Poverty dynamics and mobility in Ethiopia: Evidence from the first three rounds of the Ethiopia Socioeconomic Survey

Introduction

Although the poverty rate in non-urban parts of Ethiopia was relatively stable between 2012 and 2016, there was in fact a lot of upward and downward economic mobility that took place over this period.[1] 60 percent of those who lived in rural areas and were poor in 2012 were measured as non-poor in 2016, but more than a quarter who started out as non-poor were measured as being poor in the final round of data. Transitions amongst the urban population were less dramatic, albeit over a shorter time period, with just under 4 percent of the urban population entering poverty between 2014 and 2016.

The longitudinal nature of the Ethiopia Socioeconomic Survey (ESS) data means that households can be separated into those that were chronically poor, and those that experienced transitory poverty. The importance of this for policy purposes is highlighted in Lipton and Ravallion (1995), who note that an appropriate policy response to chronic poverty would focus on increasing the attainment of and returns to the assets (both human and physical) of the poor, while transient poverty would be better tackled through initiatives that focus on insurance and income stabilization. Accordingly, conclusions about longer run welfare depend on how much mobility is present over time in society.

The purposes of this chapter are twofold: to shed some light on the dynamics of welfare in Ethiopia between 2012 and 2016, and to profile the chronic, transitory and never poor parts of the population. Fuje (2018) uses the same three rounds of ESS data to show that consumption growth was negative across the non-urban spectrum in Ethiopia, leading to a small increase in the poverty rate. The real median of consumption dropped by over 7 percent in rural areas between 2014 and 2016, while the fall in the real mean was even greater. The impact of the drought in 2015 was considerable, with the strongest negative effects being concentrated on poor households. This report exploits the longitudinal nature of the ESS to enhance the understanding of the dynamics of welfare, and for a better understanding of who entered poverty, who exited poverty, who was stuck in poverty, and the reasons why.

This chapter is divided into several sections. In the first, the ESS longitudinal dataset is described briefly, along with some of the main assumptions that were used in the analysis. The next section describes changes in the welfare of Ethiopian households using ESS 2012, 2014 and 2016 data. The report then focuses on the kind of poverty that non-urban households in Ethiopia faced over the period and outlines the characteristics and differences of households in chronic poverty and transitory poverty. The final

[1] It is important to note that the poverty rates referred to in this chapter do not correspond to the official national poverty rates that are issued by Ethiopia's Central Statistical Agency, which are estimated using a non-comparable consumption expenditure module in the Household Income Consumption and Expenditure Survey (HICES).

section analyzes the dynamics of welfare in Ethiopia, with particular attention being paid to the determinants of poverty exit and entry.

2. Data and assumptions

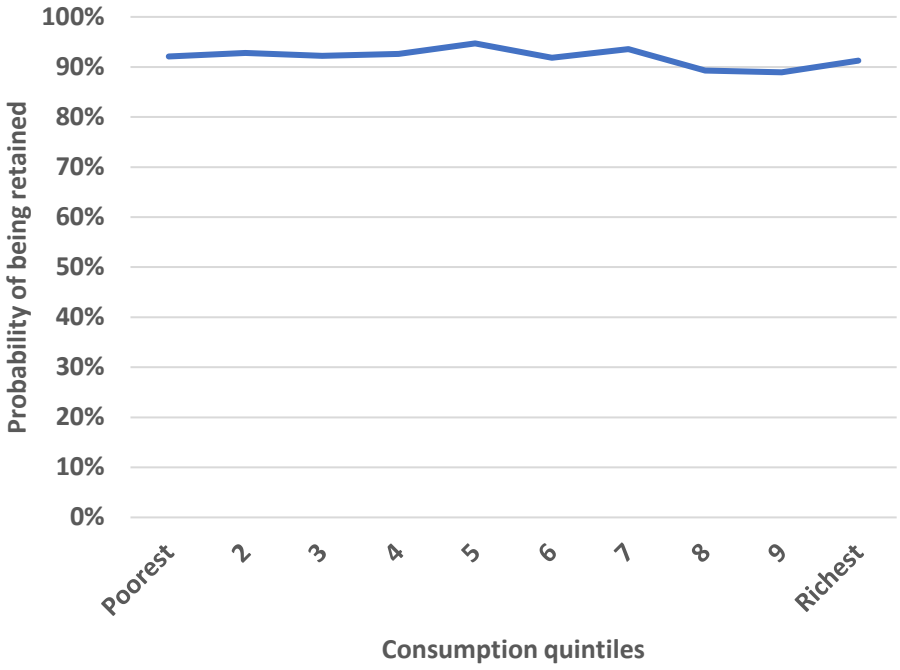
This report uses the first three rounds of ESS data, corresponding to 2012, 2014, and 2016. The ESS is a nationally representative panel survey of households that comprised rural households and small towns in all rounds, but urban (large town) households in rounds 2 and 3 only. Much of the analysis of dynamics is therefore focused on a balanced panel of non-urban residents. The ESS is representative at the rural and small town level in all rounds, and additionally at the urban level in rounds 2 and 3. It is also representative for the regions of Amhara, Oromia, Tigray, and SNNP, which cover approximately 90 percent of the population. In this report, the other regions are generally displayed as the regional group "Other".

The poverty line used in the analysis is an annual adult equivalent level of consumption of ETB 3 299. This is the consumption level of the 25th percentile of the overall distribution in 2016.[2] All monetary values are converted to their 2016 equivalents, and values are also spatially adjusted to account for variation in the cost of living across regions. In line with Fuje (2018) (who uses a poverty line at the 40th percentile) this relative poverty line is different to the official poverty line, and it was chosen as a 2016 benchmark against which progress from 2012 can be measured, rather than as a national poverty line to be used in wider studies.

Rates of attrition for non-urban households were low over the three rounds of the ESS, with little evidence to suggest that the probability of attrition differed over the distribution of consumption. Figure 1 shows that the overall retention rate for all non-urban households between 2012 and 2016 was over 90 percent. 94 percent of rural households that were interviewed in ESS 2012 were successfully re-interviewed in ESS 2016. For households in small towns, the corresponding rate was about 85 percent. Attrition in urban households was higher than in other areas, and was close to 16 percent between ESS 2014 and ESS 2016.

[2] This is approximately the poverty rate that is estimated using the national poverty line in the 2015/16 HICES.

Figure 1 Probability of being retained between 2012 and 2016 - non-urban households only



Source: Own calculations from ESS 2012, 2014 and 2016.

3. Poverty shares, population shares, and changes in the distribution of welfare

Around 80 percent of the Ethiopian population and over 90 percent of the poor lived in rural areas in 2016. There was a slight reduction in the rural poverty share between 2014 and 2016, along with small relative rises in the poverty shares of those living in small towns and in urban areas. As shown in Table 1, this took place alongside a small increase in the urban population share, which rose from 14 percent to just under 16 percent.

The differences in poverty changes across regions are stark. The population shares of Amhara and Oromia remained the same between ESS2 and ESS3, in contrast to changes in their poverty shares. The poverty share of Oromia climbed from 23 percent in 2014 to 31 percent in 2016. This was, however, still below Oromia's share of the Ethiopian population which stood at around 40 percent in 2016. The poverty share of Tigray rose slightly over the period, and was close to the population share of this region in 2016. The most dramatic fall in the poverty share took place in the SNPPR region, which contained one fifth of the population and one quarter of the poor in 2016.

Another way in which to understand differences in Ethiopia is to divide the country into five climatic/agro-ecological zones. This is done in the final panel of Table 1. Around two thirds of the

population lives in the moisture-reliable highlands, with around 22 percent in drought-prone highlands. The poverty shares of these two zones moved in opposite directions between 2014 and 2016, providing some evidence of the strong negative impact of the drought. 70 percent of the poor lived in moisture-reliable highlands in 2014. This dropped to 62 percent in 2016. In contrast, the poverty share of drought-prone highlands rose from 16 percent to 22 percent over the same period. In the other three agro-ecological zones, which make up around 14 percent of the population, the poverty share of those living in drought-prone lowlands almost doubled over the period – further evidence of the swift and significant impact of the drought.

Table 1 Poverty and population shares, 2014 and 2016

	Round 2 (2014)		**Round 3 (2016)**	
	Poverty share	**Population share**	**Poverty share**	**Population share**
Location				
Rural	92.4%	80.7%	90.8%	78.6%
Small towns	4.1%	5.3%	4.6%	5.8%
Urban	3.5%	14.0%	4.7%	15.6%
Region				
Amhara	33.0%	23.9%	30.7%	23.9%
Oromia	22.8%	39.1%	31.2%	39.4%
SNNPR	32.2%	21.2%	25.7%	20.7%
Tigray	3.8%	5.9%	5.4%	5.8%
Other	8.2%	9.9%	6.9%	10.2%
Agro-ecological zone				
Moisture reliable highland	70.3%	66.2%	61.7%	65.8%
Drought prone highland	16.1%	21.8%	22.1%	22.0%
Moisture reliable lowland	3.4%	3.4%	3.8%	3.6%
Drought prone lowland	5.2%	4.7%	9.6%	4.7%
Lowland pastoralist	5.1%	4.0%	2.9%	4.0%
N	5 071		4 717	

Source: Own calculations from ESS 2014 and 2016.

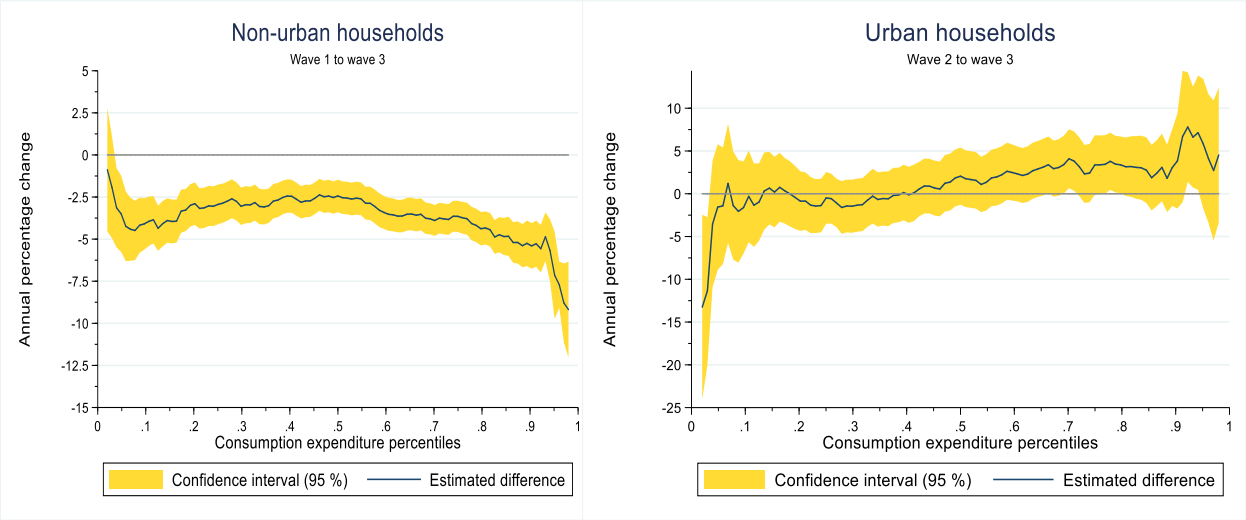
4. Changes in the distribution of welfare

The drop in consumption expenditure of non-urban households over the full distribution of consumption between 2012 and 2016 is clearly shown in Figure 2. The anonymous growth incidence curve (GIC) reflects that although consumption growth was negative throughout, the steepest declines in

consumption took place in the top decile of non-urban households.[3] This dynamic can also be seen simply by noting the strong leftward shift in the distributions of consumption expenditure for the three survey rounds, as shown in Figure 16 in the appendix. The fact that consumption shrank more quickly at the top of the distribution than at the bottom implies that although poverty rates went up, cross-sectional measures of inequality would have decreased.

The GIC for urban households between 2014 and 2016 was upward sloping, and reflects a different dynamic of welfare changes. Growth at the very bottom of the urban distribution was around -10 percent per year, while at the very top it was around 5 percent per year. Growth in consumption expenditure in urban areas was therefore decidedly not pro-poor, by either of the two broad definitions of the concept.[4]

Figure 2 Growth incidence curves of real adult equivalent consumption expenditure, non-urban and urban households



Source: Own calculations from ESS 2012, 2014 and 2016.

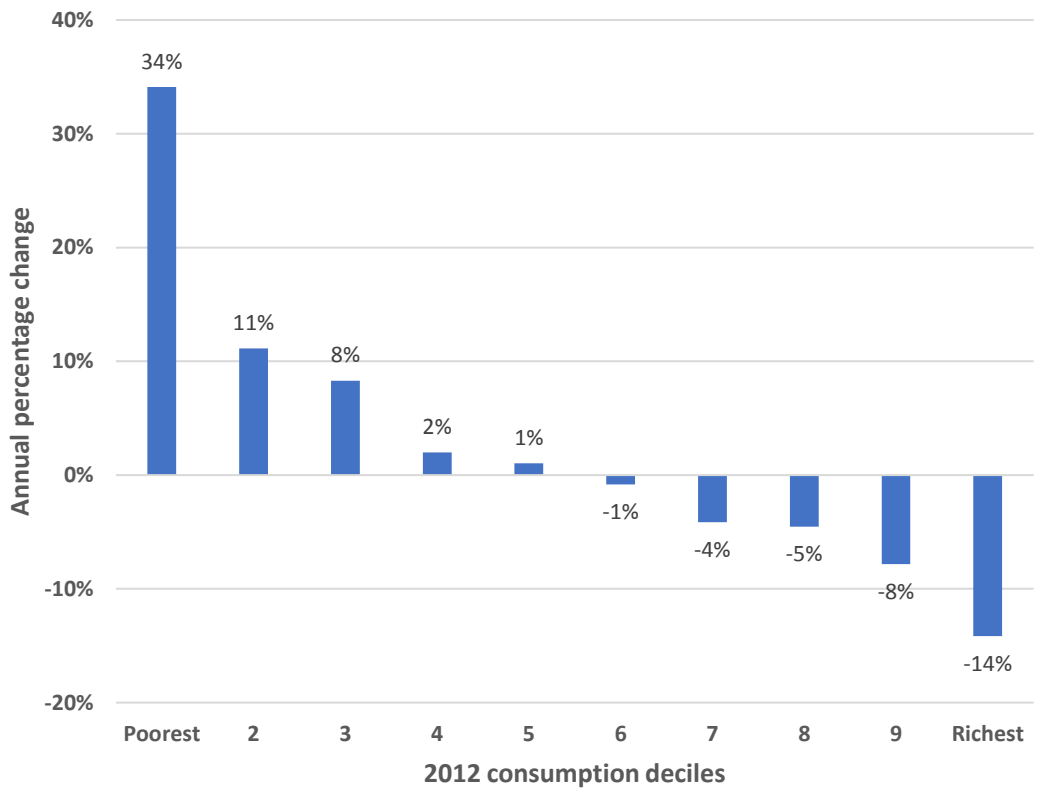
The non-anonymous GIC highlights the value of having longitudinal data, as it shows that even though the poverty rate went up overall, the consumption levels of the baseline poor grew relatively faster than those of the non-poor. Figure 3 is a simplified version of the full non-anonymous GIC that is given as Figure 17 in the appendix. It was created by ordering the non-urban population by consumption level in 2012, and then comparing each household's consumption in 2016 to its consumption in 2012, regardless of where in the final distribution the household ended up. Holding the initial ordering of households constant in this way shows that annual growth rates in consumption were highest for those who were initially the worst off. This is in contrast to the anonymized GICs which simply plot the growth rate of each

[3] These anonymous GICs are created by ordering households by consumption level in 2012 and in 2016, and then comparing growth rates for each percentile.

[4] For example, Ravallion and Chen (2003) define pro-poor growth as any positive growth rate for the poor, while McCulloch and Baulch (2000) define pro-poor growth as arising only if the growth rate of the poor is higher than that of the non-poor (meaning that growth is inequality-reducing as well as poverty-reducing).

percentile from 2012 to 2016. Growth rates were in fact positive, on average, for those who were in the bottom half of the 2012 distribution. Growth rates turned negative for those who were in the 6th decile and above in 2012, and are -14 percent for those who were initially the best off.

Figure 3 Growth rate of consumption conditional on decile in 2012 (non-anonymous quasi-GICs)

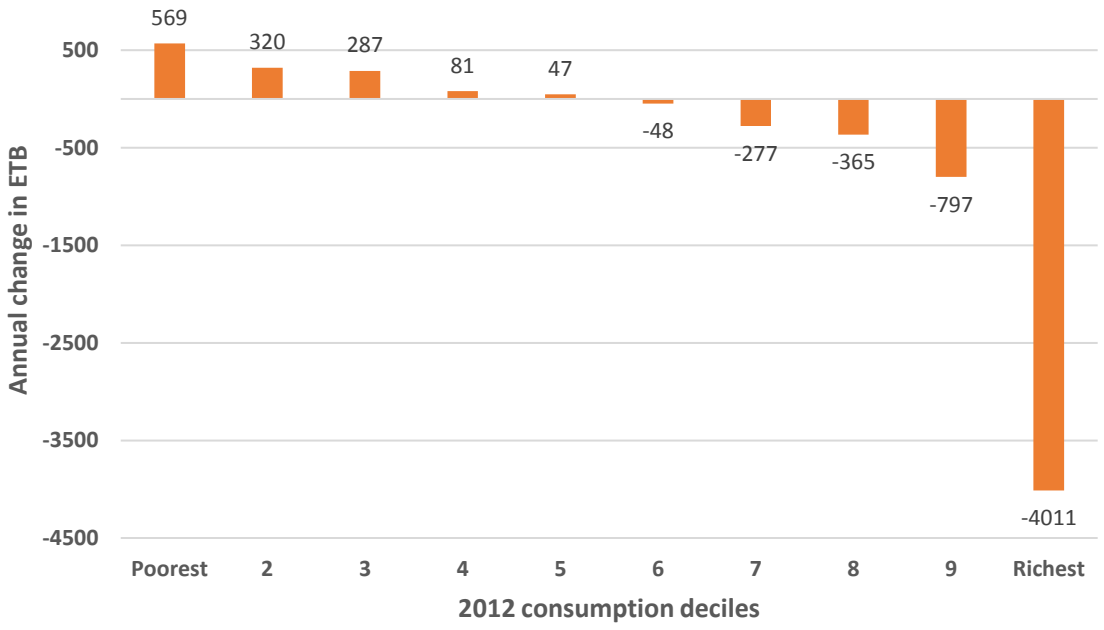


Source: Own calculations from ESS 2012, 2014 and 2016.

The consumption growth rates for the bottom three deciles were high, but they grew from a very low base. The increase in the overall poverty rate over the 2012 to 2016 period is consistent with the fact that the absolute year-on-year increase in consumption for many of the poor was not enough to lift them over the threshold of ETB 4 360. In other words, the consumption growth of the baseline poor was impressive in percentage terms, but was actually quite modest in real ETB terms. Figure 4 shows that the growth in ETB of the bottom three percentiles was a lot closer than the growth rates of the previous figure. On average, real growth was ETB 569 a year for the poorest 10 percent of non-urban Ethiopians, and this decreased to a very small ETB 47 a year for the 5th decile. The drop in consumption for the richest 10 percent was very significant, as can be expected given the first panel of Figure 2 and the last bar in Figure 3.

Another way of thinking about changes over the distribution is to compare the proportion of households that experienced increases in consumption by baseline decile. The outcome of this exercise is shown in Figure 18 in the appendix. The share of households that experienced consumption increases between 2012 and 2016 fell monotonically over the deciles – from 83 percent in the poorest decile to only 7 percent in the richest decile. Only in the poorest three deciles did more than half of households see an increase in real consumption, and this goes way towards explaining the rise in the overall poverty rate in the country.

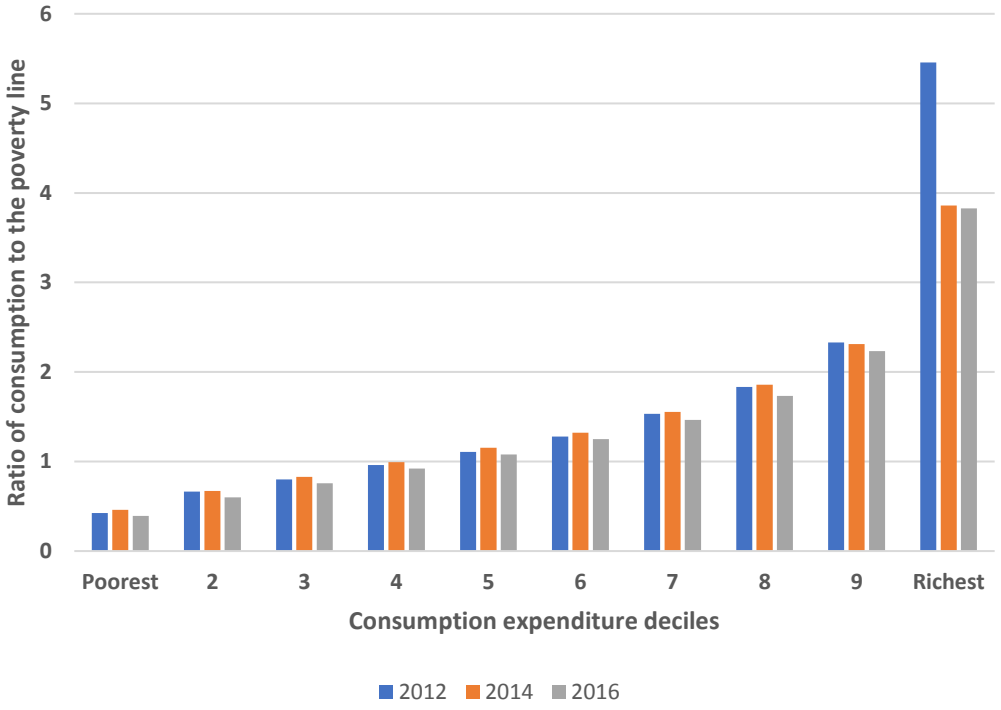
Figure 4 Year-on-year changes in consumption levels by consumption decile in 2012 - non-urban households only



Source: Own calculations from ESS 2012, 2014 and 2016.

On average, the biggest fall in consumption for poor households took place between 2014 and 2016, while for the richest households, the biggest drop took place between 2012 and 2014. Figure 5 gives the ratio of average consumption expenditure to the poverty line for the consumption deciles in each of the three rounds of the ESS. The figure presents data for non-urban households only. A ratio of 1 on the y-axis of this figure corresponds to an average consumption level of exactly ETB 4 360 per year. The average consumption levels of deciles 1 to 8 actually increased slightly (though not statistically significantly) over the first two rounds of the ESS. The most dramatic change over this period took place at the very top of the distribution, where the ratio of consumption to the poverty line for the richest decile fell from 5.5 to less than 4.

Figure 5 Ratio of average consumption expenditure to the poverty line – non-urban households only



Source: Own calculations from ESS 2012, 2014 and 2016.

5. Poverty status and transitions between 2012 and 2016

Poverty transitions between 2012 and 2016

A poverty transition matrix shows the status of individuals or households in the base period compared to the final period. The cells of the transition matrix are usually represented as proportions or as numbers. The transition matrices shown in Table 2 give the proportion of Ethiopians in each poverty state in ESS 2012 and ESS 2016 for non-urban households, and ESS 2014 to ESS 2016 for urban households. The diagonals of the matrices show the proportion whose poverty status did not change between the two periods, while the off-diagonals show the proportion who transitioned into and out of poverty. The bold numbers at the end of each row and column are the poverty and non-poverty rates within each wave of data.

There was a lot of mobility into and out of poverty in Ethiopia. A fifth of the rural population was non-poor in 2012 but poor in 2016, while only 13 percent were poor in 2012 but non-poor in 2016. This explains

the increase in the rural poverty rate for panel members.[5] Only 10 percent of the rural population was poor in both the start and end periods, while 58 percent were non-poor in both periods. The proportion of those living in small towns who were poor in both periods was a lot smaller, at 6 percent. 12 percent of people living in small towns entered poverty over the 2012 to 2016 period, while 9 percent escaped poverty. The numbers for urban residents are given over a slightly shorter period (ESS 2014 to ESS 2016), and show that 91 percent of urban residents were non-poor at both times. The same proportion of urban residents – 3.7 percent – transitioned into and out of poverty over this time period.

Table 2 Proportion of panel members poor and non-poor: ESS 2012 to ESS 2016

		Rural	
		2016	
		Non-poor	**Poor**
2012	**Non-poor**	58.2	19.9
	Poor	12.7	9.3

		Small towns	
		2016	
		Non-poor	**Poor**
2012	**Non-poor**	73.3	11.6
	Poor	9.4	5.7

		Urban	
		2016	
		Non-poor	**Poor**
2014	**Non-poor**	91.0	3.7
	Poor	3.7	1.7

Source: Own calculations from ESS 2012, 2014 and 2016.

Another way of looking at poverty transitions is to show 2016 status conditional on 2012 status. Now, end year poverty status is conditional on initial year poverty status, and this means that each row sums to 100 percent. Transitions into poverty were far more likely in rural areas than in small towns or urban areas. 26 percent of the rural non-poor in 2012 had entered poverty in 2016, compared to 14 percent of those living in small towns. The same holds true in reverse, with rural areas having the lowest conditional poverty escape rates of the three localities. A very high 58 percent of the initially poor in rural areas were non-poor in the final year, compared to almost two thirds in small towns, and 69 percent in urban areas.

[5] This rate is only for those who were successfully interviewed in ESS 2012 and ESS 2016 – the balanced panel sample over this period. The cross-sectional poverty rates by locality and region were shown in Table 1.

Table 3 Transition matrices - end-year poverty status conditional on beginning-year poverty status

Rural		2016		
		Non-poor	**Poor**	
2012	**Non-poor**	74.6	25.5	**100**
	Poor	57.8	42.2	**100**

Small towns		2016		
		Non-poor	**Poor**	
2012	**Non-poor**	86.3	13.7	**100**
	Poor	62.2	37.8	**100**

Urban		2016		
		Non-poor	**Poor**	
2014	**Non-poor**	96.1	3.9	**100**
	Poor	69.3	30.7	**100**

Source: Own calculations from ESS 2012, 2014 and 2016.

Poverty status over three waves

A more comprehensive picture of poverty dynamics emerges if the second wave (2014) of the ESS is added to the analysis. Now, instead of having four possible poverty state combinations (PP, PN, NP, NN)[6] there are eight possible combinations. These can be used to identify the kind of poverty that was experienced by different groups in the population.

[6] P=poor; N=non-poor.

Box 1 Defining chronic and transitory poverty

A number of definitions for distinguishing chronic and transitory poverty have been proposed in the literature. Two of the most commonly-found ones are the spells approach (McKay and Lawson (2003)) and the components approach (Jalan and Ravallion (1998)).

The spells approach defines chronic poverty according to how many times (or how long) a household or individual has been below the poverty over a particular period of time. For example, a household could be defined as being in chronic poverty if it is poor in at least two out of the three waves of NPS.

The components approach involves estimating the chronic and transitory components of some measure of permanent welfare. The fluctuating nature of household welfare over time is thought of as containing both a transitory component and a permanent component. The transitory component is generated by variability in household consumption levels, while the permanent component gives the poverty level if consumption does not stray from its average value.

One application of the components approach is to think about the classification of poverty into chronic and transitory groups over three waves of data by defining several characterizations (adapted from Hulme and Shepherd (2003):

- Always poor: Consumption expenditure is below the poverty line in all three rounds of ESS.
- Usually poor: The average of consumption expenditure over the three rounds of ESS is below the poverty line, but the household is not poor in all three rounds.
- Occasionally poor: The average of consumption expenditure over the three rounds of ESS is above the poverty line, but the household is poor in at least one round.
- Never poor: Consumption expenditure is above the poverty line in all three rounds of ESS.

In this chapter chronic poverty status is assigned to households/individuals who are always poor or usually poor. Transitory poverty is associated with those household/individuals who are occasionally poor.

The share of the non-urban population that was in chronic poverty was about half of the share that was in transitory poverty between 2012 and 2016. 16 percent of the non-urban population was chronically poor, according to the definition outlined in Box 1. This was significantly lower than the 31 percent who experienced transitory poverty over the period. The very high mobility rates described earlier in this report go some way to explaining why the transitory component is so high for non-urban households.[7]

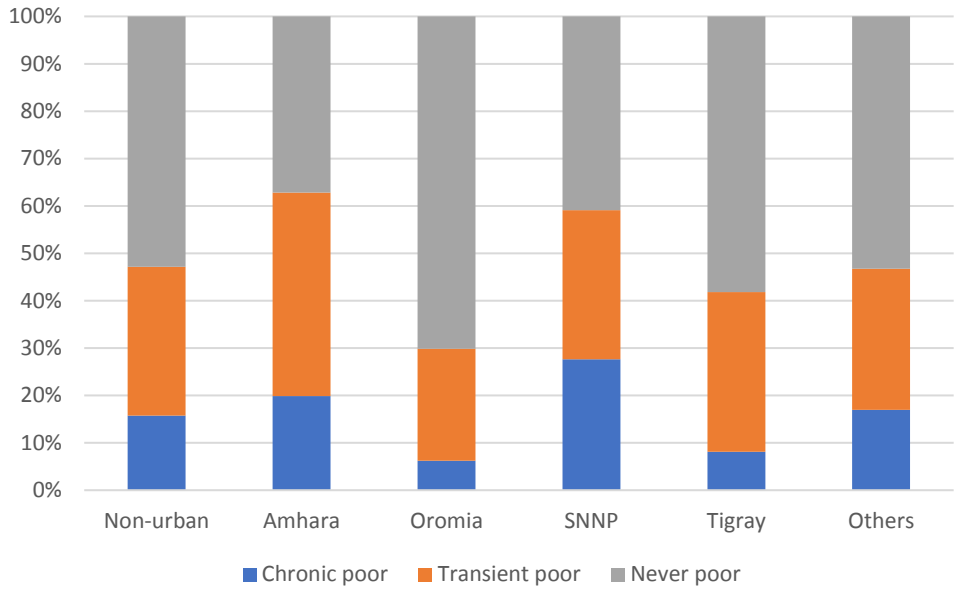
There were large regional differences in the extent of chronic poverty.[8] Chronic poverty rates were highest in SNNP and Amhara, at 28 percent and 20 percent respectively. 6 percent of the population in Oromia was in chronic poverty between 2012 and 2016, while the share in Tigray was 8 percent. Rates of

[7] Fuje (2018) constructs a different measure of chronic poverty by defining this category as containing only those who were poor in all three rounds of data. This yields lower chronic poverty rates of 12 percent in rural areas, and 6 percent in small towns. The corresponding transitory poverty rate for rural areas in Fuje (2018) is 20 percent.

[8] In this context, the region that a household is located in is the region that was recorded in 2012.

transitory poverty were more evenly spread through the different regions, and ranged between 24 percent in Oromia and 43 percent in Amhara.

Figure 6 Chronic and transitory poverty over ESS 2012 to ESS 2016 – non-urban households

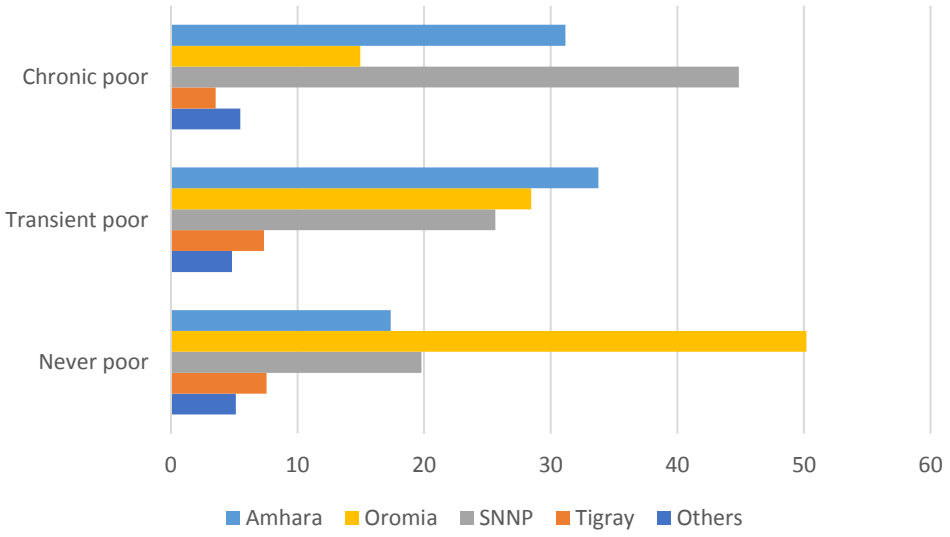


Source: Own calculations from ESS 2012, 2014 and 2016.

Figure 7 breaks down the composition of poverty type by region. This is in contrast to Figure 6 which took each region and then broke down region-specific poverty types. Decomposing the distribution of chronic and transitory poverty in this way allows for a better understanding of where the majority of the chronically poor are concentrated. 45 percent of all the chronically poor in non-urban Ethiopia live in SNNP. The share living in Amhara is also high, and stands at 31 percent. These substantially outweigh the population shares of SNNP and Amhara which are 21 percent and 24 percent, respectively (shown in Table 1). 15 percent of the chronically poor live in Oromia, while around 5 percent each are in Tigray and other regions.

The dynamic changes somewhat when the focus shifts to transient poverty, with Amhara taking up the largest overall share of this category. 34 percent of the transient poor in Ethiopia live in Amhara, which is a similar share of the chronically poor. The share of the transient poor living in Oromia is 28 percent – almost double the chronic share. In contrast, one quarter of the transient poor live in SNNP, compared to 45 percent of the chronically poor.

Figure 7 Regional shares of each poverty category

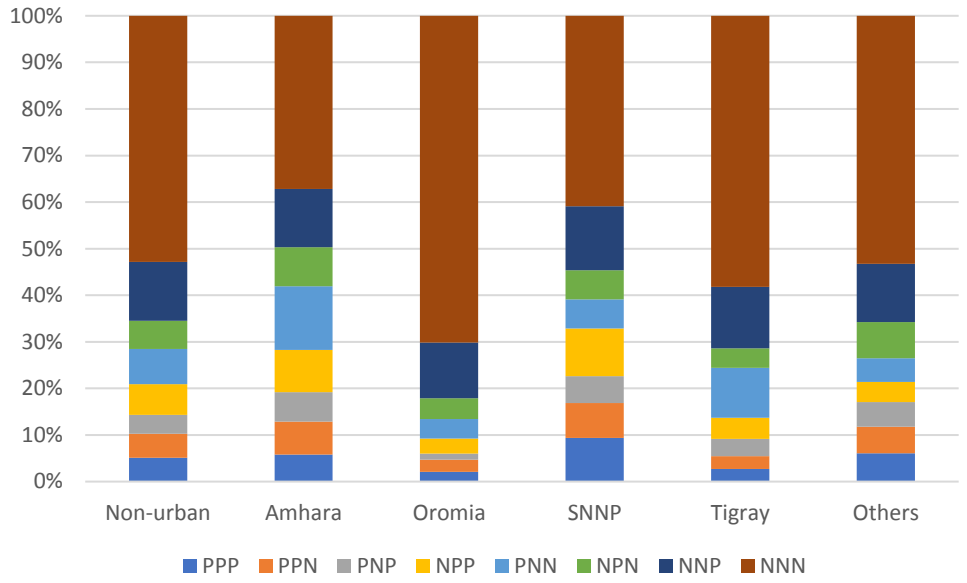


Source: Own calculations from ESS 2012, 2014 and 2016.

The regional differences in the nature of poverty over time are highlighted once again in Figure 8. Given that there are three time periods and two possible poverty states in each period, there are 8 possible poverty and non-poverty configurations ranging from poor in all three periods (PPP), to non-poor in all three periods (NNN). Overall, just 5 percent of the non-urban population was poor in all three time periods. This number, however, hides variations by region which range from 9 percent in SNNP to 2 percent in Oromia. The shares of the non-urban population in Tigray and Amhara that were poor in all three rounds were 3 percent and 6 percent, respectively.

Almost three quarters of the population in Oromia was non-poor in 2012, 2014 and 2016, compared to just 37 percent in Amhara. The share of the population that was non-poor in 2012 and 2014, but fell into poverty in 2016 (the NNP category) was very evenly across regions, at between 12 and 14 percent. There were fairly substantial proportions of the population that escaped poverty after 2012 and remained non-poor (PNN). The shares in the PNN category were 14 percent in Amhara, 11 percent in Tigray, 4 percent in Oromia, and 6 percent in SNNP.

Figure 8 Composition of three-round poverty status by region for non-urban households



Source: Own calculations from ESS 2012, 2014 and 2016.

6. Profiling chronic and transitory poverty

There are many significant differences in the composition and characteristics of chronic poor, transitory poor and never poor households. Table 4 presents differences in characteristics that are measured at the level of the household and the household head in 2012. The final two columns of the table provide a test of the statistical significance of the difference between the chronic and transitory poor, and the chronic and never poor, respectively.[9]

Chronically poor households in Ethiopia are larger, contain more young children, and have higher dependency ratios than transitory poor households and those that were never poor. The average household size of the chronically poor was 5.9, compared to 5.3 for the transitory poor, and 4.9 for the never poor. Differences between the chronically poor and the other two categories were statistically significant at the 1 percent level for this variable. This difference is driven in part by the higher number of children aged under 14 in chronically poor households. These households had, on average, 0.3 more children than the transitory poor, and 0.6 more that the never poor. Unsurprisingly, this also meant that dependency ratios were highest in chronically poor households.[10]

[9] Fuje (2018), using different definitions of chronic and transitory poverty, finds that there are generally very few differences in the baseline characteristics of the chronic poor and the transitory poor.

[10] The definition of the dependency ratio comes from Central Statistical Agency of Ethiopia (2017) and is, "…the population that is not of working age (<15 and >64) divided by total number of working age persons (15-64 years). The value is then multiplied to express it in percent. Households with no working persons were excluded in the dependency ratio computation."

Chronically poor households owned about a quarter of a hectare less land per adult than never poor households, on average. Households that were in transitory poverty between 2012 and 2016 owned about 0.32 hectares per adult on average, compared to the 0.57 hectares per adult owned by never poor households. Differences in the asset index between these groups of households are also significant in both economic and statistical senses.[11] The normalized asset index score of the chronically poor was -0.5, compared to -0.2 for transitory poor households and 0.1 for households that were never poor.

Somewhat surprisingly, chronically poor households are not significantly more remote than those households that did not experience poverty between 2012 and 2016. The average chronically poor household was located about 14km from the nearest road, while the corresponding distances for the transitory poor and the never poor were 17km and 14km, respectively. As shown in Figure 9, zones in which chronic poverty exceeded transitory poverty did not appear to be significantly more remote than zones in which transient poverty dominated. Proximity to the nearest population center of 20 000 people or more also did not vary too much between the groups. There were, however, some statistically significant differences in the average distance to the nearest market between any of the three groups which were, on average, between 61km and 73km. These numbers are consistent with Fuje (2018), albeit for different definitions of chronic and transitory poverty.

There was a significant difference in the proportion of chronically and transitory poor households that were PSNP beneficiaries in the first round of the ESS (19 percent and 14 percent). The relatively good targeting of the PSNP in this round can be seen by the fact that never poor households were far less likely to have been part of the program in 2012.

Almost half of chronically poor households reported being food insecure over the last 12 months, though only 9 percent were recipients of food aid. The prevalence of food insecurity is stark, with over one quarter of households that were never poor reporting not having had enough to eat at some stage in the 12 months prior to interview. In contrast to the targeting of the PSNP, it appears that more transitory and never poor households benefited from the scaling up of food aid programs between 2012 and 2016 than chronically poor households did.

Households that were in chronic poverty were less likely to have had a female head than those that were in transitory poverty or never poor, but more likely to have a head with no education. 22 percent of never poor households were headed by a woman, while just over 17 percent of chronically poor households were. In contrast, 70 percent of chronically poor households were headed by a member who had no education, compared to around 57 percent of never poor households. Although secondary and post-secondary education attainment levels were very low in Ethiopia, 4 percent of never poor households were headed by someone with a secondary or post-secondary education, compared to 0.4 percent of the chronically poor, and 2.4 percent of the transitory poor.

Another comparison (not shown) presents rainfall levels across household types. Rainfall levels were extremely low in the year prior to the first round of the ESS, but were not significantly different between

[11] The asset index used in this table is a share index which is calculated by first multiplying an indicator variable (for example: household owns a fridge) by the proportion of households that own the variable (for example: proportion of households that own a fridge). These products are then summed over each component at the household level to generate the share index. The components of the index are: Refrigerator, sewing machine, radio, bicycle, car, cellphone, television, electric stove, kerosene stove, sofa, wardrobe, mattress, animal-pulled card.

chronically poor households and the never poor.[12] Rainfall levels were, on average, more than double in 2013 what they were in 2011, but in this case there were no differences across the household types. The impact of the 2015 drought has been the topic of several recent studies (see Fuje (2018), Hirvonen, Sohnesen et al. (2018) and Sohnesen (2018)), and the average rainfall was indeed a lot lower in 2015 than it was in 2013. However, the only significant difference in the extent of rainfall in the year before ESS 2016 is between the chronically poor and the transitory poor, where in fact, the level was higher for the former group. Presenting the rainfall data in this way hides the fact that the 2015 drought was, in fact, far more severe in some regions than in others. As reported in Hirvonen, Sohnesen et al. (2018), Amhara was particularly badly affected by the drought, with 59 percent of households being exposed. In contrast, 26 percent of households in Oromia, 12 percent of households in Tigray, and 4 percent of households in SNNP were exposed to the 2015 drought.

Table 4 Profiles by poverty status, non-urban households 2012 to 2016

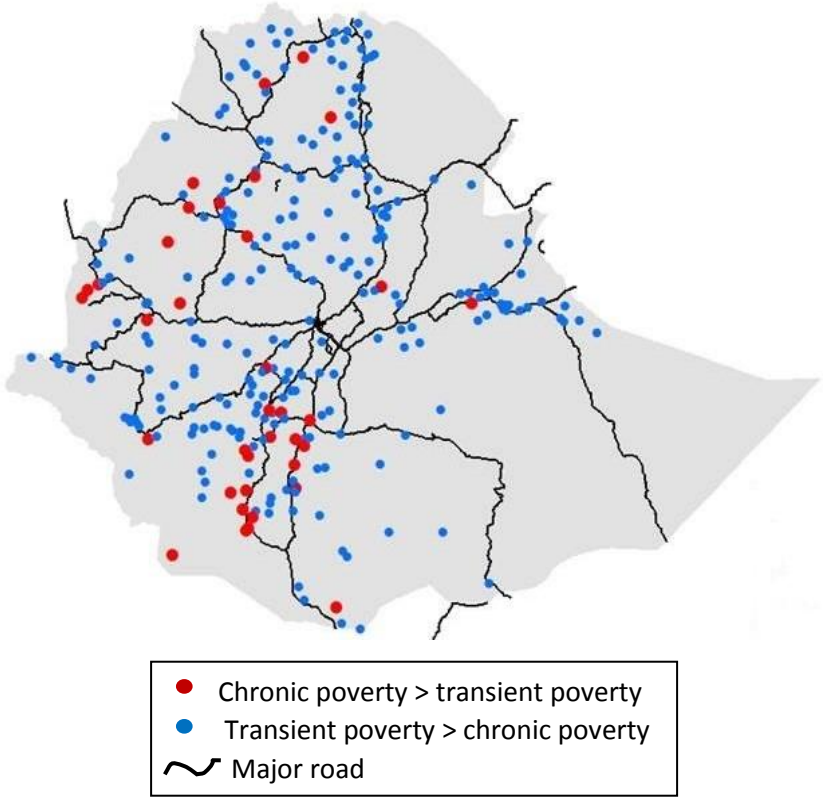
	(1) Chronic poor	**(2) Transitory poor**	**(3) Never poor**	**(1) vs (2)**	**(1) vs (3)**
Household					
Household size	5.9	5.3	4.9	***	***
Number of children <14	2.0	1.7	1.4	***	***
Dependency ratio	101.3%	88.5%	74.0%	*	***
Share of expenditure on food	82.3%	82.3%	81.2%		***
Land per adult (hectares)	0.32	0.43	0.57	***	***
Asset index	-0.5	-0.2	0.1	***	***
Dist. to nearest road (km)	13.7	16.7	14.0	***	
Dist. to nearest pop. center (km)	32.5	37.3	36.5	**	**
Dist. to nearest market (km)	73.1	64.6	60.8	**	***
PSNP household in W1 (2012)	19.3%	14.2%	11.4%	*	***
Ever PSNP HH (W1 to W3)	25.2%	20.8%	19.0%		*
Not enough food last 12 months	47.4%	35.6%	27.8%	***	***
Free food recipient W1	9.0%	8.9%	4.2%		***
Free food recipient W3	9.3%	15.0%	10.4%	**	***
Extension program W1	34.4%	30.7%	35.7%		**
Extension program W3	45.5%	40.4%	47.2%		*
Household head					
Age	43.8	46.0	44.4	**	**
Female	17.5%	18.2%	22.0%	**	*
No education	70.3%	71.5%	57.3%	**	***
Primary	29.2%	25.7%	35.6%	*	*
Secondary	0.4%	2.4%	4.2%	***	***
Post-secondary	0.0%	0.5%	2.9%	**	***
Accessibility					
Dist. to nearest bus station	17.47	19.23	16.95		

[12] The rainfall levels come from the Climate Hazards Group InfraRed Precipitation with Station data (CHIRPS) estimates. A fuller description of the data as used in this paper, as well as plots of the intensity of the drought across Ethiopia are available in Hirvonen, Sohnesen et al. (2018).

Dist. to nearest woreda	20.58	20.60	18.52		***
Fare to nearest woreda	17.36	18.45	13.79		**
Dist. to nearest urban center	84.01	90.39	73.91		**
Fare to urban center (Birr)	36.81	45.14	38.62	***	
Bank/microfin. in community	0.31	0.29	0.31		
Agro-ecological zones					
Moisture reliable highlands	74.0%	60.0%	61.9%	***	***
Drought prone highlands	13.7%	26.7%	27.3%	***	***
Moisture reliable lowlands	7.1%	5.3%	5.4%	**	
Drought prone lowlands	4.5%	6.1%	2.7%		*
Lowland pastoralist	0.6%	1.9%	2.6%	***	***

Source: Own calculations from ESS 2012, 2014 and 2016.

Figure 9 The locations of chronically poor and transient poor households in relation to major roads



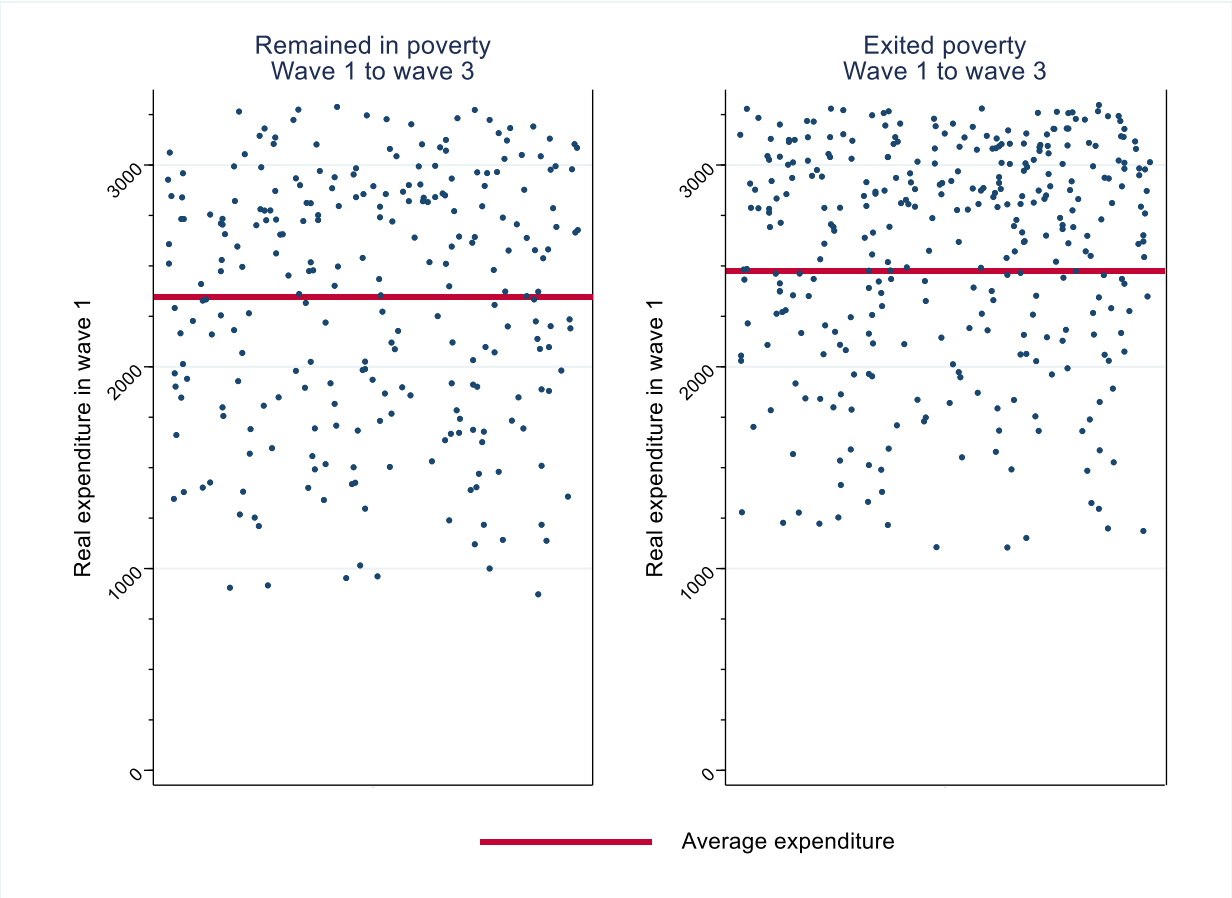
Source: Own calculations from ESS 2012, 2014 and 2016.

7. The dynamics of poverty transitions: Exit and entry

Consumption expenditure by poverty transition status

A comparison of 2012 real consumption expenditure for those who remained in poverty and those who exited poverty can be seen in Figure 10. The top of each figure in the panel represents the poverty line, and each dot is the adult equivalent consumption of a poor panel member. The average level of consumption in 2012 for those who exited poverty was ETB 2 475 (right panel). This was only slightly higher than the average for those who remained in poverty which stood at ETB 2 347 (left panel). Despite mean consumption being slightly higher for those who exited poverty, there is a great deal of overlap in the distributions. There is, however, slightly more clustering just below the poverty line of ETB 3 299 for those who exited poverty.

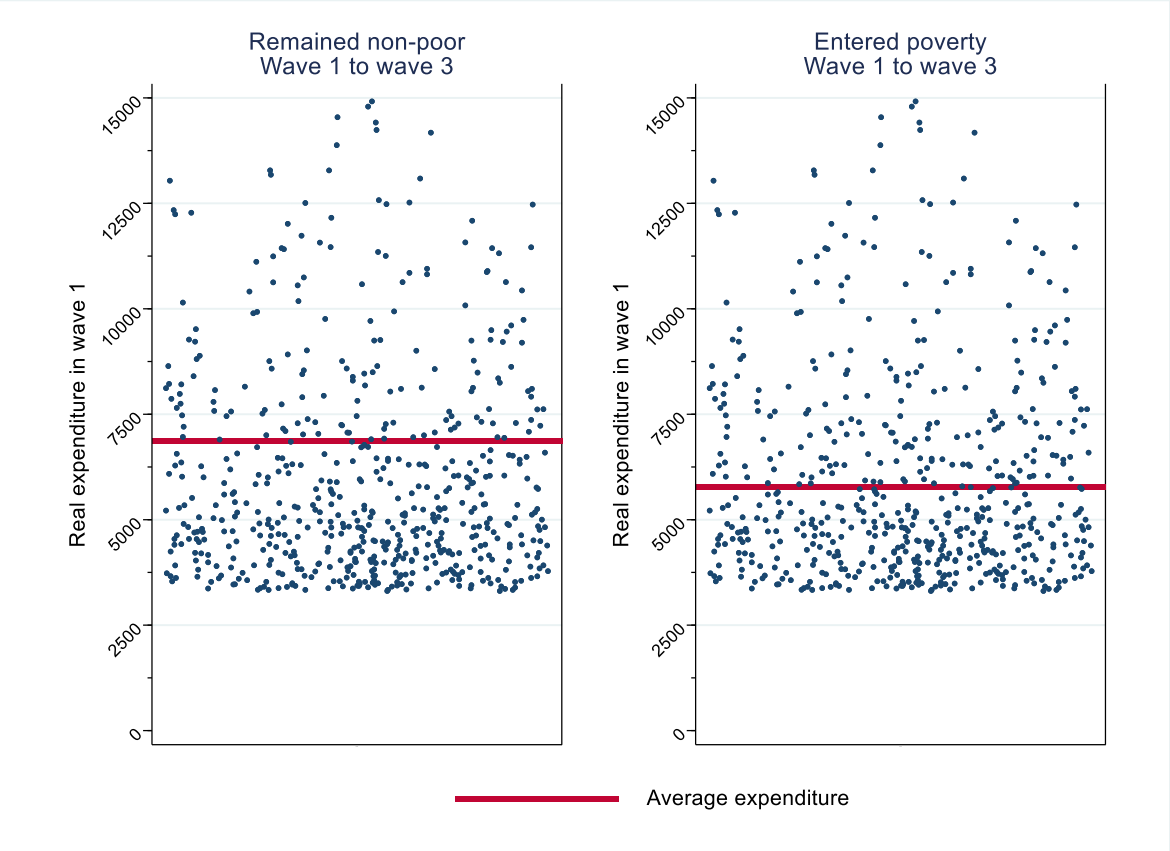
Figure 10 Consumption expenditure for those who remained poor versus those who exited poverty



Source: Own calculations from ESS 2012, 2014 and 2016.

A similar exercise is undertaken to highlight the distributional differences for those who remained non-poor versus those who entered poverty between 2012 and 2016. Figure 11 restricts the distributions to show only those whose consumption expenditure was below ETB 15 000, but were non-poor in 2012.[13] The differences between these two groups are slightly more pronounced than the differences between the groups shown in the previous figure. The mean for those who remained non-poor was ETB 6 866, while the mean for those who entered poverty was ETB 5 782. The right hand panel of the figure shows that even though there was some clustering just above the poverty line for those who entered poverty, there were also significant number of observations with consumption at 2 or 3 times the poverty line in 2012 who were in poverty by 2016.

Figure 11 Consumption expenditure for those who remained non-poor versus those who entered poverty



Source: Own calculations from ESS 2012, 2014 and 2016.

[13] The lower parts of the figures in each panel are blank because of the restriction to those panel members who were non-poor in the first round of the ESS.

Unconditional transition rates for different characteristics

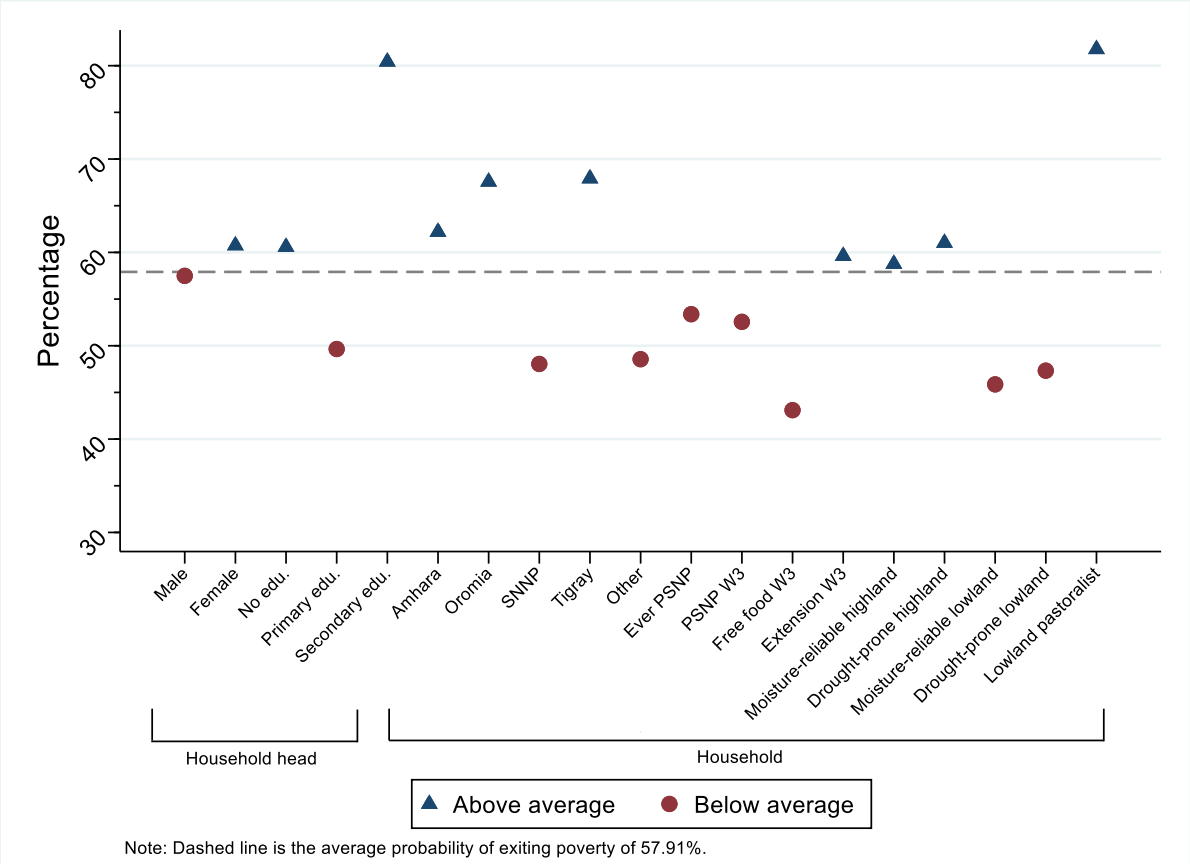
Figure 12 and Figure 13 show the relationships between different household head, and household characteristics, and poverty exit and entry transitions, respectively. The dashed lines represent the average poverty exit and poverty entry rates of 57.9 percent and 24.8 percent, corresponding to the combination of the rural and small town transition matrices presented earlier in the report. The blue triangles above the line correspond to characteristics that are associated with an above-average probability of transition, while the red dots below the line are associated with a below-average probability of transition.

There are some useful insights that can come from plotting these different correlates together, not least the fact that doing so can potentially uncover their ordering of importance. However, as noted in Dang, Lanjouw et al. (2017), the major caveat is that there will be overlap between different groups (for example, those with higher education levels are more likely to live in urban areas where there is easier access to secondary and post-secondary education).

Living in a household in which the head has attained a secondary level of education is strongly associated with a higher probability of transitioning out of poverty. Over 80 percent of households with a head with secondary education that were poor in 2012 were no longer poor in 2016, compared to 50 percent of households in which the head had a primary level of schooling. The unconditional differences in the probability of exiting poverty were similar for male versus female headed households, with the latter having a slightly higher unconditional probability of escaping poverty. Households in Oromia and Tigray were most likely to exit poverty, compared to the overall non-urban average, while households in SNNP were the least likely to (unconditionally) exit poverty between 2012 and 2016.

Households that had participated in the PSNP at any stage between 2012 and 2016 were less likely to exit poverty than the overall average, as were round three food aid households. Unconditional poverty exit rates differed markedly by agro-ecological zone, with lowland pastoralist by far the most likely to have exited poverty between 2012 and 2016, and those living in the lowlands being the least likely.

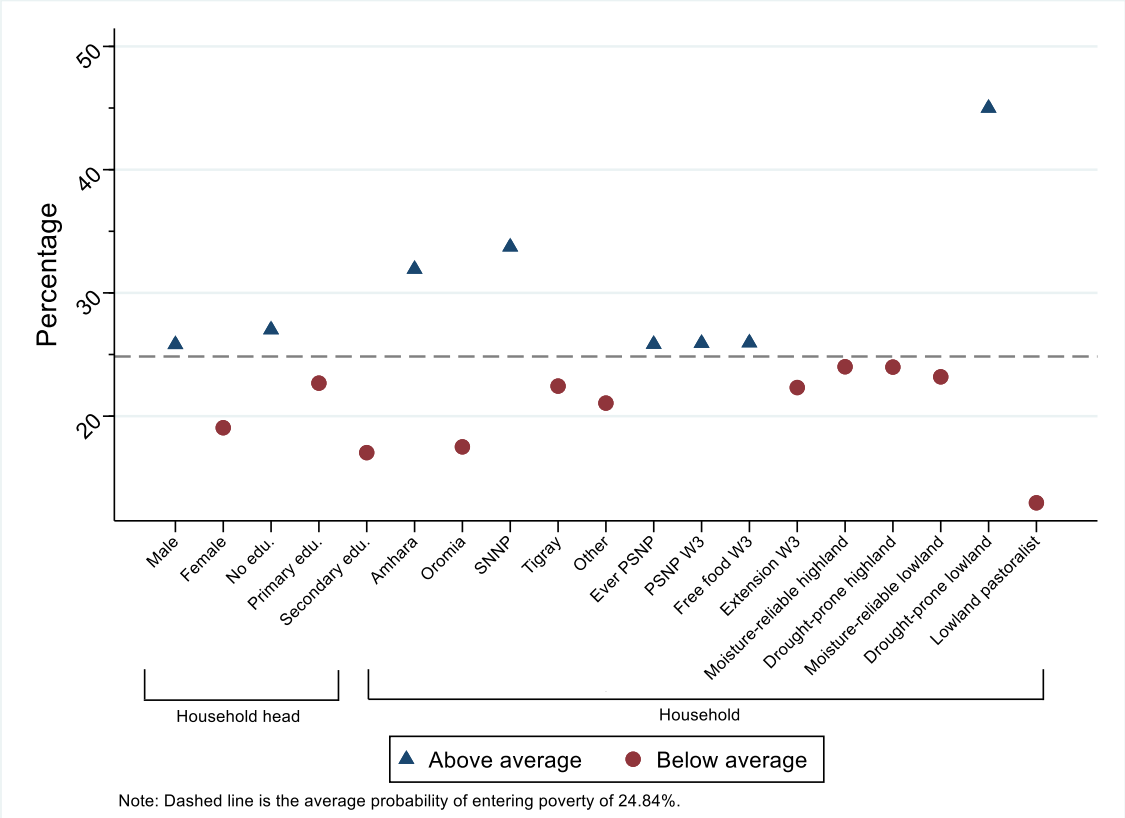
Figure 12 Poverty exit and unconditional transition rates for different characteristics



Source: Own calculations from ESS 2012, 2014 and 2016.

The gender differences in poverty transitions are clearer when considering unconditional poverty entry. Individuals living in male-headed households were almost 7 percentage points more likely to have entered poverty between 2012 and 2016 than individuals living in female-headed households. The strong effects of increasing educational attainment are once again present. Households in which the head had a secondary education entered poverty at a rate that was 8 percentage points lower than the average, while those in households in which the head did not have any education entered poverty at a rate of about 27 percent. Similar regional dynamics are present in this figure to the ones in the previous figure. The probability of households in Amhara and SNNP entering poverty between 2012 and 2016 was about 33 percent, compared to 22 percent in Tigray, 18 percent in Oromia, and 21 percent in the other regions. Lowland pastoralists were by far the least likely of the agro-ecological groups to enter poverty, while those living in the drought-prone lowlands were most likely to transition into poverty over the period.

Figure 13 Poverty entry and unconditional transition rates for different characteristics



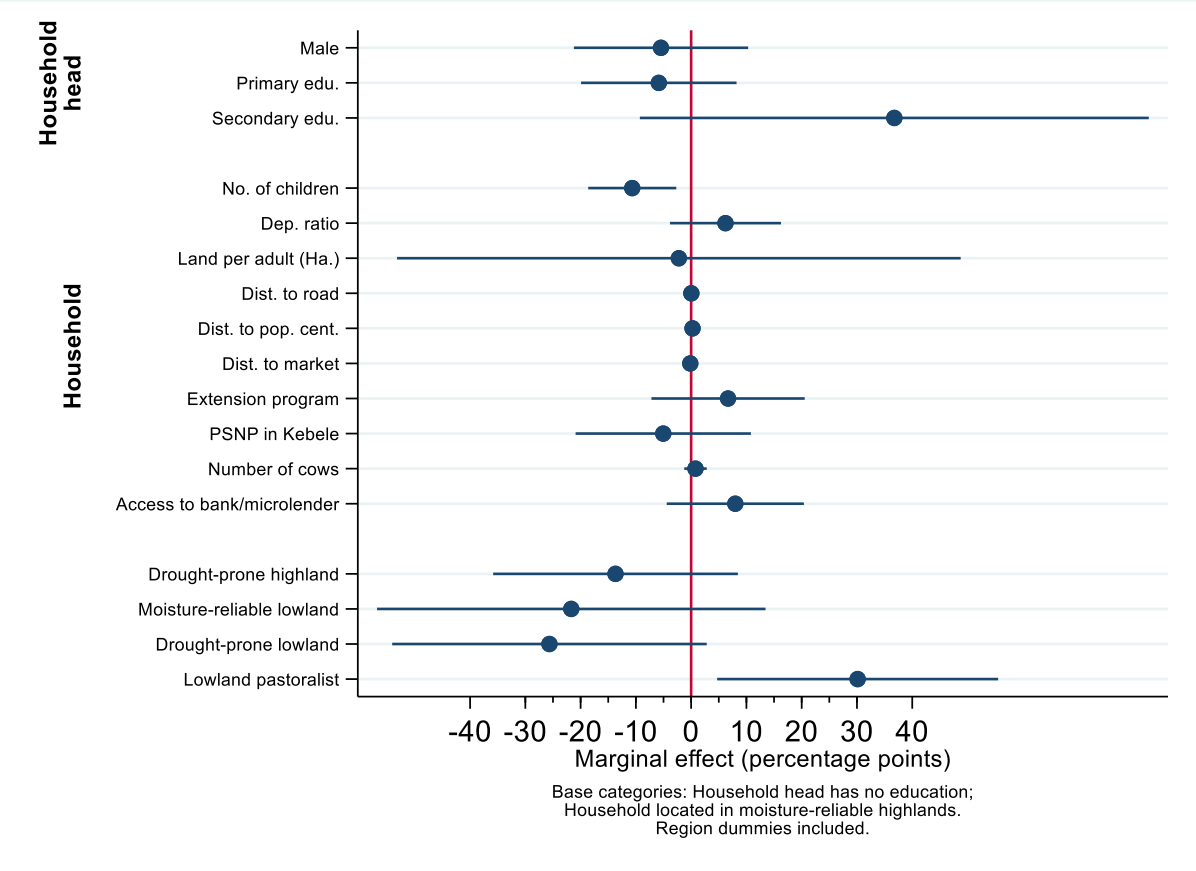
Source: Own calculations from ESS 2012, 2014 and 2016.

Regressions of poverty exit and poverty entry dynamics

In this final section of the chapter we exploit the longitudinal nature of the data by reporting the results of probit regressions for poverty exit and poverty entry between ESS1 and ESS3.[14] Marginal effects from the probit regressions are presented along with their 95 percent confidence intervals in Figure 14 and Figure 15. Marginal effects to the left of the red vertical line are associated with lower probabilities of poverty exit/entry, while those to the right are associated with higher rates of exit/entry.

[14] Full results can be found in the appendix, along with corresponding estimates for transitions between ESS 2012 and ESS 2014.

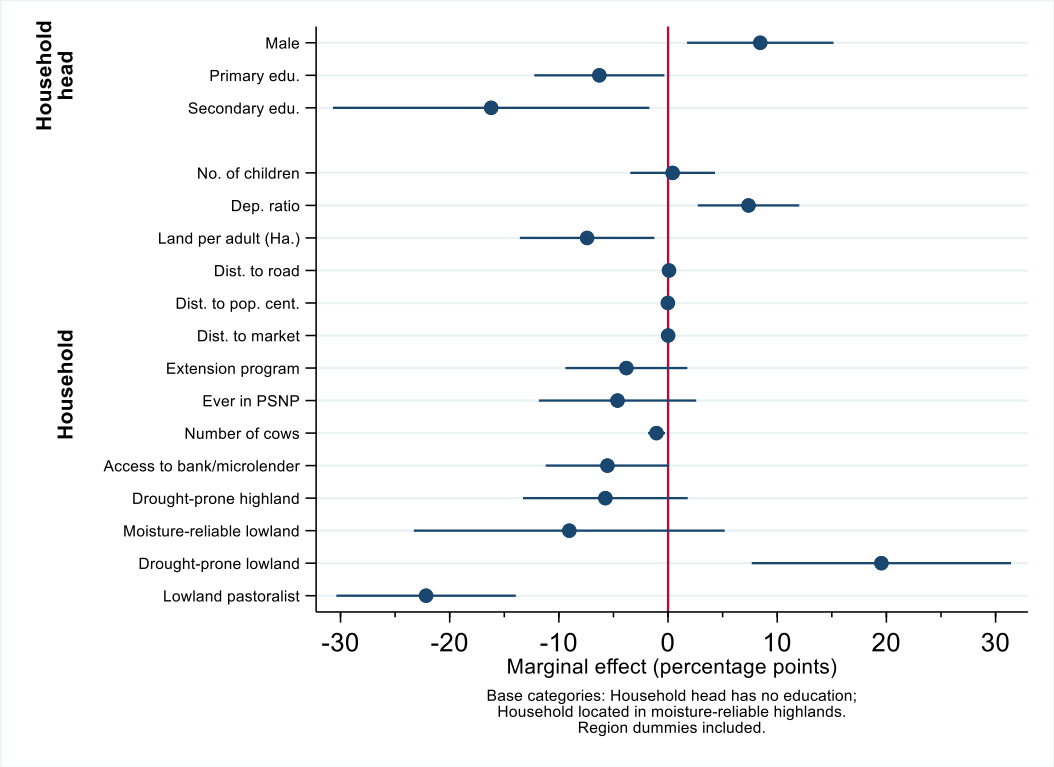
Figure 14 Marginal effects associated with poverty exit between 2012 and 2016



Source: Own calculations from ESS 2012, 2014 and 2016.

The largest effects associated with poverty exit were the education level of the household head, and the location of the household. The other explanatory variables included in this specification are generally not statistically significant at the 5 percent level. Households in which the head had a secondary education (partial or completed) were about 31 percentage points more likely to exit poverty that households in which the head had no education (the base category), though this was not particularly precisely measured, given the small number of poor secondary education households to begin with. There was no difference in the probability of poverty exit between household heads with no education, and household heads with primary education. Table 4 showed that there were few differences between the chronically poor, the transitory poor, and the never poor in terms of distance to roads, population centers and markets. The regression output confirms this, with the marginal effects of all three "distance" variables being very close to zero, with small standard errors. Households in the lowland pastoralist agro-ecological zone were, on average, about 30 percent more likely to exit poverty than households in moisture-reliable highlands (the base region), but there were no other statistically significant zonal effects, while controlling for other variables.

Figure 15 Marginal effects associated with poverty entry between 2012 and 2016



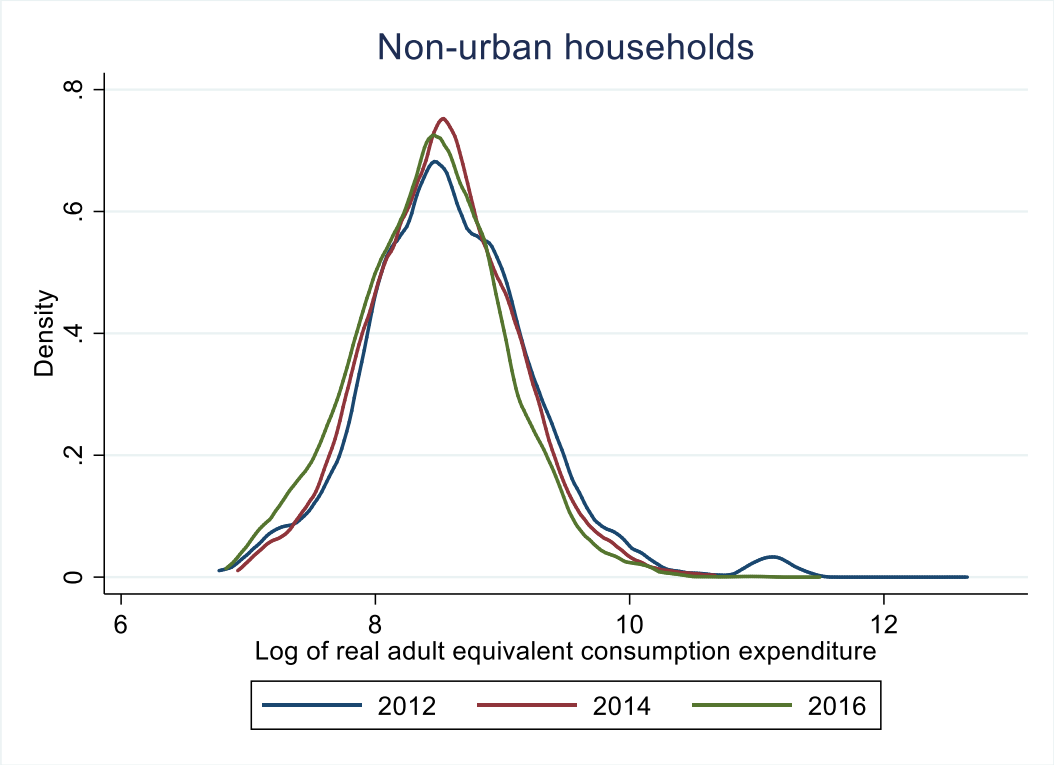
Source: Own calculations from ESS 2012, 2014 and 2016.

The marginal effects of the agro-ecological in which the household was located are more strongly highlighted when considering the dynamics of poverty entry between 2012 and 2016. The marginal effects of the primary and secondary education categories for the household head are negative, meaning that households in these categories were less likely to enter poverty than the base category of a household head with no education. Once again, the very large standard errors of the secondary education category are driven by the fact that there were relatively few secondary education households that entered poverty over the period. An additional hectare of land per adult is associated with a 7.5 percentage point power probability of transitioning into poverty. Once again, the differences in the distances of households from roads, population centers and markets are not statistically different from zero.[15] The differences between the agro-ecological zones are once again apparently, with lowland pastoralists being far less likely to enter poverty, on average, than the base category of households in moisture-reliable highlands. In contrast, households in drought-prone lowlands were the most likely to have entered poverty over the period – 20 percentage points more than the base category.

[15] This is also true is distances are measured in block, for example less than 5km, more than 5km, or more than 10km.

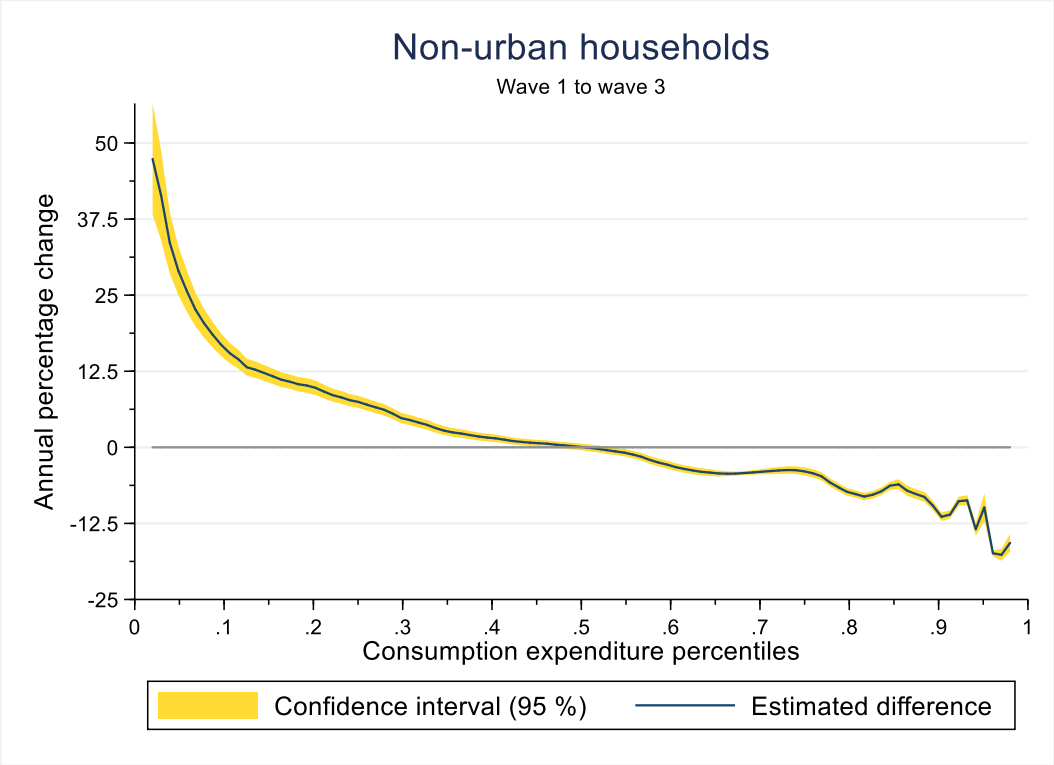
Appendix

Figure 16 Kernel density distributions of real consumption expenditure for non-urban households



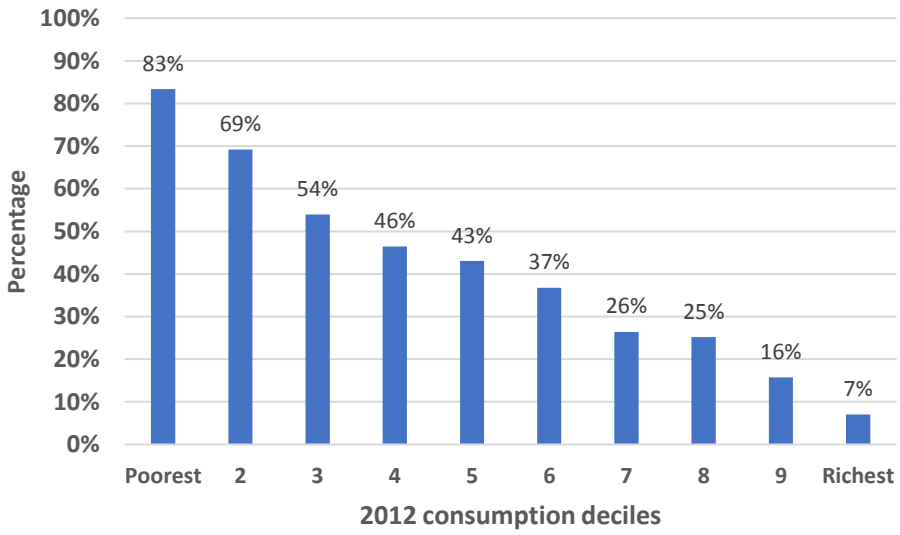
Source: Own calculations from ESS 2012, 2014 and 2016.

Figure 17 Non-anonymous GIC for non-urban households, 2012 to 2016



Source: Own calculations from ESS 2012, 2014 and 2016.

Figure 18 Proportion of non-urban households with positive consumption change based on 2012 deciles



Source: Own calculations from ESS 2012, 2014 and 2016.

Table 5 Marginal effects of probit for poverty exit

	Transitions out of poverty	
ESS 2012 variables	**W1 to W2**	**W1 to W3**
Household Head		
Age of household head	0.002	0.001
	(0.002)	(0.002)
Male household head	-0.023	-0.036
	(0.083)	(0.082)
Primary education	0.124*	-0.060
	(0.072)	(0.071)
Secondary education	0.503**	0.338
	(0.222)	(0.226)
Household		
Size	-0.039*	0.035
	(0.021)	(0.022)
Number of children	0.030	-0.104**
	(0.044)	(0.040)
Dependency ratio	-0.060	0.060
	(0.053)	(0.051)
Land per adult (hectares)	-0.105	-0.083
	(0.215)	(0.262)
Distance to road	-0.001	-0.001
	(0.002)	(0.002)
Distance to pop. Center	0.001	0.004**
	(0.002)	(0.002)
Distance to market	-0.000	-0.001
	(0.001)	(0.001)
Oromia	-0.133	0.059
	(0.101)	(0.103)
SNNP	-0.132	0.030
	(0.107)	(0.102)
Tigray	-0.044	0.244**
	(0.132)	(0.099)
Other	-0.194	-0.152
	(0.180)	(0.174)
Observations	469	459

Standard errors in parentheses

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

Source: Own calculations from ESS 2012, 2014 and 2016.

Table 6 Marginal effects of probit for poverty entry

	Transitions into poverty	
ESS 2012 variables	**W1 to W2**	**W1 to W3**
Household Head		
Age of household head	-0.002*	-0.001
	(0.001)	(0.001)
Male household head	0.078**	0.084**
	(0.032)	(0.034)
Primary education	-0.077***	-0.063**
	(0.026)	(0.030)
Secondary education	-0.062	-0.162**
	(0.064)	(0.074)
Household		
Size	0.012	0.017*
	(0.009)	(0.010)
Number of children	0.009	0.004
	(0.018)	(0.020)
Dependency ratio	0.070***	0.074***
	(0.023)	(0.024)
Land per adult (hectares)	-0.098***	-0.074**
	(0.030)	(0.031)
Distance to road	0.000	0.001
	(0.000)	(0.001)
Distance to pop. Center	-0.000	-0.000
	(0.000)	(0.001)
Distance to market	0.001**	0.000
	(0.000)	(0.000)
Oromia	-0.221***	-0.171***
	(0.036)	(0.037)
SNNP	-0.123***	-0.058
	(0.044)	(0.046)
Tigray	-0.189***	-0.095
	(0.052)	(0.058)
Other	-0.141*	0.043
	(0.086)	(0.106)
Observations	2,095	2,070

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Own calculations from ESS 2012, 2014 and 2016.

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