REPUBLIC OF MALAWI
Poverty Assessment

Poverty and Equity Global Practice Africa Region

WORLD BANK GROUP

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ABBREVIATIONS

ACSD	Accelerated Child Survival and Development
AISS	Agricultural Input Subsidy Survey
BCR	benefit-cost ratio
CEB	children ever born
CDE	constant difference of elasticities
CES	constant elasticity of substitution
CGE	computable general equilibrium
COMSIP	Community Savings and Investment Promotion (MASAF-supported)
CPS	Complementary Panel Survey
CRE	correlated random effects
CSI	coping strategies index
CT	cash transfer
DHS	Demographic and Health Survey
ECD	early childhood development
EFA	Education for All
FAO	Food and Agriculture Organization of the United Nations
FBPE	forest-based products enterprise
FCS	food consumption score
FE	fixed effects
FISP	Farm Input Subsidy Programme
GDP	gross national product
GMR	Global Monitoring Report (World Bank)
GNI	gross national income
GoM	Government of Malawi
GTAP	Global Trade, Assistance, and Production (Purdue University)
HAZ	height-for-age Z scores
HNP	Health, Nutrition and Population (World Bank Global Practice)
HOI	Human Opportunity Index
ICF	(ICF Macro – International consulting firm)
IFPRI	International Food Policy Research Institute
IHPS	Integrated Household Panel Survey 2013
IHS1	First Integrated Household Survey 1997/98
IHS2	Second Integrated Household Survey 2004/05
IHS3	Third Integrated Household Survey 2010/11
IHST	inverse hyperbolic sine transformation
IHME	Institute for Health Metrics and Evaluation
IMCI	Integrated Management of Childhood Illnesses
IPA	Innovations for Poverty Action (U.S. NGO)
ISER	Institute for Social and Economic Research
ISIC	United Nations International Standard Industrial Classification
JCE	Junior Certificate Examination
kcal	kilocalorie
kg	kilogram
LF	labor force
LIPWP	Labor-Intensive Public Works Program (Ghana)
LSMS	Living Standards Measurement Survey

MAMN	Malawi Microfinance Network
MASAF-PWP	Malawi's Social Action Fund Public Works Program
MCVR	marginal value cost ratio
MDG	Millennium Development Goal
MDHS	Malawi Demographic and Health Survey
MGNREGS	Mahatma Gandhi National Rural Employment Guarantee Scheme
MMR	maternal mortality rate
MNSFE	self-employment activities
MoAFS	Ministry of Agricultural and Food Security
MoFED	Ministry of Finance and Economic Development
MPI	Global Multidimensional Poverty Index
MSCE	Malawi School Certificate of Education Examination
NAC	Malawi National AIDS Commission
NASFAM	National Smallholder Farmers Association of Malawi
NPK	nitrogen-phosphorus-potassium
NSO	National Statistical Office
NSSP	National Social Support Policy
OIBM	Opportunity International Bank of Malawi
OLS	ordinary least squares
OPHI	Oxford Poverty and Human Development Initiative
OSR	own-source revenue
PCA	principal components analysis
PER	public expenditure review
PFM	public financial management
PMT	proxy means test
POP	population
PPI	post-partum infecundability
PPP	purchasing power parity
PSLC	Primary School Leaving Certificate
PSNP	Productive Safety Nets Program (Ethiopia)
RCT	randomized controlled trial
RH	reproductive health
RLS	Rural Livelihoods Survey
SACMEQ	Southern and Eastern Africa Consortium for Monitoring Educational Quality (UNESCO)
SCD	Systematic Country Diagnostics
SCTPP	Social Cash Transfer Pilot Programme
SDG	Sustainable Development Goal
SES	socioeconomic status
SP	social protection
SSA	Sub-Saharan Africa
TD	targeting differential
TDR	tropical disease research
TFR	total fertility rate
UBI	universal basic income
UNDSA	United Nations Department of Economic and Social Affairs
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
UN WPP	United Nations World Population Prospects
WAP	working age population
WAZ	weight-for-age Z-score (WHO)
WDI	World Development Indicators
WFP	United Nations World Food Programme
WHO	World Health Organization
WHZ	weight-for-height Z-score (WHO)
WRS	warehouse receipt system

1

POVERTY AND SHARED PROSPERITY IN MALAWI, 2004–2010

Malawi's monetary poverty is high and did not lessen in rural areas between 2004 and 2010. The over-representation of poverty in rural settings kept national poverty stagnant. Furthermore, the majority of the rural population, especially the bottom 40%, remained deprived of access to key durable assets and key public services including electricity and running water. In contrast, wealthier households and those located in urban areas tended to enjoy higher access to key assets, services, and opportunities. These gaps associated with socioeconomic status and location can impair a person's ability to perform well later in life and are likely to perpetuate poverty in rural Malawi. It is imperative that Malawi provide services and opportunities more inclusively.

Introduction

Chapter 1 documents the improvements, or lack thereof, in poverty and shared prosperity in Malawi from 2004 to 2010. It first describes the extent of poverty in the country over this period. The first part of the chapter expands analyses from the Malawi National Statistical Office (NSO) (2007, 2012) and World Bank (2104), which document the progress in poverty reduction and well-being in Malawi since 2004. The chapter compares poverty in Malawi to that of Sub-Saharan Africa and the rest of the world. The chapter then analyzes distributional aspects of welfare to understand whether the lack of progress in access to assets, services, and opportunities that could reduce poverty is generalized or not. Chapter 1 extends the distributional analysis to broaden understanding of the relative importance of growth and distribution changes in reducing poverty during the last decade. Finally, the analysis delves into the profile of those living under monetary poverty, emphasizing the spatial distribution of poverty and inequality.

1.1. *Snapshot of Poverty in Malawi*

Monetary poverty

Malawi is a land-locked country in southern Africa with high population density and a young, rapidly growing population. The 2015 United Nations Human Development Index (HDI) ranked Malawi 173 of 188 countries. According to the World Development Indicators (WDI), in 2012 the country had a GNI per capita of US$320. *In relation to its neighbors and the average for Sub-Saharan Africa, Malawi's income per capita has stagnated over the past three decades since 1980* (figure 1.1).

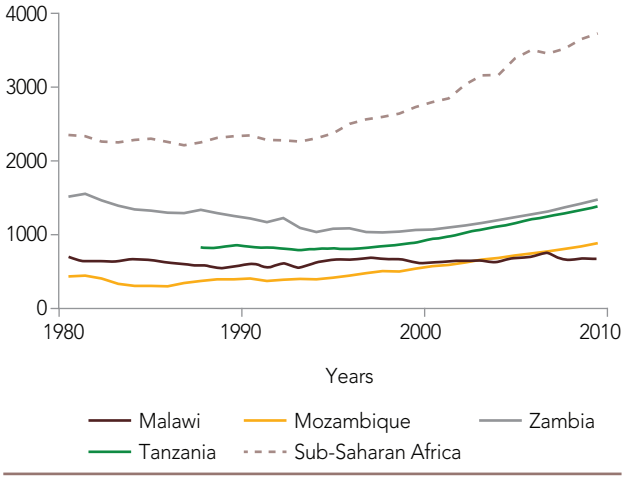
BOX 1.1: Assessing Monetary Poverty

Monetary poverty is measured in Malawi by comparing a household's annual consumption per capita with the national poverty lines. The IHS2 poverty lines have been updated to IHS3 prices to guarantee the same minimum standard of welfare across surveys: MK37,002 for total poverty and MK22,956 for ultra-poverty. The total poverty line is the sum of the food (ultra) poverty line, which represents the minimum amount of money required to afford a food bundle that provides the minimum required caloric intake, plus an additional allowance for non-food items. The following three poverty measures are used to assess poverty:

1. **Incidence of poverty (headcount index).** Provides the proportion of the population living below the poverty line.
2. **Depth of poverty (poverty gap).** Indicates how far, on average, the population is from the poverty line. In other words, depth of poverty captures the mean consumption shortfall of the population relative to the poverty line.
3. **Severity of poverty (squared poverty gap).** Takes into account the distance separating the poor from the poverty line and the inequality among the poor. Conceptually, poverty severity gives greater weight to those who are further below the poverty line.

Source: World Bank 2009.

FIGURE 1.1: GDP Per Capita for Selected Countries, 1980–2011



Source: World Development Indicators (WDI).

Poverty in Malawi remains widespread.[1] According to the Third Integrated Household Survey, the IHS3 2010, 50% of the population is poor, and 25% lives in ultra (extreme) poverty. Furthermore, from 2004 to 2010, poverty declined only marginally from 52.4% to 50.7%, respectively. In contrast, the depth (how far the poor are from the poverty line) and the severity (how distant the poor are from the poverty line and how unequal consumption is distributed among the poor) of poverty increased (table 1.1).

The extent of poverty in Malawi is exceptionally broad when compared against a line of international extreme poverty, even when compared to other Sub-Saharan African countries. The poverty incidence measured by the population living below $1.90 per day of purchasing power parity (PPP) in Malawi was 74% in 2004. When doing international comparisons based on PPP rates, this percentage puts Malawi almost on a par with countries such as Burundi and Madagascar. Malawi's

[1] This chapter relies on household survey data from the last two multitopic Integrated Household Surveys in Malawi: the IHS2 2004–05 and the IHS3 2010–11. The IHS2 is a standard Living Standards Measurements Survey (LSMS). IHS3 is part of the newly implemented LSMS-ISA (Integrated Surveys in Agriculture) funded by the Bill and Melinda Gates Foundation. Implemented by the World Bank, IHS3 utilizes an expanded agricultural questionnaire and employs IHS2-comparable data collection tools on household demographics, food and non-food consumption, income generation activities (agriculture, wage income, non-farm employment, and other sources), child anthropometry, and safety nets.

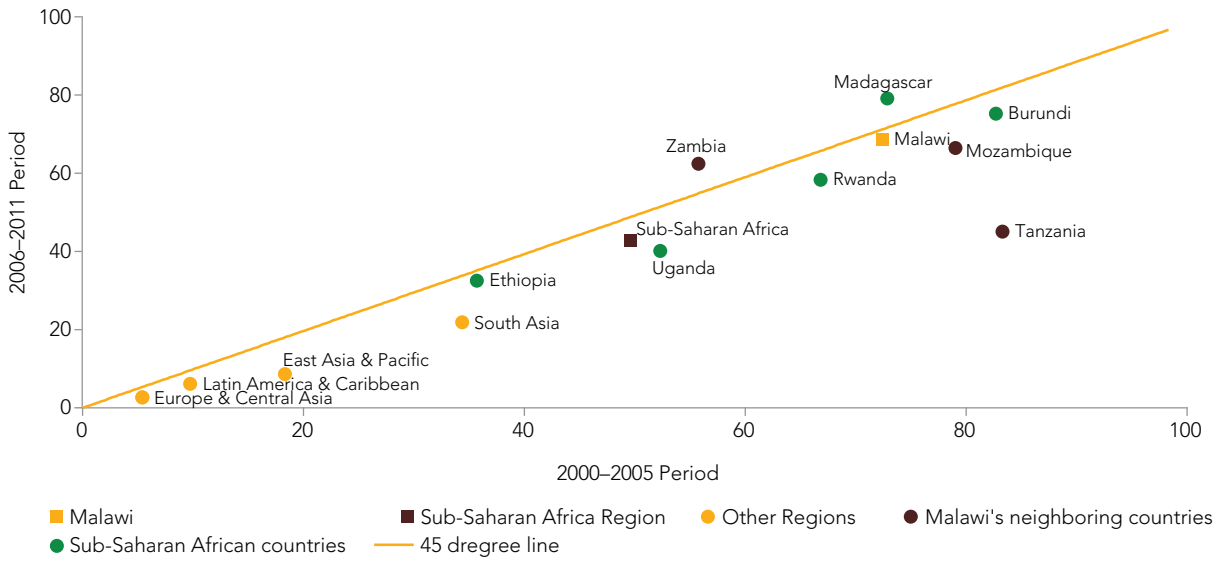
The IHS2 (2004–05) was fielded from March 2004 to February 2005, and the IHS3 from March 2010 to March 2011. The analysis will make use of variables consistently generated from each database to ensure comparability of outcomes such as poverty and inequality; demographic variables, access and use of resources and factors of production; and structure of economic activity and income. Both surveys have nationally representative samples for Malawi. IHS2 has a sample size of 11,280 households. Of these, 1,440 are from urban areas, and 9,840 are from rural areas (North: 1,440; Center: 3,840; and South: 4,560). IHS3 has a total sample of 12,271 households, 2,233 of whom are from urban areas, and 10,038 from rural areas (North: 1,758; Center: 3,485; and South: 4,795). Survey estimates are representative by district, region, and at the national level. Hence, both surveys are similar in terms of methodology, sampling design, fieldwork period, and questionnaires.

BOX 1.2: Comparing Poverty in Malawi with Sub-Saharan Africa and the Rest of the World

International comparisons of poverty rates cannot be made using national absolute poverty rates since countries set different subsistence minimum standards and use different methodologies for poverty estimations. In addition, household surveys used for poverty estimations generally are not comparable across countries. A common practice for cross-country comparisons is to use a fixed poverty line expressed in an internationally comparable denomination, such as $1.90 a day at 2011 international prices. This poverty line uses purchasing power parity (PPP) conversion factors[a] and consumer price indices to convert national consumption aggregates expressed in local currencies to U.S. dollars.[b]

Based on the cross-country comparison for 2010, with 71% of its population living below $1.90 per day, Malawi was one of the poorest countries in the world (figure 1.2). Therefore, it requires special attention from national policy-makers and the international community.

FIGURE B1.2.1: $1.90-a-Day Poverty Rates: Malawi and Other Countries, 2000–11 (*US$*)



Source: Source: Poverty Assessment team calculations based on WDI
Note: The poverty rate reported for Burundi in the 2000–2005 period is from 1998

Note:
[a] PPP conversion factors are exchange rates that take into account the cost of common items in different countries. This conversion is defined as the number of units of a country's currency required to purchase a standard basket of goods and services collected in all countries. This report uses the 2011 ICP conversion factor that was converted to the survey year using Malawi national CPI inflation rates.
[b] It is important to emphasize that international $1.90-a-day estimates should be used for international comparisons. Policy dialogue and within-country discussions should be informed by the national absolute and extreme poverty estimation methodology.

neighboring countries such as Mozambique and Zambia exhibit lower poverty rates, although not by much.

More worrisome, **during the second half of the 2000s, Malawi exhibited close-to-stagnant poverty reduction in comparison to this PPP line**. Box 1.2 contrasts Malawi's poverty trends with those of Sub-Saharan African and other countries. From 2004 to 2010, Malawi's poverty headcount dropped from 74% to 71%. In contrast, countries with a higher poverty rate between 2000–05, such as Mozambique and Tanzania, exhibited considerable reductions in poverty. Sub-Saharan countries with a lower poverty rate at baseline, such as Rwanda, and Uganda, also made important progress against poverty.

TABLE 1.1: Welfare and Monetary Poverty in Urban and Rural Areas, 2004–2010

	Malawi			Urban areas			Rural areas		
Selected indicators	2004	2010	Diff	2004	2010	Diff	2004	2010	Diff
Welfare									
Per capita consumption (000s MK)	48.4	54.6	6.2***	95.5	118.8	23.3	42.3	43.1	0.7
Share of food in total consumption	59.6	62.8	3.3***	52.8	53.4	0.6	60.4	64.5	4.1***
Monetary poverty indicators (%)									
Moderate poverty									
Poverty headcount	52.4	50.7	–1.7	25.4	17.3	–8.1**	55.9	56.6	0.7
Poverty gap	17.8	18.9	1.1*	7.1	4.8	–2.3*	19.2	21.4	2.2***
Poverty gap squared	8.0	9.3	1.3***	2.8	2.0	–0.8	8.6	10.6	2.0***
Ultra-poverty									
Poverty headcount	22.3	24.5	2.2*	7.5	4.3	–3.2*	24.2	28.1	3.9***
Poverty gap	5.3	7.0	1.7***	1.6	1.3	–0.3	5.8	8.0	2.2***
Poverty gap squared	1.8	2.8	1.0***	0.5	0.5	0.0	2.0	3.3	1.2***

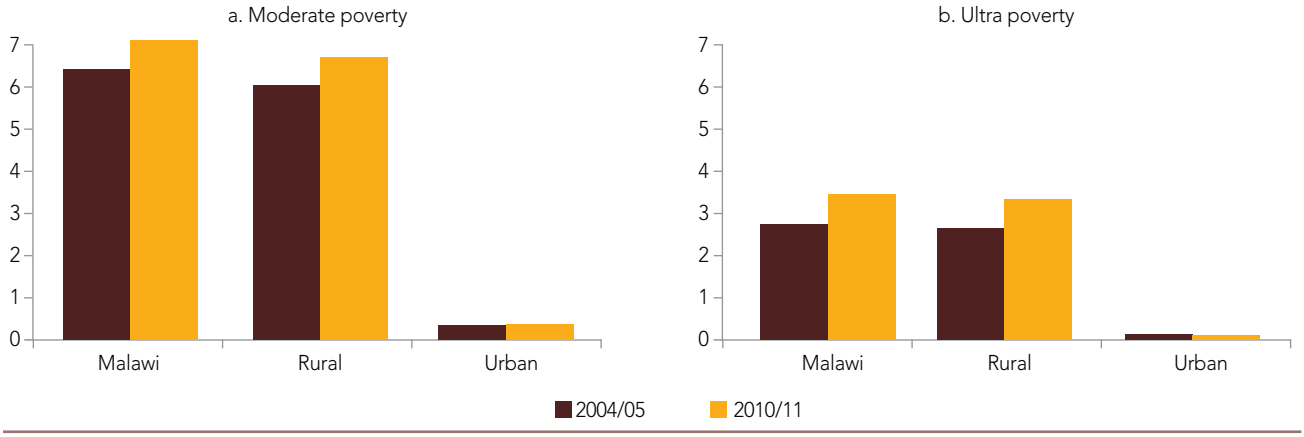
Source: Poverty Assessment team calculations based on Malawi IHS2 and IHS3.
Note: MK = Malawi kwacha.
Significance level of the difference: 1% (***), 5% (**), and 10% (*).

However, national averages mask Malawi's progress against urban poverty between 2004 and 2010. In this period, poverty fell significantly in urban areas from 25.4% to 17.3%, as did ultra-poverty from 7.5% to 4.3%. During the same period, the depth and severity of poverty also decreased in urban areas.

Unfortunately, rural areas have not seen corresponding drops, resulting in considerable and increasing geographic disparities in terms of poverty. While poverty already was lower in urban areas and had fallen significantly since 2004, it remained stagnant in rural areas, in which it rose very slightly from 55.9% to 56.6%. Extreme poverty rates in rural areas increased at a greater rate, from 24.2% to 28.1%, widening the urban-rural income divide. The depth and the severity of poverty, which declined in urban areas, rose considerably in rural areas (table 1.1). Urban areas not only have fewer poor people, but also are closer to the poverty line. In contrast, in rural areas, not only did more people fall into poverty, but also the average consumption of the poor moved farther below the poverty line. Incidentally, stagnant-to-moderate increases in monetary poverty are consistent with the drop in rural per capita caloric intake observed during the same period from 2,333 in 2004 to 2,192 in 2010; and from 1,606 to 1,532 for the bottom 40% (see chapter 4 on food security and nutrition).

Has the actual number of monetary poor people fallen? The number of poor can decrease or increase depending on the size of the population and its rate of growth over the period in question relative to the changes in the poverty rate. IHS population projections indicate that, between 2004 and 2010, the rural population increased from 10.8 million to 11.9 million; and the urban population rose from 1.4 million to 2.1 million. High population growth during the past decade and stagnant progress in monetary poverty meant that the absolute number of people living in poverty increased by 700,000 (from 6.4 million to 7.1 million). The growth of the urban population outpaced slightly the significant drop in poverty incidence in cities, resulting in 16,000 more poor people in urban areas. Therefore, almost all of the increase in the number of poor people in the country came from rural areas in which the population grew and the proportion of poor increased.

FIGURE 1.2: Absolute Number of People in Poverty and Ultra-Poverty in Malawi, 2004 and 2010 (*mil*)



Source: Poverty Assessment team calculations based on the IHS2 and the IHS3.

Have the trends for the ultra-poor been the same as those of the moderately poor? From 2004 to 2010, the number of ultra-poor persons grew by approximately 702,000—from 2.7 million to 3.4 million. Rural areas contributed 714,000 more ultra-poor people, whereas in urban areas those who could not afford the value of a basic food bundle decreased by 12,000 (figure 1.2).

Based on these trends, poverty in Malawi remains mainly a rural phenomenon. Approximately 95% of the country's poor are located in rural areas, a proportion that has remained constant during the period of analysis. In sum, between 2004 and 2010, Malawi made a dent in monetary poverty in urban areas but not yet in rural areas. The overrepresentation of poverty in rural settings has kept national poverty stagnant. It remains to be established where the poor are located and who are they among the Malawian population. This is the subject of the next section.

1.2. *Where Are the Poor and Who Are They?*

1.2.1. *Incidence of poverty and inequality across space*

Malawi is divided in 3 regions—North, Center, and South—which comprise 28 districts. Both the IHS2 and the IHS3 are representative at the regional and district levels, thereby enabling comparisons within and among regions and districts across surveys. This subsection begins with the spatial analysis at the regional level, and then analyzes poverty trends at the more disaggregated district level. All analyses will be carried out for the second half of the 2000s.

Poverty at regional level

Regional imbalances in poverty incidence and shared prosperity remain across Malawi's regions. Table 1.2 shows that Southern and Northern Malawi were worse off than Central Malawi in monetary poverty in 2004 (the poverty incidence stands at 60%, 54%, and 44%, respectively). Ultra-poverty displays a similar distribution across Malawi: 29% in the South, 24% in the North, and 15% in the Center. Such cross-regional differences have not varied over time. Minor changes in the poverty incidence occurred in the North and Center regions. Although the South region experienced a significant drop in poverty of 4.2 percentage points, it is still the poorest region. With regards to ultra-poverty, the regional ranking also remains constant. The *proportion* of ultra-poor increased notably in the Center region—by almost four percentage points—but the region continues to exhibit the lowest poverty *rates* in the country.

TABLE 1.2: Monetary Poverty and Inequality, by Region, 2004–2010

	North			Center			South		
Selected indicators	2004	2010	Diff	2004	2010	Diff	2004	2010	Diff
Monetary Poverty Indicators (%)									
Moderate Poverty									
Poverty headcount	54.1	54.3	0.2	44.2	44.5	0.3	59.7	55.5	–4.2**
Poverty gap	18.6	19.9	1.3	13.3	15.5	2.2**	21.8	21.8	0.0
Poverty gap squared	8.3	9.5	1.2	5.5	7.4	1.9***	10.2	11.0	0.8
Extreme Poverty									
Ultra-poverty headcount	24.4	25.6	1.2	15.2	18.9	3.7**	28.5	29.5	1.0
Poverty gap	5.5	6.9	1.4	3.3	5.4	2.1***	7.2	8.6	1.4**
Poverty gap squared	1.8	2.7	0.9**	1.1	2.2	1.1***	2.6	3.5	0.9***
Inequality									
Gini coefficient	0.35	0.39	0.04	0.39	0.43	0.04	0.38	0.49	0.11
Income share of bottom 40% (%)	19.2	17.4	–1.8	18.0	15.9	–2.1	18.1	13.8	–4.3
Income share of top 10% (%)	53.4	51.5	–1.9	49.4	50.4	1.0	50.6	45.8	–4.8

Source: Poverty team calculations based on the IHS2 and the IHS3.
Note: Significance level of the difference: 1% (***), 5% (**), and 10% (*). The statistical significance of the changes over time of the inequality indicators has not been estimated, thus caution should be exercised when evaluating the temporal trends.

Over 2004–2010, wealth concentration/ inequality increased in all regions. At the beginning of the period, the Gini Concentration Ratio was smaller in the North and increased from 0.35 to 0.39, below the national average. Inequality remained relatively higher in the Central areas, but did not grow significantly, increasing from 0.39 to 0.43. Inequality increased more substantially in the South—from 0.38 to 0.49, signaling that the disparity between rich and poor widened in those areas. The increase in rural inequality was less accentuated in the central and Northern regions.

Poverty at district level

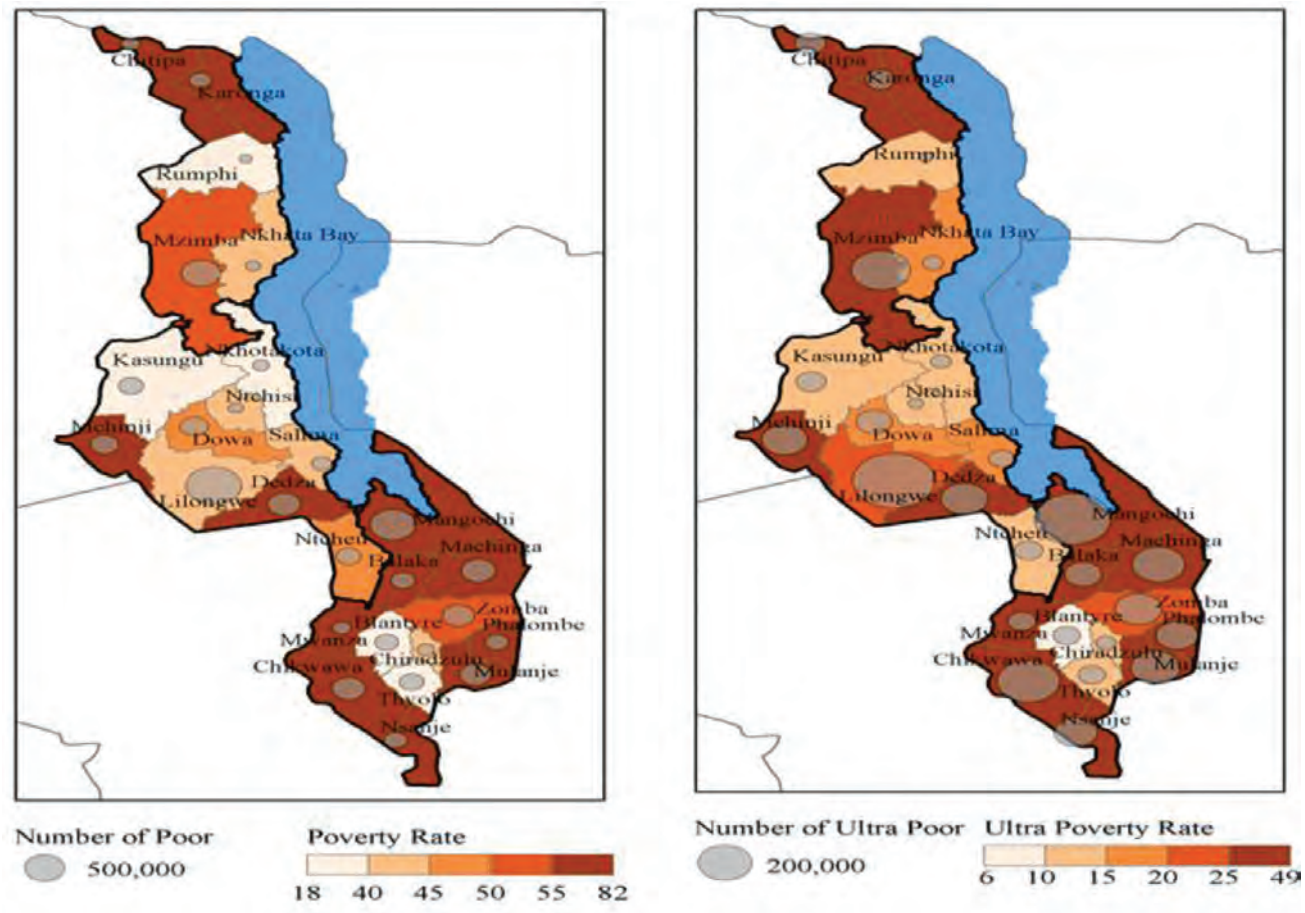
Poverty varies widely across districts in Malawi, but the levels observed are consistent with the regional trends.[2] Districts in Central and Northern Malawi primarily display poverty rates between 40% and 60%. The intraregional variation is more pronounced in the South, where some districts have poverty rates over 80%, and others under 20% (map 1.1). In line with the Central region having the lowest regional poverty rate, seven of the nine districts in this region have the lowest poverty rates nationwide. The provincial home to the capital city, Lilongwe, shows the lowest incidence of poverty. Only Mchinji and Salima have poverty rates higher than the national average. In contrast, the Southern region, which is the poorest, has eight of the 10 poorest districts in the country. The other two poorest districts are Chitipa and Karonga in the Northern region. Does having eight of the 10 poorest districts mean that most of the poor would be concentrated in the South?

[2] Of the 28 districts in Malawi, nine are located in the Central Region: Dedza, Dowa, Kasungu, Lilongwe, Mchinji, Nkhotakota, Ntcheu, Ntchisi and Salima. They have a combined population of 5,510,195 (2008 census), and cover 35,592 km^2. The Central region's capital city is Lilongwe, which is also the national capital. The Southern Region of Malawi comprises 13 districts: Balaka, Blantyre, Chikwawa, Chiradzulu, Machinga, Mangochi, Mulanje, Mwanza, Neno, Nsanje, Phalombe, Thyolo, and Zomba. The total population is 5,876,784 (2008), and the Southern Region covers 31,753 km^2. Its capital city is Blantyre. The Northern Region of Malawi is considerable less populated with 1,698,502 (2008), and covers an area of 26,931 km^2. The Northern region comprises six districts: Chitipa, Karonga, Likoma, Mzimba, Nkhata Bay, and Rumphi. The capital city is Mzuzu.

MAP 1.1: Poverty and Ultra-Poverty in Malawi by District, 2010

a. Incidence of poverty

b. Incidence of ultra-poverty



Source: Poverty Assessment team calculations based on the IHS3 data.

The South is the most densely populated region in the country. According to the latest Population and Housing Census, in 2008 there were 184 people per square kilometer (km^2) in Southern Malawi. This number is substantially higher than the national population density average of 139. Central Malawi is also heavily populated (155 people per sq. km) but has less poverty. The Northern region presents similar poverty rates to the South, but is sparsely populated (63 people per km^2). **As a result, the largest concentrations of the poor population also are in Southern Malawi (and in Lilongwe in Central Malawi)**. In 2010, almost half of the poor population in Malawi (3.4 of 7.1 million) resided in the Southern region, primarily in Mangochi, Machinga, Chikwawa, and Mulanje; 37% of the poor lived in Central Malawi; and the remaining 14% in the Northern region. The district of Lilongwe has 13% of the poor, although most of them live in the rural areas rather than in the capital city. The regional distribution of the ultra-poor resembles that of the poor. Of the 3.4 million people living in ultra-poverty, 53% were located in the South, 33% in Central Malawi, and the rest (14%) in the North.

National poverty remained stagnant between 2004 and 2010, but pronounced differences occurred in the rate of progress against poverty across districts in Malawi over the same period. As described above, regions show a very significant

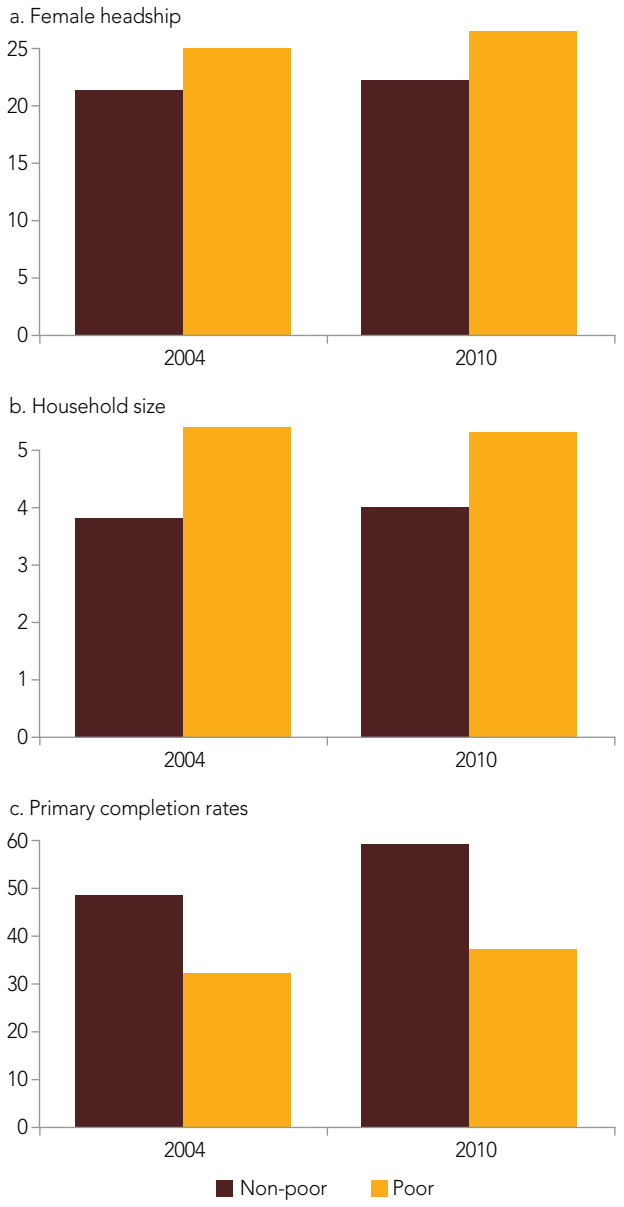
range in poverty levels, but the directions of changes in poverty over time also varied significantly. From 2004 to 2010, poverty increased in eight Southern districts, but fell in the remaining five districts: Chiradzulu, Thyolo, Mulanje, Zomba and Blantyre. Within the North region, poverty dropped considerably in Nkhata Bay, Rumphi and Mzuzu City. In the Central region, the districts of Salima, Nkhota Kota and Kasungu experienced large poverty reductions. Of special concern are the districts of Chitipa in the North and Chikwawa, Nsanje, Mangochi and Machinga in the South, which already had very high incidence rates in 2004, and become the poorest districts in the country by 2010. The lowest poverty is observed in the district of Blantyre, where poverty level is barely 18 percent—a very low level of poverty in Malawi's reality that is partly explained by the presence of Blantyre City in that district.

1.2.2. *Who are the poor?*

This section profiles households characterized by monetary poverty between 2004 and 2010. The profile assesses multiple welfare dimensions including demographic characteristics, educational achievements, economic diversification, use of agricultural inputs and services, ownership of assets, health, and access to utilities. The key characteristics are described below (and the more detailed profiles can be seen in Appendix A1.1).

Poor households are more likely to be headed by a woman and have higher dependency ratios, lower education achievements, less diversified sources of income, and less access to assets and services. First, regarding demographics, male-headed households are doing better. In contrast, poor households are more likely to be headed by a woman than are non-poor families. Twenty-five percent of poor households are headed by women, and this proportion rose over time (figure 1.3a). Poor households typically have a larger number of members (figure 1.3b), particularly children and the elderly. In other words, poor families have higher dependency ratios compared to non-poor households.

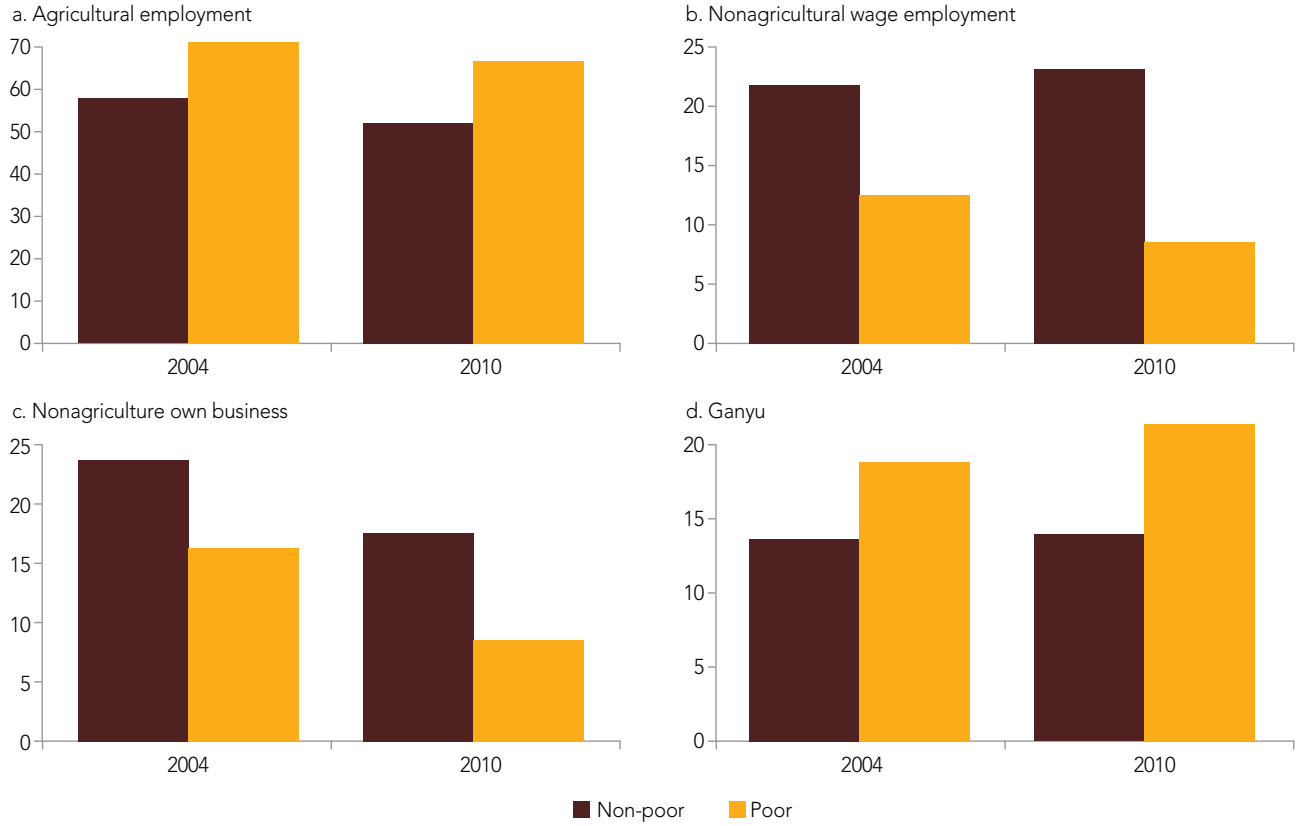
FIGURE 1.3: Selected Characteristics by Poverty Status



Source: Malawi Poverty Assessment team calculations based on IHS2 and IHS3.

Second, in terms of educational achievements, non-poor households have higher primary and secondary school completions rates than do poor families. The performance of the poor over time is unsatisfactory. Only modest improvements in primary school completion rates took place among poor households between 2004 and 2010 (figure 1.3c).

FIGURE 1.4: Employment among Household Heads



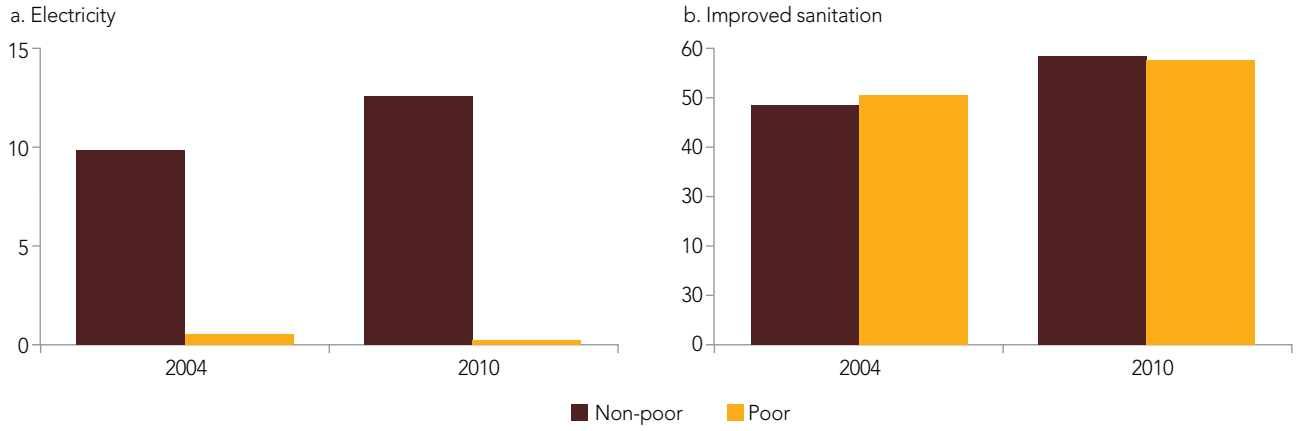
Source: Malawi Poverty Assessment team calculations based on the IHS2 and the IHS3.
Note: *Ganyu* is informal off-own farm labor.

Third, in terms of economic diversification, several results stand out. Farm employment was the most common type of work among all household heads, but it was particularly widespread among heads of poor households (figure 1.4a). Non-farm employment was more prevalent among non-poor families (figures 1.4b & 1.4c). Regarding wage employment, the differences were substantial because non-poor households were at least twice as likely as poor families to engage in this type of work. **The chances of being involved in ganyu and casual work in farm activities were higher among the poor (figure 1.4d).**[3] **By contrast, during this period, the poor diversified very little into non-farm employment.** Overall, these findings suggest that poor households rely primarily on farm activities, whose returns on agriculture tend to be lower than for other types of work. Poor households were as likely as their non-poor counterparts to grow maize. Marketing maize, however, was more prevalent among non-poor households each year, as was the growing/selling of tobacco. In each year, the non-poor agricultural households enjoyed high rates of use of chemical inputs and agricultural extension services. Access to credit also was higher among non-poor households.

Fourth, ownership of assets in the country in general was low, but, in the case of poor households, it was acute. Owning motorized vehicles, television sets, or refrigerators was rare for any family.

[3] *Ganyu* is widely used in Malawi to describe a range of short-term rural labor relationships, the most common of which is piecework weeding or ridging on the fields of other smallholders, or on agricultural estates.

FIGURE 1.5: Access to Electricity and Improved Sanitation



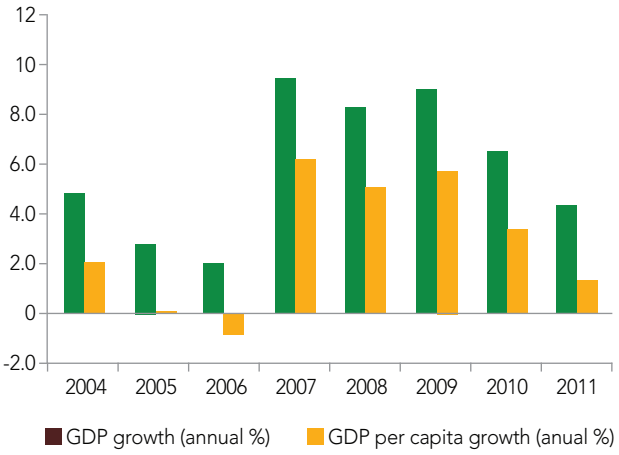
Source: Malawi Poverty Assessment team calculations based on the IHS2 and the IHS3.
Note: Ganyu is informal off-own farm labor.

Ownership improved over time only for non-poor households. Owning a telephone was no longer unusual, even among poor households.

Fifth, in terms of public utilities, almost no poor household had access to electricity or running water (figure 1.5a). The situation was better for access to improved sanitation, to which approximately 50% of poor families have access (figure 1.5b).

Last, when compared against the overall population, the poor were located disproportionately in rural areas. Interestingly, when the country was divided by region, fewer distributional differences were observed among the population, the poor, and the non-poor.

FIGURE 1.6: Real GDP and Per Capita Growth (*annual %*)



Source: World Bank staff based on WDI.

1.3. *Shared Prosperity*

1.3.1. *Incidence of growth of consumption and monetary poverty*

Malawi has experienced significant growth in recent years. From 2004 to 2011, GDP grew on average 5.9% per year. From 2004 to 2010, consumption per person increased 13%. During this period, however, GDP per capita growth did not outpace population growth: they both averaged 2.9% (figure 1.6). Although some improvements have been made, particularly in health and education, the fact that rural monetary poverty has remained high raises the question of why. Perhaps not all Malawians experienced income growth during this time. This section evaluates the changes in the distribution of consumption in the country from 2004 to 2010 and examines the roles of growth and redistribution in the poverty trends.

However, such strong growth performance has not been shared equally across population groups. Growth Incidence Curves (GIC) plot consumption per person growth rates against percentiles ranked by consumption per person from poorest to highest.

BOX 1.3: Shared Prosperity

Absolute poverty measures deprivation at a given threshold. Inequality is a broader concept that is defined over the entire population, not only those below the poverty threshold. Inequality measures generally capture either how much of the overall consumption (or income) is owned by a certain group of the population, or how consumption (or income) is distributed among all the population.
In 2013 the World Bank announced a new goal of globally promoting shared prosperity. Progress toward this goal is defined by promoting the well-being of the bottom 40% of the population in each country as measured by consumption or income. A related and simple way to examine how consumption is shared is to assess the shares of different groups of the consumption distribution.

Hence, this section first examines the growth of the per capita real household consumption for the entire population, with an emphasis on the bottom 40% of the population. Then it compares the share of the bottom 40% of the population (ranked in terms of consumption) with the share of the top 10% of the population (also ranked in terms of consumption). For a particular point in time, this section will show the disparity in consumption shares. When evaluating these shares over time, this section will show how growth is being distributed along the consumption distribution. A summary indicator would be the ratio between the shares of the top 10% and the bottom 40%. If this summary indicator grows over time, inequality is increasing; but if this indication falls over time, the disparity in incomes is decreasing.

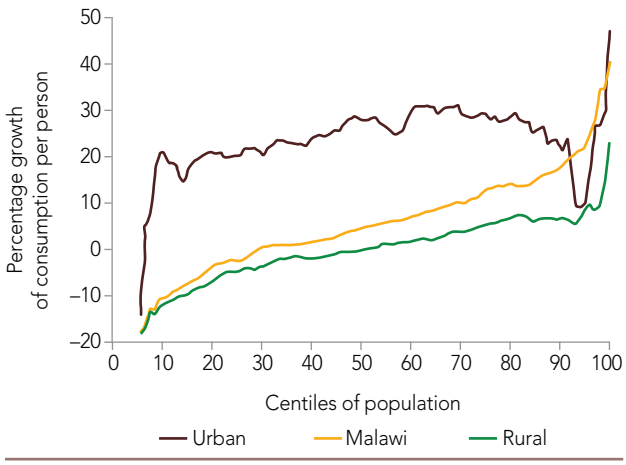
The Gini coefficient is the most common measure for inequality. A Gini coefficient of 0 indicates perfect equality, that is, a situation in which everyone has the same income. A Gini coefficient of 1 indicates complete inequality, that is, a situation in which a single person accumulates all the income.

The GE(α) indices refer to the Generalized Entropy class of inequality measures, which satisfies additional desirable properties with respect to the Gini coefficient. A parameter α represents the weight given to distances between incomes at different parts of the income distribution. Low α values make GE more sensitive to changes in the lower tail of the distribution. High α values GE more sensitive to changes in the upper tail of the distribution. The most usual values of α are 0, 1, and 2. GE(1) is the Theil Index. GE(0) is the Theil L, or log deviation measure.

Source: World Bank 2009.

GIC provides an intuitive picture of how much growth has favored different population groups. Figure 1.7 shows the GIC for Malawi as a whole and in urban and rural areas between 2004 and 2010. Growth was positive and stronger among those with higher incomes but relatively weak for those with lower incomes. In fact, consumption growth of the rural population has not favored the poor.

FIGURE 1.7: Growth Incidence Curves, 2004–2010



Source: Malawi Poverty team calculations based on IHS2 and IHS3.

For Malawi as a whole, the consumption of the bottom 40% fell by 5%, but it grew for those in the top 60% by 17%. Those in the top 10% experienced a considerable increase because their incomes rose by 30%. Thus, Malawi's growth did not increase the incomes of most of the poor or, for a few of them, rapidly enough to lift them out of poverty. In urban areas, growth rates were similar across the distribution: 19% for those in the bottom 40%, 26% for the top 60% and 24% for the top 10%. The poorest in urban areas enjoyed relatively lower, but still positive, growth rates. However, in rural areas, the pattern was much different. Only one-third of the population experienced some positive growth, whereas approximately two-thirds of the population experienced negative real consumption growth. Consumption fell by 8% for those in the bottom 40%, it barely grew 1% for the top 60% and rose significantly by 10% for those in the top 10%. In other words, **prosperity,**

TABLE 1.3: Sectoral Growth of GDP, 2004–2011

	GDP 2004	GDP 2011	Growth (%)	Share in base (%)	Growth points explained
Agriculture	144,979	188,692	30.2	32.6	9.8
Mining and quarrying	2,002	14,642	631.3	0.5	2.8
Manufacturing	40,249	68,949	71.3	9.1	6.5
Electricity, gas, and water supply	8,485	10,089	18.9	1.9	0.4
Construction	11,129	20,043	80.1	2.5	2.0
Wholesale and retail trade	71,239	140,793	97.6	16.0	15.6
Transportation and storage	15,605	25,288	62.1	3.5	2.2
Accommodation and food services	17,111	13,702	–19.9	3.8	–0.8
Information and communication	11,969	28,594	138.9	2.7	3.7
Financial and insurance	22,856	34,071	49.1	5.1	2.5
Real estate	21,150	37,300	76.4	4.8	3.6
Professional and other services	5,095	9,935	95.0	1.1	1.1
Public administration	12,412	15,729	26.7	2.8	0.7
Education	11,973	11,584	–3.2	2.7	–0.1
Health	21,640	25,088	15.9	4.9	0.8
Other	17,485	23,489	34.3	3.9	1.4
GDP	444,554	674,378	51.7	100.0	

Source: World Bank staff calculations based on IMF data.

as defined by the World Bank, was not shared in rural Malawi (and therefore nationally) between 2004 and 2010.

In addition, from 2004–2010, economic growth was driven largely by growth in urban-oriented sectors such as services. In contrast, agriculture, a rural-based sector, did not grow much. Between 2004 and 2011, table 1.3 shows that GDP grew by 51.7%. From the industry side, the most dynamic sectors were mining and quarrying, construction, and manufacturing while the service subsectors included wholesale and retail trade, real estate, information and communications, transport and storage, and professional and other services (See chapter 7 for a discussion on the income returns on different economic sectors). These sectors explain approximately two-thirds of overall economic growth. Notably, the rate of growth of agriculture was below the national average, which could partly explain the stagnant poverty rates in rural areas, where agriculture is the main sector.

Over the period analyzed, poverty in Malawi was relatively irresponsive to the strong growth. While consumption per capita increased by 12.8%, the incidence of poverty decreased by 3.4%, resulting in a growth elasticity of poverty of –0.3. The growth elasticity of poverty measures the percentage change in the poverty headcount for each percentage change in consumption. In other words, during the second half of the 2000s, a 1.0% increase in average household consumption was associated with a 0.3% decrease in the poverty headcount. According to the $1.25 international poverty line, during the same period, the growth elasticity of poverty in Malawi was –0.2, which compares poorly with an estimated average global elasticity of –2.0 (Ravallion 2001, 2004).[4] Over the same period, poverty

[4] The growth elasticity of poverty is notoriously sensitive to the baseline level of development and the location of the poverty line relative to mean consumption. More specifically, if initial levels of consumption are low, growth rates in consumption

TABLE 1.4: Growth Elasticity of $1.25 Poverty in Selected Countries

Country	Survey years	Growth elasticity of poverty
Uganda	2006 2009	–2.16292
Tanzania	2000 2007	–0.72946
Rwanda	2006 2011	–0.5256
Mozambique	2003 2009	–0.77868
Senegal	2005 2011	0.613328
Sierra Leone	2003 2011	–0.22776
Malawi	2004 2010	–0.19459

Source: Malawi Poverty Assessment team based on WDI.

was more responsive to growth in Mozambique, Rwanda, Tanzania, and Uganda (table 1.4). Sierra Leone had a similar growth-elasticity-to-poverty ratio to Malawi, and Senegal performed worse against poverty. Over the same period, had Malawi displayed a growth-elasticity-to-poverty similar to Uganda's (top performer in table 1.4), the poverty headcount of Malawi would have dropped by 14.5 percentage points (about two percentage points per year) instead of 1.8 percentage points.

To sum up, Malawi experienced economic growth during 2004–2010, but poverty was very inelastic to this growth. The fact that the poorest segments of the population did not benefit from economic growth probably widened income disparities across the population. The next section explores this issue in some detail.

1.3.2. *High and persistent income inequality*

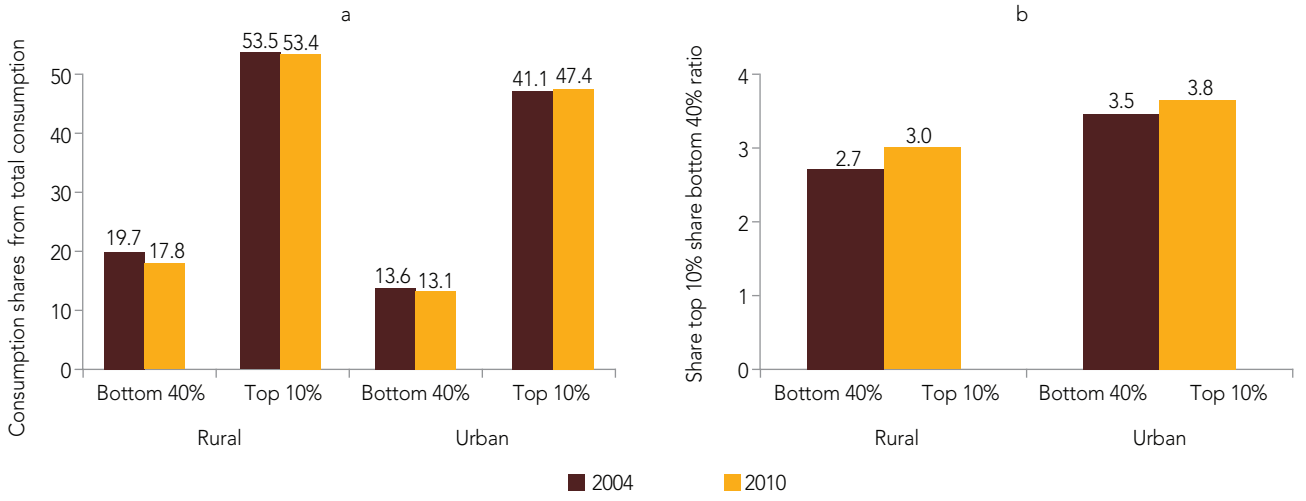
Consumption inequality increased as a result of the diverging growth performances by sector and population groups in urban and rural areas. The first way to examine inequality trends is by comparing the share of total consumption earned by the bottom 40% and the top 10% of the population between 2004 and 2010. The national share of the bottom 40% fell from 18% to 15%, while the share earned by the top 10% declined marginally from 50% to 49%. These findings suggest that both extremes of the income distribution saw their shares decline over time. However, the decline for the bottom 40% was larger, which means that inequality between these two groups widened. Accordingly, the ratio between the shares of the top 10% and the bottom 40% increased over time from 2.8 in 2004 to 3.2 in 2010.

Figure 1.8 displays the consumption shares from total consumption for the bottom 40% and top 10% (panel a) and their ratios (panel b) for urban and rural areas. The consumption share of the bottom 40% was lower in rural areas and dropped more substantially than in urban areas. In contrast, the top 10% in rural areas captured approximately little over 50% of the total consumption in the country, and that share stood flat over the 5 years. As a result, the **inequality between the top 10% relative to the bottom 40% was higher in urban areas, but, between 2004 and 2010, increased even more in rural areas than in urban areas**.

Another way to evaluate how inequality evolved is by analyzing summary indicators such as the Gini coefficient and the general entropy indices. Malawi's Gini coefficient increased from 0.39 in 2004 to 0.45 in 2010, showing that the disparity between rich and poor had widened. In line with changes in poverty, the national increase in the concentration of consumption was mainly a result of greater rural inequality, which increased from 0.34 to 0.38.

will be relatively high for a same absolute change, which will lead to an underestimation of the growth elasticity of poverty. As such, growth elasticities tend to be higher in richer countries. As an alternative measure of the sensitivity of poverty to growth, Klasen and Misselhorn (2008) propose the "semi-elasticity" of poverty reduction. This standard measures the percentage-point reduction in poverty for a 1.0% growth in consumption and does not automatically increase when a country grows richer (rather, the contrary). The semi-elasticity of poverty in Malawi is pretty low: a 1.0% increase in consumption in Malawi was associated with a 0.1 percentage point reduction in the poverty headcount.

FIGURE 1.8: Consumption Inequality Increased, 2004 and 2010



Source: Malawi Poverty Assessment team based on IHS2 and IHS3.

Inequality is considerably higher in urban than in rural areas, but barely changed during this period (from 0.48 to 0.49). Table 1.5 shows that the Theil and the other general entropy indices displayed the same general patterns as did the Gini, that is, greater temporal variation in rural areas than in cities.

The fact that income remains unevenly distributed in Malawi probably reflects inequalities in the access to assets, services, and opportunities across the population. Uneven access to health and education services along with key productive assets and market connectivity can influence household decisions on technology adoption and activities, which in turn have implications for income generation and poverty levels. Chapter 3 on nonmonetary poverty explores whether income-generating assets and opportunities were shared equally among the Malawian population or not.

As shown in chapter 3, Malawi undeniably has made gains in reducing some deprivations and increasing opportunities on average. However, gaps remain in access to key assets, services (access rates to water, sanitation, and electricity), and opportunities (health, nutrition, and education) across income groups, urban-rural areas, and boys-girls. Malawi is encouraged to address these gaps because they can impair a person's ability to perform well later in life, and therefore will perpetuate poverty in rural Malawi.

A final way to establish whether income inequalities affected poverty reduction during the study

TABLE 1.5: Inequality Indices, 2004 and 2010

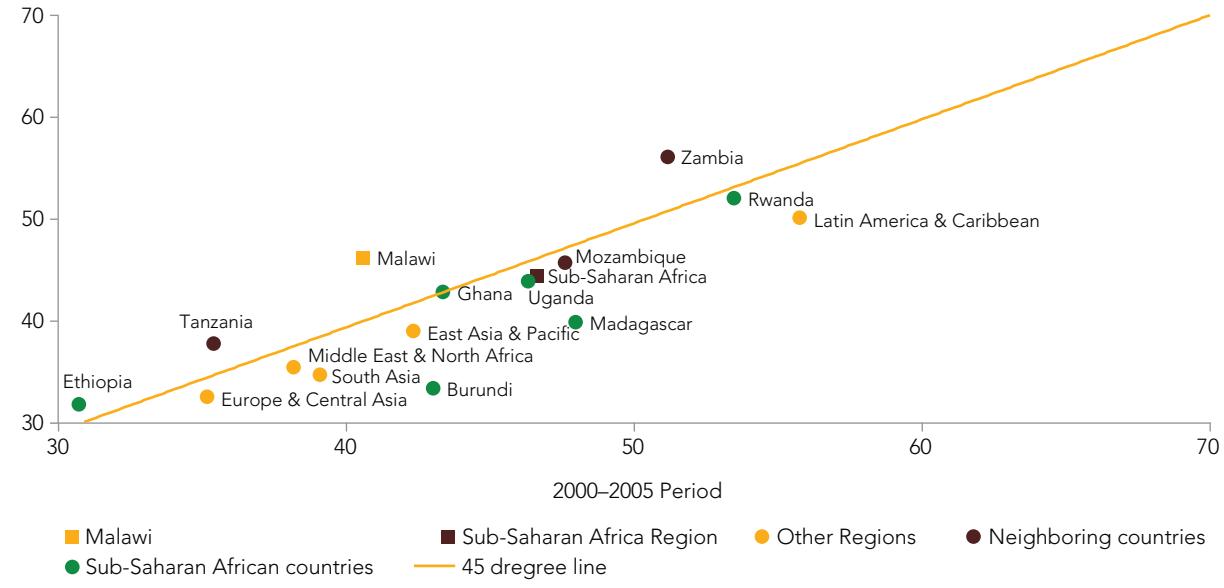
	Malawi		Urban		Rural	
	2004	2010	2004	2010	2004	2010
GE (-1)	0.28	0.41	0.48	0.54	0.21	0.28
Theil L (GE(0))	0.25	0.34	0.39	0.41	0.19	0.23
Theil index (GE(1))	0.31	0.42	0.44	0.47	0.20	0.25
GE (2)	0.58	0.96	0.73	0.88	0.29	0.38
Gini	0.39	0.45	0.48	0.49	0.34	0.38

Source: Malawi Poverty Assessment team based on the IHS2 and the IHS3.

BOX 1.4: How Does Inequality in Malawi Fare Relative to Other Countries in the Region?

Despite very low incomes and high poverty incidence, inequality expressed in the form of the Gini coefficient has reached moderately high levels in Malawi relative to other Sub-Saharan countries and to other regions in the world. Figure B1.4.1 examines the changes in inequality between two successive household surveys for a set of countries with more than one observation for most countries. Malawi's neighbors and developing regions are represented spanning the periods 2000–05 and 2006–11. In the early 2000s, most of the countries depicted had higher levels of inequality than Malawi. However, many of them experienced a decline in inequality in the second half of the 2000s. By contrast, inequality increased in Malawi as well as in Ethiopia, Tanzania, and Zambia during the late 2000s. Now Malawi and two of its three neighbors (Mozambique and Zambia) stand as countries with both high inequality (a Gini index over, for instance, 0.45) and high poverty ($1-a-day headcount index over, for instance, 50%).

FIGURE B1.4.1: Gini Coefficients for Malawi and Selected Countries/Regions, 2000/05–2006/11



Source: Poverty team based on WDI.

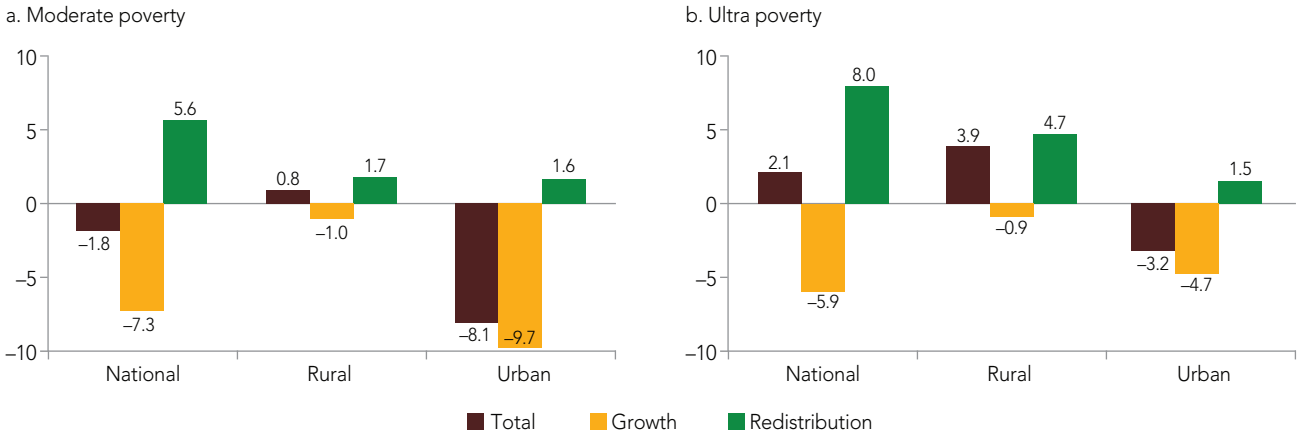
period is decomposing the contributions to poverty changes of consumption growth and its distribution along the population.

1.3.3. *Decomposing changes into growth and redistribution*

Positive average consumption growth from 2004 to 2010 reduced poverty, especially in urban areas. Poverty changes can be decomposed into a growth component, which represents shifts in the mean of the consumption distribution in the absence of changes in inequality; and a redistribution component, which represents changes in the distribution in the absence of economic growth (Datt and Ravallion 1992). From 2004 to 2010, poverty declined 1.8 percentage points, but it would have fallen 7.3 percentage points due to consumption growth alone, that is, holding constant relative inequalities (figure 1.9). This reduction in poverty would have occurred in both urban and rural areas: a substantial 9.7 percentage points in cities and a modest 1.0 percentage point in the countryside.

The worsening of the income distribution between 2004 and 2010 did not reduce poverty anywhere in the country. Changes in the distribution of consumption increased poverty (figure 1.9), hence offsetting the decline in poverty resulting from consumption growth. At the national level, poverty

FIGURE 1.9: Decomposition of Changes in Poverty by Growth and Redistribution Components, 2004–2010



Source: Malawi Poverty Assessment team calculations based on the IHS2 and the IHS3.

fell 1.8 percentage points between 2004 and 2010. If the real average consumption had remained constant over this period, the observed worsening in relative inequalities would have increased the incidence of poverty by 5.6 percentage points. In urban areas, this regressive pattern of inequality did not overturn the positive contribution of the growth component to reduce poverty. In contrast, in rural areas, the negative impact of the inequality component is the main reason for the increase in poverty. Box 1.5 presents a complementary perspective to the discussion about growth being pro-poor in the country.

Conclusion

Cross-sectional comparisons indicate that, between 2004 and 2010, monetary poverty stagnated in rural areas (and, by extension, nationally, due to the over-representation of poverty in rural settings). Improvements were achieved in urban areas and the country experienced strong economic growth, but this growth did not always benefit those at the bottom.

BOX 1.5: Was Growth in Malawi Pro-Poor between 2004 and 2010?

According to Martin Ravallion, two different definitions of "pro-poor growth" exist in the recent literature and policy-oriented discussions. By one definition ("first"), "pro-poor growth" means that growth benefits the poor more than the rest (Baulch and McCullock 2000; Kakwani and Pernia 2000). By a second definition ("second"), "pro-poor growth" is growth that reduces poverty (Ravallion and Chen 2003).

The first definition focuses on the distributional shifts during the growth process. Roughly speaking, by the first definition, for growth to be deemed "pro-poor," the incomes of the poor should grow at a higher rate than those of the non-poor. A concern with this definition is that rising inequality during a period of overall economic expansion may come with large absolute gains to the poor, yet will not be deemed to be a "pro-poor growth." (Conversely, a recession will be deemed "pro-poor" if poor people lose proportionately less than others, even though they are actually worse off.).

To avoid this problem, the second definition focuses on what happens to poverty. The extent to which growth is "pro-poor" depends on how much a chosen measure of poverty changes. Naturally, the changes on poverty will depend on what happens to the distribution, but only partially, because it also will depend on what happens to average living standards.

Malawi enjoyed cumulative overall growth between 2004 and 2010, but, on average, the structure of growth clearly benefited the non-poor more than the poor. Thus, based on both definitions, growth in Malawi for this period cannot not be called pro-poor.

Source: Malawi Poverty Assessment team.

2

POVERTY DYNAMICS IN MALAWI FROM 2010 TO 2013

Chapter 1 identified who the poor in Malawi are and how their numbers evolved between 2004 and 2010 based on the analysis of two cross-sectional household surveys (the IHS2 and the IHS3). Cross-sectional information on changes in poverty coming from IHS surveys provides reliable estimates at the aggregate level but cannot identify changes taking place at the individual level, nor can it fully answer questions about movement in and out of poverty.

The poor in Malawi can be differentiated into those who remain poor continuously over time and those who enter and exit poverty periodically. The 2013 Integrated Household Panel Survey (IHPS 2013) enabled (for the first time) the analysis of poverty transitions experienced by the population between 2010 and 2013. Some two-thirds of Malawi's population did not see much mobility over 2010–13, either into or out of poverty. Forty-four percent remained non-poor while 23% remained poor (chronically poor). However, the remaining one-third of the population experienced substantial mobility. Of these, approximately 17% managed to escape poverty while 15% became poor (transient poor).

Chronic poverty accounted for the majority (approximately 60%) of overall poverty in Malawi. Almost all of the chronically poor live in rural areas in the South and Central regions. Overall, the chronically poor had fewer endowments (assets) than the rest of the population and a larger consumption gap below the poverty line than those who experienced temporal poverty. The wealth levels and connectivity of the chronically poor are also significantly lower than those of the transient poor. The chronically poor have faced relative lack of progress in some key endowments and services. So focusing on the chronically poor is warranted.

Introduction

Chapter 1 informed the reader who the poor in Malawi are and how their numbers evolved between 2004 and 2010 based on the analyses of two cross-sectional household surveys: IHS2 and IHS3. Although cross-sectional information on changes in poverty and well-being over time has proved invaluable to policy makers, it has limitations. Cross-sectional data provide reliable estimates at

the aggregate level but cannot identify changes taking place at the individual level, nor can these data fully answer questions about movement in and out of poverty (Dang and others 2014). In other words, although some individuals may have exited poverty, others may have moved into it.

Unlike cross-sectional data, longitudinal or panel survey data follow the same group of people (a cohort) over time. Tracking the well-being of the same individuals or households over time enables estimating changes in their mobility. For instance, the poor can be subdivided into those who remain poor continuously over time—the chronically poor—and those who enter and exit poverty from time-to-time—the transient poor. Household panel information was collected in Malawi in the past but for small samples.[5] Only in 2013 did Malawi's first nationally representative panel household survey become available via the Integrated Household Panel Survey (IHPS). During April–October 2013, the 2013 IHPS attempted to track and revisit 3,247 households who had been visited during the same months in 2010 as part of the Third Integrated Household Survey (IHS3). Over the course of the 2013 survey, the sample has grown from 3,247 households to 4,007 households in IHPS 2013 as some households have subdivided and formed new ones.

Chapter 2 studies poverty dynamics in all of Malawi for the first time and the factors associated with poverty persistence and movements in and out of poverty between 2010 and 2013. The chapter is structured as follows:

The first section summarizes the main features of the IHPS panel and introduces the working definitions of chronic and transient poverty used throughout the chapter. The second section synthesizes and extends existing analyses on poverty in Malawi between 2010 and 2013. The chapter builds on NSO (2014), which presents the extent of poverty (during the non-lean months of March–October) between 2010 and 2013. The IHPS panel survey can identify the individuals who moved out of, or entered, poverty (transient poor) between the two waves of panel data available—the IHS3 baseline survey and the IHPS resurvey—and the proportion that stayed non-poor and poor (the chronically poor). Thus, the second section also documents the size and geographic dispersion of both the chronic and transient poor in Malawi. The third and final section profiles each of the four poverty transition categories (chronically poor, never poor, falling into poverty, and moving out of poverty). The section also delves into further analysis of the chronically poor, which are the most afflicted population under poverty. In doing so, it first reports the main correlates of this group and then focuses on their evolution along with other key endowments between 2010 and 2013. This last part traces all poverty dynamic groups, but has special interest on the chronic poor.

2.1. *The Integrated Household Panel Survey of Malawi*

The third Integrated Household Survey (IHS3) is a nationally representative survey of 12,271 households fielded over 12 months (March 2010–March 2011). The Integrated Household Panel Survey (IHPS) was designed to follow a subsample of 3,247 households interviewed over time between March and November 2010. The IHPS tracked and then revisited these 3,247 households during April–October 2013. The IHPS fieldwork kept the same schedule of visits that these households had in 2010.

[5] Two panel data efforts previously were made. They were based on the IHS1 and the IHS2 samples. A subsample (758) of the IHS1 households was tracked as part of the CPS (Complementary Panel Survey), which was led by the National Statistical Office, National Economic Council, and Center for Social Research of the University of Malawi, with technical assistance from IFPRI (International Food Policy Research Institute). Five rounds of the CPS were administered between January 2000 and July 2004. While the IHS1 and each round of the CPS could be combined to construct a longitudinal dataset of households from 1997 to 2004, the number of households who appeared in all waves stands at only 337 due to sample attrition. In a second effort, AISS (Agricultural Input Subsidy Survey) had attempted to track a subsample (roughly 3,100) of IHS2 households to evaluate the impacts of FISP (Farm Input Subsidy Programme). The first round of AISS was conducted in May/June 2007. The second and latest round was fielded in February and May/June 2009.

A longitudinal study follows the same eligible household members (in the case of IHPS, those 15 years and above, excluding live-in servants) in the panel households across survey rounds. The IHPS tracked households and individuals to new locations when necessary. Hence, the IHS3 sample grew from 3,247 households (15,403 people) in 2010 to 4,007 households (19,903 people) in 2013 mostly because households split and formed new households. The IHPS utilized a complex household sample design allowing for six key domains of inference: the combination of urban and rural areas with the three main regions in the country (North, Central, and South).

Despite being most suitable for modelling poverty dynamics, panel data also present important caveats that need to be considered and, if possible, corrected when conducting an analysis of this nature. A common problem arises when households drop from the panel in a nonrandom fashion. Attrition can happen because some households are very dynamic (for example, better endowed so they move elsewhere); or are extremely precarious to the point of physical extinction or implosion in the form of breakup or migration. On the contrary, if the loss of households occurs in a nonsystematic way, there should be no cause of concern other than the shrinking of the sample size (Dercon and Shapiro 2007; McKay and Lawson 2003; Baulch and Hoddinott 2000; Yaqub 2000). The IHPS managed to accomplish the lowest attrition rates ever recorded for nationally representative panel household surveys in Sub-Saharan Africa: a 3.8% household attrition rate and a 6.4% individual attrition rate over the two waves.

One additional clarification is necessary regarding the sample used in this chapter. Even though the attrition was limited, there were still individual tracking targets that the IHPS could not interview. The analysis concentrates on the sample of individuals who were interviewed during the IHS3 and who also were tracked and re-interviewed during the IHPS. The reason for this decision was to have a stricter comparison of the dynamics of the living standards of the population over time.

Finally, the IHS typically is conducted every five years. Rather than serving as a substitute in the interim years of an IHS, the IHPS can complement the official poverty analyses based on the IHS. Unlike the cross-sectional IHS, the IHPS enables understanding movements in and out of poverty for the same group of individuals. Although the IHPS measured consumption directly, the fieldwork was carried out during approximately half of the calendar period that a standard IHS covers. The collection of consumption data during the months of the non-lean season enabled the IHPS

BOX 2.1: Measuring Poverty Dynamics and Chronic Poverty

In the presence of panel data, there are basically two ways to estimate poverty dynamics: the "spells" approach (McKay and Lawson 2003) and the "component" approach (Jalan and Ravallion 1996). The "spells" approach focuses on transitions from one welfare status (poor/non-poor) to another (non-poor/poor) when two or more waves of panel data are available (a baseline survey and one or more resurveys). By extension, the spells approach defines households as chronically poor if they always have been poor, that is, those whose per capita household consumption has been below the poverty line at all points in time. The transient poor are those who have been poor only temporarily.

In contrast, the "component" approach distinguishes a household's permanent (average) consumption from its temporary variations in consumption. Whereas the "spells" approach classifies *households* as either chronically poor or transient poor, the "component" approach calculates the "chronic" and "transient" component of *household poverty*, hence cannot classify households into chronic and transient poor.

Chapter 2 employs the "spells" approach. This approach defines individuals to be chronically poor if they were poor in the two periods assessed (2010 for IHS3 and 2013 for IHPS), transient poor if they were poor in only one period, and non-poor if they never were poor.

Source: Malawi Poverty Assessment team.

to synchronize with the agricultural season and to reduce recall associated with agricultural reporting. However, this structure came at the cost of not collecting data during the lean season when poverty typically increases. For this reason, the 2010 poverty statistics based on the IHS3 panel subsample and the 2013 poverty statistics based on the IHPS should be understood as the lower-bound for the actual poverty in Malawi. For the same reason, the poverty numbers between 2004 and 2010 coming from IHS covered a full calendar year so are not directly comparable to the poverty numbers coming from IHS3 panel and the IHPS.

2.2. Stylized Facts about Poverty and Poverty Dynamics in Malawi During 2010–2013

2.2.1. Poverty in non-lean months in 2010 and 2013

This section first summarizes the main findings related to the poverty analysis derived from the IHS3 2010 panel subsample and the IHPS 2013. Poverty analysis requires three main elements. The first component is a welfare indicator to rank the entire population from the person with the lowest welfare level to the person with the highest welfare level. The chosen welfare indicator is the total annual per capita consumption. The second element is an appropriate poverty line to be compared against the welfare indicator to classify individuals as poor or non-poor. The third indicator is a set of measures that combines the individual welfare indicators and the poverty line in an aggregate poverty figure. The methodology from which the numbers reported in this chapter were derived replicates as much as possible the methodology employed in the poverty analyses of the IHS2 2004–05 and the IHS3 2010–11.[6]

New official poverty estimates in Malawi will become available only with the IHS4. The more recent household survey—Integrated Household Panel Survey IHPS 2013—suggests that, from 2010 to 2013, the poverty incidence in Malawi during the non-lean months may have dropped by one and one-half percentage points in three years. The overall incidence of poverty in Malawi during the non-lean months fell from 40.2% of the population in 2010 to 38.7% in 2013. Over these three years, urban areas displayed a considerable increase in poverty whereas rural areas experienced a decline in the share of those who were poor. It should be noted however that substantial uncertainty surrounds the headcount estimates, which, unlike measures of depth and severity, were measured with larger standard errors. Consequently, the drops in poverty at national and rural level were not statistically significant. At the same time, and as already mentioned, the consumption data panel sample for households who were revisited in 2013 was collected over six months that fell in the non-lean season. Therefore, these data may underestimate poverty by not accounting for decreasing consumption during the lean season (See figure 8.4 in chapter 8).

Rural areas had a much higher poverty incidence than urban areas. However, the gap narrowed over time because rural areas improved and urban areas worsened. Rural poverty dropped by one point percentage point per year (though changes in the poverty incidence were statistically insignificant), and the poverty gap and the poverty gap squared fell significantly. Statistically significant differences in poverty rates across regions occurred only in the first round: the North was as poor as the South, and both of these regions were poorer than the Center. In both rounds, across regions, the highest percentage of poor was observed in the North. The comparison between the Center and the South showed that in 2010 the Center was considerably less poor than the South. However, by 2013 both had similar poverty rates. In 2013 the highest percentage of poor was observed in the North, but the difference with the South was statistically nonsignificant in both rounds (table 2.1).

[6] The poverty lines used in this analysis are the same constant real poverty lines used in the analysis of the IHS2 and the IHS3. Individuals whose per capita total consumption was lower than the total poverty line (MK85,852 at 2013 prices) are considered poor.

TABLE 2.1: Incidence of Poverty in Non-Lean Months, 2010 and 2013

	Incidence			Gap			Gap squared		
	2010	2013	Diff.	2010	2013	Diff.	2010	2013	Diff.
Malawi	40.2	38.7	–1.5	12.9	11.1	–1.9**	5.8	4.5	–1.3***
Urban	17.9	26.2	8.3***	4.4	7.3	3.0**	1.5	2.9	1.4*
Rural	44.0	40.9	–3.1	14.4	11.7	–2.7***	6.5	4.8	–1.7***
North	50.2	43.3	–6.9*	16.9	12.9	–4.0***	7.5	5.5	–2.0**
Center	33.5	39.0	5.6*	9.7	11.1	1.4	4.0	4.5	0.5
South	45.0	37.3	–7.7***	15.5	10.6	–4.9***	7.3	4.3	–3.0***

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS. See NSO 2014.
Note: Significance level of the difference: 1% (***), 5% (**), and 10% (*).

The poverty gap is the average consumption shortfall of the population relative to the poverty line. Additionally the poverty squared gap takes into account the distribution of consumption among the poor. **The two poverty gaps display most of the patterns observed with the poverty incidence but with an important difference. Reductions in both indices in rural areas caused declines at the national level**. In other words, while the incidence of poverty in the country remained relatively constant over time, the rural poor improved in both the poverty gap and the poverty gap squared.

The trend of rural poverty—significant at the gap and gap squared levels—could be an important indicator of policy performance. Nevertheless, the trend does not address the possibility that many individuals remain chronically poor or that other individuals may have experienced substantial reductions in their wealth status over time. In other words, the observed trend in the poverty headcount between 2010 and 2013 suggest stagnation at the rural and national levels. However, the trend indicates nothing about whether the approximately 40% poor population remained the same over both periods, or whether new people left or entered poverty between those two years.

The panel dimension of the IHPS enables tracking the well-being (in this case, consumption) of the same individuals over time and estimating changes

BOX 2.2: Recent Progress in Rural Poverty Reduction Was Probably Reversed by Recent Shocks

Estimates of poverty from a more recent household survey (IHSP 2013), which revisited some of the households interviewed in 2010, suggest that after years of stagnation, rural poverty may have declined by three percentage points. The implied rate of poverty reduction from these data—one percentage point per year—though estimated for a short period, is similar to the regional annual average in Sub-Saharan Africa.

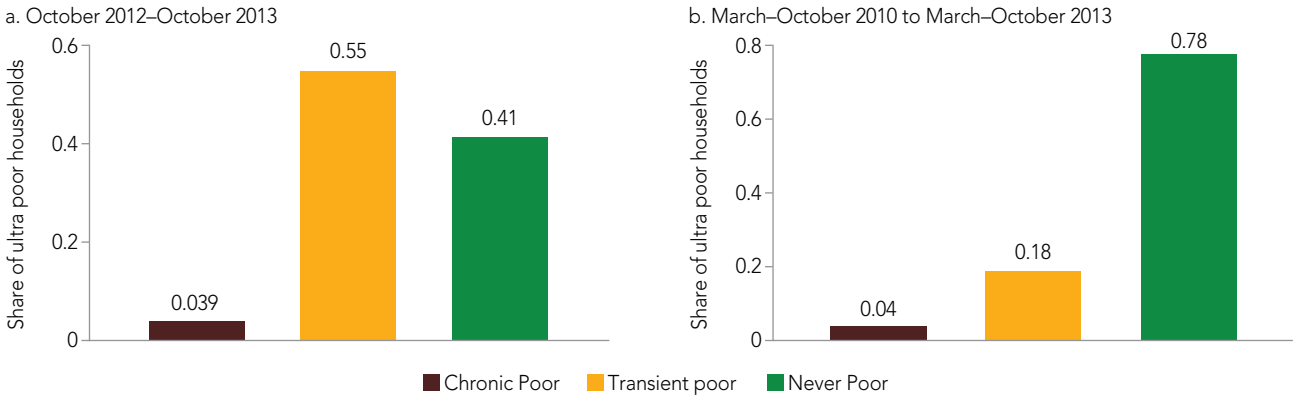
However, any poverty gains in rural areas since 2010 are probably short-lived and potentially reversed given the recent multiple large-scale shocks—floods in 2015 and drought and floods in 2016. As mentioned before, no comparable survey with the IHS3 for 2010 has been completed ever since (the Fourth Integrated Household Survey [IHS4] from 2016 to 2017 is currently in the field), but other sources of data lend support to the view that poverty may have increased as a result of the recent weather shocks afflicting Malawi. A study using the IHS3 panel and IHPS surveys found that shocks can increase poverty: In 2010, when only household characteristics (number of members, location, and sociodemographic profile) were used to predict the likelihood of falling into poverty, 22 percent of households were expected to become poor in 2013. This proportion almost doubled to 42 percent when expected shocks, particularly rainfall shocks, also were considered (McCarthy, Brubaker and de la Fuente 2016). Furthermore, poverty increased eight percentage points between 2013 and 2015 in a sample of 558 rural households affected by the floods that struck Southern and Central Malawi in early 2015 (McCarthy, Kilic, de la Fuente and Brubaker 2016).

BOX 2.3: Poverty Dynamics Can Vary Substantially Across and Within Years

Recently collected panel datasets allow to approximate the size of chronic and transient food poverty groups across time and intra-annually for Malawi. *According to the Rural Livelihoods Panel Survey*, conducted on a quarterly basis from October 2012–2013, food poverty was rarely chronic, as only 4% of Malawi's households were constantly food poor across the four survey rounds (figure 2.1a). Instead food poverty was rather transient, as 55% of Malawi's population became ultra-poor at some point during the year, but did not necessarily remain so throughout. *The IHS3 and IHPS panel data cover 2010–13* and also confirm a proportion of extreme chronically poor households at 4%, but much less mobility as only 18% of household became poor or left poverty during the two points in time (figure 2.1b). And as already mentioned, the IHS3 and IHPS also allowed establishing transitions for the moderately poor, where 44% remained non-poor while 23% remained poor over this period.

These results point out that substantial mobility is experienced into and out of poverty within a year, while not so in the longer term. Furthermore, the number of chronically poor decreases the more periods (poverty spells) considered, as the criteria to catalogue someone as chronically poor becomes much stricter.

FIGURE 2.1: Poverty Dynamics Can Vary Substantially Across and Within Years: Chronic, Transient, and Never Poor



Source: Poverty Assessment team calculations based on RLS-MASAF panel and IHS3 panel-IHPS.

in their poverty states. The analysis in this chapter concentrates on the 14,009 individuals who were present in both 2010 and 2013. Thus, the panel dimension enabled, for the first time, the analysis of poverty transitions experienced by the entire population of Malawi across time and the suggestion of interesting trends.

A transition matrix shows the welfare status for a number or proportion of individuals or households in a base period compared with their welfare status in a later period. The categories in the matrix that define such status may be poor/non-poor or quintiles, among others. Table 2.2 shows a matrix with the proportion of the Malawian population who entered and exited poverty between 2010 and 2013. The diagonal cells in the matrix from the top left to the bottom right reflect those who maintained their status over time. The remaining off-diagonal cells represent those who changed their poverty status across periods. The top right

TABLE 2.2: Poverty Transition Matrix, Malawi, 2010 and 2013

		Poverty status in 2013	
		Poor	Non-poor
Poverty status in 2010	Poor	23	17
	Non-poor	15	44

Source: NSO 2014.

cell represents those who exited poverty; the bottom left cell represents the share of the population who fell into poverty. Therefore, a transition matrix provides a useful representation of individual-level movement across states of well-being over time. According to the results of the panel analysis, it is noticeable that *more than 50% of individuals in Malawi experienced an episode of poverty in 2010, in 2013, or in both years, thus clearly demonstrating the pervasiveness of poverty across time.*

The poor can be divided into those who remain poor over time and those who enter and exit poverty over time (table 2.2). Approximately two-thirds of Malawi's population did not experience poverty mobility over 2010–13: 44% remained non-poor, while 23% remained poor over this period. The remaining one-third of the population was split almost evenly between the 17% who escaped poverty and the 15% who became poor. The following section first inquires about the number and location of the individuals who stayed in poverty over the three years, then focuses on the same issues for the transient poor.

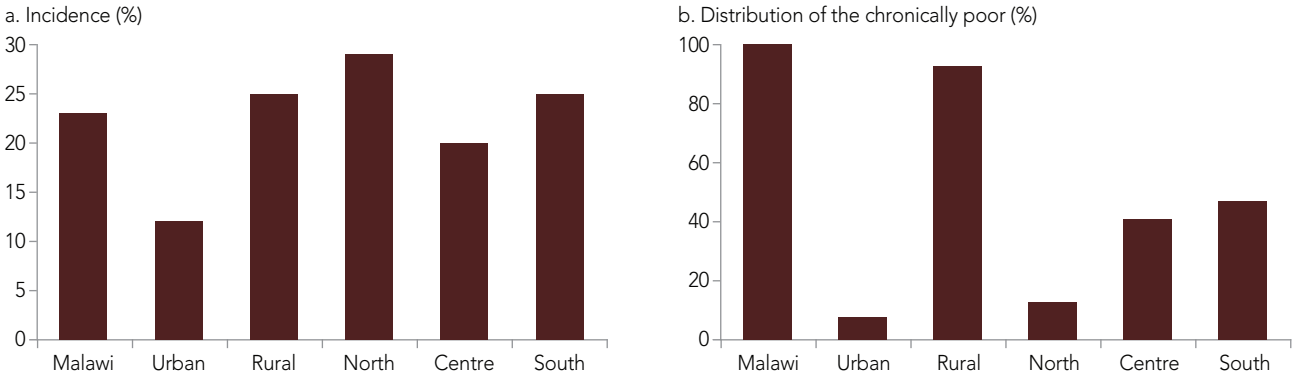
2.2.2. *Chronic poverty*

Almost a one-quarter of the population in Malawi is chronically poor. The IHPS estimates that 23% of the population stayed poor between 2010 and 2013, meaning that they were below the poverty line in both years. The proportion of the population who are chronically poor is double in rural areas compared with urban areas: 25% and 12%, respectively. Less variation is found across regions: 20% of the population in the Central region is chronically poor, 25% in the South, and 29% in the North (figure 2.2a).

The chronically poor concentrate mainly in rural areas and in the South and Central regions. The chronically poor account for 2.6 million people: 2.4 million living in rural areas and 200,000 living in urban areas. These numbers mean that the vast majority of the chronically poor live in rural areas and a minority in urban areas (92% and 8%, respectively). Figure 2.2b shows the distribution of the chronically poor across regions: 47% of the chronically poor live in the South (1.2 million), 41% live in the Central region (1.1 million), and the remaining 12% live in the North (326,000).

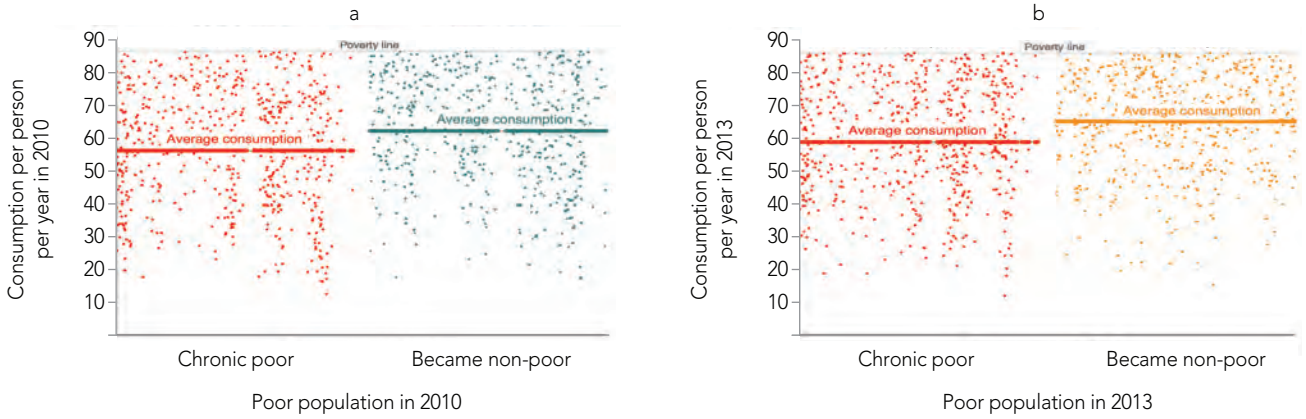
Chronic poverty accounts for the bulk (60%) of overall poverty in Malawi. Given that in 2013 23% of the population were chronically poor and 38.7% were poor, approximately 60% (23.0/38.7) of poverty was chronic and persistent. The sharp increase of poverty in urban areas (table 2.1) meant that, from 2010 to 2013, the share of chronically poor among the urban poor plummeted from 67% to 44%. In contrast, in rural areas, the proportion of chronically poor rose

FIGURE 2.2: Chronically Poor in Malawi by Area and Region



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.

FIGURE 2.3: Consumption of Chronically and Transient Poor (*000s of MWK at 2010 Prices*)



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.

from 58% to 62%. Across regions, the dominance of the chronic among the poor rose considerably in the North (from 59% to 68%) and the South (from 56% to 68%), but declined notably in the Central region (from 61% to 52%).

The chronically poor are poorer than those who managed to escape from poverty and those who entered poverty. The initial average consumption of those who remained poor between 2010 and 2013 was 35% below the poverty line (figure 2.3a). Yet the initial average consumption of those who escaped poverty in the same years was higher: 28% below the poverty line.

A similar pattern occurred between those who moved into poverty and the chronically poor (figure 2.3b). In 2013 the first group displayed an average consumption that was 24% below the poverty line. In the same year, the second group had an average consumption that was 31% below the poverty line. These findings suggest that it is harder for the chronically poor than for the transient poor to raise their consumption to move out of poverty.

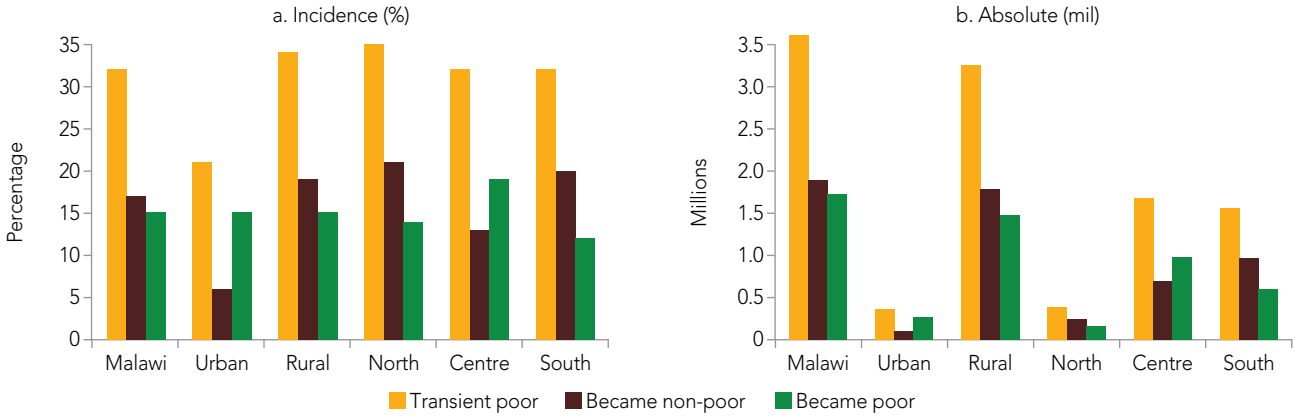
Gains in national economic growth did have some impact on the chronically poor. According to the panel data, real per capita consumption growth in Malawi between 2010 and 2013 averaged barely 0.7% per year. Consumption grew 2% per year among the chronically poor and 32% among those who escaped poverty. In contrast, real consumption dropped 22% among those who became poor and stayed constant among those who stayed out of poverty. These results suggest that economic growth varied significantly for those who moved out of or into poverty. They also suggest that real consumption growth was small for the chronically poor, but still positive and that growth remained stagnant for those who remained out of poverty. The discussion now turns to the individuals who moved in and out of poverty between 2010 and 2013.

2.2.3. *Transient poverty*

Substantial mobility into or out of poverty over 2010–13 was experienced by approximately one-third of the population in Malawi. The IHPS enabled, for the first time, the analysis of poverty transitions experienced by the population across time and suggests some interesting trends. As mentioned earlier, two of three individuals kept the same poverty status in 2010 and 2013: 44% remained non-poor, while 23% remained poor. In contrast, the remaining one-third experienced substantial mobility during this period: approximately 17% managed to escape poverty while 15% became poor (table 2.2).

From 2010–13, people living in urban areas experienced less mobility into or out of poverty than the rural population. Approximately one in five urban dwellers moved across poverty states, but one in three rural dwellers moved into or out of poverty.

FIGURE 2.4: Transient Poor Population by Area and by Region *(%)*



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.

Across regions, approximately one-third of the population changed poverty status. This proportion was fairly similar in all regions. Upward mobility was considerably larger than downward mobility in both the North and the South, whereas downward mobility was more pronounced in the Center (figure 2.4a).

The population who exited poverty came disproportionately from rural areas: 95 percent—compared to 5% of the total movers in urban areas. Among those who experienced upward transitions, 51% were from the South, 36% from the Central region, and 12% of the people who left poverty were in the North. Among the population who moved into poverty, 85% were from the rural areas and 15% from cities and towns. Across regions, 57% of those who experienced downward mobility in 2013 were from the Central region, 34% from the South, and 9% from the North.

TABLE 2.3: Movements Into and Out of Poverty by Area and by Region, 2010–2013

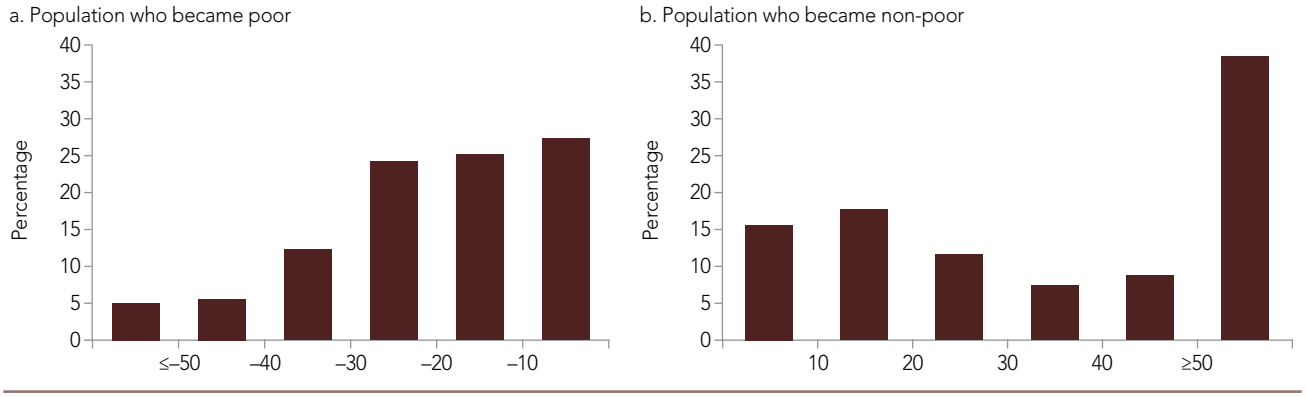
	Became non-poor	Became poor	Total
Malawi	17	15	32
Urban	6	15	21
Rural	19	15	34
North	21	14	35
Central	13	19	32
South	20	12	32

Source: NSO 2014.

Central Malawi is the region in which the majority of the transient poor entered poverty between 2010 and 2013. In Malawi, 3.6 million people are transient poor: 1.9 million exited poverty, and 1.7 million became poor. Figure 2.4b shows both types of transient poor in absolute numbers by area and by region. In urban areas, more people fell into poverty than escaped it, an increase of 157,000 more poor people. In contrast, in rural areas, those who exited poverty significantly outweighed those than became poor, thus totaling 315,000 fewer poor people. Across regions, the net effect in the South is 373,000 people out of poverty; the North accounted for 76,000 people escaping poverty; the net effect in the Central region was 292,000 additional poor people.

How far did those churning across poverty status go? Once individuals exit poverty, the expectation is that they (the "climbers") increase their well-being enough and develop the means to stay persistently out of poverty. In contrast, when people enter poverty ("slippers"), the hope is to stay as close as possible to the poverty line in order to be pulled out more easily and avoid suffering misfortunes over the long term. These two circumstances occur *in Malawi because the consumption of those who fell into poverty was closer to*

FIGURE 2.5: Absolute Difference between Consumption and the Poverty Line of "Slippers" and "Climbers"



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: Values of absolute differences on the horizontal axes are expressed in thousands of Malawi Kwachas.

the poverty line than the consumption of those who exited poverty. First, slightly more than half of the population who became poor had an annual consumption up to MWK20,000 less than the poverty line: 27% were up to MWK10,000 below the poverty line; and 25% consumed MWK10,000–MWK20,000 below the poverty line (figure 2.5). In contrast, among those who escaped poverty, only one-third had a consumption up to MWK20,000 above the poverty line.

Second, the opposite occurs for those whose consumption was farther from the MWK85,852, which represents the value of the poverty threshold. Only one in 20 of those who became poor had a consumption that was at least MWK50,000 lower than the poverty line. Almost two of five of those who exited poverty had a level of consumption that was at least MWK50,000 higher than the poverty line.[7] Overall, these patterns suggest that "climbers" drifted farther from the poverty line than "slippers." These data also seem to indicate that a stronger policy focus on the chronically poor is warranted.

After quantifying the proportion and number of households who stayed poor or non-poor over 2010 and 2013 as well as those who escaped poverty and those who entered poverty between these years, poverty profiles can be constructed for each particular category. These profiles can include indicators such as geographic location, and demographic and economic household characteristics. The next subsection examines the differences among the chronically poor, those who succeeded in exiting poverty, and those who entered poverty, relative to those who never had entered poverty.

2.3. *Correlates of Poverty Dynamics in Malawi*

This section first introduces specific distinguishing features across poverty transition categories (chronically poor, never poor, falling into poverty, moving out of poverty). The second part explores in more detail what characterizes the chronically poor through a regression-based analysis.

2.3.1. *Profiling chronic and transient poverty*

A profile of the population by poverty transition is presented in table 2.4. Several indicators of demographics, asset ownership, wealth, connectivity, sources

[7] Notice that the difference in Malawian kwachas between consumption and the poverty line has a lower bound for those who became poor but has no upper bound for those who became non-poor. For the slippers, the difference cannot be greater than the value of the poverty line because the consumption cannot be negative, whereas for the climbers, the difference could be any positive value.

TABLE 2.4: Profiling Poverty Dynamic Categories in Malawi, 2010–2013

	(a) Stayed non-poor	(b) Became non-poor	Diff. (a) and (b)	(c) Became poor	Diff. (a) and (c)	(d) Always poor	Diff. (a) and (d)	Diff. (c) and (d)
Demographics								
Household size 2010	5.2	6.1	***	6.0	***	6.4	***	*
Household size	5.2	5.7	***	6.5	***	6.7	***	
Children	2.3	2.7	***	3.5	***	3.6	***	
Adults	2.8	2.8		2.9		3.0	*	
Elders	0.1	0.2		0.1		0.2	**	
Household head (%)								
Age	44	44		43		46	***	***
Female	19	23	*	18		25	**	**
No education	62	83	***	79	***	88	***	***
Primary	12	7	***	12		5	***	***
5 Employed	92	88	**	86	**	84	***	
Unemployed	5	10	***	9	**	13	***	
Out of the labor force	3	2		4		3		
Assets								
Has nonagricultural firm	39	30	**	27	***	20	***	*
Agricultural and land index	0.38	0.38		0.36		0.34	***	
Wealth and education index	0.62	0.40	***	0.36	***	0.30	***	***
Consumption per person 2010	207,044	61,691	***	135,642	***	55,678	***	***
Consumption per person	206,263	141,850	***	65,051	***	58,828	***	***
Connectivity								
km to road	7	10	***	10	***	12	***	*
km to pop. center +20,000	30	33	*	33	*	36	***	**
km to tobacco auction	57	70	***	68	***	83	***	***
Income								
Nonagricultural self-employment	21	16	**	14	***	8	***	**
Agricultural wage	12	18	***	21	***	26	***	
Nonagricultural wage	16	8	***	5	***	4	***	
Crop production	37	42	*	46	***	50	***	
Transfers	4	4		3		3		
Location								
Urban	22	8	***	14	**	7	***	**
North	8	12	**	9		12	**	*
Center	50	38	***	57	*	41	*	***
South	42	50	*	34	**	47		***

Source: Malawi Poverty Assessment team calculations based on the IHS3 panel and the IHPS.

of income, and location are assessed (1) to examine how the chronically poor, those who moved into poverty, and those who exited poverty compared with those who stayed out of poverty; and (2) to evaluate whether endowments or local conditions have greater impact on the chronically poor and the transient poor.

In household size, two patterns were evident: (1) the chronically poor live in the largest households of all of the groups; and (2) the difference between the chronically poor and those who never had been poor was considerable in both rounds. In contrast, the difference of the chronically poor from those who became poor was significant in only the first round. The change in the number of household members between 2010 and 2013 provides a different insight. The household size of those who became poor increased notably between rounds.

The opposite occurred among those who exited poverty. Those who stayed out of poverty did not experience changes in household size, and those who were chronically poor experienced a small increase. Regarding characteristics of the household head, the chronically poor were more likely to have household heads who were older and female and had no education than were those who stayed out of poverty and those who became poor. Two of the key social protection programs in Malawi (the Public Works Program and the Social Cash Transfer Scheme—see chapter 5 on Social Protection) identify their potential beneficiaries by distinguishing the presence of able-bodied members in the household. The presence of children and elders as proxies for able-bodiedness is likely to underperform because both the chronically poor and those who became poor share similar proportions. Within the four categories, additional groups who will need support no matter what probably will need to be identified. These include orphan-headed households and the abandoned elderly

The chronically poor have fewer assets and less wealth than any other group. Interestingly, an index that takes into account ownership of agricultural tools, equipment, and livestock[8] displays significantly less variation across groups than an index that comprises durable goods and dwelling infrastructure.[9] Consumption per person barely changed across rounds for those who stayed out of poverty and for the chronically poor, but it displayed huge swings for those who crossed the poverty line. The proportion of income coming from nonagricultural self-employment varied markedly by poverty transition. It was highest among those who never had been poor; it was relatively similar among the transient poor; and it was lowest among the chronically

[8] The following variables were used to create an agricultural asset index with principal component analysis: Hand hoe dummy, watering can dummy, hand tool dummy capturing whether the household had any of (slasher, axe, sprayer, panga, or sickle), big shot dummy capturing whether the household had any of (tractor, tractor plough, ridger, cultivator, treadle pump, motorized pump, ox cart, or ox plough), livestock facility dummy capturing whether the household had any of (chicken house, livestock kraal, poultry kraal, or pig sty), and grain storage dummy capturing whether the household had any of (storage house, granary, or barn). The index was then normalized, that is, norm_index = ((index – min(index)) / (max(index)-min(index))). Land holdings are the number of hectares (ha) that the household "holds." Plots that the household farmed on and had acquired through being granted by local leaders, inheritance, bride price, purchase, or leasehold (about 5% of all plots were acquired by means other than these) are said to be "held." Any plots that the household did not farm but received rent for also were counted as being held. This variable then was normalized. The agricultural and land index displayed in table 2.4 was the sum of the normalized agricultural asset index and the normalized household land holdings.

[9] The following variables were used to create a household wealth index with principal component analysis: Furniture dummy capturing whether the household had any of (bed, table, chair, chair/couch, coffee table, drawers, or desk), radio dummy, electronic dummy capturing whether the household had any of (fan, air conditioner, stereo, clock, or solar panel), laundry dummy capturing whether the household had any of (sewing machine, washing machine, clothes iron), kitchen dummy capturing whether the household had any of (kerosene stove, electric/gas stove, refrigerator), pricey dummy capturing whether the household had any of (TV, VCR, computer, satellite dish, or generator), cell phone dummy, improved walls of dwelling dummy, improved roof of dwelling dummy, improved floor of dwelling dummy, number of rooms per capita in household dwelling, improved lighting fuel usage dummy, improved cooking fuel usage dummy, electrification of dwelling dummy, access to an improved water source dummy, access to an improved latrine dummy, improved rubbish removal usage dummy, use of insecticide treated mosquito nets dummy. The index was then normalized, that is, norm_index = ((index - min(index)) / (max(index)-min(index))). Household average years of education is the numbers of years of education completed by each individual collapsed to the household mean number of years of education. This variable also was normalized. The wealth and education index displayed in table 2.4 is the sum of the normalized wealth index and the normalized average number of years of education.

poor. On the other hand, the proportion of income coming from transfers (both public and private) was relatively similar across all groups.

Is connectivity to opportunities and markets likely to play a role in the persistence of poverty? The chronically poor lived farther than the rest of the population from a road, from population centers with at least 20,000 people, and from the tobacco auction floor. In all three cases, those who never had experienced poverty lived closest, followed by those who had moved into and those who had exited poverty. Those who always had been poor lived in more remote locations. Last, the probability of living in cities and towns was three times higher for those who had stayed out of poverty than for the chronically poor.

Overall, the chronically poor had fewer endowments than the rest of the population: less human capital, fewer assets, less wealth, and less diversified income sources. In addition, the chronically poor lived in environments that were relatively remote and had less access to public utilities.

For the transient poor, two conclusions can be drawn. Those who became poor (1) had indicators that were significantly different than those of the chronically poor, such as their wealth levels and connectivity; but also (2) had a similar share of their income coming from transfers to the chronically poor. Consequently, those who became non-poor tended to be more similar to those who had moved into poverty than to the chronically poor or those who had stayed out of poverty because the latter two are the extremes of the continuum.

An additional examination of the chronically poor is presented in table 2.5, which displays a profile of those who stayed poor in urban and in rural areas. Demographically, the dependency ratios are fairly similar, even though the gap in household size grew over time. This finding suggests that the structure of the families in cities and in rural areas must have been similar. Noticeable differences were found when assessing some characteristics of the household head. Chronically poor household heads in rural areas were significantly older and had less education than their urban counterparts.

The urban chronically poor had more assets and access to public utilities than the rural

TABLE 2.5: Profile of the Chronically Poor by Urban and Rural Areas, 2013

	Urban	Rural	Diff.
Demographics			
Household size 2010	6.1	6.4	
Household size	6.2	6.8	
Dependency ratio	56.9	55.9	
Household head *(%)*			
Age	40	47	***
Female	23	25	
No education	67	90	***
Secondary	29	5	***
Employed	90	83	*
Unemployed	9	14	
Out of the labor force	1	3	**
Assets			
Has nonagricultural firm	30	19	*
Wealth and education index	0.43	0.29	***
Consumption per person 2010	65,188	54,940	***
Consumption per person	60,877	58,669	
Connectivity			
km to road	2	13	***
km to tobacco auction	27	87	***
km to agricultural market	6	28	***
Income (% total income)			
Nonagricultural self-employment	12	8	
Agricultural wage	43	24	*
Nonagricultural wage	22	2	***
Crop production	14	53	***
Transfers	2	3	
Location			
North	13	12	
Center	72	38	**
South	15	50	***

Source: Malawi Poverty Assessment team calculations based on the IHS3 panel and the IHPS.
Note: Significance level of the difference: 1% (***), 5% (**), and 10% (*).

chronically poor. It is interesting that the gap in consumption per person shrank over time. Although the gap was significant in 2010, it no longer was in 2013 because rural consumption had grown and urban consumption had dropped. As expected, the proportion of nonagricultural wage income with respect to total income was notably higher in urban areas, while the proportion of income coming from crop production was larger in the countryside. Nonetheless, the importance of public and private transfers was similar in both urban and rural areas.

The urban chronically poor certainly were closer to roads than were the rural chronically poor. Similarly, the urban chronically poor also were closer to tobacco auction floors and agricultural markets. Finally, 50% of the rural chronically poor live in the South, whereas more than 70% of urban chronically poor live in the Central region.

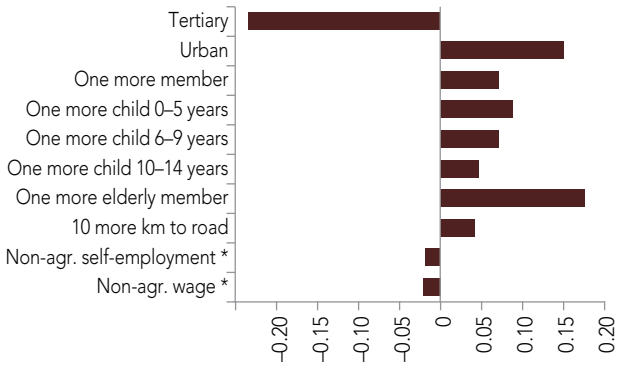
To summarize, not only were the numbers of rural and urban chronically poor substantially different in Malawi. The above findings indicate that, when comparing the urban chronically poor with the rural chronically poor, **significant differences also existed in endowments and context**. In other words, *any policy implication must deal with these two groups separately.*

Another way to appreciate the main characteristics of different groups in poverty is through the main correlates obtained in regression analysis. The next section delves into this analysis, with particular emphasis in the chronically poor, which are the most afflicted population under poverty.

2.3.2. *Correlates of chronic poverty*

Panel datasets tracking the well-being of the same individual or household over time enable the estimation of changes in their mobility while controlling for household-specific factors—observed and unobserved[10]—that could impinge on poverty. **The effects and relative contributions of multiple household and community characteristics on the probability of staying in poverty are explored for Malawi based on the IHS3-IHPS panel using a probit model**. The model concentrates on the factors that are associated with the probability of continuing to be poor in 2013 for the individuals who were poor in 2010.

FIGURE 2.6: Change in the Probability of Being Chronically Poor, 2013



Note: Selected results of probit regression models. The dependent variable is being poor in 2013. Only the statistically significant findings at 10% or lower are shown. The model controls for characteristics of the household head (gender, age, and education), household size, dependency ratio, changes over time in different age cohorts, initial location, changes in location, shocks faced by the population (maize prices, rain, malaria and employment), distance to a road, proportion of different labor sources in total income, and an index of agricultural assets and equipment and landholdings.
* = a simulated increase of 10 percentage points in the share of the labor income category in total income.

Figure 2.6 reports the marginal effect of a person staying in poverty in 2013 for those who were already poor in 2010. The direction of the bars indicates whether a particular factor increases or reduces the likelihood of becoming poor. The length of each bar displays the average marginal effect on poverty, that is, how much the probability of staying in poverty in 2013 changes when the event that the relevant variable depicts occurs.

For conciseness, only the characteristics that are statistically significant different in the survey

[10] To control for household-specific unobserved factors that could affect outcomes (for instance, psychological resilience of household members or their motivation to strive forward), the team needed to assume that these factors were fixed over time and that households who remained in the sample did not differ from those who left (Hoddinott and Quisumbing 2003).

data are presented. The estimates of the full model can be found in appendix A2.1. The model comprises variables to take into account the initial conditions of the population, where the person lives, changes between rounds, shocks faced by the population, and agricultural assets owned.[11] Other control variables include an index that captures the agricultural tools and livestock owned by the household as well as land holdings (footnote 8), the share of nonagricultural self-employment in total income, the share of agricultural wage in total income, the share of nonagricultural wage in total income, the distance that a person may have moved across rounds, and the distance of her/his dwelling from the nearest road.

Education and the initial location of people are key factors determining the probability of staying poor. The first group of results showed that more education of the household head correlated negatively with the probability of being always poor, although not always significantly. A household head who has tertiary education notably reduced the likelihood of continuing in poverty by 23 percentage points. Those living initially in urban areas during this period were more likely to continue being poor by 15 percentage points. Every 10 additional km that a person lived away from a road increased the probability of being poor in 2013 by 4 percentage points for those who had been poor in 2010. Clearly, connectivity does play a role for chronically poor.

The initial household size and the initial composition of the households in which the population lived showed a strong positive association with the probability of being poor in 2013. The larger the household and the larger the proportion of children and elderly members with respect to the number of adults, the greater the odds of being chronically poor. One more member in the second round increased the probability of continuing to be poor by seven percentage points. The age of the additional member in 2013 mattered: elderly members had a greater negative impact than children: one more child 0–5 years increased the chances of being poor by nine percentage points; one more child 6–9 years by seven percentage points; and one more child 10–14 years by five percentage points. However, one additional member 65 years or older increased the probability of being poor by 18 percentage points.

Receiving labor income from nonagricultural sources, whether self-employment or wage employment, significantly reduced the probability of being poor. An increase of 10 percentage points in the proportion of any of those two sources of nonagricultural labor income reduced the chances of being in poverty by two percentage points. Last, agricultural assets and landholdings also are highly significant. Simulating changes in this index is not intuitive because it is a normalized index. Hence, it is not presented in figure 2.6.

The prior discussion suggests that staying in urban areas increased the chances of staying in poverty from 2010 to 2013. Completed secondary education of the household head made no difference for the chronically poor to climb out of poverty. In contrast, an increased reliance on nonagricultural activities and higher proximity to roads were associated with increases in the odds of climbing out of poverty.

2.3.3. *Evolution of dynamic poverty correlates and other endowments*

This section explores the evolution between 2010 and 2013 of some of the endowments by poverty transition to shed additional light on what could have driven the lack of changes for those under chronic poverty status between 2010 and 2013.

From 2010–13, advances in access to utilities and sanitation were limited and primarily benefited

[11] The initial conditions of the population refer to demographic characteristics of the household such as size and dependency ratio; characteristics of the household head such as gender, age, and education; and place of residence. Changes between rounds refer to the changes in household size, in various age cohorts, and in movements between urban and rural areas. Shocks refer to various shocks that the population may have suffered such as malaria, too much rain, drop in employment, and low maize prices.

the better-off. Access to electricity improved significantly for those who stayed out, and those who moved out, of poverty. Nevertheless, the vast majority of the population in these two groups still lacked this public utility (Appendix A2.2). The use of nonsolid cooking fuels remained almost nonexistent across any of the four groups of interest. Safe drinking water improved only for those who never had been poor, but access to running water remained stagnant for all groups. Improved sanitation was the only dimension in which those who became poor and those who stayed poor experienced notable gains.

Ownership of assets rose for those who remained out of poverty and for those who exited poverty. Significant increases in owning televisions and refrigerators occurred for those who were nonpoor, a finding probably associated with their better access to electricity. Remarkable gains in owning telephones happened for all but those who fell into poverty. Similarly, an aggregate assets index improved significantly for those who never had been poor, for those who exited poverty, and for those who remained poor. Only those who moved into poverty experienced a fall in this index.

Household size increased for those who had become poor and for the chronically poor, but it declined for those who had become non-poor. A different pattern was observed for the dependency ratio because it dropped for all but those who had moved into poverty. The education level of the household head improved broadly for all groups, but significantly in only three cases. They were the proportion of household heads with tertiary education among those who never had experienced poverty, and the proportion of household heads with secondary education for both those who had become non-poor and the chronically poor.

In sum, the chronically poor have faced relative lack of progress in some endowments, access to key services and income diversification. Some improvements were observed for this group in their wealth and education index though, possibly driven by access to mobiles and at education of the household head at secondary level. However, both shares are still relatively small compared to other poverty transition categories. In general, those who exited poverty experienced an increase in their assets and those who moved into poverty experienced a drop.

Conclusion

Poverty in Malawi has different connotations. Approximately 40% of Malawi's population avoided poverty permanently throughout 2010–13, but almost a quarter remained below the poverty line in both 2010 and 2013 (chronically poor). Seventeen percent of households managed to escape poverty while 15% entered into poverty during this period. Conventional profiles of these groups suggest that each has some distinctive features.

A large proportion of the poor in Malawi were chronically so. If reducing long-term poverty is the policy makers' concern, focusing antipoverty interventions on this group could reduce leakage into non-poor groups, assuming it is possible to precisely target the chronically poor. Moreover, the chronically poor have faced relative lack of progress in some key endowments. Clearly, challenges remain in addressing chronic poverty in Malawi.

3

MULTIDIMENSIONAL POVERTY IN MALAWI, 2004–2010 AND 2010–2013

From 2004–2013, Malawi made strides in some aspects of education, health and nutrition. These accomplishments, along with improvements in the ownership of certain assets, led to the decline of Malawi's multidimensional poverty. However, improvements in some dimensions should not distract policymakers from the challenges posed by the relative lack of progress in others. Moreover, improvements have not always spread to the entire population. The poor have faced relative lack of progress in specific key endowments and services. Such lack of progress among the poorest partially explains why, despite observed improvements in some dimensions of nonmonetary poverty, there were no corresponding improvements in monetary poverty. The lack of parallel movements in the monetary and nonmonetary dimensions of poverty can also be explained because the improvements in the nonmonetary dimensions were largely driven by increased public investments not private consumption. Moreover, improvements in these nonmonetary dimensions of poverty reflect an increase in the quantity rather than in the quality of endowments and services. Clearly, challenges remain in laying the foundations for shared prosperity and in addressing poverty in Malawi.

Introduction

Chapter 3 documents the *improvements* in multidimensional poverty and in some nonmonetary dimensions of poverty in Malawi from 2004 to 2010 and from 2010 to 2013. The chapter first describes the extent of multidimensional poverty and nonmonetary deprivations in the country over this period. It then deconstructs the components of the Multidimensional Poverty Index, which includes some nonmonetary deprivations, to examine the trends of these components and to identify the components that contributed to improve multidimensional poverty. The chapter further presents the trends of select dimensions by deciles of the population to track whether the reduction in nonmonetary deprivations permeated to the entire population. Chapter 3 documents that, during the periods in question, the poor faced a lack of progress in some key endowments and services. Moreover, the improvements documented in select nonmonetary dimensions of poverty reflect improvements in the quantity of endowments and services rather than improvements in quality.

The chapter profiles multidimensional poverty and nonmonetary dimensions of poverty in Malawi from 2004 to 2013. The analysis presented pulls from three data sources: Second Integrated Household Survey (IHS2) from 2004, Third Integrated Household Survey (IHS3) from 2010, and Integrated Household Panel Survey (IHPS) from 2013. A subsample of the IHS3 sample was selected for follow-up in the IHPS. The IHS2 and IHS3 samples were stratified by month and administered throughout the year. However, the IHS3 subsample and IHPS sample were administered only during March-November, which covers the non-lean season in Malawi. Findings from IHS2 and IHS3, therefore, are comparable because they represent conditions experienced throughout the year. Findings from the IHS3 subsample and IHPS sample are comparable due to their panel dimension; however, they are not strictly comparable to the IHS2. As a result, the analysis will focus on two periods: from 2004 to 2010 using the cross-sectional data, and from 2010 to 2013 using the panel data.

3.1. *Multidimensional Poverty from 2004 to 2010 and from 2010 to 2013*

3.1.1. *Defining multidimensional poverty*

The welfare of the population in Malawi is influenced by many characteristics other than consumption. Thus, when assessing the well-being of the people, improvements in these indicators also should be considered. Unlike monetary measures, which rely on cut-offs based on income or consumption, nonmonetary indicators of poverty measure the share of the population deprived of a key good or service using defined standards. In fact, when national poverty numbers differ, it means that they simply are measuring different conceptions of poverty.

This section analyzes trends in the Multidimensional Poverty Index (MPI) between 2004 and 2010 using the IHS2 and the IHS3, followed by trends in the MPI between 2010 and 2013 using the IHS3 panel subsample and IHPS. First, multidimensional poverty is defined, and trends in multidimensional poverty are discussed. Next, Malawi's multidimensional poverty performance is compared with those of a selected group of countries worldwide.

The MPI measures multidimensional poverty. The index reflects deprivations in basic services and core human functions. By focusing on a different set of deprivations than income or consumption, the MPI reveals a different pattern of poverty than consumption poverty. The MPI covers three dimensions: health, education, and living standards. The three dimensions are tied to specific indicators. Deprived households are identified in each dimension based on a pre-identified benchmark. An aggregate measure is generated using the methodology proposed by Alkire and Foster (2007, 2009): each dimension is weighted equally and each indicator within a dimension is weighted equally (Alkire and Foster 2011).

The MPI is designed to reveal the combination of deprivations that affect the population simultaneously. The dimensions, indicators, deprivation criteria, and weights are presented in table 3.1. The education dimension includes measures of achievement (completion of primary education) and attendance. The health dimension includes child mortality, measured as percentage of households with the occurrence of a death of a child under five; and under-nutrition, which indicates the presence of a stunted, wasted and/or underweight child in the household. (The original methodology refers to the presence of a malnourished adult or child.) The living standards dimension includes deprivation of access to electricity, improved sanitation, safe drinking water, flooring, cooking fuel, and ownership of assets. Each indicator is a binary variable that takes the value of 1 if deprived, or 0 if not deprived. A given household is considered multidimensionally poor if the weighted sum of the 10 deprivations is at least 0.33. The MPI is the product of two numbers: the Headcount (H), which is the percentage of people who are deprived in more than one dimension; and the Average Intensity of Deprivation (A), which is the average number of deprivations among the deprived.

TABLE 3.1: MPI: Dimensions, Indicators, Cut-offs, and Weights

Dimension	Indicator	Household is deprived if…	Relative weight
Education	Years of schooling	No member has completed primary (8 years of schooling)	1/6
	Child school attendance	No school-aged child is attending school	1/6
Health	Child mortality	Any child less than 5 died over the last 2 years	1/6
	Nutrition	Any under-5 child is stunted, wasted, or underweight	1/6
Living standards	Electricity	Household has no electricity	1/18
	Improved sanitation	Household sanitation facility is not improved by MDG guidelines, or is improved but is shared with other households	1/18
	Safe drinking water	Household does not have access to safe drinking water	1/18
	Flooring	Household has a dirt, sand, or dung floor	1/18
	Cooking fuel	Household cooks with non-liquid sources (dung, wood, or charcoal)	1/18
	Ownership of assets	Household does not own more than one item of the following: radio, television, telephone, bicycle, motorbike, or refrigerator; and does not have car or truck.	1/18

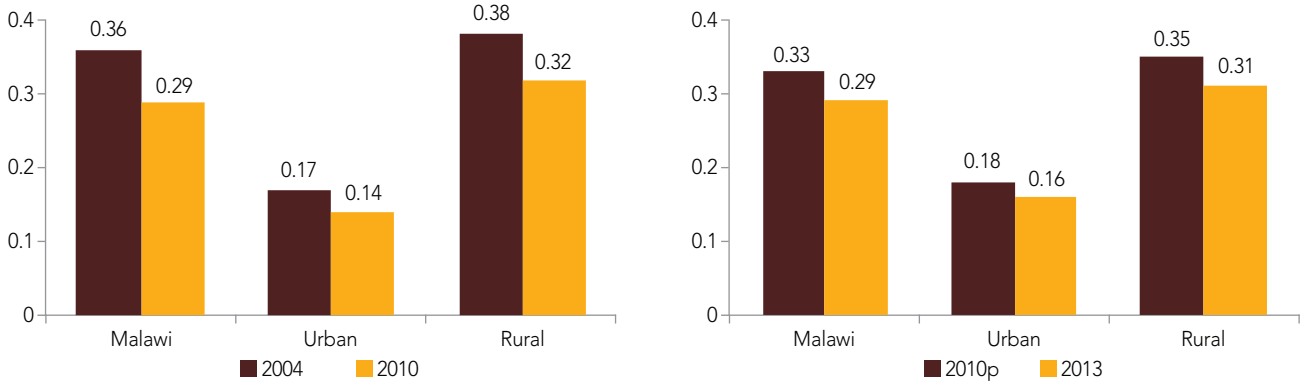
Source: OPHI, http://www.ophi.org.uk/wp-content/uploads/MPI-One-Page-final.pdf?39db4d.

3.1.2. *Trends of multidimensional poverty*

From 2004 to 2013, Malawi made improvements in reducing multidimensional poverty (figure 3.1). The reduction is most notable in the rural areas, in which the largest reductions were observed between 2004 and 2010, and between 2010 and 2013. Although the rural areas made the largest reduction in multidimensional poverty, it was still significantly higher than in the urban areas. In the rural areas, the index was above 0.30 in all periods, whereas, in the urban areas, the MPI was below 0.20.

From 2004 to 2010, the proportion of people who were multidimensionally poor declined from 70.6% to 61.3%. The share fell 8.0 percentage points in rural areas and 6.5 percentage points in urban areas (table 3.2). Regarding the intensity of deprivations among the poor (A), there was a nonsignificant reduction in urban areas (from 46.4% to 44.8%) but a significant decline in rural

FIGURE 3.1: Malawi Multidimensional Poverty Index, 2004–2010 and 2010–2013



Note: P = panel survey.
Source: Malawi Poverty Assessment team based on the IHS2 and the IHS3, and based on the IHS3 panel and the IHPS.

TABLE 3.2: Multidimensional Poverty, 2004 and 2010

	Multidimensional Poverty Index (MPI)			Headcount ratio (H)			Intensity of deprivation among the poor (A)		
	2004	2010	Diff	2004	2010	Diff	2004	2010	Diff
Malawi	**0.36**	**0.29**	**–0.07*** **	**70.6**	**61.3**	**–9.3*** **	**51.0**	**47.9**	**–3.1*** **
Area of residence									
Urban	0.17	0.14	–0.04*	36.9	30.3	–6.5*	46.4	44.8	–1.7
Rural	0.38	0.32	–0.06***	74.9	66.9	–8.0***	51.3	48.2	–3.2***

Source: Malawi Poverty Assessment team based on the IHS2 and the IHS3.
Note: Significance level of the difference: 1% (***), 5% (**), and 10% (*).

TABLE 3.3: Multidimensional Poverty in Non-Lean Months, 2010 and 2013

	Multidimensional poverty index (MPI)			Headcount ratio (H)			Intensity of deprivation among the poor (A)		
	2010	2013	Diff	2010	2013	Diff	2010	2013	Diff
Malawi	**0.33**	**0.29**	**–0.04*** **	**62.6**	**57.2**	**–5.4*** **	**52.0**	**50.6**	**–1.4***
Area of residence									
Urban	0.18	0.16	–0.03	37.4	33.8	–3.6	49.3	46.2	–3.0
Rural	0.35	0.31	–0.04***	66.8	61.3	–5.6***	52.3	51.0	–1.2
Region									
North	0.21	0.18	–0.02*	43.9	40.3	–3.6	47.1	45.7	–1.3
Center	0.34	0.29	–0.04***	63.4	57.1	–6.2***	53.0	51.3	–1.8
South	0.34	0.31	–0.03***	65.9	61.1	–4.8**	51.7	50.7	–1.0

Source: Malawi Poverty Assessment team calculations based on the IHS3 panel and the IHPS.
Note: Significance level of the difference: 1% (***), 5% (**), and 10% (*).

areas (from 51.3% to 48.2%). As a product of these two elements, the MPI fell nationally from 0.36 to 0.29.[12] In cities and towns, the MPI remained relatively low, falling from 0.17 to 0.14. However, in rural areas, in which the MPI was relatively high in 2004, it dropped from 0.38 to 0.32.[13]

A detailed profile of the households characterized by multidimensional poverty between 2004 and 2010 can be found in Appendix A3.1. The profile assesses multiple welfare dimensions including demographic characteristics, educational achievements, economic diversification, use of agricultural inputs and services, ownership of assets, health, and access to utilities.

Throughout 2010–13, Malawi continued making progress in multidimensional poverty (table 3.3). Caution should be exercised in drawing comparable trends between the IHS cross-sectional data for 2004 and 2010 and the panel data for 2010 and 2013. Notwithstanding the differences across periods, improvements in non-monetary dimensions have continued between 2010 and 2013. The proportion of multidimensionally poor people fell from 62.6% to 57.2%.[14] In urban areas, the incidence

[12] When, instead of computing the MPI based on the 10 indicators outlined in table 3.2, the Poverty Assessment team computed the MPI removing the anthropometric dimension, the team still observed declines overall, although more modest. Nationally, MPI fell from 0.33 in 2004 to 0.26 in 2010.

[13] According to the DHS, the MPI fell nationally from 0.381 in 2004 to 0.334 in 2010. In urban areas, the MPI remained relatively low and stagnant at 0.17, but in rural areas, it fell from 0.419 to 0.366 (OPHI 2013).

[14] The estimates of multidimensional poverty for 2010–13 were not fully comparable with those of IHS2 and IHS3. The multidimensional indices based on the panel data excluded one health indicator (households who had experienced deaths of children under 5 years) because that indicator was not available in 2013.

of multidimensional poverty declined 3.6 percentage points, but in rural areas, it dropped by 5.6 percentage points (table 3.3). Regarding the intensity of deprivations among the poor, at the national level, there was a weakly significant reduction (from 52.0% to 50.6%), underlain by drops in urban areas (3.0 percentage points) and in rural areas (1.2 percentage points). The MPI, which is the product of these two components, fell for the country from 0.33 to 0.29. In cities and towns, the MPI remained relatively low, dropping from 0.18 to 0.16; and in rural areas, the MPI declined from 0.35 to 0.31. The estimates of the full model can be found in appendix A2.1

3.2. *Trends in Nonmonetary Deprivations*

What factors led to the decline in Malawi's multidimensional poverty over these two periods? To answer this question, the changes in the different deprivations over these years should be analyzed. This section explores the evolution in nonmonetary dimensions of household deprivation between 2004 and 2010, and between 2010 and 2013. This exploration includes evaluating trends in the access of the population to different elements of living standards: access to and accomplishments in education; health and nutrition outcomes; and standards of living defined by type of housing infrastructure, sanitation, and access to utilities; and ownership of assets. Table 3.4 and table 3.5 show trends in deprivations (italicized items are components of the MPI).[15] As defined by the weights, each indicator in the education and health dimension is weighted three times more than individual indicators under the living conditions dimension.

Since 2004, Malawi has made great strides in some aspects of education and health. Regarding access and accomplishments in education, the proportion of households with school-aged children not in school fell from 52% to 44% in urban areas, and from 47% to 43% in rural areas. The proportion of households lacking members who had completed primary school fell by 7% in both urban and rural areas: from 26% to 19% and from 63% to 56%, respectively. In urban areas, the proportion of household heads lacking secondary education declined from 76% in 2004 to 70% in 2010. In rural areas, the very high proportion of household members who had not completed primary school decreased—but by barely two percentage points (from 97% to 95%). Similar trends are observed when the team accounted for the proportion of rural household members who lacked secondary education (table 3.4).

In terms of health and child nutrition, various data sources indicate improvements over time in child mortality, stunting, and underweight prevalence. Results from IHS2 and IHS3 indicate a significant reduction in the proportion of households that had a death of a child 5 years or younger in the previous year. Data from the 2004 and 2010 Demographic and Health Surveys (DHS) indicate that under-5 mortality rates declined from 133 to 112 per 1,000 live births during the same period, partly because of a strong immunization program. Improvements also were observed in stunting and underweight rates.[16] (See chapter 4 on Food Security

However, if the indices were recalculated excluding this indicator, the trends between 2004 and 2010 were the same.

[15] Although five child nutrition indicators are listed, the MPI considers a household deprived if it has the prevalence of at least one of the indicators.

[16] The anthropometric indices in table 3.4 report the percentage of households with malnourished children. The incidence among children 6–59 months based on the IHS2 and the IHS3 follows. Nationally, stunting fell from 44% to 32%, and underweight fell from 10% to 6%. Stunting fell more in rural areas, from 44% to 31%, whereas it fell only five percentage points in urban areas. Despite these achievements, according to the IHS data, wasting increased nationally from 2.0% to 3.4%.

The DHS data available for 2004 and 2010 also report the incidence among children. DHS data indicate improvements in stunting and underweight prevalence over time, even though these data suggest more modest declines in stunting than do IHS data: stunting fell from 53.1% in 2004 to 47.8% in 2010, and underweight from 18.6% to 14%. Rural children were more likely to be stunted than urban children. Stunting rates in rural areas declined from 54% to 49%, while in urban areas it decreased from 43% to 42%. Underweight fell from 13% to 11% in urban areas and from 19% to 15% in rural areas. DHS data also paint a different picture than IHS data with respect to wasting, which decreased from 6.2% to 4.1% nationally between 2004 and 2010 (from 7% to 2% in urban areas and 6% to 4% in rural areas over the same years). Based on the team's knowledge of

TABLE 3.4: Trends in Deprivation for Malawi, Urban Areas, and Rural Areas, 2004–2010 *(% of households)*

Selected deprivation indicators[a] *(% of households)*	Malawi			Urban			Rural		
	2004	2010	Diff	2004	2010	Diff	2004	2010	Diff
Education									
Households with school-aged children not in school	47.5	43.3	–4.2***	51.9	44.4	–7.4***	46.9	43.0	–3.8***
No household member completed primary	58.6	50.5	–8.1***	25.6	19.4	–6.2**	63.1	56.2	–6.9***
Household head did not complete secondary	94.4	91.0	–3.4***	76.3	70.0	–6.3	96.9	94.9	–2***
No household members completed secondary	93.0	88.5	–4.6***	72.2	63.7	–8.5*	95.9	93.0	–2.8***
Health and child nutrition									
Households with stunted children	16.0	13.2	–2.8***	11.5	13.4	1.9	16.6	13.2	–3.4***
Households with wasted children	0.6	1.2	0.7***	0.5	0.3	–0.2	0.6	1.4	0.8***
Households with underweight children	3.2	2.3	–0.9***	2.1	1.0	–1.2**	3.4	2.6	–0.8***
Household had death of under-5 child/children	6.5	2.3	–4.2***	3.3	2.2	–1.1	7.0	2.3	–4.7***
Access to utilities and sanitation									
No electricity	94.3	92.9	–1.4*	66.9	67.0	0.1	98.0	97.6	–0.4
No nonsolid cooking fuel power	98.0	97.4	–0.6	86.6	87.0	0.4	99.5	99.3	–0.2
No safe drinking water[b]	33.1	17.3	–15.8***	12.7	5.6	–7**	35.8	19.4	–16.4***
No running water	94.9	92.3	–2.6***	71.9	61.9	–10*	98.0	97.9	–0.1
No improved sanitation	50.8	42.2	–8.6***	64.9	49.0	–15.9***	48.9	40.9	–8***
Quality of housing infrastructure									
No quality walls[c]	34.1	20.8	–13.3***	9.1	2.2	–7***	37.4	24.2	–13.2***
No improved house floor	80.4	75.8	–4.5***	34.8	30.0	–4.8	86.6	84.3	–2.3*
Asset ownership									
No bicycle	63.9	61.4	–2.6***	80.0	72.1	–7.9***	61.7	59.4	–2.4**
No car/motorcycle	98.3	97.8	–0.5	92.8	92.2	–0.6	99.0	98.9	–0.2
No television	96.3	91.3	–5.0***	81.7	67.8	–13.9***	98.2	95.6	–2.6***
No refrigerator	98.0	96.7	–1.4***	88.2	84.2	–4.0	99.4	99.0	–0.4
No telephone	96.9	63.7	–33.2***	81.4	27.0	–54.4***	99.0	70.5	–28.5***
No assets/MPI definition[d]	69.7	59.2	–10.5***	69.6	35.6	–34***	69.7	63.5	–6.1***

Source: Poverty Assessment team calculations based on IHS2 and IHS3.
Note: Significance level of the difference: 1% (***), 5% (**), and 10% (*).
[a] Items in italics are deprivations that enter the construction of the Multidimensional Poverty Index (MPI) discussed below.
[b] Due to data issues, the Poverty Assessment team did not account for distance to source.
[c] Quality walls include brick (mud and baked) and concrete.
[d] Members of the household are considered deprived if the household does not own one or more than one of the following: radio, television, telephone, bicycle, motorbike, or refrigerator; and does not own a car or truck.

and Nutrition for a more detailed discussion of child nutrition outcomes.)

Access to utilities and sanitation remains very restricted, particularly in rural areas. From 2004 to 2010, the share of households without electricity remained constant at 67% in urban areas and 98%

complications with anthropometric data collection during the IHS3 fieldwork, it is likely that the differences observed between DHS and IHS3 are a reflection of IHS data quality issues. Nevertheless, the team decided to rely on the IHS anthropometric data for additional estimations of multidimensional poverty because the anthropomorphic data enable combining them with other welfare dimensions to provide a more comprehensive picture of deprivation in the country.

in rural areas. Likewise, rural families who had no access to running water were practically universal, and the proportion remained stagnant at 98%. In contrast, the proportion of urban households without running water decreased from 72% to 62%. The use of nonsolid cooking fuels (kerosene, ethanol or other biofuels, natural gas, LPG, and biogas or electricity) was virtually nonexistent in rural areas, where less than 1% of households used them. In other words, nearly all rural families relied on fuels such as wood, charcoal, and coal for cooking. All of these carbon fuels pose substantial health risks due to the air pollution caused by the smoke released by the incomplete combustion of these materials. In urban areas, in which deprivation is less severe, there was no progress either, with approximately 87% of households using solid cooking fuel power. On the positive side, the proportion of families with improved sanitation increased significantly over time in both cities and the countryside.

The quality of housing infrastructure improved over 2004–10, but stark disparities between urban and rural areas remained. For instance, the proportion of Malawian households with improved floors, defined as other than dirt, sand, or dung flooring, increased from 65% to 70% in urban areas, and from 13% to 16% in rural areas. On the other hand, the proportion of households with quality walls, defined as those constructed with baked brick or cement, increased both in urban areas, from 91% to 98%; and in rural areas, from 63% to 76%.

Finally, physical asset ownership increased to a great extent, mainly in urban areas. Television ownership in urban areas rose 14 percentage points, from 18% to 32%. In rural areas, the ownership of refrigerators, televisions, and means of transport other than bicycles was almost nonexistent. The persistent and widespread deprivation of some of these assets reflects the predominating lack of access to electricity in these areas. Only the ownership or access to telephone devices has experienced remarkable progress throughout the country. The proportion of households with access to a phone increased from 19% to 73% in urban areas, and from 1% to 30% in rural areas. This development is significant because it could reduce transaction costs and have positive social and economic implications including better connectivity to local production markets and to financial and health services.

From 2010–13, Malawi continued to make strides in education in terms of access and accomplishment. Significant gains were made in the rural areas. The proportion of households with school-aged children not in school fell from 41% to 37% in rural areas. The proportion of households lacking members who had completed primary school fell from 55% to 52%. In contrast, in the urban areas, the proportion of household members who had not completed primary school and households with school aged children not in school did not fall.

During the same period, child nutrition did not improve, or worsened for some indicators. Between 2010 and 2013, there were no significant reductions in the proportion of households with stunted children and in the proportion of households with underweight children. The proportion of households with wasted children increased by 1.5 percentage points in both urban and rural areas. However, in the rural areas, the proportion of households with wasted children was twice as high as compared to urban areas.

From 2010–13, advances in access to utilities and sanitation were limited and benefited primarily the urban areas. Access to electricity improved significantly for those living in the urban areas, in which the proportion of households without electricity decreased by four percentage points. The vast majority of the population in the rural areas still lacked access to electricity, although some improvements were observed (table 3.5). The use of nonsolid cooking fuels remained almost nonexistent in the rural areas and was low in the urban areas. In urban areas in 2013, 89% of households did not use nonsolid cooking fuels. Access to safe drinking water and running water remained stagnant for both urban and rural households.

TABLE 3.5: Trends in Deprivation, Malawi, and Urban and Rural Areas, 2010–2013 *(% of households)*

Selected deprivation indicators[a] *(% of households)*	Malawi			Urban			Rural		
	2010	2013	Diff	2010	2013	Diff	2010	2013	Diff
Education									
Households with school-age children not in school	40.4	37.1	–3.3**	39.8	39.8	0.0	40.5	36.5	–4.0***
No household member completed primary	49.4	46.2	–3.2***	18.2	20.2	2.0	55.4	51.6	–3.8***
Household head has not completed secondary	91.0	90.5	–0.5	73.4	73.7	0.3	94.4	93.9	–0.5
No household members completed secondary	87.3	86.9	–0.4	63.7	67.2	3.5*	91.8	90.9	–0.9
Health and child nutrition									
Households with stunted children	13.3	13.3	0.0	17.8	12.8	–5.0	12.4	13.3	0.9
Households with wasted children	1.5	3.0	1.5***	0.1	1.6	1.5***	1.8	3.3	1.5***
Households with underweight children	2.8	3.5	0.7	0.5	1.5	1.0*	3.2	3.9	0.7
Access to utilities and sanitation									
No electricity	92.9	90.9	–2.0***	67.1	63.1	–4.0**	97.8	96.5	–1.3***
No non-solid cooking fuel power	97.1	97.7	0.6*	86.4	89.1	2.7	99.2	99.5	0.3
No safe drinking water[b]	17.2	15.5	–1.7	7.1	6.6	–0.5	19.2	17.3	–1.9
No running water	92.8	91.8	–1.0*	66.9	65.7	–1.2	97.7	97.2	–0.5
No improved sanitation	39.3	38.4	–0.9	42.5	48.1	5.6	38.7	36.4	–2.3
Quality of housing infrastructure									
No quality walls[c]	24.2	18.5	–5.7***	2.1	4.5	2.4	28.5	21.3	–7.2***
No improved house floor	73.9	71.8	–2.1*	29.8	29.6	–0.2	82.3	80.4	–1.9*
Asset ownership									
No bicycle	59.6	57.8	–1.8*	66.2	67.4	1.2	58.3	55.8	–2.5**
No car/motorcycle	97.7	97.3	–0.4	91.7	92.3	0.6	98.8	98.4	–0.4
No television	90.8	88.3	–2.5***	66.5	60.4	–6.1**	95.4	94.0	–1.4***
No refrigerator	96.6	95.2	–1.4***	83.5	80.3	–3.2**	99.1	98.2	–0.9***
No telephone	61.2	54.1	–7.1***	23.5	20.1	–3.4	68.4	61.0	–7.4***
No assets/MPI definition[d]	56.5	54.3	–2.2*	30.2	35.1	4.9	61.5	58.2	–3.3***

Source: Poverty Assessment team calculations based on the IHS3 panel and the IHPS.
Note: Significance level of the difference: 1% (***), 5% (**), and 10% (*).
[a] Items in italic are deprivations that enter the construction of the Multidimensional Poverty Index (MPI) discussed below.
[b] Due to data issues, the team did not account for distance to source.
[c] Quality walls include brick (mud and fired) and concrete.
[d] Members of the household are considered deprived if the household does not own more than one of: radio, TV, telephone, bike, motorbike or refrigerator and does not own a car or truck.

Over 2010–13, the quality of housing infrastructure improved. Although the proportion of the population with improved floors was considerably higher among urban dwellers, this proportion increased two percentage points for those living in the rural areas. The proportion of households living in dwellings with quality walls increased seven percentage points from 72% to 79% for those living in rural areas.

Ownership of assets rose notably for those living in the rural areas. Significant increases in the ownership of televisions and refrigerators occurred for those who living in the urban areas—a finding probably associated with their better access to electricity.

However, some improvements in the ownership of televisions and refrigerators also occurred in the rural areas although a significant proportion of households continued to lack ownership of these assets. Increased ownership of bicycles occurred in the rural areas and remarkable gains in the ownership of telephones happened for those living in the rural areas. The proportion of households owning a telephone increased seven percentage points from 32% to 39%. Similarly, an aggregate assets index improved significantly for households located in the rural areas.

In sum, between 2004 and 2010, Malawi experienced gains in a number of nonmonetary dimensions of welfare. Specifically, improvements in education in terms of access and accomplishment were observed in both the urban and rural areas. There were gains in health and child nutrition, with notable improvements in rural areas in reductions in stunting, underweight, and under-5 child mortality. Improvements in child nutrition could be associated with the improvements in safe drinking water (16% points in the rural areas) and sanitation (eight percentage points in the rural areas). The quality of housing infrastructure and the ownership of assets, particularly the ownership of telephones, also improved. Clearly, the gains in the aforementioned dimensions contributed to the decline in multidimensional poverty between 2004 and 2010.

Nationally, the decline in the MPI was driven mainly by gains in education and health outcomes between 2004 and 2010. In particular, the share of households in which no members had completed primary education declined significantly from 59% to 50%; the proportion of households with infant deaths declined more than 50%; and the proportion of households with stunted children and/or with underweight children both declined. Although being weighted significantly less, reductions in the proportion of those deprived of safe drinking water and improved sanitation, and increases in ownership of some assets, particularly mobile phones, were also important.

Given the population distribution across rural and urban areas, these same indicators drove the decline in the MPI in rural areas. For instance, the proportion of rural households without at least one member completing primary school dropped 6.9 percentage points, and the percentage of rural families with death of infants plummeted from 7.0% to 2.3%. Likewise, improvements in living conditions occurred in these areas, particularly with respect to asset ownership and safe drinking water. MPI improvements in urban areas also were related to school attendance and completion of primary school, and, to a lesser extent, improvements in child nutritional status. Regarding living conditions, the most significant achievements that contributed to the decline of the MPI in cities were improved sanitation and ownership of assets, notably, cell phones and bicycles.

Between 2010 and 2013, Malawi still made gains, although fewer, in some dimensions of nonmonetary welfare. In contrast to the 2004 and 2010 period, the decline in the 2010–2013 MPI was smaller. The gains in education in terms of access and accomplishment were driven mainly by the gains made in the rural areas. Gains in health and child nutrition were stagnant for the most part, except for a worsening in wasting among children under 5 years. Regarding access to utilities and sanitation, only the access to electricity improved, and benefiting primarily those living in the urban areas. The rural areas did benefit, however, from improvements in the quality of housing infrastructure and the ownership of assets. Nationally, improvements in education, housing infrastructure, and asset ownership contributed to the decline in the MPI between 2010 and 2013.

Has the actual number of multidimensional poor people declined? The number of the multidimensional poor can decline or increase depending on the size of the population and its growth rate over the period in question relative to the changes in the multidimensional poverty rate. IHS population projections indicate that, between 2004 and 2010, the rural population increased from 10.8 million to 11.9 million, and the urban population rose from 1.4 million to 2.1 million. The decline (eight percentage points) of the multidimensional headcount rate in rural areas

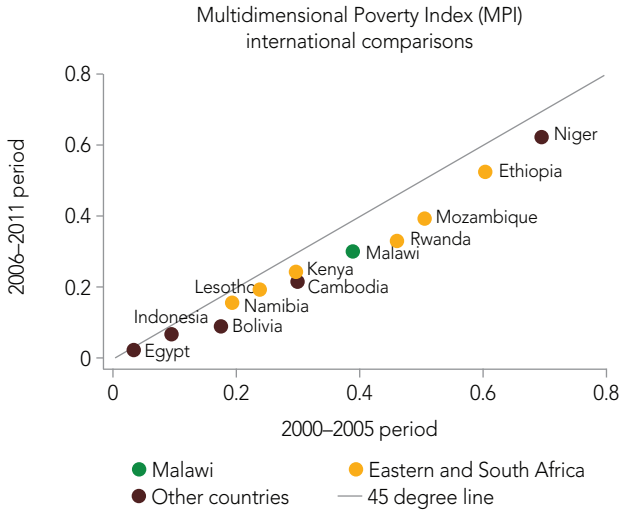
over the period was enough to outweigh the population growth, resulting in a decline in the number of the multidimensional poor by approximately 156,000 people. By contrast, a decline of 6.5 percentage points in urban areas was not enough to outweigh urban population growth, and hence resulted in 135,000 more multidimensional poor people. Overall, between 2004 and 2010, based on IHS2 and IHS3 population projections, the number of multidimensional poor fell by only approximately 21,000.[17]

How does Malawi fare in relation to other countries in terms of levels and changes in the MPI over the past years? Estimates created by the Oxford Poverty and Human Development Initiative (OPHI) for a set of selected countries from Eastern and Southern Africa (Ethiopia, Kenya, Lesotho, Malawi, Mozambique, and Namibia), other African countries (Egypt and Niger), Asia (Cambodia and Indonesia), and South America (Bolivia) are plotted in figure 3.1. The horizontal axis shows the MPI over 2000–05, and the vertical axis depicts the MPI over 2006–11. Countries along the 45-degree line experienced no change in MPI over the two periods. Those above that line had an increase in the MPI. Those below the 45-degree line experienced a decline in their MPI.

Figure 3.2 shows that the position of Malawi among the 12 countries analyzed did not change over time. Malawi performed better than Rwanda, Mozambique, Ethiopia, and Niger. All 12 countries assessed experienced a reduction in multidimensional poverty between 2000–05 and 2005–11 (all countries are below the 45 degree line). Malawi, however, had one of the best performances in reducing multidimensional poverty over the entire first decade of the century.

Another way to corroborate the relative success of Malawi in improving nonmonetary well-being is through the provision of better opportunities to children. The Human Opportunity Index (HOI) measures (1) how close a society is to universal coverage for a given set of opportunities in education, basic infrastructure, and health; and (2) how equitably coverage of that opportunity is distributed among groups with different circumstances. A recent World Bank report (Dabalen and others 2015) looks at 20 Sub-Saharan Africa countries between the late 1990s (ca.1998) and mid- to late-2000s (ca. 2008) to uncover the opportunities for children of two age groups: 0–1 year olds and 6–11 year olds. For the 0–1 year olds, the opportunities considered are access to water (piped, well, or rainwater), access to sanitation (pit or flush toilet), full immunization, and not being stunted. For the 6–11 year olds, the opportunities considered are access to safe water, adequate sanitation, and school attendance. When assessing the composite index for both age groups, Malawi tops the ranking in access to opportunities for older children and performs as well as Ghana and Senegal for the youth (figure 3.3a). Malawi also is among the top countries (with Uganda and Cameroon) in improvements in the composite HOI (box 3.1) for both age groups roughly between the late-1990s and late-2000s. Malawi had an annual increase of nearly

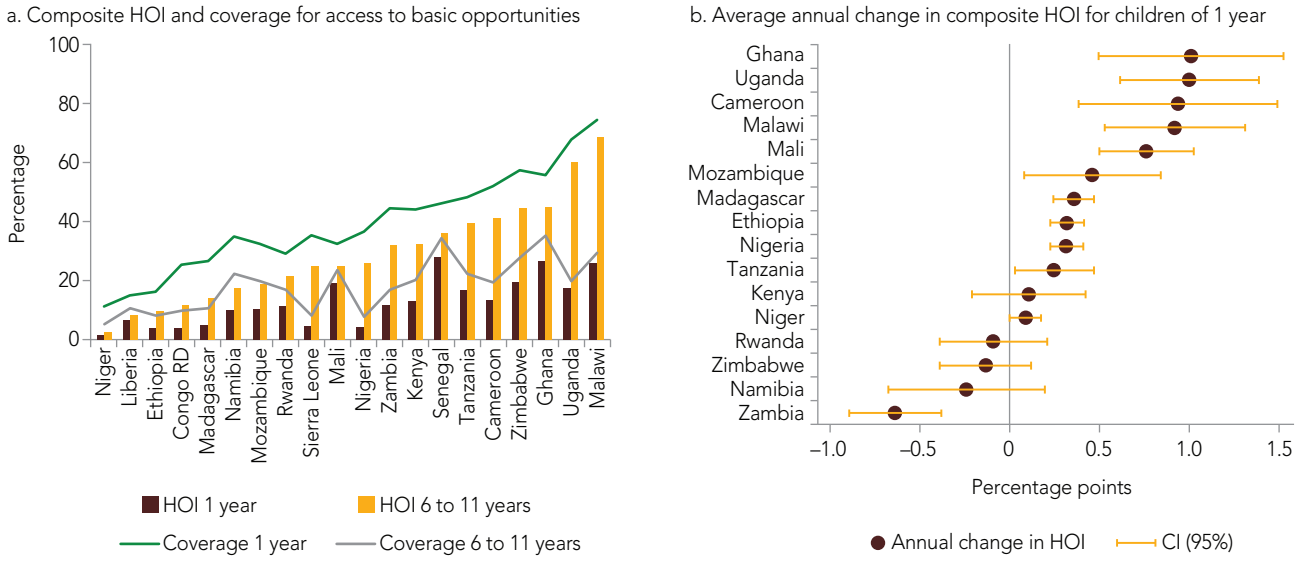
FIGURE 3.2: Multidimensional Poverty Index: Malawi and International Comparisons, 2000–2005 and 2006–2011



Source: OPHI 2013.

[17] The accuracy of these numbers is dependent on the precision of the population projections of the IHS2 and the IHS3.

FIGURE 3.3: Standings and Progress in Access to Bundle of Opportunities, Ca. 1998 to Ca. 2008



Source: Dabalen and others 2015.

one percentage point for 1–year olds and ywo or more percentage points for the 6–11 year-olds (figure 3.3b).

In summary, between 2004 and 2010, the country has made strides in some dimensions of education, health, and nutrition, the ownership of some durables, and higher access to some key services. Between 2010 and 2013, the country made strides in education; ownership of some durables, housing quality, and access to utilities. These improvements led to lower levels of multidimensional poverty and increased opportunities on average. It remains to be established whether such progress was shared equally among the Malawian population. This is the subject of the next section.

3.3 *Inequalities in Access to Assets and Services and Opportunities*

3.3.1 *Inequalities in access to assets and services*

While improvements in nonmonetary well-being were observed across the country, access to assets, services, and opportunities may not have spread to the entire population. Uneven access to health and education services along with key productive assets and market connectivity can influence household decisions on technology adoption and activities, which in turn have implications for income generation and poverty levels. This section examines the trends in nonmonetary deprivations for segments of the population that are identified by where they are positioned on the consumption distribution. The analysis focuses on three groups: the bottom 40%, those in deciles 5 to 9, and those in the top 10%. The section also examines the trends in nonmonetary deprivations for households identified by the gender of the household head.

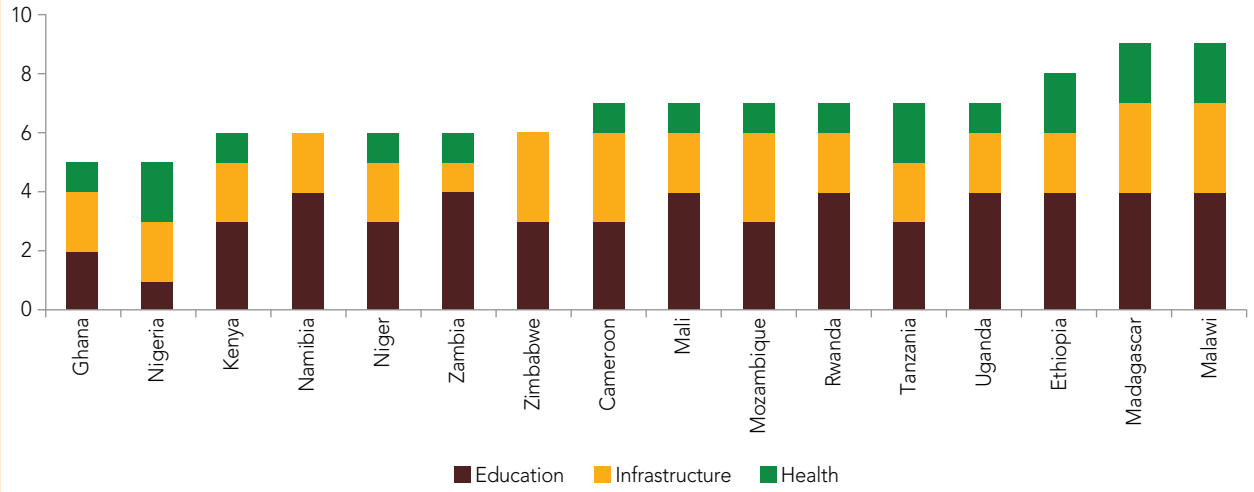
While all segments of the population made progress in completion of a primary education between 2004 and 2010, the richer segments of the population started from a higher base and experienced greater gains (figure 3.4a and 3.4b). Among the wealthiest 10 percent of the income distribution, the proportion of households in which at least one member completed primary school is more than double the proportion of households in the bottom 40 percent. The proportion of households in which at least one member completed primary school also rose for those in the bottom 40% between 2010 and

BOX 3.1: Access to Opportunities

The Human Opportunities Index (HOI) examines the extent to which circumstances beyond a person's control (race, gender, and birthplace) affect her/his probability of accessing a set of basic services or opportunities that are necessary for a healthy and productive life. Ideally, access to opportunities should not be influenced by circumstances outside of one's control and consequently access rates to opportunities across groups of individuals are roughly the same. In reality, the distribution of opportunities across groups is inequitable. When the HOI is lower than the coverage rates, the gap between the two suggests that extent of inequality.

In a report examining access to basic opportunities for children under 12 years for a sample of 20 countries in Sub-Saharan Africa, opportunities in education, basic infrastructure, and health are considered. Figure B3.1.1 shows a count of the number of opportunities for which a country experienced a statistically significant increase in an HOI. As shown, Malawi experienced a statistically significant increase in an HOI in all opportunities.

FIGURE B3.1.1: Number of Opportunities with Statistically Significant Increase in HOI[a]



Opportunities

Education
- Attend school (age 6–11)
- Attend school (age 12–15)
- Finished primary school
- Started primary school on time

Infrastructure
- Have electricity
- Have sanitation
- Have water

Health
- Full immunization
- Not stunted

Source: Dabalen and others 2015.

Note: [a] The figure does not take into account the size of the improvement.

2013, though such proportion was much lower for the bottom 40% than the rest.

Trends in child nutritional status show a growing disparity between wealthier and poorer households. Between 2004 and 2010, declines in the proportion of families with children who experience stunting and underweight happened across all deciles. Yet, in rural areas in 2010 for instance, 55 percent of children in the bottom welfare quintile were stunted, compared with 38 percent in the top quintile. Underweight prevalence in the poorest quintile was nearly double that of the top quintile (17 percent versus 9 percent). According to the IHS3 panel and the IHPS, between 2010 and 2013, the top 10% continued experiencing reductions in stunting, underweight, and wasting while the bottom 40% and those in deciles

FIGURE 3.4A: Trends in Selected Non-Monetary Indicators by Deciles (Bottom 40%, Middle 50%–90%, and Top 10%), 2004 and 2010

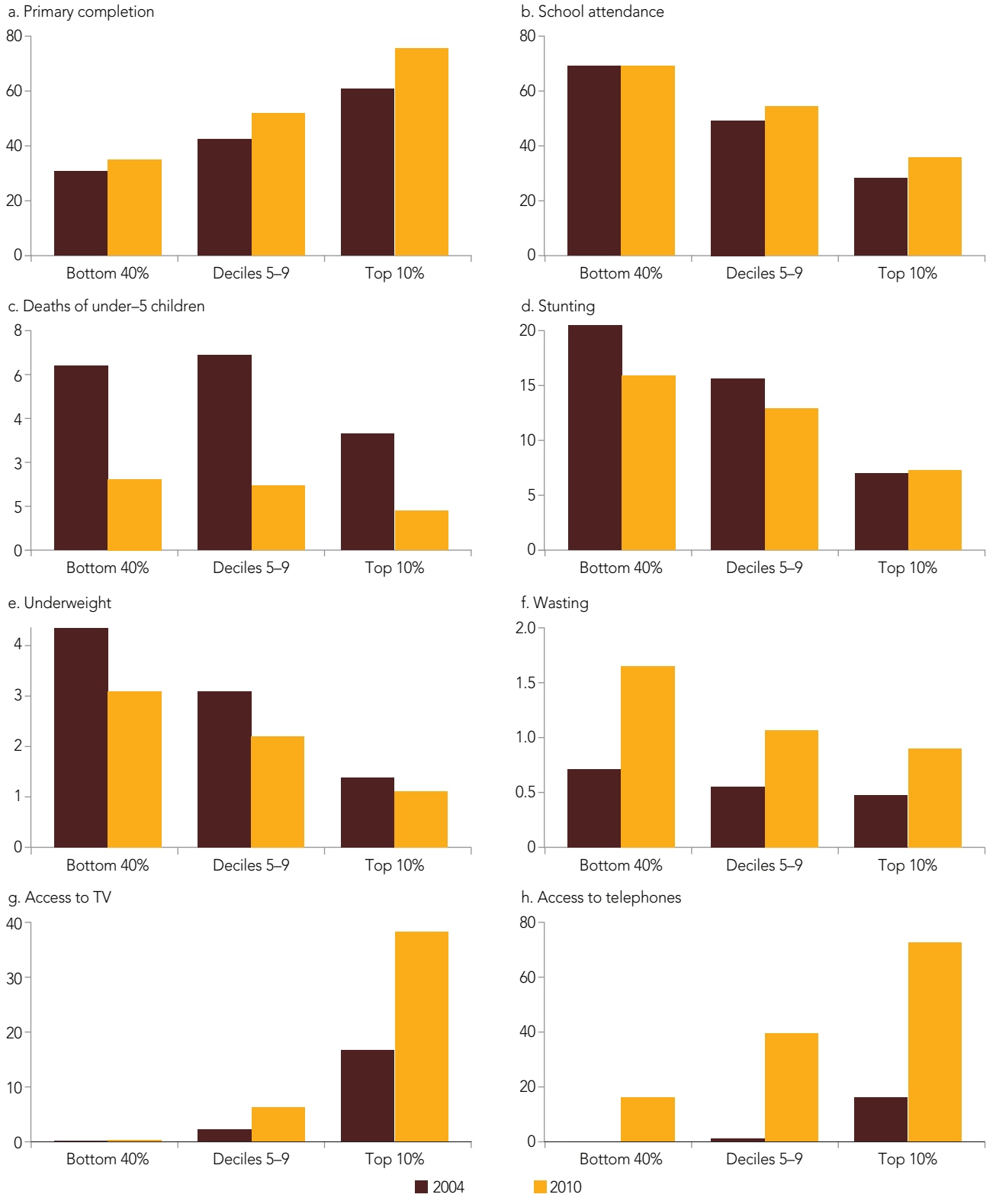


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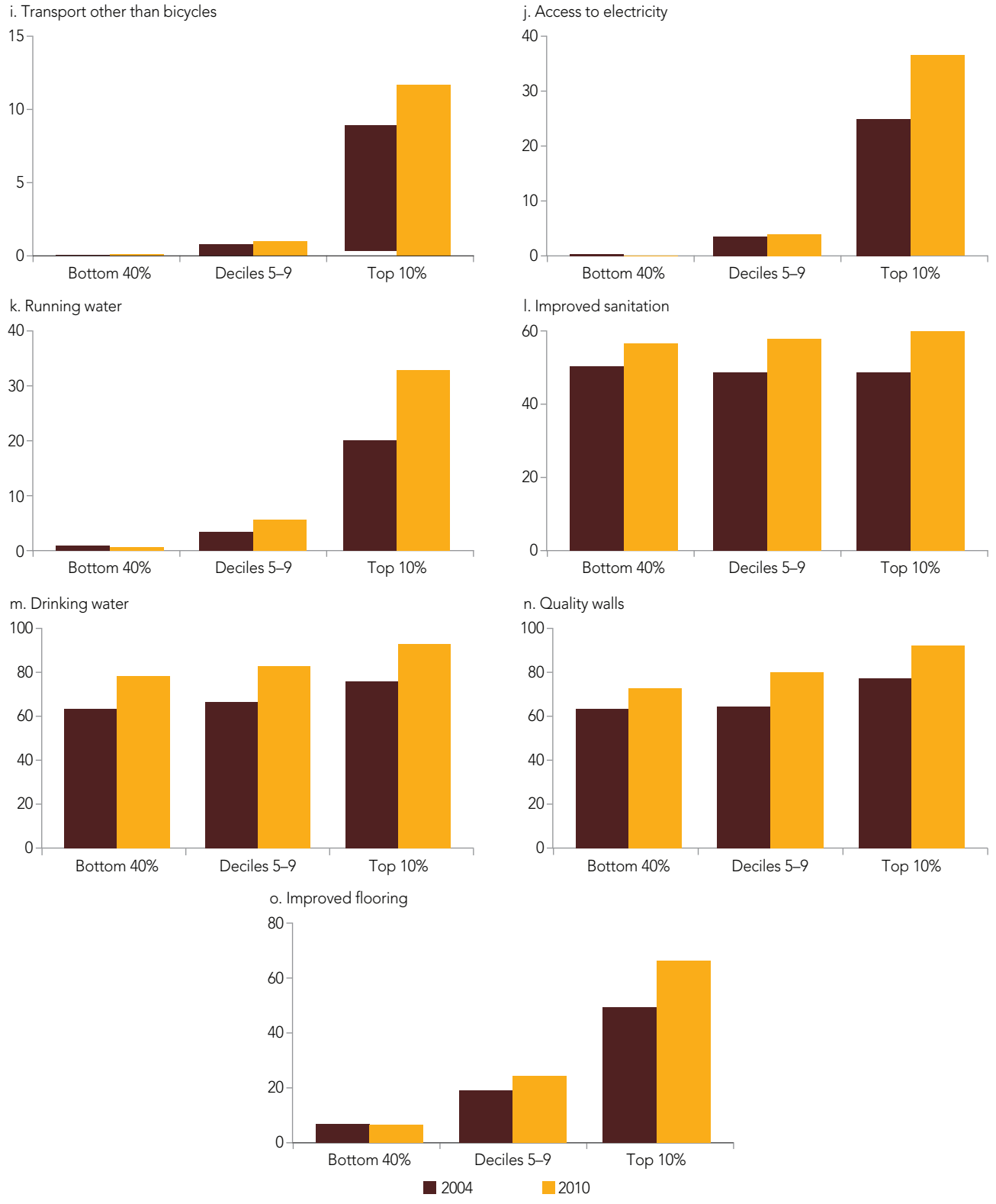
FIGURE 3.4A: Trends in Selected Non-Monetary Indicators by Deciles (Bottom 40%, Middle 50%–90%, and Top 10%), 2004 and 2010 *(continued)*



Source: Malawi Poverty Assessment team based on the IHS2 and the IHS3.

FIGURE 3.4B: Trends in Selected Non-Monetary Indicators by Deciles (Bottom 40%, Middle 50%–90%, and Top 10%), 2010 and 2013

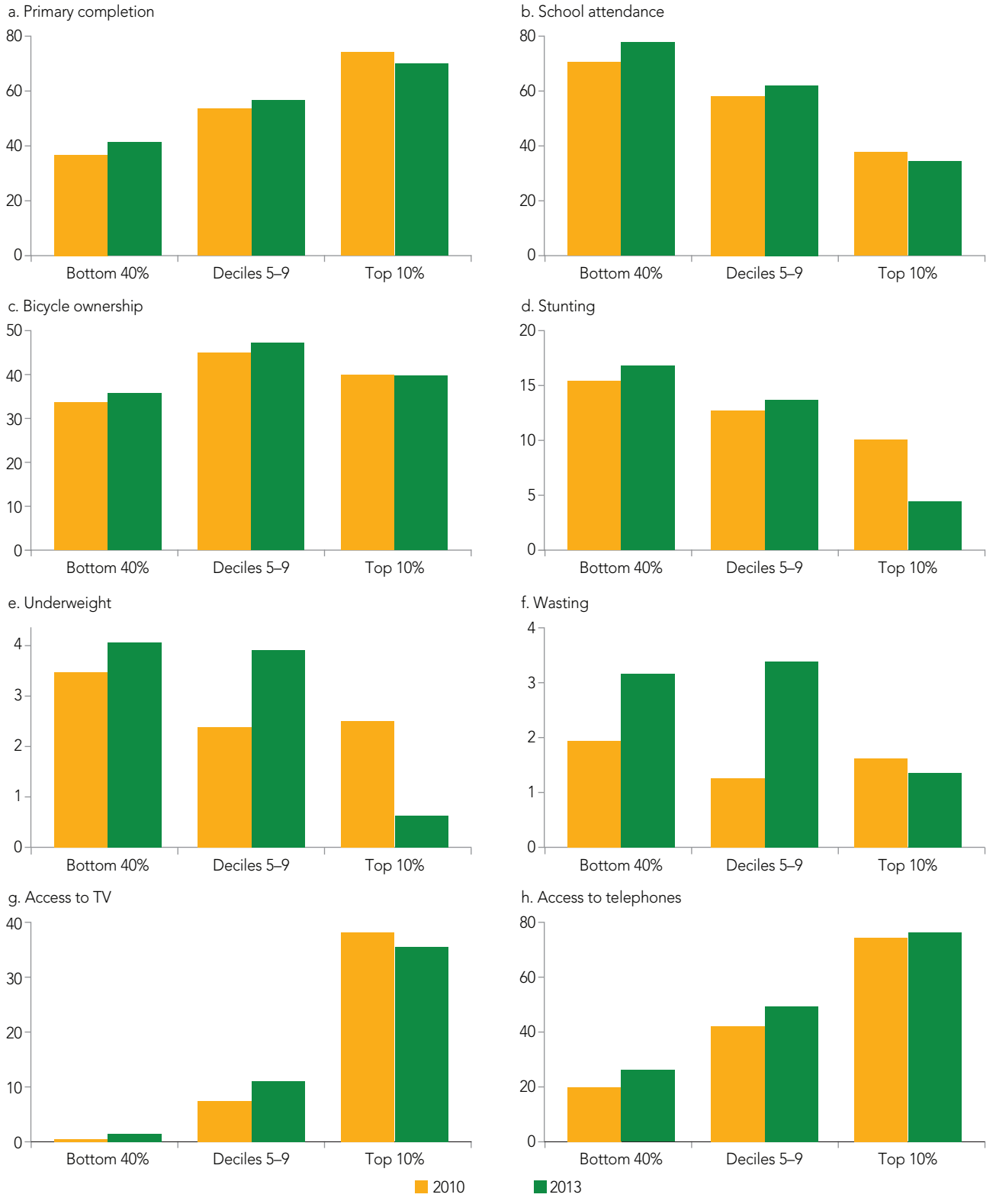


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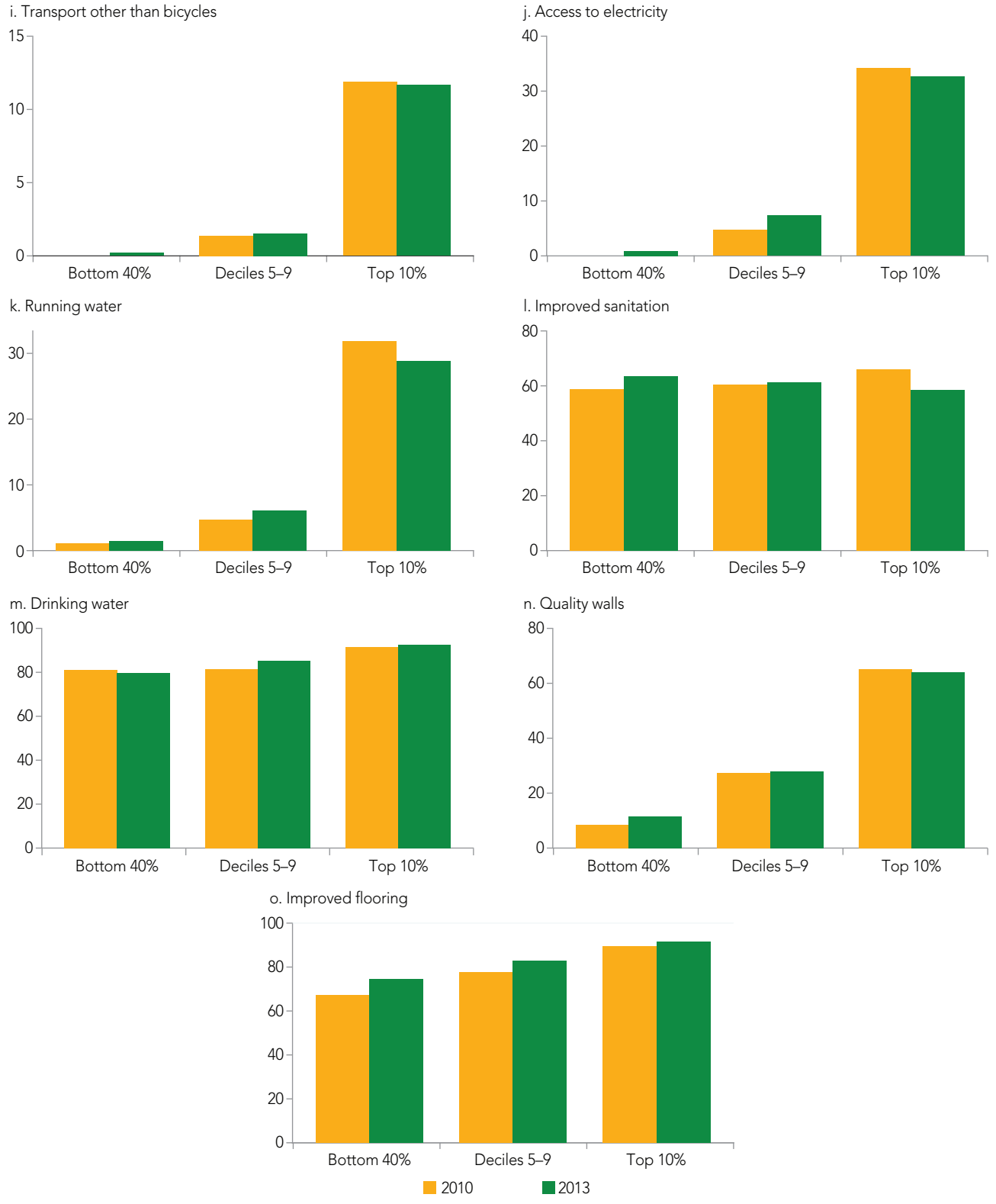
FIGURE 3.4B: Trends in Selected Non-Monetary Indicators by Deciles (Bottom 40%, Middle 50%–90%, and Top 10%), 2010 and 2013 *(continued)*



Source: Malawi Poverty Assessment team based on the IHS3 panel and the IHPS.

5 to 9 experienced increases in all three indicators, particularly in underweight and wasting.

Trends in ownership of durable goods have been more unequal because the proportion of households owning appliances has remained relatively constant along the income distribution or has risen for all but the bottom 40%. The only exception is mobile phones, which have seen impressive growth rates in ownership across all deciles.

Despite small improvements, the bottom 40% continues to be almost fully deprived of access to electricity and running water. The only exception comes with access to improved sanitation, for which all segments of the population experienced improvements over time.

Improvements in non-monetary indicators benefitted both male-headed households and female-headed households. However, female-headed households continued to lag behind in access to some nonmonetary goods and services compared male-headed households. Educational accomplishment and access to public utilities and assets followed such a trend. However, female-headed households fared better in terms of nutritional status, having a lower proportion of households in which there was at least one malnourished child compared to male-headed households.

Over time, educational accomplishment improved for both male-headed and female-headed households. The proportion of households in which at least member of household completed primary school increased for both sets of households between 2004 and 2013, however, the proportion was lower for female-headed households in all years (appendix A3.2 and appendix A3.3). Similar trends are observed for secondary school completion between 2004 and 2013. One exception is in primary school attendance where the proportion of female-headed households with a school-aged child in school was similar to that for male-headed households.

Gains in access to public utilities such as electricity and running water occurred for both female-headed and male-headed households between 2004 and 2013, however access in male-headed households was again higher relative to access in female-headed households. Growth in access to improved housing conditions (sanitation and flooring) and in access to some assets such as bicycles, televisions, and telephones occurred for both sets of households, but female-headed households continued to lag in access compared to male-headed households.

Female-headed households fare better than their male counter-parts in terms of nutritional status of children under five. Between 2004 and 2010, the proportion of male-headed households and female-headed households with children who were stunted or underweight declined, while the proportion of households with children who were wasted rose. Between 2010 and 2013 there was a growing proportion of households in which there was at least one malnourished child. However, in all years there were lower proportions of female-headed households that had malnourished children compared to male-headed households. Such a disparity in nutritional outcomes based on the gender of the household head could be explained by differential spending patterns resulting from possible differences in how men and women with decision-making power choose to allocate household income.

3.3.2. *Inequality of opportunities*

In the mid- to late-2000s, Malawi made substantial progress on several fronts to increase children's opportunities later in life directly (through education and health investments) and indirectly (through improved sanitation and safe water). Such basic goods and services constitute investments in children that could have positive repercussions on their achievements later in life. For instance, as mentioned earlier, Malawi made important progress in providing opportunities to children of certain age groups through improving school attendance and primary completion. From 2004 to 2010, the proportion of households with school-aged children not in school fell from 47% to 43% in rural areas, and the proportion of households in which at least one

household member has completed primary school increased from 37% to 44%.

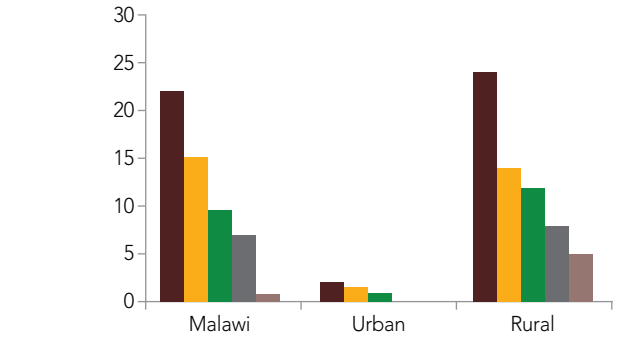
However, in Malawi (as in other developing countries), a child's birth circumstances—gender, location, parents' social and economic background—still matter a great deal in determining her/his access to these same basic goods and services.[18] **Urban areas exhibit higher rates of school completion; access to safe water and electricity; and lower rates of undernutrition with the exception of stunting** (see tables 3.4 and 3.5). In urban areas, approximately 30% of heads of households have completed secondary education versus 5% in rural areas.

Belonging to a richer household favors access to opportunities to perform better later in life. Among the wealthiest 10% of the income distribution, the proportion of households in which at least one member completed primary school is more than double the proportion for households in the bottom 40%. Similarly, access to electricity and running water is close to nonexistent among the bottom 40% of households but, in the top decile, reaches approximately 33% of households.

Poorer communities also are located farther from tar/asphalt roads. Acceptable rural access often is defined using an international benchmark: the community having an average distance from the nearest paved or all-weather road that does not exceed two km. According to a recent incidence analysis that investigates the relationship between welfare and distance to roads, even the richest rural communities appear to be at a median distance of five km from an all-weather road. Urban areas fare much better: the median distance to a paved or all-weather road for even the poorest urban communities is two km (figure 3.5).

The poor also have more distant access to health facilities. Malawi has a comprehensive network of health facilities, including five central hospitals that supply tertiary care. However, facilities at the community level often are insufficiently equipped and lack appropriate staffing levels and medicines. Thus, even when one in four rural communities has a facility within one km, the quality of the service is inadequate. Over 50% of all communities in Malawi are located more than three km from the closest health clinic. A clear inverse relationship is observed between the level of community wealth and distance to the closest health facilities, that is, wealthier communities are better served (figure 3.6). In addition, those in better-off households use more private outpatient care compared to those in poorer households, who rely more on public outpatient care.

FIGURE 3.5: Median Distance from Community to Nearest Tar/ Asphalt Road, by Community Wealth *(km)*

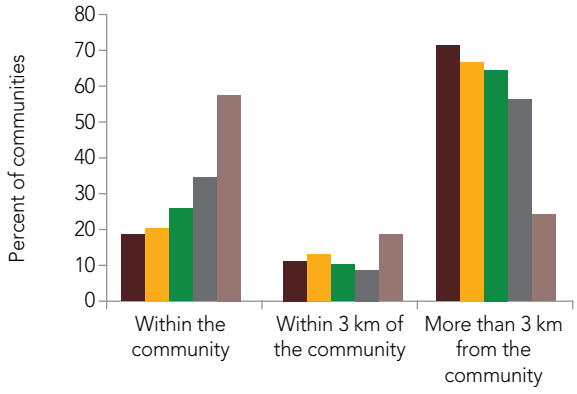


	Malawi	Urban	Rural
Poorest communities	22.0	2.0	24.0
Q2	15.0	1.5	14.0
Q3	9.5	1.0	12.0
Q4	7.0	0.1	8.0
Richest communities	0.5	0.1	5.0

Source: World Bank Malawi Public Expenditure Review (2013) based on the IHS3.
Note: The 'incidence analysis' used information from the 768 communities covered by the IHS3 and combined community level data with household level data. Community wealth levels were calculated as average household consumption per capita, grouped in five 'Community wealth quintiles' (from 1= Poorest 20% of communities, to 5= Richest 20% of communities).

[18] The recent report on human opportunities in Sub-Saharan Africa (Dabalen and others 2015) found that the wealth and education of the head of the household to which a child belongs (or, in the case of opportunities for good health, the mother's education) make the largest contributions to inequality across most countries and opportunities. Wealth and education are followed by household location (rural or urban). Belonging to a household that is wealthier, has more education, and is located in an urban area are favorable circumstances for access to almost all opportunities.

FIGURE 3.6: Distance to Health Clinic With or Without a Doctor *(% Communities by Wealth)*



	Within the community	Within 3 km of the community	More than 3 km from the community
Poorest communities	18.3	11.1	70.6
Q2	20.8	13.0	66.2
Q3	26.1	9.8	64.1
Q4	35.1	9.1	55.8
Richest communities	56.9	19.0	24.1

Source: World Bank Malawi Public Expenditure Review based on IHS3, 2013.

Disparities in Malawi are present not only in coverage but also in the quality of some of the services. For instance, wide variations between urban and rural areas still were encountered in the percentage of children with basic skills in reading and numeracy based on scores for standard tests[19] administered to sixth-grade children in 2007 (figures 3.7a and 3.7b). Large gaps in the learning outcomes for sixth graders also were encountered in the numeracy and reading skills between children of high and low socioeconomic status (figures 3.7c and 3.7d).

In sum, access to many basic services in Malawi is neither universal nor equitable. Malawi undeniably has made gains in reducing some deprivations and increasing opportunities on average. However, gaps remain in access to key assets, services (water, sanitation, and electricity), and opportunities (health, nutrition, and education) across income groups, urban and rural areas, girls and boys, and female and male-headed households. Malawi is encouraged to address these gaps because they can impair a person's ability to perform well later in life, and therefore perpetuate poverty.

3.4. What Could Explain the Improvements in Education and Health?

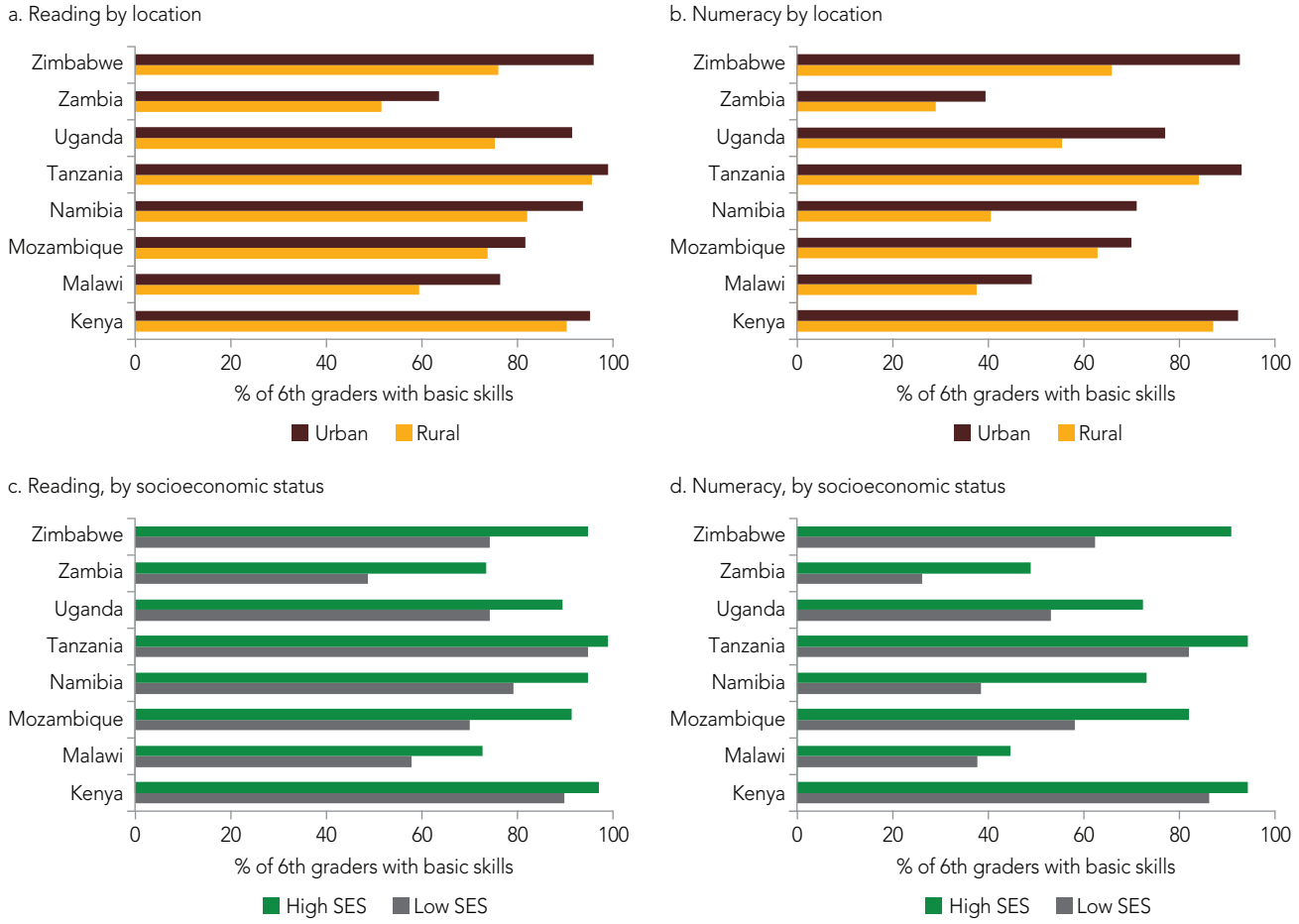
In the previous chapters, cross-sectional comparisons indicated that, between 2004 and 2010, monetary poverty stagnated in rural areas (and, by extension, nationally, due to the over-representation of poverty in rural settings). In contrast, families who suffered deaths of under-5 children declined nationally and across all deciles of the population. Child nutritional status improved on a national scale. Moreover, over time, all segments of the population gained increased access to primary education and improved sanitation. As noted above, the decline in the MPI between 2004 and 2010 was driven by improvements in education and health; and between 2010 and 2013, was driven by improvements in education. This section suggests that the improvements in education and health in Malawi were driven mainly by increases in public investments to these sectors. However, as already noted, the MPI does not necessarily map well with monetary poverty because the poorest did not always benefit from the progress made across non-monetary dimensions. Furthermore, improvements in nonmonetary dimensions of poverty reflect an increase in the quantity rather than in the quality of the services provided; and public investments to expand health and education coverage do not necessarily increase consumption.

3.4.1. *Access to education*

Greater access to education was the result of strong government efforts to expand access to education. In Malawi, the government provides free primary school education to all students. The 1994

[19] The SACMEQ (Southern and Eastern Africa Consortium for Monitoring Educational Quality) project collected test scores for sixth graders in 15 countries in southern and eastern Africa. The latest available data are from 2007.

FIGURE 3.7: Basic Proficiency in Reading and Numeracy in Selected Sub-Saharan Countries, 2007



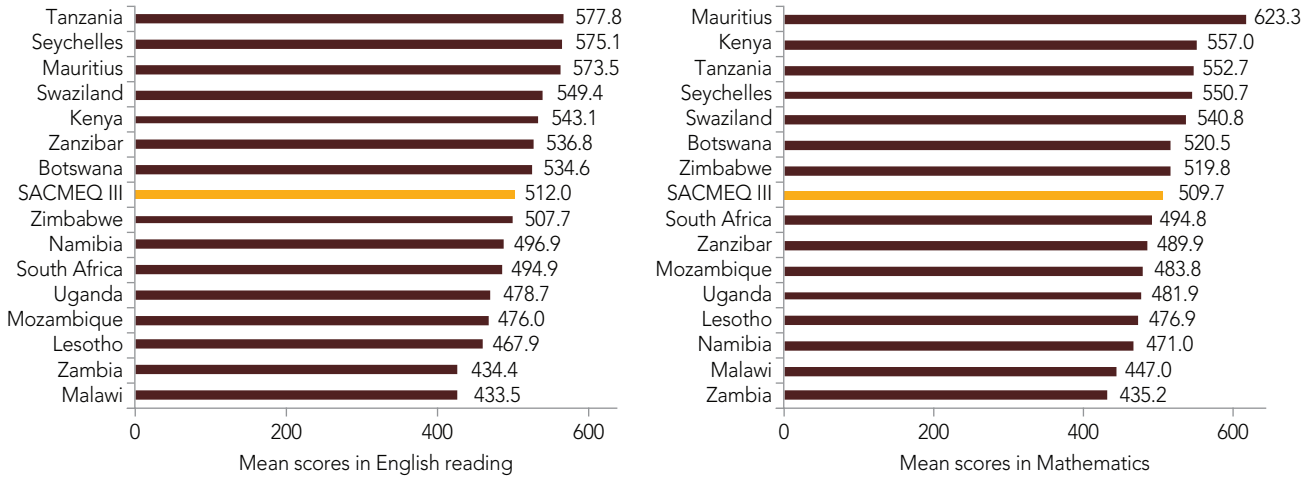
Source: Dabalen and others 2015.
Note: SES = Socioeconomic status.

Free Primary Education policy facilitated access, causing a surge in enrollment. In 1999 net primary school enrollment reached 99% and has remained above 96%, with the exception of 2007, when it was 93% (World Development Indicators).[20] However, even though access and enrollment at all levels of the education system have improved over the years, the public education system is not functioning effectively and so is producing weak educational outcomes.

The education sector accounts for the largest share of total government expenditures. The share of government expenditures on education in 2013 was 19%. Education expenditures have been increasing in nominal and real terms at a faster rate than the national budget. Between 2008/09 and 2012/13, expenditures on the education sector grew at an annual rate of 35%, compared to the annual rate of 21.4% for total government expenditures (World Bank 2013). Within the sector, primary education accounts for the largest and

[20] Net primary school enrollment was last measured in 2009 at 97%. Net enrollment rate is defined as the ratio of children of official school age who are enrolled in school to the population of the corresponding official school age.
[21] "Primary completion rate" is defined as "the number of new entrants (enrollment minus repeaters) in the last grade of primary education, regardless of age, divided by the population at the entrance age for the last grade of primary education." Note that data limitations make it difficult to exclude students who dropped out during the final year.

FIGURE 3.8: SACMEQ Scores in English and Mathematics (SACMEQ III), 2007



Source: SACMEQ III report 2010.

increasing share of the education budget followed by higher education and secondary education.

Primary school completion rates have been rising since 2004. That year, 58% of primary students had reached the last grade of primary school.[21] By 2010, the completion rate had increased by 10 percentage points to reach 68% and increased by an additional seven percentage points by 2013. Thus, in one decade, the primary completion rate rose by approximately 17 percentage points.

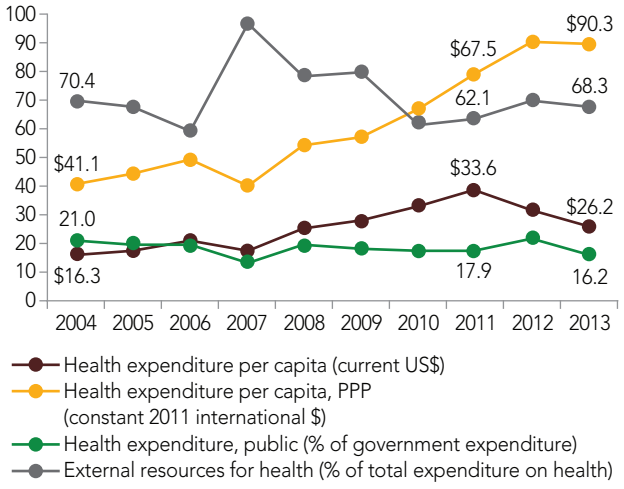
Improvements in educational achievement have not been met with improvements in educational performance. As revealed by the Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ), reading and mathematics assessment tests between 1995 and 2000, Malawi experienced a deterioration in the reading mean score for Standard 6 pupils (SACMEQ 2011a). In 2000 Malawi's Standard 6 students' performances in reading and mathematics were very poor compared to the other SACMEQ participating countries. Malawi's students ranked at the bottom in English reading and mathematics. By 2007 the mean scores for reading remained unchanged, but the mean scores in mathematics increased by 14 points. This rise nevertheless left Malawi at the bottom of the group of countries assessed in student performance in English and mathematics (figure 3.8).

The poor performance of primary school students is partly a reflection of the low quality in primary education. Because there were no corresponding increases in the number of classrooms, qualified teaching staff, and resources following the enactment of the Free Primary Education policy, primary school education suffered from poor and deteriorating quality. Large class sizes, high student-teacher ratios, inadequate learning, and a lack of qualified teaching personnel characterize primary school education in Malawi. (SACMEQ, 2011b; World Bank, 2010). From 2004 to 2013, the student-teacher ratio in primary schools was 69:1, or higher. The percentage of repeaters in primary school is alarmingly high. Since 2004, the repeater rate for both male and female students has hovered consistently at approximately 20%. This rate is of concern because repetitions entail an extra expense to a system—for each repeater it costs twice as much or more to produce one year of learning.

3.4.2. *Access to health*

Government expenditures on the health sector account for the third largest share of total government expenditures after education and agriculture.

FIGURE 3.9: Health Expenditures in the Health Sector, 2004–2013



Source: World Development Indicators.

In 2013, 16% of the Government expenditures were allocated to the health sector (figure 3.9). The growth of total health expenditures (public and private) on average has been faster than the population growth, leading to increasing total health expenditure per capita levels. Increased health expenditures are generally associated with better health outcomes especially for low-income countries (WHO 2012). Between 2004 and 2010, total health expenditure per capita doubled when expressed in U.S. dollars, and increased by a factor of 1.6 when expressed in terms of constant 2011 international dollars. Since 2010, the total health expenditure per capita has remained above the 2004 level. However, Malawi's health sector remains highly dependent on external financing with over 67% of the total financing coming from external resources.

Access to key health services at the right time can reduce child mortality. Immunizations play an important role in reducing illness and death and may protect child nutritional status. Between 2004 and 2010, the immunization of children aged 12–23 months against measles increased 13 percentage points from 80% to 93% followed by a small decrease in 2013 (table 3.6). During the same

TABLE 3.6: Health Indicators for Selected Years: 2004, 2010, and 2013

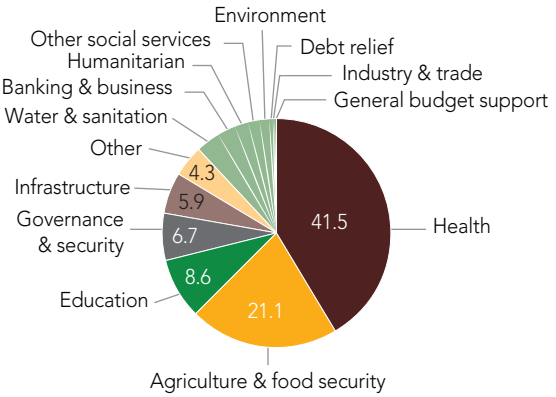
	2004	2010	2013
Immunization, DPT (% of children ages 12–23 months)	89.0	93.0	89.0
Immunization, measles (% of children ages 12–23 months)	80.0	93.0	88.0
Births attended by skilled health staff (% of total)	56.1	71.4	..
Pregnant women receiving prenatal care (%)	92.1	94.7	..

Source: World Development Indicators.

BOX 3.2: Official Development Assistance, 2011

Over 50% of aid flows to Malawi is allocated to health and education (figure B3.2.1). In 2011 The total flow of overseas development assistance (ODA) was estimated at US$0.8 billion, which represented 15% of Malawi's national income. That year, the largest share of ODA (41.5%) was allocated to health, and the third largest share (8.6%) to education. These percents indicate that approximately US$0.33 billion was allocated to health alone, and US$68 million was allocated to education.

FIGURE B3.2.1: Gross Official Development Assistance to Malawi, 2011



Source: Development Initiatives 2013. http://devinit.org/wp-content/uploads/2013/09/Investments-to-End-Poverty-full-report.pdf.

Interestingly, in 2011 the sectors that received the largest share of government expenditures were health, agriculture, education, and transport infrastructure, thus mirroring how the donors prioritized official development assistance.

period, the% of children immunized against three infectious diseases—diphtheria, pertussis and tetanus (DPT)—remained close to 90%. Also during the same period, births attended by a skilled health professional increased from 56% to 71% while the percentage of women receiving prenatal care rose slightly from 92% to 95%. Another possible contributor to Malawi's strong reduction in child undernutrition and deaths, particularly between 2004 and 2010, were the improvements in sanitation and safe drinking water.

Conclusion

Malawi has made steady gains in access to primary education, child malnutrition and under-five mortality, leading to the decline in the Multidimensional Poverty Index. The proportion of the population suffering from overlapping deprivations in education (not completing primary education or school-aged children not attending school), health (under-five mortality and undernutrition) and living standards (lack of access to electricity, improved sanitation, safe drinking water as well as lack of ownership of different assets) declined between 2004 and 2013.

Unfortunately, the progress in many of these nonmonetary indicators of well-being has not happened at the same pace for everyone or reached always the poor. Between 2004 and 2010, the richer segments of the population experienced from a higher base greater gains in educational achievements than the bottom 40 percent. There were equally large gaps between the nutritional status of children living in wealthier and in poorer households. The bottom 40 percent experienced little improvement in key nonmonetary dimensions such as access to electricity and running water. Gaps in access to key assets, services (water, sanitation, and electricity), and opportunities (health, nutrition, and education) not only prevailed across income groups, but also between urban-rural areas, boys and girls and female-male headed households.

Clearly, challenges remain in laying the foundations for shared prosperity in Malawi. The progress made in some nonmonetary dimensions should not distract policy makers from the challenges posed by the relative lack of progress in other dimensions nor should it distract policy makers from ensuring equitable access to opportunities and services for everyone.

4

FOOD SECURITY AND NUTRITION IN MALAWI: MAPPING PROGRESS SINCE 2004

Based on objective measures cross-sectional comparisons indicate that progress in food security in Malawi has stagnated since 2004. Marginal improvements have been achieved in the dimensions of dietary diversity. Nevertheless, the share of the population who consume fewer than 2,100 calories per day, the minimum threshold for per-capita intake, has hovered near 50%. Based on the panel component in the data used in this chapter, chronically undernourished individuals come from larger households with higher dependency ratios; have household heads with fewer years of education; are more likely to be poor; and have a larger income gap below the poverty line than those who can improve their nourished status. These data indicate that it is harder for the extreme poor to improve their caloric intake to acceptable levels.

Data from the Demographic and Health Survey (DHS) show that, between 2004 and 2010, Malawi achieved gains in child nutrition. Stunting fell from 53% to 48%; underweight prevalence dropped from 19% to 14%; and wasting declined from 6% to 4%. Between 2010 and 2013, despite stagnant-to-minimal progress achieved in objective measures of food security, households' subjective assessments of food insecurity increased from 50% to 65%. This chapter shows that increases in the price of maize over the 12 months preceding the IHPS survey for 2013 increase the probability of experiencing food insecurity over the last 12 months, or of worrying about food in the last 7 days. This result suggests that higher maize prices heighten people's worries to meet their food needs and, ultimately, affect their food security.

The two largest programs aimed at enhancing food security in Malawi—the Farm Input Subsidy Program (FISP) and Malawi's Social Action Fund Public Works Program (MASAF-PWP, or MASAF)—have not resulted in measurable improvements in food security. Given the massive investments in these programs, stakeholders may want to rethink the ways in which these programs can more positively impact food security.

Introduction

Poverty experts argue that effectively measuring poverty demands moving beyond income and consumption, to include more interdisciplinary measures of human welfare (Addison and others 2009). Food security and nutrition represent two such dimensions that are closely linked to poverty and can provide profound insight into a population's wellbeing: "Keeping food security and agriculture high on the development agenda, through comprehensive reforms, improvements in the investment climate, supported by sustained social protection, is crucial for achieving major reductions in poverty" (FAO and others 2013, 1). In fact, demonstrating the significance and interconnectedness of the two concepts, eradicating extreme poverty and hunger was the first goal of the Millennium Development Goals (MDGs).

This chapter profiles food and nutrition security in Malawi from 2005 to 2013. The analysis pulls primarily from three data sources: Second Integrated Household Survey (IHS2) from 2004–2005, Third Integrated Household Survey (IHS3) from 2010–2011, and Integrated Household Panel Survey (IHPS) from 2013. All three surveys were administered to national representative samples, but certain nuances in the sampling and implementation procedures should be noted when attempting to compare the data sources.[22] The IHS2 and the full IHS3 samples were both stratified by month and administered throughout the year. Findings from these two samples are generally comparable because they take into account data from twelve-month periods. These two samples only allow for cross-sectional comparisons of trends over time, as the sample was entirely refreshed for IHS3. Additionally, a subsample of the full IHS3 sample was selected for follow-up in the IHPS. This IHS3 subsample and IHPS sample were interviewed only during March-November of 2010 and 2013, respectively, and therefore are not strictly comparable to the IHS2. However, the group of individuals from IHS3 and IHPS provides a unique value in their panel dimension. As in past chapters, to simplify, the chapter will use "2004" to designate the IHS2 and "2010" to designate the IHS3 cross-section, unless otherwise stated for the panel in 2010.

The chapter is organized as follows. First, objective measures of food security (box 4.1) are used to track trends over time and identify particularly vulnerable groups in the current climate. The chapter then includes an empirical analysis of the determinants of dietary diversity and uses a nationally representative panel dataset to identify the individuals who are chronically food insecure. Finally, the chapter presents results from panel data analysis on the relationship between maize price increases and subject food insecurity.

4.1. *Caloric Intake*

Per capita caloric intake is significantly higher among the non-poor. In 2013, the average non-poor individual consumed approximately 1,250 calories more than the average poor individual.[23] Based on the consumption modules from the IHS2, IHS3, and IHPS, the overall average per capita caloric intake from March-November was estimated at 2,375 in 2004, 2,260 in 2010, and 2,327 in 2013 (figure 1a). Per capita caloric intake was only 2% higher in urban areas (2,383 calories) than in rural areas (2,336 calories) in 2004, but 11% higher (2,548 vs. 2,289, respectively) in 2013. Additionally, those living in urban areas exhibited higher caloric consumption than their rural counterparts within all regions and in all three years. The Central region (both urban and rural) has seen the largest declines in caloric intake since 2004.

Average caloric intake across all months of the year remains relatively stagnant between 2004 (2,332 calories) and 2010 (2,192 calories). The

[22] The team takes precautions to ensure valid comparisons are made and makes note of the data sources throughout the chapter.
[23] These values reflect average per capita caloric intake for March-November, for all three years. The IHPS was administered only during these months. Thus, to ensure comparability with estimates for 2013, the research team restricted the analysis of IHS2 and IHS3 for figure 4.1 to March-November. Figure 4.2 provides average per capita caloric intake across all months of the year for 2004 and 2010 only.

BOX 4.1: Measuring Food Security

Food security is a multifaceted concept, encompassing and shaped by a wide range of factors. The internationally accepted definition of food security, agreed by the 1996 World Food Summit, is:

> *Food security, at the individual, household, national, regional and global levels [is achieved] when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.*

The Food and Agriculture Organization of the UN (FAO) breaks food security into four primary dimensions:

1. *Availability.* Supply side of food security
2. *Access.* A household's ability to obtain adequate supplies of food
3. *Utilization.* Food preparation, feeding practices, and the diversity of one's diet
4. *Stability.* A household's capacity to protect itself from periodic food insecurity caused by adverse weather, political instability, or violence; or significant economic shock (FAO 2008a).

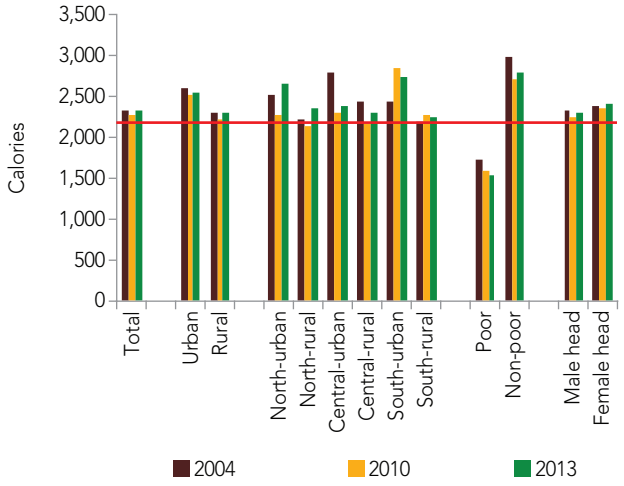
Given these inherent complexities, one can use many approaches and corresponding indicators to measure food security. Taking into account data availability, this chapter focuses on five dimensions. In fact, FAO uses 31 indicators to fully assess a population's food security, a task that requires a multitude of data sources and inputs. The indicators presented in this chapter were selected based on their ability to capture multiple dimensions of food security, as outlined above, as well as the constraints of the data availability. In order to better ensure comparability of indicators at multiple points in time over the last ten years, the team opted to use the same survey instrument as the input for data analysis. While this means that the chapter does not present trends for all 31 food security indicators, the decision allows the reader to look at nationally representative cross-sectional trends (and, when using the panel component of the IHS3 and IHPS, panel dynamics) in food security over time. The five indicators presented below, taken together and over time, provide significant insight into the four dimensions of food security in Malawi since 2004:

1. *Caloric intake* often is considered the benchmark measure for food security because caloric intake explicitly measures an individual's energy consumption. Due to financial and resource constraints in developing countries such as Malawi, caloric intake data typically is collected through a household survey food consumption module. Per capita estimates of consumption then are estimated using an adult equivalency scale, which makes assumptions about intrahousehold food consumption based on age and gender of household members. This type of data also enables constructing related food security indicators, such as the proportion of those consuming less than the standard caloric threshold and the share of dietary energy obtained from cereals, roots, and tubers.
2. *Undernourishment* quantifies food security at the national level by capturing the average availability of food against requirements. This indicator compares per capita caloric intake against a given minimum energy requirement threshold; the proportion of undernourished reflects the part of the distribution falling below the threshold. This measure allows for frequently updated comparisons of energy deficiencies across countries and over time.
3. *Dietary diversity* measures the degree to which households or individuals consume a variety of foods and can shed light on the quality of diets. The measure typically is constructed by counting the number of foods or food groups eaten over a certain reference period. This paper used the Food Consumption Score (FCS) to measure dietary diversity.
4. *Nutritional status* typically is measured using anthropometric indicators of children under 5 years of age. These indicators provide information on both acute and chronic child malnutrition, and often are linked to micro- and macronutrient deficiencies and poor feeding practices.
5. *Subjective measures of food security* generally are not used alone. However, used in conjunction with other estimates, they can paint a comprehensive picture of the experience of being food insecure. The IHS3 and IHPS include sections on subjective food security that ask households about different types of food insecurity faced in the previous seven days and in the previous 12 months.

values presented in figure 4.1 depict average per capita caloric intake only for March-November, and do not include Malawi's lean season from December through February. Per capita daily caloric intake across all months of the year can be calculated for 2004 and 2010, using the full samples from IHS2 and IHS3, respectively. The average annual per capita caloric intake was 2,333 in 2004 and 2,192 in 2010 (compared to 2,375 and 2,260, respectively, for March-November). Inclusion of the lean-season months did not significantly decrease average caloric intake at the national level (figure 4.2).

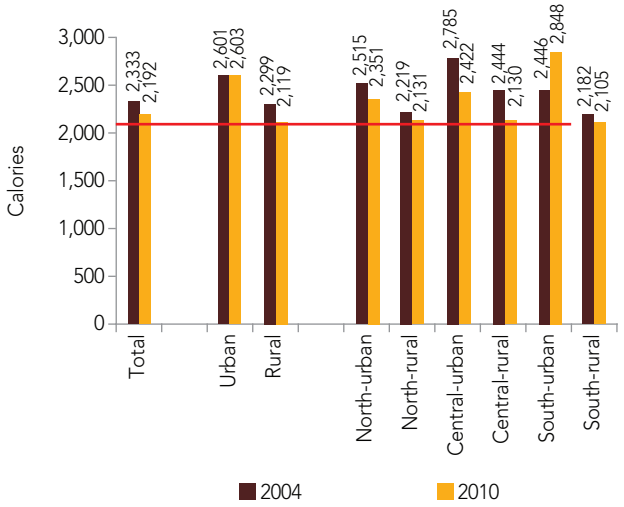
In rural areas, the average daily per capita caloric intake during the lean season is significantly lower than during the harvest season. A similar differential does not hold true in urban

FIGURE 4.1: Trends in Malawi's Daily Per Capita Caloric Intake March-November, 2004–2013



Source: Poverty Assessment team calculations based on IHS2, IHS3, and IHPS.
Note: Red line denotes 2,100 calories/person/day, the minimum value for food security and nutritional stability (WFP 2005).
Samples for IHS2 and IHS3 were restricted to the households interviewed March-November to ensure comparability with IHPS.

FIGURE 4.2: Trends in Malawi's DailyPer Capita Caloric Intake, March-February, 2004–05 and 2010–11



Source: Poverty Assessment team calculations based on the full IHS2 and IHS3.
Note: Red line denotes 2,100 calories/person/day, the minimum value for food security and nutritional stability (WFP 2005).
Estimates reflect average per capita caloric intake across all months.

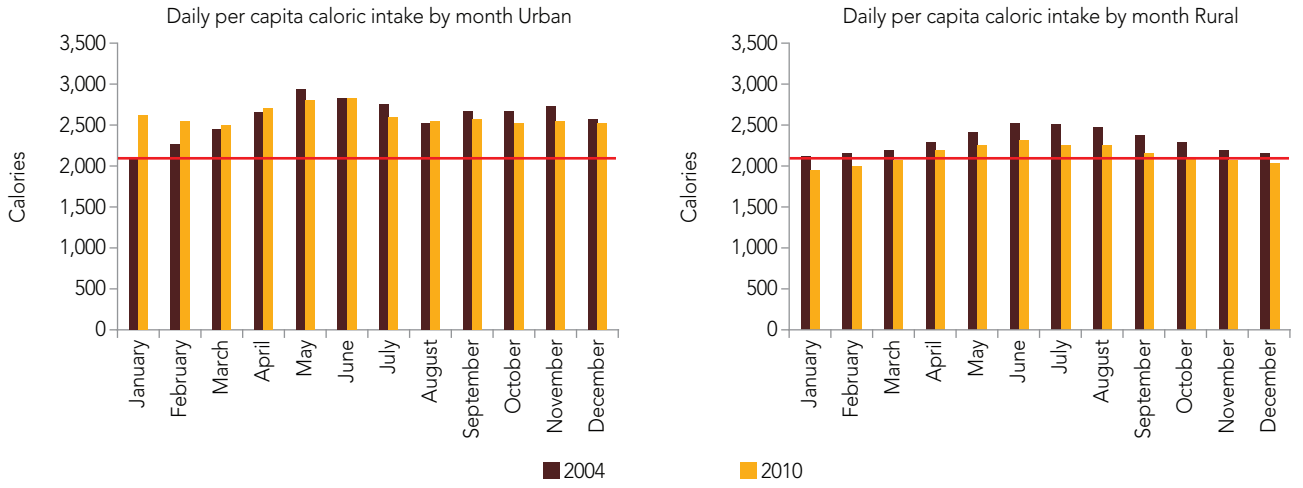
areas. Caloric intake did not vary significantly month to month at the national level. However, in rural areas, the team did note peaks in consumption from April-August, coinciding precisely with the harvest season; as well as drops during the lean season from November–February (FAO 2015). Such seasonal variation in consumption is not uncommon in societies whose food security may be highly linked to agriculture. Figure 4.3 highlights this temporal dimension of caloric consumption. Although urban individuals experience some seasonal variation in caloric intake, on average, they never take in less than the 2,100 calorie threshold. In contrast, in 2010, rural individuals consumed fewer than 2,100 calories/day from October-March, which coincides with the country's lean season.

Over the last 10 years, there has been almost no change in the core macronutrient dimension of diets. The share of dietary energy derived from cereals, roots, and tubers is an indicator used to gauge availability of nutrient-dense foods. A higher value signifies a relative dearth of calories from protein, vegetables, and fruit, and thus a potential deficit of micro and macronutrients. A lower value indicates higher dietary quality (FAO and others 2013). At all three points in time, the data show that rural households obtained a significantly higher share of their calories from cereals, roots, and tubers, and thus had less nutrient-dense diets than their urban counterpart (figure 4.4). The teams also have observed little variation in this indicator since 2004. Overall, the nutritional value of Malawian diets has remained more or less unchanged since 2004.

4.2. Undernourishment

Since 2004, while there has been some variation in undernourishment at the regional level, its national prevalence has remained nearly constant. In order to identify those consuming inadequate caloric amounts, the reader can look at the distribution of caloric consumption. More specifically, the

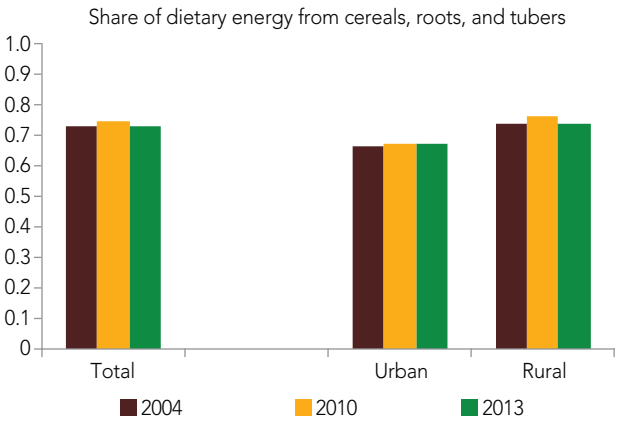
FIGURE 4.3: Seasonal Variation in Daily Per Capita Caloric Intake, by Urban/Rural, 2004 and 2010



Source: Poverty Assessment team calculations based on IHS2, IHS3, and IHPS.
Note: Estimate at each month reflects a three-point weighted average, using the month before and after. Red line denotes 2,100 calories/person/day, the minimum value for food security and nutritional stability (WFP 2005).

team can determine the share of the population that consumes fewer than the sustainable minimum of 2,100 calories/day. Nationally, the share of the population consuming less than this caloric value has hovered between 50% and 54% over the last eight years (figure 4.5)[24] from 2004 to 2013, the Central region has seen the largest increase in the share of those consuming below 2,100 calories per day. Within Central region, the share in urban and rural areas increased from 37% to 54% and from 45% to 50%, respectively. Perhaps unsurprisingly, the rural population bears more of the undernourished burden, with almost 53% of rural individuals consuming fewer than 2,100 calories per day in 2013, compared to 42% of their urban counterparts. Nationally, the rural South has significantly higher shares of undernourished persons than the rural North and rural Central. These rates in the rural South have stayed elevated consistently since 2004.

FIGURE 4.4: Malawians' Share of Dietary Energy Derived from Cereals, Roots, and Tubers, by Urban/Rural, 2004–2013

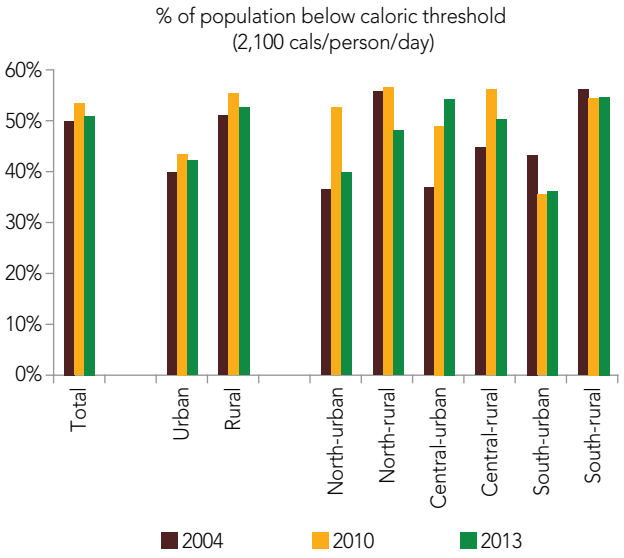


Source: Poverty Assessment team calculations based on IHS2, IHS3, and IHPS.
Note: To ensure comparability across surveys, IHS2 and IHS3 samples are restricted to households interviewed in March-November.

The share of the population consuming less than the caloric threshold is correlated with other measures of food insecurity as well as with poverty. Households who identified themselves as having

[24] Undernourishment in 2004 and 2010, using the full IHS2 and IHS3 samples, which include data collected during all 12 months of the year, is 52 and 56%, respectively. Thus, the overall levels of undernourishment increase slightly (as compared to undernourishment for March through November only) but the magnitude of the increase between years remains the same.

FIGURE 4.5: Undernourishment Trends in Malawi by Region, 2004–2013 *(%)*



Source: Poverty Assessment team calculations based on IHS2, IHS3, and IHPS.
Note: To ensure comparability across surveys, IHS2 and IHS3 samples are restricted to households interviewed in March-November.

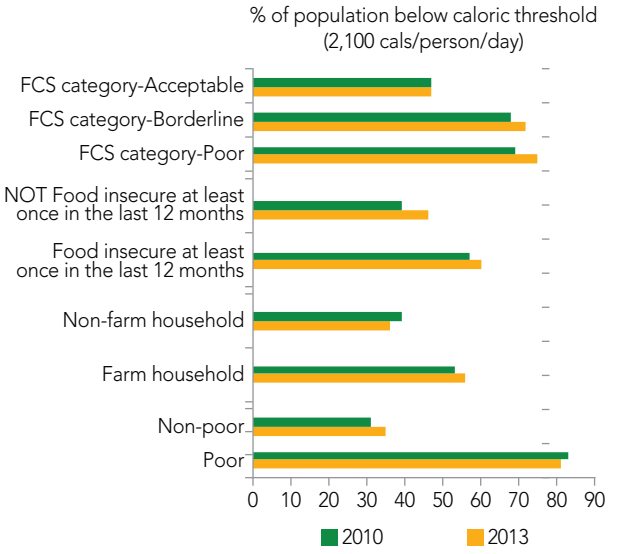
faced food insecurity at least once in the preceding 12 months also were more likely to consume too few calories as compared to their subjectively food secure counterparts (57% vs. 39% in 2013) (figure 4.6). Nationally, individuals living in households with poor or borderline food consumption scores are at least 55% more likely to consume too few calories per day as compared to those living in households with acceptable levels of dietary diversity.

In 2013, more than 80% of the poor consumed less than the recommended amount of calories per day, compared to only 31% of the non-poor. Furthermore, while the percentage of undernourished among the non-poor dropped between 2010 and 2013, among the poor, the group of undernourished grew slightly larger. Although farm households also tend to perform worse for this indicator, the gap between farm and non-farm households closed slightly between 2010 and 2013 (from a gap of 20 percentage points to 14 percentage points).

4.2.1. *Dynamics of undernourishment*

Panel analysis is particularly important for informed decision-making by policymakers to foster national growth and address particularly vulnerable groups. Analysis of cross-sectional data provides insight into trends over time. However, panel data analysis can distinguish between the chronic and transient elements of a given measure of wellbeing (Glewwe and Gibson 2005). This type of analysis may help to answer questions such as, despite a decrease in the prevalence of undernourishment, are there still individuals who are "trapped" in an undernourished state? Are there people who are subjectively food secure in one year but not the next? Are there pockets of individuals experiencing sharp declines in food consuptions scores (FCS) despite an overall improvement in dietary diversity? Answering these types of questions are of such importance that Glewwe and Jacoby (2000) recommend collecting panel data despite the few drawbacks of greater time and financial costs, to analyze welfare nutrition and food security dynamics.

FIGURE 4.6: Undernourishment and Selected Household Characteristics in Malawi, 2010–2013 *(%)*



Source: Poverty Assessment team calculations based on IHS3 and IHPS.

BOX 4.2: Welfare Programs: Are They Increasing Food Security?

Welfare programs aimed at smoothing consumption and improving food security are pervasive throughout Sub-Saharan Africa. In recent years, the Government of Malawi has invested heavily in two of the country's largest such programs: the Farm Input Subsidy Program (FISP) and Malawi's Social Action Fund Public Works Program (MASAF-PWP).

FISP was introduced in the 2005–06 cropping season with three primary objectives, one of which was to promote food security at the household level through increased productivity. FISP provides approximately half of all Malawian farmers with subsidized fertilizer for maize production, along with vouchers for modern maize seeds and tobacco fertilizers (Dorward and Chirwa 2011). The Government of Malawi has invested a significant portion of its national budget in FISP. The program accounted for 8.3% of the 2014–15 national budget (World Bank 2016b).

MASAF was conceived in the mid-1990s to provide short-term labor-intensive activities for impoverished able-bodied households to, among other goals, improve their food security and provide employment/income insurance. MASAF aims to indirectly increase access to farm inputs during the planting months of the main agricultural season. This aim distinguishes the Malawi program from the traditional public works projects (PWP) that provide income support during the lean season to smooth consumption and foster food security (see chapter 8 for a more detailed discussion of MASAF-PWP).

Impact evaluations identify two shortcomings of the programs related to food security. First, there is evidence that the programs are not effectively reaching the poorest and most vulnerable households. MASAF is intended to target pockets of the population that meet certain vulnerability criteria. However, because the program is rationed, it has reached approximately only 15% of the intended recipients (Beegle, Galasso and Goldberg 2015). FISP also was intended to target the poor but, in practice, does not. FISP does not exclusively target the poor or the rich at any level of program administration, and it reaches all socioeconomic strata of rural Malawi. Furthermore, the relatively well off in wealth and land holdings (rather than the poor or the wealthiest) along with those who are connected to community leadership and reside in locations with favorable soil quality have a higher likelihood of FISP participation and receive a greater number of coupons (Kilic and others 2014).

Second, although FISP has shown a positive and modest contribution to increase maize production, much of the increase has been observed among better-off farmers (World Bank 2014). There is also no evidence that MASAF-PWP increases the use of fertilizer and, hence, that it supports food security through enhancing production. Beegle and others applied a large-scale randomized controlled trial and find that MASAF-PWP had no effect on food security for treated households. The evidence for FISP points to minimal improvements in poverty (See Ricker-Gilbert 2016). If the massive investments in programs including MASAF-PWP and FISP are to continue, stakeholders may want to rethink the ways in which the programs can positively impact food security.

Nearly 74% of individuals in Malawi were undernourished in 2010, in 2013, or in both years, demonstrating the pervasiveness of undernourishment across time. The panel dimension of the IHPS allows the team to track trends in food security at the level of the individual, rather than the population. The IHPS follows the same panel, or sample, of individuals (approximately 14,200) at two points in time: in 2010 and in 2013. A transition matrix provides a useful presentation of individual-level movement across states of wellbeing over time. In table 4.1, the diagonal moving from the top left to the bottom right reflects those maintaining their status over time. The top right cell represents those who have improved their caloric intake. The bottom left cell represents individuals who fell into an undernourished state between 2010 and 2013. Thirty-one% of individuals consumed fewer than 2,100 calories/day at both points in time while 26% took in more than 2,100 calories/day in both waves.[25] While 23% of individuals increased their caloric intake to above the 2,100-calorie threshold, a comparable 20% fell below the threshold over the same period. Food insecurity, particularly in the form of caloric deficiency, is occasionally viewed as a proxy for chronic poverty. The basic assumption behind this view is that the poor will sooner sacrifice nonfood consumption and food quality before allowing calories to fall below subsistence needs. It is therefore somewhat surprising to see the large extent of transitions out of and in to undernourished status. Almost one-fourth (23%) of individuals increased their caloric intake to above the

[25] "Wave" refers to the round of data collection. Wave 1 is the IHS3 in 2010; wave 2 is the IHPS in 2013.

2,100-calorie threshold, while one-fifth fell below the threshold over the same period.

Furthermore, among those who consumed under 2,100 calories/day in 2010, the team compared profiles for the "stayers"—those who *also* consumed under 2,100 calories/day in 2013; and the "movers"—those who no longer consumed below the caloric threshold in 2013. Table 4.2 shows ways in which the chronically undernourished look different from those who are able to lift themselves out of food insecurity in the dimension of caloric intake. On average, individuals who consumed less than 2,100 calories/day at both points in time come from larger households with a higher proportion of members less than 15 years old and a lower proportion of members 15 years-65 years old. This finding means that households with a higher dependency ratio—the ratio of those not in the labor force to those within the age range expected to be part of the labor force—are more likely to be chronically undernourished.

Households able to increase per capita caloric intake are more likely to be non-farm households and to have household heads with more years of education. The team also found a significant difference in poverty between "movers" and "stayers;" more stayers than movers tended to be poor. Furthermore, the stayers had a higher poverty gap than the movers.[26] On average, stayers fell 24% below the 2010 poverty line, whereas movers fell 18% below it. Stayers had a larger income gap below the poverty line of 37%, compared to poor movers, who were only 33% below.[27] These findings suggest that it is harder for the extreme poor than for any other group to raise their caloric intake to acceptable levels.

TABLE 4.1: Malawi Transition Matrix for Those Who Consumed under 2,100 Calories/Day, 2010 and 2013 *(%)*

		Wave 2 (2013)	
		Undernourished	Sufficient Caloric Intake
Wave 1 (2010)	Undernourished	31.17	22.89
	Sufficient caloric intake	19.51	26.44

Source: Poverty Assessment team calculations based on IHS3 panel and IHPS

4.3. *Dietary Diversity*

Dietary diversity is a concept that captures the degree to which households or individuals consume a variety of foods. Along with caloric intake and undernourishment, dietary diversity can help generate a greater understanding of a population's food insecurity (Ruel 2003). At the most basic level, the concept is measured by counting the number of foods or food groups eaten over a certain reference period. However, a wide array of indicators are used to capture dietary diversity, and they may differ in the list of food groups, reference period, and level of data collection. While caloric intake sheds light on *how much* an individual consumes, it provides little information on the *types* of foods consumed. For example, the poverty assessment team may not consider an individual who consumes 2,500 calories/day of maize to be food secure. Research suggests that dietary diversity can be used as a proxy for household income, household level access to food, and macronutrient and micronutrient intake (Hotley and others 2000; Anzid and others 2009; Hoddinott and Yohannes, 2002; Rah and others 2010).

Food consumption score

Households have diversified their diets over the past few years. In 2010, 4%, 22.9%, and 73.1% of households had poor, borderline, and acceptable FCS levels, respectively. Three years later, only 1.8% of households had poor dietary diversity, with 17.4% and 80.1% having borderline and acceptable diversity in their diets (figure 4.7). Urban households have a

[26] The poverty gap is defined by the mean distance below the poverty line (expressed as a proportion of the poverty line), where the mean is formed over the entire population and counts the nonpoor as having zero poverty gap.

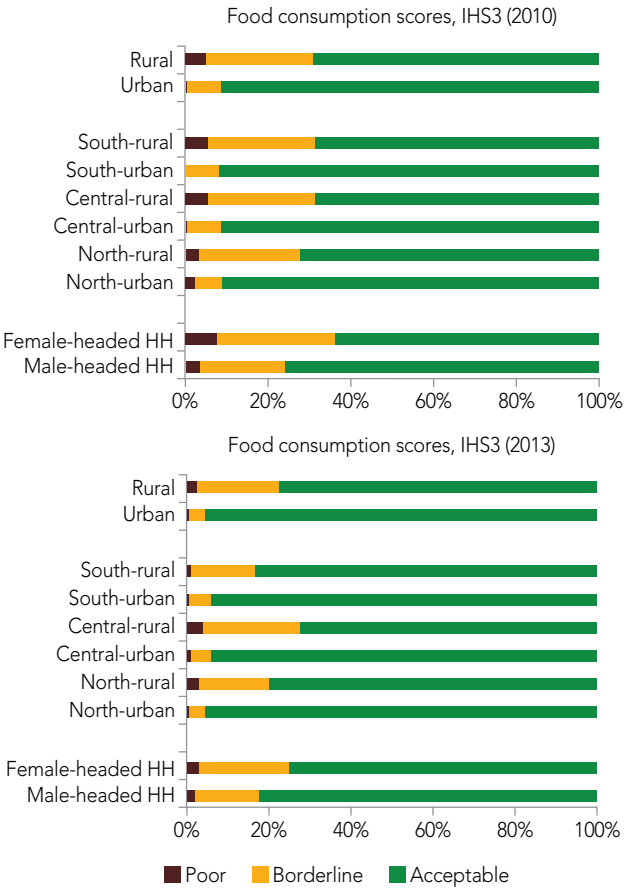
[27] The income gap helps answer the question, "How poor are the poor?" and can be thought of as the average shortfall of the poor as a fraction of the poverty line.

TABLE 4.2: Profile of Malawi's Undernourished Individuals in IHS3: "Stayers" and "Movers"

Characteristics in Wave 1 (IHS3)	Stayers: Chronically Undernourished	Movers: Move Out of Undernourished State
Urban	0.12 (0.03)	0.12 (0.03)
Household demographics		
Household size (mean)	6.59*** (0.10)	6.14*** (0.10)
Proportion of household <15 years	53.66*** (0.64)	48.60*** (0.83)
Proportion of household 15–65 years	44.03*** (0.64)	48.36*** (0.79)
Proportion of household over 65 years	2.25* (0.27)	2.92* (0.36)
Proportion of female household members	51.17 (0.62)	52.14 (0.89)
Household head characteristics		
Female	0.19 (0.02)	0.17 (0.02)
Age (mean)	43.10 (0.55)	43.49 (0.56)
Years of education (mean)	4.65* (0.23)	5.15* (0.23)
Household has improved water source	0.80 (0.03)	0.79 (0.03)
Household has improved toilet	0.70 (0.02)	0.75 (0.03)
Farming household	0.94*** (0.01)	0.91*** (0.02)
Distance to agriculture market	7.69* (0.48)	7.13* (0.41)
Poor	0.65*** (0.03)	0.55*** (0.03)
Poverty gap	0.24*** (0.02)	0.18*** (0.01)
Per capita annual expenditure (kwacha)	81,789*** (2,939)	100,171*** (4,490)

Source: Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: Standard errors in parentheses. Difference between two columns is significant at *p<0.1, **p<0.05, ***p<0.01. Undernourished is defined as consuming fewer than 2,100 calories/person/day.

FIGURE 4.7: Dietary Diversity in Malawi, 2010 and 2013 *(%)*



Source: Poverty Assessment team calculations based on IHS3 panel and IHPS.

clear advantage in dietary diversity compared to their rural counterparts; in both 2010 and 2013, almost no urban households had poor FCS levels. Additionally, rural households were more than three times as likely as urban households to have borderline FCS levels. This disparity was consistent in both periods. Female-headed households were somewhat worse off in terms of dietary diversity in both years, but the gender gap closed slightly by 2013.[28] Overall, the team noted

[28] The poorer dietary diversity in female-headed households may be driven in part by the circumstances that led to the woman's assuming the role as head. Among male household heads, 87% are monogamously married. In contrast, among female household heads, 79% are either widowed or divorced. Thus, the majority of female-headed households are inherently at a disadvantage as income earners, and potentially, due to a history of experiencing shock through the death of a husband.

BOX 4.3: Food Consumption Score

One common measure of dietary diversity is the FAO's Food Consumption Score (FCS). The FCS takes into account dietary diversity, frequency of food groups consumed, and relative nutritional value of each food group consumed in the last seven days (FAO 2008b).

Eight groups are proposed for the FCS (figure B4.1). The indicator is calculated by totaling the weighted number of days a household consumed each of the eight food groups over the last seven days. The potential score range is 140. The higher the FCS, the better the diversity of the household's food intake and, subsequently, the better the quality of the members' diets. Two possible approaches are recommended to categorize households based on their FCS. In the first approach, which is the more appropriate option in the context of Malawi (see note below), households with scores less than 21 are labeled "poor;" those falling between 21 and 35 are said to be in a borderline range; and those with scores above 35 are considered to have acceptable levels of dietary diversity (Weismann and others 2009).

FIGURE B4.3.1: Components and Relative Weights of FCS

Food groups and weights

	Food Items	Food Groups	Weight
1	Maize, maize porridge, rice, sorghum, millet pasta bread and other cereals	Cereals and Tubers	2
2	Cassava, potatoes and sweet potatoes		
3	Beans, Pas, groundnuts and cashew nuts	Pulses	3
4	Vegetables and leaves	Vegetables	1
5	Fruits	Fruit	1
6	Beef, goat, poultry, pork, eggs and fish	Meat and Fish	4
7	Milk yogurt and other diary	Milk	4
8	Sugar and sugar products	Sugar	0.5
9	Oils, fats and butter	Oil	0.5
10	Condiments	Condiments	0

Source: FAO 2008b.
Note: WFP recommends increasing these thresholds by seven points in countries whose "population is found to homogeneously consume oil and sugar nearly daily" (2008, 22). Cluster analysis of oil and sugar consumption in Malawi reveals that more conservative thresholds are better suited for the Malawian context.

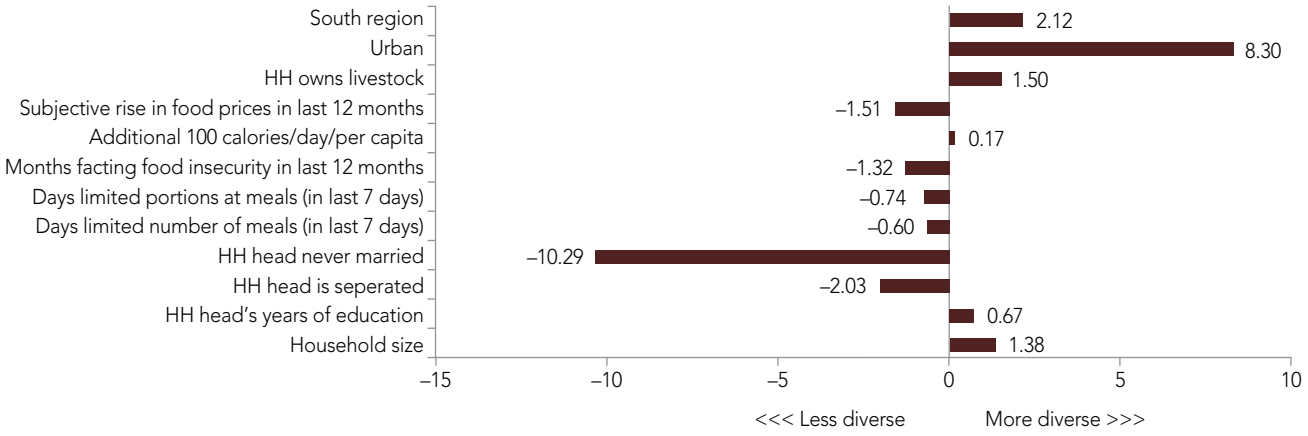
relatively low levels of poor dietary diversity across geographic regions. The vast majority of the population had borderline or acceptable FCS levels, and the proportion of households in the "acceptable" range increased over time within all regions.

4.3.1. *Determinants of dietary diversity*

The team explored the determinants of dietary diversity in a Malawian context to ascertain which characteristics had the greatest impact on improving dietary diversity. The analysis below uses a linear regression model to predict households' dietary diversity. The model uses the FCS as the dependent variable and controls for a range of determinants shown to affect dietary diversity, including household head characteristics (HH), household characteristics (H), consumption per capita (C), and other controls (O), such as region and month of interview (Taruvinga and others 2013; Das 2014). Results from this model found to be significant at a p-value of 10% or less are presented in figure 4.8. The model is specified as follows:

$$FCS = \alpha_i + b_{1i}HH_i + b_{2i}H_i + b_{3i}C_i + b_{4i}O_i + e_i$$

FIGURE 4.8: Unit Change Effect on Malawi's Food Consumption Scores, IHPS, 2013



Source: Poverty Assessment team calculations based on IHPS.
Note: Selected results of linear regression. The dependent variable is the Food Consumption Score (FCS). Only results statistically significant at 10% or lower are shown. The model controls for female head of household, household head's age, proportion of household members under age 15, ages 14–65, and over 65, participation in farming, distance to the nearest agriculture market, per capita expenditure, and interview month. Omitted categories are: household head is monogamously married and North region. Mean FCS is 50.5, and median is 48.0.

The analysis reveals that household head characteristics matter for dietary diversity. Household heads with more education are associated with more diverse diets. Household heads who are separated or who have never been married tend to manage households with less diverse diets. In fact, households whose heads have never been married have a FCS nearly 10 points lower than households with monogamously married heads. Larger household sizes also are correlated with diverse diets; each additional household member increases FCS by 1.4.

Households in urban areas and in the Southern region tend to have higher FCS. On average, urban households have an FCS that is 8.3 points higher than rural households' scores. These urban households benefit from a greater number of available and accessible foods that accompany an urban environment.

As expected, households who had to limit the number of meals or the portion sizes eaten in the previous seven days also had lower food consumption scores. Subjective measures of food insecurity also are correlated with dietary diversity. The greater the number of months a household felt they faced food insecurity in the previous 12 months, the less diverse their diet. Interestingly, after controlling for factors that the team had expected might affect dietary diversity, the team found that each additional 100 calories per capita/day had a negligible impact on FCS. Stated another way, households with similar levels of expenditure, size, and demographics, but with *different* per capita caloric intakes, nonetheless would have similar levels of dietary diversity. Households who own livestock, and thus have direct access to meat and dairy, have significantly more diverse diets.

4.4. Malnutrition

In the last eight years, Malawi has experienced moderate improvements in child malnutrition. Data on trends in child malnutrition can be derived from two primary sources: (1) the IHS data from 2004 (IHS2) and 2013 (IHPS), and (2) the Demographic Healthy Survey (DHS) from 2004 and 2010.[29] According to DHS data, between 2004 and 2010, stunting in Malawi fell from 53.1% to

[29] Due to issues with anthropometric data collection during IHS3 fieldwork, child malnutrition indicators from this wave have been excluded from this assessment.

BOX 4.4: Assessing Child Malnutrition in Malawi

In general, three measures commonly are used to ascertain child nutritional status: stunting (low height-for-age), underweight (low weight-for-age), and wasting (low weight-for-height).

1. ***Height-for-age or stunting.*** Low height-for-age is an indicator of past growth failure, capturing a slowing in the growth of the fetus and the child as compared to a healthy, well-nourished child of the same age. As such, low height-for-age identifies past undernutrition, or chronic malnutrition, but misses short-term changes in malnutrition. It is associated with a number of long-term factors including chronic insufficient protein and energy intake, frequent infection, sustained inappropriate feeding practices, and poverty. In children over 2 years of age, the effects of these long-term factors may not be reversible.
2. ***Weight-for-height or wasting.*** Low weight-for-height identifies children suffering from current (acute), undernutrition. Wasting is the result of a weight falling significantly below the weight expected of a well-nourished child of the same height. Causes include inadequate food intake, incorrect feeding practices, disease, and infection, or, more frequently, a combination of these factors. Wasting in individual children and population groups can change rapidly and shows marked seasonal patterns associated with changes in food availability or disease prevalence.
3. ***Weight-for-age or underweight.*** Low weight-for-age identifies the condition of weighing significantly less than a well-nourished child of a specific age. This index reflects both past (chronic) and/or present (acute) undernutrition.

All three of these indicators generally are expressed in terms of Z-scores, defined as the difference between the anthropometric values of an individual and the median values of a well-nourished reference population for the same age or gender. Children with Z-scores for underweight, stunting, or wasting below –2 Standard Deviations are considered moderately malnourished.

47.8%; underweight prevalence dropped from 18.6% to 14.1%; and wasting fell from 6.2% to 4.1%.[30] Significant improvements also are observed in the IHS2 and IHPS data, although these data suggest significantly larger declines in stunting than do DHS data. The IHS2 and IHPS also paint a dramatically different picture with respect to wasting. According to the IHS data, from 2004 to 2013, wasting increases from 2.2% to 7.3%.

It is important to compare different data sources when looking at trends in wellbeing over time and across groups. Discrepancies observed between sources can flag potential data quality problems as well as highlight different, but possibly coexisting, themes in the data. Based on the team's knowledge of complications with anthropometric data collection during IHPS fieldwork, it is likely that the marked differences observed between DHS and IHPS (table 4.3) are a reflection of IHS data quality issues. However, despite the fact that **the two data sources indicate improvements in stunting and underweight prevalence over time, the markedly different magnitudes make it difficult to compare Malawi with other countries in the sub-Saharan African region**. For example, if the team were to use the DHS stunting prevalence of 47.8%, Malawi would look more like Mozambique, which has one of the worst stunting rates in the Region. In contrast, if the team were to use the IHPS stunting prevalence of 30.5%, Malawi would look more like Zimbabwe, which has one of the lowest stunting rates in the Region.

TABLE 4.3: Malnutrition Trends in Malawi, 2004–2013

		Stunted	Underweight	Wasted
IHS	2004	43.9	11.6	2.2
	2013	30.5	9.3	7.3
DHS	2004	53.1	18.6	6.2
	2010	47.8	14.1	4.1

Note: To ensure comparability with estimates for 2013, estimates for 2004 from IHS2 are calculated after restricting the sample to those interviewed from March-November.

[30] These estimates were calculated by the poverty assessment team using the DHS data, but differ slightly from the official DHS statistics on child malnutrition in Malawi (official DHS stunting, underweight, and wasting prevalence estimates are 47.8, 22.0, and 5.2% in 2004, respectively, and 47.1, 12.8, and 4.0% in 2010). These small differences observed are likely due to differences in the treatment of outliers. This report uses the indicators produced by the poverty team in order to be able to look at prevalence by other characteristics later in the chapter.

TABLE 4.4: Malawi's Relative Improvement in Stunting Compared to Regional Countries, 2004–2011 *(%)*

	Period	Decline in stunting
Rwanda	2005–2010	–14
Uganda	2006–2011	–12
Malawi	**2004–2010**	**–10**
Mozambique	2003–2011	–9
Zimbabwe	2005/06–2010/11	–8
Tanzania	2004/05–2010	–5
Kenya	2003–2008/09	–1

Source: DHS 2003–2011: http://statcompiler.com/.

The relative progress Malawi has achieved in lowering stunting rates is relatively high for the Region. The team compared the relative progress achieved among other countries in the Region over the same period to benchmark the degree to which Malawi improved its child nutrition status. According to DHS data, between 2004 and 2010, Malawi's stunting prevalence declined 10%. As compared to neighboring countries, the magnitude of this decline was average to high (table 4.4). Furthermore, although stunting prevalence was higher in Mozambique than in Malawi (43% in 2011 according to the DHS data), Malawi has made greater relative progress since 2004.

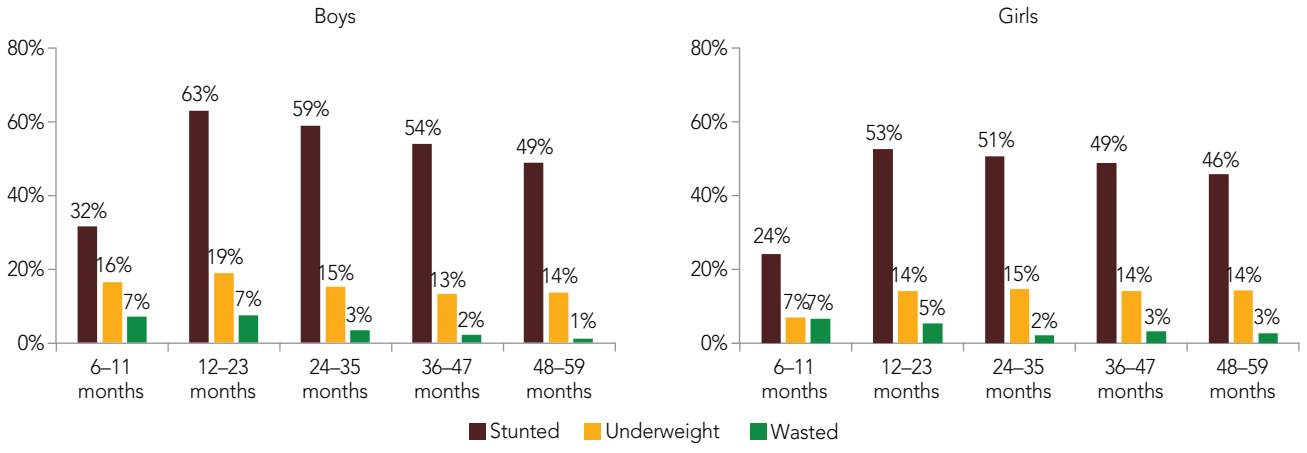
The data show that boys have a higher incidence of stunting.[31] However, in both sexes, stunting peaks in the 12–23 month category, then decreases with age (figure 4.9). Boys aged 6–23 months are more likely to be underweight than are their female counterparts. However, for children 2–5 years, underweight prevalence is comparable between the sexes.

Underlying this national improvement in child nutrition are significant gains achieved in certain geographic areas of the country. For example, stunting in the rural Central region decreased by 17%; and in the urban North, the underweight prevalence declined nearly 80% (figure 4.10). Furthermore, between 2004 and 2010, wasting fell in all regions excluding the urban South. The DHS data also highlight regions in which continued support is needed. Between 2004 and 2010, the urban Center saw an increase in both stunting and underweight, and the urban North experienced a rise in stunting.

In 2010, children living in households with improved toilets and improved water sources were better off in terms of stunting and underweight

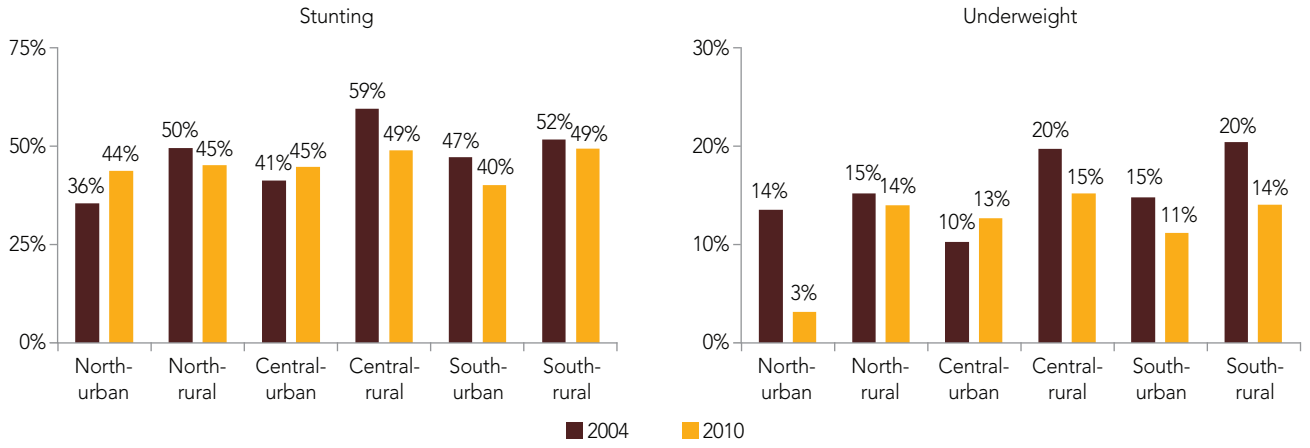
[31] A higher rate of stunting among boys aged 6–35 months, as compared to girls in the same age group, is common and was observed within all WHO regions during 2005–12.

FIGURE 4.9: Malnutrition in Malawi by Sex and Age *(%)*



Source: DHS 2010, http://dhsprogram.com/data/dataset/malawi_standard-dhs_2010.cfm.

FIGURE 4.10: Malnutrition in Malawi by Region and Urban/Rural, 2004–2010 *(%)*



Source: DHS 2004 and 2010, http://dhsprogram.com/data/dataset/malawi_standard-dhs_2010.cfm.

than children without clean water and sanitation.[32] The data also demonstrate a clear link between wealth and child nutrition (figure 4.11). Stunting prevalence declines with each successive step on the welfare ladder. Fifty-five % of children in the bottom welfare quintile are stunted, compared to only 38% in the top quintile. Similarly, underweight prevalence in the poorest quintile is nearly double that of the top quintile (17% vs. 9%).

4.4.1. *Improving child nutrition*

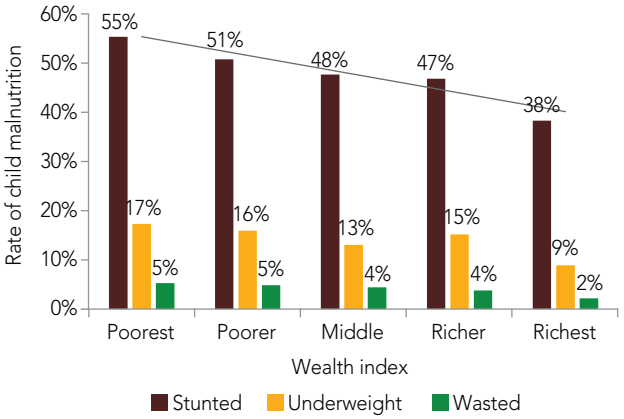
Despite minimal gains in dietary diversity and almost no progress in undernourishment, Malawi has seen modest improvements in child malnutrition indicators. It is not entirely unusual to see improvements in child nutrition without corresponding progress in traditional measures of food security. "Stunting and even wasting rates often can be substantially improved—even without changing the amount of food provided—by teaching appropriate feeding and child care practices, providing immunizations, and improving water and sanitation…" (Rajkumar and others 2011, 7). Therefore, Malawi's progress likely is the result of institutional commitment through policy development and program implementation across agriculture, education, and health sectors. Both food security and nutrition depend on food supply, availability, and access. In addition, child nutrition can be targeted through community education programs and improved family feeding practices. Furthermore, interventions that address child nutrition easily can be embedded in existing health system and community outreach programs.

The international donor community has allocated an overwhelming share of development assistance to the health sector. Health-related funding accounts for over 40% of all official development assistance (ODA) to Malawi from the international community, compared to agriculture and food security, which account for only 20% (Development Initiatives 2013). For example, USAID has supported a series of child nutrition programs in Malawi, including the successful Support for Service Delivery

[32] Improved toilets as defined by WHO include: a flush toilet, a piped sewer system, a septic tank, a flush/pour flush to pit latrine, a ventilated improved pit latrine, a pit latrine with a slab, and a composting toilet. Unimproved sanitation facilities include a flush/pour flush to elsewhere, a pit latrine without a slab, a bucket, a hanging toilet or latrine, and no facility. Improved water sources as defined by WHO include: piped water into a dwelling, piped water into a yard or plot, a public tap or standpipe, a tubewell or borehole, a protected dug well, a protected spring, bottled water, and rainwater. Unimproved sources of water include unprotected springs or dug wells, carts with small tanks, tanker-trucks, and surface water (WHO 2006).

[33] See USAID's Infant and Young Child Nutrition Project and FAO's Infants and Young Children Feeding Program (USAID 2011; FAO 2013).

FIGURE 4.11: Malnutrition in Malawi by Wealth Quintile, 2010 *(%)*



Source: DHS 2010.

Integration (SSDI). SSDI promotes quality improvement measures for integrated nutrition services. The program focuses on integrating antenatal and postnatal care, growth monitoring, prevention of mother-to-child transmission of HIV, and prevention and management of childhood illness into already-existing health services. Additionally, many projects focus on using community-based workers to increase mothers' understanding of best feeding practices, particularly complementary feeding practices for breastfed children.[33]

The country's Ministry of Health also has committed to the expansion of child nutrition programs. The Ministry's Department of Nutrition, HIV, and AIDS implemented the National Nutrition Policy and Strategic Plan to promote nutrition while developing human resources in the health sector. This policy, in conjunction with the National Social Support Policy, supports programs that focus on welfare, food security, and nutrition. The policy has led to the roll-out of community-based interventions to reduce stunting in 50% of districts (FAO 2014). This programmatic engagement has expanded rapidly since the country joined the international Scaling Up Nutrition (SUN) movement. This unique collaboration of multilateral, government, and community stakeholders formed to ensure that all people have a right to adequate food supplies and good nutrition. Participating SUN countries commit to implement specific nutrition interventions, including micronutrient supplementation, fortification of foods, and educational support for exclusive breastfeeding until an infant reaches six months of age.

4.5. *Subjective Food Security*

Objective measures of food security portray a country that has experienced very little change in measures of undernutrition, moderate improvement in dietary diversity, and significant improvement in malnutrition as measured by stunting. The improvements in food security have been very uneven, but none of the measures suggests a deterioration of food security over the last five years. Nevertheless, when households are asked if they have experienced food security in any month in the last 12 months, their responses indicate a large and significant increase in the prevalence and duration of food insecurity. Between 2010 and 2013, the proportion of households reporting being food insecure at least once in the previous year increased by 29%. Moreover, when looking at urban households only, this figure increased by 57%.

Although the greatest increase in perceived food insecurity has been in urban areas, one of the most pervasive features of rural households in Malawi is their continued state of perceived food insecurity. Further assessing the dynamics of food insecurity emphasizes the large change in this dimension between 2010 and 2013. Table 4.5 presents transition matrices for subjective food insecurity by households' rural/urban status in wave 1 (2010). Two-and-a-half times more individuals moved from a state of food security to food insecurity than vice versa (25% vs. 11%, respectively, in rural areas; and 32% vs. 13% in urban areas). Even though this ratio was slightly larger in urban areas, chronic food insecurity, defined as those who were food insecure in both waves, was almost twice as high in rural areas. Forty-three% of rural individuals lived in

food-insecure households in both waves, compared to only 22% of urban individuals. Furthermore, approximately 80% of rural individuals identified as being food insecure at some point during 2010–13. This number was only 66% for those in urban areas.

Subjective measures of food security are relatively easy to collect but are more challenging to interpret because they are not explicitly linked to objective measures of food security such as calories or diversity of diet. The IHS3 and IHPS instruments simply ask for self-reports on whether the household has faced at least one episode of food insecurity in the 12 months preceding the survey. The question does not define or provide guidance on the meaning of food insecurity. Households who identify as having faced food insecurity at least once in the 12-month period then are asked to identify the months in which this insecurity occurred. Despite the potential challenges in interpreting these data, basic tabulations suggest that households' assessments of their food security align with objective measures. These subjective estimates also provide insight into a household's sense of stability and risk of *future* bouts of food insecurity that cannot always be gleaned from objective measures.

In 2013 nearly 65% of Malawian households considered themselves to be food insecure at least once in the preceding 12 months. Table 4.6 highlights differences in selected characteristics based on households' subjective assessment of food insecurity. Food-secure households are significantly more likely to live in urban areas, have male household heads, and have higher FCS than their food insecure counterparts. On average, food-secure households also have 8% fewer members and are 23% more likely to own livestock. Not surprisingly, individuals in food-insecure households tend to consume fewer calories, have smaller per capita expenditures, and are more likely to be poor. In addition, whereas 47% of individuals in food-insecure households are poor, this figure drops to 20% for food-secure individuals.

TABLE 4.6: Selected Mean Characteristics of the Subjectively Food Secure and Insecure, 2013

	Food Secure (SE)	Food Insecure (SE)	Difference (%)
Household size	4.62 (0.08)	4.99 (0.06)	–8***
Urban	0.24 (0.026)	0.13 (0.018)	46***
Female household head	0.18 (0.015)	0.28 (0.012)	–56***
Farm household	0.78 (0.018)	0.87 (0.012)	–12***
Household owns livestock	0.56 (0.018)	0.50 (0.014)	11**
FCS	59.50 (0.769)	45.60 (0.588)	23***
Per capita daily caloric intake	2,639 (57.88)	2,152 (36.18)	18***
Per capita expenditure (kwacha)	202,904 (10,896)	108,652 (2,374)	46***
Poor (%)	0.20 (0.021)	0.47 (0.018)	–135***

Source: Poverty Assessment team calculations based on IHPS.
Note: Standard errors corrected for clustering and stratification are in parentheses.
Difference between two columns is significant at *p<0.1, **p<0.05, and ***p<0.01.

TABLE 4.5: Transition Matrices: Subjective Food Insecurity in Malawi, 2010 and 2013 *(%)*

Rural in 2010 (IHS3)

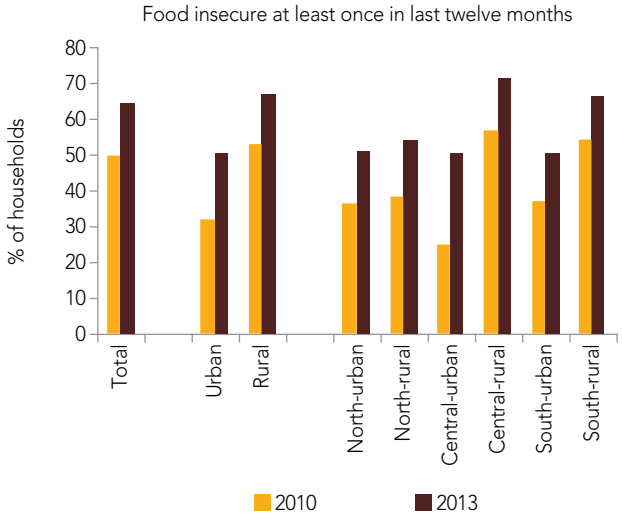
Wave 1 (2010)		Wave 2 (2013)	
		Food insecure	Food secure
	Food insecure	43.23	11.43
	Food secure	25.35	19.99

Urban in 2010 (IHS3)

Wave 1 (2010)		Wave 2 (2013)	
		Food insecure	Food secure
	Food insecure	21.73	12.51
	Food secure	31.68	34.08

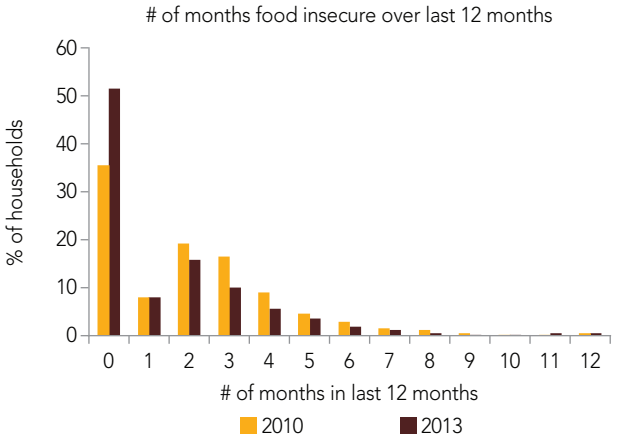
Source: Poverty Assessment team calculations based on IHS3 panel and IHPS.

FIGURE 4.12: Subjective Food Insecurity in Malawi, 2010 and 2013



Source: Poverty Assessment team calculations based on IHS3 panel and IHPS.

FIGURE 4.13: Months of Subjective Food Insecurity, 2010 and 2013



Source: Poverty Assessment team calculations based on IHS3 panel and IHPS.

From 2010 to 2013, subjective food insecurity increased markedly. Nationally, subjective food insecurity increased 30% from a value of 50% in 2010 to 65% in 2013 (figure 4.12). This increase is found in both rural and urban areas, as well as within all three regions. Interestingly, the worsening of subjective food security is relatively larger in urban areas. There, the share of households reporting food insecurity increases approximately 57%, compared to a 25% increase in rural areas. However, subjective food insecurity remains higher in rural areas overall.

The rise in overall prevalence of subjective food insecurity was accompanied by an increase in the duration of exposure. Households reported experiencing food insecurity for a greater number of months in 2013 than in 2010. Forty percent of households in IHS3 (2010) had faced food insecurity during at least two months of the preceding year; 57% of households in IHPS (2013) reported the same frequency. In 2013 a greater number of households reported facing food insecurity that had lasted three, four, and five months. (figure 4.13). In 2013, the households who reported that they had experienced food insecurity in at least one month during the preceding 12, indicated that they experienced food insecurity during an average of 3.3 months. This number contrasts with 2010, in which the average number of months for which food-insecure households reported having experienced food insecurity was 3.0 months. The increase in both prevalence and duration of reported food insecurity from 2010 to 2013 suggests that, despite modest improvement in objective measures, people *feel* worse off. *What is driving households to feel more food insecure despite improvements made in objective measures of food security?*

4.5.1. *Subjective food insecurity and food prices*

One possible answer to the question may be the massive hike in food prices that Malawi has experienced since 2011 (USAID 2012). Box 4.1 explains that FAO defines food security through three dimensions—availability, access, and utilization of food—plus the overall stability of these three dimensions. Stability is the household's capacity to protect itself from adverse shocks that affect the three key dimensions of food security. None of the objective measures adequately captures this notion of stability.

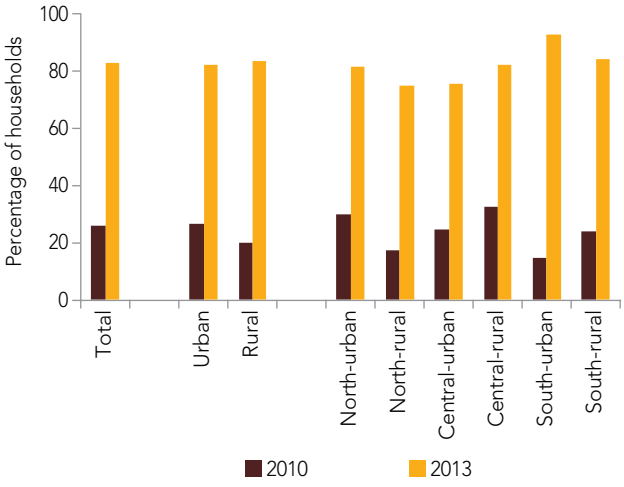
From 2010 to 2013, Malawi and the rest of the world experienced large increases in the level of staple food prices. Availability and access to food are dependent on food prices, and a hypothesis explored in this section is that unexpected price increases increase uncertainty around the stability of access to food.

Figure 4.14 presents monthly price data from 2009 to 2013 for staple foods from 72 markets across Malawi. The price of maize, one of the country's most important staple crops, hovered at approximately 40 kwacha/kg–50 kwacha/kg between May 2009 and November 2011. Beginning in 2012, the price of maize began to climb slowly. Then, between November 2012 and March 2013, the unit price more than doubled, jumping from 64.3 kwacha/kg to 136 kwacha/kg. Other food staples experienced similar spikes in the market. From March 2009 to July 2011, the price of beans vacillated between 165 kwacha/kg and 228 kwacha/kg. However, over the next 21 months, the price slowly rose to peak at 377.7 kwacha in March 2013.

The data also show that households perceive these large surges in food prices as negative shocks. Households were asked to indicate the presence of food price shocks in the 12 months leading up to the survey. While in 2010 only 26% of households reported facing an increase in food prices during the previous 12 months, in 2013 a staggering 83% of households reported facing this shock (figure 4.15). In the urban South, approximately 93% of households experienced a rise in food prices, more than six times the percentage of households in 2010.

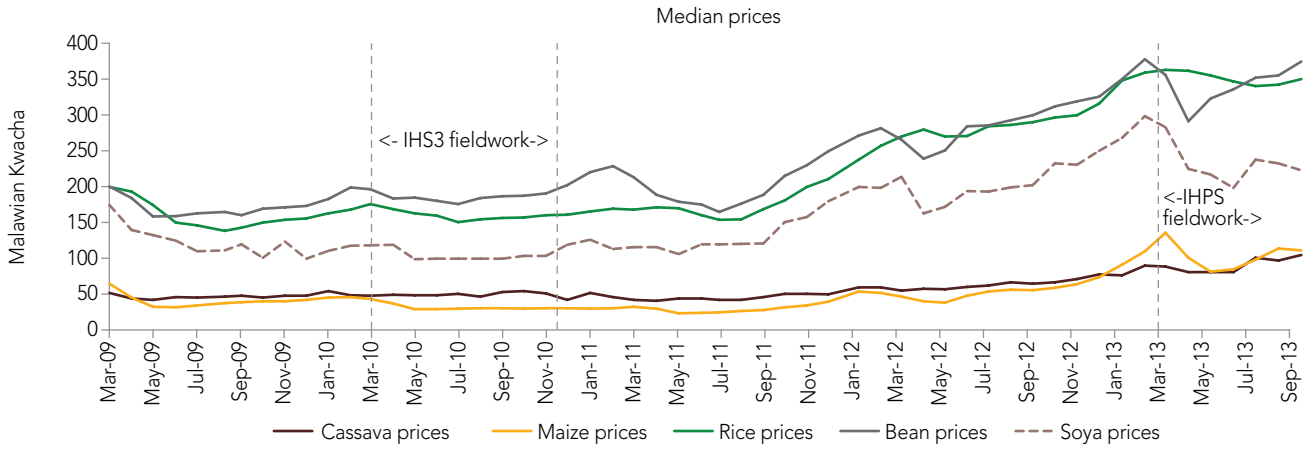
To assess the extent to which increases in food prices impacts subjective food insecurity, the team

FIGURE 4.15: Households that Faced Food Price Shock in Prior 12 Months, Self-Reported



Source: Poverty Assessment team calculations based on IHS3 panel and IHPS.

FIGURE 4.14: Rise in Food Prices in Malawi, 2009–2013 *(kwacha)*



Source: GoM Ministry of Agriculture, Irrigation and Water Development.

used the panel component of the IHS3 and IHPS. There are many idiosyncratic reasons that two individuals who look the same with respect to objective measures of food security (that is, they have similar levels of dietary diversity and caloric intake) may provide different responses to a subjective question on food security. For example, some individuals are inherently more nervous or risk-averse and are therefore more inclined to identify as food insecure. However, by examining change over time for a set of individuals, the team was able to control for these unobserved fixed effects that are unique to the individuals (thus reducing concerns of omitted variable bias).

The fixed-effects regression model used in the analysis is,

$$Y_{it} = \beta_i X_{it} + \alpha_i + u_{it}$$

where

Y_{it} is months of subjective food insecurity faced in the last 12 months (where i = individual and t = survey round),

α_i is the unknown intercept for each individual's time-invariant characteristics,

X_{it} is a vector of independent variables containing controls and measures of rising food prices,

β_i represents the marginal effects for each independent variable on food insecurity, and

u_{it} is the error term.

The model controlled for FCS and per capita caloric intake in both 2010 and 2013. These points were included as control variables because they should directly reflect access to food. Daily per capita caloric intake and annual per capita expenditure have no significant effect on experiential food security, i.e. an increase in caloric intake does not make one feel more food secure, and vice versa. Logically, FCS is negatively predictive of experiential food insecurity, though the magnitude of the effect is miniscule; a one-unit increase in FCS reduces the probability of experiencing food insecurity in the last 12 months by less than 1 percent.

To assess the hypothesis that the increase in food prices has been a causal factor in the significant increase in reported months of food insecurity, the model also includes the inflation rate of maize prices over the last 12 months leading up to the survey.[34] Maize represents Malawi's most important staple food. Maize accounts for more than 50% of all households' caloric consumptions. Thus, fluctuations in the price for maize directly affects the majority of the population (Minot 2010).

Larger increases in the price of maize over the preceding 12 months correlates positively with subjective food insecurity. After controlling for factors expected to influence perceptions of food security, specifically FCS and per capita caloric intake, the poverty assessment team found that higher maize prices can result in a higher level of food insecurity (table 4.7). The coefficient given for the coefficient of change in the inflation rate of maize, for example, translates as follows: A one-unit increase in the inflation rate of maize prices increases the probability of experiencing food insecurity over the last 12 months, or of worrying about food in the last 7 days, by 8.2 and 6 percent, respectively. Individuals who face a one-unit increase in the rate of inflation of maize prices experience an additional 0.37 months of food insecurity, on average (Jolliffe, Seff and de la Fuente 2016).

One interpretation of the findings is that, in the case of two households that are consuming the same level of calories and have approximately the same degree of dietary diversity, the household who faces greater prices is reporting both a greater probability of being food insecure and number of months of food insecurity. This finding supports the hypothesis that the instability associated with the recent increase in maize prices has caused individuals to feel more insecure and thus identify as being food insecure. While the objective measures of food insecurity indicated that the food-price increases

[34] Price data come from 72 markets throughout Malawi. Unit prices for staple foods were collected once a month at each market. Each household was linked to the market closest to it.

TABLE 4.7: Modeling Food-price inflation and experiential food insecurity

	Food insecure in the last 12 months	Months of food insecurity in the last 12 months	Worried about food in the last 7 days
Maize price 12 months ago (month 1)	0.004*** (0.001)	0.016*** (0.005)	0.004*** (0.001)
Change in inflation rate of maize (past 12 months)	0.082*** (0.016)	0.378*** (0.075)	0.060*** (0.021)
Dietary diversity (Food Consumption Score)	–0.002** (0.001)	–0.018*** (0.004)	–0.004*** (0.001)
Daily per capita calorie consumption (thousands)	–0.019 (0.013)	0.039 (0.047)	–0.009 (0.011)
Annual per capita expenditure (Kwacha)	–0.000* (0.000)	–0.000* (0.000)	–0.000 (0.000)
Number of observations	17,734	17,734	17,734
Adjusted R2	0.067	0.073	0.055

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

Notes: All models control for individual fixed effects and observations are weighted to be representative of the population. Standard errors are presented in parentheses. The models are estimated using fixed-effects OLS. Standard errors are clustered at the EA level.

had not adversely affected dietary diversity or access to calories, the maize price increases had created an uncertain economic environment that harmed the perceived stability of access to food.

Conclusion

Cross-sectional comparisons indicate that progress in objective measures of food security in Malawi has remained more or less stagnant since 2004. Marginal improvements have been achieved in the dimensions of dietary diversity. However, the share of the population who consume fewer than 2,100 calories per day, the minimum threshold for per capita intake, has hovered near 50%. The panel component in the data used in this chapter found that chronically undernourished individuals have certain common characteristics. They tend to come from larger households with higher dependency ratios, have household heads with fewer years of education, are more likely to be poor, and have a larger income gap below the poverty line than those who can improve their nourished status. These data suggest that it is harder for the extreme poor to improve their caloric intake to acceptable levels.

Regarding child nutrition, the DHS data showed that from 2004 to 2010, Malawi achieved gains. Stunting fell from 53% to 48%; underweight prevalence dropped from 19% to 14%; and wasting declined from 6% to 4%.

Nevertheless, despite the stagnant to minimal progress achieved in objective measures of food security, between 2010 and 2013, households' subjective assessments of food insecurity increased from 50% to 65%. The poverty assessment team found that the increase on the price of maize over the 12 months preceding the survey increased the number of months (in the 12 months preceding the survey) of perceived food insecurity. This finding suggests that increases in food prices profoundly impacts households' perceptions of stability and, ultimately, of food security.

5

DRIVERS OF POVERTY CHANGES IN MALAWI, 2004–2010 AND 2010–2013

Although the incidence of poverty in Malawi between 2004 and 2013 appears high and relatively stagnant, there have been distinct poverty trends in rural and urban areas. Progress achieved in urban areas between 2004–2010, when the poverty rate declined from 25% to just over 17%, was essentially wiped out in the subsequent period, when poverty ratcheted up by eight percentage points back to 26%. Rural poverty was pervasive and stagnant between 2004 and 2010, mirroring the evolution at the national level. Rural poverty may have decreased between 2010 and 2013—at a rate of one percentage point per year—an average pace similar to the annual average in Sub-Saharan Africa. What drove these changes?

Chapter 5 proposes a framework to understand the components of household income as well as the income-generating capacity of Malawi's four main socioeconomic groups: the poor, non-poor, rural, and urban. In this framework, households operate conditioned by the availability, use, and returns on assets; and the context in which they are deployed.

In rural areas, growing crop income (through increasing maize yields) has made a steady, but modest, contribution to reduce poverty. The causes are, first, that access to key inputs such as fertilizer, improved seeds, and extension services that could have increased production was limited among the poor, and so was their combined use. Equally important, the returns on fertilizer application and other complementary inputs including family labor utilization, extension services, and the application of the right type of basal fertilizer, matter in raising productivity. Access to adequate information could increase these returns, but the remoteness and low education rates of the poor likely made information difficult to obtain and use appropriately.

Contracting income from non-farm self-employment was another key factor associated with the increased rural poverty between 2004 and 2010. Then, during 2010–13, rising income from non-farm self-employment was the driving force correlated with the observed poverty reduction. For farming households to

engage in self-employment activities, access to credit was critical. Its availability or lack thereof mirrored the participation trends observed in the two periods. Moreover, the returns on the age of the enterprise explain almost entirely the difference in profits between the households who managed to escape poverty and those who stayed poor. In rural contexts, in which the opportunities for non-farm self-employment remain precarious and limited, perhaps the age of the enterprise signals an indication of experience, which, all thing being equal, may lead to higher profits.

In urban areas, income from non-farm wage employment was the key source associated with changes in poverty. Even more than age and gender, education was the most important determinant of participation in, and returns on, non-farm wage employment. Recent strides in education, along with the growth in urban-oriented sectors between 2004 and 2010 may explain the decline of Malawi's urban poverty during that period. However, the contraction of the economy during 2012/13 affected mainly urban areas. Higher education levels among the non-poor explain the wage differential between them and those who fell into poverty between 2010 and 2013. However, the higher wage premiums enjoyed by males and the more educated workers in urban areas shrank as a result of the economic contraction that urban areas underwent in 2013. The wage differential shrank in parallel. These factors underscore the importance of strengthening the business environment and the ability of households to cope with shocks associated with the macroeconomic environment, exchange rates, and inflation.

Introduction

Chapters 1 to 4 profile the trends of multiple welfare indicators in Malawi between 2004 and 2013. In particular, chapters 1 and 2 document the improvements, or lack thereof, in poverty and shared prosperity in Malawi from 2004 to 2010 and from 2010 to 2013.

Based on these trends, the incidence of poverty across years appears to be fairly large, and, in none of the periods were the changes in national poverty rates statistically significant. Consequently, stagnation appeared to prevail. However, national aggregates mask wide differences. Between 2004 and 2010, Malawi made a dent in monetary poverty in urban areas but not in rural areas. The over-representation of poverty in rural settings kept national poverty stagnant. In contrast, between 2010 and 2013, urban areas displayed an increase in poverty whereas rural areas experienced a reduction in poverty at an average pace similar to the regional average in Sub-Saharan Africa. **Chapter 5 examines which factors drove these trends observed in poverty in Malawi over these two periods.**

Chapter 5 is structured as follows. Section 1 recapitulates the main poverty trends from 2004 to 2010 and from 2010 to 2013. Section 2 introduces a simple framework to understand how poverty changes, with particular emphasis on the income generation of households driven by changes in the levels of, and returns on, their assets. Section 3 looks at the trends in sources and structure of household income in urban and rural areas for the two periods analyzed. Section 4 uses Shapley decomposition techniques to account for the contribution of changes in various income sources to the observed changes in poverty that occurred during the two periods. Shapley decompositions essentially link poverty, a consumption-based measure, and income so this section first examines the levels and shares of income components by wealth levels (measured as consumption per capita). The decomposition methods applied here help to distinguish the

main contributors to poverty reduction. However, they cannot shed light on whether the decline in poverty was due to changes in the population's endowments (such as increases in productive assets), or to changes in returns on these endowments. Subsequent chapters explore these aspects by looking at assets and their returns on key sources of income. Section 5 of chapter 5 summarizes the key findings of these explorations.

5.1. *Stylized Facts about Poverty Trends and Poverty Dynamics in Malawi, 2004–2013*

This section briefly revisits the poverty trends observed in the two periods covered by this Poverty Assessment. The first period, analyzed in chapter 1, spans 2004 to 2010. The poverty figures for this period were based on the analyses of two cross-sectional household surveys: the Second Integrated Household Surveys (IHS2) and the Third Integrated Household Survey (IHS3). Both were nationally representative surveys of households fielded over 12 months (typically starting in March and ending one year after). To simplify, the rest of chapter 5 will use 2004 to designate the IHS2 and 2010 to designate the IHS3 cross-section.

The second period, analyzed in chapter 2, ran from 2010 to 2013 and was based on a panel of households. Chapter 2 studies, for the first time, poverty dynamics in all of Malawi and the factors associated with poverty persistence and movements in and out of poverty between 2010 and 2013. In 2013 Malawi's first nationally representative panel household survey became available via the Integrated Household Panel Survey (IHPS). During March–November 2013, the 2013 IHPS tracked and revisited 3,247 households who, as part of the IHS3, had been visited during the same months in 2010. No direct comparisons of findings can be made using the full IHS2 and IHS3 cross-sectional samples and the IHS3 panel sample and IHPS. Thus, the analysis in this chapter henceforth is reported separately for the periods 2004 to 2010 and 2010 to 2013.

Between 2004 and 2010, Malawi made a dent in monetary poverty in urban areas but not in rural areas. The over-representation of poverty in rural settings kept national poverty stagnant. Between 2004 and 2010, poverty in the country as a whole declined only marginally from 52.4% to 50.7%. In urban areas, poverty fell significantly from 25% to 17%, as did ultra-poverty, which fell from 7.5% to 4.4%. The depth and severity of poverty also improved. In contrast, in rural areas, poverty remained stagnant, moving up slightly from 56.2% to 56.7%. The depth and severity of poverty worsened.

From 2010 to 2013, the poverty incidence in Malawi during the non-lean months fell slightly from 40.2% of the population in 2010 to 38.7% in 2013. Over these three years, urban areas displayed a considerable increase in poverty from 17.9% to 26.2%. In contrast, rural areas experienced a decline in the share of the poor from 44.0% to 40.9%. In other words, poverty dropped by an average of one percentage point per year (though changes in the poverty incidence were statistically insignificant), and the poverty gap and the poverty gap squared fell significantly.

Finally, given its panel nature, the IHPS allowed for the first time the analysis of poverty transitions experienced by the population across time and suggested some interesting trends. Over 2010–13, some two-thirds of Malawi's population did not see much mobility either into or out of poverty: 44% remained non-poor while 23% remained poor over this period. However, the remaining one-third of the population experienced substantial mobility: approximately 17% managed to escape poverty during this period whereas 15% became poor. People living in urban areas experienced less mobility into or out of poverty than the rural population.

In sum, during the last decade, the incidence of poverty in Malawi appears to be fairly high and relatively stagnant. Nevertheless, national aggregates mask wide differences, and the rest of chapter 5 examines the distinct poverty trends in rural and urban

areas. Progress achieved in urban areas between 2004 and 2010 when the poverty rate declined from 25% to just over 17%, was virtually wiped out in the subsequent period when poverty ratcheted up again by eight percentage points to 26%. Between 2004 and 2010, rural poverty also remained high and relatively stagnant, mirroring the evolution at the national level, but, between 2010 and 2013, then experienced a drop of three percentage points during the non-lean months. The next section outlines a simple framework to understand these trends.

5.2. A Framework to Understand What Drives Changes in Poverty

This section outlines a simple framework based on an asset approach (Lopez Calva and Rodriguez-Castelan 2016) to identify the main elements that contribute to household income generation, which then can be intuitively related to poverty reduction.

The framework presents household income as a result of four components: (a) the number of assets owned by households; (b) the public and private transfers received by the household regardless of their capacity to generate income; (c) the prices of the basket of goods and services consumed by household; and (d) the occurrence of shocks that affect the variability of income.

Households typically have endowments of capital and labor. The four types of capital are physical capital (such as agricultural tools), natural capital (land), human capital (knowledge acquired through schooling, skills, and health), and financial capital (access to credit and other stores of wealth). Labor endowments are the ability to do work oneself or to work with external employers.

The capacity of households to generate income based on these endowments depends on (a) the type of assets owned, including mainly human capital (for example, education), physical capital (land), and financial capital (access to credit and other stores of wealth); (b) the intensity of their use (participation in labor markets, use of agricultural inputs); and (c) the returns on these assets (price of factors of production such as yields, profits, and wages).

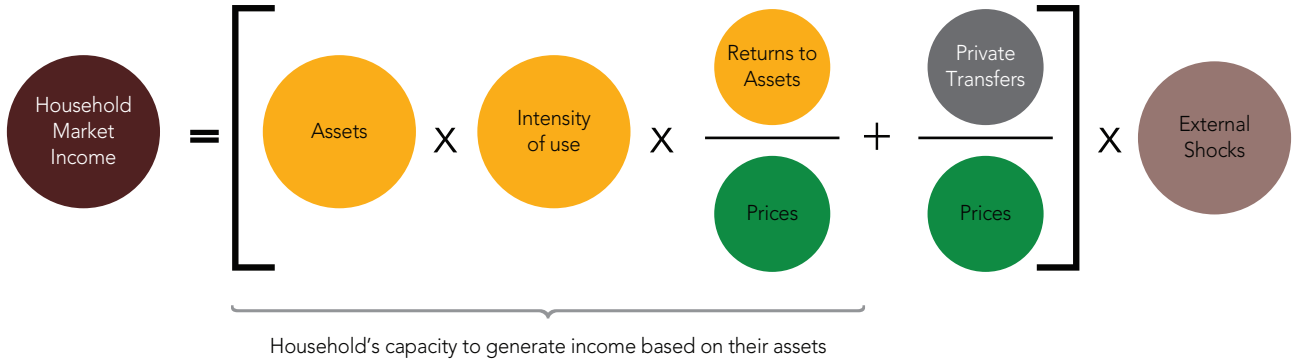
The potential to transform assets into goods and services that entitle households to different dimensions of welfare, including consumption, is equally determined by the context in which households operate. The context includes, for instance, the State's provision of socioeconomic infrastructure and access to markets, as well as public services to the population; and a sound economic environment for employment opportunities.

Shocks also can affect assets. First, they can impact assets' value and productivity. For instance, a crop yield could be lower due to a flood, or crop prices could experience dramatic surges after a poor harvest. Second, households relocate assets in response to risk. For instance, poorer households are more likely to switch land areas, labor, and crop types from high-earning, high-risk varieties to low-yield, low-risk crops. Similarly, wealthier households tend to better handle risk-related losses. In contrast, given their reduced asset base, poor households are more likely to pay a higher cost for coping with risk after it occurs.

In addition, many households rely on remittances, pensions, and other public transfers/benefits (nutritional interventions and cash transfers) to meet their most basic needs and improve the income opportunities of future generations through investments in health and education. Targeted public and private transfers also can help protect households from shocks and avoid costly responses in hard times, and help them to sustain income over their lifecycles.

In short, the proposed framework can help to understand the different components that make up household income as well as the income-generation capacity of different socioeconomic groups (poor and non-poor, urban and rural) (figure 5.1). Households operate conditioned on the availability, use of, and returns on assets, and the context and risks in which they get displayed.

FIGURE 5.1: Assets Approach to Market Income



Source: Lopez Calva and Rodriguez-Castelan 2016.

To understand the income-generating capacity of different households, initial conditions and context matter. **For growth to include the poor, reducing poverty according to the proposed framework would require specific common elements or pathways**. These elements can be summarized in household strategies that aim to (a) raise the labor incomes of the poor through more and better jobs and increased productivity in sectors in which poor people are predominantly engaged, as well as facilitating movement into new, more remunerative activities; (b) improve the opportunities of the poor through investments in their human capital; and (c) give direct transfers to the poor, including safety nets to help them grow their incomes and reduce their vulnerability to shocks through social protection mechanisms.

The subsequent three chapters explore the role that each of these income sources—both agricultural and nonagricultural—and transfers plays in Malawi. Chapter 6 deals with agriculture; chapter 7 looks at the non-farm sector, followed by an examination of public transfers in the form of social safety nets in chapter 8.

5.3. *Sources and Structure of Household Income*

According to the framework introduced in section 5.2., households rely on multiple sources of income from economic activity and transfers to improve their well-being. Section 5.3. explores the role that each of these income sources—both agricultural and nonagricultural—play in Malawi.

In rural Malawi, in particular, households are engaged predominantly in crop production and employment in the farm labor market (*ganyu*, defined as short-term labor relationship which involves work in farms, plantations). In a fundamentally agricultural economy, success in poverty reduction will require increasing agricultural productivity and growing farm incomes. However, it often is not possible to sustain income overall income growth by relying on a single source such as rain-fed agriculture, which is highly risk prone, particularly to price and weather shocks.

For this reason, in addition to cropping their own fields or those of others and livestock production, diversifying incomes to non-farm activities also is important for any income-earning strategies to improve welfare sustainably and reduce poverty. Such diversification includes the allocation of labor to (1) employment in the non-farm labor market and (2) self-employment in household-owned micro or small enterprises. In urban Malawi, labor wages from non-farm activities likely are the main source of income. Other non-activity-based private and public income sources include reliance on remittances, pensions, or other forms of private or public transfers/benefits. For conciseness, this section does not report transfer and livestock income flows, which combined average only 5%–15% of total household income.

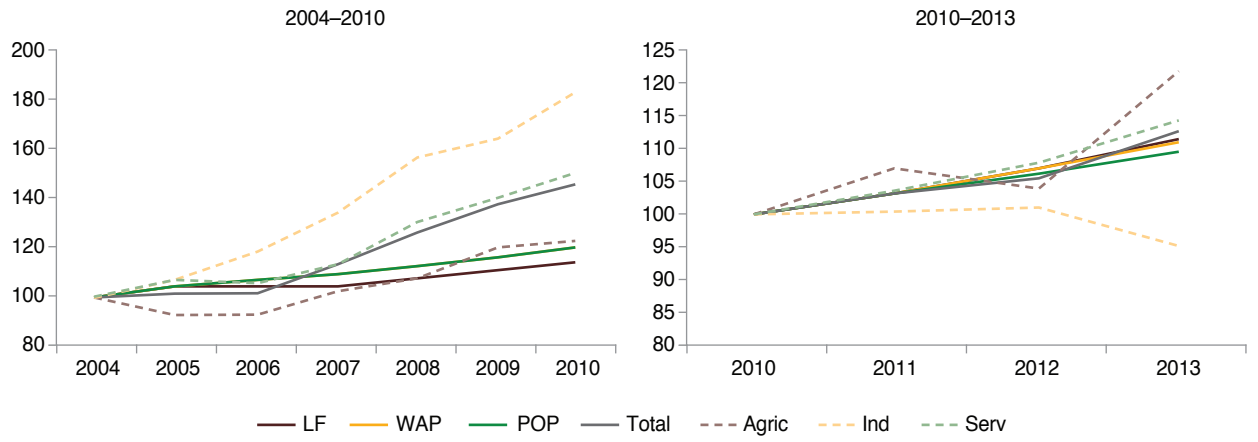
BOX 5.1: Composition of Growth Matters for Poverty Reduction

It is widely acknowledged that growth is a necessary condition for poverty reduction, but that, by itself, it is insufficient to eliminate poverty. Evidence shows that very few countries have been able to sustain high growth rates for protracted periods. Since 1950, only 12 countries have managed growth rates of 7% or more for more than two decades (World Bank 2013a). The nature and composition of growth also matter. Evidence suggests that poverty reduction is higher when growth is biased toward unskilled, labor-intensive sectors, and when growth is diversified and generates employment opportunities across multiple sectors (Azevedo and others 2013).

Malawi has experienced significant growth in most of the past decade, averaging 2.42% annual growth per capita between 2004 and 2013. During the same period, average GDP per capita in Sub-Saharan Africa grew 2.28% (WDI). In agriculture-based economies such as Malawi—compared to transforming and urbanized economies—raising the incomes of a majority of the rural poor would require high and sustained rates of growth in agriculture, the sector that employs most of the rural population. Unfortunately, the strong overall growth observed in Malawi has not always been shared equally across economic sectors.

Between 2004 and 2010, real agricultural GDP grew much more slowly than services and, especially, industry. The most dynamic industrial sectors were mining and quarrying, construction, and manufacturing. Thus, the reduction of urban poverty observed during the second half of the 2000s may have been due to the dynamism of sectors attached to urban areas. **In contrast, between 2010 and 2013 urban-oriented sectors including industry lagged and then dipped while, in in two of three years, agriculture out-performed the economy.** This gain may have been beneficial largely to rural areas whose poverty headcount dropped.

FIGURE B5.1.1: GDP in Malawi, 2004–10 and 2010–13 *(constant Price PPP US$ 2005)*



Source: Jobs Group's macro inputs from World Development Indicators data (World Bank various years).
Note: PPP = purchasing power parity; LF = labor force; WAP = working-age population; POP = population; Agric = agriculture; Ind = industry; Serv = services

Section 5.3 looks at two aspects of household income in Malawi that are interrelated and together help explain trends and the relationship with welfare and poverty levels. First, the team examines household engagement in income-generating activities—levels and changes in the proportion of households engaging in generating income from alternative activities or sources. Then, the team assesses levels and changes in income shares from individual components over time. The analysis looks separately at 2004–2010 and 2010–13.

5.3.1. *From what sources do households derive their incomes?*

Diversifying income sources is an important element of household income-earning strategies. To cope with risk and increase the sustainability of consumption levels, households draw incomes from multiple sources. In this section, the team looked at the proportion of households who draw income from agricultural (crop and livestock production, agricultural wages, and farm rents) and nonagricultural (self-employment, non-farm wage, pensions,

TABLE 5.1: Household Income Sources, 2004–2010 *(%)*

	Malawi		Urban areas		Rural areas	
	2004	2010x	2004	2010x	2004	2010x
Agricultural						
Crop	77.2	83.1	35.7	35.3	83.4	92.2
Livestock	58.4	42.3	12.7	14.1	65.2	47.6
Agricultural wage	50.8	46.0	26.8	31.7	54.4	48.7
Nonagricultural						
Nonagricultural wage	21.1	20.0	53.8	56.4	16.2	13.2
Self-employment	30.6	19.2	35.9	33.9	29.8	16.5
Transfers	85.9	33.7	64.4	39.3	89.1	32.6
Other sources	9.5	5.2	24.7	16.6	7.3	3.1

Source: Malawi Poverty Assessment team calculations based on IHS2 and IHS3.
Note: x = cross-section.

other) sources in rural and urban areas. Several results stand out.

Household income sources from 2004 to 2010

Households in *rural areas* are engaged predominantly in crop production and show limited diversification to non-farm self-employment and non-farm wage employment. In 2004 approximately 83% of rural households drew income from crop production, and the proportion increased to 92% in 2010. Table 5.1 shows that diversification to other sources, both agricultural and nonagricultural, was reasonably high in 2004, but proportions felt significantly in 2010. That year, the proportion of households who drew income from farm work (farm wage income) fell from 54% to 49%, a level that, nevertheless, was relatively high in SSA.

Rural diversification to non-farm self-employment and non-farm wage employment appears to have been limited. In 2004 a significant proportion (30%) of rural households earned income from non-farm self-employment enterprises, but the share fell to 17% in 2010, the largest drop for a single source over the period. Historically, households who drew income from rural non-farm wage labor has been low—approximately 16% of households in 2004, a share that fell to 13% in 2010. Later, this chapter argues that such limited diversification to non-farm activities was a major factor behind the stagnation in rural welfare, because, over time, the growth in agriculture did not compensate for income losses from these sources. A high percentage of households appear to have receive transfers in 2004. However, this appearance was mainly a result of the widespread support by Government to households in the form of free food maize and the starter pack (TIP) after the 2004/05 drought. Other income sources have been only marginal in household activity/income source portfolios (table 5.1).

The relative persistence in the proportion of households engaging in crop production and the decrease in other activities suggests that households moved noticeably (perhaps as a result of the Farm Input Subsidy Program) to specialize in crop production (chapter 6).[35]

The situation in urban areas differed dramatically from that in rural areas. Urban incomes appear to have been relatively well diversified and the balance relatively stable from 2004 to 2010. During this period, the proportions of urban households who drew their incomes from agricultural

[35] Over 2004–10, there was a significant reduction in the proportion of households producing all crops, except maize, tobacco, and pigeon pea, which implied a significant shrinking of crop portfolio diversification.

activities remained virtually constant. Approximately 35% of these households earned incomes from cropping; approximately 14% earned from livestock; and agricultural wage earners hovered between 27% and 32%. Nonnagricultural sources also remained important. Self-employment remained relatively high at slightly over 33% of the households, and households earning non-farm wage income increased from 54% to 56%. As discussed in the next section, patterns of urban income diversification and their sustainability over this period along with the growth in urban-oriented sectors (box 5.1) were strong enough to ensure income growth capable of improving urban household welfare over the period.

Household income sources from 2010 to 2013

Households in *rural areas* continued to be predominantly engaged in crop production and agricultural wages, but, by 2013, diversification to non-farm self-employment had increased. Among the rural panel households, in 2010 approximately 93% drew part of their incomes from crop production, but by 2013 that proportion had fallen to 89%. By 2013, approximately 50% of the households continued to have at least one member engaging in farm labor (*ganyu*). In 2013 engagement in rural non-farm *self-employment* reversed direction: the proportion of households deriving income from that source grew from approximately 20% to 28% (table 5.2). Engagement in non-farm *wage employment* in 2013 remained relatively stable compared to 2010, at approximately 14% of rural households.

As argued later, the trend reversal observed relative to the previous period—through increased diversification to non-farm self-employment and relative stability in non-farm wage employment participation in 2013—improved rural household welfare and reduced poverty in those areas.

In *urban areas*, although income sources continued to be relatively well diversified, by 2013 there was a significant drop in the proportion of households engaging in non-farm wage employment, which had been the major income source in 2010. Nonagricultural income sources remained the most important, but by 2013 the share of households drawing income from non-farm wage employment dropped from 58% to approximately 48% of the the urban panel households. Non-farm households who earned income from self-employment increased from 38% to approximately 50%. Even though the drop in participation in non-farm wage-income activities was compensated by increased participation in other activities, those other activities were not as profitable, as will be seen in the following sections.

TABLE 5.2: Household Income Sources, 2010–2013 *(%)*

	Malawi		Urban areas		Rural areas	
	2010	2013	2010	2013	2010	2013
Agricultural						
Crop	85.9	83.8	43.1	52.2	93.2	89.3
Livestock	18.1	20.6	6.5	7.9	20.0	22.8
Agricultural wage	44.6	47.0	30.1	39.4	47.0	48.3
Nonagricultural						
Nonagricultural wage	21.4	19.3	58.0	48.6	15.2	14.2
Self-Employment	22.2	30.8	38.2	49.7	19.5	27.5
Transfers	28.4	36.5	34.1	52.2	27.5	33.8
Other sources	6.2	7.6	19.6	22.2	3.9	5.0

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.

5.3.2. *Structure of household income: Shares of income by source*

The analysis in the previous section indicates trends in the propensity of households to engage in various income-generating activities and the extent of the incidence of other income sources over the period in urban and rural areas. Although the analysis reflects the persistence or not of the various livelihood activities/sources, it does not reflect the relative importance of these sources in total household income. This section looks closely at this dimension in rural and urban areas.

Shares of household income sources from 2004 to 2010

In *rural areas* from 2004 to 2010, farming activities, both own-farm labor and wage labor on other farms, and lower and/or falling shares of non-farm sources dominated household incomes. Table 5.3 shows the trends in the structure of household income.

In 2004, close to 80% of total household income came from agricultural activities (56% from crop production, 10% from livestock, and 11% from farm wage income). By 2010 statistically significant increases were observed for crop income shares to 62%, and the share of farm wage income rose to 16%. Accordingly, the shares of non-farm income sources were relatively small and shrank over time. For example, in 2004, approximately 9% of the income was generated from non-farm self-employment activities, a share that fell to just 5% in 2010. The share of non-farm wage income stayed relatively low at approximately 7% over the period. As discussed later in this chapter, these trends and the inability of households to sufficiently diversify crop structure and income sources contributed to limited welfare gains and relatively stagnant poverty levels in rural areas.

Total household income in *urban areas* was dominated by nonagricultural sources, predominantly wage employment and self-employment; and shares remained relatively stable over the period. Although over 35% of urban households drew income from crop production, its share of total income was approximately only 10% in both years. There were few changes in the shares of the major sources of income in urban areas. Non-farm income remained relatively high. Non-farm wage employment was approximately 45% of total income, and non-farm self-employment approximately 22%. As discussed later in this section, non-farm employment was key to sustained income growth and poverty reduction in urban areas over the period.

TABLE 5.3: Share of Income from Sources, 2004–2010 *(%)*

	Malawi		Urban areas		Rural areas	
	2004	2010x	2004	2010x	2004	2010x
Agricultural						
Crop	50.5	54.1	9.9	10.5	56.4	62.2
Livestock	8.4	4.8	1.8	1.3	9.3	5.5
Agricultural wage	11.0	15.5	10.1	13.2	11.2	16.0
Nonagricultural						
Nonagricultural wage	12.3	13.5	45.4	44.5	7.4	7.7
Self-employment	10.4	7.6	22.3	21.3	8.7	5.0
Transfers	6.7	3.2	7.0	3.9	6.7	3.1
Other sources	0.8	1.3	3.4	5.3	0.4	0.6

Source: Malawi Poverty Assessment team calculations based on IHS2 and IHS3.
Note: x = cross-section.

Shares of household income sources from 2010 to 2013

In *rural areas*, household incomes continued to be dominated by farming activities, but the share of income from non-farm self-employment increased (along with the proportion of household engaged). Among panel households in rural areas, the share of income from cropping was approximately 49%, virtually unchanged from 2010; farm wage income approximately 18%; and livestock just 7%. Statistically significant increases were observed for the share of non-farm self-employment from 10% to 14% while the share of non-farm wage income remained relatively unchanged at 7% (table 5.4). Further analysis later in this chapter confirms that the more balanced income structure with a relatively more important role played by diversification to self-employment by rural households was critical to enable households to improve welfare levels and move out of poverty.

In *urban areas* in 2013, household income structure continued to be dominated by nonagricultural sources, but the share of non-farm wage employment, the most important source, had fallen significantly since 2010. Non-farm wage employment remained the most important source of income for urban households in 2013. However, its share in total income fell from over 40% in 2010 to just over 30% in 2013, just slightly higher than that of non-farm self-employment, which remained the second most important source. Reliance on *ganyu* income and cropping remained low but increased slightly as a share of total income. Despite the surge in the proportion of households receiving transfers between 2010 and 2013, the share of transfer income remained relatively low at 4%. The inability of urban households to sustain gains from non-farm income in 2013, a source that had played a critical role in sustaining lower poverty levels in 2010, resulted in lower levels of welfare and higher levels of urban poverty in 2013.

5.4. Contribution of Income Sources to Poverty Changes: The Shapley Decomposition Approach

The previous sections presented the trends in the levels of household participation in income activities over the two periods, and changes in the relative importance of these income shares over time. The analysis points to patterns in income generation that could help explain the trends observed in welfare and poverty in urban and rural areas. To further this understanding, this section first explores the trends in both aspects (levels of participation in income activities and income shares of total income) by levels of consumption expenditure per capita. The

TABLE 5.4: Share of Income from Sources, 2010–2013 (%)

	Malawi		Urban areas		Rural areas	
	2010	2013	2010	2013	2010	2013
Agricultural						
Crop	43.6	43.1	6.9	10.8	49.8	48.7
Livestock	8.5	6.5	2.1	2.0	9.6	7.3
Agricultural wage	17.8	17.5	14.7	16.0	18.3	17.8
Nonagricultural						
Nonagricultural wage	13.5	11.1	41.9	31.9	8.7	7.4
Self-Employment	12.0	16.3	24.2	29.4	10.0	14.0
Transfers	2.7	3.9	3.1	4.1	2.7	3.9
Other sources	1.8	1.5	7.0	5.7	1.0	0.8

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.

section then relies on *Shapley decomposition* techniques (Azevedo and others 2013), which enable the decomposition of the observed total changes in poverty headcounts by individual income components. Essentially, changes in different income sources will affect trends in poverty, either negatively or positively.

5.4.1. *What is the relationship between income generation and household welfare?*

The Shapley decompositions essentially link poverty, a consumption-based measure, with income. Before making the decompositions, the team looked at the relationship between the levels and trends in various sources of household income per capita, and the levels and shares of its components by wealth levels (measured as consumption per capita) in both urban and rural areas; and how the relationship changed within each period.

Household income and wealth quintiles in 2004–2010

For rural areas, figures 5.2a and 5.2b show the relationship between income per capita and consumption-based wealth levels for (a) each individual income source and (b) their shares relative to total income. Several results stand out. First, as expected, there was a positive relationship between household income per capita and household wealth. The poorest households—those with the lowest levels of consumption per capita—had lower levels of household income per capita. Also in line with expectations, income levels in urban areas were higher on average than in rural areas.

Second, per capita crop income and its shares increased for all wealth groups over the period, but increases were more pronounced among wealthier households. An inverted U-shaped relationship is found for the shares of crop income in rural areas.

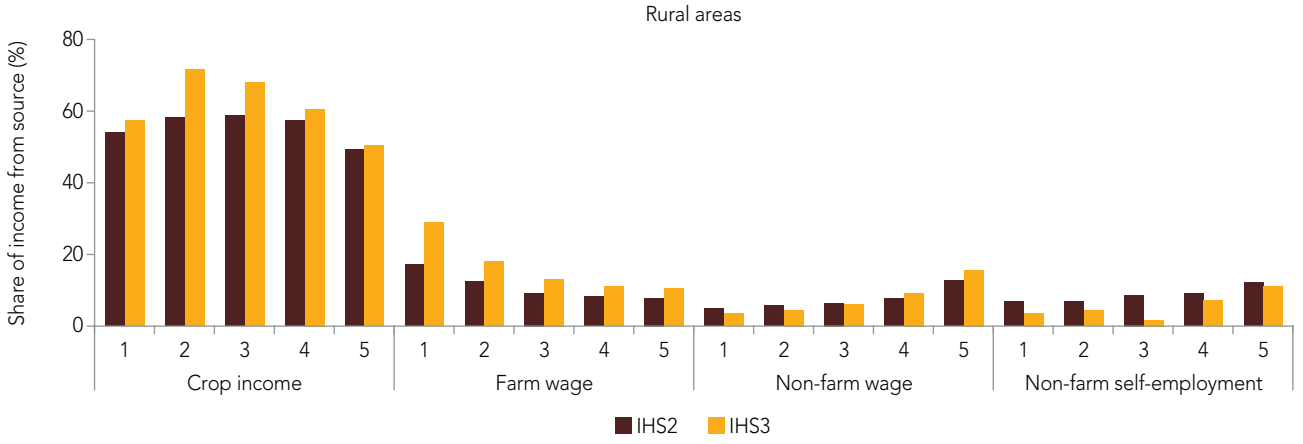
Third, the levels of agricultural wage per capita across wealth quintiles in each year were greater for richer households. However, shares of income from agricultural wage clearly were greater among relatively worse off households, as were increases in both levels and shares over the period in rural areas.

Fourth, nonagricultural wage per capita and non-farm self-employment per capita clearly were greater among the richest households in each year, as were the shares for these non-farm sources of income. However, significant differences in trends are found. While non-farm wage per capita and its shares increased for better-off households, the relatively poor experienced stagnation in per capita income

FIGURE 5.2A: Per Capita Income, by Component and by Consumption Expenditure Quintiles, Rural Areas, 2004–2010 *(%)*

Source: Malawi Poverty Assessment team calculations based on IHS2 and IHS3.

FIGURE 5.2B: Share of Income, by Component and by Consumption Expenditure Quintiles, Rural Areas, 2004–10 *(%)*



Source: Malawi Poverty Assessment team calculations based on IHS2 and IHS3.

and falling shares in total income from this source. Even more accentuated drops are observed for all wealth groups in the level of per capita income and shares from non-farm self-employment. These results highlight how important these sources (particularly self-employment income) were in explaining the relative stagnation in rural welfare over the period.

For urban areas, figures 5.3a and 5.3b show the relationship between income per capita and consumption-based wealth levels for (a) each individual income source and (b) their shares relative to total income. First, **the levels and shares of crop income in urban areas were relatively modest and fell with consumption-based wealth each year**. Differences across income quintiles in per capita crop income were more pronounced in 2004, and increases in 2010 were substantially higher among the richest households.

Second, wage income per capita clearly was the main source of income, and the levels and shares from this source across wealth quintiles in each year clearly were greater among relatively better-off households.

Third, non-farm self-employment per capita clearly was greater among the richest households, as was the increase over the period. However, the growth in income from self-employment sources and their relative shares increased for some less well-off groups (the second-bottom quintile).

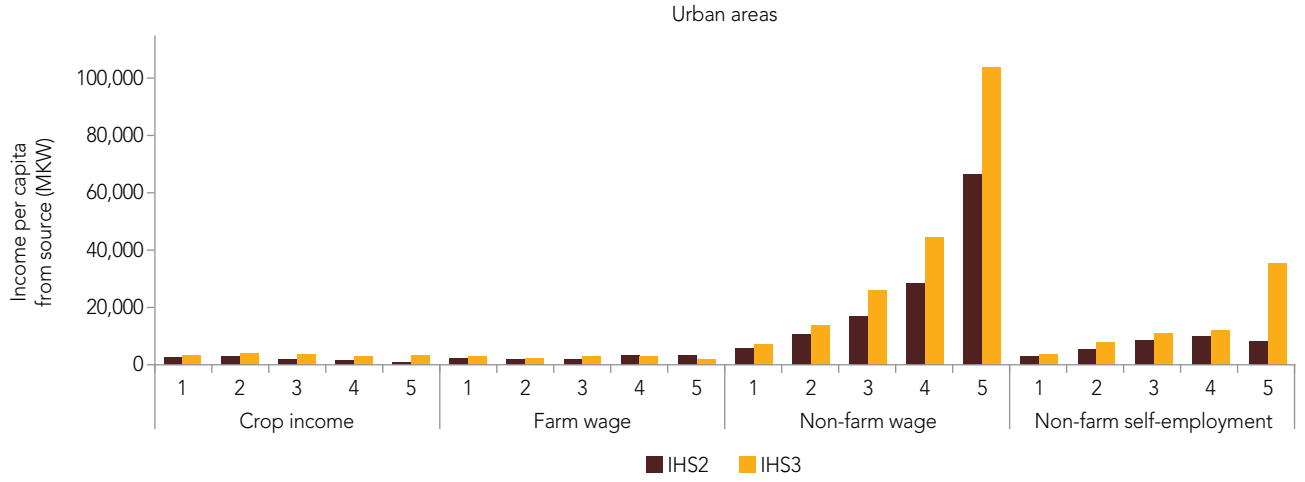
Household income and wealth quintiles in 2010–13

For this period, the team used the yearly independent distributions from the panel to rank households for the analysis. It is important to reiterate that total incomes analyzed for this period generally were lower than in the previous period. The panel data available for 2010 and 2013 covered only the non-lean months whereas the cross-sectional data available for 2004 and 2010 covered a full year.

Figures 5.4a and 5.4b explore the relationship in rural areas in 2010 and 2013 between income per capita and consumption-based wealth levels for (a) each individual income source and (b) their shares relative to total income. The following features can be highlighted. First, the levels of crop income increased with wealth each year, highlighting the continued importance of crop incomes in these areas. An inverse relationship was found for the shares of crop income, that is, poor households had a higher share of crop income in each year. **Over 2010–13, per capita crop income increased for all groups except the bottom 20%,** but the share of crop income in total income remained very similar for all groups.

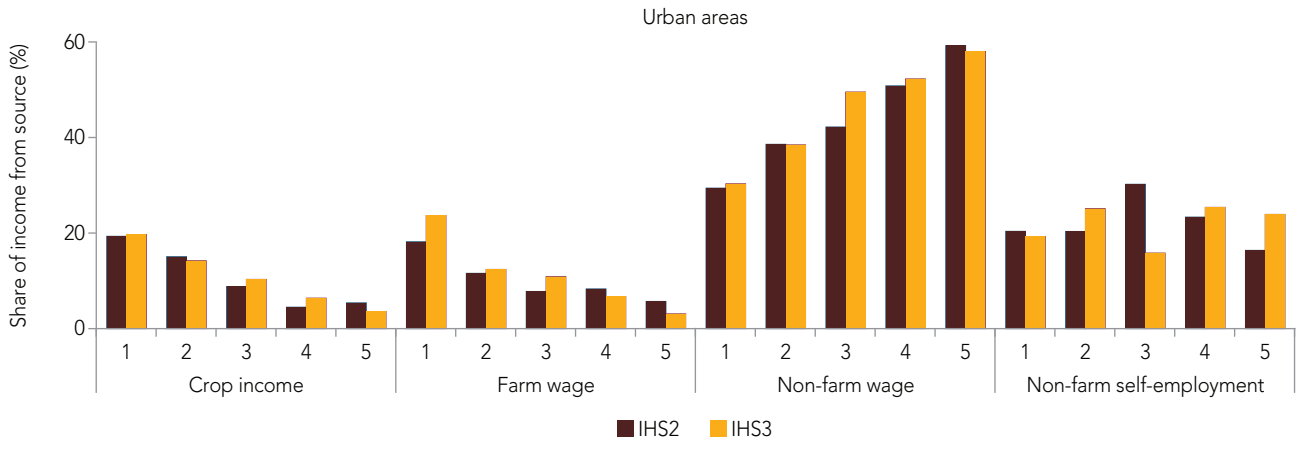
Second, while the levels of agricultural wage per capita across wealth quintiles in each year were greater for the top 20% of households, shares of

FIGURE 5.3A: Per Capita Income, by Component and by Consumption Expenditure Quintiles, Urban Areas, 2004–2010 *(%)*



Source: Malawi Poverty Assessment team calculations based on IHS2 and IHS3.
Note: The quintiles are based on household consumption expenditure per capita.

FIGURE 5.3B: Share of Total Income, by Income Component and by Consumption Expenditure Quintiles, Urban Areas, 2004–2010 *(%)*



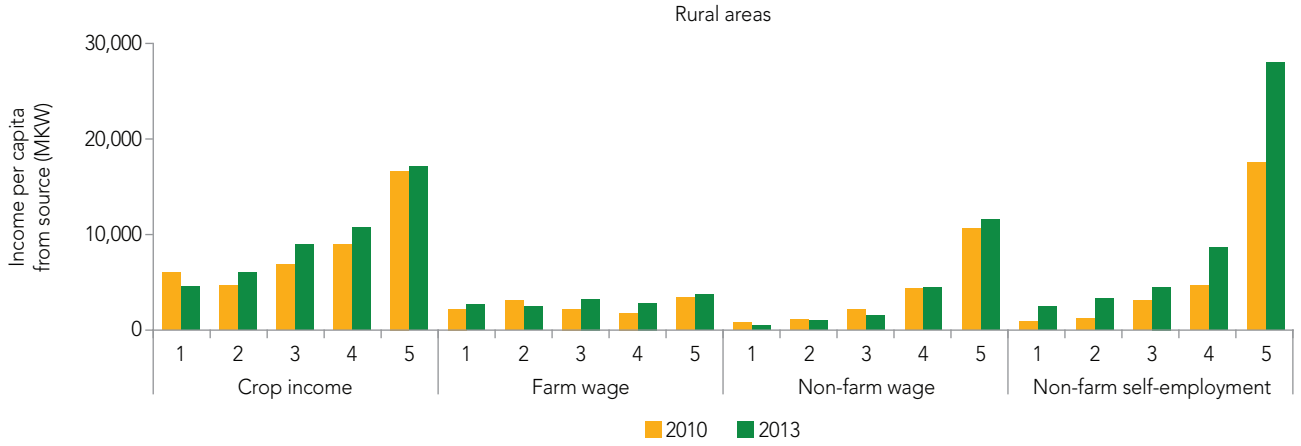
Source: Malawi Poverty Assessment team calculations based on IHS2 and IHS3.
Note: The quintiles are based on household consumption expenditure per capita.

income from that source clearly were greater among relatively poorer households.

Third, nonagricultural wage per capita and non-farm self-employment per capita clearly were greater among the richest households in each year, as were the shares for these non-farm sources of income. However, significant differences in trends are found. Although non-farm wage per capita and its shares increased for the wealthiest households (20%), the bottom 40% experienced falling shares (or at best stagnation) in per capita income.

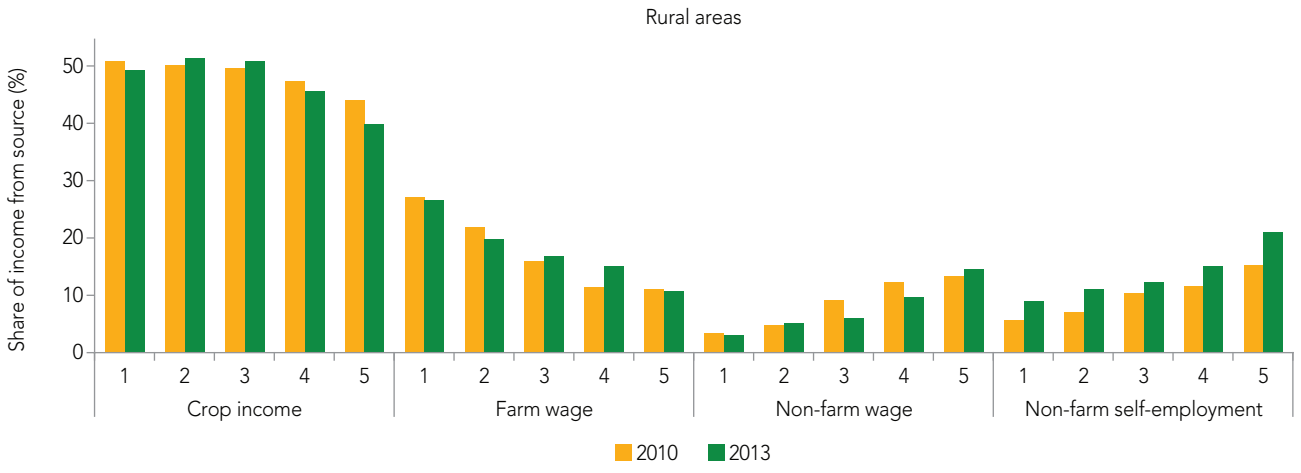
Finally, and in clear contrast to what was observed in the previous period, increases were observed for all wealth groups in the level of per capita income and shares from non-farm self-employment. These results anticipate how relevant this source of income may become to explain the improvements in rural welfare over 2010–13.

FIGURE 5.4A: Per Capita Income, by Component and Consumption Expenditure Quintiles Rural Areas, 2010–2013 *(%)*



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: The quintiles are based on household consumption expenditure per capita.

FIGURE 5.4B: Share of Total Income, by Income Component and Consumption Expenditure Quintiles, Rural Areas, 2010–13



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: The quintiles are based on household consumption expenditure per capita.

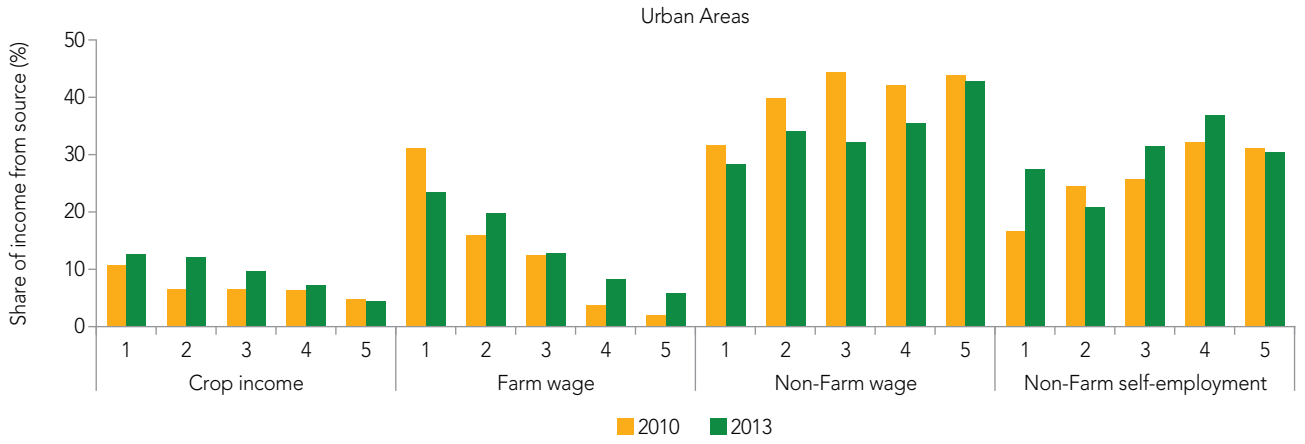
In urban areas, several results were quite distinct from those observed in the previous period (figures 5.5a and 5.5b). First, although the levels of per capita income from crops increased with wealth, the shares fell each year, suggesting that whereas richer urban households generated greater unit crop output, the poorest still were more dependent on cropping. Growth in per capita crop income in urban areas was observed for all quintiles, except the top. The top also was the only quintile that did not experience an increase in the share of crop in total income over the period.

Second, as in the previous period, while there was no discernible pattern in the levels of agricultural wage per capita across wealth quintiles in each year, shares of income from that source clearly were greater

FIGURE 5.5A: Per Capita Income, by Component and Consumption Expenditure Quintiles, Urban Areas, 2010–2013 *(%)*

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: The quintiles are based on household consumption expenditure per capita.

FIGURE 5.5B: Shares of Total Income, by Income Component, and by Consumption Expenditure Quintiles, Urban Areas, 2010–2013 *(%)*



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: The quintiles are based on household consumption expenditure per capita.

among relatively worse-off households. However, increases in both levels and shares over the period in urban areas were observed for only the second, fourth, and fifth quintiles.

Third, nonagricultural wage per capita and non-farm self-employment per capita clearly were greater among the richest households in each year. Over the period, both levels and shares of non-farm wage income dropped for all wealth groups in urban areas in what appears to be the major reason for increased poverty in those areas. Non-farm self-employment income also fell, particularly among wealthier households, although the shares remained relatively stable.

The results in this section give a clear indication of the relationship between consumption-based wealth levels (used for poverty measurement); compared to the levels and trends of total household

income per capita and the levels and shares of its components.

In retrospect, for the initial period 2004–10, in rural areas, per capita crop income and its shares increased for all wealth groups. In contrast, while non-farm wage per capita and its shares increased for better-off households, the relatively poor experienced stagnation in per capita income and falling shares in total income from this non-farm wage. Even more accentuated drops were observed for all wealth groups in rural areas in the level of per capita income and shares from non-farm self-employment. The modest growth in crop incomes could not offset the drop in non-farm income sources for the poorest. In urban areas, income per capita from nonagricultural sources clearly was greater among the richest households, as was the increase over the period. However, the growth in income from self-employment sources and its relative share increased notably for some less well-off groups.

For 2010–13, rural areas experienced growth in per capita incomes across all wealth levels, although more significantly for the households at the top quintiles. At the same time, there was a drop in per capita incomes in urban areas. In rural areas, the levels of crop income increased with wealth each year. Per capita crop income increased for all rural groups except the bottom 20%. Nonagricultural wage per capita and non-farm self-employment per capita experienced some growth among the poor, although clearly were greater among the richest rural households in each year, as were the shares for these non-farm sources of income. In contrast, in urban areas, both levels and shares of non-farm wage income dropped for all wealth groups. Non-farm self-employment income also fell, particularly among wealthier households, although the shares remained relatively stable.

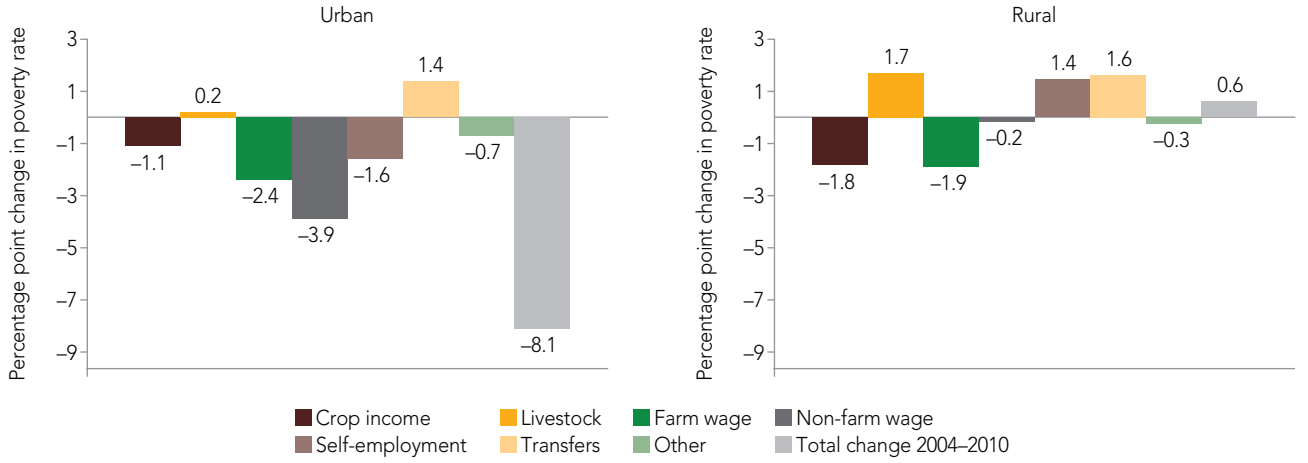
These results set the stage for the Shapley decompositions in the next section, which examines the contributions of individual sources of income to changes in poverty in rural and urban areas over each period.

5.4.2. *Contributions of income components to poverty changes in 2004–2010*

Over 2004–10, Malawi experienced relative stagnation in the levels of poverty, with the national rate falling approximately only 1.7 percentage points in six years. Although rural poverty observed a marginal increase of 0.6 percentage points, the poverty rate in urban areas, in which levels were relatively lower, was reduced by approximately eight percentage points. How are these changes in poverty related to the changes observed in the sources of income, that is, how are those percentage point changes attributable/distributed across income sources? Figure 5.6 shows the contribution from different income sources into the poverty changes observed between 2004–2010 in urban and rural areas. The downward bars show contributions to poverty reduction.

In rural areas, the increase in poverty over the period can be associated mainly with the observed drop in non-farm self-employment and livestock income along with transfers. Such drops were less than compensated for by the increased incomes from other farming sources. As highlighted in previous sections, rural incomes were dominated by farm sources, but non-farm sources such as non-farm self-employment, also prominent in 2004, fell significantly in 2010. The decomposition analysis shows that the fall in non-farm self-employment, a source typically highly correlated with welfare, was responsible for approximately 1.4 percentage points of the net increase in poverty. Drops in livestock and transfers were responsible for 1.7 percentage points and 1.6 percentage points of the net effect on poverty. Although changes in crop income and farm wage contributed to reduce poverty, they were not sufficiently strong to outweigh the losses in welfare resulting from drops in non-farm income. These results underscore the continued importance of income diversification and the need for policies to sustain gains in those sources to reduce rural poverty in Malawi. The association between various income sources and poverty is corroborated by OLS regression analysis (see Appendix A5.4).

FIGURE 5.6: Contribution of Income Sources to Changes in Poverty Incidence, 2004–2010 *(%)*



Source: Malawi Poverty Assessment team calculations based on IHS2 and IHS3.

Non-farm wage income was the driving force behind the reduction of poverty in urban areas. Urban incomes were dominated by nonagricultural sources, predominantly self-employment and non-farm wage employment, and the later actually had led poverty reduction in urban areas. Of the net urban poverty reduction of 8.1 points, increasing non-farm labor wage income had an associated contribution of approximately 50%. In addition, urban incomes remained relatively well diversified. The diversification enabled important positive contributions by other sources, such as non-farm self-employment (1.6 percentage points), and farm sources (crop and farm wages) that jointly contributed 3.5 percentage points to urban net poverty reduction. Drops in transfers also had an association with the negative contribution to poverty reduction in those areas.

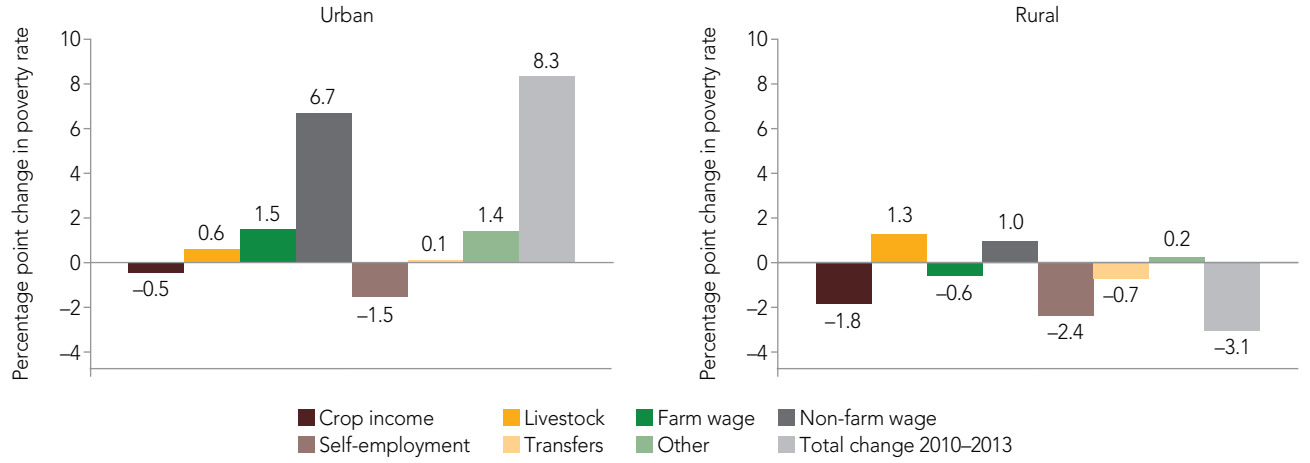
5.4.3. *Contributions of income components to poverty changes in 2010–2013*

Over the non-lean months of 2010–13, Malawi continued to experience relative stagnation in the levels of national poverty, with the rate falling approximately 1.5 percentage points. Contrary to the previous period, whereas the poverty rate in urban areas continued to be significantly lower than in rural areas, the levels increased approximately 8.3 percentage points, wiping out the gains observed in the previous period. In rural areas, however, poverty may have declined by 3.1 percentage points (without statistical significance though). How are these changes in poverty related to the changes observed in the sources of income in urban and rural areas? Results for Malawi's urban and rural areas are presented in figure 5.7.

Contrary to the previous period, rising income from non-farm self-employment was the main force associated with the poverty reduction observed in rural Malawi during 2010–13. Although farm sources continued to dominate rural incomes over this period, self-employment activities re-emerged in rural household portfolios, as witnessed in previous sections. The decomposition analysis shows that the increase in non-farm self-employment was responsible for approximately 2.4 percentage points of the net drop in rural poverty of 3.1 percentage points. Farming sources (crop and farm wage income) also helped reduce rural poverty, although more modestly. [36] They jointly

[36] The important association between crop income and non-farm self-employment in rural areas between 2010-13 is corroborated by the OLS fixed-effects regression analysis. The results show that the largest impacts on welfare came from the levels of maize yields that brought up crop incomes, and the income from non-farm self-employment (see Appendix A5.5).

FIGURE 5.7: Contribution of Income Sources to Changes in Poverty Incidence, 2010–2013 *(%)*



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.

accounted for a similar percentage drop. Transfers in rural areas also played a role in reducing rural poverty. The total observed drop in poverty would have been 5.3 percentage points had there been no reduction in other income sources like livestock and non-farm wages. These results underscore the continued importance of agriculture along with income diversification, particularly self-employment, because it remains an important part of rural livelihoods.

Poverty increases in urban areas are due chiefly to a significant reduction in non-farm wage labor income, a source that had been the driving force for improvements in the previous period. The modest growth in the first and third quintiles of non-farm self-employment income described in the previous section less than compensated for those losses. Urban incomes continued to be dominated by nonagricultural sources, predominantly self-employment and non-farm wage employment, although the share of participation and income shares of the latter dropped significantly, which made it the major driver of poverty increases in urban areas. Of the net urban poverty increase of 8.3 points, non-farm labor wage income contributed with approximately 6.7 percentage points, which makes it the single most important factor.

Non-farm self-employment played a positive role with some increased participation among urban households. However, the returns less than compensated for the losses in welfare caused by reduced increases in wage income and transfers. The contraction experienced in urban areas in this period undid the reduction in poverty observed between 2004 and 2010 (although bear in mind that the panel data was collected over the 6 months that fell in the normal season). The contraction underscores the necessity of addressing the risks associated with non-farm sources of income, and strengthening the business environment and the ability of households to cope with policy-induced shocks, particularly those associated with the macroeconomic environment, exchange rates, and inflation.

The analysis in this section sheds light on the contributions of the different income sources on changes in poverty. Looking at the two periods, crop income clearly made a modest, but steady, contribution to rural poverty reduction. Income from self-employment mirrored the trends in rural poverty observed during the two periods, as did the income from non-farm wage employment in urban areas. With this analysis in mind, the chapter now moves to the question of the role of key assets and their returns in driving the changes to the main sources of income that have led to poverty changes.

5.5. *Drivers of Main Income Sources Leading to Poverty Changes*

The decomposition method applied in the previous section distinguishes the contributors to poverty changes by income sources. Having identified the main income sources associated with poverty changes over the last decade begs the question, what determines these income components and how did these determinants change over time? The conceptual framework presented in this chapter posits that changes in the key endowments related to each income source (such as higher educational levels or increases in physical productive assets), along with changes in returns on these endowments, explain the income growth or lack thereof. This section explores how trends in access and returns on assets may have contributed to increases or reductions in poverty via their effects on the key income sources identified in the previous section.

Chapters 6 (Agriculture), 7 (Non-farm Activities), and 8 (Social Protection) explore in detail the relationships between the main income-earning sources associated with the observed changes in poverty (featured in the Shapley Decompositions) and the key asset endowments driving the changes of such income sources, including demographics, access to services, levels of education, use of agricultural technology, and asset ownership. This chapter summarizes the evolution of these key assets and their returns over the two periods analyzed. A more detailed discussion can be found in these chapters, particularly for 2010–13, given the possibility to explore the panel data available. For the 2004–2010 period, the assessment of those questions is more limited, and this chapter relies partly on past work conducted (Benfica 2014).

Main drivers of income sources affecting poverty changes in 2004–10

Using cross-sectional data from IHS2 and IHS3, this section explores through a multivariate regression framework which assets (land, inputs, education, credit, use of public services) and other factors may have been associated with the key sources of income in each area. For rural areas, the focus is on crop income and non-farm self-employment income, identified as key in driving changes in rural poverty through the Shapley decomposition analysis. For urban areas, the team concentrates on non-farm wage income, which was, by far, the greatest contributor to reducing poverty in these areas over the period.

The analysis then looks at whether the levels of the identified assets increased or decreased over the period. It discusses the changes in the returns on these assets, that is, the magnitude and significance of their effects on the levels of the relevant income components in the individual year cross-sections.

Rural areas

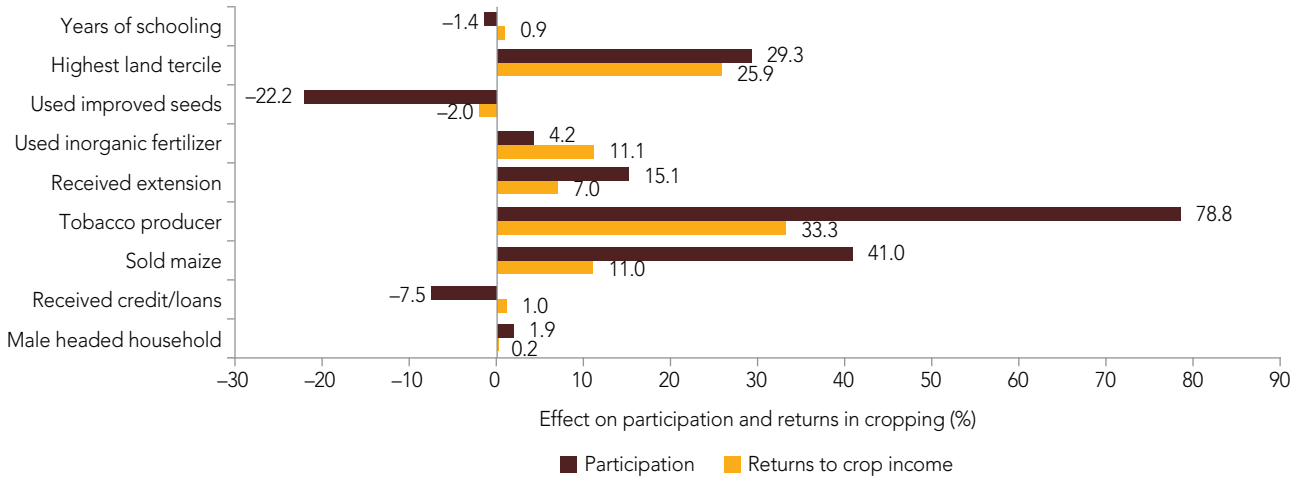
In rural areas, crop income and non-farm self-employment were the major sources of income driving welfare changes over this period. Which assets and other factors mattered most for the levels of per capita rural crop income and non-farm self-employment. The analysis uses 2-Stage sample selection models to control for selection bias. Results are summarized in figure 5.8 and appendices A5.1.a and A5.2.

What was associated with the participation in and returns from crop income?

Crop income growth in rural areas over the period was associated with the use of improved agricultural technologies, including inorganic fertilizer. The regression analysis indicates that the use of inorganic fertilizer had a statistically significant effect on per capita crop income levels. In the pooled sample, users of inorganic fertilizer averaged per capita crop income levels 11.1% higher than those of non-users. As highlighted later in this section the returns were sustained over the period of analysis.

Land area and the use of agricultural public extension services also were associated with higher levels of crop income per capita, as is growing tobacco. Households in the top land tercile had levels of crop income per capita that were approximately 25.9% higher than those in the bottom

FIGURE 5.8: Effects of Assets and Other Factors on Crop Income Per Capita in Rural Areas, 2-Stage Selection Model for Pooled Sample, 2004 and 2010 *(%)*

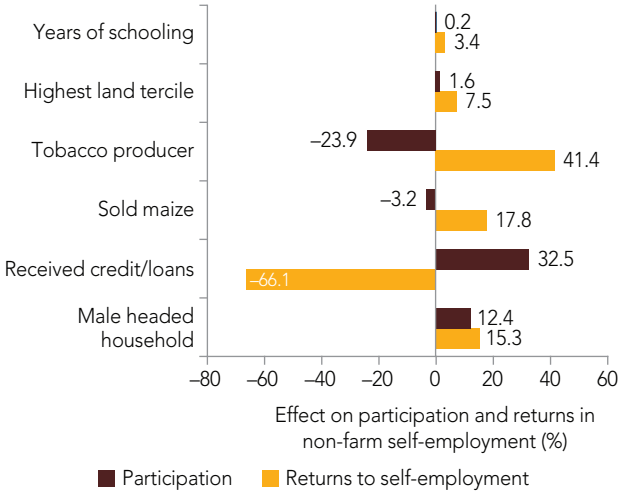


Source: Malawi Poverty Assessment team calculations based on IHS2 and IHS3.
Note: The dependent variable is the log of crop income per capita and log of self-employment income per capita, respectively. Results in figure 5.8 refer to the pooled sample over the two surveys, controlling for a wealth of factors. Both models are Heckman 2-Stage to control for selection bias. Results here refer to the returns (second stage). Only the statistically significant effects at 10% or lower are shown. See Appendix A5.1 for the full model specifications and results for both the pooled and cross-section samples for each year.

tercile. Overall, the per capita crop incomes of rural households participating in public extension services averaged 7% higher than those of households that did not. Benfica (2014) finds that (a) gender gaps in extension use fell over the period; (b) poorer households were less likely to participate in extension, and those differences persisted; and (c) there was a positive relationship between landholdings and extension up to two to three hectares. Beyond this level, participation in public extension started to fall, indicating that households with larger landholdings were using other forms of extension, especially private, generally related to larger scale commercial agriculture. Smallholders who grow tobacco have per capita crop incomes that are 33.3% higher than those of their non-growing counterparts. Returns of education on crop income per capita are positive, but relatively small.

What was associated with the participation in and profits from rural non-farm self-employment income? Figure 5.9 shows the effects of assets and other factors on non-farm self-employment participation and returns in rural areas. **Access to credit/loans increases**

FIGURE 5.9: Effects of Assets and Other Factors on Self-Employment Participation and Returns in Rural Areas, Pooled Sample, 2004 and 2010 *(%)*



Source: Malawi Poverty Assessment team calculations based on IHS2 and IHS3.
Note: The dependent variable is the log of self-employment income per capita. Results in figure 5.9 refer to the pooled regressions, using a 2-Stage Model to control for selection bias: First stage results for determinants of participation and second stage for returns. Only the statistically significant effects at 10% or lower are shown. See Appendix A5.2 for the full model specifications and results.

the chances of venturing into self-employment by 32%, and was by far the main factor associated with starting a family business or becoming self-employed. Male-headed households and those with higher land extensions also were more likely to participate in this activity. Male-headed households received more credit than female-headed households partly because the males were, on average, better off and thus deemed to have better prospects of paying back loans (World Bank 2016a). The higher access to credit enjoyed by males may explain their greater opportunities for participation in non-farm activities.

The levels of non-farm self-employment income per capita were positively associated with the gender of the household head and with having more wealth (proxied by belonging to the highest land tercile). First, male-headed households were 12.4% more likely to participate in non-farm self-employment, and had an enormous advantage over their female counterparts, enjoying, on average, a self-employment income per capita that was 15.3% higher than their female counterparts.

Although less likely to engage in non-farm self-employment activities, when they did, tobacco producers and maize sellers had higher levels of self-employment income per capita. The incomes of tobacco producers who also participated in non-farm self-employment were 41% higher than the incomes of those who engaged in non-farm self-employment but not tobacco production. Likewise, households who engaged in self-employment activities and also sold maize experienced returns that were 17.8% higher than the incomes of those who did not sell maize. Selling maize and producing tobacco bring higher returns on self-employment peharps because those who perform these activities both have more cash to invest in their own businesses.

Trends of levels and returns on individual assets to crop income and non-farm employment income per capita in rural areas

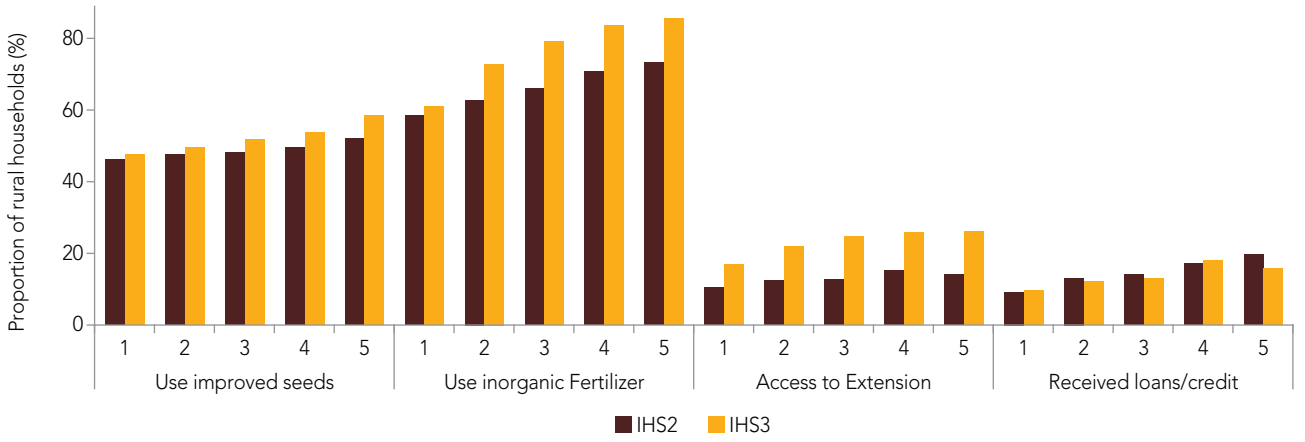
The previous sections used primarily the analysis of the effects of selected assets and other factors through a pooled regression analysis. In this section, the team looked at the trends of these key assets and factors identified, and how their effects on the key sources of income changed in rural areas. It was the combination of these frequency trends and returns that ultimately determined the contribution of these assets and factors to welfare changes via income.

The use of agricultural inputs by rural households in Malawi increased significantly over 2004 and 2010, in part due to the expansion of the Farmer Input Subsidy Program (FISP), and the returns of this technology on the levels of smallholder crop income remained relatively strong. The use of inorganic fertilizer grew from 66% to 76%. Benfica (2014) found that the increases were relatively stronger among wealthier smallholders. Over the same period, users of inorganic fertilizer in 2004 had crop income per capita that was 11% higher than non-users, a difference that fell slightly but remained relatively strong and significant in 2010. The use of improved seeds among rural households also increased from 48% of rural households in 2004 to 52% in 2010, but their returns were only significant in 2004.

The use of agricultural extension services also went up (although from a very low base) as did their returns, especially for those with larger land areas. The use of agricultural extension services by rural households increased from 13% in 2004 to over 22% in 2010. Overall, rural households participating in public extension services had per capita crop incomes that were on average higher than those who did not. By 2004, the effect of extension was 3.4% and more than doubled in 2010, with participating households enjoying a 10.5% advantage over non-participants. Crop income regression results indicated that households who cropped larger land areas averaged higher levels of crop income per capita. For instance, top land tercile households had levels that were approximately 19.9% in 2004, and differences that increased to approximately 37.6% in 2010.

The fact that more people had access to fertilizer, seeds, and extension services led to higher

FIGURE 5.10: Use of and Access to Selected Assets in Rural Malawi, by Quintiles *(%)*



Source: Malawi Poverty Assessment team calculations based on IHS2 and IHS3.
Note: The quintiles are based on household consumption expenditure per capita.

maize production and thus crop income.[37] **However, the poor had less access**. The share of households in the bottom quintile using improved seeds went from 46.1% in 2004 to only 47.3% in 2010; the share of households with access to inorganic fertilizer, is lower among the poorest and rose from 58.3% to 60.8%. Neither increase was statistically significant (figure 5.10). Clearly, the benefits of increased access to both agricultural inputs did not accrue to the poorest. This failure to ensure and enable the poor's access to these inputs could partially explain the modest growth in crop income for the poorest during this period.

Figure 5.11 shows that access to credit was also key to venturing into non-farm self-employment. Over the period, **access to credit/loans in rural areas remained stagnant, but the returns of credit to self-employment income dropped**. Access to credit in rural areas remained practically stagnant at approximately 12% each year, with the poorest experiencing negligible to negative growth in access in those areas (Benfica 2014). This trend probably reflects the drop in participation and share of self-employment income in rural areas and thus its negative contribution to poverty. There was a positive association between credit and participating in self-employment. However, after controlling for selection, the effects of credit on rural self-employment income were negative and statistically significant in each year. Some of the poor segments of the populations increased their participation in growing tobacco. This shift may have led to less participation in self-employment.

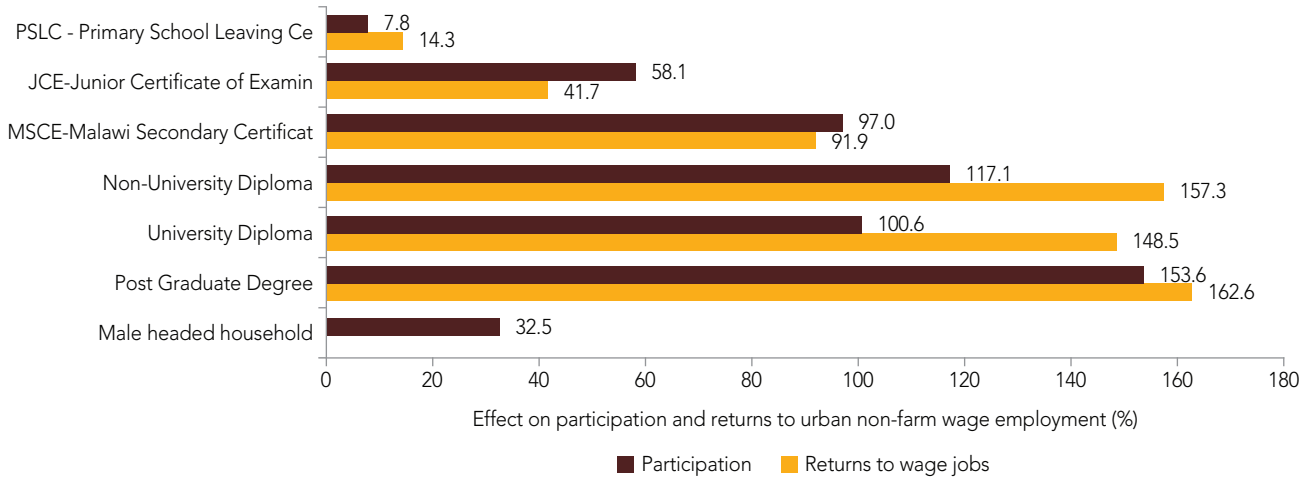
Education levels improved in rural areas, but the effects on both crop income and self-employment per capita remained relatively limited. The improvement in average years of schooling of household heads in rural areas rose from 4.3 to five years. The proportion of those who completed secondary education increased from 3.1% to 5.1%. However, their effects on crop income per capita were very small and increased only marginally from 2004 to 2010. Likewise, the effects of the educational achievements on rural self-employment income remained relatively limited. In contrast, the effects of education on wage income did play a crucial role, as the next section shows.

Urban areas

Which assets and other factors matter the most to participating in wage employment and obtaining income from this source?

[37] Although national production estimates suggested important increases in maize production and productivity from 2004 to 2010, at least three farm-level studies found lower increases in maize production and yields over the same period (Chibwana and other 2010; Holden and Lunduka, 2010b; Ricker-Gilbert and Jayne 2011).

FIGURE 5.11: Effects of Assets and Other Factors on Wage Employment Participation and Returns in Urban Areas, Pooled Sample, 2004 and 2010 *(%)*



Source: Malawi Poverty Assessment team calculations based on IHS2 and IHS3.
Note: The dependent variable is the log of self-employment income per capita. Results in figure 5.11 refer to the pooled regressions, using 2-Stage Models to control for selection bias. First-stage results for determinants of participation, and second stage for returns. Only the statistically significant effects at 10% or lower are shown. See Appendix A5.3 for the full model specifications and results. The effects of educational achievement are relative to "no schooling" (the omitted category).

Over this period, wage income was the major income source driving poverty changes in urban areas.[38] The analysis uses 2-Stage sample selection models to control for selection bias. Results are summarized in figure 5.11 and Appendix A5.3.

The levels of non-farm wage employment income per capita in urban areas were associated positively with schooling levels. Participation in, but not returns on, non-farm wages were associated with the sex of the household head. The two-stage regression results over the pooled sample for 2004 and 2010 indicated that, on average, compared to those with no schooling, those completing primary school (PSLC) are 7.8% more likely to access non-farm wage employment. That effect increased to 58.1% for a Junior Certificate of Education, 97% for a Secondary School Certificate (MSCE), and even further chances to access non-farm wage employment for those having a university or post-university degree.

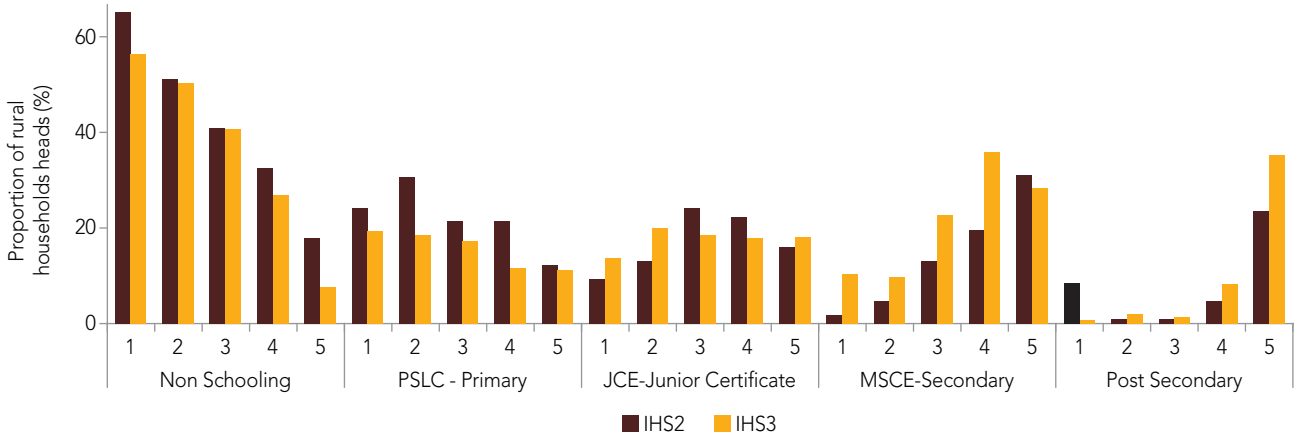
For those who engaged in wage employment in urban areas, significant effects of education on wage income per capita levels were observed. Participating households of heads who had completed primary school (PSLC) earned approximately 14.3% higher wage incomes per capita. The effect of educational achievement increased to 41.7% of higher wages for a Junior Certificate of Education, 91.9% of higher wages for a Secondary School Certificate (MSCE), and more than doubled to over 150% of higher wages for a university or post-university degree (figure 5.10 and table 5A.1c). In addition, male-headed households were 32.5% more likely to access wage income jobs than were their female counterparts, but differences in returns were not statistically different.

Trends in levels and returns on individual assets that affected urban non-farm wage employment and self-employment

In this section, the team looked at the trends in the assets and factors that mattered most to urban incomes

[38] The positive effect of wage income is evidenced in the decomposition analysis and confirmed by regressions presented in table 5A.2.

FIGURE 5.12: Education Completion by Heads of Household by Income Per Capita Quintiles in Urban Areas, 2004 and 2010



Source: Malawi Poverty Assessment team calculations based on IHS2 and IHS3.
Note: The quintiles are based on household consumption expenditure per capita.

and how their effects on these incomes changed in urban areas. **There were some improvements in education levels in urban areas; these effects were significant for non-farm wage income per capita**. From 2004 to 2010, there was an average improvement in average years of schooling of household heads in urban areas from 7.7 to 9.1 years, and an increase in the proportion of those who completed secondary education from 24% to 30%. Figure 5.12 shows that the educational achievement of household heads in urban areas changed over the period. Significant improvements over time by poor urban households were evident, with the proportions of those achieving junior certificates and secondary school levels increasing and those with no schooling or just primary school certificate falling. As described earlier, the returns of education on non-farm wage income were sizable. Returns also increased in urban areas. For instance, the average wage income per capita differential between no schooling and Junior Certificate (JCE) completion, after controlling for selection bias, increased from 12.9% in 2004 to over 49% in 2010. The pay-off of a university or post-university degree more than doubled in terms of the wage income per capita relative to no schooling (figure 5.12; appendix A5.3).

Main drivers of income sources affecting poverty changes in 2010–13

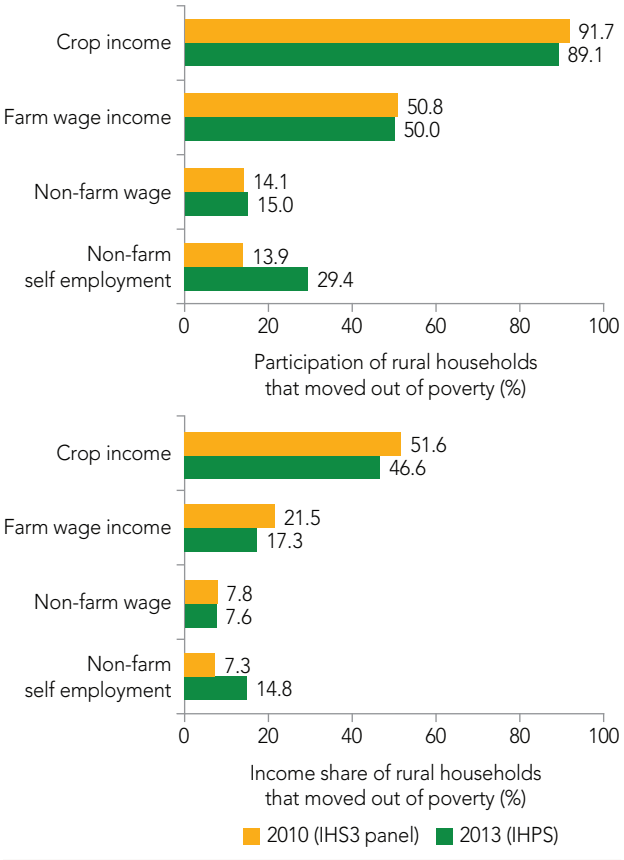
This section relies on panel data for 2010 (IHS3 panel) and 2013 (IHPS). Given the availability of dynamic poverty categories (chronically poor, transient poor, and non-poor), the section determines the respective gaps in maize yields and self-employment income between those who stayed poor and those who managed to move out of poverty. Through the Shapley decomposition analysis, both of these income sources were identified as key in reducing rural poverty. For urban areas, the team concentrated on the gap in non-farm wage income between the non-poor and those who fell into poverty. Wage income was by far the greatest income source associated with poverty increases in urban areas during this period. Through an Oaxaca decomposition analysis, the section then explores to what extent assets (land, fertilizer, seeds, education, credit) and their returns explain these gaps in crop income, profits, and wages. The analysis then looks at whether the levels of the identified assets whose levels or returns explain the gaps have increased or decreased over the period.

Rural areas

As mentioned, rising income from non-farm self-employment was the driving force behind the poverty reduction observed in rural Malawi during 2010–13. Income from self-employment accounted for 40% of that potential reduction (2.2 of 5.3 percentage points). This increase was followed by increased crop income. This section explores which endowments and returns may have contributed to the increase in both sources of income.

Chapter 7 will show the higher rates of participation and returns resulting from self-employment activities for rural households who exited poverty. The proportion of households that exited poverty ("climbers") and participated in non-farm self-employment activities more than doubled between 2010 and 2013 from 14% to 29%. The average returns per month obtained from participating in self-employment activities also doubled from MK2800 in 2010 to MK5500 in 2013. As a result, incomes from self-employment in rural areas for the group of "climbers" doubled its contribution to total household income from 7% in 2010 to 15% in 2013, and became almost as important as agricultural wage income 25.14).

FIGURE 5.13: More Poverty "Climbers" in Rural Areas Entered Self-Employment and Doubled Their Returns, 2010–2013 *(%)*



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.

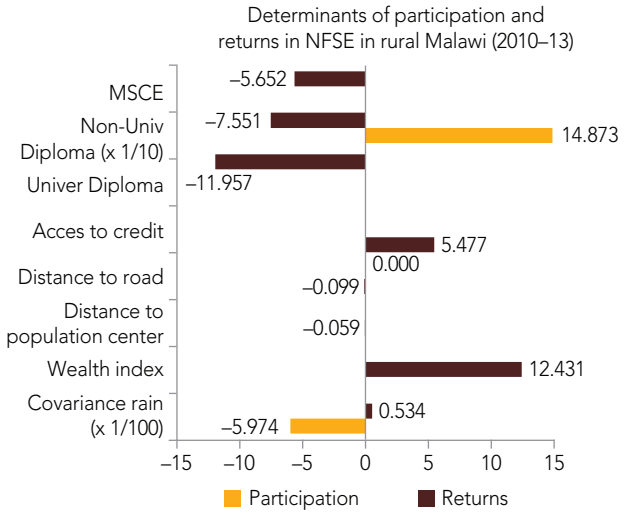
Which factors may have driven the increased engagement of some of the poor in non-farm self-employment activities and the higher business profits observed in these activities?

Figure 5.14 shows that lower wealth, access to credit, and remoteness are key constraints to venturing into non-farm self-employment. Income for investment capital increases the opportunities to start a family business, to connect people better to markets that demand the services offered by these activities.

In contrast to 2004–2010, increased access to credit may be associated with the increased participation self-employment from 2010 to 2013. Access to credit in Malawi improved for the poor and non-poor alike between 2010 and 2013, especially in rural areas. For the rural poor, access to credit almost doubled (from 12% in 2010 to 20% in 2013), whereas in urban areas, it increased from 30% in 2010 to 38% in 2013. However, most of this credit did not come from the formal sector.

Households turn to non-farm self-employment activities in response to covariate shocks. When climatic disasters affect crops and the conventional sources of livelihood for farmers, one alternative could be to pursue activities that generate income outside agriculture. **During this period, however, there were no major rainfall shocks that could have led people into non-farm activities out of necessity.** At the same time, the presence of natural disasters that simultaneously affect many households in a

FIGURE 5.14: Lower Wealth, Access to Credit, and Remoteness Were Key Constraints to Non-Farm Self-Employment, 2010–2013



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.

local area can reduce the demand for the goods and services offered by these activities, making it difficult to generate higher profits.

Further analysis of the drivers of profits from self-employment confirmed that none of the factors above explained higher profits from self-employment. Taking advantage of the panel data and closely following Blinder (1973), the team calculated the mean profit gap in 2013 between "climbers" (the households, originally poor in 2010, who escaped poverty in 2013) and "stayers" (households who were poor in 2010 and remained poor in 2013). The idea is to test whether the observed variation in profits can be attributed to differences in endowments (for example credit and loans, or the age of the household enterprise), or to differences in the returns on these endowments.

The detailed results of the decomposition (chapter 7) revealed that differences in endowments and the returns on these endowments accounted for 7.48% and 92.42% of the differences in profits from self-employment between climbers and stayers, respectively. In other words, the return to endowments almost entirely explained the variation in profit between households who remained poor and those who escaped poverty.

The same decomposition exercise reveals that the differences in returns on married status and the age of household enterprises contributed positively and significantly to the differences in the stayer-climber profit-differential. Being married probably provided some form of stability to households that enable them to focus on their businesses, thereby ensuring higher profits. The age of the enterprise was an indication of experience that, all things being equal, ensured higher profits. In sum, the returns on self-employment micro activities or small enterprises are influenced mostly by supply factors such as household skills developed possibly as the enterprise aged, and the overall demand conditions in the non-farm labor market.

The other factor that led to reductions in rural poverty between 2010 and 2013 was increased crop income (through higher maize productivity). Chapter 6 shows that agricultural productivity significantly affected all poverty measures. All things being equal, a percentage increase in maize yield increased per capita consumption expenditure by 0.132%, and reduced the poverty gap as the severity of poverty by 0.034 and 0.017 percentage points, respectively. The maize yields of poor households who became non-poor by 2013 increased by an average of 25%, whereas the yields of those who remained poor decreased by 10%.

What factors between 2010 and 2013 could be associated with the increased productivity that led to reductions in rural poverty? As the conceptual section in this chapter suggests, both the assets that people possessed (human capital and physical assets) and the contextual variables (location, access to services), which could make those endowments more productive, could help to explain the differences in the income-generation processes. Given that self-production was by far the main component of crop income in rural areas, chapter 6 (on

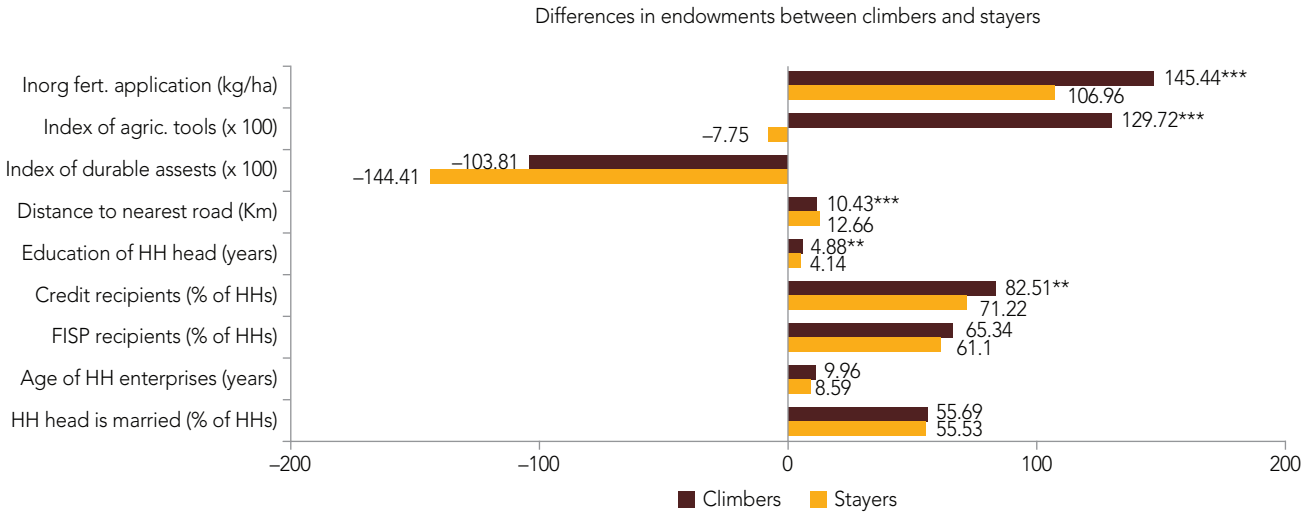
agriculture) attempts to understand such differences in productivity by carrying out basic Oaxaca-Blinder decompositions. Specifically, closely following Blinder (1973), the team calculated the mean yield gap in 2013 between "climbers" (the households originally poor in 2010 who escaped poverty in 2013) and "stayers" (the households who were poor in 2010 and remained poor in 2013). The idea was to test whether the observed differential in productivity could be attributed to differences in endowments (such as farming inputs) or differences in the returns on these endowments.

Differences in the level of production inputs and other observable attributes mattered. Forty-six percent of the maize yield differential between the chronically poor (stayers) and those who escaped poverty (climbers) between 2010 and 2013 is explained by differences in the rate of inorganic fertilizer applied as well as the rate of ownership of agricultural tools and other observable attributes of the households. Looking at the proportion of households receiving FISP-subsidized inputs in 2013, a measure highly correlated with inorganic fertilizer use, the team found that approximately 65% of climbers received the inputs compared to 61% of the chronically poor (figure 5.15).

The role that the returns of some assets play in explaining maize yield differentials is equally remarkable. The same Oaxaca decomposition reveals that over half (53%) of the maize yield differential between the chronically poor and those who escaped poverty between 2010 and 2013 is explained by changes in the returns on organic fertilizer application, family labor utilization, access to extension services, and the application of the right type of basal fertilizer. Access to and use of adequate information could therefore bring higher yields. As an example, households who stayed in poverty in both periods had lower levels of education and lived in more remote villages than those who escaped poverty (figure 5.15). Low education and remoteness likely make information more difficult for these households to obtain, and thus diminish their ability to generate income. In contrast, without a supportive context, chronic poverty could prevail because, irrespective of their endowments, the householders would be unable to utilize their endowments fully or effectively.

In short, endowments matter. However, the returns on the endowments matter equally to explain the variation in maize productivity (and therefore crop income) differentials between the chronically

FIGURE 5.15: Differential Access to Resources for "Climbers" and "Stayers" in Malawi, 2013



Source: Malawi Poverty Assessment team calculations based on IHPS.

poor and those that escaped poverty. The returns on these endowments depend on the context in which the endowments have to be used.

Urban areas

The drop in the rates of participation and returns from non-farm wage activities for urban households who fell into poverty go a long way in explaining the spike in urban poverty. Sixty percent of the urban households who became poor in 2013 had been participating in non-farm wage employment in 2010 (figure 5.16). By 2013 the participation in non-farm wage employment for this group dropped to 32% (almost a 50% decrease), probably in response to the reduction in wages from non-farm wage employment. Returns from non-farm wage employment for the households in this group who remained employed decreased from 7,000 kwachas in 2010 to 5,700 kwachas in 2013. This drop was consistent with the fact that the share from non-farm wage employment in the total income of this group dropped from 42% in 2010 to 21% in 2013.

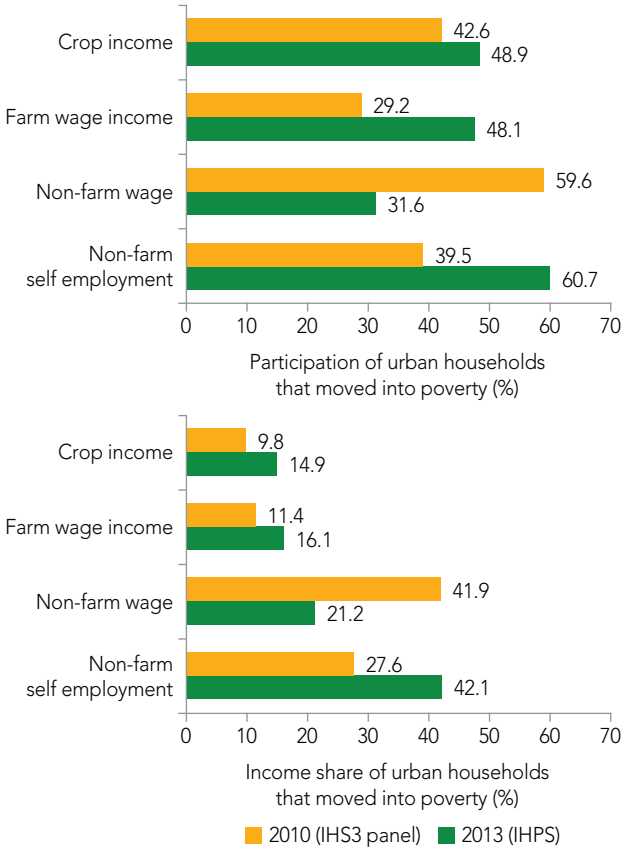
What factors may have driven the reduced engagement of some of the non-poor in non-farm wage-employment activities and the lower business profits observed in these activities?

Aside from covariate shocks, education is the most important determinant of participation and returns on non-farm wage employment. Figure 5.17 indicates that, compared to the non-educated, more educated people are more likely both to participate in non-farm wage employment and to earn higher wages. The magnitudes of education's effect on participation and wages increase in parallel with the level of education up to the university diploma, at which point the effect peaks.

Because wage income was by far the main component of income in urban areas, the team again carried out a Oaxaca-Blinder decomposition on wage differentials. Specifically, the team calculated the mean wage gap in 2013 between "stayers" (those households originally non-poor in 2010 who remained non-poor in 2013) and the "slippers" (households originally non-poor in 2010 who fell into poverty in 2013). The idea was to test whether the observed variation in urban wages between both groups could be explained by changes in their asset endowments or in their returns. Chapter 7 details the results.

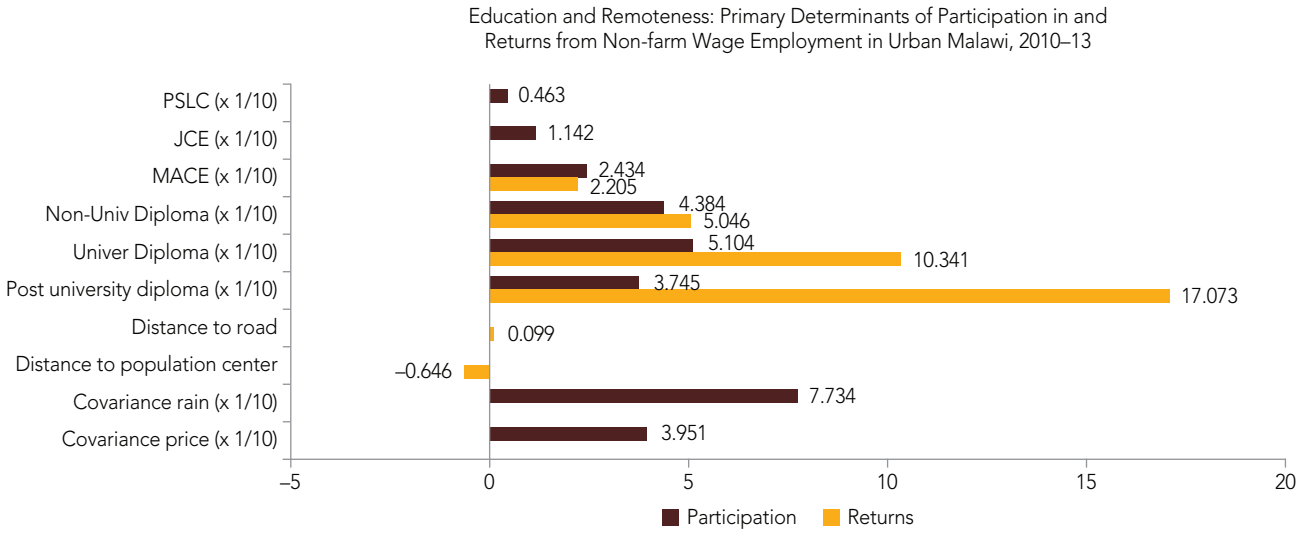
Higher education levels explain the wage differential between those who stayed out of poverty ("stayers") and those who did not

FIGURE 5.16: More Urban Poverty "Slippers" Compared to the Non-Poor Left Wage Employment and Experienced Drops in this Income Source in Their Total Household Income between 2010 and 2013 (%)



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.

FIGURE 5.17: Determinants of Participation and Returns in Non-Farm Wage Employment in Urban Malawi, 2010–2013



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.

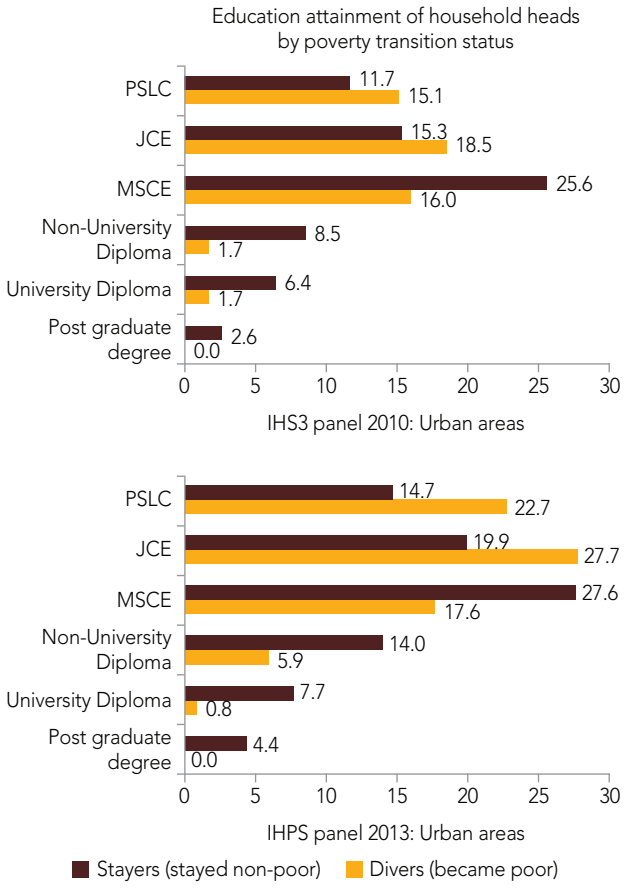
("slippers") between 2010 and 2013. Approximately 43% of the wage differential between the non-poor throughout and those who fell into poverty by 2013 is explained by differences in the educational qualifications of individuals and their asset ownership.

The non-poor ("stayers") were better educated and owned more assets than those who became poor ("slippers"). Figure 5.18 shows that, in urban areas, there was a significant educational attainment gap between the "stayers" and the "divers." Changes toward higher levels of achievement were proportionally higher for stayers than for those who fell into poverty. In addition, as people acquired more education, their non-farm wages increased. Because the highest paid jobs and businesses required the more highly educated individuals, only the lowest paid jobs were available to less educated individuals.

Differences in returns accounted for 57% of the stayer-diver wage gap. In other words, context explained a significant portion of the wage differentials between those who fell into poverty and those who stayed out. Differences in returns on the age of the household member and to certain occupations, such as salespersons, had a significantly positive effect on the climber-diver wage differential. In contrast, **the returns on male workers, educational attainment, distance from population centers, and certain types of employers including government were negative and thus reduced the wage gap**. These reductions in returns reflect the fact that the higher wage premiums enjoyed by males and more educated workers in high-population-density areas shrank as a result of the economic contraction that urban areas underwent in 2013, thus also shrinking the wage differential.

In sum, the compound effects of low education levels on participation and returns on wage employment explain the reasons that the poor remained employed primarily in low-return wage sectors. As just noted, the higher premiums enjoyed by male educated workers in urban areas certainly shrank as a result of the economic crisis and thus their wage differential relative to the poor also shrank. Nevertheless, due to the potentially high returns on increased education, these more educated males enjoyed higher returns overall than did their poor counterparts. This finding give rise to a very encouraging conclusion: there is high potential to increase poor people's

FIGURE 5.18: Heads of Households Who Fell Into Poverty ("Slippers") between 2010 and 2013 Had Lower Education Levels Than Those Who Stayed Out of Poverty ("Stayers") *(%)*



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.

livelihoods through non-farm wage employment by ensuring and increasing education for the poor.

Conclusions

Chapter 5 proposes a framework to understand the components of household income as well as to analyze the income-generating capacity of Malawi's four main socioeconomic groups (poor, non-poor, urban, and rural). Households operate conditioned by the availability of, use of, and returns on assets; market prices for inputs and outputs; a supportive business context (such as GoM's provision of socio-economic infrastructure and access to markets, as well as essential public services to the population); and a sound economic environment for employment opportunities. According to this framework, although the initial conditions and context matter, reducing poverty requires several common elements or pathways to enable growth to include the poor.

These elements can be summarized in household-centered strategies to (1) raise the labor incomes of the poor through more jobs and increased productivity in sectors in which poor people are predominantly engaged, as well as facilitate the movement into new, more remunerative activities; (2) give direct transfers to the poor including safety nets to reduce their vulnerability to shocks through social protection mechanisms; and (3) improve the opportunities of the poor through investing in their human capital and access to productive resources.

In rural areas, where income is predominantly agricultural, along with crop income, diversification into non-farm self-employment plays an important role in determining welfare levels. Growing crop income (through increasing maize yields) has made a steady, but modest, contribution to reduce poverty. The causes are, first, that access to key inputs such as fertilizer, improved seeds, and extension services that could have increased production was limited among the poor, and so was their combined use. Equally important, the returns on fertilizer application and other complementary inputs including family labor utilization, extension services, and the application of the right type of basal fertilizer, matter in raising productivity. Access to adequate information could increase these returns, but the remoteness and low education rates of the poor likely made information difficult to obtain and use it appropriately. At the same time, falling participation and returns from nonfarm self-employment was among the key factors pushing poverty up between 2004 and 2010 and then rising income from non-farm self-employment helped driving it down in the

period 2010–13. Poverty dynamics analysis confirms that a significant number of climbers in rural areas (i.e., those moving out of poverty) became self-employed and doubled their returns between 2010 and 2013. Access to credit and wealth are critical to engagement in self-employment micro or small enterprises, but not on the returns.

In urban areas, income from non-farm wage employment was the key source associated with changes in poverty, which accounts for the lion's share of urban incomes. Non-farm wage income was the driving force behind the reduction of poverty in urban areas between 2004 and 2010, when more people found increased non-farm wage opportunities and returns were sustained at relatively high levels. However, this progress was undone from 2010 to 2013, when urban poverty increased, largely because the participation and returns from these activities dropped. In this second period, panel data on poverty dynamics confirmed that non-poor urban households who fell into poverty had left wage employment or had experienced drops in this income source in their total household income. The 2012 kwacha depreciation, may have directly affected urban poverty by decreasing the demand for non-tradeable goods, and therefore the returns within non-tradeable sectors. Less demand in these occupational sectors (professional, technical, and related workers; administrative and managerial workers; and clerical and related workers) consequently depressed wages.

The following four chapters explore the role that each of the income sources—both agricultural and nonagricultural—and public transfers play in Malawi. The assessment team first looks at agriculture (chapter 6), then at the non-farm sector (chapter 7), followed by transfers in the form of social safety nets (chapter 8). Chapter 9 concludes the report by asserting the necessity to address Malawi's demographic challenge to harness the gains in each of these sectors to increase incomes, and therefore make progress in reducing poverty, and sharing prosperity a reality.

6

AGRICULTURAL PRODUCTIVITY AND POVERTY IN MALAWI

Agriculture remains the mainstay of Malawi's economy and an essential part of its social fabric, accounting for more than 30 percent of gross domestic product (GDP), employing 85 percent of the population in 2013. The low share of agriculture in GDP relative to the large population and labor force employed in the sector suggests that most people remained locked in low-productivity, subsistence agriculture. Smallholder farms characterize the country's agriculture and maize is the predominant crop (grown by approximately 98% of rural households).

Agricultural productivity has a significant positive effect on the welfare—poverty and nutrition—of agricultural households. The elasticities of per capita consumption expenditure and caloric intake with respect to maize yield are 0.132% and 0.06%, respectively. Other measures of welfare, such as the poverty gap and the severity of poverty, also improved with increases in agricultural productivity. Simulations of incremental changes in agricultural productivity show important reductions in poverty and ultra-poverty rates. A 50% increase in maize yield will reduce the ultra-poverty rate among rural agricultural households from 40.78% (11%) to 34.01% (8.46%), and consequently lift approximately 622,015 people out of poverty and 281,718 people out of ultra-poverty. Despite its positive effect on the welfare of rural agricultural households, agricultural productivity among the main crops increased modestly between 2010 and 2013, so it would have to increase greatly to bring about the needed improvement in the welfare of rural agricultural households.

Given (1) the simulated positive effects of agricultural productivity increases on living standards and (2) the Poverty Assessment team's analysis documenting the factors that enhanced agricultural productivity, the Government could consider a few policy options: (a) Expanding access to new technologies, such as irrigation and improved seeds, along with supplementary services, such as information and training on new technologies, which can boost yields. Such a bundle is likely to be superior to the current subsidy program. (b) Access to extension services could be key drivers of agricultural productivity provided they address the

direct needs of smallholder agriculture, teach reliable and proven techniques, such as land management practices, and encourage farmers to comply with fertilizer recommendations. (c) Access to agricultural equipment would improve land preparation practices to reduce erosion and increase productivity. (d) Clarifying the objectives of the Farm Input Subsidy Program (FISP) and its target population could set some foundations to improve agricultural productivity. On the one hand, despite its target of reaching smallholder, resource-poor farmers, FISP's non-poverty focus persists. On the other hand, household participation in the Farm Input Subsidy Program (FISP) explains the lion's share of the dynamics of improved inorganic fertilizer use, but growth in productivity levels has been modest, especially among the poor.

Introduction

Despite development in other sectors of the economy, agriculture remains the mainstay of Malawi's economy and an essential part of its social fabric. The sector accounts for approximately 30% of GDP, employs over 85% of households, is the main foreign exchange earner (60% for tobacco alone in 2014), and serves as the main source of livelihoods for poor and rural households.[39] The low share of agriculture in GDP relative to the large population and labor force employed in the sector proves that most people remain locked in low-productivity, subsistence agriculture. In other words, progress in transitioning smallholders from subsistence to commercial production has been limited.

Malawi's agricultural sector is made up of smallholder and estate farms. The average smallholder farm is approximately one hectare (ha) in size, but, combined, these farms account for 70% of the 2.5 million ha of arable land under cultivation (MoAFS 2012). Although smallholder farmers produce cash crops, which include tobacco, tea, and cotton, these farmers cultivate primarily food crops, which include maize, rice, legumes, and pulses, for subsistence purposes. The rates of market participation among farming households in general and maize-producing households in particular are 42% and 15%, respectively.[40] In contrast to the smallholder farms, estate farms have a minimum size of approximately 10 ha. They produce primarily tobacco, sugar, tea, and other cash crops almost entirely for export. Whereas estate farms usually occupy leasehold or freehold land, the land for smallholder farms is predominantly under customary tenure rights.

Over the last two decades, Malawi's agricultural productivity, as measured by maize yields (kg/ha), has been erratic. The factors commonly cited as underlying the variable agricultural productivity trend include weather variability (Malawian agriculture is overwhelmingly rainfed), declining soil fertility, limited use of improved agricultural technologies and sustainable land management practices, rationed agricultural extension services, market failures, and underdeveloped and poorly maintained infrastructure (World Bank 2007). Given the country's rural nature and the fact that poor households are predominantly farmers, the inconsistent agricultural performance has direct implications for living standards.

Chapter 6 offers a deeper understanding of the current state of Malawi's agricultural sector with a focus on rural smallholder agricultural households and the reason increasing agricultural productivity is critical—to reduce poverty. The Malawi Poverty Assessment team focused on these households because they have the greatest relevance

[39] Agriculture's contribution to GDP is derived from the average of 2010–13, computed with data obtained from the Reserve Bank of Malawi. The contribution of agriculture to foreign exchange earnings refers to 2014, as reported by AfDB (African Development Bank 2014), The contribution of agriculture to employment is for 2010 and 2013 based on the IHS3 (Third Integrated Household Survey) and IHPS (Integrated Household Panel Survey) datasets.
[40] Estimate is based on IHS3 data.

for poverty reduction. The chapter is motivated by two key questions posed during the World Bank's internal discussions, as well as in discussions with the Malawian government: *(1) Where and how can agriculture productivity be increased among poor smallholders?* and *(2) Do increases in agricultural productivity reduce poverty?*

The chapter is organized as follows. Section 1 analyzes the state of agriculture in Malawi with particular emphasis on the economic activities of agricultural households and crop yield. The second section analyzes the evolution of key factors commonly thought to affect agricultural productivity across poverty categories, gender status, and regions between 2010 and 2013. The factors analyzed include household ownership of equipment and land, access to various extension services, credit and subsidized inputs, ownership of livestock, and the incidence of farm input utilization. Section 3 presents an empirical analysis of the determinants of agricultural productivity. The relationship between household welfare and agricultural productivity is analyzed in section 4.

6.1. State of Agriculture in Malawi

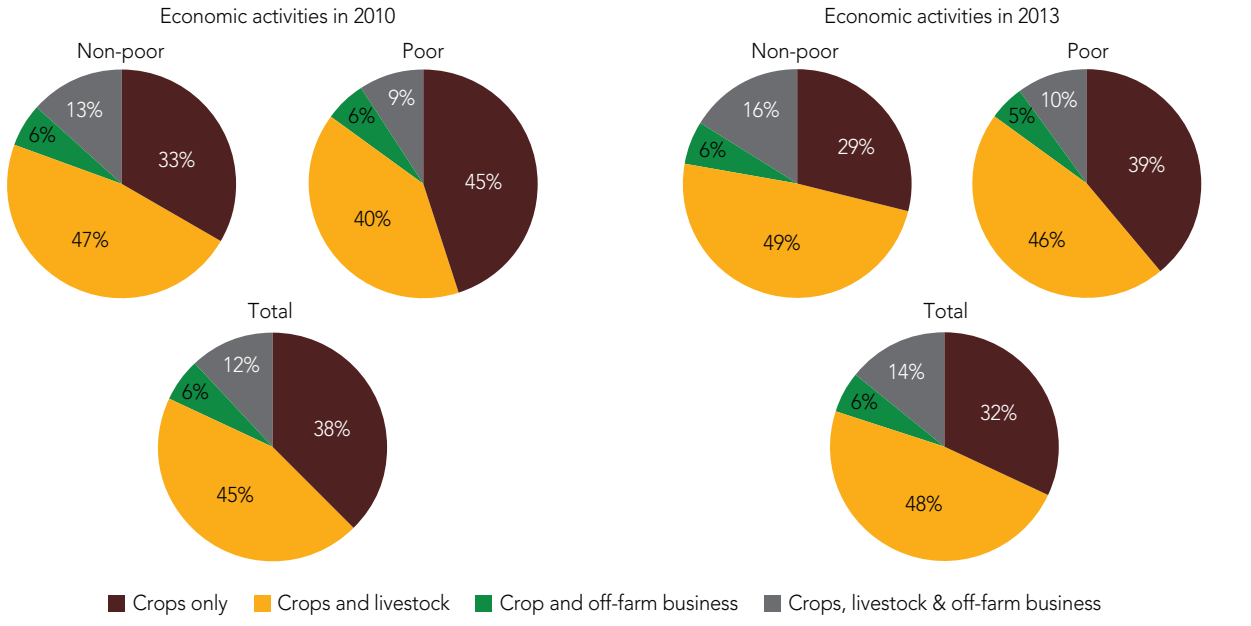
This section presents statistics about the current of agriculture in Malawi. Most information is displayed by gender, region, and poverty status. Households are classified into poverty groups—non-poor, poor, and ultra-poor—based on the national poverty and extreme poverty lines for both years (see chapters 1 and 2 for definitions of poverty lines). Households with annual consumption expenditures greater than the poverty line (MKW 85,852) are classified as non-poor. Households with annual consumption expenditures between the poverty and extreme poverty lines are classified as poor. Those whose annual consumption expenditures fall below the extreme poverty line (MKW 53,262) are classified as ultra-poor. In instances in which analyses are based on poor versus non-poor categories, ultra-poor households are included in the poor category. Thus, unless the ultra-poor category is specifically mentioned, it is considered part of the poor category.

Economic activities of rural farm households

Farm households engage in a variety of economic activities. The general trend for rural farm households, especially non-poor households, is greater diversification in economic activities. For instance, the proportion of households who engaged solely in crop production decreased from 38% in 2010 to 32% in 2013, while the proportion of households who engaged in multiple economic activities increased. Overall, the greater diversification that the assessment team observed in this study appears to be an improvement over the period 2004–10, during which time diversification in economic activities was reported to have fallen substantially in rural areas (Benfica 2014). Figure 6.1 shows that the extent of diversification of economic activities in poor households was less than in non-poor households. In 2013, for instance, approximately 10% of poor households engaged in all 3 economic activities compared to 16% of non-poor households. Notwithstanding the importance of off-farm, income-generating activities to the livelihood of agricultural households, approximately only 20% or less of rural agricultural households in Malawi owned or participated in off-farm enterprises (figure 6.1). Additionally, non-poor farmers were more likely to own off-farm enterprises than were poor farmers.

Engagement in income-generating, off-farm enterprises by rural households showed some diversity (table 6.1). A little over 20% of households who participated in off-farm, income-generating activities owned nonagricultural businesses. Another 20% processed and sold processed agricultural byproducts, while approximately 25% of the households also owned trading businesses either on the street or in a market. The non-poor were more likely to participate in the transportation business than were poor households. Otherwise, there was no

FIGURE 6.1: Economic Activities of Rural Agricultural Households by Year and Poverty Incidence, 2010 and 2013 (%)



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.

significant difference in the types of off-farm enterprises engaged in by poor and non-poor households. Across gender groups, however, male-headed households tended to participate more in nonagricultural businesses, whereas female-headed households tended to focus on processing and selling agricultural byproducts.

Crop production

Maize is the most important annual crop cultivated in Malawi (table 6.2). The crop was cultivated by over 96% of households in both the 2009–10 and 2012–13 agricultural years. The other important crops were groundnut (cultivated by over 30% of households in both years), pigeon pea (cultivated by over 20% of households in both years), and tobacco (cultivated by over 10% of households in both years). The remaining annual crops were cultivated by less than 10% of rural households in both years. The type and incidence of the three main crops did not change in the 2009–10 and 2012–13 agricultural years, compared to 2004, in which maize was cultivated by over 96% of agricultural households; groundnut, pigeon pea, and tobacco were the other important crops in the 2004–05 agricultural year (Benfica 2014).

The proportion of households who cultivated the major crops changed over time.[41] From 2010 to 2013, the cultivation of maize and tobacco decreased from 98% to 96% and from 16% to 11% of households, respectively. During the same period, groundnut and pigeon pea production increased from 33% to 38% and 21% to 29% of households, respectively.

The production of the major crops differed substantially across poverty and gender groups. The estimates indicate that groundnut was more likely to be produced by non-poor than poor households. Pigeon pea was more likely to be produced by male-headed than female-headed households. Tobacco was more likely to be produced by non-poor households and male-headed households than

[41] Major crops are defined as "crops that are cultivated by at least 10% of the households." Major crops include maize, groundnut, pigeon pea, and tobacco (table 6.2).

TABLE 6.1: Types of Off-Farm Enterprises Owned by Households by Year, Poverty Incidence, and Gender of Household Head (% of households)

		Pooled	Non-poor	Poor	Female	Male	Northern	Central	Southern
2010	Non-ag business	20.26	21.83	16.92	8.41	23.42***	16.18	22.19	19.63
	Process and sell ag by-products	22.30	21.17	24.70	46.31	15.89***	23.06	31.01	14.49
	Trading business	23.35	24.52	20.86	17.25	24.98	16.23	22.11	26.28
	Professional service	1.39	1.60	0.93	2.76	1.02	0.83	0.00	2.74
	Transportation business	4.20	5.73**	0.94	1.35	4.96*	0.00	5.05	4.53
	Bar or restaurant	2.78	2.78	2.80	1.35	3.17	0.00	1.95	4.23
	Other business	40.68	40.76	40.50	35.02	42.19	47.73	31.20	47.14
2013	Non-ag business	27.12*	27.78	25.20	16.36	29.79**	24.07	27.77	26.84
	Process and sell ag by-products	23.91	25.65	18.82	46.92	17.80	17.99	22.21	25.88
	Trading business	25.62	24.89	27.76	22.45	26.55	28.14	25.76	25.28
	Professional service	0.41	0.56	0.00	0.00	0.53	2.16	0.00	0.62
	Transportation business	5.23	6.25**	2.24	5.75	5.11	5.33	4.13	6.16
	Bar or restaurant	0.46**	0.24	1.11	0.00	0.59	0.00	0.00	0.90
	Other business	32.26**	32.17	32.52	20.79	35.45**	46.72	31.01	32.07

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: Reading of significance level of difference: 2010 vs. 2013 in the pooled column; non-poor vs. poor; and female vs. male in each respective year. Significance level of the difference: 1% (***), 5% (**), and 10% (*).

by their poor and female counterparts. However, no significant difference across poverty and gender groups was noted for maize production. The estimates also indicate that the most common crops cultivated by female-headed households were maize, groundnuts, and pigeon pea. In 2010 the participation rates were 98%, 33%, and 29%, respectively; in 2013 the rates were 93%, 34%, and 31%, respectively. In addition to these three crops, a significant proportion of male-headed households (19% in 2010 and 12% in 2013) also cultivated tobacco.

The assessment team also found substantial regional differences in the production of annual crops in Malawi (table 6.2). Although maize was cultivated by over 90% of households in each of the three regions of the country, the estimates indicate that maize was more likely to be produced in the Central and Southern regions than in the Northern region, although the differences were fairly small. The estimates also indicate that pigeon pea was produced almost exclusively in the Southern region. Groundnut was more likely to be produced in the Central region, followed by the Northern region and then the Southern region. Tobacco was more likely to be produced in the Central and Northern regions than in the Southern region, in which only 6% of households produced the crop in both years.

Crop yields

The yields of major crops are presented in figure 6.2. In 2010 the average yield for maize, groundnut, pigeon pea, and tobacco were 1331 kg/ha, 669 kg/ha, 282kg/ha, and 989 kg/ha, respectively. Between 2010 and 2013, maize and groundnut yields increased significantly by 7.96% and 22.87%, respectively. Nevertheless, the average yield of maize of 1.4 tons/ha is very low. These yield estimates are quite close to the average yield levels found in neighboring countries, such as Mozambique and Zambia, but much below the levels achieved by South Africa (approximately 4.3 tons/ha). Maize yields for non-poor

TABLE 6.2: Households Growing Various Annual Crops by Year, Poverty Incidence, and Household Head *(% of households)*

		Pooled	Non-poor	Poor	Female	Male	Northern	Central	Southern
2010	Maize	97.74	98.13	97.11	97.82	97.71	94.24	98.44	98.01
	Other cereals	15.47	14.07**	17.71	19.60	14.07**	13.70	4.85	25.27
	Groundnut	32.72	37.36***	25.34	33.22	32.56	34.53	49.42	17.56
	Pigeon pea	21.05	20.73	21.57	28.91	18.40***	0.44	0.43	44.49
	Other legumes	14.10	14.68	13.18	10.02	15.48***	27.54	20.79	4.76
	Vegetables (aggregate)	12.11	12.25	11.88	12.12	12.10	18.47	5.40	16.38
	Tobacco	15.59	17.99***	11.76	4.09	19.48***	23.51	23.66	6.45
	Other cash crops	3.82	3.19*	4.84	3.51	3.93	2.72	2.33	5.42
	Tuber crops (aggregate)	6.62	6.73	6.44	6.01	6.83	12.01	8.30	3.75
	Maize	96.20***	96.34	95.93	97.99	95.57***	94.44	96.71	96.02
2013	Other cereals	16.55	15.09**	19.37	17.98	16.05	12.20	4.01	29.27
	Groundnut	37.66**	41.12***	30.98	35.30	38.47	31.80	54.11	23.03
	Pigeon pea	29.10***	29.52	28.30	32.67	27.87**	1.03	0.41	61.46
	Other legumes	28.46***	30.32**	24.86	26.64	29.08	26.06	41.34	16.61
	Vegetables (aggregate)	23.25***	23.15	23.44	22.39	23.54	8.46	23.78	25.38
	Tobacco	10.75***	11.18	9.93	3.79	13.16***	14.81	15.38	5.61
	Other cash crops	1.43***	1.46	1.35	1.50	1.40	4.30	0.27	2.01
	Tuber crops (aggregate)	6.21	6.88*	4.93	4.05	6.96**	6.86	6.61	5.71

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: Reading of significance level of difference: 2010 vs. 2013 in the pooled column; non-poor vs. poor; and female vs. male.
Significance level of the difference: 1% (***), 5% (**), and 10% (*).

households averaged significantly greater than those for poor households in both years. However, interestingly, yields for the other major crops did not change so significantly across poverty groups (figure 6.2). Tobacco and pigeon pea yields increased over time, but the increases were not statistically significant.

The average yields of the major crops differed significantly by gender (figure 6.3). The 2010 yields for all the crops on female-managed plots were significantly less (26% for maize, 30% for groundnut, and 27% for pigeon pea and tobacco) than the yields for the same crops on male-managed plots. However, in 2013, the gender differential in yield was significant for only maize and groundnut.

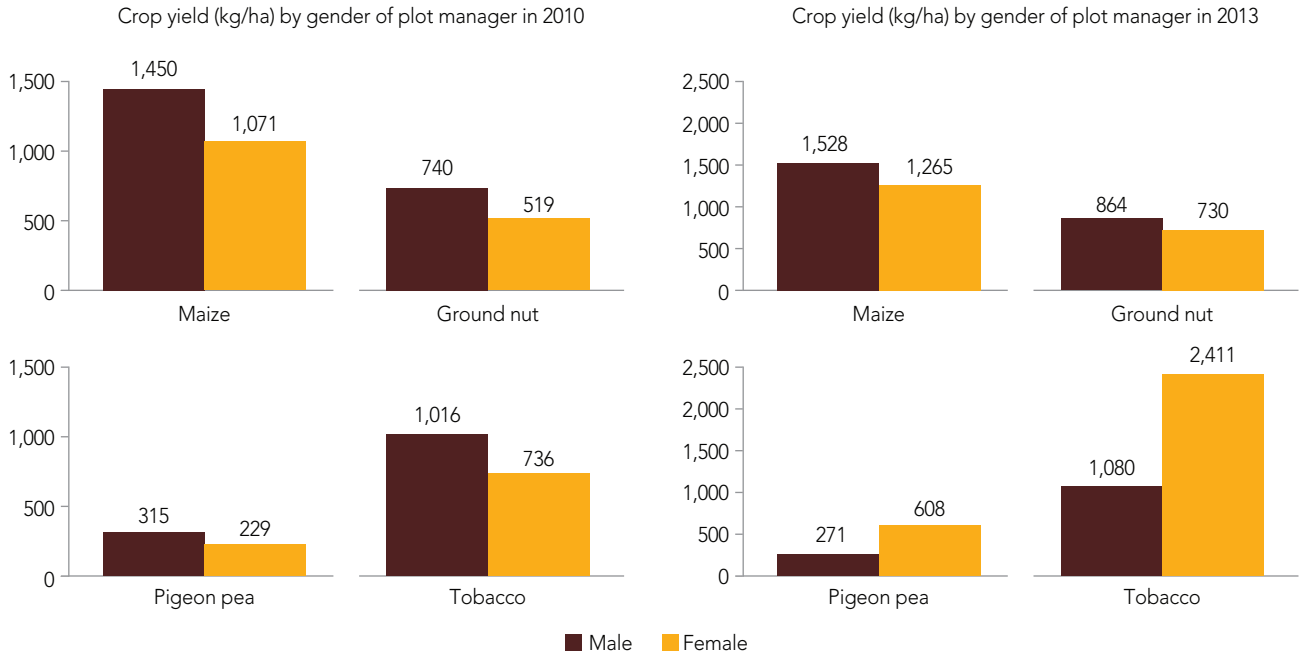
The estimates show that, apart from pigeon pea, yields for all other major crops were highest in the Central region, followed by the Northern region, then the Southern region (figure 6.4). Maize, groundnut, and tobacco yields in 2013 were highest in the Central region (1742kg/ha, 1036kg/ha, and 1409kg/ha, respectively), followed by the Northern region (1680kg/ha, 666kg/ha, and 1254kg/ha, respectively) and then the Southern region (1237kg/ha, 422kg/ha, and 756kg/ha). However, pigeon pea yields in 2013 were highest in the Southern region (393kg/ha), followed by the Central region (98kg/ha), then the Northern region (3.6 kg/ha).

The analyses of the impacts of modern inputs—inorganic fertilizer and improved seed—and extension on maize yields for poor and non-poor households are presented in figures 6.5 and 6.6. The estimates suggest that maize yields were higher when at least one modern input was used, and were highest when all modern inputs (inorganic fertilizer and

FIGURE 6.2: Crop Yield by Year and Poverty Status *(kg/ha)*

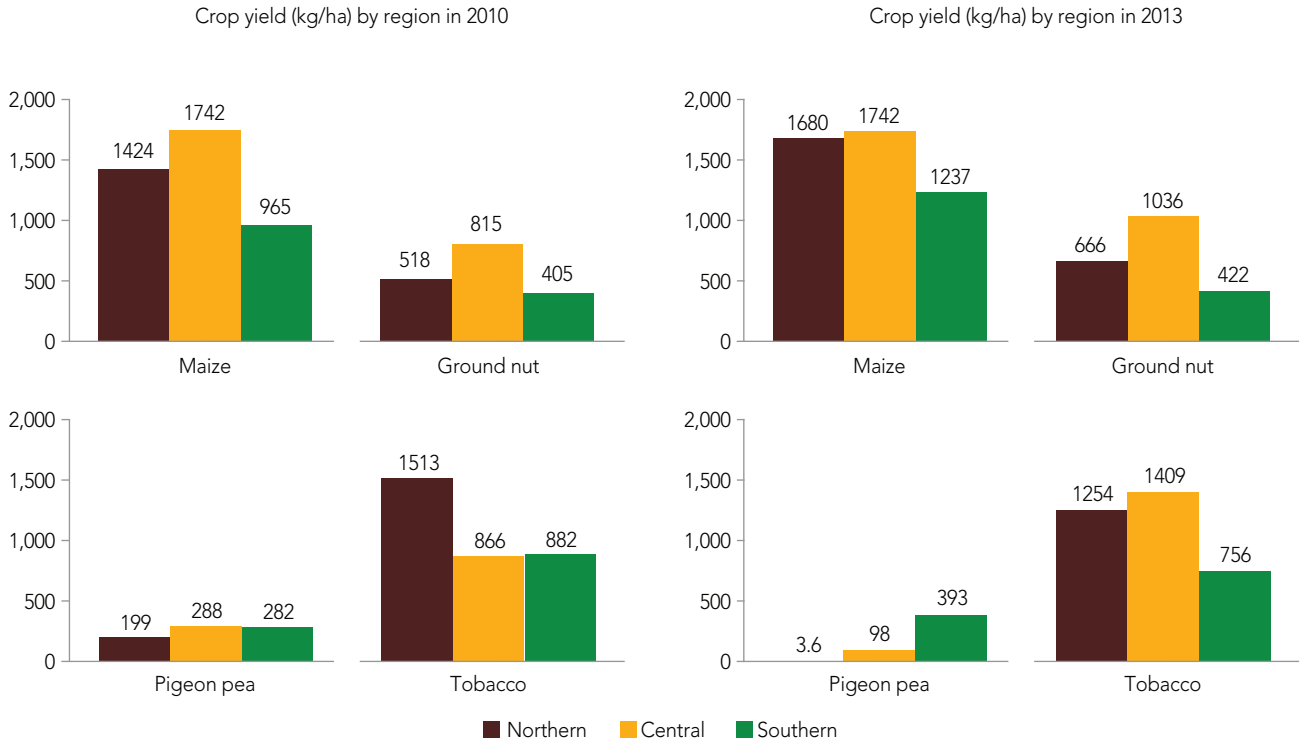
Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.

FIGURE 6.3: Distribution of Yield of Major Crops by Gender of Plot Manager



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.

FIGURE 6.4: Spatiotemporal Distribution of Crop Yield *(kg/ha)*



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.

improved seeds) and extension were used together, more than the use of one investment alone (figure 6.5). In 2013 the average yields on plots on which both inorganic fertilizer and improved seeds were used was at least 60% higher than the average yields on plots on which none of the inputs had been used. Despite the positive impact that the combined use of inorganic fertilizer, improved seed and extension services had on yields, the share of agricultural households that use these complementary inputs is rather low in 2013 (figure 6.6).

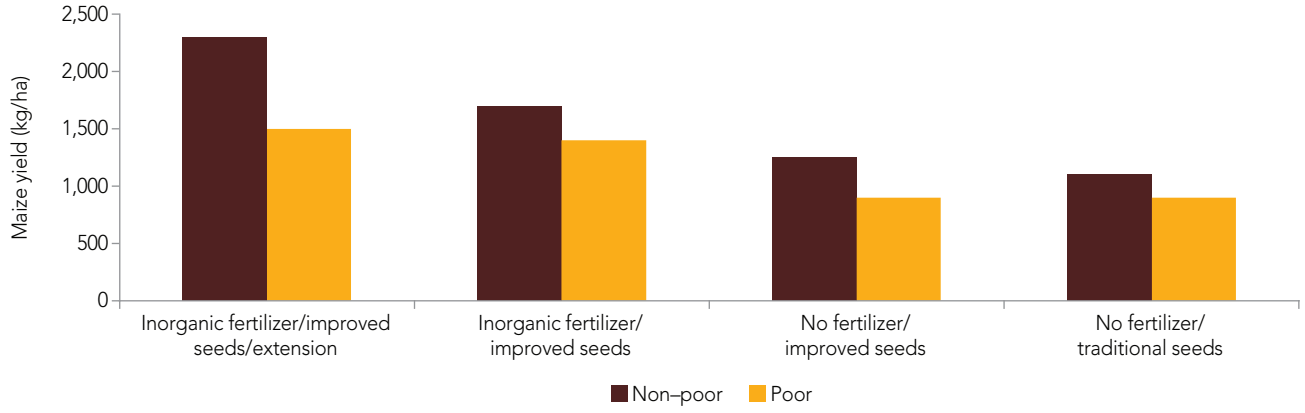
To summarize, maize continues to be Malawi's most important annual crop and is cultivated by over 90% of farm households. Nevertheless, the average maize yield of 1.4 tons/ha remains very low compared to the yields of South Africa and developed countries. Further complicating the yield gap, Malawi has substantial gender differences in the average yields of maize and groundnut, with male-headed households having larger yields than female-headed households.

Maize yields are significantly higher when at least one modern input is used, and highest when both inorganic fertilizer, improved seeds and extension services are used together. The yield estimates indicate that, for all combinations of modern inputs, the maize yields are higher for non-poor than for poor households. Despite the positive impact of the use of inorganic fertilizer and improved seed on yield, farmers' combined use of these two inputs was low.

6.2. Ownership of Agricultural Assets (Equipment and Land), Ownership of Livestock, Access to Services, and Incidence of Input Utilization

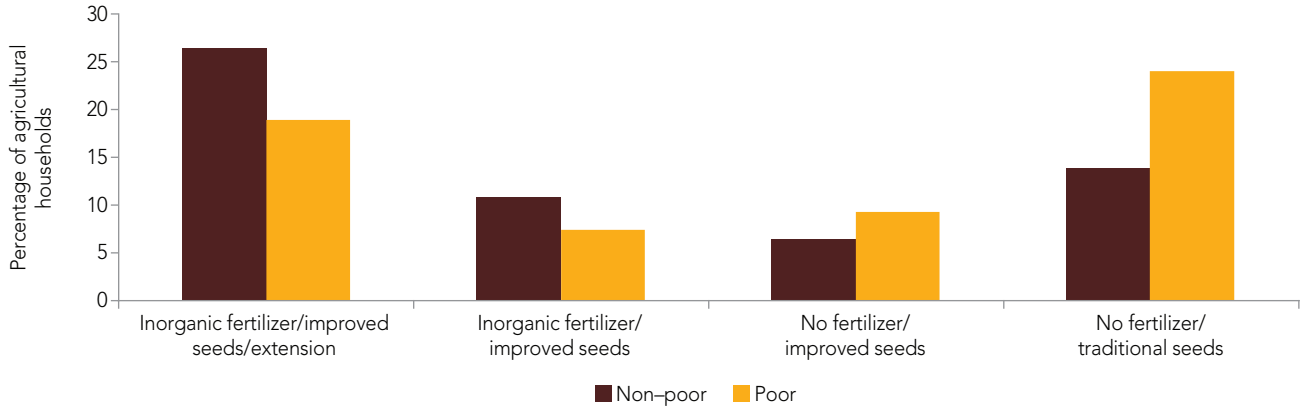
This section explores the state of ownership of agricultural equipment, access to various services, ownership of livestock, and incidence of input utilization, and compares these variables across different groups of farmers.

FIGURE 6.5: Use of Complementary Inputs for Farming and Maize Yields in Malawi, by Poverty Status, 2013



Source: Malawi Poverty Assessment team calculations based on IHPS.

FIGURE 6.6: Share of Agricultural Households with Access to a Combination of Inputs for Farming in Malawi, by Poverty Status, 2013



Source: Malawi Poverty Assessment team calculations based on IHPS.

6.2.1. *Ownership of agricultural equipment and land*

Agricultural mechanization is still limited in Malawi. Mechanized equipment, such as ploughs, ridgers, and cultivators used to prepare land, are owned by less than 2% of farmers. As expected, non-poor households own significantly more agricultural equipment than do poor households. Male-headed households are significantly more likely to own most of the equipment, compared to female-headed households.

The average landholding is very small and varies substantially across poverty and gender groups, and across the three regions (table 6.3). Landholding was 0.69 ha on average in 2010 and 0.68 ha in 2013. Non-poor households and male-headed households averaged significantly more land (at least 9% and 28% more, respectively, in 2010) than their (poor and female) counterparts. At the regional level, the average landholding was highest in the North, followed by Central, then the South.

BOX 6.1: Profitability of Fertilizer Use in the Production of Maize

The purpose of this box is to understand the profitability of inorganic fertilizer use by farmers in Malawi by analyzing specifically how fertilizer response rate and profitability of fertilizer use by farmers vary spatially and across different categories of households. In doing so, the team derived yield function and profitability of fertilizer use from the farm profit component of the Singh and others (1986) agricultural household model. Farmers are considered firms whose production set is comprised of food and cash crops. Maize is the most widely cultivated crop in Malawi, and the second most important crop (after tobacco) in fertilizer application. Accordingly, the team focused on farmers' decisions to produce maize using inorganic fertilizer and other inputs.

To study the profitability of fertilizer use in Malawi, the team began by estimating the following yield function:

$$Y = f(N, X, H), \quad (1)$$

where Y is maize yield, is the rate of nitrogen (from inorganic fertilizer) application, X is a vector of other plot-level agronomic inputs, and H is a vector of household-level variables that are likely to affect the production of maize. Taking the first order condition of profit maximization with respect to the nutrient variable and rearranging the terms results in equation (2):

$$P_Y * MP_N = P_N, \quad (2)$$

where MP_N is the marginal product of the nutrient variable; and P_Y and P_N represent the prices of maize and nitrogen, respectively. Accordingly, the left side of equation (2) is the marginal revenue product of inorganic fertilizer and measures the rate at which revenue from maize production increases with the amount nitrogen applied. A household's decision to use inorganic fertilizer in maize production was influenced by the extent to which the input had been profitable: the higher the profitability of fertilizer use, the higher the incentive for farmers to use the input. From equation (2), the extent of fertilizer profitability to a household is given by $(\frac{P_Y * MP_N}{P_N})$, that is, marginal value cost ratio (MVCR). Thus, profitability of fertilizer use depends on the household's yield response rate to fertilizer, the price of maize, and the price of fertilizer. MVCR of greater than 1 indicates that an increase in the rate of fertilizer application would increase income from maize production. However, maize farmers in Malawi could be risk averse, so could need the MVCR to be somewhat greater than 1 to make the investment in inorganic fertilizer at planting. Following the literature, fertilizer use in maize production is deemed profitable if MVCR is at least 2 (that is, a risk premium of 1) (Xu and others 2009; Sauer and Tchale 2009; Bationo and others 1992). MVCR of at least 2 enables accounting for the risk and uncertainty and the many unobserved costs associated with fertilizer use.

MP_N , the only unknown in equation (2), is obtained from the estimation of equation (1).

To study the profitability of fertilizer use by farmers in Malawi, the yield function in equation (1) is specified with a 2-level hierarchical model. For yield on plot p, belonging to household h, the model at the various levels of the hierarchy is specified as:

$$Y_{ph} = \mathbf{b}_{0\,0}\, N_{ph} + X_{ph}\mathbf{b}_k + H_h \mathbf{a}_{0\,m\,0} + (U_{0h} + U_{1hct}\, N_{ph} + \mathbf{e}_{ph}), \quad (3)$$

Y_{ph} where is yield; N_{ph} is nutrient application rate; X_{ph} is a vector of other plot-level variables affecting maize yield, and H_h is a vector of household-level variables. The terms in parentheses, r $(U_{0h} + U_{1hct}\, N_{ph} + \mathbf{e}_{ph})$, epresent the total error term in the model: $\mathbf{e}_{ph}$ from the plot level, and U_{0h} and $U_{1hct}\, N_{ph}$ from the household level.

The team used this hierarchical model to generate the response rate for each household in the dataset. Together with the price of maize and nitrogen, the profitability of the fertilizer use for each household subsequently was computed using the household-specific response rates. The team then analyzed how the response rate and fertilizer profitability varied across time, poverty groups, gender groups, beneficiaries, and non-beneficiaries of the Farm Input Subsidy Program (FISP), and districts. To account for all the prices that farmers could face in output and input markets, the team considered the harvest season (May-October) and lean season (November-April) market prices of maize, and commercial and subsidized prices (50% and 90% subsidy) of fertilizer. The 90% subsidy rate was chosen to reflect the prevailing rate, whereas the 50% was chosen to represent a rate lower than the prevailing rate.

The results are presented in table B6.1. The average maize response rate to nitrogen application was 11.63, meaning a kg increase in the quantity of nitrogen applied, all else being equal, would increase maize yield by 11.63 kg.

Table B6.1 also shows the extent to which fertilizer use was profitable The estimates show that, on average, at the commercial price, fertilizer use was not profitable in Malawi. However, when fertilizer is subsidized by 50% and 90%, it is profitable. Regarding the number of households for which the use of fertilizer is profitable, the team found that the use of fertilizer is profitable to 14.4% households when maize is valued at the lean season price, but profitable for only 3.32% of households when maize is valued at the harvest season prices. Furthermore, the estimates show that, on average, fertilizer use is approximately 54% more profitable when maize is valued at the lean season market price than at the harvest season market price.

An analysis of district-level fertilizer use profitability revealed that, at the commercial price of fertilizer and harvest season market price of maize, fertilizer use on average was not profitable in any of the districts of Malawi (tables of results are available on request). However, at the lean season market price of maize, fertilizer use was profitable in Mulanje and Blantyre, and nearly profitable in Mangochi, Chiradzulu, Chikwawa, and Neno. Apart

(continues on next page)

BOX 6.1: Profitability of Fertilizer Use in the Production of Maize *(continued)*

TABLE B6.1: Fertilizer Response Rate and Fertilizer Profitability

	Seasonal maize price		Fertilizer subsidy rate			Estimates
	Lean	Harvest	0%	50%	90%	
Response rate	—	—	—	—	—	11.632
Profitability	x		x			1.436
		x	x			0.933
	x			x		2.509
		x		x		1.624
	x				x	6.939
		x			x	4.489

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.

from Karonga, which is located in the Northern region of the country, all the other districts in which fertilizer use was profitable or nearly profitable, are in the Southern region. The districts in the Southern region had relatively lower response rates but higher maize-nitrogen price ratios than the districts in the Northern and Central regions. Hence, the team attributes the higher profitability of fertilizer use found in the districts in the Southern region to the fact that farmers in these districts faced higher maize prices and lower nitrogen prices. This conclusion makes sense because Southern Malawi has low response rate, low yields, and high population density. These conditions cause the area to have a maize deficit with high maize prices, often leading to maize being imported from Mozambique.

At 50% fertilizer subsidy, when maize is valued at lean season market price, fertilizer use is profitable in most of the districts except Chitipa, Nkhata Bay, Mzimba, Kasungu, Lilongwe, and Mwanza (mostly in the Northern and Central Regions). However, at the harvest season price of maize, fertilizer use is still unprofitable in almost all the districts except Mangochi, Chiradzulu, Blantyre, Mulanje, Phalombe, Chikwawa, Nsanje, and Neno (in the Southern region). A subsidy rate of 90%, when maize is valued at lean season market price, makes fertilizer profitable in all districts, but still unprofitable in Mzimba, Kasungu, and Mwanza when maize is valued at harvest season market price. For the percentage of households for which fertilizer is profitable, the district level profitability analysis follows a similar pattern. Fertilizer use tends to be more profitable for more households in the districts in the Southern region than it is for the districts in the Northern and Central regions.

To improve the profitability of fertilizer use in maize production, the response rate of maize to nitrogen needs to improve. Applying basal fertilizer within a week of planting and applying organic manure have a yield-increasing effect; the response rate can be raised by encouraging farmers to comply with these recommendations. Fertilizer profitability also can be improved by encouraging agricultural households to store most of their maize to consume or it or sell it during the lean season, when prices are relatively high. Storage can be improved by promoting improved grain storage technologies. In addition, farmers usually are compelled to sell their produce soon after harvesting for financial reasons. Thus, another way to encourage them to store and wait to sell during the lean season would be to provide them with credit that could be paid back later in the lean season, rather than at harvest. Efforts should be made to reduce the real costs of input supplies through investing in roads and infrastructure (Jayne and others 2003).

In Malawi, most agricultural land owned by households is inherited. Figure 6.7 shows that approximately 75% of the agricultural land owned by households was inherited, with 10% granted by local leaders, and approximately 8% rented on a short-term basis. The remainder was either obtained as bride price, or borrowed for free, or purchased.

Livestock ownership

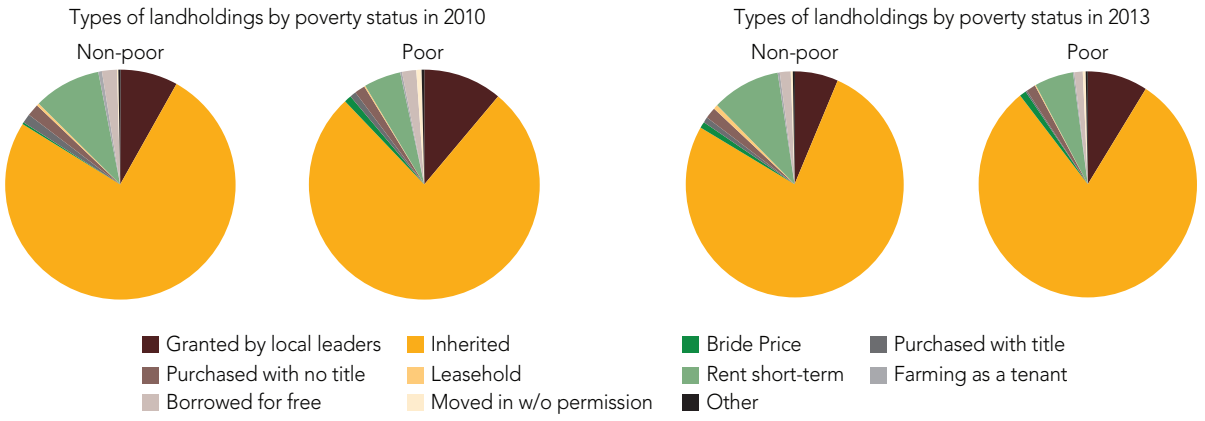
Ownership of all the important animals (chicken, goat, pig, and cattle) differed significantly across poverty and gender groups. In 2010 approximately 56% of households owned livestock. By 2013 this share had increased to 62%. Non-poor households generally were more likely to own animals than were poor households, as were male-headed

TABLE 6.3: Landholding by Poverty Incidence, Gender of Household Head, and Region *(ha)*

	Pooled	Non-poor	Poor	Female	Male	Northern	Central	Southern
Landholding (2010)	0.69	0.73***	0.63	0.57	0.73***	0.84	0.80	0.55
Landholding (2013)	0.68	0.70**	0.64	0.54	0.73***	0.81	0.77	0.57

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: Reading of significance level of difference: 2010 vs. 2013 in the pooled column; non-poor vs. poor; and female vs. male.
Significance level of the difference: 1% (***), 5% (**), and 10% (*).

FIGURE 6.7: Types of Landholdings by Year, by Poverty Status, 2010 and 2013



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.

compared to female-headed households. In 2010, for instance, the proportions of non-poor households and male-headed households who owned chickens were 5 and 20 percentage points higher, respectively, than the proportions of their (poor and female) counterparts. This is partly related to the fact that non-poor and male-headed households are, on average, better off compare to their counterparts.[42]

6.2.2. *Access to services: Extension, credit, and subsidized inputs*

Notwithstanding the positive impact that agricultural extension could have on agricultural productivity, access to extension services for crop production and for fertilizer application was quite low in Malawi (table 6.4). In 2010 only 39% and 22% of agricultural households received extension services for crop production and for fertilizer application, respectively. Nevertheless, access to extension services appears to have increased significantly over time. Benfica (2014) reports that, between 2004 and 2011, participation in extension services in general increased by 10 percentage points (from 13% to 23%). In the current study, the team found that, between 2010 and 2013, access to extension for both crop production and fertilizer application increased significantly (approximately 27 percentage points).

Access to extension services differed significantly across poverty status and gender groups in 2010, but not in 2013. In 2010 non-poor households and male-headed households had better access to extension services for both crop production and fertilizer application compared to access by poor and female-headed households. Notably, by 2013, the gap between poor and non-poor and between male-headed and female-headed households in access to

[42] A deeper explanation of this phenomenon is beyond the scope of the current report.

TABLE 6.4: Access to Agricultural Extension by Year, Poverty Status, and Gender of Household Head, 2010 and 2013 *(%)*

		Pooled	Non-poor	Poor	Female	Male	Northern	Central	Southern
2010	Production	38.84	43.01***	32.18	30.85	41.48***	46.87	34.85	40.20
	Fertilizer use	22.42	24.67***	18.84	18.50	23.80**	31.66	15.60	25.92
2013	Production	66.08***	67.16	63.97	63.96	66.78	39.26	78.15	59.33
	Fertilizer use	49.10***	50.40	46.57	46.67	49.87	33.08	63.46	38.28

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: Reading of significance level of difference: 2010 vs. 2013 in the pooled column; non-poor vs. poor; and female vs. male.
Significance level of the difference: 1% (***), 5% (**), and 10% (*).

extension services had narrowed. Benfica (2014) also observed that in 2004, access to agricultural extension in general was higher for non-poor and male-headed households compared to their counterparts (poor and female-headed households, respectively), but the gender difference narrowed by 2010. Thus, the team's estimates and those of Benfica (2014) suggest that poverty and gender gap in access to extension services reduces over time.

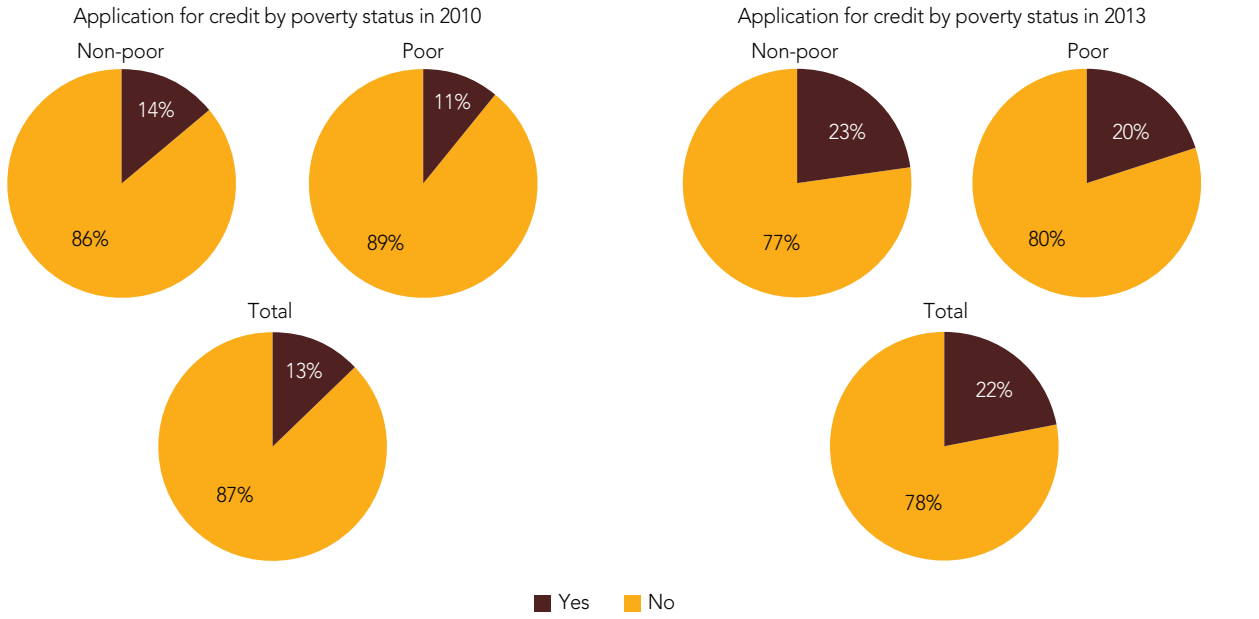
Access to credit generally was very low in Malawi and, as commonly cited in the literature, could be one of the reasons for the country's erratic agricultural productivity (Nkonya and others 2010). Figure 6.8 shows that only 13% of households in 2010 and 22% of households in 2013 applied for credit. Non-poor farmers were substantially more likely to apply for credit in both years than were poor farmers. The estimates also show that, in 2010, non-poor households were more likely to apply for credit to purchase farm inputs, whereas poor households were more likely to apply for credit for consumption purposes. Across gender, the team found that, in both years, male-headed households were significantly more likely to use credit to purchase farm inputs than were female-headed households.

Of the households who applied for credit, 41% and 27% were successful in 2010 and 2013, respectively (table 6.5). Approximately 41% of households in 2010 and 31% in 2013 were turned down, and 12% in 2010 and 8% in 2013 were awaiting decisions (table 6.5).

Non-poor households and male-headed households were more likely to receive credit (and less likely to be turned down) than were poor and female-headed households, respectively (table 6). Benfica (2014) made a similar observation for 2004. Among those who received credit, the average household received approximately MKW 13,000 in 2010. By 2013 this average increased to approximately MKW 20,000. Non-poor households received 220% more credit in 2010, but only 17% more in 2013, than poor households. These numbers imply that the gap in the amounts of credit received between non-poor and poor households has narrowed greatly over time. In contrast, across gender groups, male-headed households received at least 300% more credit than female-headed households in both years. Male-headed households received more credit than female-headed households partly because they are, on average, better off and, therefore, deemed to have better prospects of paying back loans.

Among the three regions, access to credit both in the proportion of households who received credit and the amount of credit received was lowest in the Southern region (table 6.6). For instance, the average amount of credit received in the Southern region was approximately MKW 6000 in 2010 and MKW 9000 in 2013. These amounts were at less than one-third the average amount in the other two regions of the country. The pattern of the spatiotemporal distribution of access to credit between the Central and the Northern regions is not clear.

FIGURE 6.8: Application for Credit, by Poverty Status, 2010 and 2013 *(%)*



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.

TABLE 6.5: Access to Credit by Poverty Status and Gender of Household Head, 2010 and 2013 *(%)*

		Pooled	Non-poor	Poor	Female	Male	Northern	Central	Southern
2010	Received credit	41.38	41.51	41.11	35.53	42.84	45.22	41.15	40.74
	Awaiting decision	11.84	14.53**	6.15	8.89	12.52	13.59	10.36	12.76
	Turned down	41.24	40.43	42.96	37.73	42.23	38.70	46.06	37.58
	Amount (1000 MKW)	13.16	16.91***	5.28	5.17	15.12***	25.60	18.76	5.77
2013	Received credit	26.51***	27.48	24.21	28.62	25.92	27.86	30.00	23.65
	Awaiting decision	8.12*	8.34	7.60	9.50	7.73	13.53	8.95	7.06
	Turned down	30.69***	31.49	28.77	31.69	30.45	22.53	29.10	32.56
	Amount (1000 MKW)	19.63*	20.58	17.46	7.74	23.20***	31.65	33.00	9.07

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: Reading of significance level of difference: 2010 vs. 2013 in the pooled column; non-poor vs. poor; and female vs. male.
Significance level of the difference: 1% (***), 5% (**), and 10% (*).

Incidence of Input Utilization

Households' access to subsidized farm inputs is presented next.[43] The estimates indicate that, in 2010, 58% of households participated in the farm input subsidy program (FISP). In 2013 this rate increased to 60% (table 6.6). The average amount of subsidized fertilizer and maize seeds received per farmer in 2010 was 64 kg and 1 kg, respectively. The estimates show that, in 2010, there was no significant

[43] Malawi's strategy to increase productivity among the rural population centers on heavy subsidization of fertilizers and improved seeds through FISP. The program's primary objectives are to achieve food self-sufficiency and to increase income among resource-poor smallholder beneficiaries—which implies overcoming food insecurity and poverty at the household level—through increased maize and legume production driven by access to improved agricultural inputs. Thus, the fact that the poor's access to farming inputs through FISP remained limited may have been limiting the program's impact on poverty, among other factors.

TABLE 6.6: Access to Subsidized Inputs by Year, Poverty Status, and Gender of Household Head, 2010 and 2013 *(%)*

		Pooled	Non-poor	Poor	Female	Male	Northern	Central	Southern
2010	Redeemed coupon (%)	57.62	58.44	56.32	56.08	58.13	57.64	56.49	58.61
	Fertilizer (kg)	64.11	71.70	52.07	75.33	60.33	54.63	69.76	61.66
	Maize seed (kg)	1.04	1.10	0.94	0.98	1.05	1.50	0.70	1.22
2013	Redeemed coupon (%)	60.32*	61.66*	57.71	58.84	60.79	61.10	58.63	61.78
	Fertilizer (kg)	64.09	57.39	76.71	75.85	60.00	58.15	67.39	61.89
	Maize seed (kg)	1.01	1.00	1.02	0.84	1.07*	1.62	0.73	1.17

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: Reading of significance level of difference: 2010 vs. 2013 in the pooled column; non-poor vs. poor; and female vs. male.
Significance level of the difference: 1% (***), 5% (**), and 10% (*).

TABLE 6.7: Proportion of Plots on which Inorganic Fertilizer was Applied by Year, Poverty Status, and Gender of Plot Manager, 2010 and 2013 (%)

		Pooled	Non-poor	Poor	Female	Male	Northern	Central	Southern
	Maize	78.11	82.34***	70.51	75.09	79.45**	77.65	82.29	74.85
	Ground nut	2.24	3.01**	0.51	1.01	2.68	0.00	2.42	4.05
2010	Pigeon pea	21.46	0.00***	36.66	35.22	18.24	0.00	0.00	24.05
	Tobacco	90.27	90.78	88.97	85.01	90.83	94.92	88.88	90.31
	Maize	74.33***	78.92***	64.96	71.52	75.62**	74.77	72.91	75.35
	Ground nut	2.13	2.69**	0.58	3.64	1.58	2.49	1.75	5.04
2013	Pigeon pea	33.91	28.28***	40.74	45.47	22.13	0.00	0.00	36.49
	Tobacco	90.33	93.77**	82.42	89.48	90.44	93.72	87.96	94.96

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: Reading of significance level of difference: 2010 vs. 2013 in the pooled column; non-poor vs. poor; and female vs. male.
Significance level of the difference: 1% (***), 5% (**), and 10% (*).

difference in access to subsidized inputs across poverty status and gender groups. However, in 2013, non-poor households were more likely to participate in the farm input subsidy program than were poor households. In addition, male-headed households received greater amounts of subsidized maize seeds than did female-headed households. This is probably because non-poor households and male-headed households are relatively more connected to the village leaders who are responsible for the selection of the beneficiaries at the community level.

Among the major annual crops, inorganic fertilizer was applied most in the production of tobacco, followed by maize, pigeon pea, and groundnut in this order (table 6.7). In 2010 inorganic fertilizer was applied to 90% of tobacco plots, 78% of maize plots, 21% of pigeon pea plots, and 2% of groundnut plots. Non-poor households were significantly more likely than their poor counterparts to apply inorganic fertilizer in crop production, and male plot managers were more likely than female plot managers to apply fertilizer in producing maize. In a household-level analysis of the incidence of inorganic fertilizer use, Benfica (2014) also observed male-headed households and non-poor households were more likely to use inorganic fertilizer than their respective female and poor counterparts.

Inorganic fertilizer was applied to at least 75% of maize plots and 89% of tobacco plots in all three

TABLE 6.8: Rate of Fertilizer Application to Produce Major Crops (%)

		Pooled	Non-poor	Poor	Female	Male	Northern	Central	Southern
2010	Maize	174.69	195.68***	137.20	162.82	180.04**	205.05	165.93	174.54
	Ground nut	12.01	17.17	0.43	2.08	15.49	0.00	13.01	21.48
	Pigeon pea	34.03	0.00	58.13	72.52	25.03	0.00	0.00	38.13
	Tobacco	348.61	374.60	282.02	263.70	357.59	689.21	254.98	325.58
2013	Maize	178.55	202.58***	129.50	162.50	185.93*	253.54	150.62	188.56
	Ground nut	7.50	9.69*	1.21	12.29	5.80	6.78	7.63	7.00
	Pigeon pea	74.05	60.99	89.85	100.27	47.30	0.00	0.00	79.67
	Tobacco	425.46	406.22	470.30	949.19	365.79	354.78	499.96	267.24

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: Reading of significance level of difference: 2010 vs. 2013 in the pooled column; non-poor vs. poor; and female vs. male.
Significance level of the difference: 1% (***), 5% (**), and 10% (*).

regions in both years (table 6.7). However, there was no clear spatiotemporal pattern in the proportion of maize and tobacco plots on which inorganic fertilizer was applied.

The estimates show that the rate of fertilizer application in the production of the major crops did not change significantly over time (table 6.8). The team also found that non-poor households and male-headed households tended to use significantly more inorganic fertilizer than their poor and female counterparts to produce maize, but not to produce the other crops. The significantly higher use of inorganic fertilizer by male-headed households in maize production compared to female-male headed households contributes to the gender gap in agricultural productivity observed by Kilic and others (2014).

There was substantial variation in the rate of fertilizer application across the three regions. The rate of fertilizer application in the production of maize of maize for instance was highest in the Northern region, followed by the Southern and the Central regions in that order (table 6.8).

Unlike inorganic fertilizer, the use of organic fertilizer and pesticides in crop production in Malawi was very low.[44] **Irrigation was barely used in crop production, suggesting that production was almost entirely rain-fed**. This supposition probably explains the food insecurity suffered during the drought of the early 2000s. The drought in the 2000–01 agricultural year caused the maize harvest to fall from 2.5 million to 1.7 million metric tons (MT), creating a national deficit of 273,000 MT (IMF 2002).

In crop production, smallholder farmers used predominantly family labor, with very limited exchange and hired labor. The types of labor (family, exchange, and hired) used to produce major crops are presented in Appendices A6.1, A6.2, and A6.3. In 2010 family, exchange, and hired labor accounted for 93.5%, 5.1%, and 1.4%, respectively, of the 35 days of labor used to produce maize.

In summary, poor households tended to be under-endowed in production assets and agricultural inputs, while also having lower access to credit, extension services, and market opportunities. These deficits may explain these households' low productivity. Furthermore, poor households and female-headed households tended to own less agricultural equipment, land, and livestock, and also used significantly less inorganic fertilizer, than their non-poor and male counterparts. In

[44] Tables showing the levels of utilization of organic fertilizer, pesticides and irrigation in crop production are available upon request.

general, agricultural mechanization was still limited in Malawi as evidenced by the facts that less than 2% of rural agricultural households owned mechanized equipment and no household owned a tractor. The average landholding of 0.69 ha, is very small. Access to credit also was low. Moreover, any credit amounts received still fell short of what was needed by farmers to meaningfully increase their agricultural production. The credit amounts received by poor and female-headed households were much lower than the amounts received by non-poor and male-headed households. The following sections will test whether the areas in which the poor were under-endowed matter for agricultural productivity and then whether increased agricultural productivity could reduce poverty.

Low productivity is partially explained by the lack of access to services, key productive assets, and market opportunities across the population. Lack of access to these assets and services can negatively influence households' decisions on adopting technology and their activity portfolios, with implications for income generation and poverty levels. The next section explores the key factors and inputs to raise agricultural productivity.

6.3. Empirical Analysis of the Determinants of Agricultural Productivity

This section explores the determinants of agricultural productivity. A household-fixed-effects model is used to account for household-specific unobservables. Agricultural productivity is measured as quantity of maize produced per ha. The model is specified as follows:

$$InY_{ph} = InX_{it}\,\mathsf{b}, + Z_{ph}\,\mathsf{ba}_{p} + \mathsf{u}_{ph}, \quad (4)$$

For $p = 1, \ldots, P$ and $h = 1, \ldots, H$. where Y_{ph} is agricultural productivity observed for plot p belonging to household h. X_{ph} and Z_{ph} are vectors of variables that affect the agricultural productivity, which are classified into physical inputs, human capital, asset ownership, and household and geo-variables, a_{ph} is the unobserved household-invariant individual effects, u_{ph} and is the error term. For variables in X_{ph}, such as inorganic fertilizer, family labor, hired labor, and exchange labor, that have zeros, the assessment team followed Bellemare and others (2013) and D'Souza and Jolliffe (2014) and have used the inverse hyperbolic sine transformation (IHST) instead of the log transformation. IHST is a logarithmic-like transformation that enables negative, as well as zero-valued, observations and enables the coefficients to be interpreted as elasticities. The estimates of the other independent variables change only slightly in magnitude when this transformation is used.

The regression results of the determinants of agricultural productivity are presented in Table B1. Fertilizer application and compliance with recommendations for fertilizer application are important determinants of agricultural productivity. All else being equal, a 1.00 percentage increase in the rate of inorganic fertilizer application will increase agricultural productivity by 0.05%. This finding supports the widely acclaimed notion that the use of inorganic fertilizer is important to improve agricultural productivity. However, given the cost of inorganic fertilizer, the magnitude of the effect is much lower than expected. Agricultural productivity on plots on which the rate of fertilizer application was below the recommended rate is approximately 10.6% lower than it is on plots on which the recommended rate was followed. It is usually recommended that, to ensure higher yields, basal fertilizer application in maize production should be done within a week after planting. The results indicate that, all else being equal, compliance with this recommendation increases yield by approximately 7.5%. The results further indicate that the use of organic fertilizer increases agricultural productivity by approximately 9%.

There is a significantly inverse relationship between plot size and agricultural productivity. This inverse relationship is common in the literature

(Carletto and others 2011). All else being equal, a 1.00 percentage increase in plot size will decrease agricultural productivity by 0.36%. Larger farms are not usually farmed as intensively as smaller farms so are underutilized, resulting in lower productivity.

Labor utilization has a positive and significant effect on agricultural productivity. All else being equal, a 1.00 percentage increase in the days of work by family and hired labor will increase agricultural productivity by 0.1% and 0.06%, respectively. The positive effect is expected because labor (family or hired) is needed for practices, such as land preparation, weeding, mulching, fertilizer application and pest control. Without these, yield would be very low.

Soil quality has a positive and significant effect on agricultural productivity. The estimates show that, on average, productivity on plots of good or fair soil quality is approximately 15.4% higher than productivity on plots of poor soil quality. The effect of soil quality is also reflected in the effect on the soil quality index. The index shows that constraints on nutrient availability, nutrient retention capacity, or oxygen availability, among others, hinder agricultural productivity.

The gender of plot managers also has a significant effect on agricultural productivity. Agricultural productivity on female-managed plots is approximately 12.8% lower than on male-managed plots. In a similar study in which agricultural productivity was measured by value of output per ha, Kilic and others (2014) observed that productivity of female-managed plots was 25% lower than on male-managed plots. The authors found that 82% of the gender differential in agricultural productivity was attributable to differences in endowments: lower use of and returns on adult male labor, and lower returns on inorganic fertilizer application on female-managed plots.

Agricultural productivity also is positively affected by asset ownership. Livestock ownership increases agricultural productivity by 13.1% and, all else being equal, a unit increase in the index of durable assets ownership increases productivity by 0.06%. The positive relationship between asset ownership and agricultural productivity is expected because farmers with more equipment are likely to purchase and use fertilizer and other modern inputs in production.

Rainfall has a positive and significant effect on agricultural productivity. All else being equal, a 1-millimeter increase in total annual rainfall increases agricultural productivity by 2.4%. This finding suggests that increasing farmers' access to irrigation facilities would boost agricultural productivity.

The estimates also indicate that agricultural productivity increased over time. Agricultural productivity in 2013 was approximately 10.5% higher than it was in 2010. The significant increase in agricultural productivity could have been due to increased use of inorganic fertilizer and other physical inputs, as well as to farmers becoming more skilled at combining inputs in crop production.

To summarize, fertilizer use and compliance with recommendations for fertilizer application, family and hired labor utilization, soil quality, good rainfall and ownership of livestock and durables assets all increase agricultural productivity.

6.4. Poverty and Agricultural Productivity

In this section, the team analyzed the incidence of poverty and poverty dynamics *among rural agricultural households* and the effects of agricultural productivity on their welfare.

6.4.1. Poverty incidence and dynamics

For the analysis in this section, households were classified into poverty groups—non-poor, poor, and ultra-poor—based on the national poverty and extreme poverty lines. Households with annual consumption expenditures greater than the poverty line (MKW 85,852) were classified as non-poor. Households whose annual consumption expenditures fell short of the extreme poverty line (MKW 53,262) were

classified as ultra-poor. Poor households were those whose annual consumption expenditures lie between the poverty and extreme poverty lines.

Increases in agricultural productivity improved the poverty status of households. A comparison of maize productivity levels by poverty status categories in Figure 6.2 showed that the maize yield for non-poor households was, on average, 27% and 31% greater than that of poor households in 2010 and 2013, respectively. Additionally maize yield of households who transitioned out of poverty increased by 25% on average, while that of households whose poverty status changed from non-poor to poor decreased by 14% (table 6.9). These findings already suggest that increased productivity may be associated with reductions in rural poverty.

A Blinder-Oaxaca decomposition of the mean yield gap between climbers (households who were poor in 2010, but became non-poor in 2013) and stayers (households who were poor in 2010 and remained poor in 2013) is presented in Appendix A6.5. The results in panel A of the Appendix A6.5 indicate that 46.46% of the climber-stayer yield differential is accounted for by differences in the level of production inputs and other observable attributes (endowment effect). The remaining 53.54% is accounted for by differences in returns on the observable attributes (structural effect).

A detailed decomposition of the endowment and structural effects is provided in panel C of Appendix A6.5. The factors that contribute significantly to the endowment effect include the inorganic fertilizer application rate, and ownership of agricultural tools.

TABLE 6.9: Effect of Agricultural Productivity on Poverty Dynamics
(% of maize output/kg/ha)

		Poverty status in 2013	
		Non-poor	Poor
Poverty status in 2010	Non-poor	17	–14
	Poor	25	–10

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.

The positive coefficients of these variables imply that climbers used more inorganic fertilizer and owned more agricultural tools than stayers. Respectively, these factors accounted for 52.7%, and 13.1% of the overall increase in endowments. These percentages should be understood as correlations rather than causal parameters, because they were obtained by dividing the coefficient of the variables by the sum of the coefficients of all the variables that contributed positively to the endowment effect.

The decomposition of the structural effect reveals that more than half (53 percent) of the maize yield differential between households that are chronically poor and those that escaped poverty between 2010 and 2013 is explained by differences in family labor utilization and extension services obtained as well as the returns to organic fertilizer and applying the right type of basal fertilizer. Access to and use of adequate information could therefore bring higher yields. Findings from empirical models of movements in and out of poverty in chapter 2 showed that persons who stayed in poverty in the same period had lower levels of education and lived in more remote villages than those who escaped. Remoteness and low education are likely to make information for these households harder to obtain and use appropriately and, in the process, to diminish their income generation capabilities.

A more detailed analysis of the empirical relationship between agricultural productivity and poverty follows.

6.4.2. *Empirical analysis of the effect of agricultural productivity on the welfare of households*

Improving agricultural productivity is widely regarded as a major route to reduce poverty and food insecurity in agrarian economies such as Malawi. This view is based on the heavy reliance on agriculture of poor and food-insecure households. Increased agricultural production is likely to increase the demand for farm labor through increases in area cultivated or intensity of cultivation, which can in turn lead to higher wages. In countries that have

substantially reduced poverty, labor incomes grew due primarily to higher returns on endowments, signaling an increase in the marginal value of work due to increases in productivity or in the relative price of labor. In Malawi, rural incomes depend mainly on crop production (56% and 64% in 2004 and 2010, respectively) and farm wage income (11% and 16% in 2004 and 2010, respectively). Increased agricultural output can also decrease food prices, to the benefit of all net food buyers, which in Malawi are over 50 percent of households (Palacios-Lopez and other 2016). Clearly, because agriculture is the main source of livelihood for the majority of Malawi's poor, increasing the sector's productivity is critical. In this section, the team analyzes the effects of agricultural productivity on the welfare of Malawi's agricultural households and their transition out of poverty.

The team measured household welfare in terms of poverty and nutrition. The poverty indicators are per capita consumption expenditure, poverty gap, and severity of poverty. The nutrition indicators comprise caloric intake. Agricultural productivity is measured by maize yield.

The relationship between agricultural productivity and welfare of household i in time t is specified as:

$$W_{it} = \mathsf{a}A_{it} + Y_{it}\,\mathsf{b}, + H_{it}\,\gamma + P_{it}\,\mathsf{d} + \mathsf{e}_{ij}, \quad (5)$$

where W_{it} is household welfare; A_{it} is household-level agricultural productivity; Y_{it} is a vector of variables measuring other sources of household income; H_{it} is a vector of household characteristics; P_{it} is a vector of prices; G_{it} is a vector of household geo-variables; and is the stochastic error term. a, b, γ, d are t parameters, with being the parameter of interest: the effect of agricultural productivity on welfare. Depending on the measure of welfare, equation (5) is estimated with either a household fixed-effects estimator or a two-part estimator proposed by Beloti and others (2015) and described in Appendix A6.7.

Agricultural productivity in a welfare model is potentially endogenous, with the main source of endogeneity being omitted variable bias. Welfare and agricultural productivity are both likely to be affected by the health status of households and by unobserved institutional and location factors (Keswell and others 2012; Dzanku 2015). The use of household fixed effects enabled the team to account for unobserved time-invariant factors such as the location variables, but not for the time-varying factors. Consequently, using an approach developed by Oster (2015), the team assessed the robustness of its estimates to omitted variables bias resulting from unobserved time-varying factors.

Table 6.10 presents the elasticity of per capita consumption expenditure related to maize yield. A summary of the impacts of agricultural productivity on the other welfare indicators is presented in Appendices A6.6 and A6.7. The full model results are presented in table A6.7. The last column of Appendix A6.6 shows the range of the estimates based on Oster (2015). Because the range of estimates does not contain zero and the upper bounds are within the confidence interval of the "controlled estimates," the team is confident that its estimates are robust to omitted variable bias (Oster 2015; Nghiem and others 2015; Freier and others 2015; Gonzalez and Miguel 2015). The formal test of endogeneity using the control function approach also rejects the hypothesis that agricultural productivity is endogenous in the team's welfare models. Hence, overall, the team's estimates are robust not only to omitted variable bias, but also to other potential sources of endogeneity. Results of the endogeneity test using the control function approach are available on request.

The results indicate that agricultural productivity has a strongly significant effect on all measures of poverty (Appendix A6.6). All else being equal, a 1% increase in agricultural productivity leads to an estimated 0.13 increase in consumption per capita (in logarithms) and an estimated 0.06 increase in food consumption (in logarithms), measured by caloric intake per capita. Poverty measures such as the poverty gap and severity of poverty also decline with increases in agricultural productivity.

TABLE 6.10: Elasticity of Agricultural Productivity on Household Welfare

Measure of agricultural productivity	Measure of household welfare	Estimate	Range of estimates
Log of maize yield	Log of per capita consumption expenditure	0.132*** (0.020)	[0.132 0.173][a]

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: a Based on Oster 2015.

The simulation results (table 6.11) **indicate that a 50% increase in maize yield will reduce the poverty (ultra-poverty) rate among rural agricultural households from 40.78% (11%) to 34.01% (8.46%). The 50% increase in maize yield correspondingly will lift approximately 622, 015 people out of poverty and 281,718 people out of ultra-poverty.** The estimates also show that a 100% increase in maize yield will decrease the poverty (ultra-poverty) rate to 33.03% (7.46%), and lift 662,994 people out of poverty and 325,018 people out of ultra-poverty. Additionally, the simulation results show that 25.32% of rural agricultural households still will be poor, (and 5.14% be ultra-poor) even if all households produce maize at full potential. This chapter defines the full potential level of maize production as the highest household-level maize yield in the districts reported in the team's sample.

The above estimates of the impact of agricultural productivity on the welfare of rural agricultural households should be considered as lower bound estimates, that is, they measure only the direct welfare-improving effect of growth in agricultural productivity. Growth in agricultural productivity has many additional, economy-wide spillover effects that the team's welfare models could not capture.[45] For instance, agricultural productivity growth could provide raw materials for the non-farm sector. As another example, the resulting increased household income could increase demand for goods and services produced in the non-farm sector. These spillover effects in turn will stimulate employment in the non-farm sector through both forward and backward linkages and eventually increase off-farm income of households (Hanmer and Naschold 2000; Mellor 1999). In other words, the proposed model captures only the direct effect of productivity on consumption expenditure, but not the indirect effects that come via reduced prices and increased wages. It should also be noted that the poverty effect likely stagnates at around the 50% increase because the consumption expenditure of the remaining households are so further below the poverty line that further increases productivity are not enough to move them above the poverty line.

The team provides an estimate of these spillover effects using the Benin and others (2008) estimate of the multiplier between growth in agricultural sector and the rest of the economy, the agricultural GDP of Malawi in 2013 (MKW 346,182 million in constant 2010 prices), and the share of crop production in the agricultural GDP of Malawi (83%). The multiplier between the agricultural sector of Malawi and the rest of the economy is 1.11, meaning that a 1-kwacha increase in agricultural GDP results in an additional MKW 0.11 increase in the GDP of the nonagricultural sector (Benin and others 2008). Using this multiplier, the team estimates the spillover effects of a 1% increase in agricultural productivity on the rest of the economy to be MKW 316.064 million.[46]

The direction of the effects of agricultural productivity on all measures of household welfare supports the widely held notion that improving agricultural productivity could be an effective channel by which to improve the welfare of rural agricultural households in Malawi. However, given the efforts that have been made to improve agriculture to reduce poverty and food insecurity in Malawi, the magnitude of the direct effect is much lower than

[45] The team's welfare models also could not capture the potential indirect welfare-improving effect of growth in agricultural productivity that results from the productivity-induced lowered food prices and increased wage income (Datt and Ravallion 1998; Saxena and Farrington 2003; Schneider and Gugerty 2011; Otsuka 2000; and Biswanger and Quinzon 1986).

TABLE 6.11: Effect of Increases in Agricultural Productivity on the Transition Out of Poverty, 2013

Increase in maize yield	% of poor households in 2013	% of ultra-poor households in 2013	# of people lifted out of poverty	Number of people lifted out of ultra-poverty
0%	40.78	11.00	—	—
5%	35.74	9.39	555,969.31	253,024.14
10%	35.45	9.26	555,969.31	260,351.78
15%	35.45	9.26	555,969.31	260,351.78
20%	35.19	9.11	567,825.50	260,351.78
25%	35.08	9.11	571,433.63	260,351.78
30%	34.99	9.11	576,370.13	260,351.78
35%	34.77	9.05	581,876.44	260,351.78
40%	34.62	8.65	588,786.94	270,491.66
45%	34.36	8.65	601,266.94	270,491.66
50%	34.01	8.46	622,015.25	281,718.41
55%	33.95	8.34	622,015.25	288,746.94
60%	33.86	8.00	626,781.38	308,266.31
65%	33.76	7.94	626,781.38	311,868.69
70%	33.76	7.79	626,781.38	320,494.97
75%	33.62	7.79	631,964.19	320,494.97
80%	33.17	7.64	657,617.88	320,494.97
85%	33.17	7.64	657,617.88	320,494.97
90%	33.08	7.64	662,993.94	320,494.97
95%	33.08	7.64	662,993.94	320,494.97
100%	33.03	7.56	662,993.94	325,017.94
Raising productivity of all households to:				
Quarter of district highest	32.16	6.60	728,040.63	327,458.78
Half of district highest	28.98	5.95	863,750.31	350,718.66
Three-quarters of district highest	27.29	5.23	909,683.69	377,188.38
District highest (full potential?)	25.32	5.14	1,021,293.50	382,145.03

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.

expected. The weak effect indicates that efforts to effectively reduce rural poverty and food insecurity in Malawi should go beyond the confines of increasing agricultural productivity to embrace nonagricultural measures including promoting off-farm income-generating activities. Making this transition applies not only to Malawi, but also to other African countries including Ethiopia, Ghana, Kenya, and Tanzania, in which similar strongly significant, but small direct, effects of agricultural productivity on measures of household welfare have been observed (Dercon and Christiaensen 2005; Dzanku 2015; Mistiaen 2006; and Sarris and others 2006, respectively).

[46] The spillover effect is computed as: [(0.0083*346182000000)*0.11], where (0.0083*346182000000) is the additional increase in agricultural GDP resulting from a 1-percent increase in crop output, and 0.11 is the increase in the GDP of the nonagricultural sector that results from 1 unit increase in agricultural GDP.

Other important determinants of the welfare of Malawi rural agricultural households include household size, landholdings, ownership of crop storage house, and prices of consumable goods. Each of these factors causes its expected effect. In line with chapters 1 and 2, household size has a significantly negative effect on household welfare. A 1-person increase in household size decreased the per capita consumption expenditure by 14.8%; increased the poverty gap and severity of poverty by 3.1 and 1.6 percentage points, respectively. The average household size of five in the analytical sample and the fact that household size increased significantly over time drove home the necessity to promote smaller household size among Malawi's rural agricultural households.

Landholding improves the welfare of households. A 1% increase in the total quantity of land owned by Malawi households increased per capita consumption expenditure by 0.129%; decreased the poverty gap by 0.047 and 0.024 percentage points respectively; and increased caloric intake by 0.054%. Benfica (2014) also observed the general welfare-improving effect of landholding. The author observes that the poverty rate is relatively highest among the land poorest and that the level of poverty falls as landholdings increase. Benfica further observes that the share of poor households falls significantly at the higher end of the land distribution. The positive effect of landholding on welfare has important implications for poverty in Malawi, in which landholdings generally are small and are likely to get smaller with increasing population pressure.

Ownership of a crop storage structure improves the poverty status of households but has no significant effect on nutritional status of households. Ownership of storage structures increases per capita consumption of households by 10.9%, and reduces the poverty gap and severity of poverty by 3.0 and 1.5 percentage points, respectively. The positive effect on poverty of ownership of crop storage structures is expected because storage structures enable farmers to keep part of their produce for sale during the lean season, when crop prices are relatively higher than harvest season prices. Currently, approximately only 16% of rural agricultural households own crop storage structures. This small percentage implies that more than 80% of rural farmers are unable to take advantage of higher lean season prices, a situation that could thwart pro-agriculture poverty reduction efforts.

Finally, the price of consumable goods exacerbates the poverty status of households. A 1-percent increase in prices of consumable goods (food and non-food) will, all else being equal, reduce per capita consumption expenditure by 0.7%; and increase the poverty gap and severity of poverty by 0.3 and 0.2 percentage points respectively.

Conclusions

Agriculture is still the mainstay of Malawi's economy. The sector accounts for approximately 30% of GDP and employs over 85% of households. Between 2010 and 2013, the majority of rural agricultural households diversified their economic activities. Nevertheless, it remains characterized by smallholder production. Most people are locked in low-productivity, subsistence agriculture with inadequate transition toward higher-value commercial production.

Improvement in agricultural productivity significantly lessens the effects of poverty, food insecurity, and poor nutrition on rural agricultural households. The elasticity of per capita consumption expenditure with respect to maize yield is 0.132%, and the elasticity of caloric intake with respect to maize yield is 0.06%. Agricultural productivity also improves other measures of welfare, such as the poverty gap and severity of poverty. Simulations of incremental changes in agricultural productivity also show important reductions in poverty and ultra-poverty rates.

Nevertheless, despite its positive effect on the welfare of rural agricultural households, **growth in agricultural productivity has been modest up to date**. Agricultural productivity will therefore have

to increase greatly to tackle pervasive poverty and food insecurity.

Many factors explain the low performance of agriculture to date. Organic fertilizer, pesticides, and irrigation rarely were used in crop production. Farmers used predominantly family labor in crop production, with only limited numbers of hired and exchange laborers. Agricultural mechanization (including ploughs, ridgers, and cultivators) remained limited in Malawi, so as access to credit and extension services. Participation in the large-scale Farm Input Subsidy Program (FISP) increased slightly from 58% of households in 2010 to 60% in 2013. However, in 2013 non-poor households were more likely to participate in FISP than poor households. The average response rate of maize to fertilizer is also very low, and at the commercial price, fertilizer use generally is not profitable in Malawi.

Given (1) the simulated positive effects of agricultural productivity increases on living standards and (2) the Poverty Assessment team's analysis documenting the factors that enhance agricultural productivity, a few policy options could be considered: a) Expanding access to new technologies, such as irrigation and improved seeds along with supplementary services, such as information and training on new technologies, can boost yields because such a bundle is likely to be superior to the current subsidy program. (b) Access to extension services could be key drivers of agricultural productivity so long as they address the direct needs of smallholder agriculture, teach reliable and proven techniques, such as land management practices, and encourage farmers to comply with fertilizer recommendations. (c) Access to agricultural equipment would improve land preparation practices to reduce erosion and increase productivity. (d) Focus the objective of the Farm Input Subsidy Program (FISP) on increasing productivity and let other programs deal with the safety net function that has been implicitly assigned to FISP in the past. Having multiple goals puts considerable pressure on the FISP, because given the programs substantial budget share there is an expectation that it will deliver both increased maize productivity and reduced poverty to rural Malawi.

7

NON-FARM ACTIVITIES AND POVERTY IN MALAWI

The expansion of non-farm activities and income diversification are likely features of economic development in any developing country and could improve welfare. Chapter 7 examines whether both claims have held for Malawi since 2004.

Participation in non-farm activities, such as self-employment (defined as the primary ownership of a non-farm enterprise) and wage employment (defined as having a non-farm salary job), is associated with higher consumption growth and, therefore, remains a potential avenue for lifting households out of poverty. Rising non-farm self-employment income was the driving force behind the reduction in rural poverty from 2010 to 2013. The increased engagement of some of the poor in non-farm self-employment activities and the higher business profits observed in these activities are what drove income growth and poverty reduction. Conversely, during the same period, falling non-farm wage employment income led to an acute rise in urban poverty. A reduction in the participation of the urban poor in wage employment activities, even below levels observed in 2004, along with lower monthly salaries can explain the increase in poverty.

Within Malawi, participation in and returns from non-farm activities are lower for the poor compared to the non-poor so there is scope for improvement. Income for investment capital increases the opportunities to venture into self-employment, so as connecting people better to markets that demand the services offered by such activity. Connecting remote communities with population centers through public roads can facilitate the expansion of nonfarm bussineses. Training and technical skills also can improve the chances of higher returns. Education is particularly important for participating and obtaining higher returns on non-farm wage employment in both urban and rural areas because the more sophisticated jobs require higher levels of qualification. Unlocking all of these components for the poor can increase their participation in non-farm activities and the returns obtained from them.

At the same time, non-farm self-employment activities rely heavily on increased local demand. Given the limited access to insurance services for agriculture-related shocks in Malawi, the presence of rainfall shocks, which affect everyone, can reduce the returns from these activities. Well-functioning safety nets also could protect the welfare of those affected by disasters and help them to avoid joining the ranks of the self-employed out of necessity. For persons already self-employed, effective safety nets could improve the prospects of staying in business.

Introduction

Malawi is an agricultural economy. Therefore, to reduce poverty, increasing agricultural productivity and growing farm incomes are critical (chapter 6). However, it is often not possible to sustain income from a single occupation, such as rain-fed agriculture, which is highly prone to risk. **The expansion of non-farm activities and the diversification of incomes are likely features of economic development in any developing country and could improve welfare**. In Malawi in 2013, 13% of poor households earned more than 50% of their income from non-farm activities, either through wage labor or operating non-farm enterprises in the service sector. Such income improves the wellbeing of households and, as the standard decomposition and growth regression techniques used in chapter 5 show, its role in reducing poverty cannot be dismissed.

Chapter 7 examines the role that non-farm activities play in reducing poverty and documents key factors that hinder the poor from engaging in non-farm activities and getting higher returns. Here, nonagricultural activities are considered to be all household activities that generate some sort of revenue to the household, but do not involve crop farming. Non-farm ***wage*** employment (NFWE) comprises activities in which household members are employed for a salary, regular or not, and excludes farm labor activities (also called *ganyu* labor in Malawi). Non-farm ***self***-employment (NFSE) includes all business enterprises carried out by members of a household to earn additional revenue.

Chapter 7 uses detailed household data collected in Malawi between 2004 and 2010 in the cross-sectional Integrated Household Survey (IHS2 and IHS3) and in the 2010–13 panel dataset. The IHS2 and the full IHS3 samples both were stratified by month and administered throughout the year. Findings from these two samples are generally comparable because they take into account data from 12-month periods. These two samples enable only cross-sectional comparisons of trends over time, because the sample was entirely refreshed for IHS3. Additionally, a subsample of the full IHS3 sample was selected for follow-up in the Integrated Household Panel Survey (IHPS). The IHS3 panel subsample and IHPS sample were interviewed only during March-November of 2010 and 2013, respectively so are not strictly comparable to IHS2. However, the group of same individuals from IHS3 and IHPS provides a unique value in its panel dimension.

Chapter 7 is organized as follows. Section two describes the prevalence and nature of nonagricultural activities in both urban and rural areas, as well as the returns on these activities and for which types of households. The impacts of non-farm activities on consumption growth and poverty are summarized in section three. Within Malawi, diversification and returns are lower for the poor compared to the non-poor. These features are analyzed in section four. Section five seeks what determines entering into and obtaining higher returns from non-farm activities. Particular attention is drawn to factors that hinder the poor from engaging in non-farm activities and getting higher returns. Hindrances can arise in the areas of human capital levels and access to credit and wealth.

7.1. *Non-Farm Employment in Household Livelihoods*

This section looks at the proportion of households who engage in and generate income from non-farm activities or sources, including non-farm wage employment (NFWE) and non-farm self-employment (NFSE). The section then looks at the share of these two sources in total income, highlighting their relative importance and their trends in urban and rural areas.

7.1.1. *Prevalence of non-farm activities in Malawi*

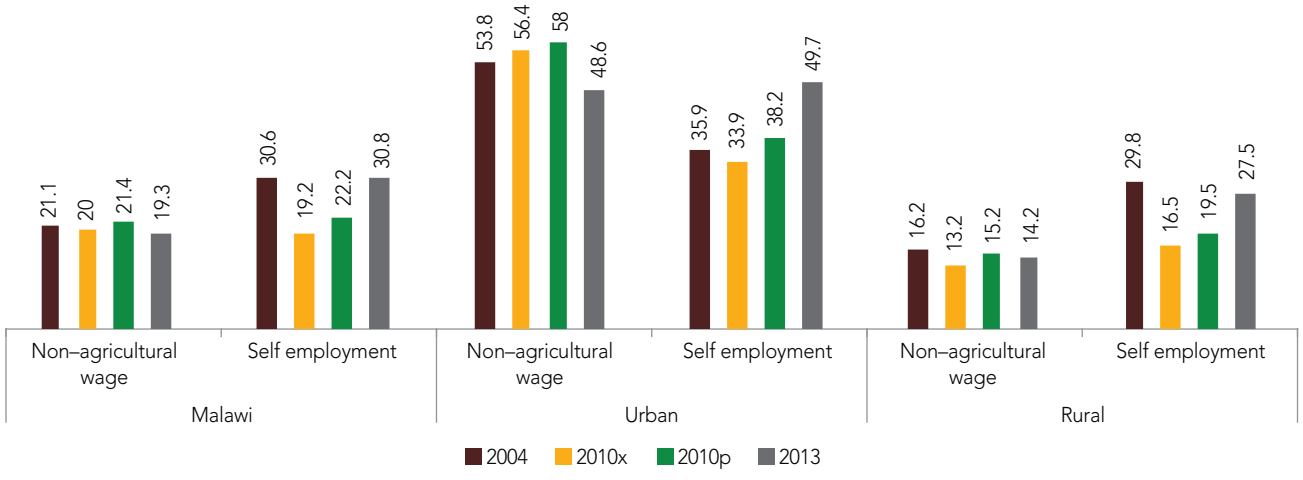
Participation in off-farm employment is not widespread among households in Malawi. Figure 7.1 indicates that participation in NFSE dropped from 31% in 2004 to 22% in 2010, but then rose again to 31% in 2013. As for NFWE, during 2004, 2010, and 2013, participation rates remained flat at approximately 21%. A recent study using panel household survey data to compare NFSE in Malawi with Ethiopia, Niger, Nigeria, Tanzania, and Uganda found that Malawi had the lowest share of rural households operating a nonfarm enterprise (Nagler and Naude 2014).

Nevertheless, Malawians' participation in non-farm self-employment activities recently increased. Figure 7.1 shows that, overall in Malawi, participation in NFSE did not increase much between 2004 and 2013. However, in urban areas, participation in NFSE grew by almost 15 percentage points, from 36% in 2004 to 50% in 2013 (although it then declined to 34% in 2010). In the meantime, rural households' participation in NFSE dropped greatly between 2004 and 2010 (30% and 17% respectively for both years), but then increased substantially to 28% in 2013, close to the participation rate observed in 2004.

Non-farm wage employment participation seems to exhibit a decreasing trend over recent years in both rural and urban areas. The analysis of figure 7.1 reveals that, in urban areas, the NFWE participation rate stayed at approximately 55% in urban areas between 2004 and 2010, before decreasing to 50% in 2013. In the meantime, NFWE participation among rural households remained flat approximately 15% over the years.

These figures indicate that **participation in NFSE is becoming increasingly relevant among households in Malawi, whereas participation in NFWE**

FIGURE 7.1: Household Participation in Off-Farm Employment in Malawi, Rural and Urban Areas, 2004/2010/2013



Source: Malawi Poverty Assessment team calculations based on IHS2, IHS3 cross section, IHS3 panel, and IHPS.
Note: x = cross section; p = panel.

apparently remains stagnant. Section 3 tackles what may explain the contemporary sharp increase in self-employment participation and decrease in wage employment participation in urban areas, and how this movement affects households' poverty status. Similarly, the team tries to understand the dynamic of non-farm employment in rural areas and how it affects rural poverty.

The percentage of households who earn incomes from non-farm activities (figure 7.1) does not tell the complete story about the importance of, or the impact of lack of, these income sources for households in Malawi. Figure 7.2 fills this gap, by showing the share of income from these sources in the total income of the participating households in the years 2004, 2010, and 2013.

A non-negligible share of households' income is drawn from non-farm wage and non-farm self-employment in Malawi. In urban areas, figure 7.2 shows that 50%–75% of total household income every year came from these sources. In rural areas, this share comprised 25% of total household income in 2013. In addition, the changes in income shares of NFWE mirrored the trends of the participation rates. In urban areas, NFWE contributed to a decreasing share of household income (approximately 45% in 2004 and 2013, then 32% in 2013). In contrast, the share observed in rural areas for NFWE remained more or less flat approximately at 8% from 2004–13.

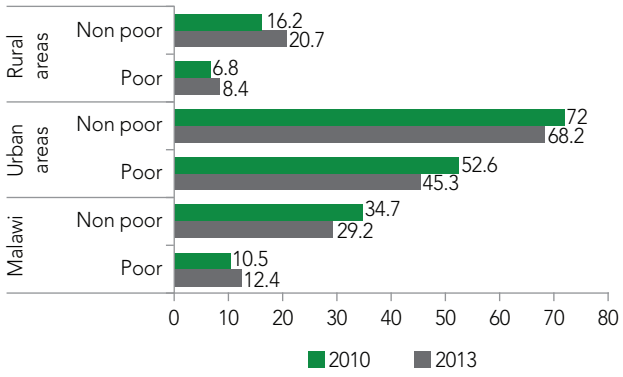
As for NFSE, its contribution to household income increased in both urban and rural areas from 2004–13. In urban areas, the share remained stable at approximately 22% in 2004 and 2010 and then rose sharply to 30% in 2013. In rural areas, the share of household income from NFSE decreased from 9% in 2004 to 5% in 2010 but then almost tripled to 14% in 2013.

Non-farm activities are a significant source of income (more than 50% of total household income) for several households living in poverty in Malawi. An average of 11% of the poor in Malawi derive more than 50% of their income from non-farm enterprises and non-farm wage employments. This proportion is 5–8 times higher in urban areas than in rural areas. The reason is that a higher share of the income of the poor in rural areas comes from agricultural activities (figure 7.3).

FIGURE 7.2: Household Income from Non-Farm Income Sources in Rural and Urban Areas in Malawi, 2004/2010/2013 (%)

Source: Malawi Poverty Assessment team calculations based on IHS2, IHS3 cross section, IHS3 panel, and IHPS.
Note: x = cross section; p = panel.

FIGURE 7.3: Households Who Draw More Than 50% of Their Incomes from Non-Farm Activities (Household Businesses and Non-Farm Employment) by Poverty Status, 2013 and 2010 *(%)*



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.

7.1.2. *Nature of non-farm activities in Malawi*

Participation in non-farm self-employment

Non-farm self-employment participants are highly concentrated in the Commerce and Tourism sector.[47] Figures 7.4 and 7.5 present individual level of participation rates, as well as the average profits earned by participants in non-farm self-employment by sector in urban and rural areas, respectively. The reference period for returns on participation is the month prior to the interview. The figures reveal that more than half (58% in 2010 and 55% in 2013) of all household enterprises are participants in Commerce and Tourism (wholesale and retail trade, restaurants and hotels). This sector consists primarily of people selling or reselling a wide variety of products from groceries and food products to clothes, shoes, and more. The prevalence of this sector over others is more prominent in urban areas. There, approximately 70% of non-farm enterprises are in the Commerce and Tourism sector, compared to approximately 50% in rural areas.

In urban areas, participation in other sectors is minimal, except in the construction and services sectors, which account for approximately 15% or less of all household enterprises. In rural areas, the Food, Beverage, and Tobacco Manufacturing sector accounts for approximately 25% of all household enterprises. This sector includes primarily street vendors of various food and drinks. The Non-food Manufacturing sector represents 12–16% of all household businesses. If the Food, Beverage, and Tobacco Manufacturing sector is combined with the Non-Food Manufacturing sector, the total manufacturing sector accounts for two in five (40%) of all household enterprises, making it close to the leading sector in rural areas.

In urban areas, combining the non-food and food manufacturing sectors yields a manufacturing sector that contains approximately 15% in 2010 and 17% in 2013 of all the household enterprises—very far from the leading sector.

The proportion of households' enterprises in the primary sector is extremely low across Malawi. The primary sector contains forest-based-product enterprises including bamboo, charcoal, firewood, and timber selling, and represents only 2–3% of household enterprises in rural areas. In urban areas, household enterprises in the primary sector are almost nonexistent. This is normal since, by definition, non-farm self-employment excludes most income-generating activities directly related to farming.

Returns on participation in non-farm self-employment

Returns on participation in self-employment by industry groups do not explain the distribution of household enterprises in these groups. Construction

[47] Participants in off-farm self-employment or wage employment are involved in several sectors and industries. This section describes these different sectors and industries, as well as the returns to participation by sector. This analysis classifies these sectors into several main categories. The classification of non-farm enterprise activities into industry categories used here closely follows the 1992 United Nations International Standard Industrial Classification (ISIC) standards into five main groups. The groups include: (a) Primary sector, which comprises agriculture, livestock, hunting, fishing, and mining; (b) Food, Beverage, and Tobacco Manufacturing; (c) Non-food Manufacturing, (d) Commerce and Tourism (wholesale and retail, and restaurants and hotel businesses); and (e) Other sectors, which include construction, electricity and utilities, transportation, and other services.

and Services generate the highest monthly revenue on average, despite showing a decrease of 8,000 kwachas over the years. However, as mentioned above, this sector is second to last in concentration of household enterprises in Malawi. The Commerce and Tourism sector absorbs the highest proportion of household enterprises. They generated 9,000 kwachas in revenues per month in 2013 (approximately 30% less than the Construction and Services sector). The nonfood manufacturing sector is the third most profitable industry and experienced monthly revenues of 8,800 kwachas in both years. The primary sector generates the lowest level of earning monthly and is the only one whose returns worsened.

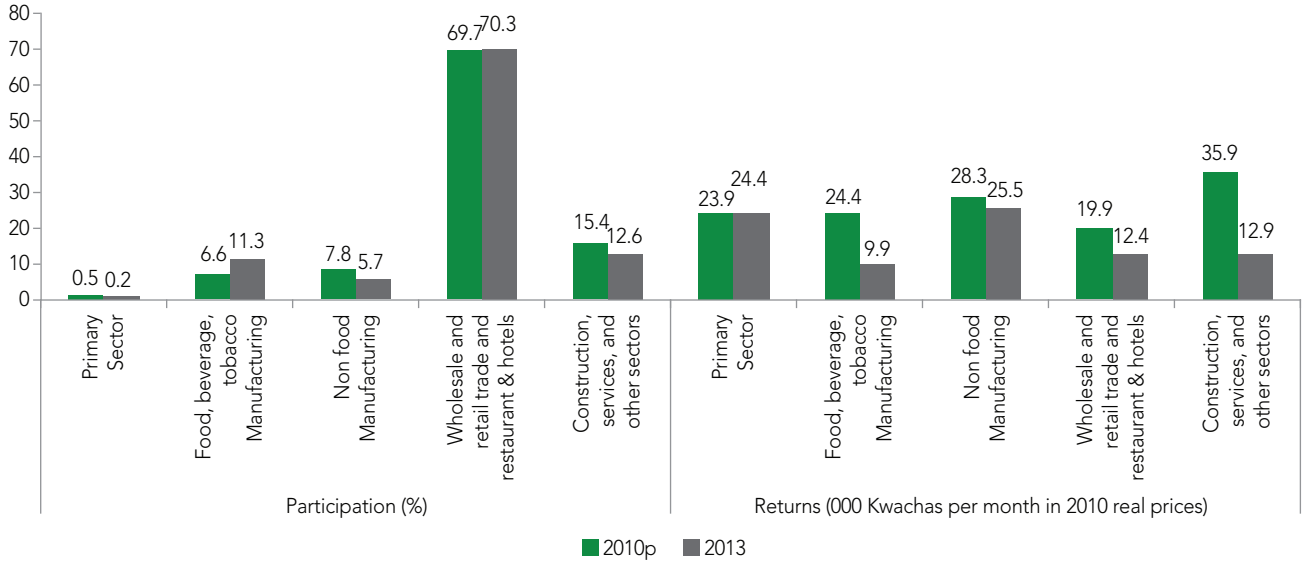
Revenues from household enterprises are considerably higher in urban areas than in rural areas across all industry groups. Average profits from participation in self-employment were 23,400 kwachas in urban areas in 2010, which is approximately 18,000 kwachas higher than average returns in rural areas in the same year. In 2013 the average profits in urban areas were approximately 13,000 kwachas vs. 6.400 kwachas in rural areas. This huge urban-rural gap is largely maintained across all industry groups.

The exception is the general decrease in returns on non-farm self-employment in urban areas compared to increased returns in rural areas. Between 2010 and 2013, average returns from non-farm self-employment decreased by almost 45% in urban areas, while they increased by approximately 12% in rural areas during the same period. The decrease in average returns in urban areas is observed consistently across all the industry sectors, except the primary sector. Similarly, the increase in average returns in rural areas is observed consistently across all industry sectors, except the primary sector.

Profile of non-farm enterprises

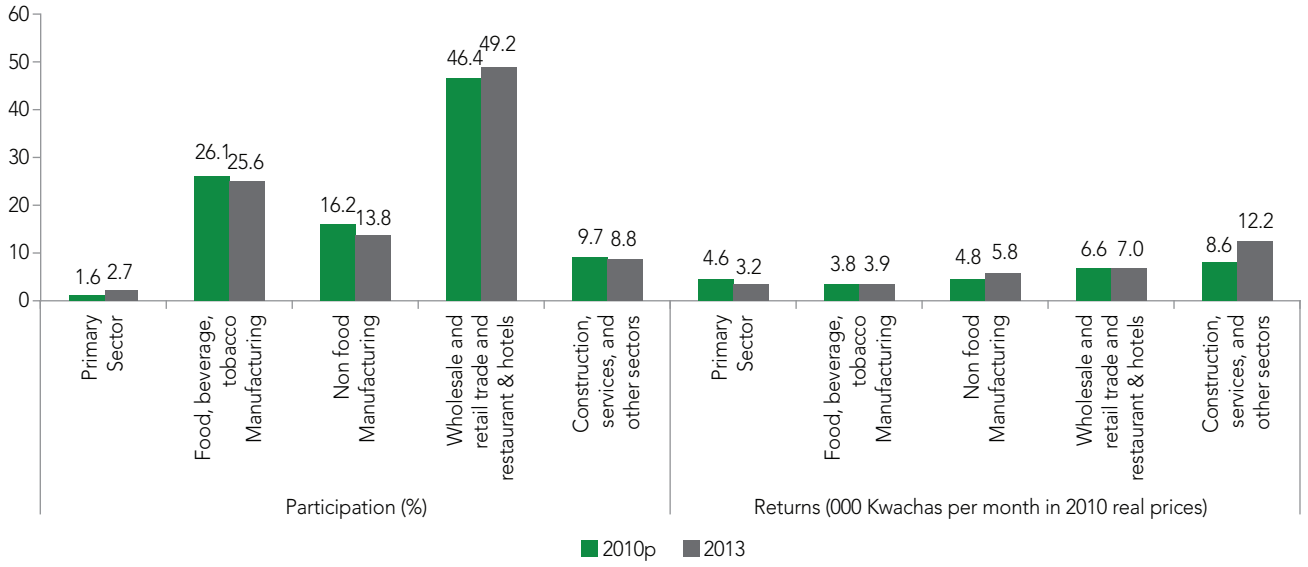
Most household enterprises are relatively new and are operated informally from home by young uneducated males, often household heads. Table 7.1 describes selected characteristics of household enterprises. Table 7.1 indicates that household enterprises are relatively young. Although the owners were close

FIGURE 7.4: Individual Participation in Non-Farm Self-Employment and Returns by Sector in Urban Areas in Malawi, 2010 and 2013



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: Profit = the reported profit generated by the household enterprise over the month prior to the interview.
Note: P = panel survey.

FIGURE 7.5: Individual Participation in and Returns on Non-Farm Self-Employment Activities by Sector in Rural Areas in Malawi, 2010 and 2013



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: Profit = the reported profit generated by the household enterprise over the month prior to the interview.
Note: P = panel survey.

to 40 years old, enterprises were, on average, 11 years old in 2010 and 8 years old in 2013. The lower age of enterprises in 2013 compared to 2010 suggests that a large number of new businesses may have replaced the older ones within these three years. No major differences exist between rural and urban areas in the age of enterprises or the age of their owners.

Table 7.1 also indicates that more than 40% of all businesses in Malawi are operated from home. More enterprises are home based in rural areas (49% in 2010 and 44% in 2013) than in urban areas (35% in 2010 and 36% in 2013). In addition, most household enterprises operate without access to electricity, especially in rural areas, where only 13% of household business owners mentioned having access to electricity for their businesses. Household enterprises generally are informal, consistent with their relatively short lifespan. Fewer than one in 10 of the household businesses in Malawi are registered with either the Malawi Register of Companies, or the Malawi Revenue Authority, or the Local Assembly. This number almost doubles in urban areas (14% in 2010 and 2013) relative to rural areas (6% in 2010 and 8% in 2013). Finally, table 7.1 reveals that the large majority of business owners are uneducated. In rural areas, 75% of business owners are uneducated, far higher than in urban areas.

Participation in non-farm wage employment

Non-farm wage employments are primarily concentrated in the service sector. Figures 7.6, 7.7, and 7.8 display individual level participation rates in non-farm wage employment by sector, as well as the average monthly wages earned by participants for national, urban, and rural areas, respectively. At the national level, almost 33% of all the non-farm wage employment jobs are in the service sector. This sector contains mostly unskilled labor jobs, such as building caretakers, cleaners, and maids and related housekeeping services, security and protective service workers, as well as cook, waiters, and bartenders. The next most popular sector of employment includes production and related workers, transport equipment operators, and laborers not elsewhere classified. This

TABLE 7.1: Selected Characteristics of Household Enterprises in Rural and Urban Areas in Malawi, 2010 and 2013

Characteristics of households' enterprises	Malawi		Urban areas		Rural areas	
	2010	2013	2010	2013	2010	2013
Age of enterprises (years)	11.2	8.7	10.5	7.1	11.7	9.1
Outside partner (%)	2.4	3.3	1.8	3.1	2.9	3.4
Business operating premises (%)						
Home	43.4	41.8	34.7	36.2	49.8	44.0
Market place and commercial area shop	32.8	37.5	37.6	36.1	29.2	38.0
Roadside and other areas	23.8	20.8	27.7	27.7	21.1	18.1
Formal registration (%)	9.6	9.3	14.3	13.9	6.2	7.6
FBPE[a] (%)	11.5	13.8	9.1	11.9	13.2	14.6
Access to electricity (%)	23.2	30.7	29.8	53.2	12.8	12.8
Number of enterprises per household (1 to 4)	1.1	1.1	1.2	1.2	1.1	1.1
Male owner (%)	58.2	51.9	59.6	45.1	57.2	54.6
Owner if household head (%)	69.2	67.4	68.3	59.5	69.9	70.4
Age of owner (%)	37.1	38.1	35.5	35.7	38.3	39.0
Education of owner (%)						
None	63.4	67.5	44.8	48.7	77.1	74.8
PSLC[b]	12.0	12.9	14.4	13.1	10.3	12.8
JCE[c]	11.8	9.8	16.2	16.4	8.5	7.2
MSCE[d]	8.4	7.2	15.3	14.4	3.2	4.4
Non-university diploma	2.4	1.8	4.9	5.4	0.5	0.4
University diploma	1.6	0.5	3.4	1.0	0.4	0.4
Post-graduate degree	0.4	0.3	1.0	1.0	0.0	0.0

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note:
[a] Forest-Based Products Enterprise.
[b] Primary School Leaving Certificate.
[c] Junior Certificate Examination.
[d] Malawi School Certificate of Education Examination.

sector represents approximately 25% of all the wage employment jobs in Malawi. Professional and technical jobs represent approximately 20% of all wage employments. Although this sector includes relatively more skilled types of jobs, including doctors, architects, lawyers, and engineers, teachers fill the majority of these jobs, especially in rural areas, in which teachers accounted for more than 70% of these jobs in 2013. Among other skilled labor jobs, such as administrative and managerial workers, clerical and related workers, and sales workers, each represents a small proportion of all the occupation groups, with administrative and managerial workers making up the smallest share.

The relative importance of the different sectors of non-farm wage employment is similar across urban and rural areas. There are more unskilled than skilled labor jobs in both urban and rural areas (figures 7.7 and 7.8). Approximately 67% in urban areas and 75% in rural areas of all the non-farm jobs are in sectors that do not require highly skilled labor. Among the group of unskilled labor jobs, the primary sector (agriculture, animal husbandry, forestry, fishers, hunters) is almost

negligible in urban areas whereas it accounted for 20% of all rural non-farm wage jobs in both years.

Returns on participation in non-farm wage employment

The returns on non-farm wage employment are higher for occupations in sectors that require more skilled labor. In 2010 average monthly wages of individuals participating in the sectors of employment that require skilled labor ranged from 8,200 kwachas for sales workers to 72,800 kwachas for administration and managerial workers (figure 7.6). Meanwhile, wages in the unskilled labor sectors of employment ranged from 5,600 kwachas for primary sector workers to 10,000 kwachas for production and related workers and transport, and equipment operators. In 2013 wages in the skilled labor sectors dropped dramatically to 25,900 kwachas for administrative and managerial workers, but these wages were still higher than for unskilled occupations, in which wages hovered between 3,600 kwachas for primary sector workers to 8,600 kwachas for production and related workers, and transport and equipment operators.

Wages generally are higher in urban areas. Consistently across all job categories, workers in urban areas earn a higher wage compared to workers in rural areas (figures 7.7 and 7.8). The average wage difference between urban and rural workers was 10,800 kwachas in 2010, but dropped to 6,800 kwachas in 2013. The reason was that while wages earned in both urban and rural areas decreased generally, wages decreased more pronouncedly in urban areas. Given that participation in wage employment is higher in urban areas than in rural areas, the decrease in wages is likely to affect more the livelihood of urban residents than rural residents. The effects of this wage decrease on poverty dynamics in urban areas are investigated in a later section.

Between 2010 and 2013, returns on non-farm wage employment decreased in both urban and rural areas. Returns on non-farm wage employment at the national level decreased by almost 15%, from 12,100 kwachas in 2010 to 10,300 kwachas in 2013 (figure 7.6). This decrease in wages is observed consistently across all the sectors of employment except

FIGURE 7.6: Individual Participation in Non-Farm Wage Employment and Returns by Sector in Malawi, 2010 and 2013

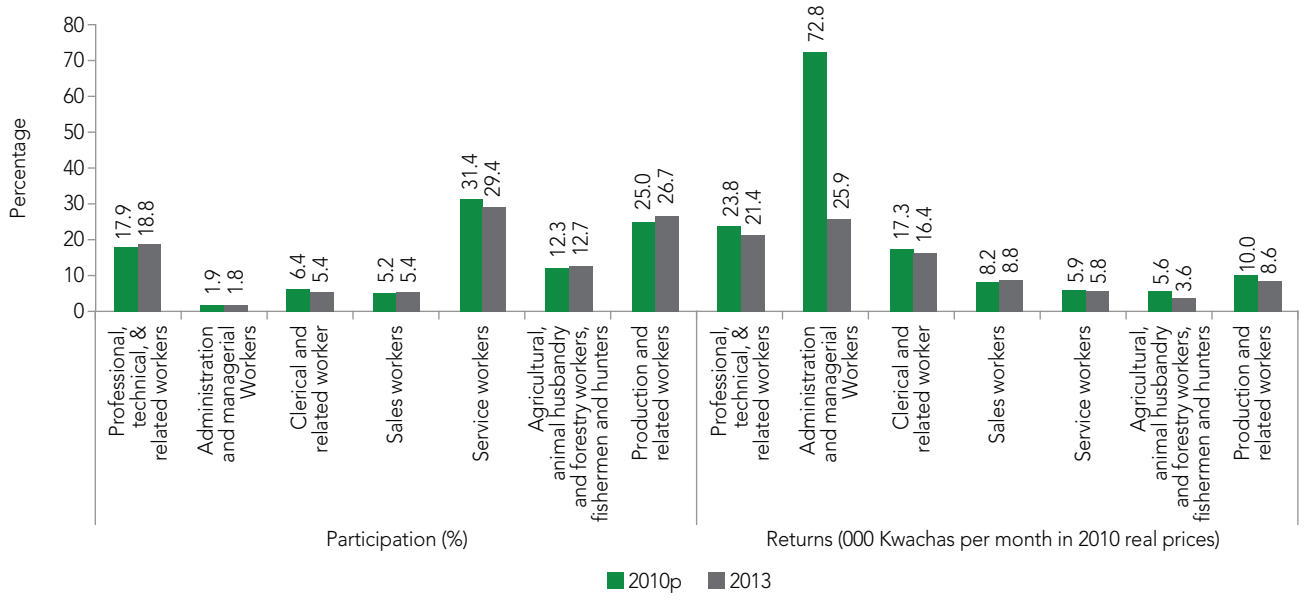


FIGURE 7.7: Individual Participation in and Returns on Non-Farm Wage Employment Activities by Sector in Urban Malawi, 2010 and 2013

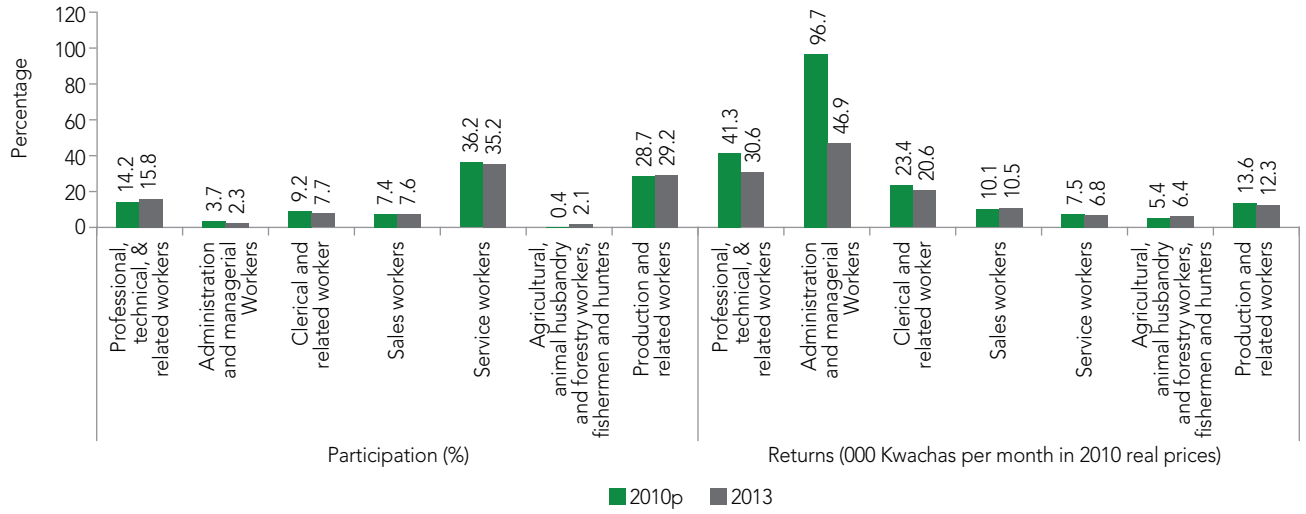
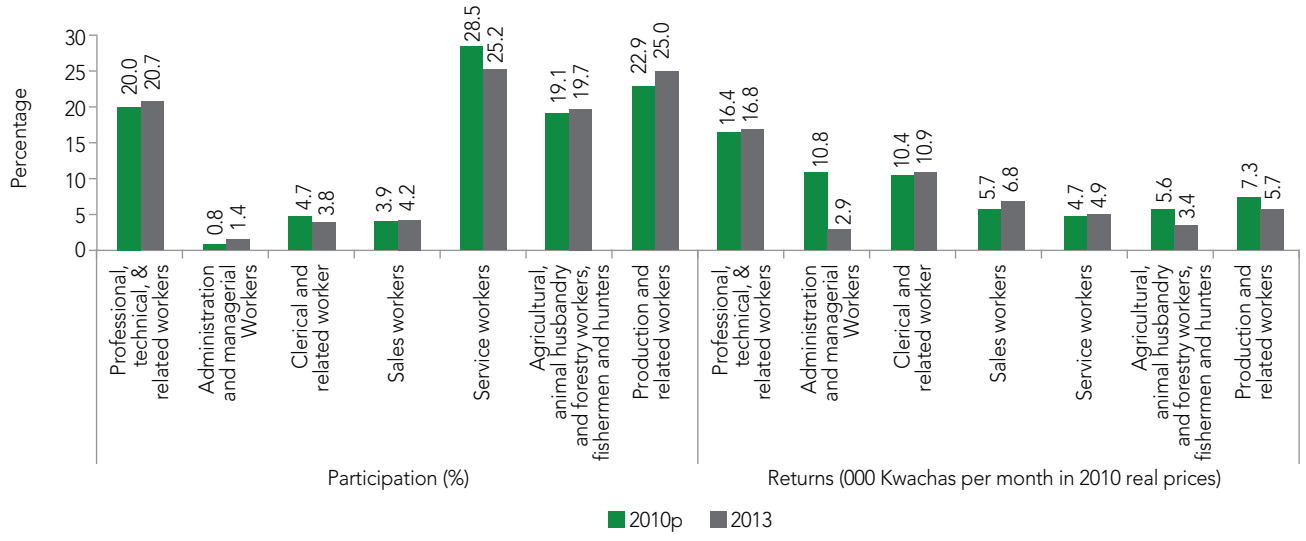


FIGURE 7.8: Individual Participation in and Returns on Non-Farm Wage Employment Activities by Sector in Rural Malawi, 2010 and 2013



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: P = panel survey.

sales workers for whom an average 7% increase in wages was observed. The sharpest decrease was experienced by administrative and managerial workers whose wages declined drastically from 72,800 kwachas in 2010 to 25,900 kwachas in 2013 (a decrease of almost 65%).

In urban areas between 2010 and 2013, wages decreased by an average of 25%. Wages decreased in all sectors of employment except for sales workers, whose wages remained practically the same. The sharpest decrease is observed in the urban administrative and managerial workers sector, but only a small

BOX 7.1: Did the Kwacha Depreciation in 2012 Affect Welfare by Depressing Economic Activity and Reducing Returns on Non-Farm Employment?

According to the FAO (United Nations Food and Agriculture Organization), devaluation is a form of stabilization or macro-adjustment policies that induces a change in foreign rates to reduce deficits in the balance of payments. By lowering the value of local currency, devaluation has the effects of reducing imports, which are now more expensive, while stimulating domestic production and exports, for which supply response is strong. While this likely creates an opportunity for expansion of the tradable agricultural sector, devaluation can affect negatively the non-tradable sectors of the economy. In particular, devaluation could impose a double burden on the urban poor, because the prices of basic tradable commodities increase while the prices of labor-intensive nontradable services decrease.

Barrett and others (2000) reported some evidence of this in *The Response of Income Diversification to Macro and Micro Policy Shocks in Cote d'Ivoire. The Response found that* the 1994 devaluation of the FCFA increased returns on the production, processing and marketing of tradable commodities, such as rice, cocoa, coffee and cotton, but reduced returns on the production of non-tradable commodity and services, leading to a reduced income for households, especially the less endowed with land, education, and liquidity.

The same phenomenon might be happening in the period between 2010 and 2013, bracketing the 2012 kwacha depreciation in Malawi. We find that real returns on non-farm activities (both self-employment and wage employment), especially in urban areas, decreased in most categories of employment, probably reflecting a narrow export base for those activities. Returns on self-employment activities decreased for all industry sectors, except the primary sector, in which more tradables are expected to be produced. In rural areas, in which the production of more tradable and import-substitutes was expected, returns did not decrease as much as in the urban areas in Malawi. These have important implication for welfare. An analysis of potential welfare effects of devaluation in Malawi by Benfica (2013) indicated significant negative effects (stronger in urban areas than rural areas) of devaluation on households' consumption.

These confirm that macro policy adjustments, such as devaluation, present an opportunity for the expansion of the economy and for correcting macroeconomic imbalances that resulted from bad policy choices, but can also potentially affect income and welfare of those stuck in the non-tradable sectors due to factors constraints. The non-farm sector of Malawi, which currently is dominated by small and low return activities, and the production of mostly non-tradable commodity and services, would need to be reorganized, by activating its tradable engines, in other to better seize the opportunity In addition, preemptive analysis of the distributional consequences of a devaluation of the local currency could have helped to detect unintended consequences or identify potential losers from the policy measure that could be supported in advance where deemed appropriate.

fraction of individuals are employed in this sector. By contrast, urban professional and technical workers also experienced a significant drop in their wages, and they comprise a much larger fraction of individuals participating in non-farm wage employment.

In rural areas between 2010 and 2013, wages decreased by an average of only 6%. Furthermore, while most rural employment sectors experienced a decrease in wages, workers in most skilled labor sectors, except the administrative and managerial workers, experienced a slight wage increase.

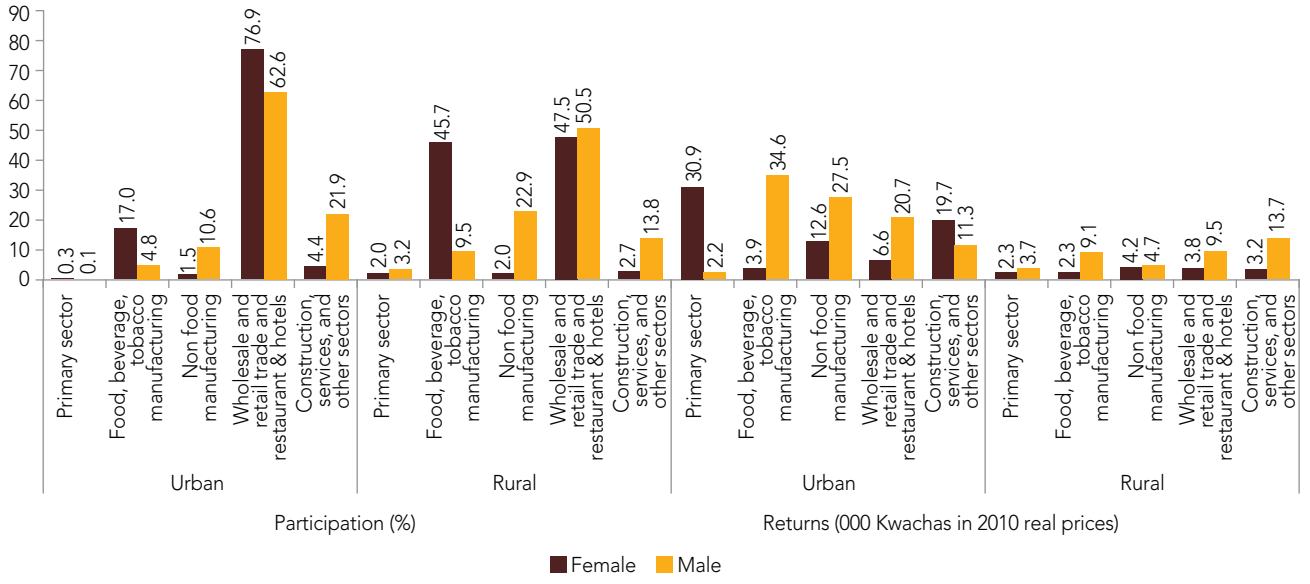
7.1.3. *Gender disaggregated participation in non-farm employment*

Non-farm self-employment

Both men and women-owned household enterprises are concentrated mainly in the commerce and tourism (wholesale and retail trade, restaurants and hotels) sector, in both rural and urban Malawi. Figure 7.9 indicates that 77% of women owned household enterprises and 63% of male owned enterprises in urban areas are in the commerce and tourism sector, dominating all the other sectors. In rural areas, these numbers are 48% and 50% for female and male owned enterprises respectively.

Beyond the commerce and tourism sector, a considerable proportion of women-owned household enterprises are concentrated in the food, beverage, and tobacco manufacturing sector, while male owned enterprises are mostly in the construction and services sector. This is more evident in the rural areas, where the second most popular sector for women-owned enterprises is the food, beverage, and tobacco manufacturing sector with about 46% of all enterprises while only 9.5% of male-owned household enterprises are in the sector.

FIGURE 7.9: Participation and Returns from Participation in Self-Employment Activities by Gender in Urban and Rural Areas, 2013



Source: Malawi Poverty Assessment team calculations based on IHPS.

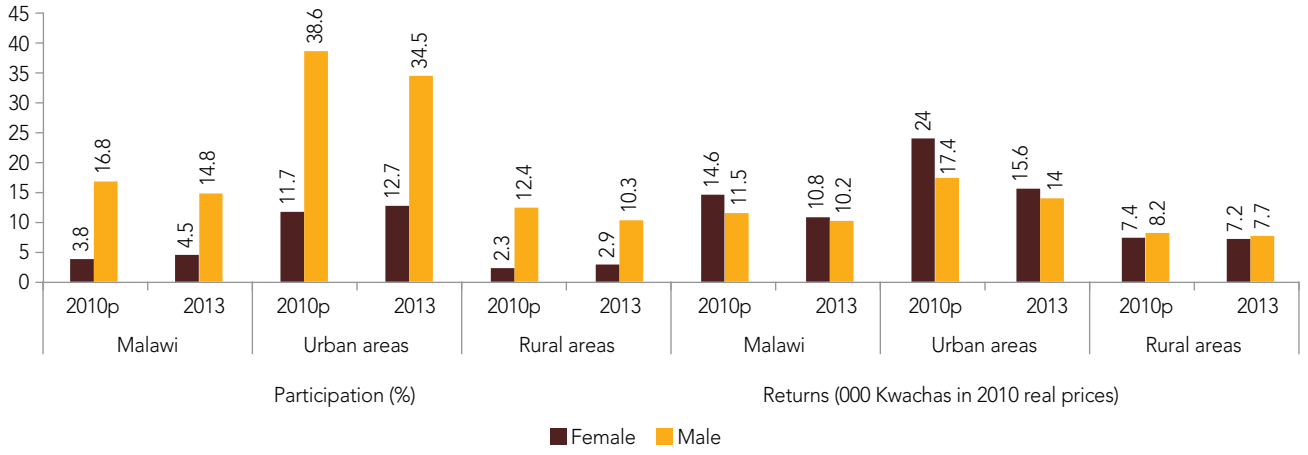
Female-owned household enterprises reported lower returns than male-owned enterprises in almost all industry sectors. Figure 7.9 indicates that profit generated by male-owned enterprises in urban areas, in the commerce and tourism sector, where most female-owned enterprises are concentrated, is almost three times (6,600MKW versus 20,700MKW) the profit in female-owned enterprises. In rural areas, the gap is smaller (3,600MKW versus 9,500MKW for female and male enterprises respectively), though, male enterprises still appear more profitable. The same observation appears in the second sector of concentration of female-owned enterprises. The food beverage and tobacco manufacturing sector male-owned enterprises reported an average profit of 35,600MKW in urban areas and 9,100MKW in rural areas, while female-owned enterprises reported 3,900MKW and 2,300MKW in urban and rural areas respectively. This is evidence suggesting that even when they participate in non-farm employment, women are marginalized in terms of access to the most lucrative enterprise opportuntities.

Non-farm wage employment

There is clear evidence of dualism along gender lines in terms of access to non-farm wage employment. Figure 7.10 indicates that female participation in non-farm wage employment is consistently lower than male participation in both urban and rural areas in 2010 and 2013. The most striking gap is in urban areas in 2010, when 12% of adult women reported participating in non-farm employment, in contrast with 39% among the adult men.

However, **women participating in non-farm wage employment seems to earn as much if not more than men on average.** Figure 7.10 indicates that women participating in non-farm wage employment in urban Malawi earn 24,000MKW in 2010 and 15,600MKW in 2013, compared to 17,400MKW in 2010 and 14,000MKW in 2013 for men. This might indicate a strong selection effect. In fact, since women are discriminated in access to non-farm wage employment opportuntites, only the very qualified do participate and they, therefore, appear to earn more on average than men because they are skilled enough to participate in skilled labor market. In

FIGURE 7.10: Participation and Returns on Wage Employment by Gender in Urban and Rural Malawi, 2010–2013



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: P = panel survey.

rural areas, there does not appear to be a significant difference in earning between men and women participating in non farm-wage employment. Women actually earn slightly less than men.

Women participating in non-farm wage employement are highly concentrated in the skilled labor sectors, while the men are more concentrated in the less skilled labor sectors. This is more striking in urban areas. Figure 7.10 indicates that in urban areas, the non-skilled labor sectors employs half of the female non-farm labor force compared to 70% of the male labor force. This confirms our earlier assumption that women who do participate in the labor force are skilled and take skilled labor jobs. In rural areas, the difference between men and women is less important. Approximately 54% of women are in the non skilled labor force as opposed to 66% for men.

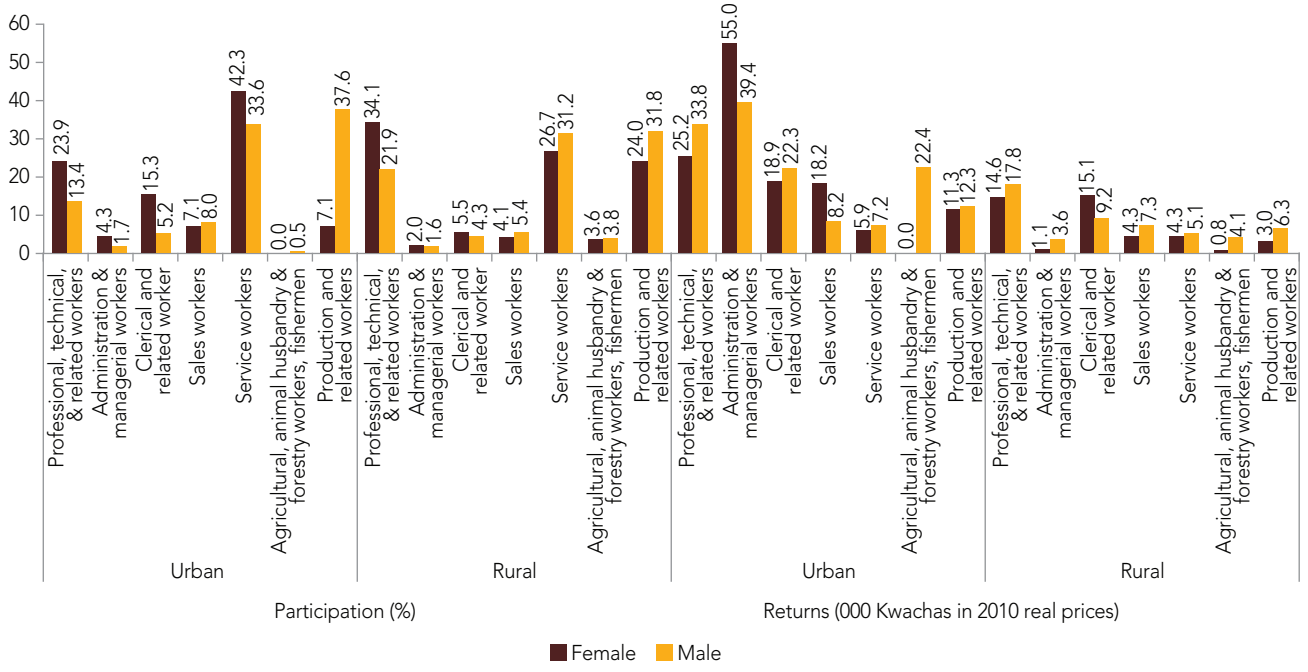
However, controlling for the sector of employment, women seem to earn less than men in every sector of employment, except the administration and managerial sector as well as the sales workers in urban areas and the clerical workers sector in rural areas. Figure 7.11 indicates that the returns on non-farm wage employment are distributed similarly for men and women across the different sectors of employment. But in most sectors, men earn higher wage than women. This suggest that though it is the qualified women that select in wage employment participation, they earn less than men with similar qualification working in the same sector.

7.2. Effects of Non-Farm Activities on Household Welfare

Engagement in non-farm activities is associated with higher consumption growth. Rural households who earned income from NFSE in 2004 had consumption levels that were on average 11.7% higher than those that did not (chapter 5). The effects of participating in NFSE in urban areas were very similar in size and magnitude to the effects found in rural areas. Households who earned non-farm wage income had 4% higher consumption than those that did not, and that effect remained relatively stable between 2004 and 2010. The rest of this section reports results based on the latest available panel data, which permits refining the analysis of the effects of non-farm activities on welfare.

According to the latest available data for Malawi for 2010–13, participation in non-farm self-employment activities also was associated with

FIGURE 7.11: Participation and Returns from Participation in Non-Farm Wage Employment Sector Activities by Gender in Urban and Rural Areas in Malawi, 2013



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.

higher consumption per capita of 11% to 14% in rural households and of 9% to 17% in urban areas, depending on the estimation method used.[48] Non-farm wage employment participation is associated with increases in consumption of 7% in urban areas, compared to 10–12% in rural areas. Results also indicate that wage employment participation is positive, and sometimes statistically significant, in urban areas among urban households. Figure 7.12 reports the marginal effects of participation in wage employment and self-employment on household per capita expenditures for the periods analyzed.

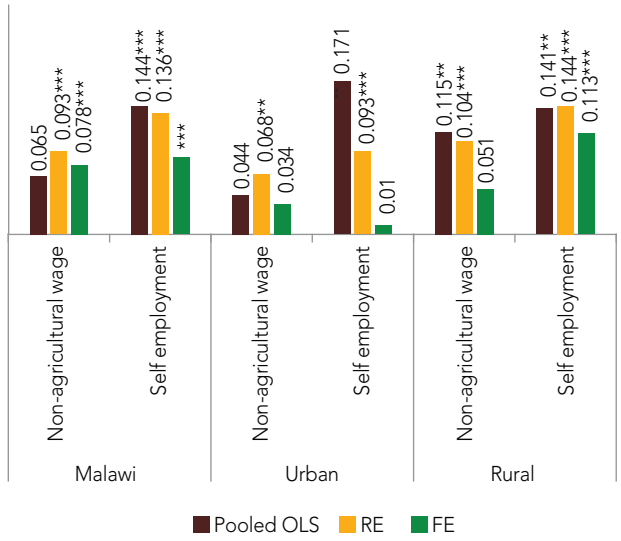
In both rural and urban areas, even though households with more non-farm activities have higher average levels of consumption, **it is not clear whether households who are better off are better able to engage in these activities, or whether non-farm activities help some households become less poor**. For instance, it could be that operating non-farm enterprises is a means by which some poor, uneducated households grow their incomes and escape poverty. However, it also could be the case that households already better off are able to invest in high-return non-farm activities so are more likely to operate them. The IHS3-IHPS panel data enables concentrating on the incomes of poverty dynamic categories to better understand the role played by non-farm activities to help people exit or enter into poverty.

7.2.1. *What explains the welfare improvements from non-farm activities?*

This section argues that the effect of performing non-farm activities on welfare is driven by the rate

[48] The team used the panel portion of the IHS3 and the IHPS to evaluate the impacts of participation in non-farm employments on household welfare using panel regression methods. Controlling for other determinants of household per capita expenditures, such as household characteristics, education, and location, the team estimated the pooled ordinary least squares (OLS) regression model, the random effects model, and the fixed effect models; and found consistent results.

FIGURE 7.12: Welfare Effects of Off-Farm Activities in Urban and Rural Malawi, 2010 and 2013



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: **p < 0.01, * p < 0.05, + p < 0.1.

of participation of the poor in these activities along with the rates of return observed from the activities. The section first explores the rates of household participation and returns in non-farm categories among various poverty dynamic categories, then the returns from the different sectors of non-farm wage employment and self-employment. For rural areas the focus is the groups of households who exited poverty between 2010 and 2013. For urban areas, the focus is non-poor households who entered poverty in 2013.

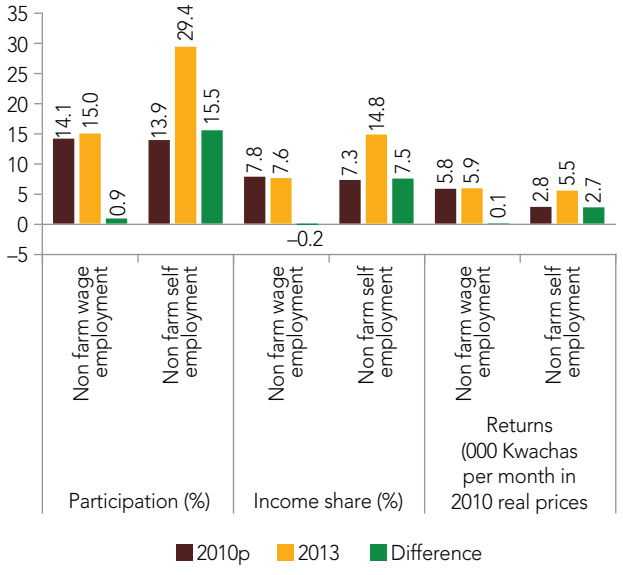
Rising income from non-farm self-employment was the driving force behind the reduction on poverty observed in rural Malawi during 2010–13, whereas the reduced income from non-farm wage employment drove the increase in poverty observed in urban Malawi. In chapter 5, the Shapley Decomposition (figure 5.7) showed the contribution of different income sources to poverty changes between 2010 and 2013 at the urban and rural levels in Malawi. The downward bars show contributions to poverty reduction, while the upward bars show contributions to poverty increases. The net observed change in poverty between 2010 and 2013 was –1.5 percentage points. However, poverty rates increased by 8.3 percentage points in urban areas and dropped by 3.1 percentage points in rural areas.

Figure 7.13 appears to show that income from self-employment contributed to reduce urban poverty by 1.5 percentage points, which was not enough to offset the 6.7 percentage point increase in poverty due to the fall in wage income (81% of net poverty change in urban Malawi). As for rural areas, income from self-employment reduced poverty by 2.4 percentage points (77% of the net poverty change in rural Malawi), which did offset the increase in poverty due to changes in income from other sources.

The prominent role of non-farm income from self-employment in reducing poverty is consistent with the higher rates of participation and returns resulting from these activities for rural households who exited poverty. Between 2010 and 2013, the proportion of rural households who exited poverty ("climbers") and participated in non-farm self-employment activities more than doubled from 14% to 29% (figure 7.10). The average returns per month obtained from participating in them also doubled from MK2800 in 2010 to MK5500 in 2013. As a result, incomes from NFSE in rural areas for the group of climbers, self-employment more than doubled its contribution to total household income from 7% in 2010 to 15% in 2013 and became almost as important as agricultural wage income. At the same time, the share of income from non-farm self-employment increased by less than two percentage points for households who fell into poverty in rural areas. In other words, while returns from self-employment increased between 2010 and 2013, rural households who diversified income toward non-farm self-employment sources were made better off and lifted out of poverty. During the same period, rural households who did not make non-farm self-employment a more important source of income became or remained poor.

Average returns from non-farm self-employment increased for all sectors. Participation for individuals in the households who became non-poor

FIGURE 7.13: Participation Rates and Income Shares as Share of Total Income by Income Source for Rural Households Who Exited Poverty, 2010 and 2013

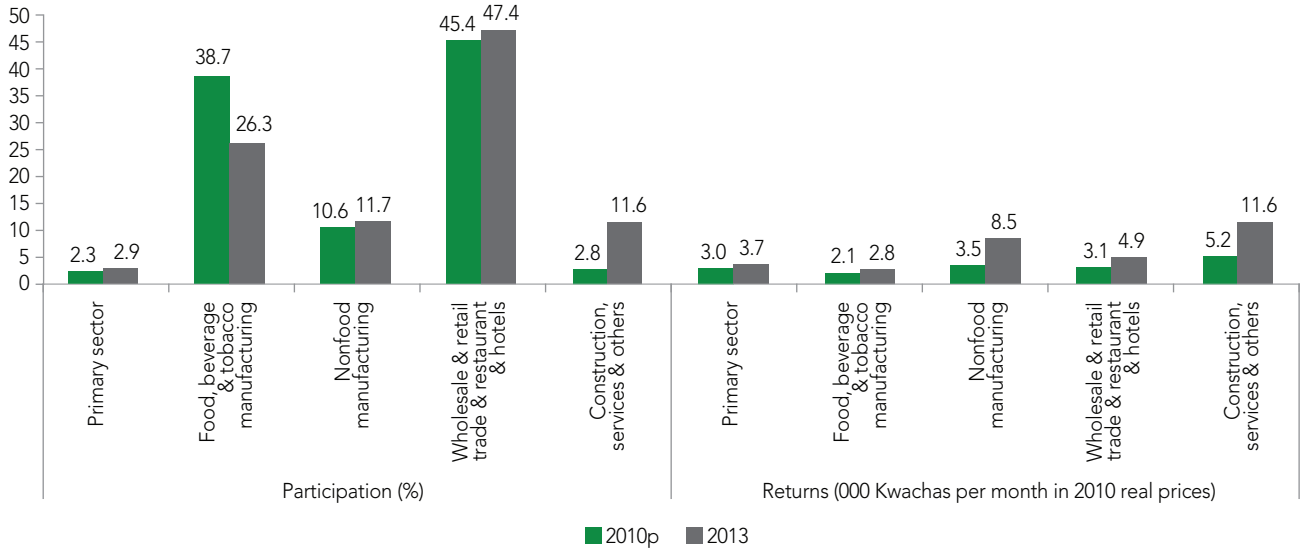


Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: P = panel survey.

in rural areas also increased for all sectors, most notably in construction and services, except within the food, beverage and tobacco manufacturing (figure 7.14).

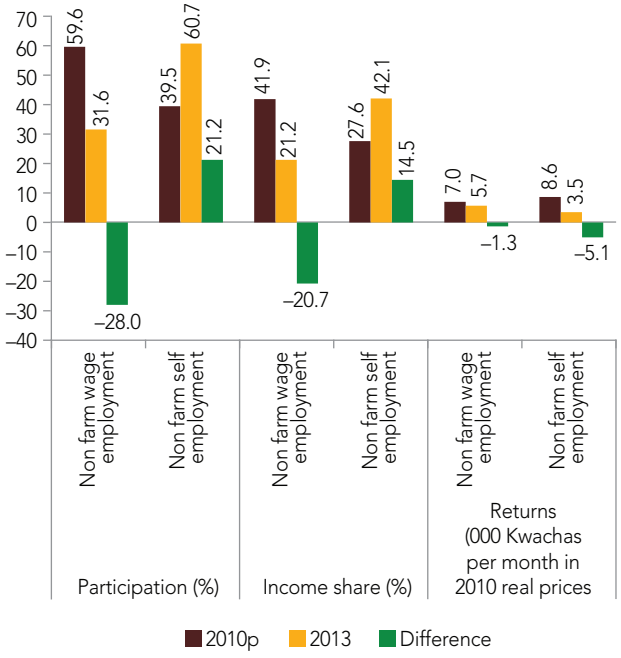
Similarly, the drop in the rates of participation and returns resulting from non-farm wage activities for urban households who fell into poverty go a long way in explaining the spike in urban poverty. In urban areas, 60% of the households who became poor in 2013 were participating in non-farm wage employment in 2010 (figure 7.15). In 2013 participation in non-farm wage employment for households who became poor dropped to 32% (almost 50% decrease) probably in response to the reduction in wages from non-farm wage employment. In fact, returns on non-farm wage employment for the households who became poor in urban areas and remained employed decreased from 7,000 kwachas in 2010 to 5,700 kwachas in 2013. This drop in non-farm wages is consistent with the fact that the share of income from non-farm wage employment almost halved (from 42% in 2010 to 21% in 2013) for the

FIGURE 7.14: Sector of Participation and Returns on Non-Farm Self-Employment for Those Who Exited Poverty in Rural Areas in Malawi, 2010 and 2013



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: P = panel survey.

FIGURE 7.15: Participation Rates and Income Shares as Share of Total Income by Income Source for Urban Households Who Fell Into Poverty, 2010 and 2013



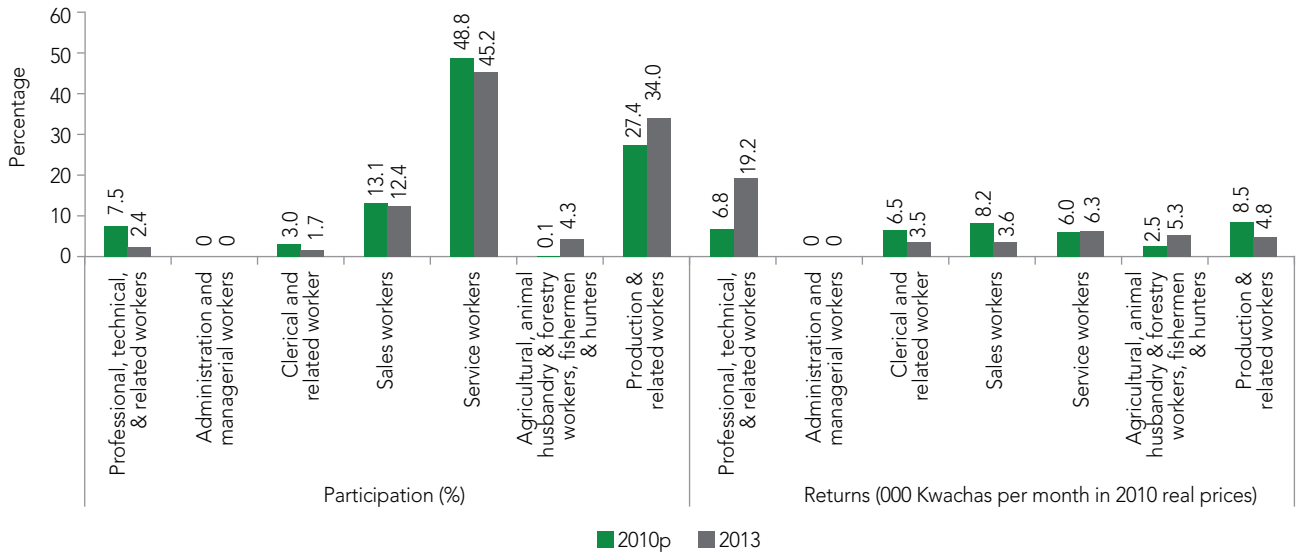
Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: P = panel survey.

households who became poor and were employed in non-farm wage activities.

Profits from non-farm self-employment decreased substantially from 8,600 kwachas in 2010 to 3,500 kwachas in 2013 (almost 60% reduction) for households who became poor in urban areas even though participation rates increased substantially during the same period (figure 7.13). Hence, revenue from non-farm self-employment was not enough to offset the poverty induced by the reduced income from non-farm wage employment, resulting in the large increase in poverty observed in urban areas between 2010 and 2013.

Moreover, returns on non-farm wage employment decreased considerably in two of the most important sectors of employment. Figure 7.16 indicates that sales workers and production workers are in the second and third most popular sectors of employment, respectively, for those who became poor in 2013 in urban areas. It also happens that those two sectors have experienced the largest decrease in wages, thus likely pushing many urban non-poor households into poverty in 2013.

FIGURE 7.16: Sector of Participation and Return in Non-Farm Wage Employment for Those Who Became Poor in Urban Areas in Malawi, 2010 and 2013



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: P = panel survey.

7.3. Role of Non-Farm Activities among Poor Households

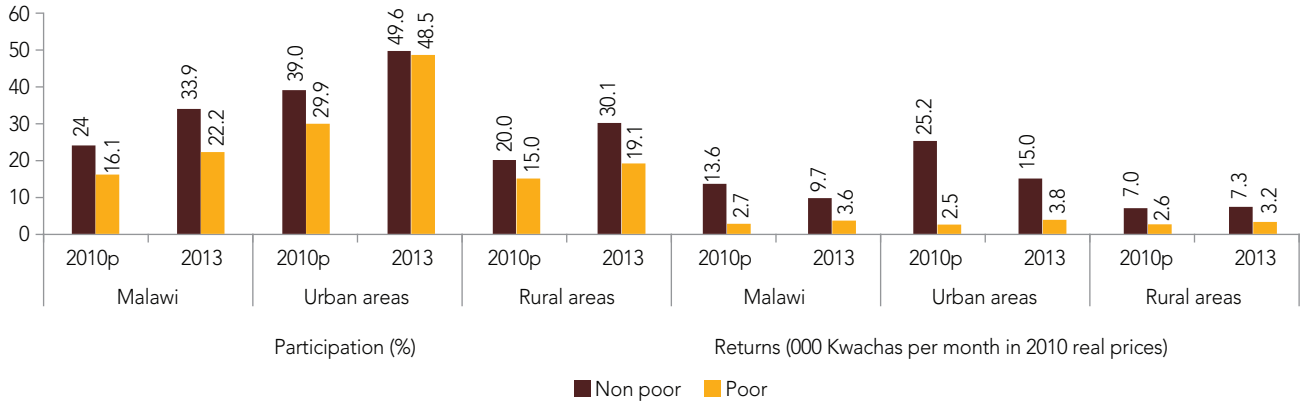
Non-farm self-employment

Despite the recent drive toward diversification, there is scope for improvement because the rates of participation and returns are lower for the poor compared to the non-poor. Sixteen percent of the poor households in Malawi owned a business in 2010, compared to 24% for the non-poor, whereas 22% of the poor owned a business in 2013, compared to 34% for the non-poor (figure 7.17). The significantly lower returns on non-farm self-employment participation for poor households compared to for non-poor may explain in part why poor households participate less in non-farm self-employment. Average returns for the poor were 2,700 kwachas in 2010 and 3,600 kwachas in 2013, compared to 13,600 kwachas and 9,700 kwachas for the non-poor. This gap in participation and returns between poor and non-poor households is observed consistently across urban and rural areas. This fact suggests that the poor in Malawi probably had a limited access to productive resources, such as credit and market access, both of which are critical to start and operate household enterprises and to make them more profitable. The determinants of participation and returns in non-farm activities are explored later.

The distribution of household businesses across industry sectors was similar between the poor and the non-poor, but the returns from these businesses were significantly lower for poor households across all industry sectors. Commerce and Tourism (wholesale and retail trade, restaurants and hotels) remained the main industry sector in which both poor and non-poor were primarily involved (figure 7.18). The primacy of Commerce and Tourism is observed consistently across years as well as in both urban and rural areas. However, the rural poor had higher rates of participation as street vendors of various food and drinks, and as carpenters and tailors.

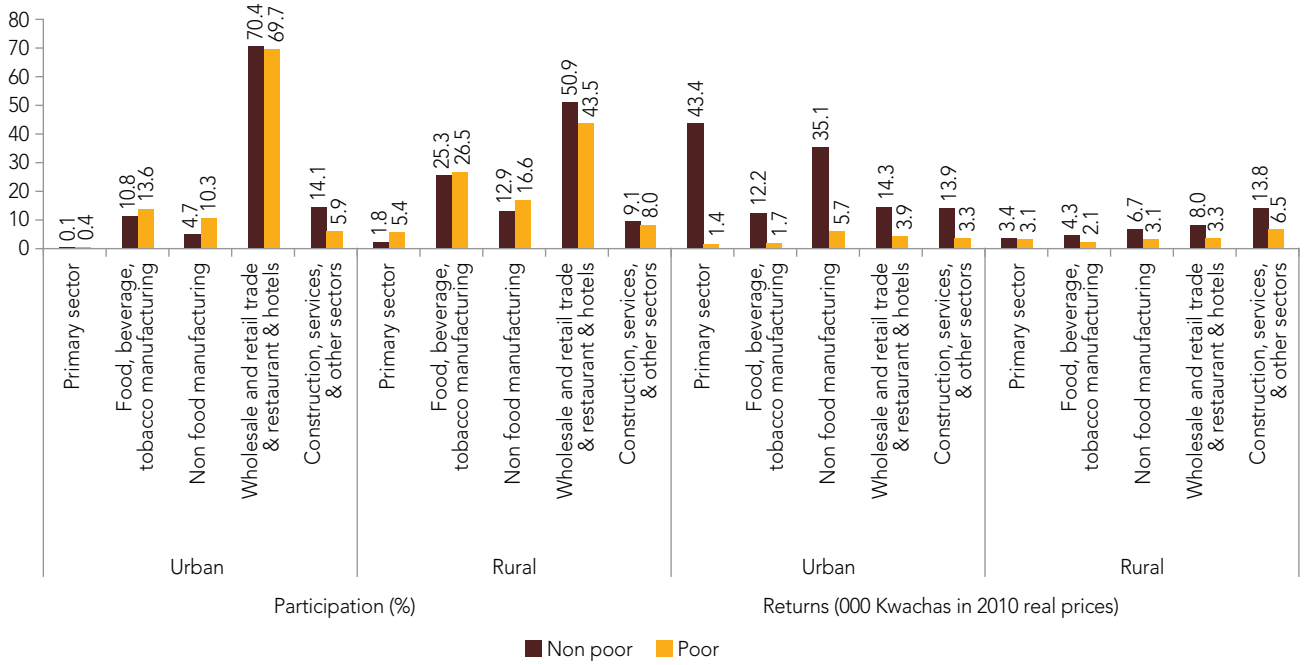
As for returns, the poor earned significantly lower profits from non-farm businesses than did the non-poor, irrespective of the sector, year, or location (urban/rural). The gap in returns between poor and non-poor is more prominent in urban areas than in rural areas. However, even in the construction and services sectors, where the rural poor observed the highest returns in 2013, the gap is almost double: 6,500 kwachas for the poor against 12,200 kwachas on average for the non-poor.

FIGURE 7.17: Participation in and Returns (Monthly Profits) on Self-Employment Activities, by Poverty Status in Urban and Rural Areas in Malawi, 2010 and 2013



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: P = panel survey.

FIGURE 7.18: Participation in and Returns on Participation in Self-Employment Activities, by Industry Sector and by Poverty Status in Urban and Rural Areas in Malawi, 2013



Source: Malawi Poverty Assessment team calculations based on IHPS.

Non-farm wage employment

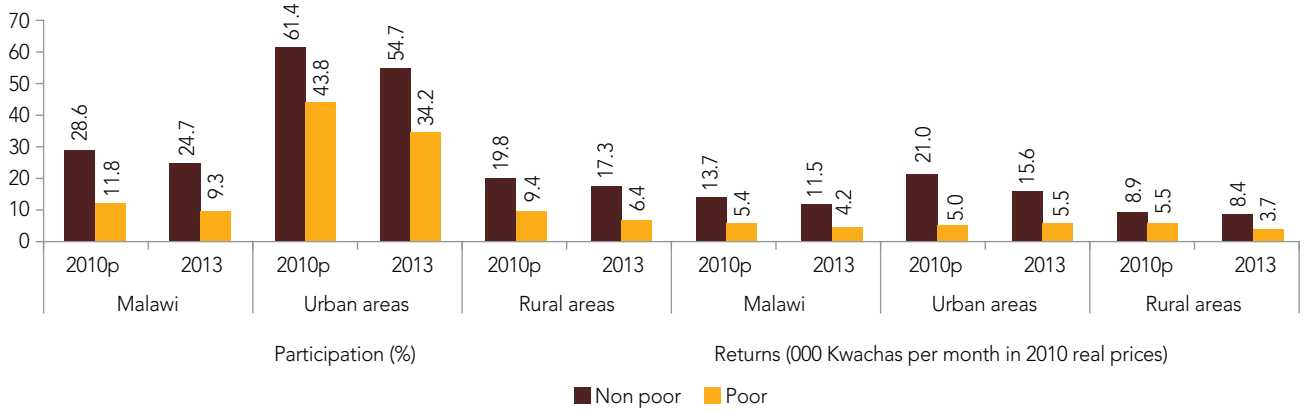
Rates of participation in non-farm wage employment and returns are lower for the poor compared to the non-poor. Figure 7.19 indicates that rates of participation in non-farm wage employment for the non-poor almost tripled the participation rate for the poor in Malawi. This difference in participation is maintained across urban and rural areas. Returns on participation are also three times higher for non-poor households than for the poor: the non-poor earned approximately 14,000 kwachas in 2010 and 12,000 kwachas in 2013 from participating in non-farm wage employment. At the same time, the poor earned only 5,000 kwachas in 2010, and 4,000 kwachas in 2013. The low earnings of the poor relative to the non-poor point to a great scope to increase the benefit of non-farm wages for the poor by increasing their access to higher paid jobs.

Participation by the poor in non-farm wage employment is concentrated almost solely in the sectors that require less skilled labor. Service workers, agricultural workers, and production and transport-related workers occupy more than 80% of the non-farm employment jobs held by the poor in Malawi in both urban and rural areas (figure 7.19). Interestingly, minimal participation by the poor in professional and technical jobs is more widespread in rural areas than in urban areas.

As expected, the urban poor are totally absent from the agriculture sector, while approximately 33% of the employed rural poor are found in this sector. The latter's strong showing indicates that a more diverse range of wage employment— including building caretakers, cleaners, and bricklayers—is held by the rural poor than by the urban poor. In contrast, and also as expected, the rural and urban non-poor seem to have access to non-farm jobs in all sectors of activities, even though these non-poor are more concentrated in the service sectors.

Not only were urban and rural poor quasi-excluded from the sectors that provided the highest

FIGURE 7.19: Participation in and Returns (Monthly Wages) on Wage Employment, by Poverty Status in Urban and Rural Areas in Malawi, 2010 and 2013



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: P = panel survey.

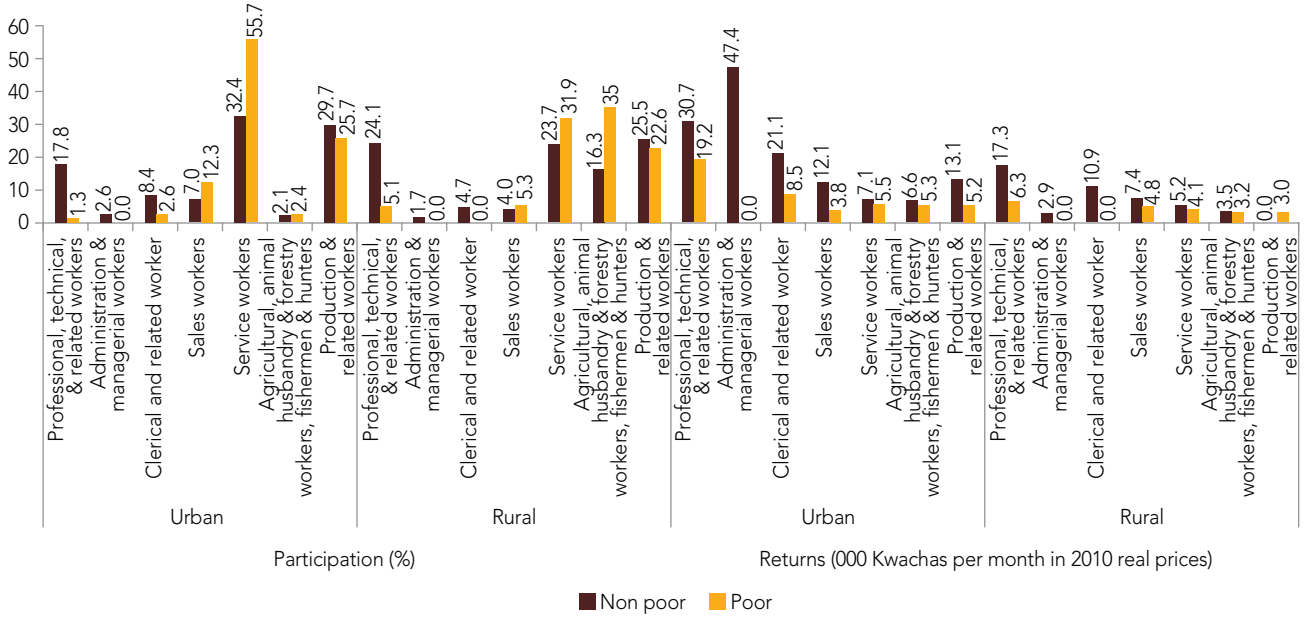
wages, but also the poor earned significantly lower wages in most sectors in which they did participate than did the non-poor. The skilled labor employment categories, in which poor people rarely were seen, generated the highest monthly wages for both poor and non-poor in both urban and rural areas (figure 7.20). In addition, in both rural and urban areas, the wage levels of the non-poor participating in non-farm wage employment were significantly higher than the wages of the poor across almost all sectors (figure 7.20). The gaps in returns between poor and non-poor were smaller in the unskilled labor sectors than in the skilled labor sectors. For example, in 2010 poor service workers earned 6,700 kwachas in urban areas (compared to 7,600 kwachas for the non-poor), and 4,900 kwachas in rural areas (compared to 4,500 kwachas for the non-poor). These numbers reveal very little difference in wages between the poor and non-poor in this sector. A similar statement could be made for 2013.

To summarize, this section establishes that participation in non-farm activities (self-employment and wage employment) is infrequent among the poor compared to the non-poor in Malawi. Moreover, the poor who do participate in non-farm activities earn significantly lower returns than the non-poor do. This significant wage gap implies considerable opportunity to improve the livelihoods of Malawi's poorest by increasing their participation in, and returns on, non-farm activities. However, any such policy requires a good understanding of the main drivers of participation and returns on these activities. The following section focuses on determinants of participation and returns on non-farm employment

7.4. Determinants of Participation and Returns on Non-Farm Employment Activities

To understand the observed participation rates and returns on non-farm activities, the team used a two-stage model to investigate (a) the determinants of farmers' participation decisions and (b) the determinants of returns on participation. The ***dependent variable*** to estimate returns on non-farm wage employment is ***monthly wages earned by participants***. As for the ***self-employment regression***, the ***dependent variable is the profit earned from the household businesses in the month prior to the interview***. Information for 2010 and 2013 are pooled for these regressions. The Heckman two-stage selection model is used to account for the selection issue that arises when exploring the determinants of returns

FIGURE 7.20: Participation in and Returns on Participation in Non-Farm Wage Employment Activities, by Type of Occupation and by Poverty Status in Urban and Rural Areas in Malawi, 2013



Source: Malawi Poverty Assessment team calculations based on IHPS.

on participation among participants who self-select into participation.[49]

Self-employment

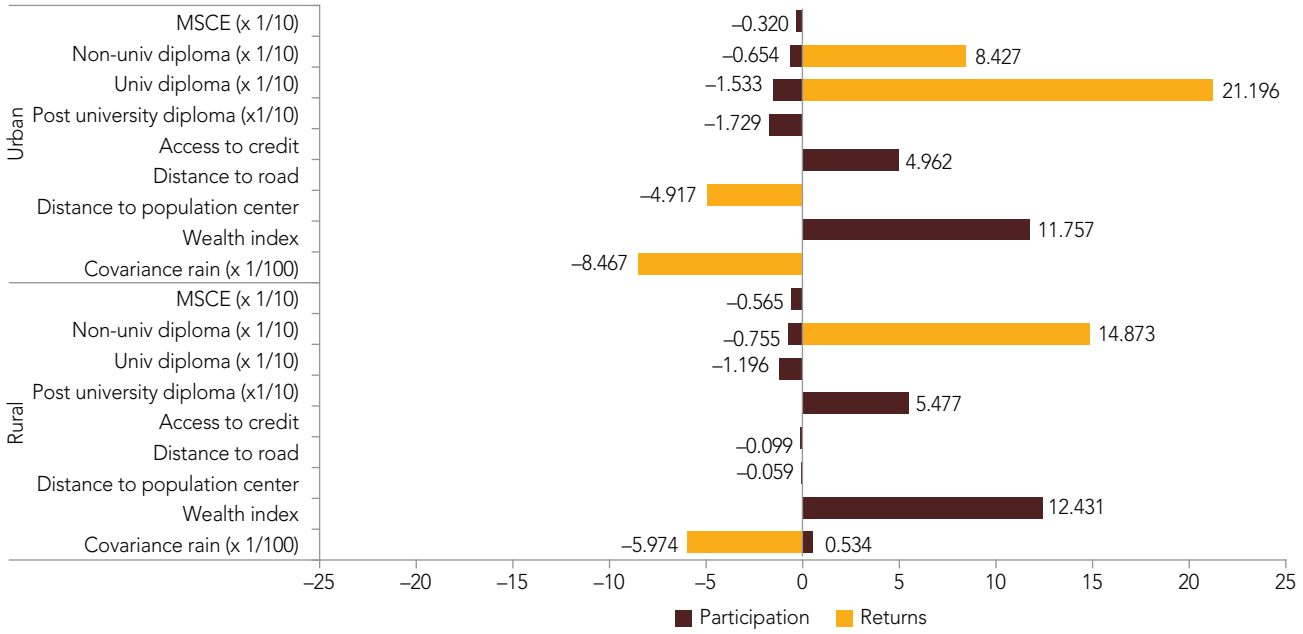
Figure 7.21 reports the average marginal effects of the factors that affect individuals' probability of participation in (orange) and returns on (blue) non-farm self-employment. The direction of the bars indicates whether the variable has a positive (right) or negative (left) effect on participation or returns. The length of the bars represents the magnitude of the effect, that is, by how much the probability of participation or the return from participation changes following a unit change in the value taken by the variable. Only variables of interest that have a statistically significant effect are reported.

As people in rural areas acquire higher education, their *likelihood of participating* in non-farm *self*-employment decreases. The probable cause is that more highly educated people have access to better paid non-farm ***wage*** employment. Prior to the Junior Certificate Examination (JCE) level, education has no significant effect on expected self-employment participation. Starting at the JCE level,[50] in both urban and rural areas, educational attainment

[49] The first stage is a Probit model of participation in wage employment or participation in self-employment, given a set of explanatory variables. The first stage informs concerning the main drivers of participation in the two types of off-farm employments. To eliminate potential bias due to sample selection, the inverse mills ratio is calculated from the first-stage regression and included in the second-stage regression as an explanatory variable to control for selection (See Wooldridge 2010 for more details about the Heckman approach).

[50] After two years of secondary education, students write a national examination called the Malawi Junior Certificate Examination (JCE). At the end of secondary school, students write another national exam, the Malawi School Certificate of Education Examination (MSCE). It requires the student to take examinations in a minimum of six subjects. The student can take more, but only the top six are counted for the final score. MSCE results also are used to select candidates for training courses and employment. Students who do very well in MSCE and pass the University of Malawi entrance examination are selected into university education.

FIGURE 7.21: Determinants of Participation in and Returns on Non-Farm Self-Employment in Urban and Rural Areas in Malawi, 2010–2013



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: MSCE: Malawi School Certificate of Education Examination.

consistently negatively affects participation in non-farm self-employment (figure 7.21). The magnitude of this negative effect increases as the level of education attained increases. Compared to no education, earning a university diploma decreases the likelihood of participating in non-farm self-employment by approximately 15 percentage points in urban areas and 12 percentage points in rural areas.[51]

In direct contrast, for those participating in non-farm *self*-employment in urban areas, *profits earned* increase with level of education. The positive effect of education on ***returns on*** non-farm self-employment starts only at the ***university level***. People who have reached the university level, although they are very few, especially in rural areas, are likely to have acquired superior management skills so start more productive businesses, in contrast to those with lower education level, who start smaller and less profitable businesses.

In rural areas, relative to having no education, earning a non-university *diploma* increases profits from household businesses substantially. Most individuals in rural areas fell short of earning a university degree or post-graduate degree. At the end of secondary school, students write the Malawi School Certificate of Education Examination (MSCE). Entry into the University of Malawi is very competitive because places are limited. Only a small percentage of successful candidates get selected for university education. Some successful candidates who fail to get places at the University of Malawi find places in teacher training, technical, and other colleges for career training courses that provide non-university diplomas. Some of these skills and training well could be applied to self-employment activities.

Wealth and access to credit are crucial to start a business or self-employment activity. Starting a household business requires some capital investment

[51] The effect of a post-graduate degree on self-employment participation could not be estimated in rural areas because very few rural residents had such degrees, and none of those who did had been self-employed.

that only the wealthiest or those with access to credit can afford. Poor farmers are less wealthy and have less access to credit services because they lack collateral. Therefore, they are significantly less likely to start a business in either urban or rural areas compared to the non-poor. The next section shows that access to credit is lower among the poor. Loans are sought for different uses. According to the IHPS, half (50.4%) of those who borrowed a loan in 2013 did so to open up a business venture, followed by those who purchased agricultural inputs (21.4%) (NSO 2014). In rural areas, having access to credit increases the chances of being able to open a business by 5 percentage points.

Remoteness from roads and markets discourages engaging in self-employment activities. The regression results in figure 7.21 show that, in rural areas, people living far away from roads and from population centers are less likely to participate in non-farm self-employment. It is likely that the more isolated the household, the more that the transaction costs of acquiring the inputs for the household business or marketing the output increase and the profitability of the business is reduced. In urban areas, the distance to roads and population centers does not affect the likelihood of participation in non-farm self-employment because, by definition, population density in urban areas is high and infrastructure, such as roads, are more widely available.

Households turn to non-farm self-employment activities in response to covariate shocks, especially in rural areas. When climate shocks affect crops and the conventional sources of livelihood for farmers, an alternative is to pursue activities that generate income outside agriculture. Useful as they are, informal risk-sharing arrangements almost never cover all households or provide full protection against disasters. Therefore, nonagricultural activities still may be needed, and income diversification remains desirable. Figure 7.21 indicates that a 0.1 unit increase in the covariance of rainfall increases the likelihood of participating in non-farm self-employment by more than 5 percentage points in rural areas, and reduces the profits earned by the same activity. In urban areas, where people rely less on agricultural income, the covariance of rainfall does not affect the likelihood of participation in non-farm self-employment, but it does affect the profits earned.

In this period, however, there were no major rainfall shocks that could have led people into non-farm activities out of necessity. At the same time, the presence of natural disasters that affect many households simultaneously in a local area can reduce the demand for the goods and services offered by these activities, and this makes it difficult to generate higher profits. Insuring people may improve the chances of their getting into non-farm activities as a choice, not a necessity, as well as hasten the potential demand for goods and services that originate from these activities.

Additional analysis of the drivers of profits from self-employment confirmed that none of the factors above explain higher profits into self-employment. Taking advantage of the panel data, and closely following Blinder (1973), the team calculated the mean profit gap in 2013 between "climbers" (those households originally poor in 2010 who escaped poverty in 2013) and "stayers" (households that were poor in 2010 and remained poor in 2013). The idea is to test whether the observed variation in profits can be attributed to differences in endowments (for example credit and loans or the age of the household enterprise), or to differences in the returns on these endowments. The detailed results of the decomposition are presented in Appendix A7.1 and reveal that differences in endowments, and returns on these endowments, respectively account for 7.48% and 92.42% of the difference in profits from self-employment between climbers and stayers. In other words, the return to endowments almost entirely explains the variation in profit between households that remained poor and those that escaped poverty.

The same decomposition exercise reveals that the differences in returns on being married status and the age of household enterprise contribute positively and significantly to the differences in the stayer-climber profit-differential. Being married probably provides some form of stability to

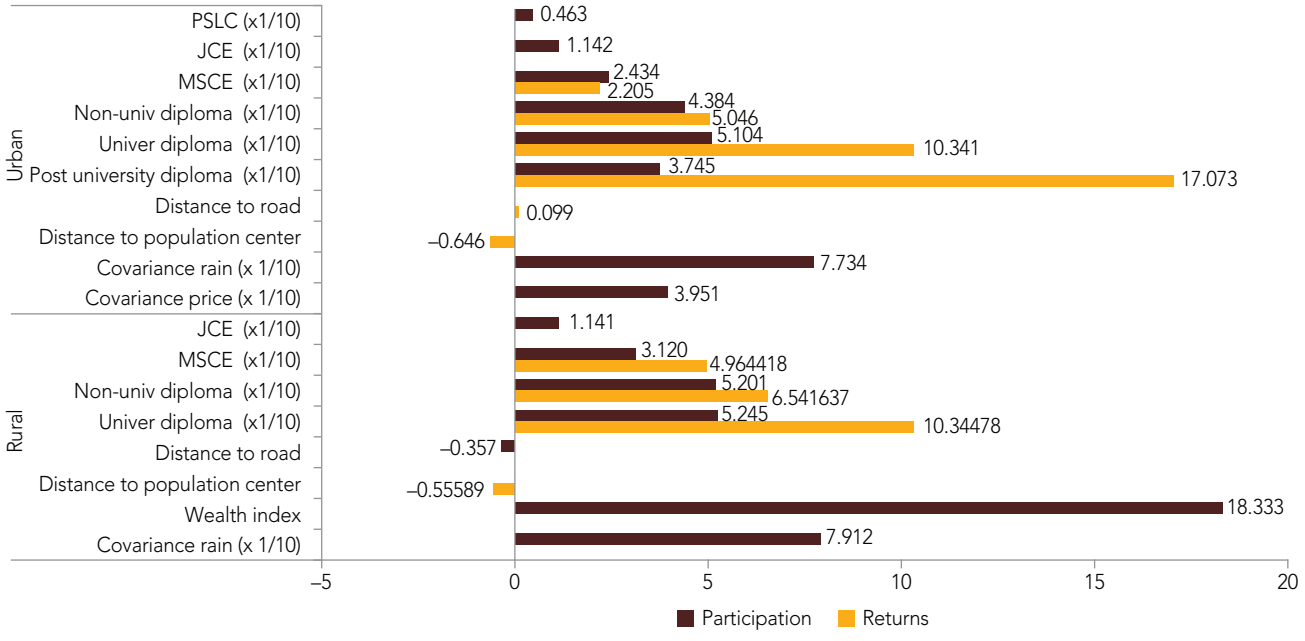
households, which enables them to focus on their business, thereby ensuring higher profits. The age of the enterprise is an indication of experience or endurance that, all things being equal, ensures higher profits. In sum, the returns on self-employment micro activities or small enterprises are mostly influenced by supply factors, such as household skills developed possibly as the enterprise ages, and the overall demand conditions in the non-farm labor market.

Wage employment

In both rural and urban areas, education is the most important determinant of participation and returns on non-farm wage employment. Figure 7.22 indicates that, compared to the non-educated, more educated people are more likely to participate in non-farm wage employment and earn higher wages. In urban areas, relative to having no education, completing primary school increases the likelihood of participation in non-farm wage employment by approximately 5 percentage points. However, in rural areas, completing primary school has no effect. In both urban and rural areas, having passed the Junior Certificate Examination has a marginal effect of approximately 12 percentage points. The magnitude of the education effect increases in parallel with the level of education up to the university diploma, at which point the effect peaks. In both urban and rural areas, the university diploma increases the probability of participation by more than 50 percentage points. Earning a post-graduate degree, compared to no education, increases the probability of participation by a lesser amount (37%) in urban areas and has no effect in rural areas, This implication could be that there are very few post-university-level jobs available, so people with higher degrees prefer to search for jobs in which they can earn as much as possible.

Regarding the returns on non-farm wage employment participation, increased education consistently increases monthly wages in both rural and urban areas. Up to university level, the magnitude of the effect generally is higher in rural areas. However, as the

FIGURE 7.22: Determinants of Participation in and Returns on Non-Farm Wage Employment in Urban and Rural Areas in Malawi, 2010–2013



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.

education level increases, the difference between urban and rural areas decreases. For example, relative to no education, earning a middle school certificate increases wages in urban areas by approximately 20%, but, in rural areas, by a 50% marginal increase—more than double (figure 7.22). However, the effect of earning a university degree is the same in urban and rural areas: it increases wages by 175% relative to no education.

Non-farm *wage* employment also is a coping mechanism when households face covariate shocks. Figure 7.22 shows that a 0.1 increase in covariance rain increases the likelihood of participation in non-farm wage employment by approximately 8 percentage points in both urban and rural areas. As noted earlier, more rainfall variability did not affect urban households' participation in non-farm ***self***-employment. The probable implication is that, in response to rain shocks, urban households turn more to wage employment than to non-farm self-employment. Also notable is that, in urban areas, an increase in the covariance of maize prices also forces people into looking for wage employment opportunities.

Given that wage income is by far the main component of income in urban areas, the team carried out another Oaxaca-Blinder decomposition on wage differentials between non-poor households in 2010 who remained non-poor in 2013 ("stayers") and households that were non-poor in 2010, but fell in poverty in 2013 ("divers"). The idea once again is to test whether the observed variation in urban wages between both groups could be explained by changes in their asset endowments or in their returns.

Higher education levels explain an important part of the wage differential between those who stayed out of poverty and those who did not manage to do so between 2010 and 2013. Approximately 43% of the wage differential between the non-poor throughout and those who fell into poverty by 2013 is explained by differences in the educational qualifications of individuals and asset ownership. The positive coefficients on these variables reported in Appendix A7.1 imply that "stayers" are better educated and own more assets than divers.

Differences in returns account for 57% of the stayer-diver wage gap. In other words, context explains a significant part of the variation in wage differences between those who felt into poverty and those who managed to stay out of poverty. Differences in returns on the age of household members and certain occupations, such as sale workers, have a significantly positive effect on the climber-diver wage differential. By contrast, **the returns on male workers, educational attainment, distance to population centers and certain types of employers like government were negative and thus reduced the wage gap**. These reduction in returns reflect the fact that higher wage premiums enjoyed by males and more educated workers in high population density areas shrink as a result of the economic contraction that urban areas underwent in 2013 and thus the wage differential.

In sum, having the wealth and income to use as investment capital increases the opportunities to venture into NFSE, so as connecting people better to the markets that demand the services offered by their NFSE activities. Training and technical skills also can improve the chances of higher returns. Education is the key asset to improve people's chances to get into wage employment and earn higher salaries. The next section evaluates the potential for increasing participation in non-farm activities among the poor given their standing in each of these factors.

7.4.1. *Constraints and opportunities related to non-farm activities*

Supply-side constraints

The poor have lower education levels than the non-poor. As mentioned, non-farm activities display positive returns on education. In other words, as people acquire more education, the wages earned from non-farm wage employment and the profits earned from non-farm self-employment increase. The reason is that the highest paid jobs and businesses require more highly educated individuals. This reality leaves only the lowest paid jobs available

to less educated individuals. Table 7.2 indicates that educational attainment is lower for the poor compared to the non-poor. This fact could explain in part the lower participation rates by the poor in non-farm activities compared to the non-poor. In addition, the compound effect of low education levels on participation and returns on non-farm activities, especially wage employment, explains why the poor remain employed mainly in low return wage sectors. Given the potentially high returns on increased education, there is high potential through granting more education to increase poor people's livelihoods through non-farm wage employment, especially in rural areas whose rates of education are still very low.

Increased access to credit may partially explain the increased participation in self-employment between 2010 and 2013. Figure 7.23 indicates that access to credit in Malawi improved for the poor and non-poor alike between 2010 and 2013, especially in rural areas. For the rural poor, access to credit almost doubled (from 12% in 2010 to 20% in 2013). In urban areas, it increased from 30% in 2010 to 38% in 2013. However, most of this credit did not come from the formal sector.

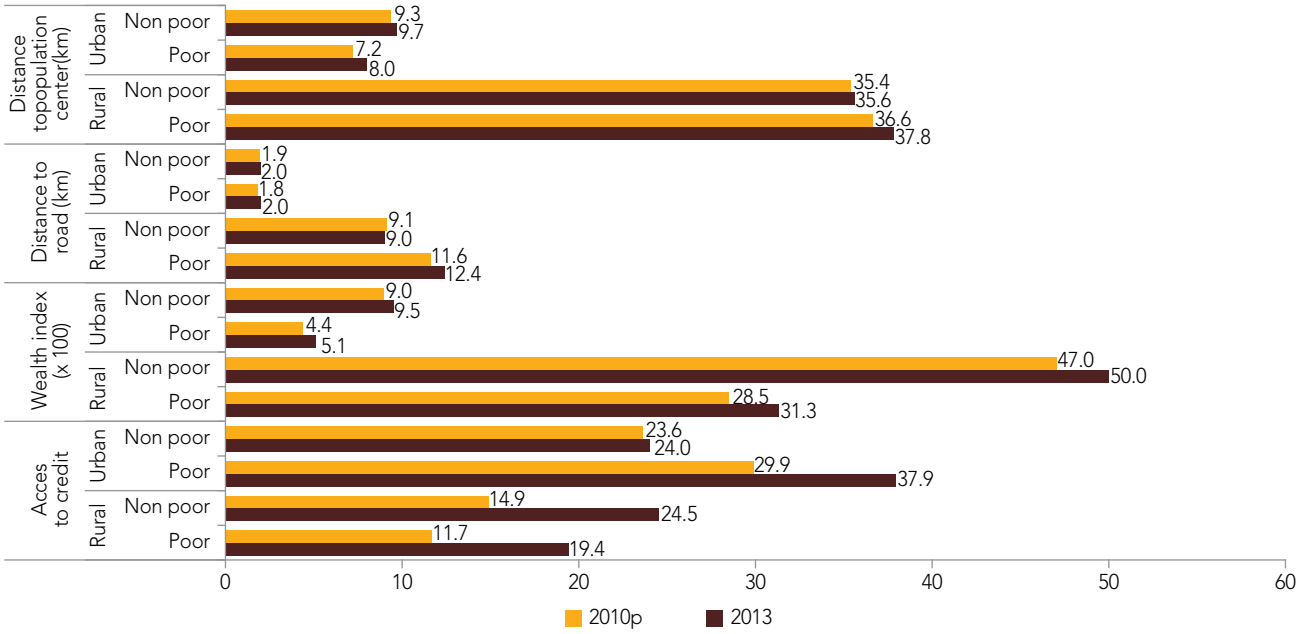
Nevertheless, access to formal sources of credit remained critically low. According to the IHPS survey, of those who obtained a loan in 2013, only 9% borrowed from a commercial bank. Most people relied on family and friends to get loans. These flows are well directed, and they have merit. However, many relatives and neighbors also were cash strapped and could have faced constraints in helping their poor neighbors. Thus, while friends and family may be able help, the formal banking system can play an important role by massively expanding these services, especially for the rural poor. Government can do a great deal to ensure

TABLE 7.2: Education Level by Poverty Status in Urban and Rural Malawi, 2010 and 2013

	Malawi		Urban areas		Rural areas	
Sector	2010	2013	2010	2013	2010	2013
Poor						
No education	89.3	86.5	82.5	71.6	89.7	88.2
PSLC	5.7	6.9	8.4	11.7	5.6	6.4
JCE	3.7	4.8	8.0	12.2	3.5	4.0
MSCE	1.2	1.8	0.6	4.4	1.3	1.5
Non-university diploma	0.0	0.0	0.4	0.0	0.0	0.0
University diploma	0.0	0.0	0.0	0.0	0.0	0.0
Post-graduate degree	0.0	0.0	0.0	0.0	0.0	0.0
Overall						
Non-poor						
No education	67.9	65.9	42.7	39.5	75.1	72.8
PLC	12.2	13.2	15.6	16.5	11.2	12.3
JCE	10.4	10.9	18.3	18.0	8.2	9.1
MSCE	7.5	7.5	16.7	17.9	4.8	4.7
Non-university diploma	1.1	1.6	3.7	4.9	0.5	0.7
University diploma	0.6	0.8	2.2	2.3	0.2	0.4
Post-graduate degree	0.2	0.3	0.8	0.9	0.1	0.1
Overall						

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.

FIGURE 7.23: Access to Resources and Markets for the Poor and Non-Poor in Malawi, 2010 and 2013



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: P = panel survey.

that this happens and would do well to remove the hurdles that hinder credit markets in rural areas.

Demand-side constraints

The poor have more restricted access to markets in rural areas, but not in urban areas. In rural Malawi, roads and population centers are farther from the poor than from the non-poor households (figure 7.21). This isolation forces the poor to experience higher transaction costs to participate in markets. Consequently, they participate less in self-employment activities compared to the non-poor, who have easier access to markets for inputs and outputs. In contrast, in urban areas, the poor do not appear to be more isolated from markets than are the non-poor. The rates of participation in non-farm self-employment generally are higher in urban than in rural areas, and the difference in participation between the poor and the non-poor is less in urban areas. This difference highlights the importance of market access to increase self-employment participation.

To summarize, on the supply side, the poor are more constrained than the non-poor, especially in rural areas, in levels of education, wealth, and credit for investment capital. On the demand side, restricted access to markets, especially for the rural poor, considerably limits their participation in non-farm self-employment. Unlocking all of these constraints can improve opportunities for lifting many households out of poverty through increased participation and returns on non-farm activities.

Conclusions

Non-farm activities remain an important complement to strengthen the fragile economies of poor households. In urban areas, the fluctuations in non-farm wage opportunities mirror the changes observed in poverty trends during the last decade. Poverty declined between 2004 and 2010 as more people found increased non-farm wage opportunities. However, this progress was undone from 2010 to 2013 largely

because the participation and returns from these activities dropped. The policy-induced shock including the 2012 kwacha depreciation may have directly affected urban poverty by decreasing the price of, and therefore the returns on, labor-intensive services. Less demand in the occupational sectors that use more skilled labor (professional, technical, and related workers; administrative and managerial workers; and clerical and related workers) consequently depressed wages.

Rising non-farm self-employment income from 2010–13 has been the driving force behind the recent reduction in rural poverty. However, the levels of participation in non-farm employment have not yet recovered to 2010 levels and are comparable only to those observed in 2004.

Facilitating the emergence of more non-farm wage opportunities could be an important avenue to reduce poverty. In rural areas, wage employment in the farm sector has been relatively high but this sector is absorbing large numbers of people in an activity that generates low returns. From a policy standpoint, it will be important to reduce labor intensity in wage agriculture and elevate the suitability of the labor force to more specialized non-farm work through job skills training. If job-training efforts are complemented by increased non-farm wage opportunities, they can increase the number of households who earn higher non-farm wages and accelerate poverty reduction in rural areas. Avoiding future policy-induced shocks, such as the kwacha depreciation, can also help to improve both the quantity and quality of non-farm wage employment opportunities in urban areas.

Possessing wealth and income for investment capital increases the opportunities to venture into non-farm self-employment activities, so as connecting people better to markets that demand the services offered by their activities. Training and technical skills also can improve the chances of higher returns. Unlocking these components can increase the supply of self-employment activities. Non-farm self-employment activities rely heavily on increased local demand. Given the limited access to insurance services for agricultural-related shocks in Malawi, the presence of rainfall shocks affecting everyone can reduce the returns obtained from these activities. During the period covered by this chapter, no major rains or drought occurred that could have affected profits. Well-functioning safety nets also could protect the welfare of those affected by disasters and help them to avoid joining the ranks of the self-employed out of necessity. For persons already self-employed, effective safety nets could improve the prospects of staying in business.

8

SOCIAL PROTECTION AND POVERTY IN MALAWI

Poverty in Malawi is widespread and manifests differently over time. Some poverty is chronic and stems from the structural characteristics of households. Equally important, uninsured risks due to weather shocks and to the seasonality of agricultural production and income are pervasive and can force households into poverty in a context in which risk mitigation mechanisms (either ex-ante or ex-post) are extremely limited. Thus, social protection interventions that help to increase income levels and protect households from seasonal fluctuations and shocks are much in need in Malawi.

Public spending on social protection in Malawi is low by international standards. Therefore, despite recent expansions, coverage of the main programs remains limited. In 2010, except for the School Feeding Program, all programs covered less than 10% of the population. By 2013, in response to the economic situation, the Malawi Social Action Fund–Public Works program (MASAF-PWP) was scaled up, increasing coverage of the population, so as the participation in nutrition programs.

In addition, many poor families fail to be reached by Malawi's social programs. According to anecdotal evidence some redistribution toward the poorest may happen within communities, but household survey data suggest that the in 2013, six of every ten beneficiaries of MASAF-PWP and/or of direct cash transfers from government at the time were not poor.

A large-scale randomized controlled trial (RCT) was implemented during the 2012–13 agricultural season to assess the effectiveness of one of the main large scale social protection program in Malawi, the MASAF-PWP (Malawi Social Action Fund Public Works Program), and some of its variants, in protecting food security. The results showed that the program did not increase the chances of exiting poverty for its beneficiaries nor improve their food security. In addition to poor targeting and significant rationing, the relatively small size (compared to similar programs) of the transfers associated with infrequent projects may have contributed to the lack of impact. The SCT program aims to tackle extreme poverty by providing cash to

labor-constrained households. Impact assessments of the pilot SCT program and, more recently, of a larger version, show its effectiveness in increasing both consumption and productive asset investment. The program is growing and will soon cover all districts, but still reaches a relatively small share of the extreme poor population in the country.

Given the incidence and frequency of weather and production shocks, as well as Malawi's pronounced seasonality of income and consumption, mechanisms that enable households to address uninsured risk and reduce their vulnerability to poverty are urgently needed. Design features that enable social programs to be rolled out rapidly to the geographic areas in the greatest need and to the neediest households in response to shocks are important priorities for the future.

Introduction

The previous two chapters explore how to raise the labor incomes of the poor through improved productivity in agriculture, the sector in which most poor people in Malawi are engaged (chapter 6), as well as through facilitating movement into new, more productive activities outside agriculture (chapter 7).

Nevertheless, many poor households need basic support for starting to grow their incomes and thereby elevate themselves out of poverty. Nutritional interventions and cash transfers can help the poor to meet their most basic needs and improve the income opportunities of future generations through investments in health and education. To sustain income over their lifecycles, the poor and vulnerable also need to be protected from uninsured risk arising from recurrent shocks, such as natural disasters. Public and private transfers targeted at the poorest and most vulnerable can help them manage risks and avoid costly responses in hard times. **Chapter 8 assesses whether the current social protection system in Malawi has lived up to these tasks of promoting the income of the poor and improving their food security as well as protecting them from falling into, or reverting to, poverty when faced with shocks**.

The chapter reviews the current system of social protection in Malawi, and explores ways to strengthen and expand it. The first section reviews reasons that make it compelling to have a strong safety net in place. The next section reviews the coverage and performance at reaching the poor of the social protection programs operating in Malawi. The third section assesses whether and how the main programs have managed to protect welfare. The final section concludes with the main shortcomings that need to be addressed in the current social protection system and provides recommendations for its reform.

The work primarily draws on two data sources. The primary data for the analysis relies on the panel component of the nationally representative Third Integrated Household Survey (IHS3), which collected data from 2,274 households between March and November 2010 and could be tracked later in the Integrated Household Panel Survey (IHPS), conducted in 2013. To ensure comparability, the team restricted the analysis to the group of original households included in the baseline survey, excluding household splits. The second primary data source is a panel household survey called the Rural Livelihoods Survey (RLS) gathered in the context of the evaluation of the Malawi's Social Action Fund Public Works Program (MASAF-PWP). The RLS sampling frame was drawn from the full IHS3 collected between March 2010 and March 2011, which can be considered the baseline survey for the RLS. Four high-frequency rounds of subsequent data collection were administered between October 2012 and October 2013: (a) the first round collected during the pre-planting season between October and November of 2012, (b) the second round administered during the lean season in February 2013, and (c) the third round collected at the beginning of the harvest season between April and May 2013. The

final RLS round was administered in October 2013 in line with the administration of the IHPS.

8.1. *Why Does Having a Social Protection System in Malawi Matter?*

8.1.1. *Poverty is widespread and has many faces*

Poverty incidence and depth remain high in Malawi (chapters 1 and 2). According to the most recent official poverty survey in Malawi—the Third Integrated Household Survey (IHS3)—in 2010, over 50% of the population was poor and a separate 25% was estimated to live in ultra-poverty (that is, below the food poverty line). Even during the non-lean months in 2013, the IHPS encountered a poverty incidence of close to 40%. Poverty is especially widespread among rural households, who accounted for approximately 90% of the total population in poverty during the non-lean months in the country in 2013.

Different kinds of poverty exist within Malawi. For some households, poverty is persistent whereas, for others, it is transitory (chapter 2). A minor proportion of the population (4%) is chronically food-poor, across and within years. A larger share of households transition in and out of food poverty. Of these, one-fifth (19%) did so between 2010 and 2013, but over half (55%) did so within the span of the year from 2012–13. If the metric is moderate poverty —rather than food poverty—approximately one-quarter of the population (23%) remained poor between 2010 and 2013, while one-third moved in and out of poverty.

Regardless of the exact size of each poverty group within the population, which clearly depends on the metric (food or total consumption) and the periodicity with which welfare gets assessed (annually or quarterly), keeping the distinction between poor and non-poor, as well as between transient and chronic poverty, remains critical from a policy perspective.

Intuitively, it could be expected that some factors that keep households in poverty are unrelated to the factors that drive them into that state permanently. Previous chapters show that chronically poor households share structural characteristics that translate into low and slow-changing consumption patterns. These characteristics include poor access to socioeconomic infrastructure (chapter 2), low agricultural productivity (chapter 6), and undiversified labor markets (chapter 7). In contrast, transient poverty is likely to stem from seasonal traits or the inability of households to smooth consumption in the face of shocks. Uninsured shocks can also exacerbate the persistence of poverty, but the chronically poor still would remain so even in the absence of shocks. The next section examines the prevalence of seasonality and shocks in Malawi.

8.1.2. *Uninsured risk as a driver of poverty*

Risk is pervasive in Malawi. According to the most recent household surveys available, Malawi has experienced multiple and recurrent shocks. For example, almost one-third of the population self-reported that they suffered with a drought between 2012 and 2013. That same period, many became highly exposed to local food price fluctuations, which, according to self-reports in the IHPS, affected more than 80% of the population (table 8.1). Households can also be affected by multiple shocks at once. From October 2012 and October 2013, according to the RLS) households in Malawi reported between 1.4 and 1.9 shocks per season. More recently, the 2014–15 agricultural season was extremely poor in Malawi due to the late onset of rains, followed by the highest floods on record in early 2015—predominantly in the Southern Region—and then long dry spells. All of these factors led to poor crop harvests in 2015, which are reflected by the acute food insecurity of the 2016 lean season. Yet again, the 2015–16 agricultural season was also extremely poor, largely due to the El Niño-induced drought across the Southern Africa region.

When shocks hit households in contexts characterized by widespread poverty and limited access to credit and insurance, not surprisingly, most household responses were based on self-help and informal mechanisms. According to self-reported data from the IHPS, approximately one-third of the households who

TABLE 8.1: Selected Shocks Experienced in 2012–2013 by Poverty Status in 2010 *(% Population)*

	Non-Poor	Poor	Total
Unusually high prices for food	81	86	83
Unusually high costs of agricultural inputs	73	79	76
Irregular rains	47	50	48
Unusually low prices for agricultural output	36	36	36
Drought	27	35	30
Serious illness or accident of household member(s)	17	17	17
Floods	11	16	13

Source: Poverty Assessment team calculations based on the IHS3 panel and IHPS data.

reported being affected by shocks in 2012–13 relied on their own savings to cope. Help from relatives and friends and changes in dietary pattern were households' other two main coping strategies.

High exposure to shocks coupled with lower capacity to cope with them negatively impacted income, food production, and asset levels. For instance, almost all of the households who self-reported being affected by floods in 2012–13 reported experiencing a fall in food production and food stocks. Four in every five affected households also reported drops in income as a result of the floods, and one in three of families reported a decrease in assets.

Reductions in income, food production, and assets as a result of shocks could lead to drops in consumption and increased poverty. Lower asset levels could reduce the income-generating potential of poor households, leading to lower welfare and more poverty in the future. Lower asset holdings also made households more vulnerable to future contingencies resulting from decreased means to buffer income fluctuations. Of course, households would work to smooth their consumption in the face of shocks that lead to fluctuations in their short-term income. Therefore, it is possible that transitory poverty reflected households' inability to cope with negative shocks, which in turn reflected their inability to smooth consumption. However, households who were chronically poor could also have low amounts of capital and could find it more difficult to respond to new shocks, further compromising their likelihood of staying in chronic poverty.

Do shocks in fact make households vulnerable to poverty? A recent study was conducted looking at rural households to measure their vulnerability to consumption shortfalls. The study analyzes its sources using the nationally representative panel based on the 2010 IHS3 and 2013 IHPS (McCarthy, Brubaker, and de la Fuente 2016). The exercise included exploring the impacts of shocks on consumption per capita. Four shock variables were considered: rainfall shocks experienced in 2013; maize price shocks experienced by consumers in 2012; incidence of malaria in the household; and loss of wage-earning household members between 2010 and 2013.[52]

Results show that, in 2010, 40% of all households had a chance of falling below the poverty line. In other words, in the future, many households in rural Malawi will be vulnerable to poverty. However, as with many other studies of rural areas in other countries, much of vulnerability is due to chronic

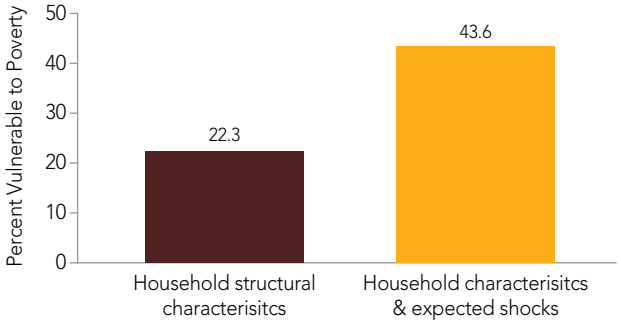
[52] Four types of shocks were constructed to estimate the impact of shocks on consumption, income, and production. Rainfall shocks were constructed using the absolute value of the standardized difference between flowering season rainfall during December 2012–January 2013 and the long-term mean during the flowering season. Price shock is the percentage difference between the mean real maize price observed in from January–March 2012 and the mean of the real maize prices observed in January/March from 2005 to 2010, and 2011 to 2013 (2011 was excluded due to the inability to reliably correct for inflation) in the market nearest to that household. Price shocks from 2012 were used since the team expected them to affect outcomes in 2013 through changes in producer behavior and/or changes in household wealth levels. However, the 2012 prices could not have been affected by production in 2013. Prices from January to March were used since this was the lean season prior to harvest in which the largest portion of households would be forced to buy maize at relatively high prices. The team proxied for illness shocks in the household by including a dummy for whether any household member had malaria in the two weeks prior to the 2013 survey interview. A household demographic shift was considered when the household had had access to income from wage employment, ganyu labor, or self-employment off the farm in 2010, and had lost access to that income in 2013.

poverty. Nonetheless, risks—particularly rainfall and loss of off-farm employment—are also important in explaining why poor households remain poor, and why some households are more likely to fall into poverty in the next period. Figure 8.1 shows the change in the percentage of households who in 2010 were vulnerable to become consumption poor in 2013 when considering only structural household characteristics versus including the probability of experiencing the historical average shocks. Twenty-two percent of households in Malawi were expected to be vulnerable to consumption poverty when only structural household characteristics, such as low wealth and education levels, small land holdings, and large family sizes, were considered. When accounting for the effect of expected shocks, 44% of households were expected to be vulnerable to consumption poverty.

The vulnerability analysis also found that both **household wealth and agricultural assets could protect households from falling into poverty and reduce the severity of the fall when shocks occur**. However, little evidence exists to suggest that other strategies to reduce vulnerability are effective. Figure 8.2 summarizes the percentage shortfall experienced by households whose consumption would fall below the poverty line under expected shocks. The analysis divided households into quartiles based on household wealth levels, and excluded any households that would not fall under the poverty line. Households with lower wealth levels experienced more severe average shortfalls in consumption than those with higher wealth, who presented higher and more stable consumption and income.

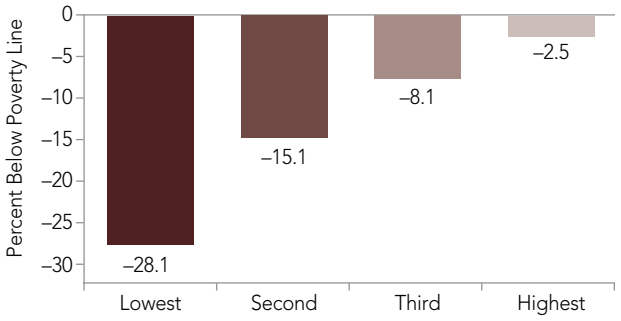
A regression analysis of the RLS data with self-reported shocks also confirmed that shocks do increase the likelihood of staying food poor. An inspection of the RLS panel suggests that weather shocks and high food prices experienced between 2012 and 2013 could increase the chances of staying in poverty, although not of entering poverty. A household that reported a weather shock is significantly more likely to remain poor in any given season in 2013, especially in the harvest and pre-planting seasons, whereas food price shocks increase the probability of stay poor the most during the harvest season (figure 8.3).[53] This evidence is only suggestive, so does not enable spelling out the pathways behind this association. Chapter 4 also shows that increasing food prices profoundly impacts households' perceptions of stability and, ultimately, food security.

FIGURE 8.1: Vulnerability to Poverty, 2010–2013 *(%)*



Source: Poverty Assessment team calculations based on the IHS3 panel and IHPS.

FIGURE 8.2: Shortfall for Households Below the Poverty Line by Wealth Quartile, 2010–2013 *(%)*



Source: Poverty Assessment team calculations based on the IHS3 panel and the IHPS.
Note: Each subfigure presents the change in probability for households at the mean wealth level of each wealth quintile.

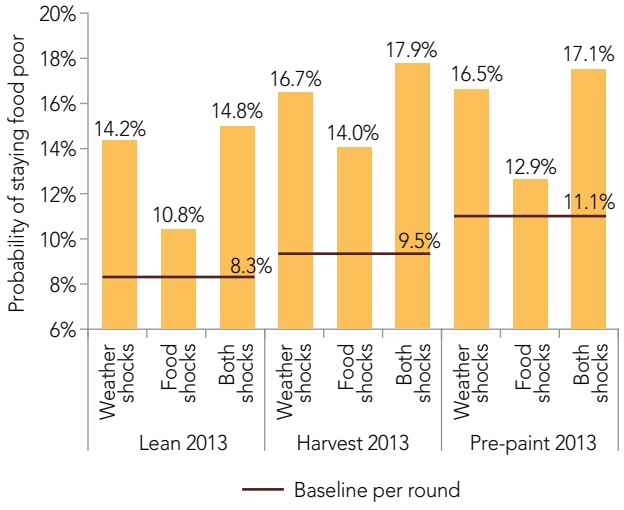
[53] Appendix A8.1 probit shows that the increase in the probability of staying poor due to food price shocks is statistically significant for only the pre-harvest season, not for the lean and pre-planting seasons.

In sum, risk is pervasive in Malawi, and wealth can protect households from falling into poverty and reduce the severity of the fall when shocks occur. However, in country contexts such as Malawi, whose risk mitigation mechanisms are limited, shocks can force or keep households in poverty. The empirical analysis based on the latest available data showed that a sizable number of rural households in 2010 were vulnerable to becoming poor in 2013 due to the potential realization of risks (the occurrence of shocks) between 2012 and 2013. This increase in vulnerability was greater for more disadvantaged households. For these reasons, having well-thought-out safety nets in place that could accommodate the temporary poor as well as those already poor pushed further down by shocks could be advisable.

8.1.3. *Seasonality in consumption in Malawi*

Chapter 4 on food security and nutrition notes that, in rural Malawi, **the average daily per capita caloric intake during the lean season is significantly lower than during the harvest season**. A similar differential does not hold true in urban areas. When looking at household surveys that are administered all year round in 2004–05 and 2010–11, there is a clear seasonal pattern in consumption, with peaks from April-August, which coincided with the harvest season, and drops during the lean season from November-February. Chapter 4 also observes that, in 2010, rural individuals consumed fewer than 2,100 calories/day from October-March, which coincided with the country's lean season.

FIGURE 8.3: Change in the Probability of Staying in Ultra-Poverty Due to Weather and Food Shocks, 2013 *(%)*



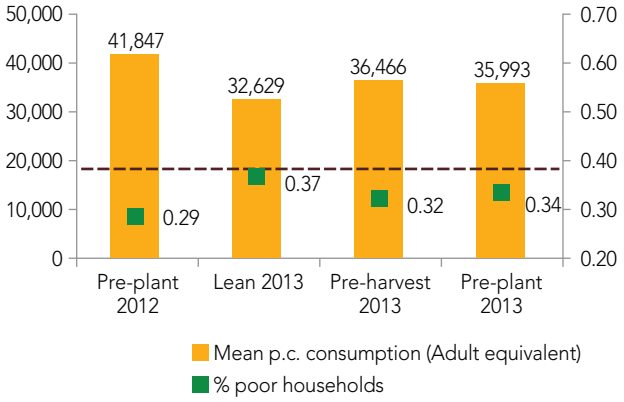
Source: Malawi Poverty Assessment team calculations based on RLS panel.

Such seasonal variation in consumption is not uncommon in countries, such as Malawi, whose food security is highly linked to agriculture. A seasonal dimension in food security can also often be observed in countries that have a dominant subsistence crop, such as maize in Malawi. This type of seasonal variation is characterized by limited access to food during the "hungry months", when the prices peak, immediately prior to the new harvest, when the prices slump. In this instance, seasonality in food consumption, as well as nutritional status and health, goes hand in hand with seasonality in food prices and results in significant intra-annual fluctuations in welfare.

Between October 2012 and October 2013, the RLS panel collected data on food consumption at different points of the year: pre-planting, lean, and pre-harvest. These data enabled exploration of the short-term, intra-season change in consumption and poverty status. In the period under study, consumption followed an irregular pattern and was at its lowest around the lean season (figure 8.4). The high level of intra-annual fluctuations in food and non-food consumption tracks the high seasonality in food prices. For instance, maize prices are on average 50.6 percent higher during the peak (hunger) season than during the trough (postharvest). (Gilbert, Christiaensen, and Kaminski 2016). The irregularity underscores the challenge that households face in smoothing their food and non-food consumption throughout the year.

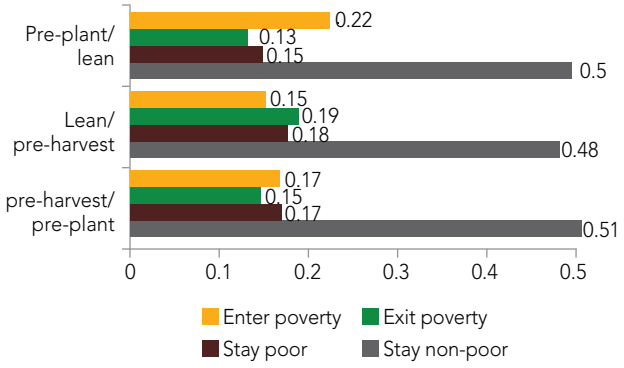
The inability to smooth consumption can send households into poverty. Figure 8.5 describes the short-term, intra-season change in poverty status, indicating which percentage of households remained food poor or non-food poor, or exited or entered food

FIGURE 8.4: Yearly Real Household Food Consumption Per Capita *(Q2 2010 MWK)*



Source: Malawi Poverty Assessment team calculations based on RLS panel.
Note: Red dashed line = food poverty line, of 22,956 2010 MWK yearly food consumption per capita.

FIGURE 8.5: Short-Term Seasonal Change in Poverty Status, October 2012–October 2013



Source: Malawi Poverty Assessment team calculations based on RLS panel.

poverty, when compared to the previous season/survey round. While, on average, approximately 15% of households enter food poverty in any quarter of the year, households experience **the highest probability of entering food poverty during the lean season** (approximately 22%). The number of households exiting food poverty fluctuated more than those entering poverty, ranging from 13% to 19%. The **harvesting season seemed to offer the highest chances for families to leave food poverty** because people already may have started reaping harvest benefits by then.

In sum, poverty in Malawi is widespread and has different manifestations over time. Some of this poverty stems from the structural characteristics of households. However, risk and seasonal patterns are very pervasive and can force households into poverty because risk mitigation mechanisms are limited. Different interventions may be warranted depending on the objective. If the aim is to address the persistence of poverty, policies may need to focus on interventions that determine the structural capacity of households to earn a living. Social protection programs can contribute to this goal by building human (health, education, and nutrition interventions) and physical capital (community infrastructure). Some intrinsically destitute persons will require support that provides a secure safety net. Finally, some of the moderately poor, and even the non-poor, who face large fluctuations in incomes due to reliance on risk-prone activities, such as rain-fed agriculture, may need occasional safety nets to keep poverty at bay.

Given the recurrent onset of shocks in the country (food price spikes, late onset of rains, excess/deficit rainfall) and the fact that Malawi suffers from one of the greatest seasonal maize price variabilities (including highest maize prices during the lean season) in Sub-Saharan Africa, public insurance-type programs likely are needed in Malawi. Food aid or cash transfers can stabilize consumption. At a minimum, they can make poverty more bearable by transferring incomes to the poorest, partly because an effective social protection floor enables the poor to better manage health or weather shocks. At best, these transfers can provide an element of insurance that enables households to make choices about livelihoods that yield higher earnings.

However, if food aid and cash transfers mobilized in the aftermath of a disaster are promoted as a panacea to the neglect of policies that strengthen production and build markets and infrastructure, the underlying precarious conditions could remain. It is just as necessary to invest in measures that help raise agricultural productivity and accumulate assets

as it is to mobilize relief once disasters unfold. The next section reviews Malawi's current safety net system. The section presents the key characteristics of the main programs in the country and reviews their performance.

8.2. Review of the Current Social Protection System in Malawi

8.2.1. Overview of current programs

The current social protection framework laid out in the National Social Support Policy (NSSP) identifies three groups as potential beneficiaries of social protection programs: (1) extreme- or ultra-poor, who include orphan-headed households and the elderly who are destitute and will need support no matter what; (2) able-bodied extreme poor households with low productivity or with very few assets and small landholdings, who, with supplemental income and complementary capital or agricultural inputs, could be assisted to improve their productivity; and (3) the moderately poor, whose consumption from subsistence agriculture keeps them in a reasonable position but will require an occasional safety net.

As part of its National Social Protection Strategy, the Government has identified five types of interventions to support these groups: (1) cash transfers to the ultra-poor through labor on public works (PW), which provide short term income support while maintaining or building community assets; (2) unconditional social cash transfers (SCTP) for those who are most vulnerable and labor constrained, including the elderly, disabled, and sick; (3) school meals; (4) microcredit; and (5) village savings from public works earnings and loan schemes coupled with livelihood and skill development interventions (COMSIP, or Community Savings and Investment Promotion) to enable poor households to "graduate" from public works. Table 8.2 provides an overview of the current main SP programs.

The main social programs in Malawi rely on a vast range of mechanisms to reach their intended beneficiaries (Table 8.2). The first level of targeting of social programs is "geographic," whereby regions/districts

TABLE 8.2: Brief Description of Major Social Protection Interventions and the Farm Input Subsidy Program (FISP) in Malawi

Programs	Geographic distribution	Beneficiaries	Target group	Targeting mechanism	Benefits
Malawi Social Action Fund-Public Works Program (MASAF-PWP)	All 28 districts	450,131 households (as of Nov-Dec 2015)	Poor and credit-constrained households with able- bodied members	Pro-poor geographic targeting, followed by a combination of community-based targeting (eligible households), and self-selection (participating households) via a low wage rate.	Daily wages MK600 for 48 days/year in 2 cycles (planting season Oct-Dec and post-harvest season Jun-Jul). The cycles are further divided into consecutive 12-day waves. Payments are made within 1–2 weeks after the end of each wave.
Social Cash Transfer Program (SCT)	18 districts	170,114 households or 754,694 people (as of March 2016)	Ultra-poor and labor-constrained households (no able-bodied adult aged 19–64, or more than 3 dependents per working-aged adult)	Community-based targeting	12 monthly cash transfers, annually: 1 member = MK1,700 2 members=MK2,200 3 members=MK2,900 4+members=MK3,700 + MK500 per primary school age child + MK1000 per secondary school age child
School Feeding Program	13 districts	635,000 students (as of 2010)	Primary- school-going children	Geographic targeting (food insecurity, enrollment, attendance, and drop-out rates)	School meals and monthly take-home rations of 12.5kg of maize

Source: Beegle and others (2015); World Bank 2011; UNICEF-UNC The Transfer Project website, https://transfer.cpc.unc.edu/); Davis and Handa 2015.

and villages are selected for each intervention. The public works program and the school feeding programs rely on geographic targeting of the areas most in need based on the annual Malawi vulnerability assessment, carried out by the Malawi Vulnerability Assessment Committee (MVAC). Within villages, some programs rely on easily observable characteristics that are assumed to be more common among the poor (children, women, elders, disabled, and landless); this technique is called "categorical" targeting. Other programs try to identify their core beneficiaries through identifying correlates of long-term poverty, a technique called "proxy means testing." However, sometimes it is difficult to find a set of proxies for income that distinguish the non-poor from the poor (least the poor from the ultra-poor). Within villages, in some instances, a combination of community wealth-ranking exercises and self-targeting is employed to provide assistance, which could include public works programs targeted to low wage earners and commodity subsidies for grains consumed by the poor.

The next section will assess how well each of these options has worked to reach the poor in the programs in which these options have been implemented. The section will review the current cost of social programs in the country as well as their coverage and relative effectiveness in reaching key groups of the population.

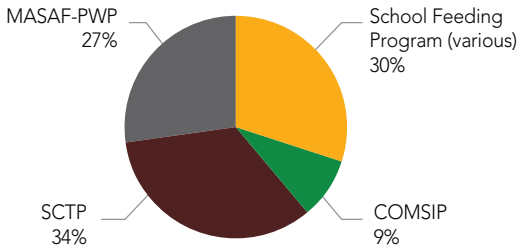
8.2.2. *Costs, coverage, and targeting performance*

Social protection budget

Excluding the Farm Input Subsidy Program (FISP), Malawi's public spending on social protection is low by international standards. In dollar terms, the country's annual budget for social protection (SP) programs in 2014–15 was US$53.2 million.[54] This amount was only 2.9% of total government expenditure and approximately 0.8% of GDP. Based on international standards, Malawi's social protection budget is less than two-thirds of the Africa region budget.[55]

Figure 8.6 illustrates the relative sizes of major SP programs as a share of the social protection budget **As of 2014–15, the two largest SP programs in the budget were the Social Cash Transfer Program (SCTP) and MASAF-PWP.** The Community Savings and Investment Promotion groups (COMSIP) evolved from MASAF in 2014. Together, SCTP and MASAF-PWP accounted for more than 60% of the SP budget. However, they were relatively small in size, at 0.3 and 0.2 percent of GDP, respectively.[56]

FIGURE 8.6: Malawi's Two Largest SP Programs in Budget Terms are SCTP and MASAF-PWP (%)



Source: Local Development Fund 2015 (e-mail communication).

School Feeding Program is another important part of the SP budget. Although several programs on school feeding operate across Malawi, the biggest ones are funded by the World Food Programme and by Mary's Meals.

Coverage and targeting

This section analyzes the incidence of social programs in Malawi. Programs are clustered in three broad categories: **Work programs**, including the Food/Cash-for-Work Program and the Inputs-For-Work Program; **Nutrition programs**, such as the School Feeding Program, the Free Distribution of Likuni Phala to Children and Mothers, and the Supplementary Feeding for Malnourished Children at a Nutritional Rehabilitation Unit; and **Other**

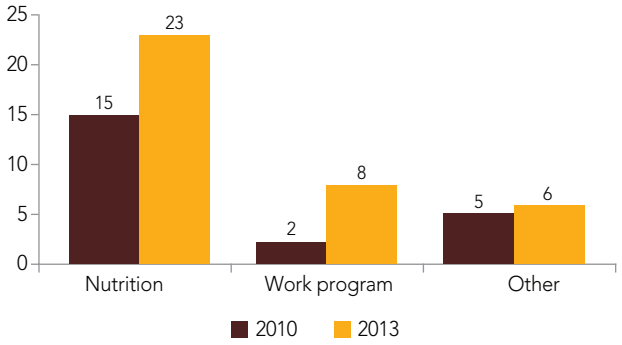
[54] Excluding pension budget.
[55] The average SSN spending as percentage of GDP for Sub Saharan Africa from 2010–2016 is 1.35 based on ASPIRE.
[56] A recent report from the International Labour Organization also confirmed that the SCTP and MASAF-PWP are the two biggest social protection programs, although their calculation of the sizes of these two programs as a share of GDP is slightly different from ours (Juergens and Pellerano 2016).

transfers, free maize, free food (other than maize), scholarships/bursaries for secondary and tertiary education, tertiary loan schemes, direct cash transfers from government, and other cash transfers.

Most social protection programs have recently expanded, but their coverage remains very limited. According to the RLS panel data, in 2010 no single program reached more than 15% of the population. In fact, except for the nutrition programs (mainly on School Feeding), each of all of the other programs covered less than 6% of the population. In 2013 all main programs were scaled up in response to the economic downturn. Public work program coverage increased from 2% to 8%, driven mainly by the expansion of MASAF. The participation in nutrition programs also grew, mainly driven by the School Feeding Program: its coverage of the population rose from 15% to 23% (figure 8.7).

In addition to limited coverage, social programs in Malawi experience high leakage rates. Table 8.3 shows that the School Feeding Program and MASAF-PWP have the largest population coverage. However, these programs—as with all of the rest—benefit a larger share of the ***non-poor***. Most of the extreme poor population is excluded. Given the high rates of exclusion errors, the fact that the majority of the poor do not benefit from social safety nets is not surprising. However, the inclusion errors certainly point to the need to strengthen the targeting performance of programs that have such limited budget envelopes. Somewhat similar trends are observed for social programs when using

FIGURE 8.7: Social Program Coverage, 2010 and 2013 *(%)*



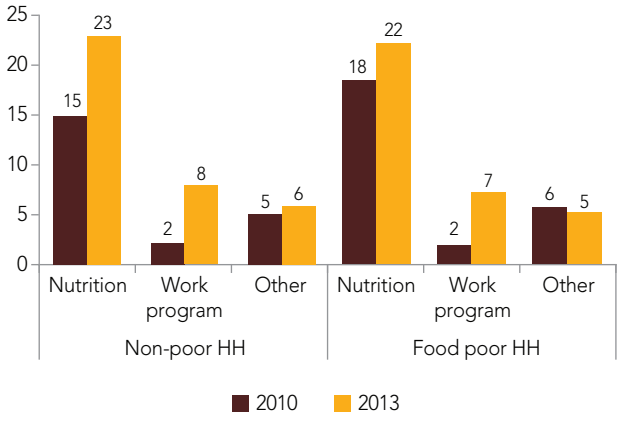
Source: Malawi Poverty Assessment team calculations based on RLS panel.

TABLE 8.3: Coverage, Exclusion, and Inclusion Rates of Selected Social Programs, 2013 *(%)*

		Extreme poor	
	Coverage	Exclusion of extreme poor	Inclusion of nonextreme poor
School feeding program	23	78	67
MASAF – PWP	8	94	76
Free maize	4	97	76
Free food (other than maize)	3	98	77
Other (specify)	1	99	74
Food/cash-for-work program	7	94	70
Inputs-for-work program	1	99	68
Other direct cash transfers (specify)	0	100	71
Scholarships/bursaries for secondary education	0	99	57
Free distribution of likuni phala to children and mothers	0	100	69
Direct cash transfers from government	0	100	75
Scholarships for tertiary education	0	99	0

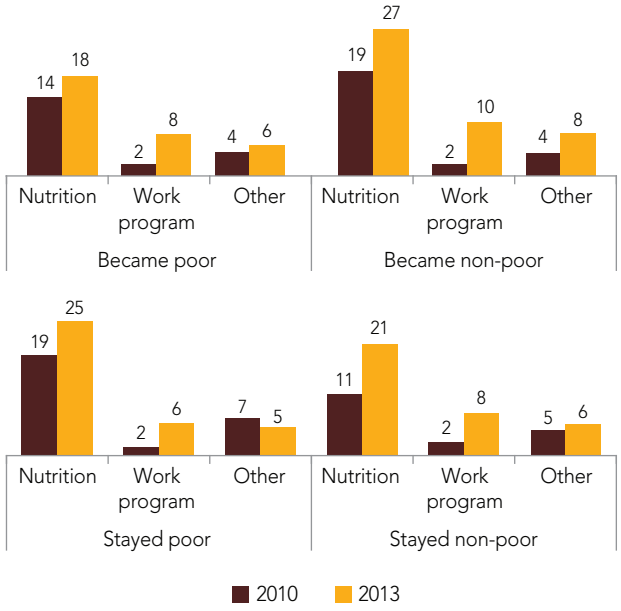
Source: Malawi Poverty Assessment team calculations based on RLS panel.
Note: Coverage = percentage of population who received the transfer. Exclusion = percentage of poor individuals who did not receive transfers as a share of the entire poor population. Inclusion = percentage of individuals who received transfers and were not poor, as a share of the population who received transfers.
a. Likuni phala = porridge made of maize.

FIGURE 8.8: Coverage of Social Programs in 2010 and 2013, by Poverty Status (%)



Source: Malawi Poverty Assessment team calculations based on RLS panel.

FIGURE 8.9: Access to Groups of Social Programs by Transition of Extreme Poverty, 2010–2013



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.

the IHPS survey and looking at both the extreme and moderate poor (Appendix A8.2).

In other words, at first glance, social programs in Malawi do not appear to be largely targeted to the poor, but provide similar coverage to the poor and the non-poor. By 2013 work-related programs had a coverage rate of 7% and 8% among the poor and non-poor, respectively. Approximately 23% of households receive nutrition programs, and this rate is similar for both groups. Finally, other programs, such as free maize and cash transfers, appear to benefit the poor (5%) and non-poor (6%) in similar magnitudes. The next section presents a more detailed analysis of the targeting performance across programs.

Nevertheless, some groups within the poor have benefitted more than others from social programs. Figure 8.9 depicts the incidence of groups of social programs by four categories defined according to their extreme poverty status between 2010 and 2013. Those categories are the never poor, the chronically poor, and those who either entered or left poverty relative to their status in 2010. National coverage rates mask important trends within poverty dynamic groups, and certain interesting trends stand out. The distribution of free maize increased from 3% to 6% among those who were poor in 2010 and who became non-poor in 2013 (and from 1% to 5% for other foods). Although the association cannot be taken as supporting evidence on the causal impact of such support, such expansion may have contributed to reduce poverty. Since 2010, public work programs also have increased substantially but have achieved similar coverage across all four categories.

The next sections assesses the effectiveness of two major SP programs currently in operation: PWP and SCTP. Also worth noting is the low reach of most interventions, especially nutrition programs, toward the chronically poor relative to other groups, such as the non-poor and the transient poor. The only exceptions are the free maize distribution program and direct cash transfers (contained in other programs), which display a higher coverage of the chronic group. Direct cash transfers from Government reached mainly the extreme chronically poor (4%) and, to a lesser extent, those who left chronic poverty (1%) (Appendix A8.3).

How much of the targeting performance is due to geographic targeting as opposed to targeting

TABLE 8.4: Targeting Performance of Selected Social Programs, Rural Areas

		Coverage of poor (%)	Coverage of non-poor (%)	Targeting differential	Within-village	Between-village
a. 2010 (IHS3)						
Public work programs	*All villages*	2.3	2.9	–0.6**	–0.2	–0.4
	Participating villages	9.9	10.7	–0.8	–0.7	–0.1
Nutrition programs	*All villages*	14.6	9.5	5.2***	3.1	2.1
	Participating villages	34.8	23.6	11.2***	7.5	3.7
Other transfers	*All villages*	4.5	3.2	1.3***	0.2	1.1
	Participating villages	12.7	10.9	1.8	0.6	1.2
Agriculture coupons	*All villages*	52.3	51.5	0.9	2.8	–1.9
	Participating villages	55.9	53.1	2.8**	2.9	–0.1
b. 2013 (IHPS)						
Public work programs	*All villages*	1.7	1.8	–0.1	–0.3	0.2
	Participating villages	10.3	10.9	–0.5	–1.9	1.4
Nutrition programs	*All villages*	14.9	11.8	3.1**	3.9	–0.8
	Participating villages	27.7	19.8	7.8***	7.0	0.8
Other transfers	*All villages*	12.2	13.8	–1.7	–0.6	–1.0
	Participating villages	18.2	21.1	–2.8	–0.9	–1.9
Agriculture coupons	*All villages*	40.9	42.9	–2.0	–2.2	0.2
	Participating villages	41.6	43.7	–2.1	–2.3	0.2

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: *=Denotes significance at 10% level; **at 5% level; *** at 1% level.

within villages? The next section analyzes the decentralized beneficiary targeting performance of Malawi's social programs in 2010 and 2013 (as per IHS3 and IHPS) in more detail. We will follow the same categorization of social programs proposed earlier in the section, and will also add to the analysis the expenditure on agriculture coupons.[57]

Following Galasso and Ravallion (2005), the national targeting performance for each group of programs (TD, or "targeting differential") is estimated as the difference between the share of the poor receiving such benefits (coverage, G^P) and the share of the non-poor who also receive them (leakage, G^N). This coefficient can range from –1 to 1, with TD =1 representing perfect targeting to the poor and no transfer leaked to the non-poor, and the opposite, TD= –1, implying total leakage to the non-poor. A uniform, untargeted, program allocation yields TD=0. For ease of exposition, the targeting performance will be presented in percentages rather than shares so that the targeting differential potentially ranges from –100 to 100.

Importantly, the targeting differential can be exactly decomposed into an inter-areas/geographic component, which reflects the efforts to target poor areas, and a within-village component, which documents the ability to reach the poor within each village/community. Table 8.4 presents the TD, the coverage of the poor and leakage to the non-poor,

[57] **Work programs**, including the Food/Cash-for-Work Program and the Inputs-For-Work Program; **Nutrition programs**, including the School Feeding Program, Free Distribution of Likuni Phala to Children and Mothers, and Supplementary Feeding for Malnourished Children at a Nutritional Rehabilitation Unit; **Other transfers**, including free maize, free food (other than maize), scholarships/bursaries for secondary and tertiary education, tertiary loan schemes, direct cash transfers from government, and other cash transfers; **Agriculture coupons**, to acquire items including urea, maize seed, and 23:21:0+4S/Chitowe, as well as a flexi voucher.

and the decomposition of the targeting into within- vs across-village components for each of the major social programs in Malawi in 2010 and 2013.

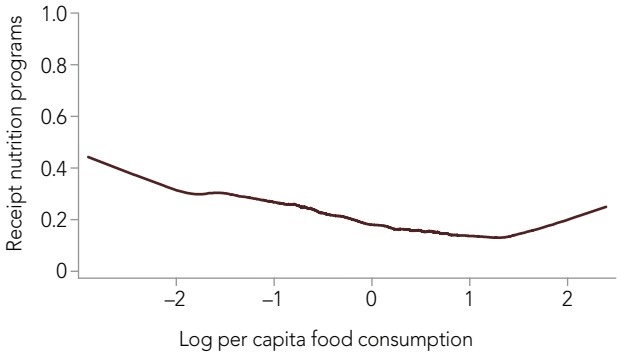
Table 8.4 confirms that, overall, despite the recent expansion documented in figure 8.8, social programs had low coverage in rural Malawi. Of all the programs, agricultural coupons had the highest coverage in 2010–11, reaching over 52% of the overall poor population and 51% of the non-poor. In 2013 coverage remained high, but dropped overall by approximately 10%. Coverage increased for nutrition programs, and decreased for public works programs and agricultural coupons.

Across all programs, the targeting differential was very low, mildly pro-poor only for nutrition programs, and not significantly different from zero. The programs were targeted uniformly among the poor and the non-poor across most programs in rural areas. When the team looked at the targeting performance within vs across villages, nutrition programs were pro-poor-targeted across both years, with the largest share of targeting coming from within-village selection of the beneficiaries. All other programs exhibited neither a within-village pro-poor selection, nor an effective village/area geographic targeting.

Self-selecting into the program within villages did not seem to work either. When households were randomly offered the opportunity to participate in the PWP without being screened through the village selection process, the average take-up rate was approximately 50% uniformly across the distribution of baseline food consumption (dotted line in figure 8.10). This uniformity indicates that the wage was high enough to attract richer households as well (The results are also reflected in a regression in appendix A8.4).

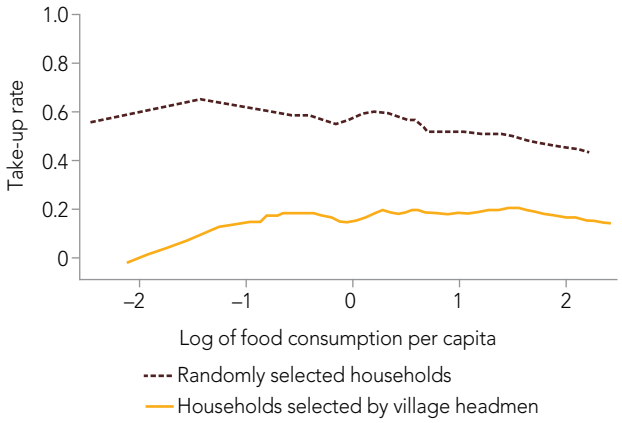
Finally, the assignment of the program was not flexible enough to enable households to participate as a response to shocks. PWP program beneficiaries were not more likely to take up the program when experiencing production or weather shocks (appendix A8.4). The take-up of PWP was overall unresponsive to the overall number of shocks, such as weather, production, food price, or household idiosyncratic, experienced by households during the pre-planting and during the lean season. The only exception was that households who were randomly offered the program were marginally more likely to respond to contemporaneous food price hikes during the lean season. Their response confirmed the extent of the unmet demand for insurance during the season with the highest needs. The inability to cope with shocks limited the potential of this program to serve its key consumption-smoothing function of a safety net. The lack of responsiveness was likely to have ensued from an inflexible assignment of

FIGURE 8.11: Nutrition Programs Were More Likely to Reach the Poor



Source: Beegle and others 2015.

FIGURE 8.10: MASAF's Targeting Scheme Failed to Be Pro-Poor



Source: Beegle and others 2015.

BOX 8.1: Were Vulnerable Groups More Prevalent among the Poor?

Given the extent of poverty incidence in Malawi, it may not be possible to attend to all the poor. Some programs relied on easily observable characteristics within the poor (children, women, elders, disabled). However, the limited pro-poor targeting of existing social programs in Malawi calls for a better understanding of the relative size of these categorical groups among the poor. According to the RLS panel, the most predominant vulnerability precondition was having a child under 5 years of age in the household (see Figure 8.12). Incidentally, having a child aged under-5 was the main characteristic that differentiated the poor from the non-poor.

There was little overlap between the groups identified as potential beneficiaries for social protection programs and the extreme poor population. Potential beneficiaries were not always more likely to be food-poor than not, with the exception of three particular groups. Evidence shows that, during October 2012–13, **households with female heads, with at least one child under 5 years old, and with at least one orphan were more likely to be poor.**

However, households with elderly and disabled people were not more likely to be poor, and neither were households with little land.[a]

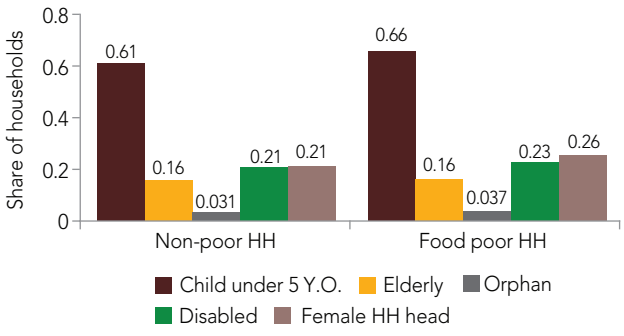
Furthermore, this mild overlap between poverty and vulnerability happened not only across but also within, a year. Appendix A8.5 shows that **the share and composition of vulnerable groups did not change by survey round (season)** and, consistent with the team's previous findings, the elderly and disabled were not represented more in the poor households than in the non-poor ones in any given season. Similarly, although households with little land comprised an important share of Malawi's households (approximately 35%), this condition was equally predominant among poor and non-poor households.

[a] Less than 0.5 hectares of cultivated land in October 2012 as measured by GPS.

programs to households at a given time of the year, with beneficiaries identified through a village selection process during the pre-planting season.

In summary, up to the time when this Poverty Asseesment was conducted, the main social protection programs in Malawi had limited coverage nationally and among the poor. Only some were moderately pro-poor. In a few cases, the key characteristics determining eligibility for social programs were not strict predictors of the probability of being chronically poor or transient poor. Thus, it was to be expected that social programs in Malawi did not have a big welfare impact on poverty. The next section grapples with this issue by exploring how effective the current mix of programs has been at reducing poverty, given the programs' current features and design.

FIGURE 8.12: Households with Vulnerable Members by Food Poverty Status, October 2012–October 2013



Source: TMalawi Poverty Assessment team calculations based on RLS panel.

8.2.3. *What is the promotive/protective role of the main social protection programs in Malawi?*

Social cash transfer program impact

The Social Cash Transfer (SCT) is an unconditional cash transfer program targeted to labor-constrained, ultra-poor households. SCT's objectives are to tackle extreme poverty and improve children's school enrollment and attendance. The schooling objective is promoted by providing a continuing additional transfer for each child in primary school and an even higher transfer amount for each child in secondary school.

When this report was concluded, the SCTP was covering eighteen of Malawi's twenty-eight districts, scaling up from the experience of a pilot in Mchinji

district in 2006 and expanded to six additional districts by 2012. Out of ten remaining districts that are currently not covered, one will be covered by Irish Aid and six by proposed World Bank's Additional Financing for MASAF IV, which would leave only three districts remaining uncovered. Early impact assessments of the STC demonstrated encouraging results of its effectiveness in increased food security, productive asset investment, curative care-seeking; and reduced vulnerability to shocks. Several analyses based on data from an impact evaluation survey (2007–08) of Mchinji district's pilot showed that households who participated in the SCT programs experienced: (a) higher food,[58] basic necessities, and healthcare consumption; (b) increased ownership and investment of productive assets and farming equipment, which led to greater agricultural production, consumption, and sales; and (c) reduced vulnerability to seasonal shocks (Miller 2011; Miller, Tsoka, and Reicher 2011).

Moreover, the pilot SCT program has improved children's health and education outcomes (Baird and others 2015). Children aged 0–5 who resided in beneficiary households experienced reduced stunting, especially in families who shifted toward home production of foods (Romeo and others 2013). Moreover, children aged 6–17 in beneficiary households had lower odds of child illness and substantially higher odds of utilizing health services for serious illnesses (Luseno and others 2014). School-aged children of participant households experienced higher educational enrollment and expenditures, fewer absences, and lower probabilities of working outside the home (Miller and Tsoka 2012).

The most recent expansion of the SCT (eight districts) started in 2014, and its effects in multiple domains, including food security, asset holdings, health and education, and psychological well-being, were studied in a three-year, mixed method experimental study design. This extensive impact evaluation covered more than 3,300 households in two districts, Salima and Mangochi, from 2013 to 2016 (Angeles 2016). **Positive results from past evaluations were confirmed**. The results showed that beneficiary households not only consumed significantly more food and other necessary items but also invested more in livestock and productive assets such as agricultural inputs. These households also were less likely to make purchases on credit and more likely to pay their debts. Children in SCTP benefited as well. They had higher school enrollment rates and more regular school attendance. They also were fed better and more frequently. The children were less likely to be sick and, when ill, more likely to seek treatment. The qualitative component of the impact evaluation found that beneficiary households were more optimistic about the future and less distressed overall (Angeles 2016). **However, unlike the pilot's evaluation, recent expansions showed no impacts on adult health, use of services, and delivery at health facilities. Furthermore, this evaluation showed negative impacts on child labor**, perhaps due to increased productive activities of households.

Malawi social action fund public works program

The Malawi Social Action Fund Public Works Program (MASAF-PWP) has been operational since the mid-1990s. The program provides cash to able-bodied poor households in exchange for labor from a menu of public works.

A large-scale program, it had been expanded to reach approximately 500,000 beneficiaries per cycle. Historically, participants were expected to perform 12 days of work during the planting months of the agricultural season, primarily on construction and maintenance of local infrastructure. The wage rate was set at MK200/day, which was higher than the Government's minimum wage of MK170/day for casual labor in rural areas. In the 2012–13 season, in response to an exchange rate devaluation, the wage rate was adjusted up to MK300/day (MASAF3). The program was expanded both in the duration of exposure and in the net income earned by participants (from 12 days to 48 days per beneficiary). The

[58] Which had a sizable impact on food security and diversity.

total transfer amounted to approximately US$22 at planting season and an additional $22 later during the year (harvest season). The wage rate in the current program (MASAF4) has been updated to MK600/day to reflect recent inflation, and the number of days each participant is available for public works have been mainly concentrated in the lean season (36 days).

In principle, the public works program could protect beneficiary households from shocks and promote food security through multiple channels. The cash received from the program could help stabilize consumption in the face of shocks and, therefore, avoid additional households falling into poverty. The infusion of income during the planting season, when the distribution of fertilizer subsidies occurs in the country, could help households purchase more fertilizer, and hence increase their productivity and improve food security. The public works created could bring indirect benefits to beneficiaries by creating or repairing community infrastructure.

When assessed in 2012–2013 as MASAF3, the program did not live up to its potential. It had no impact on food security or on the use of productive inputs. A large-scale randomized controlled trial (RCT) was built into the IHS3 sample to study key design features of the program implemented during the 2012–13 agricultural season, namely, the timing of the program and the schedule of program payments. Program availability was assigned randomly across communities and to households within these communities. The results of the large-scale evaluation showed that Malawi's PWP was not effective in achieving its aim of improving food security during the 2013 lean season. Even improving the structure of the program by rescheduling the second cycle from the harvest season to the lean season did not generate measurable improvements in the food security of treated households. In addition, the households who had been offered PWP were more likely to get fertilizer subsidy coupons and therefore spend slightly less on fertilizer. However, there was no effect on the amount of fertilizer used so the productivity effect that could raise incomes likely was not achieved via the program.

Why did the program not protect food security for its participants? The total transfer paid to PWP households during MASAF3 was not negligible. It was approximately US$44 in a country with a per capita GNI of approximately $320. Yet, households may have spread consumption across the 4- to 8-month (depending on the treatment group) period. The size of benefits does seem small relative to other cash transfer programs that were found to positively affect beneficiary households. As a comparison, SCT transfers totaled $168 per household per year in the Michinji pilot (equivalent to approximately $250 in 2010 prices), an amount more than five times what households received from PWP 2012–13. The size of the benefits was also small compared to other public works program in the region, due mainly to a lower number of potential days of work. Ethiopia's PWP covers approximately 120 days at a lower wage, adding up to approximately $60 during the lean season. Public work programs in Sierra Leone and Ghana are offered for the comparable number of days (50 and 57, respectively), but at a much higher wage rate ($1.70 and $3.30, respectively), for a larger total overall potential transfer ($85 and $190, respectively). A program that provides greater income might be necessary to achieve a noticeable impact.

The new design of MASAF4 has refocused a larger share of implementation on the lean season, when food insecurity is the highest, and allows a higher non-wage component of the cost while reorienting the planning of the program to watershed management. Not much is known about the benefits of the value of the assets created though the public works. This represents an important knowledge gap to be able to compare the cost-effectiveness of public works programs against other social protection tools. The MASAF4 is also trying to maintain the beneficiary roll to be the same households in each work cycle. Efforts to improve the program targeting based on proxy means testing

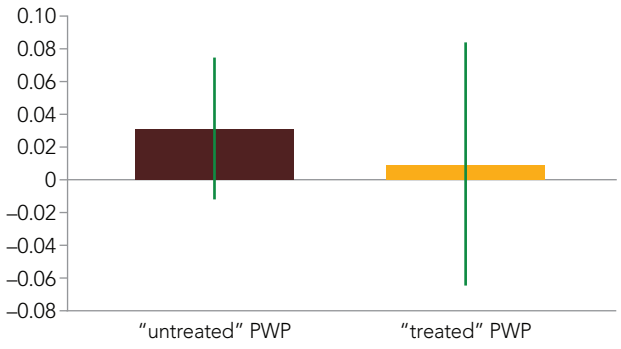
BOX 8.2: Did the Malawi Social Action Fund Public Works Program Help its Beneficiaries Exit Poverty?

The measures of poverty incidence use the household food consumption in the last week, including home consumption, adjusted for adult equivalent scales and deflated by a price index for a standard food basket, relative to the food poverty line in the IHS3 in 2010–11. According to the RLS panel sample, between 2010 and 2013, approximately 16% of the population escaped poverty.[a] *The cash-for-public works program in Malawi did not increase the chances of exiting poverty for its beneficiaries.* Figure 8.13 shows that, between 2010–11 and 2013, the offer of PWP at the village level did not affect the probability of exiting poverty. There were no statistical differences in the probability of exiting poverty over the three-year period for households who were offered the program, nor were there indirect effects for households in PWP villages who were not randomly selected for the program.

[a] Over this period, 57% remained non-poor, and 10% remained poor. The remaining 33% of the population was nearly evenly split between the 16% who escaped poverty and the 17% who became poor.

(developed and piloted in two districts, with plans for further expansion) are currently under trial, but their effectiveness remains to be tested.

FIGURE 8.13: Probability of Households to Exit Poverty, 2010–2013 *(%)*



Source: Malawi Poverty Assessment team calculations based on RLS panel.
Note: "Treated" PWP = households who were offered the program in PWP villages. "Untreated" PWP = households in program villages who were not randomly selected for inclusion.

Conclusion

The evidence portrayed in this chapter showed that income and consumption are highly seasonal in Malawi, thus confirming the inability of households to smooth consumption throughout the year. This intra-annual variation of consumption reflects the seasonality in prices of the main crop, maize. Furthermore, uninsured risk is pervasive, and frequent production and weather shocks add up to households' vulnerability to poverty.

Malawi's social programs mainly comprise cash transfers, school meals and public works. This social protection system, although recently expanded, is characterized both by low expenditure by international standards and very limited coverage. In addition, although based on anecdotal evidence, some redistribution toward the poorest may happen within communities, household survey data suggest that the targeting of most existing social protection programs is not very effective and needs to be revisited because it is not very pro-poor. Efforts to improve targeting based on proxy means testing (developed and piloted in two districts, with plans for further expansion) are currently under trial, but their effectiveness remains to be tested. The inappropriate targeting coupled with the limited coverage translates into large errors of exclusion and inclusion, meaning that many non-poor receive transfers that should have been targeted to the poor beneficiaries to which programs were intended.

According to anecdotal evidence some redistribution toward the poorest may happen within communities, but household survey data suggest imperfect targeting. Such targeting performance is by and large a reflection of inappropriate geographic targeting, as well as lack of targeting of the poorest within villages themselves. There is scope for improving both the geographical and within-villages dimensions of targeting. Our findings suggest that targeting based on poverty status, or its proxies, is hard to implement, as there is no large overlap between the key target groups of the NSSP

and poverty status; the main overlap between poverty and such categories is the presence of children under 5 years of age in the household.

In terms of the current social safety nets, there is scope for reforming or redesigning some existing programs (including their insurance role), and expanding others. For starters, one of the largest scale SP programs in Malawi, the MASAF-PWP, has the potential to represent a key safety net for households, but failed so far to realize its protective role on food security due to a combination of rationing, poor targeting performance and low transfers amounts. The SCTP has shown many positive impacts on welfare, but its coverage of the poor population remains minuscule relative to need. It is desirable the ongoing strengthening and expansion of the Social Cash Transfer program as a means towards putting in place an effective safety net for the extreme poor. More generally, we recommend reforms of the SP system to guarantee a faster and more appropriate response to shocks, by promoting a rapid rollout of programs during the lean season, increased responsiveness of geographical targeting to large weather shocks, and improving access and flexibility of households to take-up safety net programs after being affected by shocks.

9

POPULATION DYNAMICS AND POVERTY IN MALAWI

During the coming 35 years, Malawi will face both important challenges and opportunities that will emerge from its population dynamics. This chapter identifies these challenges and opportunities in attempting to reap the benefits of a demographic dividend. The country has begun its demographic transition and has substantially improved child mortality and contraception prevalence. Nevertheless, these changes have not been accompanied by lower fertility rates. As a result, Malawi is experiencing rapid population growth and an unprecedented increase in a young population. The country's population is expected to double in approximately two decades (22.8 years): from 17.2 million in 2015 to 34.4 million in 2038 (UNDSA 2015). Today, 56.2% of the population is less than 19 years old, compared to the much smaller working age population (38.8%).

The important challenges include covering the needs of this extremely high proportion of dependents. Still, accelerations in its fertility decline could lead to substantial changes in its projected age structure and lead to opportunities for economic growth. Scenario analysis suggests that a one child difference in Malawi's fertility rates by 2050 could lead to real GDP per capita differences of 31%. However, the extent to which these changes in population size and age structure will affect Malawi's prospects in the next decades depends greatly on its capacity to accelerate fertility decline and ensure that adequate health and educational policies are in place. Fertility has remained persistently high in Malawi, particularly among poor women. In 2010, 60% of women (the poorest three quintiles) were still experiencing rates above six births per women, whereas the wealthiest 20% had half that number of births.

Differences in fertility also indicate inequities in access to family planning, ideal family sizes, and rates of early marriage, and childbearing. Despite the notable increase in using contraception, poor women were 30% less likely to use family planning than wealthier women. This pattern was accentuated in the Northern and Southern regions. Women across the four bottom wealth quintiles had higher desired fertility (four or more children) than women in the wealthiest group, but were also less likely to meet their ideal fertilities. The proportion of both child marriage and teenage pregnancy remain extremely high in

Malawi. Poor adolescents are twice as likely to get married and have not experienced any reduction in their fertility rate in the last ten years leading up to 2010. If Malawi were to eliminate early childbirth alone, the country's total fertility rate would decrease by 0.48 births (8%).

Fertility is closely linked with families' well-being and poverty. The relationship is bidirectional. Fertility decisions are associated negatively with the number of children and with having secondary education. On the other hand, having a new child in the family reduced household income per capita and increased the likelihood that the household would fall into poverty. Post-primary education is the most important determinant of expected number of children. These findings highlight the importance of providing secondary education and family planning to female adolescents to reduce child marriage and early childbearing.

Introduction

Chapter 9 assesses the role that demographic change plays in Malawi's economic development and household well-being. The role of population in reducing poverty has long been the source of much debate. However, what is agreed is that both increased population size, and changes in the comparative size of specific groups within the population (age structure) may influence poverty and efforts to reduce it (Birdsall and others 2001; Bloom and others 2003). ***Rapid population growth*** increases the pressure on existing capital and limited resources, and reduces the government's capacity to provide basic public services to a growing population. Along with slowing population growth, ***changing the population age structure*** to relatively more working-age adults and fewer dependents can raise savings and productivity and generate a ***demographic dividend***, which is associated with important benefits to economic development and to household and individual living conditions (Canning and others 2015; World Bank 2016a).

Chapter 9 profiles Malawi's population dynamics at both the household and aggregated levels and identifies challenges and opportunities for poverty reduction and economic development. The first section describes the conceptual framework for analyzing population dynamics and their effects on poverty. The second section presents a set of stylized facts around Malawi's demographic transition, as well as associated changes in its age structure. The third section details Malawi's fertility transition to identify the main factors hampering Malawi's progress toward lower fertility rates and to identify vulnerable groups. This section deconstructs fertility rate trends over time and assesses the role of proximate or direct determinants (marriage, contraception use). Section three also makes an empirical analysis of women's socioeconomic determinants of children birthed—an indicator of current fertility. These determinants include education, poverty, residence, age at first birth, and child mortality. Using panel data and their effects on human development, section four assesses the relationship between fertility and poverty dynamics. Finally, section five identifies Malawi's opportunities for poverty reduction and economic development (the demographic dividend) that could be created by changes in the age structure in the next 35 years, if adequate policies were put in place. Section five is based on the LINKAGE model, which has been used to analyze the growth and poverty impacts of age structure changes.

The analysis presented in chapter 9 uses three data sources: (1) cross-sectional data from three Malawi Demographic and Health Surveys (MDHS 2000, 2004, and 2010); (2) Integrated Household Survey 3 (IHS3) from 2010 and Integrated Household Panel Survey (IHPS) from 2013; and (3) United Nations World Population Prospects' (UN WPP) population projections. MDHS are representative at the national,

regional, district, and urban-rural levels. Conducted every five or six years since 1992, these surveys are designed to provide information on indicators of maternal and child health in Malawi. Information is collected on various population and health characteristics. They include fertility, family planning, child mortality, maternal and child health, nutrition, as well as individual and household background characteristics. The women's sections follow comparable standard questionnaires and include information on women of reproductive age (15–49). The women's section samples for these years total 13,220 (2000), 11,698 (2004), and 23,020 (2010).[59]

9.1. *Conceptual Elements of Population Dynamics and Their Effects on Poverty*

The analysis presented in chapter 9 is guided by the ***demographic transition theory*** (box 9.1). The analysis focuses on the impact of population change on poverty using two key channels: ***population size and growth***, and age-distribution effects (see appendix A9.1, Conceptual Framework diagram). Section two provides an overview of Malawi's position in its demographic transition, its current population growth, and its prospects for the next 35 years.

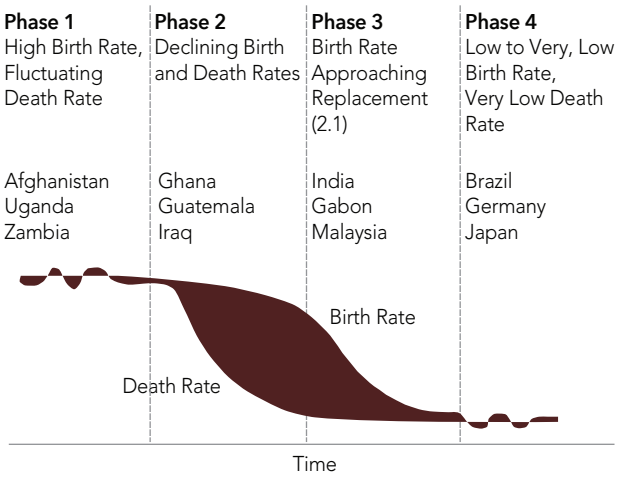
Fertility and mortality, two of the main demographic components that influence both population growth and age composition, have important and separate effects on poverty and economic growth (Bloom and Freeman 1988; Kelley and Schmidt 1995, 2005). For instance, lower probabilities of dying (especially reductions in child mortality) increase population size, but also lengthen the time that people are expected to live. Longer lifespans influence labor force, pension, and health care needs. Similarly, lower fertility slows the rate at which population increases and is associated with positive effects on mother and child health, and on human capital investments. These health gains, together with increased women's labor participation and investments in children's education, correlate with reduced poverty and increased productivity. Higher fertility has the opposite effect. Larger family size is associated with higher poverty and worst health outcomes for mothers and children, explained in part by the fact that poor women are more likely to be illiterate or have lower educational attainment, and have less access to affordable health and contraception methods.

By producing a proportional decline in the number of children born in the short term, accompanied

BOX 9.1: Malawi Demographic Transition Model

Demographic transition defines the process by which countries move from high mortality and fertility levels to low mortality and fertility (figure 9.1). During this transition, which can last several decades, two main population processes are in play. First, mortality declines (due primarily to control of infectious diseases), followed by a drop in fertility and degenerative diseases. The time between the mortality and fertility declines opens a period in which population grows. Because child mortality reductions are very much underway in most Sub-Saharan African (SSA) countries, but fertility transitions' pace and time vary greatly by country, several African countries, including Malawi, are experiencing rapid population growth

FIGURE 9.1: Malawi Demographic Transition Model



Source: Population Bureau 2011, http://www.prb.org/.

[59] For information on IHPS and IHS3, see chapters 1 and 2.

by generating a smaller cohort of women of childbearing age over time, in the longer term, fertility declines lead to changes in the age structure of the population—reducing the ratio of dependents to working-age population. Lower dependency ratios are considered to have positive effects on countries' economic growth because they lead to higher savings, and productivity (Bloom and others 2000). However, to reap the benefits of a demographic dividend, labor, and financial, and human capital policies need to be in place (Bloom and others 2001).

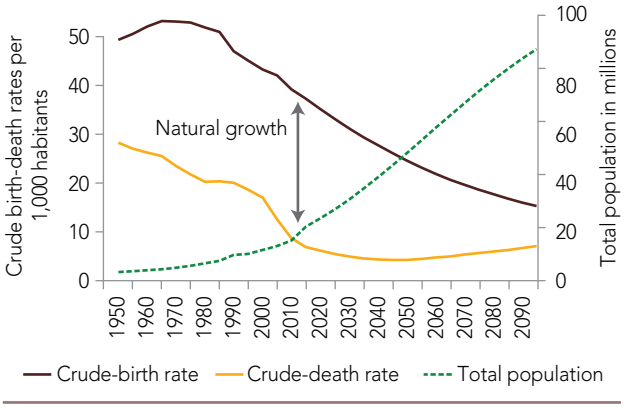
The contrary also is true. Higher fertility under conditions of low child mortality produces a youth-aged population structure that relies on a smaller proportion of productive labor force. Thus, fertility decline is considered a key determinant to slow population growth and to decrease dependency ratios, thus paving the way for a demographic bonus.

9.2. Malawi's Population Dynamics: Stylized Facts

Section two describes Malawi's demographic transition by identifying levels and trends over time of key components (mortality and fertility) and focusing on how population and the age structure of the population are changing over time. With a total fertility rate (TFR) of 5.25 children and a life expectancy of 56.1 years (UN 2015), Malawi is still at the early stage of its demographic transition.[60] The transition is characterized by a steady drop in death rates, generated primarily by a sound decline in child mortality resulting from improved preventive and curative healthcare. Concurrently, birth rates have remained high: 40 to 50 births per 1,000 habitants (figure 9.2).

Similarly to most East African countries, Malawi faces rapid population growth. In 2015 its population reached 17.2 million—three times the country's 1980 population of 6.1 million. With an annual population growth rate of 3.06%, the country's population is projected to double within the next 25 years and to reach 42 million by 2050 (UNDSA 2015). This rapid growth is associated

FIGURE 9.2: Demographic Transition in Malawi, 1950–2090



Source: UN Population Division 2015.
Note: Data after 2015 are projections based on medium-variant fertility.

with unfavorable consequences that could hamper Malawi's development efforts. The drivers of population growth are primarily those of natural increase: the difference between crude death and birth rates (figure 9.2). Thus, the speed at which the country's fertility declines in the next decades will also determine its rate of population growth.

Malawi has made notable progress in reducing *child mortality—one of the main drivers of population change*. Between 1990 and 2010, under-5 mortality dropped by more than 67% from 242 to 64 deaths per 1,000 births (UNICEF 2015). At the same time, neonatal mortality halted (50–25 deaths per 1,000 live births). This progress was accompanied by a strong governmental commitment toward child health, as evidenced by an increase in health spending (chapter 3). Currently, Malawi allocates 8% of GDP to its health sector, far above SSA average (5.7%) (WDI 2015). Nevertheless, progress has not been consistent across wealth quintiles. According to DHS data, children in the top wealth quintile have better probabilities of surviving their first five years of life than

[60] Total fertility rate (TFR) is a summary indicator that, based on current birth rates, represents the number of children an average woman in a population is likely to have during her childbearing years. TFR enables comparing the overall fertility of different populations over time.

TABLE 9.1: Demographic and Health Indicators in Malawi and Comparator Countries, 2000 and 2015

	Malawi 2000	Malawi 2015	South Africa 2015	Sub-Saharan Africa 2015	Low-income countries 2015
Infant mortality rate (per 1,000 live births)	103.5	43.4	33.6	56.3	53.1
Maternal mortality ratio (per 100,000 live births)	890	634	138	547	495
Life expectancy at birth	46.0	56.1	57.4	57.6	60.0
Total fertility rate (TFR)*	6.3	5.2	2.3	4.9	4.7
Adolescent fertility rate (births per 1,000 women ages 15–19)	161	137	49	106	101
Teenage pregnancy (%)	33.0	25.6	N.A.	N.A.	N.A.
Child marriage (% married by age 15)	14	14	N.A.	12	15
Child marriage (% married by age 18)	51	52	N.A.	40	45
Desired TFR	5.2	4.2	N.A.	4.6	4.4
Unmet need for FP	30	19	N.A.	24	25
Contraceptive prevalence rate (modern method)**	26	42	N.A.	N.A.	N.A.
Contraceptive prevalence rate (any method)**	31	46	N.A.	24	30

Source: HealthStats http://datatopics.worldbank.org/hnp; UNICEF http://data.unicef.org/.
Note: N.A. = data not available. * = UN estimates. ** = figures for 2015 correspond to 2010 (DHS).

those in the lowest quintiles. Notably, this gap in early childhood survival rates leveled off in 2010.[61]

Improvements in life expectancy in Malawi have been slower than improvements for child mortality. Despite being one of the countries highly affected by the HIV epidemic and AIDS-related mortality, Malawi experienced an increase in life expectancy from 46 years in 1990 to 56.1 in 2015 (WDI 2015). However, life expectancy at birth is lower than the SSA average of 57.6 (table 9.1). HIV prevalence (15–49) has declined steadily from 16.4% in 1999 to 10.6% in 2010 (NAC 2015). As HIV prevalence declines and social conditions improve, over the next 35 years, Malawi's life expectancy will increase to 75 years (UN 2015).

Meanwhile, Malawi's maternal mortality remains extremely high. Malawi's MMR declined from 890 in 2000 to 634 in 2015—a 34% reduction—but, of this, only 2% took place during the last decade (WHO and UNICEF 2015). Malawi's 634 maternal deaths per 100,000 live births was one of the highest rates in the world, just behind Nigeria, Sierra Leone, and South Sudan (table 9.1). This trend contrasts with a significant increase in the proportion of live births delivered at hospitals in the country (currently 71%). The lack of progress despite better health care access may be affected by poor or inadequate quality of care by health personnel. Among other factors, delaying first birth and longer birth intervals are associated with a lower risk of dying for both mothers and children under five. In northern Malawi, between 1992 and 2004, lower parity (first and second births as opposed to third and higher) led to a 6% decline in the mortality hazard (Handa and others 2010).

On the other hand, *fertility*, *the second main driver of population change*, has remained persistently high in Malawi, particularly among poor women. During the last decade, fertility rates in Malawi remained above five children.[62] According to

[61] This was as a result of coordinated effort. Between 2004 and 2011, the GoM and counterparts initiated several programs and policies focused on improving child survival, especially among the poor. Among them was the Accelerated Child Survival and Development (ACSD) strategy, which supported a 5-year Integrated Management of Childhood Illnesses (IMCI) program. IMCI increased coverage of key children's interventions, including pneumococcal vaccine and bed nets (Doherty and others 2015).
[62] TFR estimates vary greatly across sources. National Census projections set TFR in 2015 at 5.96 whereas the UN 2015 estimate is 5.2 children per women. DHS data from 2010 estimate TFR at 5.7, and the Malawi MDG Endline Survey 2013–14 sets TFR at 5.0.

UN data, between 2000 and 2015, TFR declined from 6.10 to 5.25 births per woman. Despite this 18.0% decline, Malawi's TRF still is higher than the SSA average (figure 9.3). In contrast, using DHS data, the TFR appears to have declined only 9.4 %—from 6.3 children per woman in 2000 to 5.7 in 2010.

One reason for the country's average moderate decline was that women from different socioeconomic groups exhibited differing fertility levels. Significant disparities existed across wealth quintiles.[63] According to DHS data, women in the bottom 40% had fertility rates twice as high as the wealthiest 20% (6.8 and 3.7 births per woman, respectively) (table 9.2). Moreover, only the wealthiest 20% had experienced a significant fertility decline since 2000: from 5.2 children to 3.7 children in 2010 (table 9.1). Among women in the middle—the second and third quintiles—the change was negligible. However, among the poorest 20%, the TFR declined slightly from 7.3 children in 2000 to 6.8 children in 2010.

Malawi's persistently high fertility and low life expectancy have resulted in a large youth population. Today, 56.2% of the population is under 19 years old, and a smaller share of the population is working age (38.8% of the population is 20–59 years). Figure 9.4 highlights the difference between Malawi's (a pre-dividend country)[64] population pyramid, and South and East Asia's (late and post-dividend countries). In 2015 the proportions of Malawi's population of adolescents (10–19 years) and youth (15–24 years) were very high (24% and 21%, respectively). They are expected to remain high in 2050: 20% and 19%, respectively. Under the UN medium scenario, in absolute numbers, the size of the adolescent and youth populations will increase from 4.1 million and 3.6 million in 2015 to 8.8 million and 8.1 million, respectively, in 2050. The actual numbers in 2050 will depend on how rapidly Malawi reduces its TFR. For example, the total number of youths is expected to reach 7.1 million, 8.1 million, and 9.2 million under the low, medium, and high fertility scenarios, respectively.

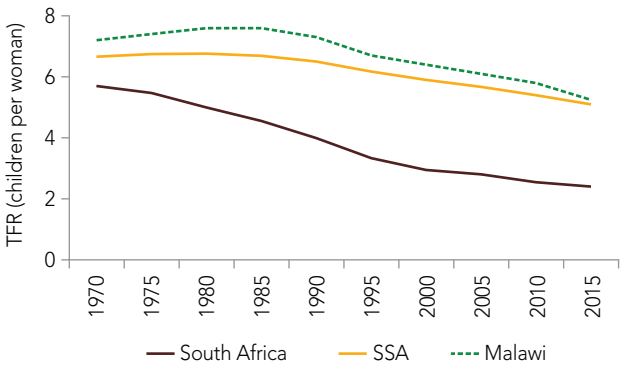
The bottom row of figure 9.4 shows what the population pyramids would look like in 2050 under the three UN population variants. As expected, the total dependency ratio (the number of dependents aged 0–14 and over 65 to the total population aged

TABLE 9.2: Malawi Fertility Rates Higher among Poor Women and Decline Stalled, 2000–2010

Wealth quintile	TFR 2000	TFR 2010	Change 2000–10 (%)
Poorest	7.3	6.8	–7
2	6.9	6.8	–1
3	6.4	6.3	–2
4	6.0	5.3	–12
Richest	5.2	3.7	–29

Source: DHS 2000–10.
Note: Distribution based on wealth quintiles.

FIGURE 9.3: TFR in Malawi, Sub-Saharan Africa, and South Africa, 1970–2015



Source: UN 2015.

[63] DHS surveys do not collect information on income or household consumption, but they estimate a wealth index (a composite measure of a household's cumulative living standard). The wealth index is calculated by a principal component approach, which uses data on a household's ownership of selected assets. http://www.dhsprogram.com/topics/wealth-index/Index.cfm#sthash.Ui9u4iuc.dpuf.

[64] A country with a TFR higher than four in 2015 and, therefore, characterized by a population age structure with a very large proportion of young (dependent) children (World Bank 2016a, Global Monitoring Report).

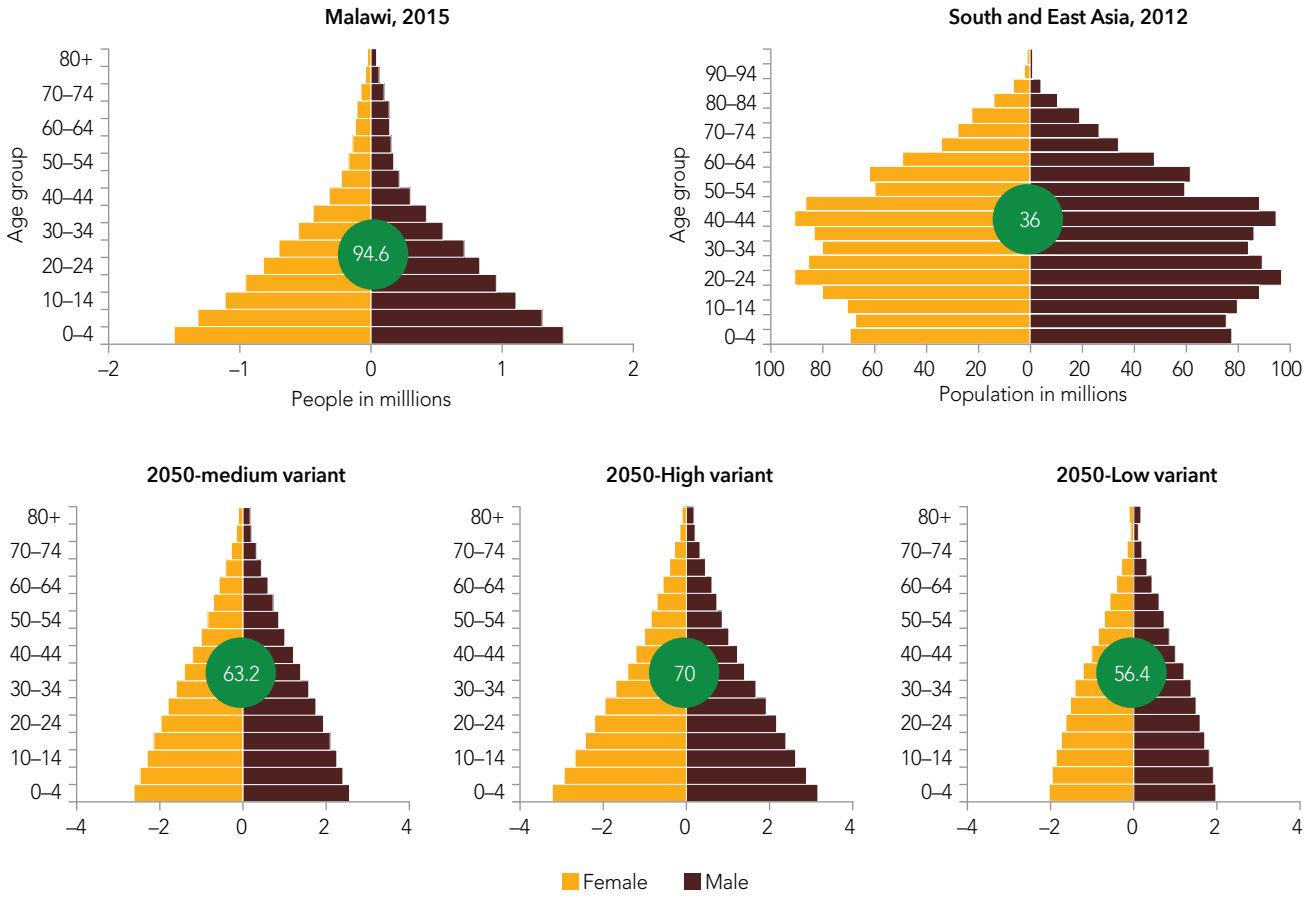
15–64) will be much lower under the low fertility scenario. Malawi's total dependency ratio (94.6) is among the highest in SSA, and above the regional average (86.0). Thus, how rapidly Malawi reduces its fertility certainly will affect its capacity to provide basic services.

High fertility also determines the dependency ratio within households, which is the number of dependents (children under 15 and adults over 65 years) **as a share of working-age individuals**. Analysis based on the IHS3 2010 and IHPS 2013 panel subsamples estimates a total and children household dependency ratio of 1.34 and 1.19, respectively. This indicates that, on average for one working-age individual, there were 1.34 dependents and 1.19 young dependents. Chapter 2 findings highlight that the larger the household and the larger the proportion of children and elderly members compared to the number of adults, the greater the odds of being poor. Dependency also correlates with household poverty and whether households remain poor over time (chronically poor) or fall into poverty (transient poor).

Figure 9.5 shows that both youth and total dependency ratios are higher among the poor (1.3) and chronically poor (1.5) than among non-poor households (1.0).

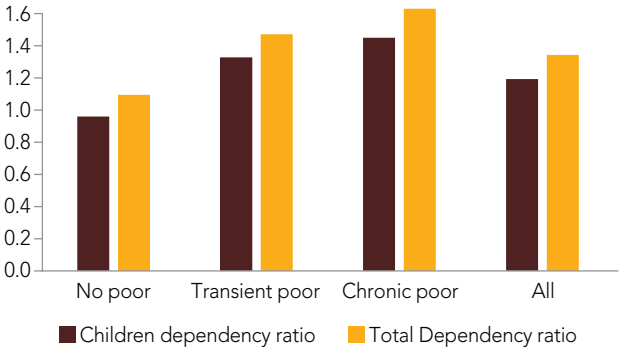
Malawi's growing young population requires large investments to sustain minimum coverage of basic health, education, and other services, resulting in an increasing demand for fiscal resources.

FIGURE 9.4: Population Pyramids in Malawi and South and East Asia (total Dependency Ratios Inside), 2012–2050



Source: UN 2015.
Note: Total dependency ratio (TDR) in center refers to number of dependents (aged 0–14 and 65+) to total population (aged 15–64).

FIGURE 9.5: Children and Total Household Dependency Ratios, Malawi, 2010–2013



Source: Poverty assessment team calculations based on IHS3 panel and IHPS.

For example, the latest Education System profile (World Bank 2010) highlights Malawi's significant challenges to provide basic education to a large and rapidly growing youthful population. In coming years, improvements in school retention along with school-age population growth will cause an unprecedented increase of both primary and secondary populations. In 2012, 50% of education sector expenditures were attributable to the primary education subsector (PER 2013), while secondary education accounted for only 14.8%. As a result, covering the needs of both subsystems will require significantly increasing education spending. However, the GoM already has increased public education spending in recent years to 8.1% of GDP, and the former is growing faster than general budget. Therefore, increasing education funding in the near future will be extremely challenging (PER 2013).

Hence, the demographic profile indicates that, over the next 35 years, Malawi will have important challenges but also opportunities. First, the country has started its demographic transition and has substantially improved child mortality. Nevertheless, this change has not been accompanied with lower fertility rates, which causes rapid population growth, and an unprecedented increase in young population. The country also faces important challenges associated with covering the needs of this extremely high proportion of dependents. However, the extent to which these changes in age structure will affect Malawi's prospects in the next decades will depend greatly on its capacity to accelerate fertility decline and ensure that adequate polices are in place.

9.3. *Trends and Determinants of Fertility in Malawi*

This section examines fertility trends between 2000 and 2010 and differentials across groups using three MDHS surveys (2000, 2004, and 2010). The section investigates both direct and indirect determinants. Early childbearing is studied in detail because it is key for Malawi's fertility transition. Table 9.3 summarizes key changes in fertility rates across background characteristics, including age group, educational attainment, place of residence, wealth quintile, and region. As noted above, fertility rates in Malawi declined very slowly between 2000 and 2010. The groups who experienced more than 10% decline were women living in urban areas (11%) or in the Central region (15%), and women in the top two wealthiest quintiles (12% and 29%).

Table 9.3 also indicates that poor women and women with no education exhibit the highest fertility rates across socioeconomic groups. In 2010 their fertility rates reached 6.9 and 6.8 births per woman, respectively, and neither group has seen a significant decline in its fertility rates in the last 10 years. In contrast, women with secondary education or more (approximately 11% of women in 2010, and 20% in 2010) have the lowest levels of fertility (3.6 births per woman), but this educational group did not see a substantial change in their fertility between 2004 and 2010.

In Malawi, as in other SSA countries, the estimated total fertility rate is lower in urban areas than in rural areas. **In 2010, the differential between rural areas (6.1) and urban areas (4.0) was of two births,** consistent with the fact that rural women tend to be poorer and less educated, and have lower access to

TABLE 9.3: Malawi's Trends in Total Fertility Rates by Background Characteristics, 2000–2010

Background characteristics	2000	2004	2010	Change (%) 2000–10	Change % 2004–10
Education					
No education	7.3	6.8	6.9	–5	1
Primary	6.4	6.2	5.9	–8	–5
Secondary+	3.0	3.8	3.6	18	–6
Place of residence					
Urban	4.5	4.2	4.0	–11	–5
Rural	6.7	6.4	6.1	–9	–5
Wealth quintile					
Poorest (20%)	7.3	7.1	6.8	–7	–4
Poorer	6.9	7.0	6.8	–1	–3
Middle	6.4	6.5	6.3	–2	–3
Richer	6.0	5.8	5.3	–12	–9
Richest (20%)	5.2	4.1	3.7	–29	–10
Region					
Northern	6.2	5.6	5.7	–8	2
Central	6.8	6.4	5.8	–15	–9
Southern	6.0	5.8	5.6	–7	–3
Total	6.3	6.0	5.7	–10	–5

Source: Poverty assessment team calculations based on MDHS 2000, 2004, and 2010.

health services. These figures indicate that, on average, urban fertility is almost 32% lower than rural fertility. However, between 2004 and 2010, fertility rates in both areas fell marginally at the same rate: 5%.

In contrast to locality, across geographic regions, recent fertility levels do not appear to differ greatly. In 2010 the Central, South, and North regions exhibited similar rates: 5.7 births, 5.8 births, and 5.6 births, respectively. In 2000 the Central region exhibited the highest rate among the three regions (6.8 births), compared to the Northern (6.2 births) and Southern (6.0 births) rates. However, by 2010, the Central region's fertility rate declined by approximately 1.0 birth per woman to 5.8 births—similar to the Northern region's rate (MDHS 2010). Figure 9.6 shows that the gap between urban and rural was larger in the Southern region. There, rural women had fertility that was nearly double (6.1) that of women living in urban areas (3.8). Overall, between 2004 and 2010, fertility remained constant by region and locality.

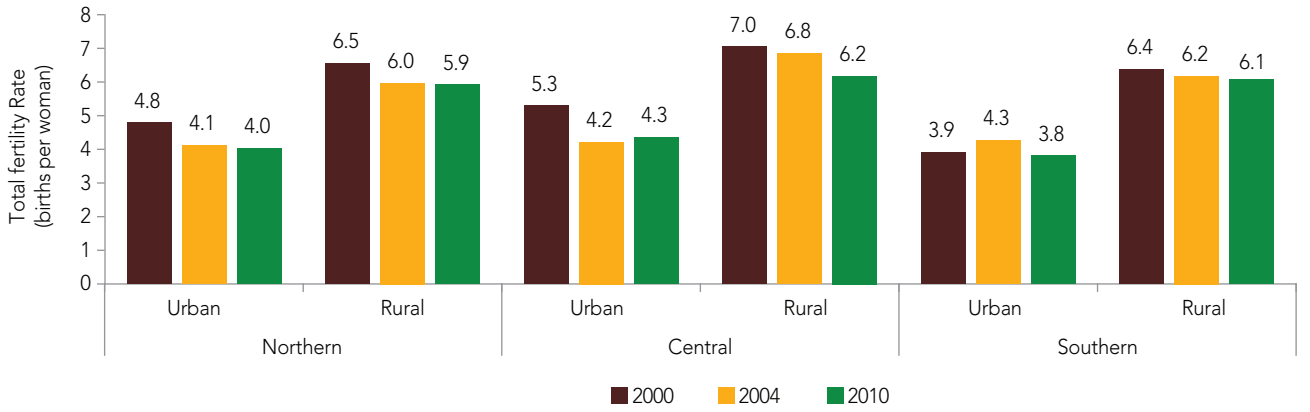
An important factor contributing to this moderate fertility decline is the desired fertility or demand for children prevalent in Malawi. Figure 9.7 shows that women across the four bottom wealth quintiles had higher desired fertility (four or more children) than women in the wealthiest group, but also were less likely to meet their ideal fertility. Only among the wealthiest 20% of women was observed fertility close to desired fertility. Moreover, desired fertility (mean ideal number of children) remained at nearly the same level from 2000 to 2010 (4.2 vs. 4.1) across wealth quintile, location, and educational level.

Significant gradient differences existed, however, among women with primary or no education, and women with higher education. For instance, in 2010, women with a high school education or more exhibited a fertility of 3.6 and desired fertility of 3.1, whereas women with less education had were twice fertile (6.2), and higher desired fertility (4.2).

The gap between desired and observed fertility was associated with disparities in family planning. In 2010 modern contraceptive prevalence among married women was 42.2%, a high prevalence for Eastern African countries and above the SSA average. Contraception use increased substantially from 28.1% in 2004 to 42.2% in 2010.[65] Women across all wealth quintiles experienced an increase in utilization (figure 9.8), but the disparities persisted between the poorest 20% and the richest 20%. In 2010 poor women were 30% less likely to use family planning than the wealthiest women. This

[65] This remarkable increase in contraception was due to three factors: (a) strong political commitment from the Governmenton increasing access to reproductive health services; (b) deploying lower cadres of health professionals to distribute contraceptives in rural areas, in particular, health surveillance assistants who were trained to provide injectables and community-based distribution agents (CBD) who provide pills and condoms; and (c) the use of public-private partnerships to expand outreach and mobile services (USAID 2012).

FIGURE 9.6: Malawi's Total Fertility Rate by Region and Locality, 2000–2010

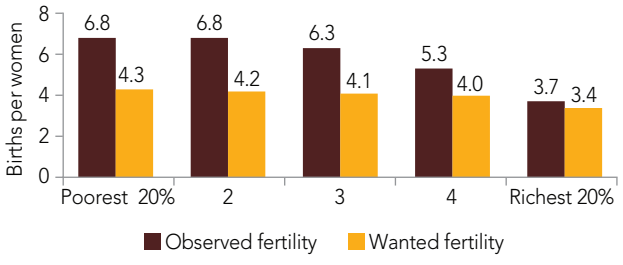


Source: Poverty assessment team calculations based on MDHS 2000, 2004, and 2010.

pattern was more accentuated in the Northern and Southern regions, in which only 28% and 35% of poor Malawian women, respectively, used contraception, compared with 45–47% among the richest 20%. Figure 9.8 also shows differences across age groups, indicating that wealth disparities in contraception use were concentrated among older women (over 35 years) rather than among younger women (<35 years). Only 16% of poor women aged over 35 used modern permanent methods to limit childbirth (female or male sterilization) in comparison to 33% of wealthier women who used these methods (MDHS 2010).

The substantial increase in modern contraception among married women (from 26% to 42% in the past two decades) has not translated yet into a corresponding decline in observed fertility. Low method mix, poor adherence and method discontinuation,[66] all common in Malawi, especially among injectable users (Dasgupta and other 2015) are likely to explain this pattern. Proximity to health services and availability of contraceptives at local level are also found to affect continued use of injectable (Skiles and others 2015). Demand for contraception among currently married women of reproductive age is approximately 70% (34% for spacing methods, and 40% for limiting methods). Compared with trends 10 years back, there are not large differences across the wealth quintiles. However, women in the poorest quintile are less likely to have their demands for contraceptives met. Only 50% of their demand is satisfied,[67] as opposed to 64% of women in the wealthier quintile, indicating that both contraceptive use and access to family planning are lower among poor women.

FIGURE 9.7: Observed and Desired TFR by Wealth Quintile, 2010

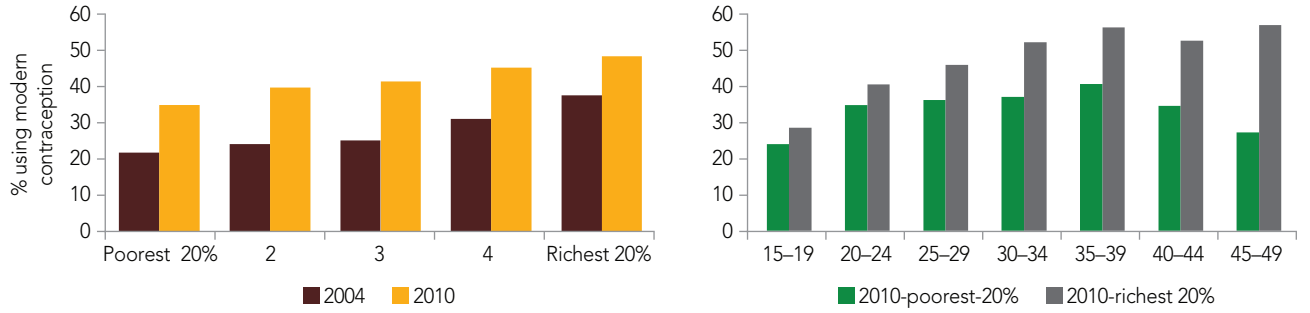


Source: Poverty assessment team calculations based on MDHS 2010.

[66] The most widely used methods in Malawi are injectable contraceptives (55% of users), followed by female sterilization (22% of users), and pills and condoms (11%). This distribution indicates low method-mix with a high reliance on temporary methods (injectables). Poor adherence refers to inconsistent use, for example, missing injections or pills. Method discontinuation refers to stopping family planning use due to side effects or other concerns.

[67] Demand for family planning is defined as the percentage of married or in-union women aged 15–49 years who want to delay or limit childbearing. Demand met refers to the proportion of women currently using modern contraception as the share of those demanding family planning.

FIGURE 9.8: Current Modern Contraception Use by Wealth Quintile and Age, 2004–2010

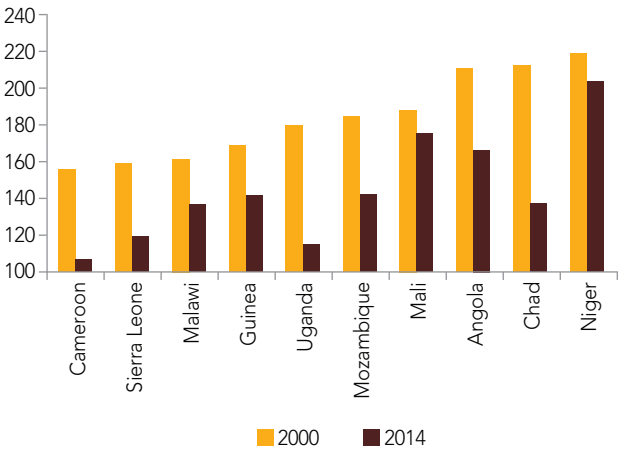


Source: Poverty assessment team calculations based on MDHS 2004 and 2010.

9.3.1. *Early childbearing and child marriage in Malawi*

Important contributors to high fertility are early childbearing and child marriage. Both are extremely high in Malawi. The country's adolescent fertility rates continued to be among the highest in the world because 50% of girls marry before age 18, and 33% start childbearing as adolescent (UN 2015) (figure 9.9). According to DHS data, in 2000 there were approximately 172 births per 1,000 adolescents, a figure that, over 20 years, decreased by 11% to 152 births. However, this progress affected only girls in the wealthiest group. Girls in the top wealth quintile also saw their fertility drop 40%. Meanwhile, poor adolescents experienced no reduction in their fertility rate. Poor girls also had fertility rates twice as high as girls in the richest wealth quintile (187 vs. 90).

FIGURE 9.9: Ten Countries with World's Highest Adolescent Fertility Rates, 2000–2014



Source: United Nations Population Division, World Population Prospects.

The most important factors contributing to the current level of adolescent fertility in Malawi are early sexual initiation, child marriage,[68] **and low contraception use**. Malawian women start to be sexually active at a median age of 17.4 years. According to DHS data, 12% of girls are married before age 15; 40% of women aged 15–19 are married; while 50% of women aged 20–24 reported being married before age 18. Child marriage encourages early childbirth. In 2010, 68% of married adolescents were pregnant or had at least one child, and 10% already had two living children (DHS 2010). Approximately 26% of married adolescents use modern contraception, which is 30% less than young adult women aged 20–24. Approximately 50% of their demand for modern methods of family planning is not satisfied. As a consequence, adolescents are also more likely to have an unplanned or undesired birth, higher fertility, and shorter birth intervals, thus placing them and their children at a great disadvantage. In 2010, 40% of births to adolescents were unintended,

[68] Malawi has been working toward increasing the minimum marriage age. In 2009 it was increased from 15 to 16 (with parental consent). In 2015, a new law set the minimum marriage age at 18 years.

and 33% of births had a birth interval under 24 months—the recommended spacing for mother and child safety.

Poor adolescents are more likely to marry young and become mothers. According to the latest DHS data, among women aged 20–24 in the bottom two quintiles, 60% of them marry as adolescents—approximately 2.3 times more than young girls in the wealthier group (26%). Similarly, 40% of poor young women are pregnant or are already mothers before 18, compared to 22% among the richest group (figure 9.10).

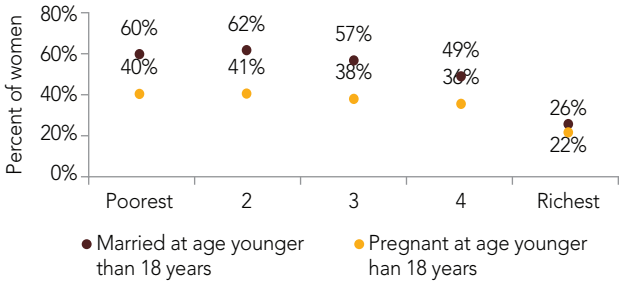
Furthermore, early fertility patterns in Malawi are not homogeneous. In addition to the poor-wealthy divide, disparities exist between urban and rural groups as well as across regions.

In Malawi, being married before 18 years also correlates strongly with educational attainment. Table 9.4 shows the distribution of educational attainment in Malawi among young women aged 20–24 across differing marital status and marriage age. Table 9.4 indicates that single young women were more likely to have attained secondary and higher education compared with ever-married young women regardless of the age at which they were married. More importantly, table 9.4 shows that only 9.3% of women who were married by the age of 18 attained any grade of secondary school or more, compared with 35% of women who married after 18 and 75% of single women.

Why is it essential to address adolescents' reproductive needs?

Child marriage and early childbearing negatively affects Malawian adolescent girls' health, the health of their children, their own educational prospects, and subsequently their own employment opportunities. Married girls may also experience increased lack of agency within their households and intrafamiliar violence. Finally, as mentioned, child marriage contributes to population growth by lengthening the time a woman is exposed to childbearing.

FIGURE 9.10: Trends in Early Marriage and Pregnancies in Women Aged 20–24, by Wealth Quintile *(%)*



Source: Poverty assessment team calculations based on MDHS 2010.

TABLE 9.4: Educational Attainment Distribution among Young Women, by Marital Status

Highest grade attained	Single	Married>18	Married<18
No education	2.3	6.6	10.5
Primary	22.2	**58.1**	**80.3**
Secondary+	**75.5**	35.4	9.3
All	100.0	100.0	100.0

Source: Poverty assessment team calculations based on MDHS 2010.

Consequences of child marriage and early childbirth in Malawi

The consequences of child marriage and early childbearing affect not only the mother's health but also her children's. The female body under the age of 18 is not physiologically ready for giving birth so young mothers are at risk for medical complications, including obstetric fistula. Early childbirth also increases the likelihood of child mortality and malnutrition. A World Bank analysis on the economic costs of child marriage and early childbearing (Onagoruwa and Wodon 2016) indicates that Malawian babies born of adolescent mothers had a probability of dying before age five that was between 1.4 and 3.6 percentage points higher (with and without controlling by other variables) than children of similar circumstances born of older mothers aged 18–34. Specifically, 9.7% of mothers under 18 saw

their children die before the age of five, compared to 8.2% of mothers 18–34 and 10.1% of mothers older than 35 (Onagoruwa and Wodon 2016). The study simulations also indicate that, in Malawi, two in 100 deaths under the age of five proceed directly from early childbirth. Two may seem low relative to the number of children who die overall but two in 100 still represents a large number of children.

Child marriage affects not only the health of the mother and of her future children, but also her potential educational attainment. In five African countries (Burkina Faso, Cameroon, Côte d'Ivoire, Guinea, and Togo), Lloyd and Mensch (2008) found that child marriage and early pregnancy account for 15% to 33% of girls who drop out of secondary school. Nguyen and Wodon (2012) calculated that, in Africa, each year of child marriage reduces the likelihood of literacy by 5.6 percentage points and the probability of completing secondary school by 6.5 percentage points. Low educational attainment limits married adolescents' employment prospects and earnings potential throughout their lifetimes. Keeping girls in school may be one of the best ways to delay marriage and subsequent early childbirth, and vice versa.

Child marriage is correlated with Malawian adolescents' labor force participation. 50% of women 18–22 who marry before the age of 18 work, but the work is primarily without cash earnings (Male and Wodon 2016). Child marriage leads to both a higher number of children in the household and young mothers' lower educational attainment, both of which may reduce their labor force participation. Marrying early also is associated with a decreased lack of agency for girls, including access to family planning. For instance, based on DHS data, more than 50% of married adolescents do not decide by themselves on their need to seek medical care but rely on their husbands to get it for them. Unequal relationships may inhibit a child bride's mobility and her time working outside of the household, decreasing her productivity outside the home. By reducing educational attainment, child marriage is indirectly associated with diminished earnings as well as less likelihood of formal employment. Girls who are not married are more likely to complete secondary education and increase their economic prospects by participating in the labor-force.

Controlling for socioeconomic and other characteristics, if Malawi were to eliminate early childbirth alone, the country's total fertility rate would decrease by 0.48 births (8%) (Onagoruwa and Wodon 2016). Likewise, it is estimated that, on average, postponing childbearing by one year would decrease a woman's expected number of children by 4.5% (DHS 2010). This combined decrease would substantially slow population growth in Malawi. Increasing access to family planning and reproductive health information throughout the country would encourage women and girls to increasingly delay their births, leading to additional decreased fertility.

9.3.2. *Factors influencing fertility change in Malawi: Proximate determinants*

Fertility trends and differentials are better understood by looking at the proximate determinants of fertility. These are the biological and behavioral factors through which socioeconomic, cultural, and environmental variables affect fertility (Bongaarts 1978). The analysis considers Bongaarts' model of four proximate determinants: sexual activity, contraception, post-partum infecundability, and sterility (appendix A9.2).[69] In this model, the relative effect of each of the proximate determinants of fertility is expressed with an index from 0 to 1, wherein 1 indicates no reduction of fertility by the determinant, whereas values closer to 0 indicate more reduction.

In Malawi the most important determinant to control fertility before 2010 was post-partum infecundability (PPI) (table 9.5). This factor accounts for the times during which women are not susceptible to pregnancy, due primarily to lengthened periods

[69] The assessment team's findings illustrate the relative contribution of each of the proximate determinants to the observed differences in fertility levels in Malawi over the study period. The lower the index, the greater its inhibiting effect on fertility, the reducing effect being the complement of the index value. Abortion is very difficult to estimate, so it usually is assumed that the index of abortion is very close to 1.0 and reduces fertility by less than 1%.

TABLE 9.5: Total Fertility-Reducing Effect of Bongaarts Four Proximate Determinants in Malawi

Proximate determinant	Births per woman			%		
	2000	2004	2010	2000	2004	2010
Marriage	2.2	2.2	2.3	21.6	22.8	20.8
Contraception	3.0	3.4	5.3	29.8	34.9	47.3
Infecundability	5.1	4.3	3.7	50.6	43.6	33.0
Sterility	–0.2	–0.1	–0.1	–1.9	–1.3	–1.1
Total	10.03	9.77	11.21	100.0	100.0	100.0

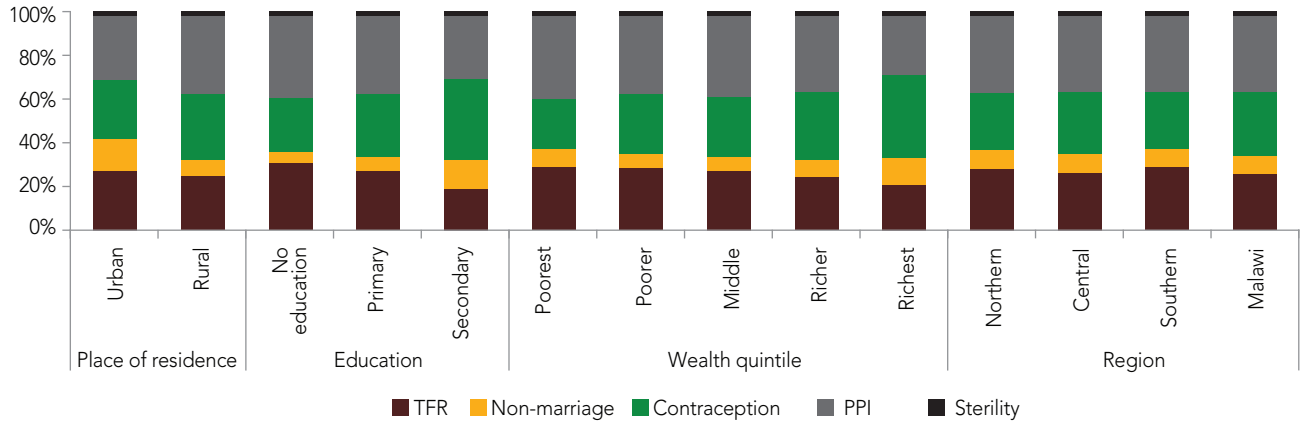
Source: Poverty assessment team calculations based on MDHS 2000, 2004, and 2010.

of breastfeeding, and post-partum abstinence. This pattern usually is observed in countries with low fertility control (contraception). By 2010 contraception had taken the lead in fertility control, followed by PPI. In that year, 47% of prevented births were due to contraception use. The third determinant, which affects fertility to a lesser extent, is the index of marriage. The results indicate that of the 11.21 births per woman that were prevented in 2010, only 2.3 births per woman (or 21%) were due to the effect of non-marriage. This result is consistent with the high rates of early marriage and pregnancy still prevalent in the country and suggests the possibility of reducing fertility to a greater extent by reducing these practices.

The contribution of each proximate determinant to reduced fertility varies by women's characteristics. Figure 9.11 shows the relative effect in 2010 of each index by socioeconomic group. As expected, contraception and marriage are most important factors among the wealthiest women, who live in urban areas and have high-school education. In contrast, women in the poorest quintiles, who live in rural areas and are not educated, rely less on contraception for birth control and more on breastfeeding and abstinence. This contrast illustrates as well that women who are in better economic positions and who attained secondary or higher education have better access to family planning services than do poor and uneducated women, regardless of location or region.

The analysis of proximate determinants also indicates that, in Malawi, between 2000 and 2010, the decline in fertility by 0.60 births (from 6.3 to 5.7 children) was driven primarily by an increase in contraception, followed by a slight decrease in the proportion of women married or in union. The decrease in breastfeeding and abstinence during the same period had the opposite effect. It raised the fertility rate, particularly among women in secondary school. This increase was compensated by a decline of 16% due to contraception (table 9.6). Notably, contraception use has affected fertility across all groups, as opposed to the index of non-marriage. The

FIGURE 9.11: Four Proximate Determinants' Effects on TFR in Malawi, 2010 *(%)*



Source: Poverty Assessment team calculations based on MDHS 2010.

TABLE 9.6: Proportional Change in TFR Due to a Change in the Indexes, 2000–2010 *(%)*

	Marriage	Contraception	PPI
Total	–4	–26	12
Poorest 20%	–1	–20	8
Richest 20%	–10	–24	10
Urban	–5	–13	8
Rural	–3	–18	7
No education	–3	–22	9
Primary	–1	–24	4
Secondary	16	–16	30

Source: Poverty assessment team calculations based on MDHS 2000 and 2010.

marriage index barely changed between 2000 and 2010 except for the women in the richest quintile. This group was the only one experiencing a significant decline in fertility (table 9.6).

9.3.3. *Determinants of the number of children ever born (CEB) in Malawi*

This section assesses the relationship between fertility and wealth quintile using cross-sectional data (DHS 2010) and identifies additional socioeconomic determinants, such as educational level and locality. The empirical study of these associations is usually done using cross-sectional data and is not able to control for unobserved characteristics that confound the result. For example, DHS surveys have detailed information on women's reproductive behaviors and social determinants. Unfortunately, these surveys do not collect information on household spending or consumption but rely exclusively on the wealth index to estimate income differences.

The assessment team identified key determinants influencing the number of children ever born using a Poisson regression to model count data.[70] The summary table with key variables can be found in appendix A9.3. The model uses children ever born as dependent variable and a control for a range of determinants found to contribute to women's fertility, including age, age at first birth, marital duration, household wealth index, women's and their partners' educational levels, ethnicity, and other control such as region and locality. The model is specified as follows:

$$m_i = exp\ (X_i b)$$

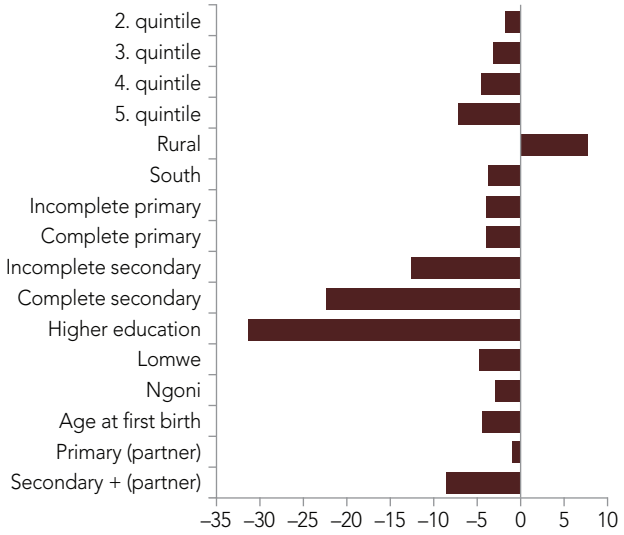
Increasing Xi by 1 unit multiplies the mean by a factor exp (bj). Results from this model significant at p-value 10% or less are presented in bold in table 9.5. Figure 9.12 presents the results in percentage change in expected number of children ever born for unit increase in X.

The model's findings indicate that household wealth and women's educational level are the main factors correlated with a reduced number of children ever born in Malawi. Holding all other variables constant, being women in the wealthiest 20% decreases the expected number of children born by 7.2%. Whereas women with either incomplete or completed secondary school have 12.6 and 22.4% fewer children than women with no education. Moreover, being a woman with higher education signifies a decreased number of children of 31.4% compared to women with no education. While primary school (incomplete or complete) has a significant negative effect on fertility, its effect on fertility is much smaller, indicating that the returns on education are concentrated in post-primary education. Partner education analysis showed that having a partner with secondary school or more decreased the number of children ever born. This result suggests that, in Malawi, the substitution effect of having children is greater than the income effect.

Having primary or no education has a similar effect on fertility (4%). A more significant gradient starts with secondary education, indicating that post-primary schooling is key for girls in reducing the number of children born (figure 9.12). Figure 9.13 shows the distribution of number of children ever born per woman by educational level, reflecting the

[70] The number of children ever born to a particular woman is a measure of her lifetime fertility experience up to the moment at which the data are collected.

FIGURE 9.12: Change in the Number of Children Ever Born (%)

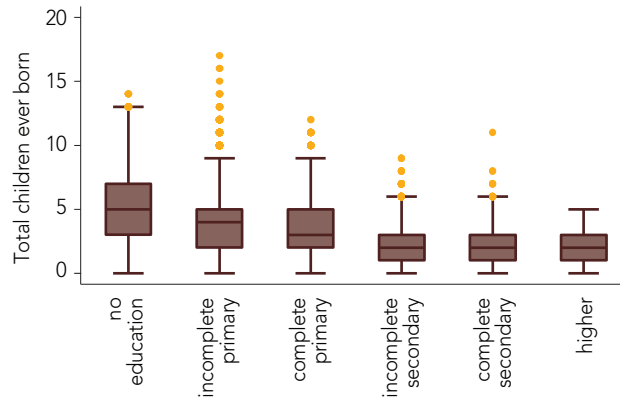


Source: Poverty assessment team calculations based on MDHS 2010.
Note: Sample 17,501. Model controls for age, age squared, and marital duration (not presented). Changes relative to poorest quintile, urban, Northern region, no education, and Chewa ethnicity. Cluster SE.

variability across the two groups (primary or less vs post-primary education). The median of women with no education is the highest: five children.

Women living in urban areas and in the Southern region tend to have fewer children than women in rural areas and in the Northern region. On average, women from rural areas have 7.5% more children than women in urban areas. Whereas women from the Southern region have 3.5% less children born than women in the Northern region. Yet, the differences across regions are small or not significant (such as Central vs. North). Finally, as expected, the earliest a women starts childbearing, the greater the number of children ever born. That is, a 1-year delay in a woman's first child signifies a reduction of 4.5% in the number of children she will bear.

FIGURE 9.13: Distribution of the Number of Children Ever Born, by Educational Attainment



Source: Poverty assessment team calculations based on MDHS 2010.

9.4 Fertility and Household's Poverty in Malawi

In the previous section, the cross-sectional analysis suggests that fertility decisions and household wealth are associated. This section assesses the relationship between fertility and household consumption and poverty using the IHS3 and IHPS panel data. Chapter 2 analyzes whether having an additional child in the household under 5 years old increased the chances of being poor or falling into poverty. This section employs women's individual characteristics to analyze the impact of having a newborn between 2010 and 2013 on the probability of falling into poverty, being chronically poor, and exiting poverty. The balanced panel contains household consumption information. Fertility information is limited to the number of biological children living in the same household as their mother, and a period fertility indicator, whether there was a child born in the last 24 months in the household (between the two rounds).[71] The assessment team estimates the

[71] Both IHS3 and IHPS include questions establishing links between children in the household and their biological parents if present in the household. The assessment team then was able to estimate an indicator of "own children" that can be linked to a mother's individual characteristics as well as households' variables, such as expenditure per capita and poverty indicators. The analysis of fertility then can be done at the individual level instead of using household size as proxy. Nevertheless, this indicator excludes children who died or who do not live in the same household as their mothers. When necessary, the team restricted the sample to women aged 12–49. The team also includes in the analysis a contemporaneous fertility variable that asked women of the same age whether they had had a child in the previous 24 months.

effect that fertility could have on per capita expenditure and on whether households with an additional child would be more likely to fall into poverty or to be chronically poor.

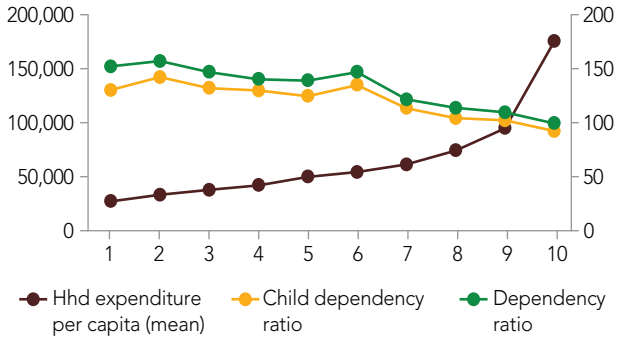
Household expenditure per capita is negatively associated with child and total dependency ratios. The relation between fertility and living standards in Malawi is analyzed on the basis of the IHPS data. Figure 9.14 shows the values that child and total dependency ratios and share of adults in the household take at different per capita expenditure deciles. Both dependency ratios correlate negatively with consumption per capita. The child dependency ratio ranges from 130 per 100 working-age population among the poorest 10% to 92 among the richest 10%, or approximately 67% of that for the poorest decile. Likewise, the share of adults in the household also correlates negatively with expenditure per capita.

Per capita expenditure is also associated with the number of women's own children living in the household. Figure 9.15 shows the results of a Poisson regression using the same approach as in the cross-sectional data using DHS. Only significant determinants are shown. Whereas the IHPS does not count variables related to age at birth or child mortality, it does permit including household consumption. The number of children among married women 15–49 decreased 18% if a woman had attained her Junior Certificate Examination (JCE), and decreased 16% if she had passed the Malawi School Certificate of Education Examination (MSCE). A 100% change in household per capita consumption signified an 8.8% change in the number of children. In comparison, women living in rural areas had 9% more children living in the same house.

The balanced panel dataset provides the possibility to study poverty dynamics and fertility indicators. Table 9.7 shows the distribution of number of children and the probability of having recent birth by poverty status. This indicator profiles poverty dynamics between the two rounds of the survey (2010 and 2013), differentiating between transient and chronic poverty.

A second regression using a poverty dynamics indicator shows that poverty was associated with the number of own children in the household. Figure 9.15 shows that women living in households that fell into poverty between 2010 and 2013 had a 20% higher number of children than women who never had been poor. Similarly, women who were chronically poor had 30% more children. Consistently, poor women exiting poverty were associated with a 6.6% increase in the number of children compared to women who never had been poor. The analysis also shows that women in rural areas

FIGURE 9.14: Age Dependency Ratios by Per Capita Expenditure Deciles, 2013



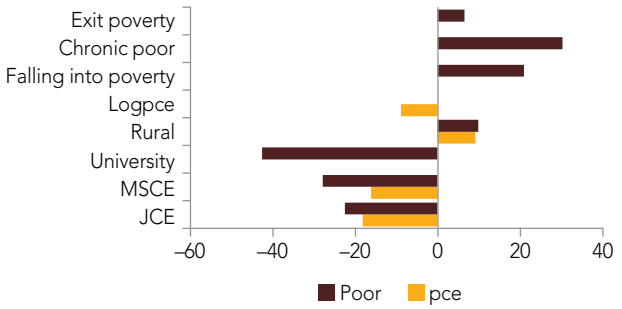
Source: Poverty assessment team calculations based on IHPS.

TABLE 9.7: Poverty Dynamics and Fertility Indicators IHS3-IHPS Balanced Panel, 2013

Poverty dynamics	Number of own children	Recent fertility (%)	Child dependency ratio
Always poor	2.64	31	137.22
Fall into poverty	2.71	35	137.35
Exit poverty	2.17	24	107.12
Never poor	1.85	25	90.08

Source: Poverty assessment team calculations based on IHS3 panel and IHPS.
Note: Recent fertility indicates the percentage of woman who had a child in the previous 24 months.

FIGURE 9.15: Change in Number of Children Born to All Women Living in the Household, 2013



Source: Poverty assessment team calculations based on IHS3 panel and IHPS.
Note: Only women aged 15–49 years. "Own children" excludes those living elsewhere and children who died. It includes any women in the household with children, not solely the spouse of head. Clustered standard errors.

TABLE 9.8: Effect of a Recent Birth on Poverty Dynamics, 2013

Dependent variable	Falling into poverty	Exiting poverty	Chronic poverty
Having a new-born child between 2010 and 2013	0.044**	0.024	0.026

Source: Poverty assessment team calculations based on IHS3 panel and IHPS.
Note: * = Significant at ** p < 0.01. Controls included rural, region, educational attainment, and hh size. Clustered standard errors.

had 10% higher expected number of children than women in urban areas. Furthermore, the analysis suggests that the expected number of children does not differ across regions. This result differed from the analysis that used DHS, indicating that women living in the Southern region have 3.5% less children born than women in the Northern region.

Education continues to be one of the key factors that decreases fertility, particularly educational levels higher than PSLC. For instance, attaining JCE or MSCE was associated with 35% and 49% reductions in the number of children, respectively.

A household's size and composition also increase its risk of falling into poverty. One additional child under the age of five in a household increased the chances of that household's being poor or falling into poverty by 9 percentage points (chapter 2). An additional child aged 6 to 9 years increased the chances by 7 percentage points (chapter 2). Using women's individual characteristics, the assessment team analyzed the impact of having a newborn between 2010 and 2013 on the probability of falling into poverty, being chronically poor, or exiting poverty. Table 9.8 suggests that having an additional child between round 1 and round 2 significantly increased the probability that a household would fall into poverty in round 2 by 4.4 percentage points. However, the additional child was projected to have no effect on either the likelihood of being chronically poor or exiting poverty.

These findings are consistent with the fact that an additional child could increase households' vulnerability, particularly for those whose incomes located them very close to the poverty line. Such households are more likely to fall into poverty with an exogenous shock, such as an additional child. This effect remained after controlling for household size. Aligned with these results, using data from Second Malawi Integrated Household Survey, Mussa (2014) found that, after accounting for endogeneity between fertility and poverty, fertility increases the probability of household objective poverty.

In this section, fertility was found to be closely linked with families' well-being and poverty. The relationship was bidirectional. On the one hand, household income, which is considered an important factor in fertility decisions, was associated negatively with the number of children and with having secondary education. These outcomes may indicate that better educational and work opportunities for women and men increase the opportunity cost of childbearing (substitution effect). On the other hand, having a new child in the family reduced household income per capita and increased the likelihood that the household would fall into poverty because children are net consumers who require food and other expenses.

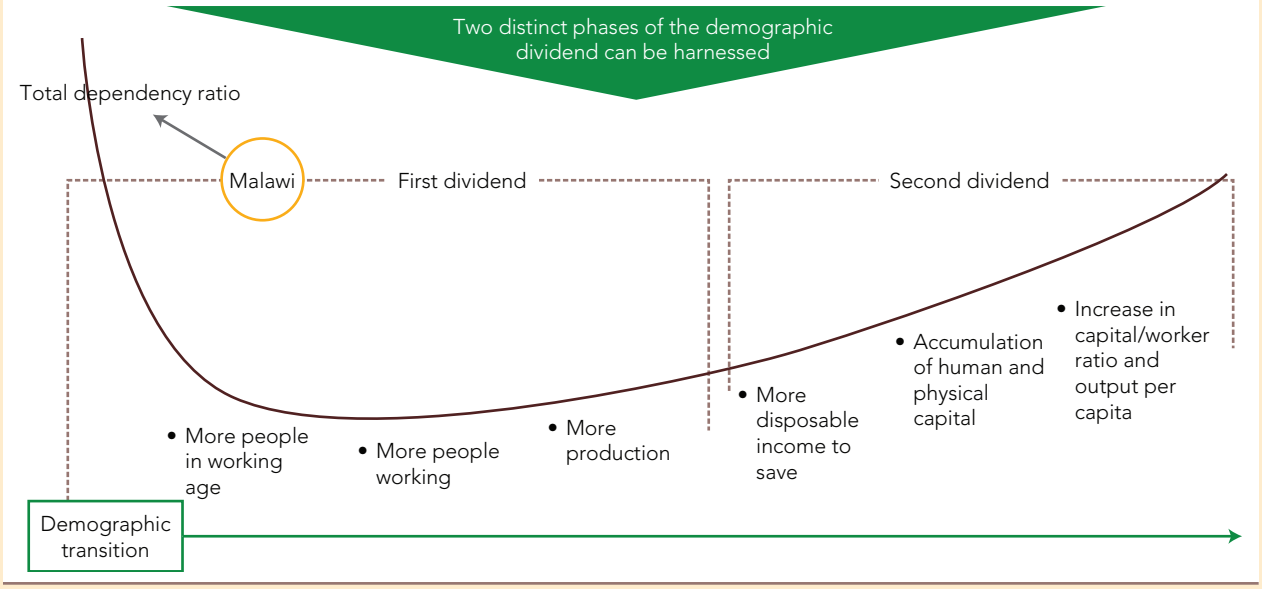
BOX 9.2: Demographic Dividend Model

As explained in the Introduction, the demographic dividend refers to the potential accelerated economic growth enabled by the opportunities created by lower dependency ratios occurring as part of the demographic transition. Two distinct phases can be identified (figure B9.2.1). The first dividend can be captured as the demographic transition speeds up and the population age structure (here represented by the total dependency ratio) becomes more concentrated around working ages. All else being equal, the larger share of working-age population delivers higher per capita growth.

The second phase comes later in the demographic transition if countries are able to increase savings and investments as a result of fewer dependent children, more disposable income, and prospects for longer lives. These investments in physical and human capital would result in higher productivity and higher aggregate production.

These demographic dividends are not automatic. In fact, to create the demographic conditions for the dividends and to be able to seize them, countries need to have in place the right policies.

FIGURE B9.2.1: Two Phases of Malawi's Demographic Dividend



9.5. *Unleashing the Demographic Dividend for Poverty Reduction and Economic Growth*

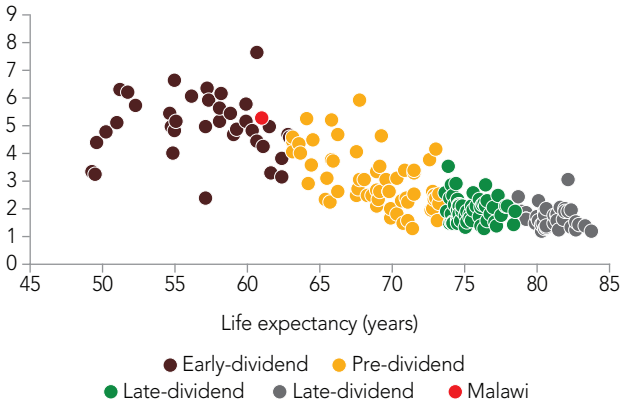
This section focuses on the ***second driver of the effects of population change on economic development: age structure***. Using the Demographic Dividend model (see box 9.2), the assessment team identified Malawi's challenges and opportunities in reaping the benefits of a demographic dividend in the next 35 years if adequate policies are in place. The section provides a general overview of Malawi's prospects based on the LINKAGE model,[72] which has been used to analyze the growth and poverty impacts of age structure changes.

According to the World Bank's 2015/2016 Global Monitoring Report, Malawi is a pre-demographic-dividend country (figure 9.16).[73] A

[72] Based on Ahmed and others (forthcoming). The LINKAGE model, a recursive dynamic computable general equilibrium (CGE) model (van der Mensbrugghe 2011), is used to examine the economic impact of demographic change on growth. The model then is used to consider the marginal impacts of different fertility rates on Malawi's economy by considering the age structure changes under the UN WPP's medium, high, and low fertility scenarios.

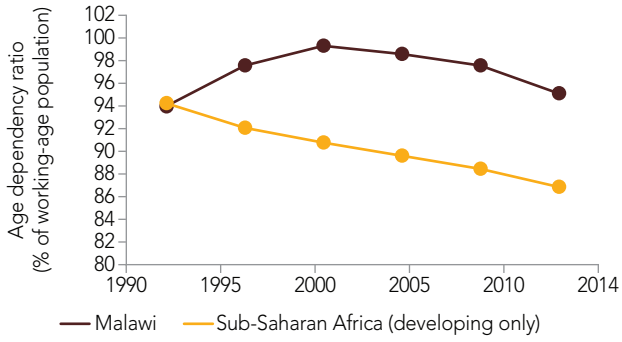
[73] This new typology distinguishes among countries in their abilities to harness demographic dividends based on the latest revision of the United Nations Population Division statistics

FIGURE 9.16: Demographic Dividend Country Typology



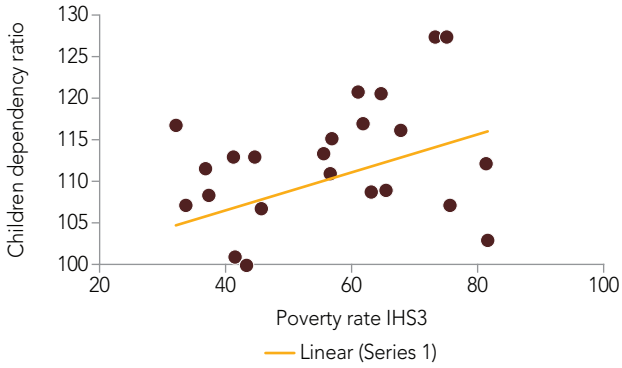
Source: World Bank Group 2016.

FIGURE 9.17: Total Dependency Ratio, 1990–2014



Source: WDI 2015 based on UN 2015.

FIGURE 9.18: Child Dependency Ratio by District, 2011



Source: IHS3 2011 (total sample).

pre-dividend country has a TFR higher than four in 2015 and is, therefore, characterized by a population age structure with a very large proportion of young (dependent) children. Most SSA countries are classified as pre-dividend countries. Some exceptions are Botswana, Ethiopia, Ghana, and South Africa, which are considered early-dividend countries. Countries that are similar to Malawi in life expectancy but with lower fertility rates are Congo, Kenya, and Liberia.

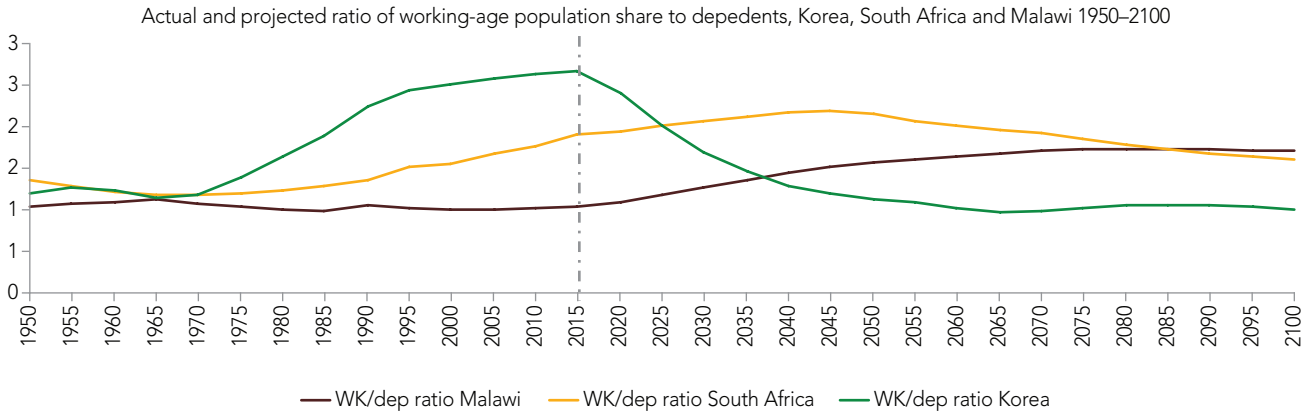
Over time, due to lower mortality and high fertility, Malawi's dependency ratio has increased. However, the ratio is expected to decline as fertility declines. In 2014 the country's total dependency ratio—the number of dependents relative to the working-age population—was estimated at 95.2, having risen even further than its already high value in 1990 (94.9) and above the SSA average of 86.8 (figure 9.17). The gap between Malawi and SSA also increased over time (figure 9.17). However, Malawi's dependency ratio varied greatly by district, ranging from 100 to 127 (figure 9.18).

Figure 9.18 also shows that districts in which dependency ratios were higher also had higher poverty rates. For example, Mangochi and Machinga had poverty rates above 70%, and child dependency ratios of approximately 127. All ratios in Malawi were above 100, indicating that, in Malawi, for every 100 working-age persons, there were at least the same number of dependents.

Based on the UN's medium-term fertility projection, starting in 2015, Malawi's dependency ratio is expected to decline and the working-age share of the population to dependents increase (figure 9.19). Considering that fertility has declined very slowly until now, the increase will be gradual rather than

(2015). According to this classification, a pre-dividend country lags in human development and exhibits fertility levels above four births per woman. These countries experience rapid population growth and high dependency ratios, but they are expected to move gradually toward lower fertility. They are in need of laying the foundations for realizing their first demographic dividend (World Bank Group 2016).

FIGURE 9.19: Actual and Projected Ratios of Working-Age Population Share to Dependents: Malawi, South Africa, and Korea, 1950–2100



Source: Poverty assessment team calculations based on UN projection (2015).

rapid. Given the estimated fertility rates, Malawi is expected to take 60 years to reach a ratio of 1.7 workers per dependent. In contrast, South Africa started its transition earlier, and despite experiencing a gradual decrease, it is estimated to reach a workers-to-dependents ratio of 2.0 in 2015. Korea, which is a good example of a country benefitting from the demographic dividend, had a fast fertility transition. In 25 years, its fertility rate fell from 5.4 children per woman in 1950 to 2.9 in 1975. Because of this fast transition, Korea's age structure changed rapidly, and the workers-to-dependents ratio has remained above 2.0 for the last 20 years.

9.5.1. *Accelerating the demographic transition could boost economic growth and poverty reduction: An example of demographic dividends from Malawi*

This last section identifies Malawi's opportunities for poverty reduction and economic development that can be created by changes in the age structure in the next 35 years if adequate policies are put in place. The section is based on the LINKAGE model, which has been used to analyze the growth and poverty impacts of age structure changes. The model is based on neoclassical growth theory in which aggregate growth depends on labor force, capital stock, and productivity. The growth of the labor supply is determined by the growth of the working-age population in each scenario. Savings is determined endogenously as a function of past savings, GDP growth, the child dependency ratio, and the aged dependency ratio. Past savings and GDP growth affect savings positively; the two dependency ratios affect it negatively. The reason for the latter is that, as dependency rises, households' propensity to consume increases.[74] **When high-fertility countries begin the fertility transition, they experience shifts in age structure that can boost economic development**. After fertility rates begin falling, the share of children in the population eventually begins declining. At the same time, the share of people of working age (commonly recognized as 15 to 64 years) begins rising, giving the economy the potential to realize a demographic dividend to development. Rising shares of people of working age suggest that the labor supply can grow faster than the total population—even if employment ratios remain constant—and thus lead to an increase in workers per capita. The result would be

[74] Falling dependency ratios are expected to boost savings and investment (Higgens and Williamson 1997; Loayza and others 2000).

an automatic increase in real GDP per capita growth. If the higher numbers of workers are saving at least at the same rate as previous generations, there also would be an increase in aggregate savings. If these savings can be converted to productive investment, they would speed up capital formation and improvements in capital-to-worker ratios—all leading to an even faster real GDP per capita growth. An increase of one percentage point in the working-age population share is estimated to boost GDP per capita by 1.1 to 2.0 percentage points. The rapid growth of East Asia in past decades has been attributed to its realization of the demographic dividend.[75]

As households' child-dependency ratios fall and the shares of working-age people increase, per capita income is likely to rise and poverty could fall. Families who have fewer children will have more per capita resources at their disposal for consumption as well as for investment. Evidence from Bangladesh suggests that demographic factors, including age structure, gender, and regional distributions of populations accounted for 25% of the rapid reductions in poverty that occurred between 2000 and 2010 (World Bank 2013). Between 1971 and 2004, Bangladesh halved its fertility rate, decreasing from more than six children per woman to approximately three. The country is on track to reach replacement rates in the coming decades. Cross-country estimates suggest that a 1.00 percentage point reduction in the child dependency ratio is associated with a reduction of 0.38 percentage point in the poverty headcount rate (World Bank 2015).[76]

Malawi is a high-fertility country so modest accelerations in its fertility decline could lead to substantial changes in its projected age structure. The country currently has a total fertility rate (TFR) of 5.25. Under the UN WPP median fertility scenario, the TFR is projected to fall to only 3.96 children by 2030 and 3.16 children by 2050 (figure 9.20a). With these fertility rates, the population share of children will remain high for several decades. The share of children in the population peaked in the 1980s at over 47%. Since then, it fell and then rose again before beginning a downward trend that is expected to persist through future decades (figure 9.20b). Currently, children account for 45% of the population, will account for more than 41% by 2030, and for more than 33% by 2050. Currently, the working-age population accounts for 51% of the population. This age cohort will account for 61% of the population by 2050. If fertility declines are slower, as under the WPP's high-fertility scenario, then the future population's share of children will be even higher. In contrast, if fertility reductions are more rapid in the future, as under the WPP's low fertility scenario, then there will be more potential workers by 2050 due to the higher share of people aged 15–64.

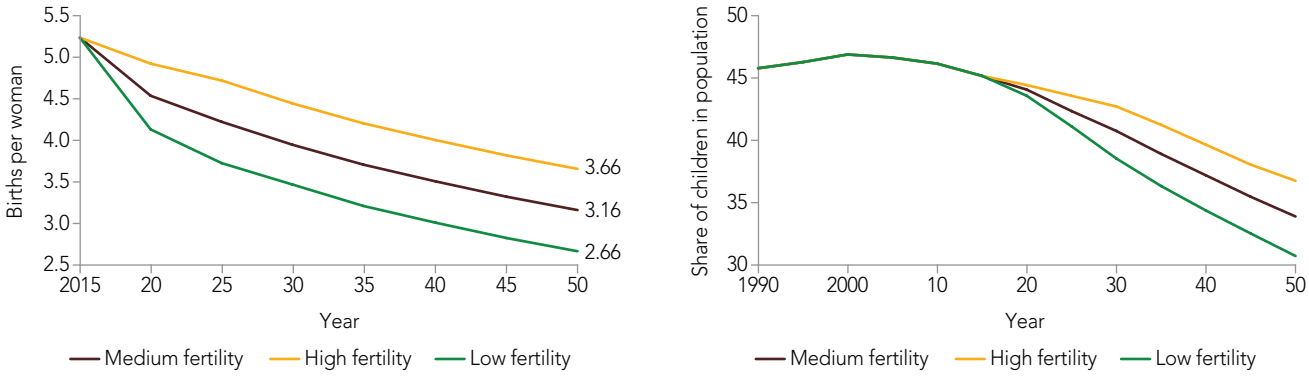
Scenario analysis suggests that a 1-child difference in Malawi's fertility rates by 2050 could lead to differences of 31% in real GDP per capita (figure 9.21). Under the UN WPP medium fertility scenario, simulations of Malawi's economic growth using the LINKAGE economic model suggest that real GDP per capita could grow from $314 (constant US$) in 2015 to $446 by 2030, and to $1,024 by 2050.[77] However, under the WPP's high fertility scenario, growth would be more modest, reaching $892 by 2050. Under the low-fertility scenario, per capita income in 2050 would be $1,163.

[75] World Bank (2015a) provides empirical estimates of the impact of the age structure changes on growth and poverty reduction, in addition to an extensive review of the demographic dividend literature. Bloom and Williamson (1998) and Bloom and others (2000) provide empirical evidence of East Asia's demographic dividend.

[76] The child dependency ratio is the ratio of the under-15 population to the population aged 15–64. The aged dependency ratio is the ratio of the over-64 population to the population aged 15–64.

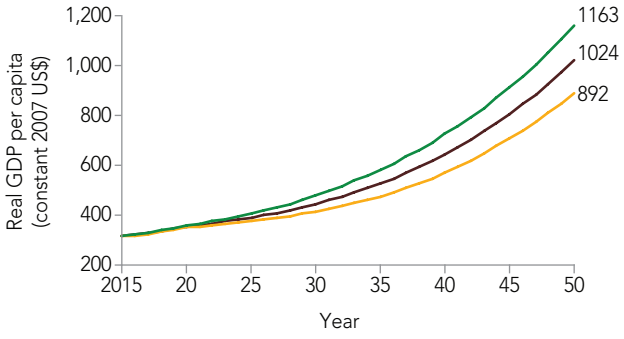
[77] The LINKAGE model was used to analyze the growth and poverty impacts of age structure changes as in Ahmed and others (forthcoming). The models showed that demographic change between 2015 and 2030 could explain 11%–15% of GDP volume growth and 40 million–60 million fewer poor in Sub-Saharan Africa by 2030. The analytical framework also was used to examine the impact of demographic change on the global economy in World Bank (2015a) and on South Africa (World Bank 2015b). Additional details on the methodology can be found in Technical Appendix 2 (Appendix A9.4). However, the scenario analysis does not account for any discrete structural changes in Malawi's economy that could occur, such as unanticipated infrastructure investments. Therefore, the simulation results should be considered illustrative and as highlighting the marginal impacts of demographic change rather than as forecasts.

FIGURE 9.20: Lower Future Fertility Rates Could Substantially Decrease Share of Children in Malawi's Population in Medium and Long Terms



Source: United Nations data 2015.

FIGURE 9.21: One-Child Difference in Malawi's Fertility Rates by 2050 Could Lead to Differences of 30% in Real GDP Per Capita *(constant 2007 US$)*



Source: Simulation results from LINKAGE.
Note: The scenarios consider the age structure changes projected in the 2015 UN WPP medium, high, and low fertility scenarios.

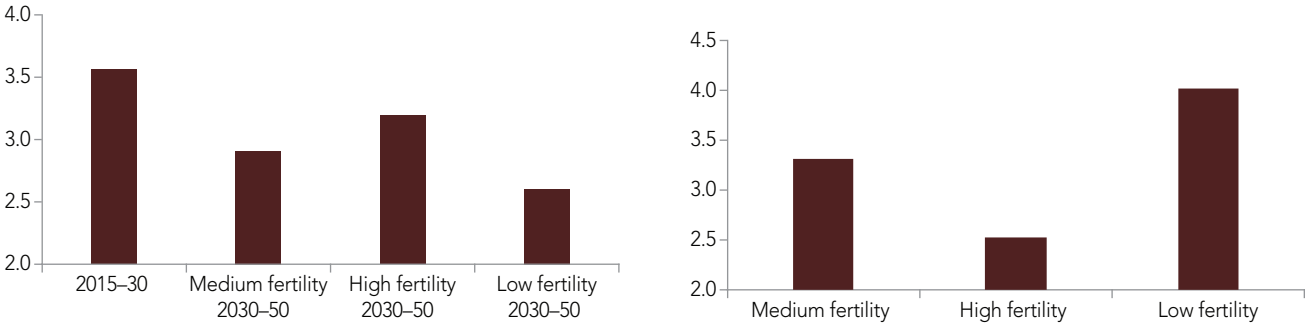
Differences in fertility rates also could affect the structure of the economy, as illustrated by the rate of capital deepening in different scenarios, with differences becoming more pronounced only after 2030. Capital formation is faster in scenarios with lower child-dependency ratios because savings and subsequently investment are greater. At the same time, the growth rate of the labor supply is relatively similar across the different UN WPP scenarios and, in fact, is the same across scenarios until 2030 (figure 9.22a).[78] Therefore, lower fertility scenarios see a faster increases in capital-to-worker ratios than does higher fertility, given the former's faster capital accumulation (figure 9.22b).

The model likely understates the marginal economic benefits of fertility reductions. The analysis makes the conservative assumption that the skill-share of the labor force remains constant into the future.[79] In the model, skilled and unskilled labor supply grows at the same rate as the working-age population, making the skill composition of the labor-force (proportion of skilled/unskilled labor force) constant throughout the simulation period. If Malawi manages to increase its human capital, the growth implication of the demographic transition would be even greater as the additional working-age population becomes more effective and participates more in production. As recent evidence from South Africa suggests, rapid improvements in educational attainment and employment ratios can help

[78] A fertility change today would affect the working-age population size only after 2030, when a child born in 2015 would become 15 years old.

[79] This assumption leads to a future labor force whose skill-share is lower than what is predicted by the most pessimistic scenario of Samir and others (2010). However, the assumption enables a clearer comparison of the direct impacts of changes in aggregate labor supply and savings due to age structure changes because the relative supplies of skilled and unskilled labor are held constant.

FIGURE 9.22: Average Growth Rates of Working-Age Population and Capital-to-Labor Ratios by Fertility Scenarios, 2015–2050



Source: Panel a: United Nations 2015; Panel b: Simulation results from LINKAGE.
Note: The scenarios consider the age structure changes projected in 2015 UN medium, high, and low fertility scenarios.

countries take greater advantage of high or growing working-age populations (World Bank 2015b).

The scenario analysis also does not consider the impact of declining child-dependency ratios in boosting productivity, which omission could also contribute to an underestimation of possible benefits. As the number of children per household falls, the public and household-level spending per child can be deepened. Since there will be fewer children to demand services, spending on education, healthcare, and early childhood development (ECD) interventions can be increased with the same budget. With greater investments in the human capital of children, there will be direct improvements in human development outcomes. The productivity of these children will exhibit permanent improvements, leading to higher incomes over the life-cycle and contributions to aggregate economic growth.

Conclusions

In summary, as are other several countries in SSA, Malawi is still in the early stages of its demographic transition, with high fertility rates and dependency ratios. Nevertheless, there is still potential for it to benefit from the demographic dividend if preconditions and strategic policies are in place. Six conclusions/recommendations follow.

The highest priority is to accelerate fertility decline. Malawi's young age structure generates an extremely high proportion of dependents as a share of working-age population. Such a ratio is associated with higher poverty levels. The extent to which population growth and changes in age structure will affect Malawi's prospects in the next decades will depend greatly on its capacity to accelerate fertility decline. Succeeding, first, will positively affect economic growth because a 1-child difference in fertility rates by 2050 could lead to differences of 31% in real GDP per capita. Second, accelerating fertility decline will determine the share of children as a share of the population. The resulting ratio affects greatly the level of public resources and investments. Third, lower fertility will have a positive affect at the household level on health and education of children and mothers, especially young mothers.

To harness the demographic dividend, policies are required that both hasten the transition to smaller family size and generate the conditions for increased productivity. Malawi requires polices that will sustain its reduction of child mortality and help couples to achieve a smaller family size. A faster demographic transition would greatly increase the short-term benefits of the transition. Policies in four key areas would accelerate the fertility transition and increase the demographic dividend:

(1) increase female education; (2) improve access to quality and comprehensive family planning services, in particular expanding the contraception method mix; (3) reduce the proportion of child marriage and early childbearing; and (4) empower women at all ages. Improvements in these four areas are desirable regardless of the potential economic payoffs, but they should receive even higher priority than they do today.

Chapter 9 demonstrates that secondary education is key to reduce fertility. The fact that the wealthiest and better-educated women in Malawi not only have lower fertility rates but also their rates are closer to their ideal family sizes implies a proven path to lower fertility. Findings highlight the importance of empowering women by ensuring their equal access to education, particularly secondary education. Malawian women with complete or incomplete primary educations have fertility patterns similar to those with no education. Education's significant effect on fertility emerges does not emerge until secondary school.

A related and urgent element to reduce fertility and increase educational attainment is to reduce early marriages and childbearing. Chapter 9 shows that Malawi's adolescent fertility rates are among the world's highest. Reducing child marriage and teenage pregnancy, especially among the poorest population, who suffer the most, is key to ensure these young women's access to education and labor opportunities. Also important are shortening the period of motherhood and improving birth spacing practices. As Canning and Schultz assert, "Improvements in reproductive health and access to family planning benefit the economy by improving general health and reducing fertility (by reducing both the average number of children per woman, and the number of high-risk births for adolescent's mothers and women at high-parity)" (2012).

Over the last 10 years, Malawi has made substantial progress in increasing contraception use, especially in reducing disparities across income levels and regions. However, this significant increase in use has not translated into decreased fertility rates. Reducing fertility rates is particularly important for the poorest 40%. Despite doubling their contraception use from 26% to 42% between 2004 and 2010, their fertility rates remained at the same high levels (6.8 births) as in 2004. This persistent plateau calls for a better understanding of its causes. Both poor adolescent and poor older women are less likely to use modern contraception, and their demand is not met. Malawi also needs to increase its method-mix, which depends primarily on injectable contraceptives.

The demographic dividend will be even greater if young workers are employed productively. During the initial period of the demographic transition, the rise in the ratio of working-age to dependent population produces an automatic demographic dividend. However, keeping younger workers employed may be difficult during this early period because the absolute numbers of youth are rising, and the economy may not be able to absorb the cohort into productive employment. Nevertheless, investment in the human capital of the young is essential. An improved education sector able to provide quality education and enhanced progression rates paves the path for a productive workforce. It is also important to encourage female employment outside the home, to improve the business environment to build demand for labor, and to attract foreign direct investment.

APPENDICES

Appendix A1.1

Selected Indicators by Monetary Poverty Status, 2004–2010

Selected Indicators	Monetary poverty status (2004)			Monetary poverty status (2010)		
	Non-poor	Poor	All	Non-poor	Poor	All
Demographics						
Sex of head (% male)	78.7	75.0	77.1	77.8	73.6	76.0
Household size	3.8	5.4	4.5	4.0	5.3	4.5
Dependency ratio	0.8	1.4	1.1	0.9	1.4	1.1
Education						
Primary completion (at least one household member)	48.6	32.1	41.4	59.1	37.1	49.5
Secondary completion (household head)	9.1	1.1	5.6	14.8	1.5	9.0
Secondary completion (at least one household member)	11.1	1.7	7.0	18.1	3.0	11.5
Household economic diversification						
Farm self-employment (household head)	57.6	71.1	63.5	51.8	66.5	58.2
Non-farm self-employment (household head)	23.7	16.3	20.5	17.5	8.4	13.5
Non-farm wage employment (household head)	21.8	12.5	17.7	23.2	8.4	16.8
Ganyu work (household head)	13.6	18.8	15.8	13.9	21.3	17.1
Asset ownership						
No bicycle	60.7	68.2	63.9	59.1	64.3	61.4
No motor transportation (car/truck/ motorcycle)	97.1	99.9	98.3	96.3	99.8	97.8
No television	93.7	99.6	96.3	85.0	99.4	91.3
No refrigerator	96.5	100.0	98.0	94.1	100.0	96.7
No telephone	94.6	99.8	96.9	49.9	81.4	63.7
Health, sanitation, and utilities						
Household had death of child/children under-5	6.3	6.8	6.5	2.0	2.7	2.3
No electricity	90.2	99.5	94.3	87.4	99.8	92.9
No running water	91.7	99.0	94.9	87.1	99.1	92.3
No improved sanitation	51.6	49.8	50.8	41.8	42.7	42.2
No quality walls	31.5	37.3	34.1	16.1	26.8	20.8
Area of residence						
Urban	17.0	5.5	12.0	24.0	4.8	15.6
Rural	83.0	94.5	88.0	76.0	95.2	84.4
Regions						
North	10.3	10.6	10.4	11.8	13.6	12.6
Center	46.7	34.6	41.4	43.8	36.5	40.6
South	43.0	54.8	48.2	44.3	49.9	46.8
Household economic diversification[a]						
Produce maize	96.5	97.1	96.8	97.6	96.3	97
Sell maize	21.4	13.1	17.5	19.2	11.6	15.5
Produce/sell tobacco	18.5	13.1	16	16.7	12.4	14.6

(continued on next page)

Selected Indicators by Monetary Poverty Status, 2004–2010 *(continued)*

Selected Indicators	Monetary poverty status (2004)			Monetary poverty status (2010)		
	Non-poor	Poor	All	Non-poor	Poor	All
Use of inputs[a]						
Use of Improved/purchased seeds	49.8	45.5	47.8	56.4	48.9	52.7
Use of inorganic fertilizer	69.9	60.5	65.5	83.5	69	76.4
Participation in extension and access to credit[a]						
Participation in extension (agricultural households)	13.8	11.6	12.8	24.1	20	22.1
Receipt of loans/credit	13.6	9.7	11.8	14.8	10.5	12.7

Source: Malawi Poverty Assessment team calculations based on IHS2 and IHS3.
Note:
[a] Agricultural households.

Appendix A2.1

Probability of Being Chronically Poor in 2013

Initial conditions		
Household size	0.197	***
Dependency ratio	0.007	*
Household head		
Female	0.087	
Age	–0.012	
Age squared	0.000	
Primary	–0.259	
Secondary	–0.202	
Tertiary	–0.754	**
Urban	0.507	*
North	–0.243	
Centre	0.417	
Latitude	0.284	***
Longitude	0.449	***
Changes across rounds		
Additional members	0.229	***
Additional children 0–5 years	0.285	**
Additional children 6–9 years	0.225	**
Additional children 10–14 years	0.150	**
Additional members 65 years or more	0.560	***
Move from urban to rural areas	–0.141	
Move from rural to urban areas	–0.612	
Distance between rounds (lnkm)	0.001	
Other		
Distance to road (km)	0.013	**
Agricultural index	–1.526	***
Non–agr. self–employment share	–0.005	**
Agricultural wage share	0.003	
Non–agricultural wage share	–0.007	**
Constant	–12.838	**
N	4795.000	

Source: Poverty Assessment team calculations based on IHS3 panel and IHPS.

Appendix A2.2

Trends in Deprivations and Endowments by Poverty Transition, 2010 and 2013

Selected indicators	Stayed non-poor			Became non-poor			Became poor			Stayed poor		
(% of population)	2010	2013		2010	2013		2010	2013		2010	2013	
Access to utilities and sanitation												
No electricity	86.3	82.9	***	99.9	97.0	***	97.3	98.6	**	100.0	99.7	
No nonsolid cooking fuel power	95.4	96.6	**	100.0	99.3		99.6	99.8		99.7	100.0	
No safe drinking water[2]	15.7	12.4	*	17.8	16.2		22.7	20.8		20.2	20.9	
No running water	87.6	86.4		98.7	97.9		98.2	97.7		98.9	99.7	*
No improved sanitation	32.9	31.2		38.4	38.1		40.9	32.8	**	39.1	33.3	*
Quality of housing infrastructure												
No quality walls[3]	17.5	13.2	***	24.9	20.9		25.5	21.7		39.3	27.3	***
No improved house floor	58.3	57.0		89.3	80.6	***	80.3	83.0		93.8	90.2	***
Asset ownership												
No bicycle	49.0	47.8		59.8	49.4	***	53.8	59.6	**	64.9	62.2	
No car/motorcycle	95.0	94.2		100.0	98.6		98.2	100.0	*	100.0	99.7	
No television	81.5	75.8	***	98.9	95.4	***	95.8	97.2		99.6	99.2	
No refrigerator	93.1	89.1	***	100.0	99.7	***	99.3	99.4		100.0	99.9	
No telephone	42.0	35.4	***	72.8	7.0	***	62.0	62.9		82.4	76.8	**
No assets/MPI definition[4]	37.1	33.8	*	66.9	52.7	***	53.2	65.2	***	78.0	73.2	**
Asset Indices												
Wealth and education index	0.6	0.6	***	0.3	0.4	***	0.4	0.4		0.3	0.3	***
Agriculture and land index	0.4	0.4		0.3	0.4	***	0.4	0.4	***	0.3	0.3	
Income shares												
Non-agric. self-employment	16.2	21.0	***	7.4	15.8	***	12.8	14.5		6.5	8.4	
Agricultural wage	12.0	11.9		22.3	18.0	*	15.2	20.7	***	25.0	25.8	
Nonagricultural wage	19.8	16.2	***	8.4	7.6		12.0	5.4	***	6.1	3.7	
Demographics												
Household size	5.2	5.2	*	6.1	5.7	***	6.0	6.5	***	6.4	6.7	***
Dependency ratio	45.4	45.0		55.4	49.8	***	54.0	56.1	**	58.2	56.0	***
Household head **(%)**												
No education	62.1	61.7		85.7	83.3		80.0	79.2		90.8	88.3	**
Primary	11.2	12.1		7.3	6.6		9.8	12.0		4.1	5.0	
Secondary	22.8	21.2		6.9	9.1	*	10.1	8.8		5.1	6.7	***
Tertiary	3.9	5.0	*	0.1	1.0		0.1	0.0		0.0	0.0	

Source: Poverty Assessment team calculations based on IHS3 panel and IHPS.

Note:

[1] Items in italic are deprivations that enter the construction of the Multidimensional Poverty Index (MPI) discussed in chapter 3;

[2] Due to data issues, we do not account for distance to source;

[3] Quality walls include brick (mud and burnt) and concrete;

[4] Members of the household are considered deprived if the household does not own more than one of: radio, TV, telephone, bike, motorbike or refrigerator and does not own a car or truck.

Significance level of the difference: 1% (***), 5% (**), and 10% (*).

Appendix A3.1

Selected Indicators by Multidimensional Poverty Status, 2004 and 2010

	Multidimensional poverty status (2004)			Multidimensional poverty status (2010)		
Selected indicators	MPI non-poor	MPI poor	All	MPI non-poor	MPI poor	All
Demographics						
Sex of head (% male)	82.0	75.3	77.1	81.0	73.0	76.0
Household size	4.6	4.5	4.5	4.6	4.5	4.5
Dependency ratio	0.8	1.2	1.1	0.8	1.3	1.1
Education						
Primary completion (at least 1 household member)	97.7	21.9	41.4	97.2	20.9	49.5
Secondary completion (household head)	16.3	1.8	5.6	20.4	2.2	9.0
Secondary completion (at least 1 household member)	20.5	2.3	7.0	26.3	2.7	11.5
Household economic diversification						
Farm self-employment (head)	50.0	68.1	63.5	48.6	64.0	58.2
Non-farm self-employment (head)	22.2	19.9	20.5	16.4	11.8	13.5
Non-farm wage employment (head)	30.6	13.3	17.7	27.6	10.2	16.8
Ganyu work (head)	8.0	18.6	15.8	12.1	20.1	17.1
Asset ownership						
No bicycle	57.0	66.4	63.9	55.3	65.0	61.4
No motor transportation (car/truck/motorcycle)	95.3	99.3	98.3	94.9	99.6	97.8
No television	88.7	98.9	96.3	80.5	97.7	91.3
No refrigerator	93.5	99.6	98.0	91.7	99.7	96.7
No telephone	89.7	99.3	96.9	40.9	77.4	63.7
Health, sanitation, and utilities						
Household had death of child/children under-5	5.0	7.1	6.5	2.2	2.4	2.3
No electricity	82.3	98.5	94.3	82.9	98.9	92.9
No running water	85.4	98.2	94.9	83.5	97.6	92.3
No improved sanitation	40.9	54.3	50.8	35.8	46.1	42.2
No quality walls	20.4	38.8	34.1	12.3	25.9	20.8
Area of residence						
Urban	26.1	7.0	12.0	27.9	8.2	15.6
Rural	73.9	93.0	88.0	72.1	91.8	84.4
Regions						
North	14.8	8.9	10.4	18.8	8.9	12.6
Center	37.8	42.7	41.4	38.4	42.0	40.6
South	47.4	48.4	48.2	42.8	49.1	46.8
Household economic diversification[a]						
Produce maize	96.3	96.9	96.8	96.8	97.1	97.0
Sell maize	21.5	16.2	17.5	18.6	14.0	15.5

(continued on next page)

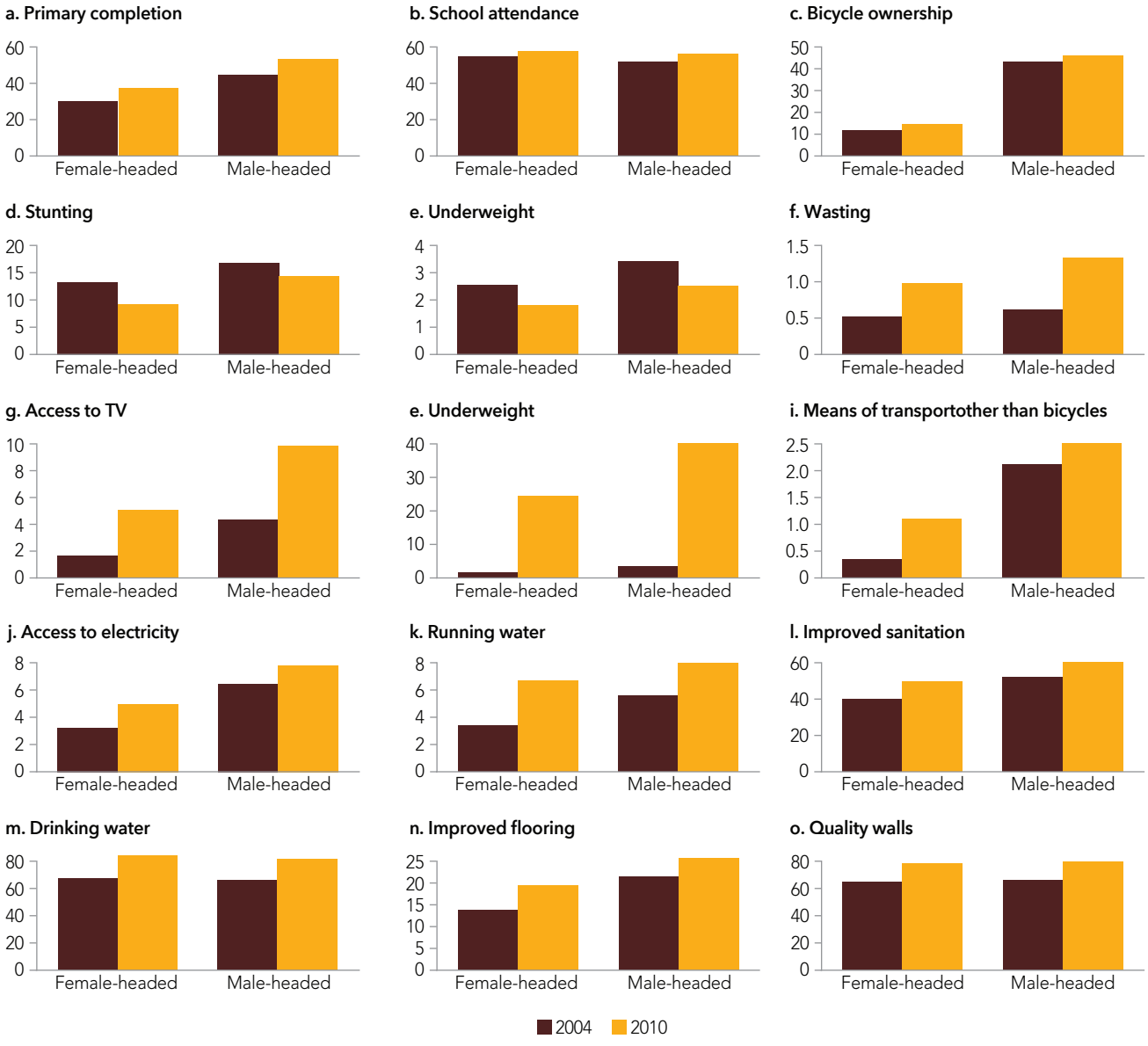
Selected Indicators by Multidimensional Poverty Status, 2004 and 2010 *(continued)*

Selected indicators	Multidimensional poverty status (2004)			Multidimensional poverty status (2010)		
	MPI non-poor	MPI poor	All	MPI non-poor	MPI poor	All
Produce/sell tobacco	17.2	15.6	16	16.8	13.5	14.6
Use of inputs[a]						
Use of improved/purchased seeds	52.9	46.0	47.8	57.2	50.5	52.7
Use of inorganic fertilizer	75.3	62.1	65.5	85.0	72.1	76.4
Participation in extension and access to credit[a]						
Participation in extension (agricultural households)	14.8	12.1	12.8	23.1	21.6	22.1
Receipt of loans/credit	15.9	10.4	11.8	15.9	11.1	12.7

Source: Malawi Poverty Assessment team calculations based on IHS2 and IHS3.
Note: Agricultural households

Appendix A3.2

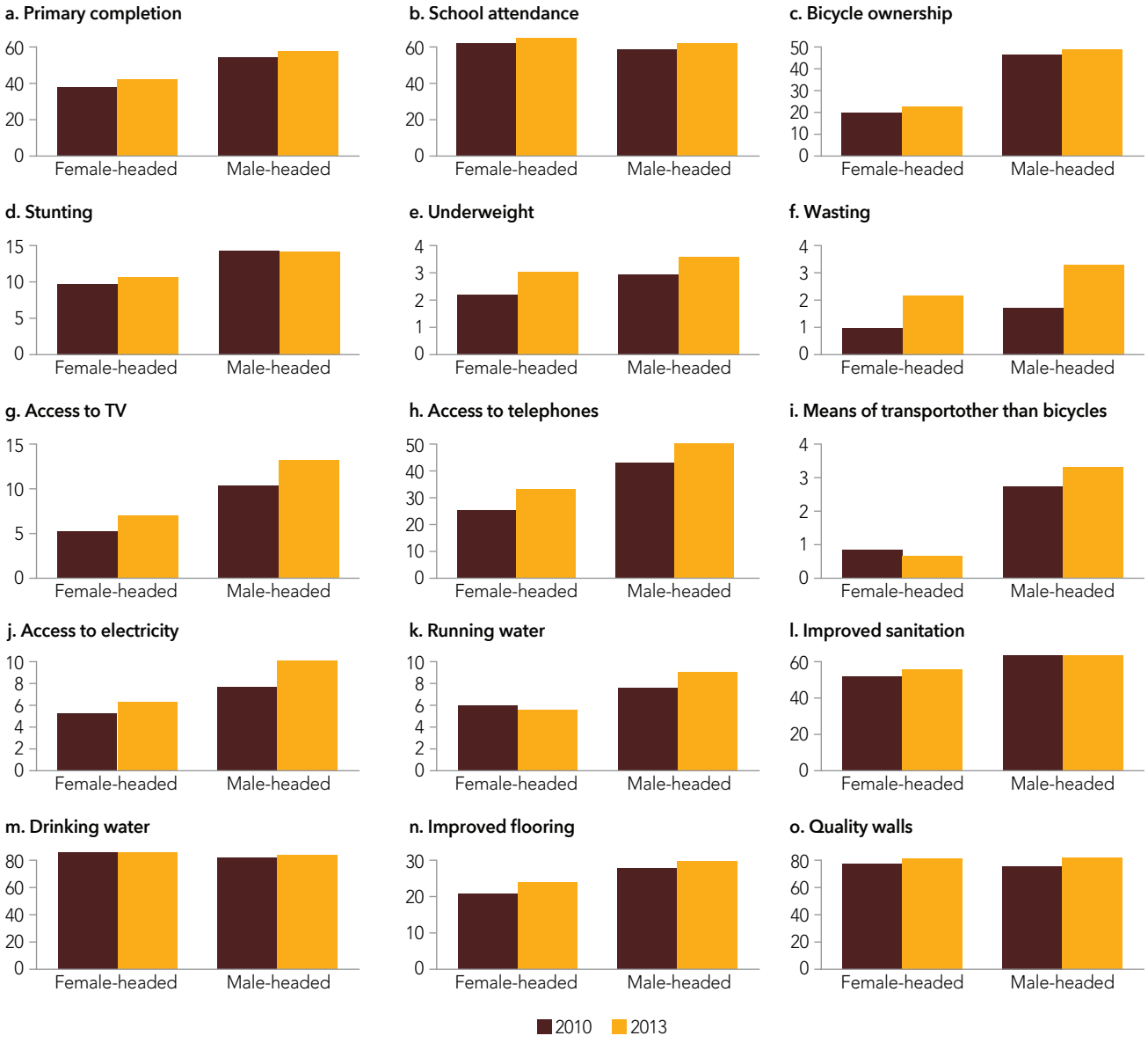
Trends in Selected Non-Monetary Indicators by Gender of Household Head, 2004 and 2010



Source: Malawi Poverty Assessment team calculations based on IHS2 and IHS3.

Appendix A3.3

Trends in Selected Non-Monetary Indicators by Gender of Household Head, 2010 and 2013



Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.

Appendix A5.1

Correlates of Crop Income per Capita, 2-Stage Model, Rural Areas, 2004 and 2010

Dependent variable	Crop income per capita, Rural areas Coefficients											
Log (crop income per capita)	Pooled				IHS2–2004				IHS3–2010			
Explanatory variables	Participation		Returns		Participation		Returns		Participation		Returns	
Sex of the head (Male=1)	0.0186		0.0015		0.1093	+	–0.0044		–0.0493		–0.0085	
Age of the head	–0.0062		0.0114	**	0.0051		0.0054		–0.0172	*	0.0161	**
Age of the head squared	0.0001	+	–0.0001	+	0.0000		0.0000		0.0002	*	–0.0001	*
Years of schooling of head	–0.0144	**	0.0088	**	–0.0195	**	0.0084	**	–0.0107	+	0.0093	**
Household adult equivalents	0.0314	**	–0.1721	**	0.0252		–0.1674	**	0.0365	*	–0.1775	**
Log maize yield	0.0615	**	0.0780	**	–0.0030		0.0511	**	0.1626	**	0.1565	**
Use improved seeds	–0.2225	**	–0.0203		–0.2822	**	–0.0814	**	–0.1927	**	0.0363	
Use inorganic fertilizer	0.0419		0.1111	**	–0.0803		0.1141	**	0.1097	*	0.0777	*
Use organic fertilizer	0.1270	*	0.0659	**	0.1159		0.0494	+	0.1191	+	0.0889	**
Area tercile II	0.1812	**	0.1295	**	0.2659	**	0.0857	**	0.1659	**	0.2107	**
Area tercile III	0.2931	**	0.2586	**	0.3026	**	0.1987	**	0.3366	**	0.3761	**
Received public extension	0.1514	**	0.0700	**	0.1425		0.0340		0.1485	**	0.1048	**
Sold maize	0.4096	**	0.1103	**	0.4278	**	0.1659	**	0.3660	**	0.0368	
Produced/sold tobacco	0.7877	**	0.3327	**	0.6631	**	0.3588	**	0.8679	**	0.2764	**
Sold other crops	0.7458	**	0.2319	**	0.8754	**	0.2982	**	0.6071	**	0.1394	**
Received credit/loans	–0.0753		0.0105		–0.0051		0.0471		–0.0931		–0.0218	
Year dummy (year=2010)	–0.2064	**	0.2266	**	—		—		—		—	
Region Fixed Effects	Yes		Yes		Yes		Yes		Yes		Yes	
Sold Livestock	0.2851	**	—		0.3227	**	—		0.2315	**	—	
Self–Employment	–0.1365	**	—		–0.1979	**	—		–0.0837		—	
Non–Farm Wage	–0.1446	**	—		–0.2671	**	—		–0.0035		—	
Farm Wage	0.0396		—		0.1487	**	—		–0.0142		—	
Constant	1.0338	**	8.7043	**	1.2306	**	9.0479	**	0.3248		8.1979	**
Lambda Mills			–0.8708	**			–1.0331	**			–0.6242	*
Observations	16,943		15,945		8,821		8,410		8,122		7,535	
rho	–0.8119				–0.9932				–0.5757			
sigma	1.0725				1.0402				1.0841			

Source: Malawi Poverty Assessment team calculations based on IHS2 and IHS3.
Note: Significance level of the point estimates and differences: 1% (**), 5% (*), and 10% (+).

Appendix A5.2

Correlates of Self-Employment Income per Capita, 2-Stage Model, Rural Areas, 2004 and 2010

Dependent variable	Self–employment income per capita, Rural areas Coefficients											
Log (Self-employment income pc)	Pooled				IHS2–2004				IHS3–2010			
Explanatory variables	Participation		Returns		Participation		Returns		Participation		Returns	
Sex of the head (Male=1)	0.1240	**	0.1533	+	0.1561	**	–0.0110		0.0752		0.4417	**
Age of the head	0.0039		0.0133		0.0030		0.0141		0.0032		0.0153	
Age of the head squared	–0.0001	**	0.0000		–0.0001	*	0.0000		–0.0001	+	0.0001	
Years of schooling of head	0.0021		0.0339	**	–0.0057		0.0488	**	0.0134	**	0.0169	
Household adult equivalents	0.0464	**	–0.2636	**	0.0464	**	–0.2516	**	0.0508	**	–0.2929	**
Area tercile II	0.0368		–0.0958		–0.0038		0.0009		0.0998	*	–0.2269	+
Area tercile III	0.0166		0.0748		–0.0628	+	0.2367	*	0.1335	**	–0.1709	
Sold maize	–0.0325		0.1783	**	–0.0322		0.2081		–0.0313		0.1283	
Produced/sold tobacco	–0.2393	**	0.4144		–0.2706	**	0.3755	**	–0.2146	**	0.5152	**
Received credit/loans	0.3250	**	–0.6610	**	0.3441	**	–0.6666	**	0.3207	**	–0.6390	**
Year dummy (year=2010)	–0.5118	**	1.4299	**	—		—		—		—	
Region Fixed Effects	Yes		Yes		Yes		Yes		Yes		Yes	
Non-Farm Wage Work (D)	–0.3069	**	—		–0.3024	**	—		–0.3488	**	—	
Farm Wage Work (D)	–0.2552	**	—		–0.2050	**	—		–0.3411	**	—	
Constant	–0.6099	**	11.2211	**	–0.5809	**	11.3430	**	–1.1528	**	12.0764	**
Lambda Mills			–2.7143	**			–2.9035	**			–2.2554	**
Observations	17,309		3,839		8,951		2,552		8,358		1,287	
rho	–0.9791				–0.9983				–0.9339			
sigma	2.7722				2.9085				2.4152			

Source: Malawi Poverty Assessment team calculations based on IHS2 and IHS3.
Note: Significance level of the point estimates and differences: 1% (**), 5% (*), and 10% (+).

Appendix A5.3

Correlates of Wage Income per Capita, 2-Stage, Urban Areas, 2004 and 2010

Dependent variable	Non-farm wage employment income per capita, Urban areas Coefficients											
Log (non-farm wage income pc)	Pooled				IHS2–2004				IHS3–2010			
Explanatory variables	Participation		Returns		Participation		Returns		Participation		Returns	
Sex of the head (Male=1)	0.3254	**	–0.1846		0.4558	*	–0.5464	+	0.3203	*	–0.1228	
Age of the head	0.0347	+	0.1156	**	0.0308		–0.0004		0.0440	+	0.1763	**
Age of the head squared	–0.0005	*	–0.0011	**	–0.0004		0.0003		–0.0005	*	–0.0017	**
PSLC—Primary Sch. Leaving Certificate	0.0783		0.1434		0.2076		0.0047		–0.0352		0.2152	
JCE—Junior Certificate Examination	0.5807	**	0.4165	**	0.7559	**	0.1294		0.4356	**	0.4929	**
MSCE—Malawi Sec. Certif. of Education	0.9702	**	0.9194	**	1.0418	**	0.4499	+	0.9348	**	1.0923	**
Non-university diploma	1.1712	**	1.5732	**	1.0780		1.2366	*	1.1897	**	1.7441	**
University diploma	1.0059	**	1.4846	**	0.5654	*	0.8573	*	1.4584	**	1.8416	**
Post-graduate degree	1.5357	**	1.6765	**	7.2059		0.5021		0.9565		2.3212	**
Household adult equivalents	0.0679	**	–0.2079	**	0.0904	**	–0.1796	**	0.0379		–0.2233	**
Area tercile II	–0.0021		0.0694		0.0749		0.0233		–0.0761		0.0682	
Area tercile III	–0.1617		–0.1231		–0.2564		–0.0277		–0.0058		–0.0765	
Sold maize	–0.1850	+	–0.0126		–0.1539		0.1135		–0.2589		–0.1096	
Produced/sold tobacco	–1.2708	**	–0.0423		–1.4454	**	0.6261		–1.1538	**	–0.5647	
Received credit/loans	0.0070		0.0853		0.0041		0.2495		0.0599		0.0193	
Year dummy (year=2010)	–0.1452	+	0.0921		–		–		–		–	
Region Fixed Effects	Yes		Yes		Yes		Yes		Yes		Yes	
Non-Farm Self-employment work (D)	–0.8884	**	–		–0.6803	**	–		–1.0630	**	–	
Farm Wage Work (D)	–0.6291	**	–		–0.5771	**	–		–0.6691	**	–	
Constant	–0.6344		8.2238	**	–0.8205		11.4473	**	–0.7757		6.7423	**
Lambda Mills			–0.4098	**			–1.2443	**			–0.0531	
Observations	1,268		674		539		282		729		392	
rho	–0.3991				–0.9209				–0.0579			
sigma	1.0267				1.3511				0.9172			

Source: Malawi Poverty Assessment team calculations based on IHS2 and IHS3.
Note: Significance level of the point estimates and differences: 1% (**), 5% (*), and 10% (+).
PSLC—Primary School Leaving Certificate; JCE—Junior Certificate Examination; MSCE—Malawi Secondary Certificate of Education.

Appendix A5.4

Correlates of Welfare, Urban and Rural Areas, Pooled and by Year, 2004 and 2010

Dependent variable	Determinants of welfare in Malawi, 2004 and 2010 Coefficients for OLS for Rural and Urban areas											
	Rural Areas					Urban Areas						
Log (household expenditure pc)		OLS by Year						OLS by Year				
Explanatory variables	Pooled OLS	2004		2010		Pooled OLS		2004		2010		
Demographics and education												
Sex of the head (Male=1)	0.0538	0.0432	**	0.0687	**	–0.0643		–0.0035		–0.1440	*	
Age of the head	0.0115	0.0072	**	0.0173	**	0.0113	+	0.0103		0.0148		
Age of the head squared	–0.0001	0.0000	*	–0.0001	**	0.0000		0.0000		–0.0001		
Years of schooling of head	0.0383	0.0370	**	0.0380	**	0.0822	**	0.1026	**	0.0694		
Household adult equivalents	–0.1426	–0.1311	**	–0.1585	**	–0.0919	**	–0.0942	**	–0.0974		
Economic diversification												
Log non–farm self–employment pc	0.0096	0.0080	**	0.0125	**	0.0134	**	0.0139	**	0.0158	**	
Log farm wage income pc	–0.0075	–0.0083	**	–0.0063	**	–0.0127	**	–0.0105	**	–0.0146	**	
Log non–farm wage income pc	0.0090	0.0045	**	0.0149	**	0.0123	**	0.0123	**	0.0128	**	
Log maize yield	0.0513	0.0430	**	0.0819	**	—		—		—		
Accessed Loans/Credit												
Received credit/loans	0.1139	0.1121	**	0.1113	**	0.1277	*	0.1341	+	0.1313	*	
Year dummy (year=2010)	–0.0667	—		—		0.0114		—		—		
Region Fixed Effects	Yes	Yes		Yes		Yes		Yes		Yes		
Constant	10.4703	10.6060		10.1051	**	10.4784	**	10.3274	**	10.5906	**	
Observations	16,692	8717		7,975		1,338		604		734		
R–Squared	0.2872	0.2851		0.3029		0.4016		0.4368		0.3775		

Source: Malawi Poverty Assessment team calculations based on IHS2 and IHS3.
Note: Significance level of the point estimates and differences: 1% (**), 5% (*), and 10% (+).

Appendix A5.5

Determinants of Welfare Changes, Fixed Effects Model, Urban and Rural Areas, 2010–13

Dependent variable for fe model Log (consumption expenditure per capita)	Fixed effects model for the determinants of welfare, Rural and Urban areas			
Explanatory variables	Rural areas Coefficient		Urban areas Coefficient	
Demographics and education				
Sex of the head (Male=1)	0.0572		0.2633	**
Age of the head	0.0104	+	–0.0036	
Age of the head squared	–0.0001		0.0000	
Years of schooling of head	0.0305	**	0.0175	+
Household adult equivalents	–0.1611	**	–0.1294	**
Economic diversification				
Log non-farm self-employment income pc	0.0050	**	0.0070	*
Log farm wage income pc	–0.0015		–0.0039	
Log non-farm wage income pc	–0.0016		0.0119	**
Log maize yield	0.0760	**	–	
Percent of maize sold	0.0035	**	–	
Mean maize price last year	0.0018		0.0033	
SD Maize price last year	–0.0006		–0.0111	*
Received credit/loans	–0.0328119		0.0780	+
Region Fixed Effects	Yes		Yes	
Constant	11.2587	**	12.4374	**
Observations	3,558		1,890	
R-Squared – within	0.2472		0.2981	
R-Squared between	0.2529		0.1685	
R-Squared – overall	0.2575		0.1813	
Sigma_u	0.5023		0.7178	
Sigma_e	0.4175		0.4271	
rho	0.5915		0.7385	

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: Significance level of the point estimates and differences: 1% (**), 5% (*), and 10% (+).

Appendix A6.1

TABLE A1: Family Labor Utilization in the Production of Major Crops, 2010–13 *(days/ha)*

		Pooled	Non-poor	Poor	Female	Male	Northern	Central	Southern
2010	Maize	35.07	29.66**	44.77	30.32	37.25	50.34	33.70	32.54
	Ground nut	53.51	47.69	66.58	42.03	57.67	76.62	52.72	27.03
	Pigeon pea	22.81	0.00	38.97	0.00	28.14	0.00	0.00	25.56
	Tobacco	63.14	57.77	76.88	38.11	65.78	54.71	71.27	44.74
2013	Maize	82.05***	72.94**	100.73	82.98	81.64	123.61	47.20	102.59
	Ground nut	94.55	61.35	190.16	153.90	73.49	194.00	87.53	67.93
	Pigeon pea	36.92	54.66	15.45	0.00	74.57	0.00	0.00	39.72
	Tobacco	130.33	128.85	133.70	25.21	142.22**	152.83	126.11	130.37

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: Reading of significance level of difference: 2010 vs. 2013 in the pooled column; non-poor vs. poor; and female vs. male. Significance level of the difference: 1% (***), 5% (**), and 10% (*).

Appendix A6.2

TABLE A2: Hired Labor Utilization in the Production of Major Crops, 2010–13 *(days/ha)*

		Pooled	Non-poor	Poor	Female	Male	Northern	Central	Southern
2010	Maize	0.53	0.57	0.46	0.36	0.61***	0.83	0.73	0.30
	Ground nut	0.75	0.56	1.19	0.49	0.84	0.26	0.82	0.93
	Pigeon pea	0.17	0.41	0.00	0.00	0.21	0.00	2.00	0.00
	Tobacco	0.31	0.23	0.52	0.10	0.34**	0.44	0.32	0.16
2013	Maize	0.53	0.68***	0.22	0.36	0.61***	0.23	0.73	0.42
	Ground nut	1.42*	1.73***	0.56	0.84	1.63**	0.15	1.67	0.35
	Pigeon pea	0.09	0.16	0.00	0.00	0.18	0.00	0.00	0.09
	Tobacco	3.86***	5.13**	0.92	2.07	4.07	2.33	3.87	4.57

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: Reading of significance level of difference: 2010 vs. 2013 in the pooled column; non-poor vs. poor; and female vs. male. Significance level of the difference: 1% (***), 5% (**), and 10% (*).

Appendix A6.3

TABLE A3: Exchange Labor Utilization in the Production of Major Crops, 2010–13 *(days/ha)*

		Pooled	Non-poor	Poor	Female	Male	Northern	Central	Southern
2010	Maize	1.92	2.35**	1.15	3.47	1.23**	3.45	1.21	2.13
	Ground nut	1.99	2.40	1.08	4.52	1.12	5.50	1.58	0.18
	Pigeon pea	0.41	0.98	0.00	2.15	0.00	0.00	0.00	0.46
	Tobacco	0.37	0.41	0.29	0.00	0.41**	1.54	0.00	0.47
2013	Maize	1.51	1.83***	0.86	2.61	1.00***	1.59	1.13	1.79
	Ground nut	1.84	2.33	0.41	0.85	2.19	0.93	2.12	0.15
	Pigeon pea	8.05*	7.75	8.41	15.94	0.00**	0.00	0.00	8.66
	Tobacco	3.40	4.75	0.31	0.00	3.78	0.62	0.47	12.41

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: Reading of significance level of difference: 2010 vs. 2013 in the pooled column; non-poor vs. poor; and female vs. male. Significance level of the difference: 1% (***), 5% (**), and 10% (*).

Appendix A6.4

Determinants of Agricultural Productivity *(maize yield)*

Log rate of inorganic fertilizer application (kg/ha)	0.050*** (0.009)
More than 10% below recommended rate of fertilizer application (1 = yes)	–0.106* (0.057)
More than 10% above recommended rate of fertilizer application (1 = yes)	–0.009 (0.061)
Basal fertilizer was applied within 7 days after planting (1 = yes)	0.073* (0.042)
Intercropped (1 = yes)	0.102*** (0.038)
Applied organic fertilizer (1= years)	0.087** (0.043)
Log seed rate (kg/ha)	0.027*** (0.010)
Planted hybrid variety (1 = yes)	0.026 (0.029)
Log plot size (ha)	–0.362*** (0.068)
Log plot size squared	0.001 (0.023)
Log family labor (days)	0.096*** (0.022)
Log hired labor (days)	0.056*** 0.013)
Log exchange labor (days)	0.010 (0.043)
Good or fair soil quality (1= yes)	0.154*** (0.042)
Soil quality index	–0.098** (0.040)
Little or no slope (1 = yes)	–0.005 (0.031)
Soil type is between sandy and clay soil	0.029 (0.034)
Managed by female (1 = yes)	–0.128** (0.055)
Age of plot manager (years)	0.003 (0.002)
Education of plot manager (years)	0.004 (0.009)
Household size	0.008 (0.016)
Dependency ratio	0.000 (0.000)
Household owns livestock (1 = yes)	0.131*** (0.041)
Household earns agricultural and/or nonagricultural wage (1 = yes)	–0.060 (0.037)
Distance to district boma (km)	–0.001 (0.001)
Agro-ecological zone fixed effects	Yes
Durable assets index	0.056*** (0.018)
Log of total annual rainfall (mm)	2.433* (1.329)
Log of average annual temperature (times 10 degree Celsius)	–0.712 (1.348)
Household received extension service for production (1 = yes)	–0.053 (0.036)
Household had access to credit (1 = yes)	0.025 (0.042)
Year (1 = 2013)	0.100** (0.041)
Constant	–7.095 (12.988)
Observations	4,326
R-squared	0.699

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: *** p < 0.01, ** p < 0.05, * p < 0.1. Standard errors in parentheses.

Appendix A6.5

Decomposition of the Climber-Stayer Differential in Maize Yield

A. Mean climber-stayer yield differential		
Mean maize yield for climbers	1,496.920*** (68.530)	
Mean maize yield for stayers	1,177.523*** (44.472)	
Mean difference in maize yield between climbers and stayers	319.397*** (81.744)	
B. Aggregate decomposition	**Endowment effect**	**Structure effect**
	148.392*** (53.908)	171.004** (72.112)
Share of the climber-stayer yield differential	46.46%	53.54%
C. Detailed decomposition		
Inorganic fertilizer application	131.069*** (42.894)	–33.723 (141.496)
Below recommended nitrogen application rate (1/0)	–5.029 (8.793)	38.427 (359.266)
Above recommended nitrogen application rate (1/0)	–5.493 (9.172)	7.298 (53.893)
Applied basal fertilizer on time (1/0)	0.429 (1.704)	–2.617 (39.816)
Applied inorganic fertilizer twice (1/0)	–25.942* (13.258)	–21.648 (128.797)
Fertilizer used is basal fertilizer	–1.928 (8.932)	135.067* (80.230)
Applied chemicals (1 = yes)	–2.538 (4.990)	–7.367 (7.348)
Applied organic fertilizer (1/0)	–1.982 (5.482)	63.956* (35.326)
Used hybrid seed (1/0)	–4.673 (5.020)	–5.325 (54.388)
Pure stand (1/0)	–2.795 (3.685)	75.373 (60.876)
Plot size (ha)	–15.490 (12.394)	43.285 (105.543)
Family labor utilization rate (days/ha)	–2.260 (8.075)	223.237* (122.180)
Hired labor utilization rate (days/ha)	5.522 (8.645)	3.108 (30.058)
Exchange labor utilization rate (days/ha)	0.432 (2.255)	14.971 (9.326)
Good soil quality (1/0)	–6.137 (12.849)	130.723 (151.002)
Plot is sloppy (1/0)	2.523 (3.863)	63.948 (68.390)
Plot is swampy (1/0)	–0.515 (5.094)	8.450 (26.246)
Soil is sandy clay (1/0)	3.350 (4.011)	–9.822 (76.894)
Plot show signs of erosion (1/0)	–0.743 (2.272)	–0.188 (59.565)
Received extension service for crop production	3.782 (4.371)	235.790*** (87.604)
Female plot manager (1/0)	9.088 (7.296)	–15.879 (45.344)
Age of plot manager (years)	–1.977 (3.748)	–551.268** (221.642)
Years of education of plot manager	8.397 (9.322)	–21.078 (84.925)
African Adult Male Equivalent	16.105 (10.138)	–27.516 (190.355)
Dependency ratio (%)	–14.149 (8.800)	49.577 (119.723)
Distance to boma (km)	3.302 (3.775)	106.467 (90.698)
Index of ownership of agricultural tools	32.637* (16.941)	1.437 (7.294)
Index of ownership of durable goods	31.695** (15.320)	257.381** (116.528)
Avg 12-month total rainfall (mm) for July-June	–8.601 (6.133)	–92.315 (614.826)
Annual Mean Temperature (°C * 10)	0.313 (1.391)	–498.744 (551.711)
Observations	2,865	2,865

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: Standard errors in parentheses. *** p < 0.01, ** p< 0.05, * p < 0.1.

Appendix A6.6

Elasticity of Agricultural Productivity on Household Welfare

Measure of agricultural productivity	Measure of household welfare	Estimates	Range of estimates[a]
Log of maize yield	*Poverty measures*		
	Log of per capita consumption expenditure	0.132*** (0.020)	[0.132 0.173]
	Poverty gap	–0.034*** (0.006)	—
	Severity of poverty	–0.017*** (0.004)	—
	Nutrition indicators		
	Log of calories consumed per capita	0.060** (0.023)	[0.060 0.107]

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.

Appendix A6.7

Effect of Maize Yield on Poverty (kg/ha)

	Log consumption expenditure HH fixed effects Coefficient	**Poverty gap**[a] CRE logit and CRE fractional logit Unconditional APE	**Poverty severity**[a] CRE logit and CRE fractional logit Unconditional APE
Log of maize yield (kg/ha)	0.132*** (0.020)	–0.034*** (0.006)	–0.017*** (0.004)
Log of value of other crops (MKW/ha)	0.002 (0.003)	–0.001 (0.001)	–0.001 (0.000)
Log net income from tree crops (MKW)	0.002 (0.003)	–0.001 (0.001)	–0.000 (0.001)
Number of livestock	0.043*** (0.014)	–0.009 (0.011)	–0.002 (0.007)
Log of net income from off-farm activities	0.003 (0.002)	–0.001 (0.001)	–0.000 (0.000)
Log of agricultural wage	–0.002 (0.003)	–0.000 (0.001)	0.000 (0.000)
Other income sources (1/0)	0.003 (0.028)	0.001 (0.009)	0.000 (0.006)
Household size	–0.148*** (0.009)	0.031*** (0.003)	0.016*** (0.002)
Dependency ratio (%)	–0.001*** (0.000)	0.000 (0.000)	0.000 (0.000)
Male-headed household (1/0)	0.018 (0.051)	–0.011 (0.017)	–0.003 (0.009)
Age of household head (years)	0.009 (0.007)	0.002 (0.001)	0.002** (0.001)
Age of household head squared	–0.000* (0.000)	–0.000 (0.000)	–0.000 (0.000)
Education of most educated HH member (years)	0.008 (0.010)	–0.005* (0.003)	–0.004** (0.002)
Log of landholding (ha)	0.129*** (0.030)	–0.047*** (0.006)	–0.024*** (0.004)
Owns crop storage house (1/0)	0.109*** (0.033)	–0.030** (0.013)	–0.015** (0.007)
Accessed credit (1/0)	0.049 (0.031)	–0.011 (0.011)	–0.014** (0.006)
Accessed extension for production (1/0)	0.008 (0.028)	–0.018* (0.010)	–0.012** (0.006)
Distance to road (km)	–0.002 (0.005)	0.000 (0.002)	0.001 (0.002)
Distance to tobacco auction (km)	–0.001 (0.002)	0.001 (0.001)	0.001* (0.000)
Distance to boma (km)	0.002** (0.001)	–0.001*** (0.000)	–0.000** (0.000)
Distance to weekly market (km)	0.003 (0.003)	–0.001 (0.001)	–0.000 (0.000)

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Effect of Maize Yield on Poverty (kg/ha) *(continued)*

	Log consumption expenditure HH fixed effects Coefficient	**Poverty gap**[a] CRE logit and CRE fractional logit Unconditional APE	**Poverty severity**[a] CRE logit and CRE fractional logit Unconditional APE
Log of price of urea fertilizer (MKW/Kg)	0.127 (0.143)	–0.076* (0.045)	–0.036 (0.028)
Laspeyre's spatial price index	–0.007*** (0.003)	0.003*** (0.001)	0.002*** (0.000)
Northern region	–0.196 (0.230)	–0.283* (0.157)	–0.296*** (0.099)
Southern region	–0.060 (0.177)	–0.129 (0.127)	–0.181** (0.081)
Graded/Graveled	–0.077 (0.098)	0.021 (0.016)	0.001 (0.011)
Dirt road (maintained)	–0.015 (0.105)	–0.003 (0.020)	–0.016 (0.012)
Dirt track	0.096 (0.128)	–0.027 (0.028)	–0.028** (0.014)
Agro-ecological zone fixed effect	Yes	Yes	Yes
Year (1 = 2013)	0.135*** (0.036)	–0.024** (0.010)	–0.010** (0.005)
Constant	11.641*** (0.902)		
Time averages (CRE)[b]	NA	Yes	Yes
Observations	2,023	2,023	2,023
R-squared	0.825		

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses.
[a] Estimation was based on a 2-part model: first part, CRE logit of probability of being poor; and second part, CRE fractional model of extent of poverty.
[b] CRE implies Correlated Random Effects.

Appendix A6.8
Effect of Maize Yield on Nutrition (kg/ha)

	Log caloric intake HH Fixed effects coefficient
Log of maize yield (kg/ha)	0.060** (0.023)
Log of value of other crops (MKW/ha)	0.005 (0.004)
Log net income from tree crops (MKW)	0.002 (0.003)
Number of livestock	0.024 (0.025)
Log of net income from off-farm activities	–0.003 (0.002)
Log of agricultural wage	–0.002 (0.003)
Other income sources (1/0)	0.024 (0.030)
Household size	–0.104*** (0.011)
Dependency ratio (%)	–0.001*** (0.000)
Male-headed household (1/0)	–0.029 (0.050)
Age of Household head (years)	0.012 (0.008)
Age of household head squared	–0.000* (0.000)
Education of most educated HH member (years)	–0.003 (0.009)
Log of landholding (ha)	0.054** (0.026)
Owns crop storage house (1/0)	0.042 (0.034)
Accessed credit (1/0)	0.033 (0.033)
Accessed extension for production (1/0)	0.008 (0.026)
Distance to road (km)	0.002 (0.004)
Distance to tobacco auction (km)	–0.002 (0.001)
Distance to boma (km)	0.001 (0.001)
Distance to weekly market (km)	0.001 (0.003)
Log of price of Urea fertilizer (MKW/kg)	0.256 (0.156)
Laspeyre's spatial price index	0.005* (0.003)
Northern region	0.071 (0.250)
Southern region	–0.008 (0.252)
Graded/Graveled	–0.050 (0.088)
Dirt road (maintained)	0.031 (0.088)
Dirt track	0.157 (0.105)
Agro-ecological zone fixed effect	Yes
Year (1= 2013)	0.052 (0.036)
Constant	5.555*** (0.893)
Time averages (CRE)[b]	NA
Observations	2,023
R-squared	0.703

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: *** p < 0.01, ** p < 0.05, * p < 0.1. Standard errors in parentheses.
[a] Estimation was based on a 2-part model: first part, CRE logit of probability of being poor; second part, CRE fractional model of extent of poverty. b. CRE = implied Correlated Random Effects.

Appendix A7.1

Oaxaca-Blinder Decompositions of Profits and Wages in Rural and Urban Areas, Respectively

	Decomposition of log profit in 2013 from self-employment between stayers (remain poor 2013) and climbers (became non-poor 2013) in rural areas Malawi. Based on sample of poor 2010 in rural areas.		Decomposition of log wage in 2013 from wage employment between divers (fell poor 2013) and stayers (remain non-poor 2013) in urban areas Malawi. Based on sample of non-poor 2010 in urban areas.	
A. Mean Non-Poor – Poor Returns Differential in 2013				
Mean return for non-poor 2013	8.583*** (0.834)		10.139*** (0.130)	
Mean return for poor 2013	6.993*** (0.291)		8.453*** (0.112)	
Mean difference in NFE between poor and non-poor 2013	1.590* (0.883)		1.686*** (0.172)	
B. Aggregate Decomposition	Explained Profit 2013	Unexplained Profit 2013	Explained Wage 2013	Unexplained Wage 2013
	0.119 (0.137)	1.471* (0.881)	0.731*** (0.120)	0.955*** (0.172)
C. Detailed Decomposition	Explained Profit 2013	Unexplained Profit 2013	Explained Wage 2013	Unexplained Wage 2013
Age of the household member	–0.096	–2.635	0.046	1.964**
	(0.123)	(4.205)	(0.124)	(0.961)
Squared age of the household member	0.141	1.653	–0.051	–0.837**
	(0.169)	(2.413)	(0.098)	(0.398)
Member is of the male gender (0/1)	0.100+ (0.065)	–0.524 (0.426)	–0.020 (0.015)	–0.598*** (0.197)
Member is married (0/1)	0.000 (0.001)	1.044** (0.532)	–0.012 (0.014)	–0.160 (0.123)
Educational qualification is PSLC	0.008 (0.014)	0.170* (0.089)	–0.001 (0.006)	0.005 (0.031)
Educational qualification is JCE	0.040+ (0.028)	0.020 (0.042)	–0.013 (0.018)	0.085 (0.066)
Educational qualification is MSCE	0.003 (0.019)	0.020 (0.022)	0.055* (0.032)	–0.098* (0.056)
Educational qualification is NON-UNIVERSITY DIPLOMA	0.006 (0.006)	–0.000 (0.001)	0.113*** (0.025)	–0.100*** (0.026)
Educational qualification is UNIVERSITY DIPLOMA	0.000 (0.000)	0.000 (0.000)	0.110*** (0.022)	–0.062*** (0.016)
Educational qualification is POST-GRADUATE DEGREE	0.000 (0.000)	0.000 (0.000)	0.048*** (0.015)	–0.012* (0.006)
Industry is food, beverage, tobacco manufacturing	–0.015 (0.031)	0.040 (0.077)		
Industry is non-food manufacturing	0.051 (0.063)	0.363 (0.289)		

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Oaxaca-Blinder Decompositions of Profits and Wages in Rural and Urban Areas, Respectively *(continued)*

	Decomposition of log profit in 2013 from self-employment between stayers (remain poor 2013) and climbers (became non-poor 2013) in rural areas Malawi. Based on sample of poor 2010 in rural areas.		Decomposition of log wage in 2013 from wage employment between divers (fell poor 2013) and stayers (remain non-poor 2013) in urban areas Malawi. Based on sample of non-poor 2010 in urban areas.	
Industry is wholesale and retail trade and restaurant and hotels	–0.002 (0.014)	–0.001 (0.141)		
Industry is construction, services and other sectors	–0.046 (0.049)	0.266 (0.365)		
Forest Based Product Enterprise (0/1)	–0.004 (0.029)	–0.107 (0.102)		
Age of household enterprise	0.001 (0.006)	0.787** (0.383)		
Outside partner of household enterprise (0/1)	–0.001 (0.009)	–0.031 (0.032)		
Business operated from home (0/1)	–0.025 (0.035)	0.026 (0.172)		
Distance to nearest road (Km)	–0.002 (0.039)	–0.582 (1.094)	0.004 (0.010)	0.024 (0.253)
Distance to nearest road squared	0.015 (0.035)	0.105 (0.430)	0.004 (0.006)	–0.065 (0.075)
Distance to nearest population center with +20,000 people	0.104 (0.141)	–0.588 (2.470)	0.025 (0.024)	–1.128** (0.527)
Distance to nearest population center with +20,000 people squared	–0.089 (0.131)	0.596 (1.291)	–0.017 (0.019)	0.482* (0.285)
Access to credit (0/1)	–0.004 (0.023)	0.626 (0.502)		
Dependency ratio	–0.080 (0.065)	–0.445 (0.413)	–0.006 (0.051)	–0.279* (0.160)
Rain – EA level CoV of Dec-Jan rainfall from 1983/84–2012/13	–0.004 (0.013)	–2.524 (2.770)	0.005 (0.024)	1.821*** (0.667)
Price – market level CoV of May-August real market maize price from 2005–2013	0.021 (0.025)	–2.310 (3.843)	0.001 (0.008)	5.553*** (1.558)
Malaria – District CoV of HH malaria in last two weeks, 2010 and 2013	–0.005 (0.012)	–0.142 (0.555)	0.007 (0.007)	–0.224** (0.104)
% of households that produced cash crop out of total households(ag hh+ nonag hh)	–0.001 (0.007)	0.04 (0.203)	0.006 (0.007)	0.098** (0.050)
Percentage of households who sold any crop out of total ag households in an ea	0.003 (0.012)	0.265 (0.577)	0.005 (0.016)	–0.021 (0.081)
Employer is PRIVATE INDIVIDUAL			0.050 (0.040)	–0.152** (0.076)
Employer is GOVERNMENT			–0.006 (0.011)	–0.088* (0.047)
Employer is OTHER			–0.000 (0.006)	–0.009 (0.011)

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Oaxaca-Blinder Decompositions of Profits and Wages in Rural and Urban Areas, Respectively *(continued)*

	Decomposition of log profit in 2013 from self-employment between stayers (remain poor 2013) and climbers (became non-poor 2013) in rural areas Malawi. Based on sample of poor 2010 in rural areas.		Decomposition of log wage in 2013 from wage employment between divers (fell poor 2013) and stayers (remain non-poor 2013) in urban areas Malawi. Based on sample of non-poor 2010 in urban areas.	
Occupation is ADMINISTRATION AND MANAGERIAL WORKERS			0.017** (0.009) (0.007)	0.004 (0.003) (0.007)
Occupation is SALES WORKERS			0.016 (0.022)	0.132* (0.070)
Occupation is SERVICE WORKERS			0.000 (0.014)	0.127 (0.114)
Occupation is AGRICULTURAL, ANIMAL HUSBANDRY AND FORESTRY WORKERS, FISHERMEN AND H			0.001 (0.001)	–0.001 (0.001)
Occupation is PRODUCTION AND RELATED WORKERS, TRANSPORT EQUIPMENT OPERATORS AND LA			–0.004 (0.010)	0.278** (0.121)
Reside in urban area (0/1)			0.000 (0.000)	0.000 (0.000)
Normalized HH wealth index (dwelling and assets) + Normalized HH avg. yrs. education			0.339*** (0.084)	–0.683** (0.285)
Constant		5.338 (7.546)		–5.093** (2.049)
Observations	3,261	3,261	2,636	2,636

Source: Malawi Poverty Assessment team calculations based on IHS3 panel and IHPS.
Note: Standard errors in parentheses *** p < 0.01, ** p < 0.05, * p < 0.1, + p < 0.15.

Appendix A8.1

Probability to Enter or Stay in Food Poverty per Round, 2013

	Lean 2013		Pre-harvest 2013		Pre-plant 2013	
	Enter poverty	Stay in poverty	Enter poverty	Stay in poverty	Enter poverty	Stay in poverty
Weather shock	–0.029	0.295***	0.142	0.273***	0.021	0.254**
Production shock	0.030	–0.034	0.094	–0.173*	–0.048	–0.113
Food prices shock	–0.067	0.081	–0.033	0.217**	0.138	0.080
Female head – baseline	0.120	0.089	0.027	0.118	–0.010	–0.029
Share of divorced females in HH – baseline	0.668	–0.667	0.326	–0.270	1.028*	0.749
Share of widows in HH – baseline	–0.384	–0.737**	–0.393	–0.735*	–0.125	–0.629*
Share of children under 5 yrs in HH – baseline	–0.166	–0.562**	0.012	–0.641***	0.320	–0.443
Share of elderly in HH – baseline	–0.533**	–0.747***	–0.271	–0.840***	–0.298	–1.090***
Years of education of HH head – baseline	–0.038***	–0.063***	–0.017	–0.059***	–0.034***	–0.052***
Top-up beneficiary in PWP areas	–0.014	–0.055	–0.154*	0.032	0.023	–0.250***
Number	1,839	1,839	1,839	1,839	1,736	1,708

Source: Poverty Assessment team calculations based on RLS panel.
Note: Probit regression. Shock variables are dummies (weather the household reported having received each type of shock or not). Control variables include pre-plant season 2012 household characteristics (female head dummy, years of education of head, and share of divorced females, widows, children under 5 years old and elderly), top-up beneficiary in PWP areas, district and week of the survey.

Appendix A8.2

Coverage Rates, and Exclusion, and Inclusion Errors of Selected Social Safety Net Programs, 2013 *(%)*

	Coverage	Exclusion error of extreme poor	Inclusion error of nonextreme poor	Exclusion error of poor	Inclusion error of nonpoor
School feeding program	18	86	91	82	62
MASAF– PWP	15	85	89	84	59
Free maize	10	94	93	90	63
Free food (other than maize)	7	95	93	93	62
Other (specify)	3	99	96	97	59
Food / cash-for-work program	2	98	83	99	67
Inputs-for-work program	1	100	95	99	71
Other direct cash transfers (specify)	1	100	95	100	87
Scholarships/bursaries for secondary education	1	99	80	99	50
Free distribution of likuni phala to children and mothers	1	98	59	99	36
Direct cash transfers from Government	0	99	66	100	59
Scholarships for tertiary education	0	99	77	100	77
Supplementary feeding for malnourished children at a nutritional rehabilitation unit	0	100	81	100	76

Source: Malawi Poverty Assessment team calculations based on IHPS.
Note: Likuni phala = porridge made of maize.

Appendix A8.3

Access to Social Programs by Transition from Extreme Poverty, 2010–2013

	Extreme poverty transitions			
	Stayed extreme non-poor	Became extreme non-poor	Became extreme poor	Stayed extreme poor
Free maize	9	22	6	8
Free food (other than maize)	6	19	4	7
Inputs-for-work program	1	1	0	1
School feeding program	18	21	16	10
Free distribution of likuni phala to children and mothers	0	0	2	1
Supplementary feeding for malnourished children at a nutritional rehabilitation unit	0	1	0	0
Scholarships/bursaries for secondary education	1	1	2	0
Direct cash transfers from government	0	1	0	4
Other direct cash transfers (specify)	1	1	1	0
Other (specify)	3	5	1	0
MASAF-PWP	14	17	14	15
Food /Cash-for-work program	2	0	3	0
Scholarships for tertiary education	0	0	1	0

Source: Malawi Poverty Assessment team calculations based on the IHS3 panel and the IHPS.

Appendix A8.4

Take-up of PWP during the Lean Season (PWP Villages Only)

	Baseline consumption (IHS3)	# Shocks round 1 (Pre-Planting)	# Shocks round 2 (Lean)
=1 if randomly offered to household	0.402*** (0.026)	0.398*** (0.035)	0.337*** (0.046)
log p.c. food consumption	0.011 (0.023)	0.009 (0.023)	0.013
Randomly offered *log p.c. food consumption	–0.062** (0.03)	–0.060** (0.03)	–0.064** (0.03)
# Weather shocks		–0.085* (–0.048)	0.035 (0.034)
# Production shocks		–0.016 (–0.023)	0.03 (0.024)
# High food prices		0.021 (0.039)	–0.086** (0.036)
# Family events shocks		0.025 (0.032)	–0.046 (0.028)
Randomly offered *#Weather shocks		0.143** (0.059)	–0.03 (0.047)
Randomly offered *#Production shocks		0.002 (0.032)	–0.001 (0.033)
Randomly offered *#Food price shocks		0.011 (0.046)	0.103* (0.055)
Randomly offered *#Family shocks		–0.05 (0.04)	0.02 (0.041)
Number of observations	1,757	1,757	1,757
R2	0.201	0.204	0.206
Test joint significance (p-value):			
All Shocks (untreated)		0.364	0.054
All shocks (treated)		0.13	0.319

Source: Malawi Poverty Assessment team calculations based on the RLS panel.

Appendix A8.5

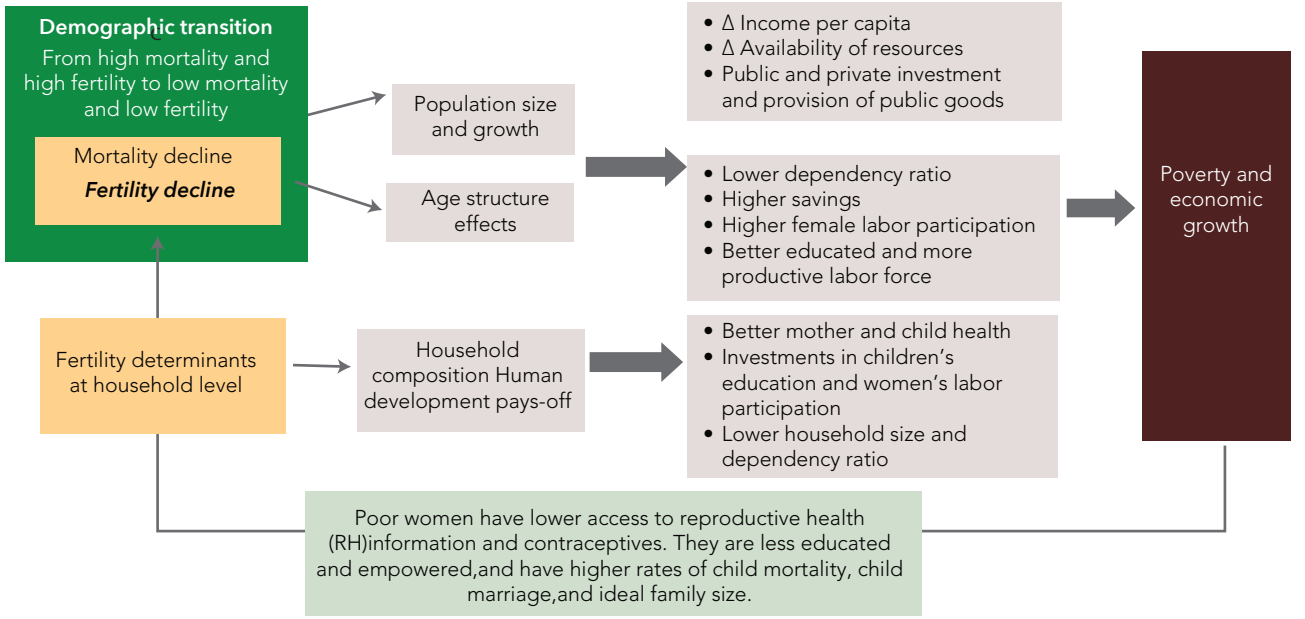
Share and Composition of Vulnerable Groups in Malawi, October 2012–2013 *(%)*

	All households (%)					Food-poor households (%)				
Round	Child under 5 y.o.	Elderly	Little land	Orphan	Disabled	Child under 5 y.o.	Elderly	Little land	Orphan	Disabled
Pre-plant 2012	52	17	36	3	20	60	17	35	5	20
Lean-2013	55	17	35	3	20	61	15	34	4	20
Harvest 2013	55	17	35	3	21	59	16	33	3	20
Pre-plant–2013	53	19	36	3	21	59	19	37	4	22

Source: Malawi Poverty Assessment team calculations based on the RLS panel.

Appendix A9.1

Conceptual Framework



Appendix A9.2

Bongaarts Model: Proximate Determinants of Fertility

Total fertility rate (TFR) is calculated from births and exposure during the 3 years (36 months) prior to each woman's month of interview.

Calculation of the Bongaarts indices is based on the following equation:

$$TFR = TF \times Cm \times Cc \times Ci \times Ca,$$

where TFR = total fertility rate, TF = total fecundity rate, Cm = index of non-marriage, Cc = index of contraception, Ci = index of postpartum insusceptibility (including lactational amenorrhea and postpartum abstinence), and Ca = index of induced abortion.

Index of non-marriage (*Cm*): represents the reduction in fertility caused by periods during which a woman is not sexually active. Cm is a proxy for the proportion of women aged 15 to 49 who are married.

Index of contraception (*Cc*): measures the fertility-inhibiting effect of contraceptive use and is calculated from the proportion of all women of reproductive age currently using specific methods of modern and traditional forms of contraception, weighted by each method's use effectiveness (Stover, 1998). Thus,

$$Cc = 1 - u*e,$$

where u is the proportion of currently married women using contraception and e is the average effectiveness of contraception.

Index of postpartum infecundability (*Ci*): measures the effect of the extended periods of postpartum amenohrroea and abstinence on fertility. It is calculated as the average birth interval in the absence of breastfeeding, divided by the average length of the interval in which breastfeeding takes place:

$$Ci = \frac{20}{18.5 + i},$$

where i is the average number of months of postpartum infecundability due to the combined effect of postpartum amenorrhoea and abstinence.

Index of infertility (*Cf*) is intended to measure the fertility-inhibiting effects of primary and secondary infertility due to disease or any other cause. A woman is defined as infertile if she is not menopausal, not postpartum amenorrhoeic, not pregnant, has not used a contraceptive method, has been in union during the last five years, and has not given birth during that period. The index is calculated as follows:

$$Cf = 1 - f,$$

where f is the proportion of sexually active women who are infertile.

Appendix A9.3

Summary Statistics DHS, 2010

Variables	Mean	S.D	Variables	Mean	S.D
Children ever born	3.141	2.721	**Region**		
Age	28.124	9.346	North	0.182	0.386
Education			Central	0.342	0.474
No education	0.147	0.354	South	0.476	0.499
Incomplete primary	0.572	0.495	Age at first birth	18.361	3.009
Complete primary	0.095	0.293	Child mortality rate	0.054	0.134
Incomplete secondary	0.122	0.327	**Ethnicity**		
Complete secondary	0.051	0.22	Chewa	0.295	0.456
Higher	0.014	0.117	Tumbuka	0.108	0.311
Partner education			Lomwe	0.162	0.369
No education	0.103	0.305	Yao	0.105	0.307
Primary	0.604	0.489	Sena	0.056	0.23
Secondary	0.292	0.455	Ngoni	0.137	0.343
Rural	0.867	0.34	Other	0.137	0.344

Source: DHS 2010.
Note: Cross-sectional data. Sample includes ever-married women.

Appendix A9.4

LINKAGE Model: Economic Impact of Demographic Change on Economic Growth

Following the approach applied in Ahmed and others (2016) and World Bank (2015a, 2015b), LINKAGE, the recursive dynamic computable general equilibrium (CGE) model of van der Mensbrugghe (2011), is used to examine the economic impact of demographic change on growth. The model then is used to consider the marginal impacts of different fertility rates on Malawi's economy by considering the age structure changes under the UN WPP's medium, high, and low fertility scenarios.

Three scenarios with differing age structure changes are considered. The three scenarios are identical in their labor productivity growth rates, but differ in their demographic projections. The first scenario considers demographic projections from the UN WPP's medium fertility scenario, in which TFR declines from 5.25 in 2015 to 3.16 in 2050. The second scenario considers demographic projections from the UN WPP's high fertility scenario, in which TFR falls at a slower rate by 2050 such that the TFR is 0.4 children higher than in the medium fertility scenario by 2030, and 0.5 children higher by 2050. The final scenario considers the demographic projections from the UN WPP's low fertility scenario, in which TFR falls at a faster rate by 2050 such that the TFR is 0.4 children lower than in the medium fertility scenario by 2030, and 0.5 children lower by 2050.

From each UN WPP scenario, data for three variables are determined: the average working-age population growth rates for every year until 2050, and the child and aged dependency ratios for every year until 2050.[80] The first variable is used as a proxy for the labor supply growth rate and assumes that current employment ratios remain constant. The second and third variables are used as inputs to determine savings, and hence investment, in a given year. Moreover, all scenarios assume fixed employment ratios, implying that unemployment rates and labor force participation rates at least stay the same.

[80] The child dependency ratio is the ratio of the under-15 population to the population aged 15–64. The aged dependency ratio is the ratio of the over-64 population to the population aged 15–64.

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