilser*	-0.0210319	0.31848	-0.07	0.947	-0.645239	0.603175	0.149834
publicen*	-0.0254499	0.44562	-0.06	0.954	-0.898853	0.847953	0.075331
privempl*	-0.0066792	0.41991	-0.02	0.987	-0.829696	0.816338	0.042219
casualwo*	-0.0027637	0.31513	-0.01	0.993	-0.620404	0.614877	0.069536
depenrat	0.0323855	0.01746	1.85	0.064	-0.001845	0.066616	0.338727
north*	0.0418447	0.62742	0.07	0.947	-1.18787	1.27156	0.164735
meanage2	-1.18e-07	0.00002	-0.01	0.994	-0.000031	0.000031	816.981
agehhh2	-3.11e-06	0.00001	-0.30	0.764	-0.000023	0.000017	2503.42
addis*	0.0385144	0.51922	0.07	0.941	-0.979142	1.05617	0.649007
awasa*	0.0640396	0.62733	0.10	0.919	-1.16551	1.29359	0.049669
bahrdar*	0.0059169	0.50601	0.01	0.991	-0.98584	0.997674	0.055464
dessie*	-0.0037684	0.4939	-0.01	0.994	-0.971799	0.964262	0.066225
diredawa*	-0.0046475	0.68322	-0.01	0.995	-1.34374	1.33445	0.079470

Note: (*) dy/dx is for discrete change of dummy variable from 0 to 1.

Marginal effects of the probability of re-entry into poverty for urban households

y = Pr (entry) (predict)
  = 0.03130547

Variable	dy/dx	Std err	z	P>|z|	(95% C.I.)		X
hhsz	0.000227	0.00126	0.18	0.857	-0.002246	0.0027	6.12693
meanage	0.0001991	0.00144	0.14	0.890	-0.002618	0.003016	26.9050
femhhh*	0.0026078	0.23844	0.01	0.991	-0.464726	0.469941	0.362583
agehhh	0.0014694	0.00128	1.15	0.251	-0.001037	0.003976	48.0786
hhhprime*	-0.010525	0.25165	-0.04	0.967	-0.503753	0.482703	0.415563
wifprime*	-0.0068046	0.28897	-0.02	0.981	-0.573173	0.559564	0.217715
privbuss*	-0.0023966	0.74039	-0.00	0.997	-1.45354	1.44874	0.019040
ownaccnt*	-0.0053522	0.2855	-0.02	0.985	-0.564922	0.554218	0.178808
civilser*	-0.0049665	0.34084	-0.01	0.988	-0.672996	0.663063	0.149834
publicen*	0.0008812	0.39628	0.00	0.998	-0.77581	0.777573	0.075331
privempl*	0.0068043	0.46471	0.01	0.988	-0.904012	0.917621	0.042219
casualwo*	0.0060515	0.3593	0.02	0.987	-0.698163	0.710266	0.069536
depenrat	0.0231312	0.01606	1.44	0.150	-0.008352	0.054615	0.338727
north*	-0.0163816	0.52318	-0.03	0.975	-1.04179	1.00902	0.164735
meanage2	-6.45e-06	0.00002	-0.35	0.727	-0.000043	0.00003	816.981
agehhh2	-0.0000135	0.00001	-1.07	0.284	-0.000038	0.000011	2503.42
addis*	-0.0233952	0.33399	-0.07	0.944	-0.678009	0.631219	0.649007
awasa*	-0.0186651	0.59579	-0.03	0.975	-1.18639	1.14906	0.049669
bahrdar*	0.0055813	0.56251	0.01	0.992	-1.09692	1.10808	0.055464
dessie*	0.0078778	0.54808	0.01	0.989	-1.06634	1.0821	0.066225
diredawa*	-0.0069755	0.42353	-0.02	0.987	-0.837079	0.823128	0.079470

Note: (*) dy/dx is for discrete change of dummy variable from 0 to 1.

8   Vulnerability and its determinants

Vulnerability here is defined as a probability function from a standard normal distribution, where the distance from the poverty line for the per capita income of each household is computed and normalized by standard deviation. We summarize this result with respect income decile and quintile. The results show that there is a great deal of vulnerability among lower-income deciles in Ethiopia. In the bottom four deciles the vulnerability is higher in urban areas than in rural areas but further up the income scale, the vulnerability is more extensive in the rural sector. Urban high-income earners have a more secure position than rural ones. Also the better-off rural households are sensitive to swings in the weather or in the market for their output.

Tables 10a and 10b show some simple regressions to identify the determinants or correlates of rural and urban vulnerability. The results show that larger households are much more vulnerable, and particularly so in the rural areas. We also find that education reduces vulnerability both in the rural and urban areas, but much more strongly so in the urban setting. In the rural areas, vulnerability is reduced when crop sales are high (note the high significance of chat sales), and when the household owns oxen and other assets. It is noteworthy that good access to markets also reduces vulnerability. In the urban setting, it is particularly the access to various forms of wage employment that reduces vulnerability. This type of job provides secure sources of income also in Ethiopia.

Table 7
Vulnerability by inter-temporal consumption expenditure decile

Inter-temporal mean consumption decile	Urban households	Rural households
1	0.99	0.98
2	0.89	0.83
3	0.72	0.64
4	0.46	0.43
5	0.26	0.30
6	0.18	0.22
7	0.14	0.18
8	0.12	0.17
9	0.09	0.16
10	0.07	0.15

Table 8
Vulnerability by inter-temporal consumption expenditure decile

Inter-temporal mean consumption decile	Urban households	Rural households
1	0.94	0.90
2	0.59	0.54
3	0.22	0.26
4	0.13	0.17
5	0.08	0.16

Table 9
Measures of vulnerability for rural and urban households by the status of chronic poverty

Households	Vulnerability of being poor	Frequency (no of households)
Rural households:		
Non-poor	0.23 (0.13)	973
Poor	0.81 (0.17)	430
All households	0.41 (0.30)	1403
Urban households:		
Non-poor	0.17 (0.14)	803
Poor	0.83 (0.17)	405
All households	0.39 (0.35)	1208

Source: Authors' calculation

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Table 10a
Determinants of vulnerability in rural Ethiopia

Regression with robust standard errors

		No. of observations =	4199
		F (18, 4180) =	120.66
		Prob > F =	0.0000
		R-squared =	0.2907
		Root MSE =	0.25774

zvulneb	Coef	Robust Std err	t	P>|t|	[95% Conf. Interval]	
hhsize	0.02816	0.0015545	18.11	0.000	0.0251123	0.0312077
meanage	0.0007565	0.0016796	0.45	0.652	-0.0025363	0.0040494
agehhh	0.004321	0.0013249	3.26	0.001	0.0017234	0.0069185
agehhh2	-0.0000209	0.0000126	-1.66	0.097	-0.0000457	3.76e-06
eanage2	-0.0000754	0.0000213	-3.53	0.000	-0.0001172	-0.0000335
hhhprime	-0.0455392	0.0145056	-3.14	0.002	-0.0739779	-0.0171004
wifeprim	-0.0403192	0.0283985	-1.42	0.156	-0.0959954	0.015357
depndrat	0.1035805	0.0279012	3.71	0.000	0.0488793	0.1582817
cultivat	-0.0152958	0.0024731	-6.18	0.000	-0.0201443	-0.0104473
landsz	(dropped)					
cropsale	-0.0000942	8.12e-06	-11.59	0.000	-0.0001101	-0.0000782
oxen	-0.0220791	0.0029473	-7.49	0.000	-0.0278574	-0.0163008
assetval	-0.0001411	0.0000137	-10.31	0.000	-0.000168	-0.0001143
market	-0.0000125	1.24e-06	-10.04	0.000	-0.0000149	-0.00001
offfarm	0.040749	0.0087179	4.67	0.000	0.0236573	0.0578407
teff	0.0144635	0.0101159	1.43	0.153	-0.0053691	0.034296
coffee	0.0007761	0.014186	0.05	0.956	-0.0270361	0.0285882
chat	-0.2201358	0.0155888	-14.12	0.000	-0.2506981	-0.1895735
north	-0.1054408	0.0113429	-9.30	0.000	-0.1276788	-0.0832027
_cons	0.277808	0.0380131	7.31	0.000	0.2032821	0.3523339

Table 10b
Determinants of vulnerability in urban Ethiopia

Regression with robust standard errors

		No. of observations =	3624
		F(17, 3606) =	99.47
		Prob > F =	0.0000
		R-squared =	0.2590
		Root MSE =	0.30016

zvulneb	Coef	Robust Std err	t	P>|t|	[95% Conf. Interval]	
hhsz	0.0220487	0.0022119	9.97	0.000	0.017712	0.0263854
meanage	-0.0101945	0.0026655	-3.82	0.000	-0.0154206	-0.0049685
femhhh	-0.0382166	0.0125653	-3.04	0.002	-0.0628524	-0.0135809
agehhh	0.0054986	0.0015122	3.64	0.000	0.0025338	0.0084635
hhhprime	-0.1418804	0.0131522	-10.79	0.000	-0.1676669	-0.1160939
wifprime	-0.1380023	0.013352	-10.34	0.000	-0.1641805	-0.1118241
privbuss	-0.3244778	0.0258785	-12.54	0.000	-0.3752158	-0.2737399
ownaccnt	-0.167346	0.015226	-10.99	0.000	-0.1971984	-0.1374936
civilser	-0.1347316	0.0157672	-8.55	0.000	-0.165645	-0.1038181
publicen	-0.1314388	0.0205846	-6.39	0.000	-0.1717975	-0.0910802
privempl	-0.1887669	0.024945	-7.57	0.000	-0.2376746	-0.1398593
casualwo	0.0363691	0.0220014	1.65	0.098	-0.0067673	0.0795055
depenrat	0.2723256	0.0293826	9.27	0.000	0.2147175	0.3299336
north	-0.055623	0.014387	-3.87	0.000	-0.0838306	-0.0274155
capitalc	0.0617371	0.0131316	4.70	0.000	0.035991	0.0874831
meanage2	0.0000942	0.000035	2.69	0.007	0.0000255	0.0001628
agehhh2	-0.0000588	0.0000169	-3.48	0.001	-0.0000919	-0.0000256
_cons	0.3771469	0.0597717	6.31	0.000	0.2599571	0.4943366

9   Determinants of chronic poverty

To complement our analysis of transitory poverty, we also run a regression on chronic poverty. Also here we see that education reduces poverty significantly. We see that the likelihood of chronic poverty is reduced by variables such as crop sales and ownership of assets, as is natural. We also note that market access significantly reduces chronic poverty. Interestingly we note that off-farm activity is associated with higher chronic poverty. This suggests that off-farm income activity is a survival strategy and not a sign of a household moving up the income scale. The production of chat again is a very reliable way out of poverty.

Figures 1 and 2 map our measure of vulnerability against our measure of chronic poverty. We note that the extent of vulnerability is extensive also among households that are well below the poverty line. The two measures, therefore, do not measure exactly the same thing but complement each other.

Table 11
Logit estimate for the determinants of chronic poverty in rural Ethiopia

Logit estimates

Log likelihood = -685.49769

No. of observations = 1399
LR chi2(18) = 353.67
Prob > chi2 = 0.0000
Pseudo R2 = 0.2051

headcount	Odds ratio	Std err	z	P>|z|	[95% Conf. Interval]	
hhsize	1.195977	0.0319736	6.69	0.000	1.134923	1.260315
meanage	1.02679	0.0474829	0.57	0.568	0.9378179	1.124202
agehhh	1.051425	0.0296949	1.78	0.076	0.9948057	1.111267
agehhh2	0.9996911	0.0002613	-1.18	0.237	0.999179	1.000203
meanage2	0.9987897	0.0007098	-1.70	0.088	0.9973994	1.000182
hhhprime	0.6045418	0.1748436	-1.74	0.082	0.3429609	1.065634
wifeprim	0.5747956	0.3561339	-0.89	0.371	0.1706565	1.935994
depndrat	2.256719	1.230407	1.49	0.135	0.7751507	6.570054
cultivat	0.849762	0.036369	-3.80	0.000	0.781388	0.9241191
cropsale	0.9992121	0.0001686	-4.67	0.000	0.9988817	0.9995426
oxen	0.9301877	0.071029	-0.95	0.343	0.8008902	1.080359
assetval	0.998566	0.0003468	-4.13	0.000	0.9978865	0.9992459
market	0.9998907	0.0000242	-4.51	0.000	0.9998433	0.9999382
offfarm	1.449922	0.2054946	2.62	0.009	1.098261	1.914184
teff	0.9242134	0.1486777	-0.49	0.624	0.6742795	1.26679
coffee	0.9620107	0.2027813	-0.18	0.854	0.6364378	1.454132
chat	0.2807098	0.0863285	-4.13	0.000	0.1536322	0.5129004
north	0.3751883	0.0664696	-5.53	0.000	0.2651232	0.5309466

Figure 1
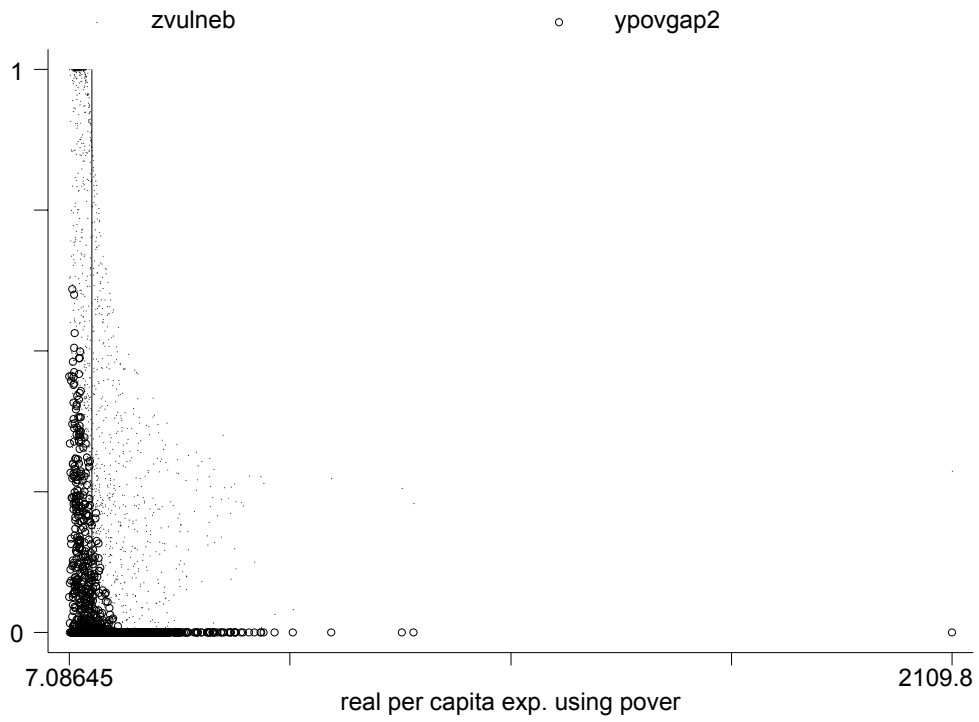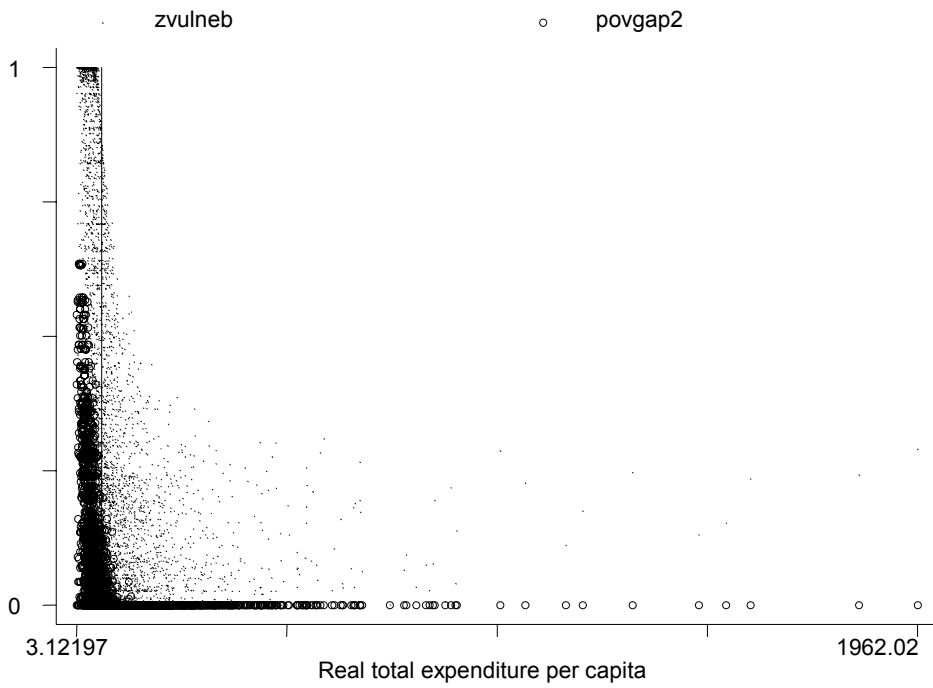Vulnerability and chronic poverty in rural Ethiopia

Figure 2
Vulnerability and chronic poverty for urban Ethiopia

10   Policy discussion

For policy purposes it is important to make a distinction between chronic and transient poverty.[10] If poverty is chronic, one requires long-term investments and structural reforms. The policy should build up the poor man's assets, by building up his human capital through education, health services and the like, and build up physical, natural and financial assets through grants, redistribution of access to land and natural resources. The policy package might also include redistribution of assets,[11] direct investments in physical infrastructure, reduced social exclusion from employment, markets and institutions, and possibly some measures to provide more long-term social security. By investing in basic infrastructures, such as physical and financial infrastructures, the government can help reduce the transaction cost for households. A problem here is that the poor tend to live in less accessible areas or to have social positions that make it hard to help them. It is thus often expensive to help chronically poor people. Particularly since the *World Development Report 2000* (World Bank 2000) the issue of empowerment has come into focus.

If poverty is transitory, one needs instead temporary interventions to support households during the bad spells. The measures one could envisage here are different forms of safety nets, credit and insurance schemes. Publicly organized safety nets in Ethiopia were virtually non-existent in earlier times, which meant that the drought in 1983-84 had disastrous effects. The current drought in Ethiopia, which is as severe as the earlier one, has had much less drastic consequences, because the government, together with foreign donors and NGOs, has built up a safety-net that can provide a certain level of food to households. To the extent that shocks are idiosyncratic, local networks can cope with them, but when the shocks affect whole villages or regions they cannot cope. Transient poverty may be addressed by safety-net type of measures that help people manage their temporary problems and helps them to return to the status of non-poor. This could include limited-term unemployment allowances, social grants, workfare micro-credit or new skill-acquisition programmes (Hulme and Shepherd 2003).

We have noted that the scope for consumption smoothing is limited in rural Ethiopia, which indicates that credit rationing is pervasive (not surprisingly). The credit market does not help much with the consumption smoothing. Households instead have to try to sell assets in bad times to survive, but this is hard in a situation when many households are in the same state and they all try to sell assets at the same time. The prices then tend to fall dramatically (Sen 1981). Security can be improved by individually oriented measures and community oriented measures, including workfare, micro-finance, micro-enterprise development, and local infrastructure development through social funds.

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[10] Jalan and Ravallion (2000) test whether transient poverty is determined by the same factors as chronic poverty in rural China. They find that the factors vary considerably between the two types of poverty and that the policies directed at chronic poverty may not be effective tools to deal with chronic poverty.

[11] Redistribution of assets, such as land, may also ease the credit constraints poor people face.

11 Concluding remarks

Our results show that poverty is more persistent in urban areas than in rural areas in Ethiopia. The proportion of people who remained poor throughout the sample period in urban areas was twice that of rural areas. This suggests the need for different approaches to fight poverty in these areas. Security issues tend to be more important in rural areas, while expanding opportunities seem to be appropriate in urban areas.

In addition, the proportion of people in poverty declined considerably in rural as well as urban areas over the period covered. Our measure of vulnerability indicates that on average, the probability of a household being poor at any point in time during this period was about 40 per cent, indicating the high degree of insecurity in the society. In rural areas, such factors as age of the head of the household, dependency ratio within the household greatly affect the odds of moving into poverty. Factors such as size of cultivated land, education of the head of the household, education of the wives, value of crop sales, type of crops planted, access to local markets significantly reduce vulnerability to poverty. In urban areas, household size, age of the head of the household, region of residence (particularly the capital) increase the probability of being in poverty. Such characteristics as occupation of the head of the household (excepting for casual workers), education of head of the household reduce significantly vulnerability to poverty.

Annex tables

Variable definition	Explanation
Rural households	
Household characteristics	
Hhsize	Household size
Agehhh	Age of head of the household
agehhh2	Squared age of the head of the household
Meanage	Mean age of the household
Meanage2	Squared mean age of the household
Dependrat	Dependency ratio (ratio of employed to dependants)
Hhhfem	Female headed households
Hhhprime	Dummy for household head completing primary school
Wifeprime	Dummy for a wife completing primary school
Household assets	
Landsz	Land size
Assetval	Value of household assets (durables)
Cropsale	Value of crops sold
Cultivat	Size of cultivated land
Oxen	Number of oxen owned
Types of crops planted	
Teff	Dummy if major crop grown is teff
Coffee	Dummy if major crop grown is coffee
Chat	Dummy if major crop grown is chat
Enset	Dummy if major crop grown is enset
Other means of income	
Offfarm	Off farm income
Regional variables	
Market	Access to local market
North	Dummy if the village is located in the north
Urban households	
Household characteristics	
Hhsize	Household size
Agehhh	Age of head of household
agehhh2	Squared age of head of household
Meanage	Mean age in the household
Meanage2	Squared mean age in the household
Dependrat	Dependency ratio
Hhhfem	Dummy if household head is female
Hhhprime	Dummy if household head completed primary school
Wifeprime	Dummy if wife completed primary school
Occupation	
Privbuss	Household head is in the private business
Ownaccnt	Household head is own account worker
Civilserv	Household head is civil servant
Publicen	Household head is employed by public enterprise
Privempl	Household head is private sector employed
Casualwor	Household head is casual worker
Unemp	Household head is unemployed
Regional variable	
North	The town is located in the north

Annex Table 2a
Transition probabilities by expenditure decile for rural households

Decile	1	2	3	4	5	6	7	8	9	10
1	22.41	15.72	12.04	11.04	8.36	10.70	5.02	6.02	5.02	3.68
2	14.24	17.55	11.92	9.93	8.61	9.93	9.60	7.28	5.63	5.30
3	15.63	14.24	9.03	12.85	12.85	7.29	7.64	4.51	9.72	6.25
4	9.71	10.43	12.23	12.95	10.43	10.43	8.27	6.47	6.47	10.79
5	9.49	10.95	9.49	9.85	9.49	10.58	11.31	12.04	9.49	7.30
6	7.25	9.06	10.87	8.70	13.41	9.42	10.14	9.42	9.78	11.96
7	4.26	7.45	8.87	8.87	9.93	10.64	9.93	14.54	11.35	14.18
8	6.15	5.38	10.00	8.08	6.92	11.54	12.69	10.38	12.31	16.54
9	4.42	3.06	8.16	7.14	9.52	8.84	11.56	12.93	19.05	15.31
10	4.74	6.72	7.51	7.11	9.09	7.91	17.79	10.28	15.42	13.44

Annex Table 2b
Transition probabilities by expenditure decile for urban households

Decile	1	2	3	4	5	6	7	8	9	10
1	37.08	21.25	17.50	9.17	5.00	3.75	2.08	2.92	0.42	0.83
2	18.50	23.23	17.32	13.78	10.24	5.51	6.30	2.36	1.57	1.18
3	21.62	15.32	14.86	9.91	12.16	6.76	7.21	4.95	5.86	1.35
4	8.63	12.94	15.29	14.90	13.73	11.37	9.41	6.67	2.75	4.31
5	4.12	8.23	9.05	16.87	17.70	12.76	10.29	9.05	7.00	4.94
6	5.56	7.26	8.55	6.84	15.61	18.80	11.54	10.26	10.68	4.70
7	2.08	3.75	7-92	12.50	8.33	16.67	17.92	12.92	11.67	6.25
8	3.27	4.49	2.86	8.57	7.35	10.61	15.92	18.78	19.59	8.57
9	1.22	1.22	1.22	6.53	4.08	8.16	13.88	16.73	24.90	22.04
10	0.42	1.26	1.26	3.78	3.78	6.30	5.88	15.55	16.81	44.95

Annex Table 3a
Odd ratios for the probability of exiting poverty, rural households

exit	Odds ratio	Std err	z	P>|z|	[95% Conf. Interval]	
hhsize	0.9266069	0.0249187	-2.83	0.005	0.8790321	0.9767566
agrozone	1.69243	0.7150741	1.25	0.213	0.7393781	3.873956
hhhfem	0.9824135	0.1609365	-0.11	0.914	0.7126113	1.354366
hhhprime	0.7495409	0.1802117	-1.20	0.230	0.4678874	1.200741
wifeprim	0.6763727	0.3687289	-0.72	0.473	0.2323529	1.968902
landsz	1.117158	0.0434089	2.85	0.004	1.035237	1.205562
meanage	0.9550063	0.0260709	-1.69	0.092	0.9052513	1.007496
agehhh	1.03566	0.0241782	1.50	0.133	0.9893395	1.084149
assetval	0.9999462	0.0002285	-0.24	0.814	0.9994985	1.000394
haresaw	0.675909	0.2663887	-0.99	0.320	0.312186	1.4634
geblen	1.105419	0.3987403	0.28	0.781	0.5451128	2.241648
dinki	1.188872	0.4176812	0.49	0.622	0.5971542	2.366923
debreber	0.9438557	0.2836066	-0.19	0.848	0.5237685	1.700872
shumsheh	0.1551276	0.073814	-3.92	0.000	0.0610469	0.3941978
sirbana	0.539692	0.2020732	-1.65	0.100	0.2590815	1.124231
adele	0.1866144	0.0995093	-3.15	0.002	0.0656228	0.5306835
korodega	0.4207009	0.1543639	-2.36	0.018	0.204951	0.8635688
imdibir	4.059724	1.689028	3.37	0.001	1.796215	9.175603
azedeboa	2.759688	1.147018	2.44	0.015	1.222003	6.23229
adado	3.225835	1.329653	2.84	0.004	1.43809	7.235991
garagodo	1.704748	0.6992707	1.30	0.193	0.7629667	3.809032
market	0.9999534	0.0000358	-1.30	0.193	0.9998834	1.000024
agehhh2	0.999781	0.0002212	-0.99	0.322	0.9993476	1.000215
meanage2	1.000264	0.0003687	0.72	0.474	0.9995413	1.000986
depndrat	1.376854	0.584476	0.75	0.451	0.5991729	3.163908
offfarm	1.014291	0.1427447	0.10	0.920	0.769786	1.336457
teff	0.7253531	0.1490477	-1.56	0.118	0.4848887	1.085068
coffee	0.904534	0.2301286	-0.39	0.693	0.54937	1.489309
chat	0.9459938	0.2658104	-0.20	0.843	0.5453974	1.64083
oxen	1.077474	0.0538065	1.49	0.135	0.9770123	1.188267

Annex Table 3b
Odds ratios of logit estimates for entering poverty, rural households

Logit estimates

No. of observations = 4197
LR chi2(30)   = 163.22
Prob > chi2   = 0.0000

Log likelihood = -986.04106

Pseudo R2   = 0.0764

exit	Odds ratio	Std err	z	P>|z|	[95% Conf. Interval]	
hhsize	0.8234266	0.0258781	-6.18	0.000	0.774237	0.8757413
_lagrozone_3	0.4094259	0.187028	-1.95	0.051	0.1672406	1.002326
hhhfem	0.7788405	0.1289524	-1.51	0.131	0.5630091	1.077412
hhhprime	1.337479	0.3302588	1.18	0.239	0.8243335	2.170057
wifeprim	0.9497456	0.4151674	-0.12	0.906	0.4031968	2.237163
landsz	1.149164	0.0464465	3.44	0.001	1.061642	1.2439
meanage	0.9608635	0.0329798	-1.16	0.245	0.8983506	1.027726
agehhh	1.050269	0.0277476	1.86	0.063	0.9972683	1.106086
assetval	0.9999968	0.0002277	-0.01	0.989	0.9995507	1.000443
haresaw	2.397623	1.079711	1.94	0.052	0.9918889	5.795604
geblen	1.948233	0.8410175	1.54	0.122	0.8359728	4.540351
dinki	1.986008	0.8886251	1.53	0.125	0.8262601	4.773589
debreber	0.2166308	0.0779319	-4.25	0.000	0.1070297	0.4384661
shumsheh	2.261905	0.9323219	1.98	0.048	1.008376	5.073718
sirbana	1.203461	0.3784756	0.59	0.556	0.6497383	2.229081
adele	0.9312538	0.4607378	-0.14	0.886	0.3531312	2.45584
korodega	2.799874	0.8313253	3.47	0.001	1.564602	5.01041
imdibir	0.4464037	0.2790368	-1.29	0.197	0.1311176	1.519828
azedeboa	0.8897827	0.4373761	-0.24	0.812	0.3395257	2.331822
adado	0.3946156	0.2162303	-1.70	0.090	0.1348208	1.155026
garagodo	1.244328	0.4451157	0.61	0.541	0.6172294	2.508552
market	1.000079	0.0000395	2.00	0.045	1.000002	1.000156
meanage2	0.9998717	0.0005085	-0.25	0.801	0.9988756	1.000869
agehhh2	0.9997961	0.0002502	-0.82	0.415	0.9993059	1.000287
depndrat	0.7903433	0.3582508	-0.52	0.604	0.3250715	1.921555
offfarm	1.207197	0.1753214	1.30	0.195	0.9081514	1.604717
teff	0.914971	0.1750129	-0.46	0.642	0.6289152	1.331136
coffee	0.6815558	0.2782807	-0.94	0.348	0.3061639	1.517221
chat	0.4898275	0.2468049	-1.42	0.157	0.1824551	1.315014
oxen	1.128736	0.0556455	2.46	0.014	1.024776	1.243242

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Annex Table 3c
Odds ratios of exiting poverty, urban households

Logit estimates

No. of observations = 3624
LR chi2(21) = 38.10
Prob > chi2 = 0.0126

Log likelihood = -667.02168

Pseudo R2 = 0.0278

exit	Odds ratio	Std err	z	P>|z|	[95% Conf. Interval]	
hhsz	1.016657	0.0356095	0.47	0.637	0.9492057	1.088902
meanage	1.013343	0.0342576	0.39	0.695	0.9483756	1.082761
femhhh	0.9376821	0.1910814	-0.32	0.752	0.6289227	1.398022
agehhh	1.006725	0.0253745	0.27	0.790	0.9582003	1.057707
hhhprime	0.8084067	0.170153	-1.01	0.312	0.5351425	1.22121
wifprime	1.057313	0.2449382	0.24	0.810	0.6714491	1.664921
privbuss	0.2437612	0.2481388	-1.39	0.166	0.0331495	1.792473
ownaccnt	1.044463	0.2313181	0.20	0.844	0.6766692	1.612164
civilser	0.5256135	0.1673967	-2.02	0.043	0.2815638	0.9811967
publicen	0.4128531	0.1839765	-1.99	0.047	0.1723778	0.9888031
privempl	0.8341955	0.3502907	-0.43	0.666	0.3662992	1.899764
casualwo	0.9309434	0.2933669	-0.23	0.820	0.5019787	1.726479
depenrat	2.259731	1.000046	1.84	0.065	0.9491974	5.379684
north	2.24515	1.40865	1.29	0.197	0.6564253	7.679014
meanage2	0.999997	0.0004004	-0.01	0.994	0.9992126	1.000782
agehhh2	0.9999218	0.000261	-0.30	0.765	0.9994103	1.000434
addis	2.953991	1.533778	2.09	0.037	1.067693	8.172819
awasa	2.810675	1.763224	1.65	0.099	0.8219124	9.611601
bahrdar	1.150949	0.5823888	0.28	0.781	0.426915	3.102919
dessie	0.9060722	0.447511	-0.20	0.842	0.3441538	2.385465
diredawa	0.8846076	0.6043851	-0.18	0.858	0.2318406	3.375296

Odds ratios for entering poverty, urban households

Logit estimates

Log likelihood = -526.61488

No. of observations = 3624
LR chi2(21)   = 20.80
Prob > chi2   = 0.4711
Pseudo R2   = 0.0194

exit	Odds ratio	Std err	z	P>|z|	[95% Conf. Interval]	
hhsz	1.007514	0.0419189	0.18	0.857	0.928615	1.093116
meanage	1.006586	0.0477143	0.14	0.890	0.9172803	1.104586
femhhh	1.088757	0.2596029	0.36	0.721	0.6822923	1.737365
agehhh	1.049648	0.0446135	1.14	0.254	0.9657501	1.140834
hhhprime	0.7008646	0.1763735	-1.41	0.158	0.4279845	1.147731
wifprime	0.7877524	0.2276359	-0.83	0.409	0.4471147	1.387907
privbuss	0.921281	0.682108	-0.11	0.912	0.2158591	3.932004
ownaccnt	0.8298758	0.2369297	-0.65	0.514	0.4742364	1.452216
civilser	0.840976	0.2866363	-0.51	0.611	0.4311834	1.640231
publicen	1.029144	0.4078273	0.07	0.942	0.4733291	2.237632
privempl	1.227807	0.5705751	0.44	0.659	0.4938185	3.052759
casualwo	1.203244	0.4323251	0.51	0.607	0.5950006	2.433269
depenrat	2.144201	1.143591	1.43	0.153	0.7538489	6.09883
north	0.519708	0.2718983	-1.25	0.211	0.186394	1.449062
meanage2	0.9997872	0.0006094	-0.35	0.727	0.9985935	1.000982
agehhh2	0.999554	0.0004186	-1.07	0.287	0.9987338	1.000375
addis	0.501635	0.1675426	-2.07	0.039	0.2606708	0.9653463
awasa	0.4200269	0.2502481	-1.46	0.145	0.130659	1.350252
bahrdar	1.18677	0.6675708	0.30	0.761	0.394055	3.57418
dessie	1.265765	0.6937416	0.43	0.667	0.4323403	3.705786
diredawa	0.775896	0.3286152	-0.60	0.549	0.3382939	1.779561

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