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Structural transformation and poverty in Malawi

Decomposing the effects of occupational and spatial mobility

by
Rui Benfica
Margherita Squarcina
Alejandro de la Fuente

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Authors:
Rui Benfica, Margherita Squarcina, Alejandro de la Fuente

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About the authors

Rui Benfica is Lead Economist, Research and Impact Assessment Division, IFAD. He undertakes research in areas relevant for IFAD's overarching goal of overcoming poverty and achieving food security. This includes development research outputs, the design and implementation of impact assessments in client countries, and economy-wide modelling analysis to inform IFAD's country strategies. Benfica has extensive policy research and outreach experience in developing regions. Before joining IFAD in 2015, he was associate professor at Michigan State University. Prior to that, he worked at the World Bank as an economist with the Gender and Development Group, and poverty economist with the Africa region, Mozambique Country Office, where he worked closely with the Ministries of Planning and Development, and Agriculture and Rural Development. He holds a PhD in agricultural economics from Michigan State University with a focus on international development, commodity market analysis, and quantitative development policy research. He is a member of several professional organizations. Benfica has published extensively in peer-reviewed journals.

Margherita Squarcina is an Economist in the Smallholders in Transition team at the Food and Agriculture Organization of the United Nations (FAO). She undertakes research and analyses trends on structural transformation with a focus on smallholders. In particular, she provides evidence on the profiles of small family farms around the world by looking at their poverty status, socio-economic conditions, access to market and productivity constraints. Squarcina has strong analytical skills and considerable experience on quantitative economic research. Before joining FAO, she worked at IFAD in the Research and Impact Assessment Division, where she was part of the research branch of the team. She holds a master's degree in development economics from the University of Florence with a focus on economic development, poverty analysis, international cooperation and statistics. Her final dissertation was about resilience to food insecurity, taking Ethiopia as a case study. Her main topics of interest include poverty reduction, food security, resilience and structural transformation.

Alejandro de la Fuente is a Senior Economist at the World Bank's Poverty and Equity Global Practice. His current work involves providing policy advice and technical support to African governments on poverty analysis, food and nutrition security, programme evaluation, and risk and vulnerability. Past engagements at the World Bank have involved working and leading projects on poverty, natural disasters, and weather insurance in countries in East Asia and Latin America and the Caribbean. Previous experience outside the World Bank includes working for the Human Development Report Office at the United Nations Development Programme, the International Strategy for Disaster Risk Reduction Secretariat, the Inter-American Development Bank, and various positions at the Ministry of Social Development and the Office of the President in Mexico. He holds a DPhil in development studies/development economics from Oxford University.

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Abstract

This paper analyses the effects of household income composition and occupational and spatial mobility on welfare and poverty in Malawi between 2010 and 2013. Departing from traditional decomposition approaches, it proposes an augmented panel decomposition methodology, using both regression- and non-regression-based techniques. Several results stand out. First, we find that on-farm activities represent the main sources of income for rural households, and non-farm sources dominate in urban areas. However, a single income source is not sufficient to withstand the many uncertainties that rural households face. This leads them to diversify into non-farm activities, especially self-employment in household-owned microenterprises to increase and sustain higher levels of welfare. In urban areas, shocks to non-farm income activities have significantly affected welfare levels. Second, while there is significant occupational mobility (although intrasectoral mobility dominates intersectoral dynamics), spatial mobility is relatively limited in Malawi. Third, results of the decomposition analysis of occupational mobility indicate that agriculture continues to play an important role as a source of income growth and poverty reduction. In fact, people specializing in agriculture in both years have experienced more poverty reduction than those specializing in non-agriculture. However, we find that moving from agriculture to non-agriculture or to diversified activity portfolio is systematically linked to higher levels of income growth and poverty reduction. These results suggest that, while continued investments in agriculture are essential, economic diversification towards a more balanced occupational portfolio has a significant effect on sustained poverty reduction and income growth. As the economy transforms, improving the ability of households to achieve and sustain such diversification will allow for the realization of better development outcomes.

1 Introduction

Malawi has experienced rapid population growth and relatively fast, but unstable, levels of economic growth in the past two decades, with GDP per capita growth averaging 2.4 per cent a year since 2000, well in line with levels experienced in sub-Saharan Africa, but with a much higher degree of volatility.[1] At the macro level, the country has also experienced a relatively fast pace of structural transformation compared to other countries in the region (IFAD, 2016). In fact, between 1990-94 and 2010-14, the share of agriculture in GDP dropped from 40.3 to 31.5 per cent.[2] Urbanization has proceeded and so have the rural-urban dynamics. Spatial mobility as a result of such dynamics has been relatively slow, but structural changes within the rural economy, reflected in occupational mobility, have been noticeable. But how does that dynamic relate to poverty and welfare outcomes?

In the last decade, poverty in Malawi has remained pervasive and relatively stagnant. Considering the international poverty line of US$1.25 per person per day, the level of poverty during the second half of the 2000s was higher compared to the average for sub-Saharan Africa. Although it decreased slightly between 1998 and 2005, the reduction was not significant, and the level remained stagnant in 2010. In more recent years (2010-2013), however, the incidence of poverty, measured by the headcount rate at the national poverty line, dropped by 1.5 percentage points from 40.2 to 38.7 per cent. Results have been quite different between urban and rural areas, driven by different factors. In urban areas, the cost of living increased significantly due to currency depreciation in 2012,[3] leading to an increase in the poverty headcount from 17.9 per cent in 2010 to 26.2 per cent in 2013. In rural areas, where the economy continues to depend heavily on agriculture, agricultural income growth has stagnated, leading to the continued prevalence of high poverty rates – 44.0 per cent in 2010 and 40.9 per cent in 2013. Thus, challenges remain in sustaining growth and poverty reduction in the country.

This paper analyses the effects of occupational and spatial mobility on household welfare and poverty reduction in Malawi in the period 2010-2013. The analysis aims to answer the following questions: (a) What are the main drivers of poverty reduction in Malawi? (b) What are the main sources of income, and how do they contribute to poverty reduction and income growth? (c) How do occupational and spatial mobility/dynamics help in reducing poverty and improving household welfare?

1. The coefficient of variation of GDP per capita, between 2000 and 2014, was three times higher than the average for sub-Saharan Africa.
2. Over the same period, there was also some transformation in the rural economy with the levels of labour productivity, expressed as agricultural value added per worker, increasing from US$120 to US$233.
3. Since the end of 2011, there has been an increase in prices of staple crops and of many basic needs items, not followed by a proportional increase in wages. This has had consequences especially in urban areas. See: www.irinnews.org/news/2011/12/19/urban-poor-hit-slew-price-increases and www.theguardian.com/global-development/2012/may/25/malawians-counting-cost-economic-reform.

Departing from standard decomposition methodologies, the analysis adds to the literature and brings insights beyond those generated by previous approaches (Ravallion and Huppi, 1991) applied to answer similar questions. It proposes an augmented decomposition methodology focused on location and occupation, creating both static and dynamic categories and using both regression-based as well as non-regression-based approaches. The novelties introduced include: (a) the use of panel data that allows the creation of dynamic categories based on both occupational and spatial variables; and (b) the full decomposition of changes in poverty and consumption by accounting for intra- and inter-sectoral shifts. We also decompose the effects on poverty considering the joint occupational and spatial dynamics.

The paper is structured as follows. The following section outlines the methodological approaches applied in the analysis, emphasizing the differences between previous methods and the ones introduced in this analysis, both non-regression-based and regression-based. The third section describes in detail the data sources, survey coverage, and the key variables used in the analysis. This is followed by a section that presents and discusses the results, first providing some descriptive statistics on the outcomes and of their main determinants, and then moving to non-regression-based decompositions and their validation through a regression-based approach. The concluding section of the paper summarizes the key findings and provides policy implications.

2 Poverty decomposition approaches

There are several approaches to decomposing welfare or poverty changes. In this analysis, we divide those approaches into two groups. First, we review non-regression-based decompositions, namely, Ravallion-Huppi (RH) and Shapley, and outline an alternative augmented decomposition approach using household panel data. Then, we focus on regression-based decompositions, highlighting Shorrocks-Shapley decomposition of R^2 and an alternative regression approach that relies on the dynamics of sector and location of economic activity.

2.1 Non-regression-based decompositions

Ravallion–Huppi decomposition

The main poverty decomposition approach using household-level data was proposed by Ravallion and Huppi (1991) – hereafter RH – who have established that a change in poverty between two periods can be decomposed into contributions of intrasectoral effects, intersectoral shifts and the interaction between those two effects.

Formally, the decomposition of the national poverty change between time t and t+1 is represented as:

$$P_{t+1} - P_t = \sum_s \alpha_t^s (P_{t+1}^s - P_t^s) + \sum_s P_t^s (\alpha_{t+1}^s - \alpha_t^s) + \sum_s (P_{t+1}^s - P_t^s)(\alpha_{t+1}^s - \alpha_t^s) \quad (1)$$

where P is the national poverty index, s is a sectoral category and α is the sectoral population share.

The first term on the right-hand side of the formula represents the intrasectoral effects, meaning the sum of changes in poverty within the same sector (taking the size of the sector unchanged from baseline). The second term explains the effects of intersectoral shifts, holding poverty unchanged from the baseline level in each sectoral occupation. Finally, the last term represents the interaction between intra- and inter-sectoral effects, and it consists of the sum of poverty changes within each intersectoral shift, multiplied by the changes in the population size of each sector between t and t+1.

This approach considers repeated cross sections, and it is usually applied at the national level or separately for well-defined geographic domains, for example, rural and urban areas. While this method is extremely useful for accessing decomposition across two points in time, it has several limitations. First, from a policy standpoint, it is difficult to interpret the meaning of the interaction term, which can be sizeable. Second, as presented, there is no visible advantage

of the method in the presence of panel data, as it does not account for any dynamics of mobility on poverty. Therefore, it can lead to misleading results as it does not allow for tracking households' trajectories across space and occupation, vis-à-vis poverty status.

Shapley decomposition

The Shapley decomposition of poverty changes links poverty, a consumption-based measure, and household income sources. The Shapley value is a concept initially applied to cooperative game theory and only recently used for poverty and inequality analyses.[4] The Shapley decomposition measures the contribution of each income component to the change in poverty rate between two periods. The method uses counterfactual distributions of the welfare change and calculates the contribution of each component at a time. Hence, for each counterfactual distribution, we can compute the poverty level that would have prevailed in the absence of a change in that indicator.

A problem that emerges with this approach is that results suffer from path-dependency (Essama-Nssah, 2012; Fortin et al., 2011; Ferreira, 2010), i.e. they change in relation to the order in which the determinants are listed. Azevedo, Sanfelice and Nguyen (2012) suggest a method to overcome this obstacle. It consists in calculating the decomposition across all possible permutations and then computing their average for each component. These averages are referred to as Shapley-Shorrocks estimates and represent the final contribution of each element of the decomposition (Shapley, 1953; Shorrocks, 1999). This decomposition satisfies two desirable properties: (i) symmetry (or independence), meaning that the contribution assigned to any given factor does not depend on the order on which the factors are listed; and (ii) additivity, i.e. no residual terms are included but all contributors completely explain the overall change of the poverty index, a clear advantage over the RH method.

Formally, the contribution of source j is given by:

$$Sh_j(K,X,I) = \sum_{\substack{S \subset K \\ j \in S}} \frac{(s-1)!(k-s)!}{k!} [I(y(S)) - I(y(S - \{j\}))] \quad (2)$$

where $K = \{1,\ldots,j,\ldots,k\}$ is the set of income sources that can be described by a matrix $X = [x_i^j]$, I is the selected poverty index, S is a subset of sources and y is the income. The result is sensitive to the type of poverty index employed. The contribution of any given factor to the overall poverty change can be interpreted as the expected marginal impact of the factor when the expectation is taken over all the possible sequences (Shorrocks, 1999).

In this paper, we considered seven income sources: crop, livestock, farm wage, non-farm wage, self-employment, transfers and other income. We estimated their contribution to the change in the national, urban and rural headcount poverty index between 2010 and 2013. As the poverty index is based on levels of consumption compared against a poverty line, while the sources are expressed in income, and for each household the reported consumption expenditure does not always equal income earned, we followed an adjustment procedure that normalizes income to consumption levels across components by multiplying each individual income source by the ratio of total consumption expenditure to total earned income in each period.

4. In a context of game theory, this method allows the assigning "the gains of a coalition of players among its members as a function of what they contribute to the coalition" (Sastre and Trannoy, 2002).

Summing up, the Shapley method presents several basic features that make it an attractive decomposition approach. In addition to treating the factors in a symmetric manner, it fully explains the contribution of the different income sources. However, a feature that must be considered when using the Shapley decomposition is that the counterfactual income distributions suffer from equilibrium inconsistency. This is because they are not a result of an economic equilibrium, but rather a statistical exercise (Azevedo, Inchaust and Sanfelice, 2013). The method can be used with cross-sectional and panel data alike, but, like RH, it does not allow for the evaluation of the dynamics in income sources or spatial mobility. In the presence of panel data, that heterogeneity can be observed by running the analysis across subsamples of occupational, spatial or occupational-spatial dynamic categories.

Augmented panel decomposition

This analysis proposes an alternative augmented panel decomposition approach that departs from the RH framework and tries to relax some of its restrictions. While the RH approach is useful for assessing the relative contributions of sectoral growth and of some of the processes underlying structural transformation to welfare changes, it can only be applied to repeated cross sections or panel data, without tracking particular household sectoral or spatial paths. Instead, our approach takes advantage of the panel nature of the household data to fully decompose the effects on total poverty change without residual terms, and accounting for the joint spatial and sectoral dynamics.

This augmented model focuses, therefore, on the effects on poverty of occupational and spatial mobility, tracking how households' sector and location change over time. The approach contributes to poverty and welfare decomposition literature as it allows measurement of the dynamic nature of poverty reduction and of its sources. To operationalize this approach, we defined, for each period, complex categories based on the occupational portfolio of households and the relative importance of the derived household income shares. Then, we set dynamic pairs defined on the basis of changes in income sources, and assessed the contribution of those pairs to the changes in poverty rate by decomposing intra- versus inter-sectoral effects.

Formally, this approach takes the following form:

$$P_{t+1} - P_t = [\sum_{\Delta s} \alpha^{\Delta s} (P_{t+1}^{s_{t+1}} - P_t^{s_t}) \mid s_{t+1} = s_t] + [\sum_{\Delta s} \alpha^{\Delta s} (P_{t+1}^{s_{t+1}} - P_t^{s_t}) \mid s_{t+1} \neq s_t] \quad (3)$$

where P is the poverty index between time t and $t+1$, Δs represents the sectoral dynamic categories, and $\alpha^{\Delta s}$ is the share of the population in each dynamic category. The first term on the right-hand side of the equation reports the contribution to poverty change of those that stayed in the same sector between time t and $t+1$, namely, the intrasectoral effects. The second term measures the contribution to poverty change of those that moved from one sector to another, representing the intersectoral shifts.

In our analysis, we compute the decomposition over two definitions: sector of specialization (occupational), i.e. agriculture, non-agriculture and diversified; and location of operation (spatial), i.e. rural and urban. We also create more complex dynamic categories that combine occupational and spatial dynamics, which allows us to jointly consider the composite effect of spatial and occupational mobility.

2.2 Regression-based decompositions

Welfare regression decomposition with occupational and spatial dynamics

In order to statistically estimate the relationship between welfare and mobility, we propose a welfare regression decomposition approach that allows for the exploration of the effects of intrasectoral and intersectoral dynamics on household consumption expenditure growth between time t and $t+1$, while controlling for time-variant and time-invariant factors. The regression is estimated by ordinary least squares.

The model is formulated as follows:

$$\Delta Y_j = \alpha + \beta Z + \gamma \Delta X + \delta T + \varepsilon \quad (4)$$

where ΔY is the change in per capita consumption expenditure, Z is a set of dynamic sectoral and spatial categories, ΔX represents changes in a set of time-variant factors, T is a set of time-invariant factors, and ε is a stochastic error term.

Dynamic categories included in set Z are defined as dummy variables representing discrete groups of household mobility status change between period t and $t+1$. The mobility categories are built to assess effects in three models: occupational mobility, spatial mobility, and occupational/spatial mobility.

Time-variant X factors include household characteristics, such as the age of the household head and his/her level of education, community-level variables, such as weather and other shocks, and distance to agricultural market. Time-invariant factors are represented by regional dummies.

Essentially, this method represents the multivariate regression version of the augmented panel decomposition approach.

Shorrocks-Shapley decomposition of R^2

The purpose of the Shorrocks-Shapley decomposition of R^2 is to determine how much each independent variable contributes to the model. The method uses the same definition of the Shapley value discussed above, but in this case, it is employed to decompose the goodness of fit (R^2) of the model into contributing components using the Shapley value approach (Shapley, 1953; Shorrocks, 1999).

Consider the following regression model:

$$\Delta Y = \beta_0 + \beta_1 \Delta X_1 + \beta_2 \Delta X_2 \ldots + \beta_j \Delta X_j \ldots + \beta_k \Delta X_k + \varepsilon \quad (5)$$

where ΔY is the change in household expenditure per capita, ΔX_j is the change in sources of income (or dynamic categories), non-income-related factors (the contributing components), and ε is a stochastic error term. As discussed above, under this decomposition method, based on cooperative game theory techniques, R^2 is seen as a total value of the game played by a series of contributing components X_j, where $j \in K = \{1, 2, \ldots, j, \ldots k\}$.

Formally, let θ be a permutation of the variables with the interpretation that variable X_j has the position $\theta(j)$ in θ. The set of variables that appears before x_j in θ is denoted by P $(\theta; X_j) = \{ X_p \in K \mid \theta(p) < \theta(j)\}$. Thus, the marginal contribution of X_j in θ is:

$$MC(X_j, \theta) = v(P\ (\theta; X_j) \cup \{ X_j\} - v(P\ (\theta; X_j)) \tag{6}$$

This equation tells us that the marginal contribution of a variable X_j is given by the difference between the goodness of fit explained by a subsample that includes x_j and the set of all the variables excluding X_j. Denoting by $\Theta(K)$ the set of all possible permutations of K, we can define the Shapley value of variable X_j as follows:

$$Sh_{X_j} = \frac{1}{\Theta(K)} \cdot \sum_{\theta \in \Theta(K)} MC(X_j, \theta) \tag{7}$$
$$\sum_{j=1} Sh_{X_j} = R^2 \qquad j = 1, 2, \ldots, k$$

Therefore, Sh_{X_j} the share of R^2 explained by the variable X_j is given by the average of its marginal contribution over all possible permutations. In this paper, we use the Shorrocks-Shapley decomposition of R^2 to examine how, in a regression setting, the variation in the income earned from different sources contributes to changes in welfare, complementing the simple Shapley decomposition.

3 Data sources and variables for the analysis

3.1 Household panel survey sample and data

This study uses data from the Malawi Integrated Households Panel Surveys over two rounds (IHS3 for 2010 and IHSPS for 2013) implemented by the Government of Malawi through the National Statistical Office in coordination with the World Bank Living Standards Measurement Study – Integrated Surveys on Agriculture (LSMS-ISA) initiative.[5] This is a multidimensional survey with detailed information about households' characteristics, activities and livelihoods, agricultural practices and community-level information.

The first round of the data includes 3,246 households, selected by means of a stratified sampling from 204 enumeration areas, and interviewed from March 2010 to November 2010 as part of the larger third Integrated Household Survey (IHS3). The same households were revisited between April and December 2013 for the second round of the panel survey. Due to attrition and split-off of some households between the two survey periods, the second round IHPS dataset contains 4,000 households that can be traced back to 3,104 baseline households that form a balanced panel corresponding to 14,005 individuals in each round.

The sample frame includes all three geopolitical regions of Malawi: Northern, Central and Southern. The survey stratified the country into rural and urban strata. The urban stratum includes the four major urban areas: Lilongwe, Blantyre, Mzuzu and Zomba. All other areas are considered rural. The data are representative at the national, urban/rural and regional levels.

We also use auxiliary data such as the consumption aggregates developed by the World Bank LSMS team for poverty analysis in Malawi.[6] The use of these pregenerated variables allows us to compare and link our results to official statistics and other research outputs developed using the publicly available LSMS data, thereby contributing coherently to the broader discussion about livelihoods in Malawi.

5. For more information on the Malawi LSMS-ISA initiative, see: www.worldbank.org/lsms-isa.
6. The consumption aggregates data as well as a detailed discussion on how each component is calculated are in the dissemination documentation available for download from the LSMS website.

3.2 Defining the key variables in the analysis

The analysis in this paper uses three main sets of variables: welfare and poverty outcomes; income sources; and occupational and spatial mobility variables. A brief description of the main variables in each set follows.

Welfare and poverty outcomes

The measurement of welfare and poverty outcomes uses three main indicators. First, household welfare defined as the household consumption expenditure per capita. Second, poverty measured through poverty headcount defined as the proportion of households below the poverty line.[7] Although other poverty indices exist, the poverty headcount ratio (poverty incidence) has been chosen for this analysis as this is not intended to be a full-fledged poverty report. Finally, poverty dynamics are analysed by using 4×4 poverty transition matrices to account for movements of households into and out of poverty, and the persistence in poverty status – the presence of chronic poverty and/or sustained well-being over time.

Sources and structure of household income

Economic diversification is accounted for by identifying the main sources of household income and the structure of annual earnings from the Rural Income Generating Activities dataset compiled from the information collected in IHS3 and IHSPS. The activities are structured around three main groups: agricultural activities, including own crop production, own livestock, and farm wage; non-agricultural activities, including non-farm wage and non-farm self-employment; and non-activity income, including transfers, rents and other income.

Occupational and spatial dynamics

Occupational dynamics are looked at by assessing the movements of people across activities defined as the major source of activity income (as defined in the previous paragraph). For this analysis, the main activities are discretely defined as agriculture, non-agriculture and diversified. In this context, a household is considered specialized in one activity if the share of income from the given source is greater than 75 per cent of the total income earned by the household. Otherwise, it is considered diversified. The resulting occupational transition/dynamic categories over the two data points considered in this analysis will therefore consist of: "agriculture/agriculture", "agriculture/non-agriculture", "agriculture/diversified", "non-agriculture/agriculture", "non-agriculture/non-agriculture", "non-agriculture/diversified", "diversified/agriculture", "diversified/non-agriculture" and "diversified/diversified".

An alternative occupational classification is employed and also used for computing the combined occupational and spatial mobility. In this case, for ease of computation, we remove the diversified category and use the 50 per cent cut-off point to define a reduced occupational classification. If the share of agricultural income is greater than half, the household is considered "agricultural", otherwise it is classified as "non-agricultural".

For tracking the spatial dynamics, in each period, the population is divided into those who lived in rural areas and those who were located in urban areas. For a subset of the analysis, urban areas are further divided into small towns and large towns. Using the same logic used

7. This is the P0 measures of the Foster-Greer-Thorbecke indices. It does not measure how far people are from the poverty line. The poverty gap (P1) shows how far below the poverty line people are, and the squared poverty gap (P2) takes into account the income gap and inequality among the poor (World Bank, 2008). P1 and P2 are not used in this analysis.

for occupational mobility, with the initial rural/urban cut, four dynamic categories emerge based on who stayed in the original location "rural-rural" and "urban-urban", and who instead moved from one area to the other, i.e. "rural-urban" or "urban-rural". Introducing the distinction between small towns versus large towns within urban areas, generates nine dynamic groups: "rural/rural", "rural/small towns", "rural/large towns", "small towns/rural", "small towns/small towns", "small towns/large towns", "large towns/rural", "large towns/small towns", and "large towns/large towns".

The reduced occupational classification (agriculture versus non-agriculture) is combined with the first set of spatial variables to generate occupational/spatial categories employed in the analysis: "rural-agriculture", "urban-agriculture", "rural-non-agriculture" and "urban-non-agriculture". From this static classification, we create dynamic pairs over all possible combinations of these categories.

Household tracking status

Spatial mobility analysis also extends to the assessment of the mobility of individuals moving away from original 2010 households and forming new households in 2013, and we compare those households with those remaining in the original places with or without splitting. This allows for the decomposition of the sample into spatial dynamics based on household tracking status, resulting in four categories: "original non-movers" (same place, all members, both periods); "original movers" (different places, all members); "original split remainers" (same place, subset of original members); and "split-offs" (different place, subset of original members). As we are using panel data, "split-offs" and "original split remainers" refer to a subset of people who originally belong to the same household. This implies that they share the original welfare and poverty status.

3.3 Other household- and community-level variables

For the regression-based approaches, we introduced some control variables, both time-variant and time-invariant at household and community levels. Household-level variables include: demographics, education and asset ownership, such as household head's age, years of schooling and sex, and household dependency ratio and land holdings.

At the community level, the analysis includes shock variables such as: incidence of malaria, unemployment, rainfall and market prices. Finally, we also use distance from village to closest market, and region-specific fixed effects.

4 Analytical results

The ability of households to improve welfare levels and move out of poverty depends to a great extent on their capacity to generate and diversify their sources of income. This section presents the core of the analysis undertaken in this paper. We start by presenting some descriptive statistics to assess trends in levels and the dynamics of poverty and household welfare, and evaluating the structure and dynamics of income earnings over time and across space. Then, we provide the analytical results related to the application of the non-regression and the regression-based decomposition approaches proposed in this paper.

4.1 Descriptive statistics

In this section, we look at livelihood sources of income and changes in the structure of household income, in relation to welfare and poverty changes. In particular, we present levels of and changes in poverty and welfare, trends in participation and shares from sources, and implications for welfare and the distribution of population among dynamic categories.

Poverty and welfare trends and dynamics

Levels and changes by location and tracking status

Malawi has experienced relatively limited national poverty reduction and stagnant overall consumption growth in recent years. In the period 2010-2013, the poverty headcount ratio fell from 40.2 to 38.7 per cent. Significant differences were observed between urban and rural areas and across different regions of the country.

For instance, rural areas experienced more significant consumption growth and poverty reduction – with rural poverty dropping from 44 to 41 per cent, while in urban areas it increased significantly from 18 to 26 per cent (table 1).[8]

Similar disparities have been observed across regions of the country, with the central region performing the worst, with a significant drop in consumption expenditure and higher poverty levels. Elsewhere in the country, poverty generally dropped. Notably, the Southern Region performed best, with a poverty reduction of 7.7 percentage points and an annual change in consumption of 2.8 per cent.

Considering the household tracking status (table 2), most Malawian panel households (77 per cent) can be identified as "original non-movers". Among that group, the level of poverty at baseline was quite high and it increased slightly in 2013, from 40.7 to 41.5 per cent.

8. These trends are opposite to the results observed in the period 2005-2010 when poverty increased in rural areas and dropped in urban areas.

"Original split remainers" (4.2 per cent) reported the highest incidence of poverty in 2010, but they managed to reduce it by 10.9 percentage points in 2013, reaching a lower level than "original non-movers". "Original movers" (10.5 per cent) had the lowest levels of poverty in 2010 and the rate for them dropped by only 1.3 percentage points.

"Split-offs" experienced the best performance, reaching the lowest level of poverty in the second round, with only 22.5 per cent of the population below the poverty line. Overall, these results suggest that people who split from the original household, both split remainers and split-offs, performed better in the second period than the rest of the population, resulting in an increase of per capita consumption and a reduction in poverty.

Table 1 Poverty headcount and expenditure per capita, 2010-2013

Region of residence at the time of the survey	Population share (%)		Poverty headcount (%)			Consumption per capita (MK 1,000)			
	2010	2013	2010	2013	Change (percentage points)	2010	2013	Annual growth (%)	Annual change
Area of residence									
Rural	85.5	85.2	44.0	40.9	-3.1	49.9	54.1	2.7	1.4
Urban	14.5	14.8	17.9	26.2	8.3	110.9	94.0	-5.5	-5.6
Region									
Northern	9.8	9.9	50.2	43.3	-6.9	47.3	48.3	0.7	0.3
Rural	8.4	8.5	53.4	45.6	-7.8	42.8	46.1	2.5	1.1
Urban	1.4	1.4	31.4	29.4	-2.0	74.5	61.3	-6.5	-4.4
Central	46.3	46.6	33.5	39.0	5.5	63.8	61.8	-1.1	-0.7
Rural	39.7	39.5	35.3	39.7	4.4	56.4	55.6	-0.5	-0.3
Urban	6.6	7.1	22.5	34.9	12.4	108.2	95.9	-4	-4.1
Southern	43.9	43.5	45	37.3	-7.7	55.9	60.9	2.8	1.7
Rural	37.5	37.1	51.0	41.0	-10	44.6	54.4	6.6	3.3
Urban	6.5	6.3	10.2	15.6	5.4	121.5	99.1	-6.8	-7.5
National	100.0	100.0	40.2	38.8	-1.4	58.7	60.0	0.7	0.4

Source: Authors' calculation based on IHS3 and IHPS.

Table 2 Levels and changes in welfare and poverty by household tracking status, 2010-2013

Household tracking status	Population share (%)	Poverty headcount (%)			Consumption per capita (MK 1,000)			
		2010	2013	Change (percentage points)	2010	2013	Annual growth (%)	Annual change
Area of residence								
Original non-movers	77.0	40.7	41.5	0.8	56.1	55.7	-0.3	-0.1
Original movers	10.5	34.1	32.8	-1.3	75.2	74.4	-0.4	-0.3
Original split remainers	4.2	46.6	35.7	-10.9	56.2	61.5	3.1	1.8
Split-offs	8.3	39.7	22.5	-17.2	63.8	81.8	9.4	6.0
National	100.0	40.2	38.8	-1.4	58.7	60.0	0.7	0.4

Note: Household tracking status: original non-movers (same place, all members, both periods); original movers (different places, all members); original split remainers (same place, subset of original members); split-offs (different place, subset of original members).
Source: Authors' calculation based on IHS3 and IHPS.

Table 3 Poverty dynamics, 2010-2013 (%)

Region of residence in 2010	Always poor	Entering poverty	Exiting poverty	Never poor	All households
	Poor (2010) Poor (2013)	Non-poor (2010) Poor (2013)	Poor (2010) Non-poor (2013)	Non-poor (2010) Non-poor (2013)	
Area of residence					
Rural	25.5	14.9	18.2	40.9	100.0
Urban	11.4	15.4	8.9	64.9	100.0
Region					
Northern	29.2	14.1	20.3	36.3	100.0
Rural	31.4	14.2	21.6	32.8	100.0
Urban	16.0	13.4	12.6	58.0	100.0
Central	20.3	18.7	13.7	47.3	100.0
Rural	20.9	18.8	14.7	45.5	100.0
Urban	16.9	18.0	8.0	57.1	100.0
Southern	25.3	12.0	19.4	43.3	100.0
Rural	28.9	12.1	21.1	37.9	100.0
Urban	4.1	11.6	9.2	75.2	100.0
National	23.4	15.4	16.8	44.5	100.0

Source: Authors' calculation based on IHS3 and IHPS.

Poverty dynamics

Poverty dynamics analysis reveals some interesting results (table 3). First, as mentioned above, in spite of relative progress in poverty reduction in rural areas, those areas had much higher levels of chronic poverty (25.5 per cent) than urban areas (11.4 per cent), and a smaller share of households that stayed non-poor (41 per cent versus 65 per cent). Second, a more significant share of rural households escaped poverty in rural areas (18.2 per cent) than in urban areas (8.9 per cent), while the share of those entering poverty was fairly similar across the two areas.

Finally, consistent with results in table 1, the Central Region experienced the highest rates of people entering poverty and the lowest of those exiting, when compared to other regions.

Sources and structure of household income

Household income sources

At the national level, about 86 per cent of the population derived income from crop production and sales in 2010, a share that dropped slightly to 84 per cent in 2013. Almost half of the households reported earnings from agricultural labour and about one-fifth from non-farm sources such as non-agricultural wages and/or non-agricultural self-employment.

Among the rural panel households, in 2010 about 93 per cent drew part of their incomes from crop production, but by 2013 that proportion had fallen to 89 per cent. By 2013, about 50 per cent of the households continued to have at least one member engaging in farm labour. In 2013, engagement in rural non-farm self-employment reversed direction: the proportion of households deriving income from that source grew from about 20 to 28 per cent. Engagement in non-farm wage jobs in 2013 remained relatively stable compared to 2010, at about 14 per cent of rural households (table 4).

Table 4 Proportion of households by income source, 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
Non-agricultural						
Non-agricultural 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.

In urban areas, non-agricultural income sources remained the most important, but by 2013 the share of households drawing income from non-farm wage employment had dropped from 58 per cent to about 48 per cent of the urban panel households. Non-farm households that earned income from self-employment increased from 38 per cent to about 50 per cent. Although the drop in the participation in non-farm wage-income activities was compensated by increased participation in other activities, those other activities were not as profitable, contributing to the rise in poverty in those areas.

Structure of household income

Similar trends can be found when considering the share of incomes from different sources. Among panel households in rural areas, the share of income from cropping was about 49 per cent, virtually unchanged from 2010 (table 5). The same holds for the other agricultural activities: farm wage income remained about 18 per cent; and livestock just 7 per cent. Statistically significant increases were observed for the share of non-farm self-employment, which increased from 10 to 14 per cent, while the share of non-farm wage income remained relatively unchanged at 7 per cent. A more balanced income structure with a relatively more important role played by diversification to self-employment by rural households was critical to enabling households to improve welfare levels and move out of poverty (World Bank, 2017).

In the period 2010-2013, non-farm wage employment remained the most important source of income for urban households. However, its share in total income fell from more than 40 per cent in 2010 to just over 30 per cent in 2013, slightly higher than that of non-farm self-employment, which remained the second-most important source. Reliance on farm wage 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 per cent. The inability of urban households to sustain gains from non-farm income in 2013, a source that had played a critical role in sustaining low poverty levels in 2010, resulted in lower levels of welfare and higher levels of urban poverty in 2013.

Table 5 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
Non-agricultural						
Non-agricultural 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.

Table 6 Proportion of household by income source by poverty dynamics, Malawi, 2010-2013 (%)

Income sources	Always poor		Entering poverty		Exiting poverty		Never poor	
	2010	2013	2010	2013	2010	2013	2010	2013
Agricultural								
Crop	88.0	84.2	88.8	86.6	89.4	90.2	82.5	85.3
Livestock	9.9	12.5	23.6	17.2	9.4	28.0	23.7	26.8
Agricultural wage	55.7	59.7	46.5	52.7	51.6	50.7	35.4	37.3
Non-agricultural								
Non-agricultural wage	8.9	8.2	20.8	12.6	15.2	15.3	30.6	27.7
Self-employment	15.7	21.4	23.6	27.1	15.1	29.2	27.8	39.0
Transfers	24.6	30.3	24.3	32.6	27.0	38.2	32.4	38.2
Other sources	1.3	2.6	7.1	4.4	1.1	4.7	8.6	11.9

Note: The table considers the population share in urban and rural areas based on 2010 data.
Source: Authors' calculation based on IHS3 and IHPS.

Income diversification and poverty dynamics

Household income sources by poverty dynamics

Households that came out of poverty in 2013 were mainly engaged in crop production, with a participation rate of 90 per cent in 2013, but participation in livestock, self-employment and transfers also significantly increased among them. At the opposite end, people who became poor in 2013 showed a higher participation in agricultural wage activities and receipt of transfers (table 6).

A general trend observed in Malawi over the period is the increase in the participation in self-employment for all poverty dynamic categories, in particular for those who exited poverty, highlighting its importance as a strategy (table 6).

Table 7 Share of income from source by poverty dynamics, Malawi, 2010-2013 (%)

Income sources	Always poor		Entering poverty		Exiting poverty		Never poor	
	2010	2013	2010	2013	2010	2013	2010	2013
Agricultural								
Crop	49.7	51.3	46.0	46.8	49.4	45.4	37.3	38.7
Livestock	8.7	6.8	9.1	6.9	8.2	8.3	8.3	6.7
Agricultural wage	26.2	25.7	15.6	20.6	22.9	18.8	12.3	11.8
Non-agricultural								
Non-agricultural wage	6.2	3.8	12.2	6.4	8.6	8.2	19.7	15.6
Self-employment	6.6	8.8	13.3	15.6	7.5	14.5	16.2	20.7
Transfers	2.5	3.0	2.5	3.1	2.8	3.9	2.9	3.5
Other sources	0.1	0.5	1.3	0.6	0.6	0.8	3.4	3.1

Note: The table considers the population share in urban and rural areas based on 2010 data.
Source: Author's calculation based on IHS3 panel and IHPS.

Structure of household income by poverty dynamics

The trends in participation are consistent with the patterns of income shares. First, crop production was the main income source and, in particular, it represented almost half of total income for the chronically poor, with a slight increase in 2013. Second, livestock earnings decreased for all the population, except for those who moved out of poverty, where they remained stable (table 7). This can be explained by the flood that occurred in 2012, which washed away most livestock and so destroying an important source of income for many households.

Third, agricultural wages decreased for all groups, except for those who became poor, suggesting that it might be responsible for pushing people into poverty. Finally, people exiting poverty and those never poor exhibited a much more significant increase in both participation and in the share of income from this activity over the period.

4.2 Occupational and spatial dynamics

Occupational mobility

The majority of households in Malawi had agricultural activities as the main source of income (greater than 75 per cent of total income) in both years, accounting for 44 per cent of the population (table 8). In rural areas alone, those staying in agriculture represented almost half of the population. On the other hand, more than half of people located in urban areas had non-agricultural activities as the main source of income over the period.

In general, there was some occupational mobility between 2010 and 2013, in both urban and rural areas. About 62 per cent of households remained in the same activities over the period 2010-2013. However, among the 38 per cent that changed main activity, there was a greater tendency to move from agriculture to diversified sources of income, especially in rural areas, where this dynamic category accounts for 13.3 per cent of the total.

Table 8 Occupational mobility by location and household tracking status, Malawi, 2010–2013 (%)

Dynamic occupational mobility	Population share (%)			Population share (%) by household tracking Status			
	National	Urban	Rural	Original non-movers	Original movers	Original split remainers	Split-offs
Agriculture => Agriculture	43.9	6.7	50.2	46.3	29.1	46.7	39.0
Agriculture => Non-agriculture	4.9	5.4	4.8	4.2	9.8	3.6	6.4
Agriculture => Diversified	11.7	2.8	13.3	12.9	7.6	9.1	8.1
Non-agriculture => Agriculture	4.3	8.9	3.6	4.3	4.0	3.5	5.2
Non-agriculture => Non-agriculture	11.5	51.1	4.8	8.8	24.3	17.8	17.0
Non-agriculture => Diversified	4.7	11.7	3.5	3.9	8.0	6.6	7.2
Diversified => Agriculture	8.6	4.1	9.4	9.7	4.0	4.2	7.4
Diversified => Non-agriculture	3.7	5.0	3.5	3.5	6.6	2.2	3.1
Diversified => Diversified	6.6	4.2	7.0	6.6	6.6	6.4	6.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Authors' calculation based on IHS3 and IHPS.

Looking at the distribution of occupational mobility by household tracking status, all four categories were mainly reliant on agriculture in both years. In particular, almost half of the "split remainers" and "original non-movers" continued to have agriculture as the main income-generating activity. The second-highest population share (24.3 per cent) is represented by "original movers" that remained specialized in non-agricultural activities. People who changed location (both "original movers" and "split-offs") reported a higher share of occupational mobility from agriculture to non-agriculture, implying a possible correlation of spatial and occupational mobility, which is possibly linked to potential relatively higher welfare gains.

Spatial mobility and combined occupational-spatial dynamics

Overall, the sample showed very limited spatial mobility in Malawi between 2010 and 2013 (table 9). Indeed, 84 per cent of the total population stayed in rural areas, and 13.3 per cent remained in urban areas, in particular in large towns (11.2 per cent). Only 2.7 per cent of individuals changed their location, from rural to urban (1.5 per cent) or vice versa (1.2 per cent). As a result of this limited spatial mobility, when considering the combined occupational and spatial mobility, we note that, over the period, the overwhelming majority

of the population stayed in rural areas and were engaged predominantly in agricultural activities. People who continued to be predominantly involved in non-agricultural activities are evenly distributed between those that remained in urban and rural areas. About 1 per cent of the population moved across the urban-rural space and continued to have non-agricultural activity as the main livelihood.

In rural areas, people who moved in and out of agriculture represented about the same proportion (10 per cent). A similar share was reported to have remained in non-agriculture in those areas. In contrast, in urban areas, a greater proportion of people moved from agriculture to non-agriculture (1.3 per cent of the national population), while only 0.4 per cent moved into agriculture.

Table 9 Population distribution by combined occupational-spatial mobility, 2010-2013

Dynamic occupational changes	Population share (%)
Agriculture rural => Agriculture rural	53.3
Agriculture rural => Non-agriculture rural	10.9
Agriculture rural => Non-agriculture urban	0.5
Agriculture rural => Agriculture urban	0.4
Non-agriculture rural => Agriculture rural	10.2
Non-agriculture rural => Non-agriculture rural	9.6
Non-agriculture rural => Non-agriculture urban	0.5
Non-agriculture rural => Agriculture urban	0.1
Non-agriculture urban => Agriculture rural	0.4
Non-agriculture urban => Non-agriculture rural	0.6
Non-agriculture urban => Non-agriculture urban	8.7
Non-agriculture urban => Agriculture urban	2.1
Agriculture urban => Agriculture rural	0.1
Agriculture urban => Non-agriculture rural	0.1
Agriculture urban => Non-agriculture urban	1.3
Agriculture urban => Agriculture urban	1.3
Total	100.0

Source: Authors' calculation based on IHS3 and IHPS.

4.3 Non-regression-based decomposition analysis

This section presents the results of the analysis of non-regression-based decomposition approaches introduced earlier, applied to the household survey data from Malawi for the years 2010 and 2013. First, we present and discuss the results from the RH decomposition method. Second, an analysis of the Shapley decomposition approach is introduced at the national level and by contrasting rural and urban (including large versus small towns) areas, and subsets of occupational/spatial mobility status. Finally, we present the results from the application of the proposed augmented panel decomposition approach, which maximizes the benefits of the available panel data to fully explore intra- and inter-sectoral effects, and how occupational, spatial and combined occupational-spatial mobility relate to poverty changes.

Ravallion–Huppi decomposition

The results for the RH decomposition presented in table 10 look at three types of decomposition: occupational, spatial and combined spatial/occupational. Several results stand out. First, for all types of decomposition, intrasectoral effects represent the major contribution to poverty changes. Second, the small effects of intersectoral shifts in spatial decomposition were due to the low mobility between rural and urban areas that occurred in Malawi over the period. Finally, intrasectoral effects are particularly important when considering the combined occupational and spatial decomposition, as most of the occupational mobility occurred within the same area.

While the results give a general idea of the main contributors to poverty change in Malawi, the interaction term does not allow a complete interpretation of the effects on poverty reduction of changes within and between sectors. This issue is addressed with the next set of methods below.

Table 10 Ravallion–Huppi decomposition by type of disaggregation, Malawi, 2010-2013

Type of disaggregation	Intrasectoral effects	Intersectoral effects	Interaction term
Occupational mobility (agriculture, non-agriculture and diversified)	66.4	36.1	-2.8
Spatial mobility (rural-urban)	96.6	6.1	-2.7
Combined occupational and spatial mobility	99.8	3.4	-3.2

Note: The results have been divided by the total poverty change in order to obtain the percentage contribution of each term.

Source: Authors' calculation based on IHS3 and IHPS.

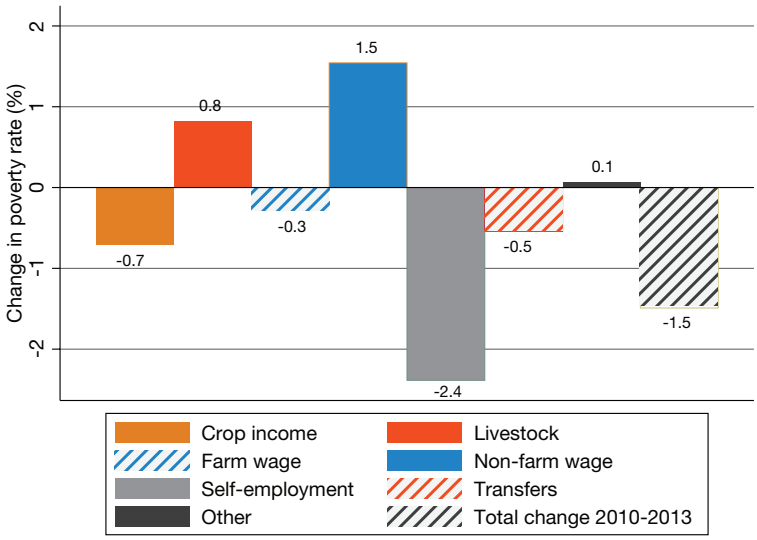
Shapley decompositions

National level

The decomposition of the national poverty changes by income sources through the Shapley methodology provides results well in line with observed trends in participation and returns to particular sources. In the period 2010–2013, Malawi continued to experience relative stagnation in the levels of national poverty, with the rate falling by about only 1.5 percentage points (figure 1).

The main contributors to this reduction were self-employment income activities, followed by crop income. In contrast, non-farm wages experienced downward trends in participation and returns, negatively affecting the total poverty change. However, these effects did not outweigh the positive contribution of the other sources.

Figure 1 Shapley decomposition of change in poverty, national level, 2010-2013 (%)



Source: Authors' calculation based on IHS3 and IHPS.

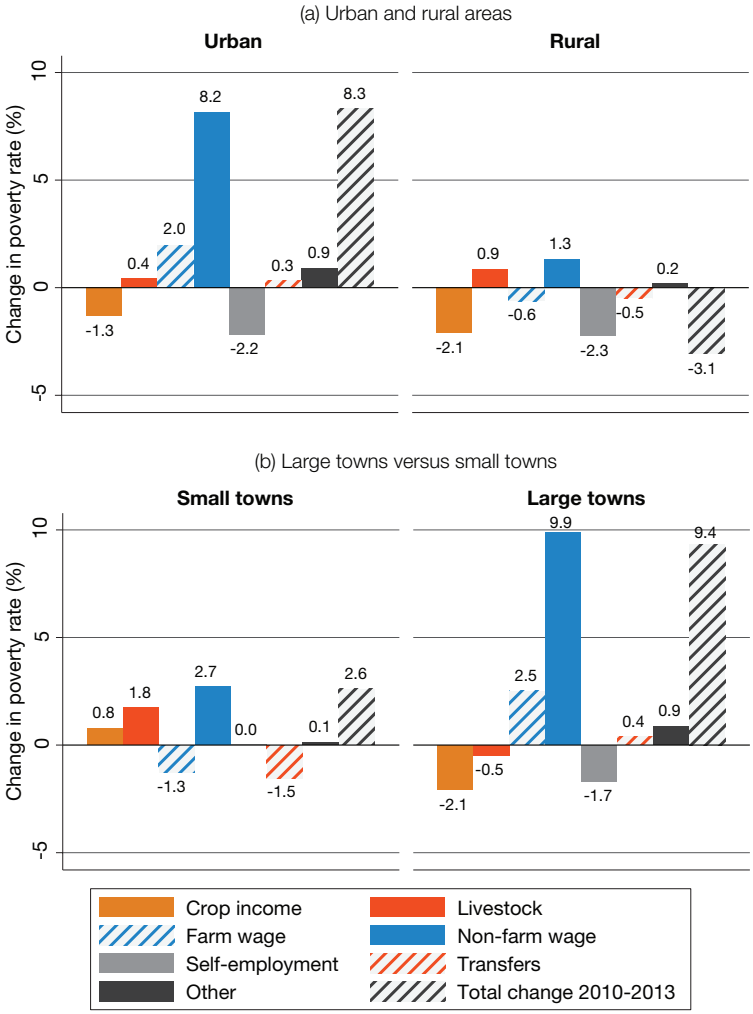
Rural and urban areas

The Shapley decomposition analysis for rural areas shows that the increase in non-farm self-employment was responsible for about 2.3 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. Transfers in rural areas also played a role in reducing rural poverty. The total observed drop in poverty would have been 5.5 percentage points if there had been no reduction in other income sources such as livestock and non-farm wages (figure 2a). These results underscore the continued importance of agriculture for rural livelihoods, along with income diversification, particularly self-employment (World Bank, 2017).

Quite different results are revealed for urban areas, where poverty increased over the period. As highlighted in previous sections, urban incomes are dominated by non-agricultural sources, predominantly self-employment and non-farm wage employment, although the shares of participation and income of the latter dropped significantly. The Shapley decomposition results indicate that the drop in non-farm wage employment is a major driver of poverty increases in urban areas. Of the net urban poverty increase of 8.3 percentage points, non-farm labour wage income contributed with about 8.2 percentage points, which makes it the single-most important factor (figure 2a). 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 (World Bank, 2017).

Results similar to those in urban areas are found in large towns, where most of the urban population lives. Poverty in large towns increased by about 9.4 percentage points, most of it explained by non-farm wage employment, which dropped significantly over the period. Even in this case, positive contributions from non-farm self-employment and crop income less than compensated for that negative effect. In small towns, where poverty increased by 2.6 percentage points, the main drivers of that increase were non-farm wage and livestock, while the forces that mostly contributed towards its reduction were transfers and farm wage income.

Figure 2 Shapley decomposition of changes in poverty, 2010–13 (%)



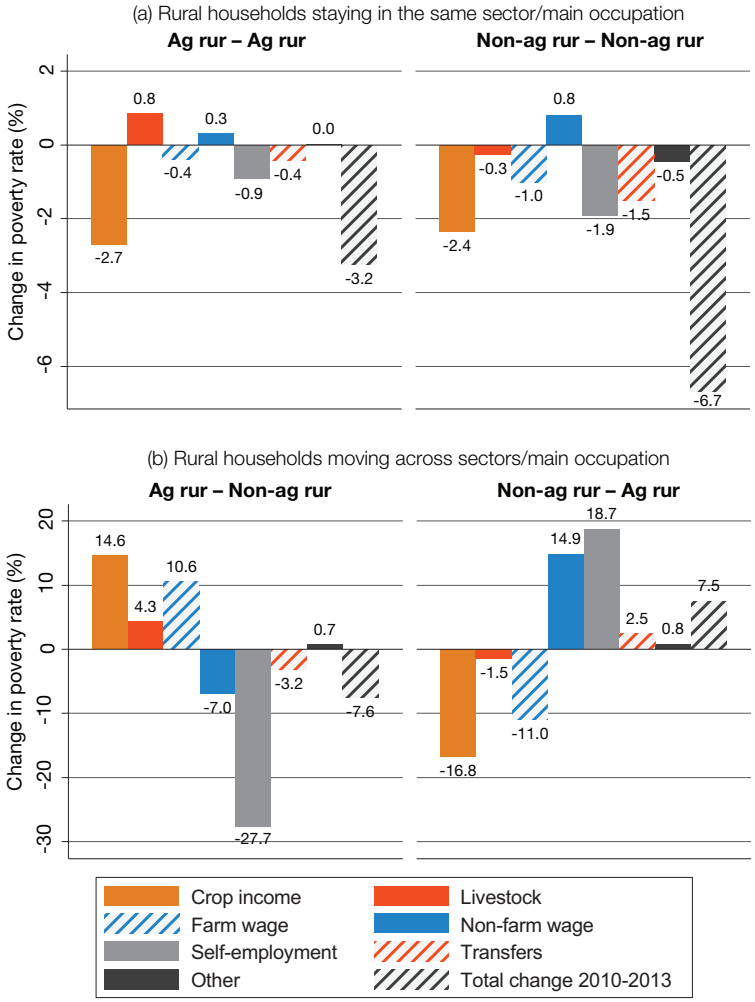
Source: Authors' calculation based on IHS3 panel and IHPS.

Combined spatial and occupational mobility in rural areas

In addition to looking at Shapley decompositions across space, we also undertook a decomposition analysis of poverty changes across subsamples of combined spatial and occupational dynamics in rural areas. The two rural subsamples considered were "rural households staying in the same sector" and "rural households moving across sectors" between 2010 and 2013. We find several revealing results.

Shapley decomposition analysis for those households that stayed in the same sector in rural areas (figure 3, Panel a) reveals that poverty fell for both people that remained involved in agriculture (-3.2 per cent) and those that remained in non-agricultural (-6.7 per cent). In both cases, the source of income that mainly contributed to the poverty decrease was crop production, followed by self-employment. Non-farm wage income had negative effects on poverty, especially for those specialized in non-agriculture. Income from livestock negatively contributed to poverty reduction for those that remained in agriculture, while its effect was positive for those specialized in non-agriculture.

Figure 3 Shapley decompositions among rural households, by mobility status



Source: Authors' calculation based on IHS3 and IHPS.

When looking at the subset of the rural population that moved across sectors (figure 3b), we find that people who moved from agriculture to non-agriculture activities experienced a decrease in the level of poverty. The drop was mainly driven by self-employment income. However, crop production and farm wage made negative contributions to poverty reduction. The opposite trend was experienced by people who moved from non-agriculture to agriculture, i.e. an increase of poverty incidence, mainly caused by self-employment and non-farm wage income.

Augmented panel decompositions

The augmented panel decomposition approach takes full advantage of the panel nature of our data and fully accounts for the decomposition of effects on poverty of occupational, spatial and combined occupational/spatial mobility. In this section, we first look at the relative importance of intra- versus inter-sectoral effects in explaining poverty changes at the national level, and within urban and rural areas. Then, we look at spatial mobility, and

finally at the combined occupational/spatial mobility. Second, an analysis of the poverty changes by dynamic occupational category is undertaken at the national, urban and rural levels in order to assess the contribution of sectoral dynamics to poverty reduction.

Contribution of intra- and inter-sectoral effects to poverty changes

The analysis in table 11 reports the overall intra- and inter-sectoral effects on poverty change over all types of population decomposition, measured by the augmented panel decomposition approach. As in the case of the RH decomposition, intrasectoral effects explain the bulk of total poverty changes. In particular, they had a significant weight in the combined occupational-spatial dynamic decomposition. This is due in part to the limited spatial mobility aggravated by the persistence of agriculture in rural areas.

However, the only case where intersectoral effects played the main role in defining the poverty change is for the urban subsample, where shifts between sectors accounted for 73 per cent of the urban poverty change. This is consistent with mobility trends observed in urban areas over the period, and discussed above (see table 8). Accounting for spatial mobility alone, we find that 75 per cent of the changes in poverty are explained by intralocational effects, and only one-quarter by movements across rural and urban areas. Those effects are even stronger (86 per cent) when considering the combined occupational-spatial mobility (table 11).

Table 11 Augmented panel decomposition by type of disaggregation, Malawi, 2010–2013

Type of sectoral decomposition	Intrasectoral effects	Intersectoral effects
Occupational mobility (agriculture, non-agriculture and diversified)	83.8	16.2
Rural	58.3	41.7
Urban	26.8	73.2
Spatial mobility (rural-urban)	75.1	24.9
Combined occupational and spatial mobility	88.6	11.4

Source: Authors' calculation based on IHS3 and IHPS.

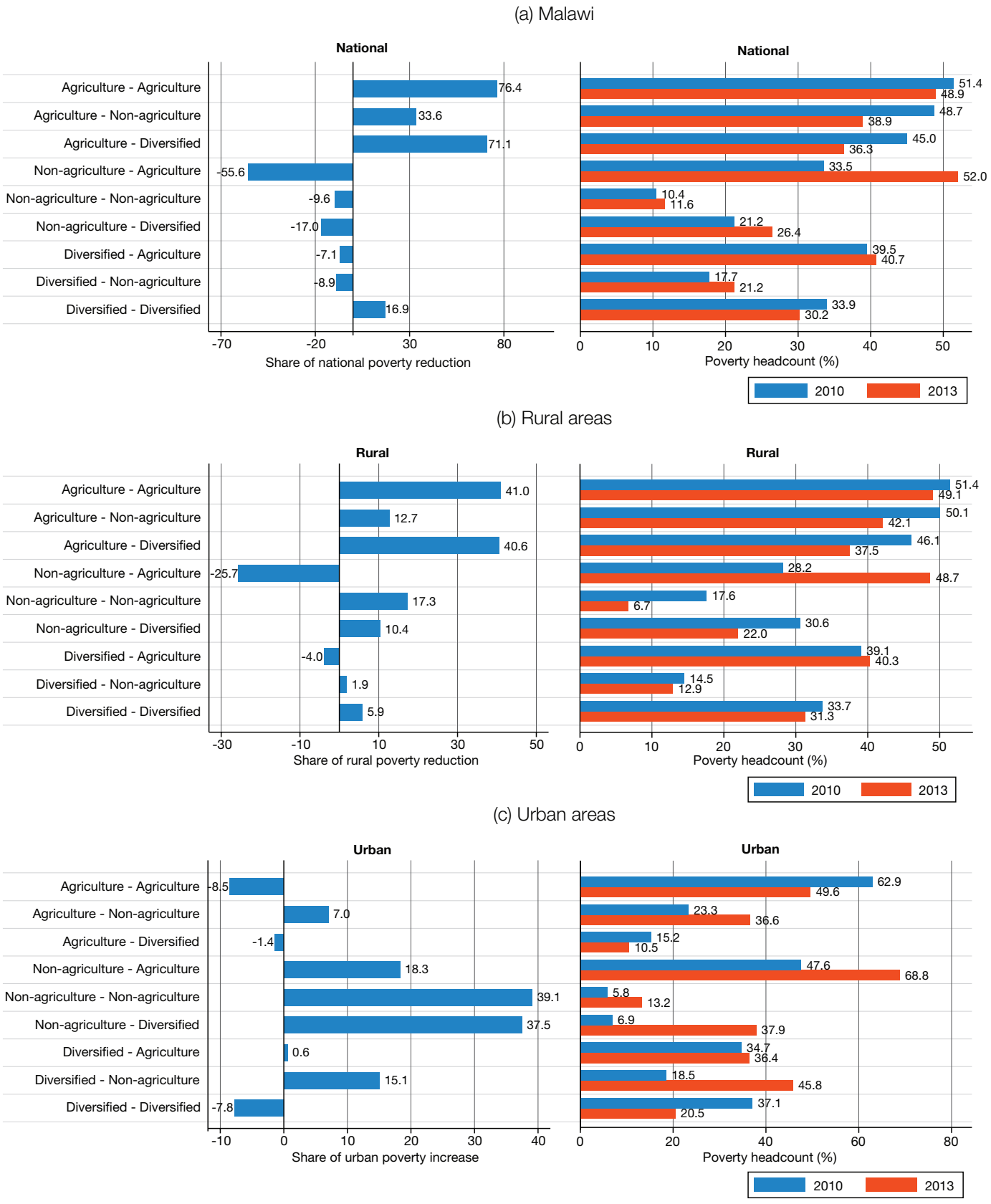
Contribution of occupational mobility to poverty reduction

The augmented panel decomposition approach is used to estimate the contribution of occupational mobility to poverty reduction, at the national level, as well as separately for urban and rural areas. We also look at the decomposition results for a particular tracking group, i.e. the "split-offs", which stood out earlier when accessing poverty reduction by tracking status, and compare them with national results here.

Figure 4 summarizes the results. The panels on the right show the poverty headcount in 2010 and 2013 of each dynamic category, and the panels on the left illustrate the share of poverty change explained by that specific dynamic category. Where poverty reduction occurred, the contribution has a positive (+) share, and effects towards poverty increases have a negative (-) share.

At the national level, Malawi experienced a slight reduction in the incidence of poverty between 2010 and 2013. Several results stand out (figure 4a). First, the occupational dynamic category that mainly contributed to this change is represented by people who remained specialized in agriculture in both years (explaining a net 76 per cent of the change). This result can be

Figure 4 Augmented panel decomposition: share of poverty reduction and poverty headcount levels, by occupational dynamics, 2010-2013



Source: Authors' calculation based on IHS3 and IHPS.

explained by considering that most Malawians were engaged in on-farm activities; therefore, a small poverty reduction in this portion of the population had a great repercussion at the national level. However, the level of poverty among people involved in agriculture in 2013 was still very high (49 per cent) compared to people staying in non-agricultural (38 per cent) or moving to diversified (36 per cent) sources of work.

Second, the next-most important dynamic pairs in terms of effects on total poverty decline is represented by households that shifted their occupation from agriculture to a more diversified income source set (explaining a net 71 per cent of the change). In this case, the explanation is that, even if the sample size of this group is quite small, the difference in the headcount ratio between 2010 and 2013 (almost 10 percentage points) was large enough to have a relevant impact at the national level. Finally, while sustaining diversified incomes made a positive contribution to poverty reduction, moving into agriculture from both non-agriculture and a diversified portfolio had a negative effect on poverty at the national level (netting negatively 56 per cent and 7 per cent, respectively).

In rural areas, where overall poverty fell by 3 percentage points, the reduction was driven by some of the similar determinants as at the national level, but additional dynamics also emerge (figure 4b). First, staying in agriculture and moving into a diversified set led the process of poverty reduction (net contribution of about 41 per cent in each case). Second, persistent dependence on non-farm sources and further diversification from previously non-farm income-dominated portfolios into more balanced ones also had a positive effect on poverty reduction in rural areas. Finally, moving into agriculture caused a welfare contraction, negatively contributing to rural poverty reduction – 27 per cent when moving from non-farm-dominated composition and 4 per cent when moving from diversified portfolios.

In urban areas, poverty increased by 8.3 percentage points between 2010 and 2013. The results reveal some interesting findings. First, poverty increases were mostly driven by those who stayed in non-agricultural activities, as those activities were apparently less profitable in 2013 in part due to the massive currency depreciation in 2012.

Indeed, in mid-2012, a series of economic reforms were undertaken, namely: the devaluation of the currency, the adoption of a floating exchange rate regime, the liberalization of foreign exchange markets, and the introduction of an automatic fuel price adjustment mechanism. These reforms, while expected to be beneficial in the long term, had immediate detrimental impacts on the cost of living. Prices of many basic items increased by as much as 50 per cent, and fuel prices rose by 30 per cent, pushing up the cost of public transport (IRIN, 2012). This was not followed by a proportional increase in wages. Given their relatively greater dependence on wage income, the urban population was relatively more affected by these economic measures. Actually, urban areas had already been affected by an increase in prices of staple crops at the end of 2011. According to the cost-of-living survey released by the Centre for Social Concern, a local NGO, the price of maize increased by an average of 11.7 per cent in October 2011 in the country's four main urban centres (Lilongwe, Blantyre, Mzuzu and Zomba) (IRIN, 2011).

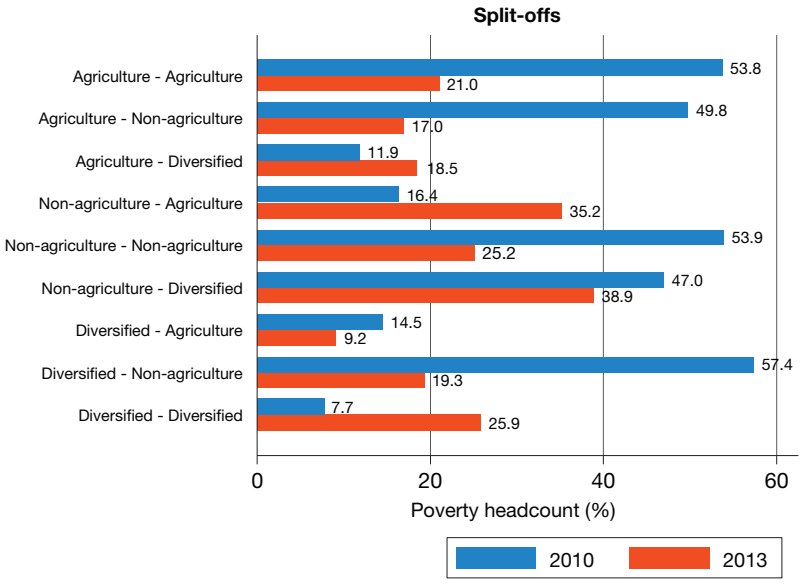
Second, as agricultural income was less sensitive to these reforms, staying in agriculture had a positive effect on poverty reduction in urban areas. However, while non-agricultural income was associated with poverty increases, the levels of poverty among those engaging in such activities remained relatively lower (13 per cent) than that of those staying in agriculture (50 per cent) or moving into it from non-agriculture (69 per cent).

Finally, moving from on-farm to diversified sources or remaining with a diversified set of activities turned out to be a good strategy to help people escape poverty. While those particular groups represent a significantly smaller share of the population, therefore resulting in relatively limited overall shares of forces towards urban poverty reduction, i.e. 1.4 per cent and 8 per cent, respectively, the poverty headcounts of such groups fell to relatively low levels – from 15 to 11 per cent for those moving from agriculture to diversified sets, and from 37 to 20 per cent among those with diversified activity portfolios.

Split-offs, those households emerging elsewhere from original households, represent a relatively small proportion of Malawi's total population – only about 8.3 per cent. However, although the direction of the contributions to poverty reduction by occupational dynamics of this group is in line with the results provided at the national level, their poverty reduction and final standings in 2013 were always stronger than the national average for particular transition categories. For instance, people who remained specialized in agriculture and split off succeeded in decreasing the poverty headcount ratio from 54 per cent in 2010 to 21 per cent in 2013, while a similar mobility group at the national level still had 49 per cent of population below the poverty line in 2013, from an almost similar level (51 per cent) in 2010 (figures 4 and 5).

The same can be observed in people who moved from agriculture to non-farm activities, reaching 17 per cent of poverty incidence in 2013, against 39 per cent at the national level; and those staying diversified, 25 per cent in 2013 (from 54 per cent in 2010) for split-offs and 30 per cent in 2013 (from 34 per cent in 2010) at the national level. These results suggest that people who moved to another dwelling and to another place managed to improve their welfare more than the other households tracking groups.

Figure 5 Poverty headcount ratio by occupational dynamic categories, split-offs, 2010–2013



Source: Authors' calculation based on IHS3 and IHPS.

Contribution of spatial mobility to poverty reduction

As described above, the analysis looks at two levels of spatial mobility – across rural and urban areas; and across rural areas, small towns and large towns. Several results stand out (table 12).

First, Malawi experienced very little spatial mobility between 2010 and 2013, with only 2.7 per cent of the population moving from rural to urban areas, or vice versa. Most of the spatial mobility occurred between large towns and rural areas, involving 1.9 per cent of the total population. Only about 0.8 per cent moved across small towns and rural areas, and only 0.2 per cent within rural areas, across small and large towns. Second, looking at rural/urban disaggregation, most of the poverty reduction occurred among those who stayed in rural areas, although the levels remained relatively higher than in urban areas. Third, consequently, while poverty levels increased in urban areas, we found positive effects of moving from rural to urban areas. Fourth, people who stayed in urban areas experienced an increase in poverty, but overall levels were still significantly lower than those of rural dwellers.

Fifth, individuals who remained in large towns represent the share of population that exhibited the greatest increase in the poverty headcount. However, moving from rural areas to large towns had positive effects on welfare, as did moving from rural to small towns (although to a lesser extent). Finally, intralocation effects are generally stronger in explaining poverty changes (75 per cent) than movements across urban and rural areas (25 per cent). Those effects are even stronger (81 per cent) when considering rural areas, and the disaggregation of urban areas, due to the relatively limited mobility observed.

Table 12 Contribution of dynamic spatial changes to poverty reduction in Malawi, 2010-2013

Spatial dynamics	Population share (%)	Poverty headcount (%)		Share of national poverty reduction (%)
		2010	2013	
Rural – rural	84.0	**43.9**	**41.1**	**166.1**
Rural – urban	1.5	45.4	17.7	**29.6**
Rural – small towns	0.6	33.6	27.6	2.5
Rural – large towns	0.9	53.0	11.3	27.1
Urban-rural	1.2	23.6	29.3	-4.8
Small towns – rural	0.2	40.1	38.5	0.3
Large towns – rural	1.0	19.6	27.1	-5.0
Urban – urban	13.3	17.4	27.2	-90.9
Small towns – small towns	1.9	21.1	25.0	-5.1
Small towns – large towns	0.1	0.0	72.9	-5.9
Large towns – small towns	0.1	0.4	0.0	0.0
Large towns – large towns	11.2	17.1	27.4	**-79.9**
Total	100.0	40.2	38.7	100.0
Intra-/Inter-sectoral effects				
Rural – urban				
Intralocation effects				75.1
Interlocation effects				24.9
Rural – small towns – large towns				
Intralocation effects				81.0
Interlocation effects				19.0

Source: Authors' calculation based on IHS3 and IHPS.

Contribution of combined occupational-spatial mobility to poverty reduction

Finally, we examine the effects of the combined spatial and occupational mobility on poverty change in Malawi. Combining the two occupational categories (agriculture and non-agriculture) and two spatial categories (urban and rural), we have four possible static occupational-spatial categories. On that basis, we have a total of 16 possible combinations of the occupational-spatial mobility dynamics between the two periods (table 13).

The results show some consistent patterns. First, as highlighted in table 11, considering a combined occupational-spatial sectoral decomposition, intrasectoral (occupation-location) effects (88.6 per cent) dominate intersectoral effects (11.4 per cent). Second, remaining in rural areas and being specialized in agriculture in both periods was the best strategy for welfare improvement. This result is consistent with other existing evidence (Christiansen and Todo, 2014; World Bank, 2017) and emphasizes the fact that agriculture is still an important sector in Malawi's economy with tremendous potential to lift people out of poverty.

Table 13 Contribution of dynamic occupational-spatial changes to poverty reduction in Malawi, 2010-2013

Occupational-spatial mobility dynamic categories	Population share (%)	Poverty headcount (%)		Share of national poverty reduction (%)
		2010	2013	
Agriculture rural => Agriculture rural	53.3	50.1	46.9	119.9
Agriculture rural => Non-agriculture rural	10.9	44.0	36.6	56.0
Agriculture rural => Non-agriculture urban	0.5	71.7	21.5	19.2
Agriculture rural => Agriculture urban	0.4	39.5	27.6	3.4
Non-agriculture rural => Agriculture rural	10.2	34.5	42.1	-54.3
Non-agriculture rural => Non-agriculture rural	9.6	19.4	12.7	44.5
Non-agriculture rural => Non-agriculture urban	0.5	23.0	6.6	5.8
Non-agriculture rural => Agriculture urban	0.1	35.2	9.7	1.3
Non-agriculture urban => Agriculture rural	0.4	41.0	32.9	2.0
Non-agriculture urban => Non-agriculture rural	0.6	7.3	25.9	-7.3
Non-agriculture urban => Non-agriculture urban	8.7	5.9	19.3	-80.7
Non-agriculture urban => Agriculture urban	2.1	39.8	52.9	-18.8
Agriculture urban => Agriculture rural	0.1	3.7	7.2	-0.3
Agriculture urban => Non-agriculture rural	0.1	66.1	57.5	0.8
Agriculture urban => Non-agriculture urban	1.3	32.8	28.6	3.7
Agriculture urban => Agriculture urban	1.3	44.0	38.3	4.9
Total	100.0	40.2	38.7	100.0
Intra-/Inter-sectoral (occupation/location) effects				
Intrasectoral effects				88.6
Intersectoral effects				11.4

Source: Authors' calculation based on IHS3 and IHPS.

Third, moving from agriculture to non-agricultural income-generating activities, within or across locations, contributes positively to poverty reduction. About 56 per cent of the net poverty reduction is explained by movements from rural agriculture to rural non-agriculture (11 per cent of the sample) – with the poverty rate of that group falling from 44 to 36 per cent. Although representing a much smaller share of the national population, movements out of agriculture within rural areas and across rural-urban areas also result in drops in the poverty headcount. Fourth, persisting with non-rural activities in rural areas also results in substantial poverty reduction. The 10 per cent of households that managed to sustain the dominance of non-agricultural income saw poverty levels falling from the already low 19 per cent in 2010 to 12 per cent in 2013.

Finally, and consistent with patterns previously revealed, the major contribution to poverty increases was represented by people who stayed in urban areas and in non-agricultural activities. Accounting for about 9 per cent of the population, these groups experienced an increase in the poverty rate from 6 per cent in 2010 to 19 per cent in 2013. As discussed above, this was due, to a great extent, to the significant reduction in returns to non-farm wage employment in those areas.

4.4 Regression-based decomposition analysis

The analysis looks at income composition, occupational and spatial mobility, and factors associated with household welfare dynamics in a multivariate regression setting. The proposed models are a natural complement to the descriptive analysis, and serve to confirm and reinforce some of the key findings. As defined in the methodological section, we use two models: first difference welfare regression to assess the effects of occupational and spatial dynamics; and Shorrocks-Shapley decomposition of R^2 to understand the contribution of income sources and occupational and spatial mobility to the variation in welfare levels.

Welfare regression decomposition with occupational and spatial dynamics

The approach proposed here permits the exploration of the effects of intrasectoral and intersectoral dynamics on household consumption expenditure growth between 2010 and 2013, while controlling for a wealth of time-variant and time-invariant factors. All models use first difference for household consumption expenditure per capita and all continuous right-hand side variables. Dynamic occupational, spatial and combined occupational-spatial transition categories are represented by dummy variables, 1 if the household belongs to that specific category, and 0, otherwise. Models are then estimated by ordinary least squares.

Effects of occupational mobility

The model considers changes in household welfare affected by three sets of factors: occupational mobility, household's characteristics and other factors, including land ownership and market and weather shocks. For the occupational dynamic categories, we use "agriculture–agriculture" as the reference category against which occupational mobility is compared. Several results stand out.

First, consistent with the earlier bivariate analysis, moving away from agriculture to non-agriculture or diversified income sources in rural areas is positively linked to welfare improvement, while the opposite shift leads to lower levels of consumption. Second, persistence in sustaining a diversified income portfolio results in higher welfare relative to remaining in agriculture, especially in urban areas.

Third, an increase in years of schooling is positively linked to welfare increases, in particular in urban areas, while increases in land size increases consumption in rural areas. Market and weather shocks, when statistically significant, have generally negative impacts on welfare. Table 14 presents results of the model.

Table 14 Estimated coefficients of the welfare regression with sector dynamics

Variables	Change in per capita consumption (MK 1,000)					
	National		Urban		Rural	
Occupational dynamics						
Agriculture => Non-agriculture	8.17	***	7.46		6.39	***
Non-agriculture => Non-agriculture	-0.35		-6.04		-0.55	
Non-agriculture => Agriculture	-8.34	**	-15.71	***	-7.66	
Diversified => Diversified	6.81	***	28.14	***	1.41	
Diversified => Agriculture	-4.13	***	-11.91	*	-3.94	***
Diversified => Non-agriculture	-14.39	***	-37.71	***	-5.60	
Non-agriculture => Diversified	-11.24	***	-27.56	***	0.59	
Agriculture => Diversified	3.24	***	12.01	*	2.00	
Change in demographics						
Change dependency ratio	0.92		1.10		0.68	
Change age HH head (years)	-0.55	***	-0.81	***	-0.44	***
Change education (years)	2.09	***	4.57	***	0.47	
Male HH head (dummy)	1.04		11.95		-1.62	
Change in other factors						
Change land (acres)	0.01	***	0.30		0.01	***
Shock price (real market maize price)	-3.44		3.98		-10.35	***
Shock rain	5.02		-102.89	***	11.71	
Shock employment (dummy)	1.92		2.14		1.52	
Shock malaria (dummy)	1.34		2.55		1.16	
Distance to agricultural market (km)	-0.05		0.20		-0.06	
Location effects						
Urban (dummy)	-15.57	***				
Central region (dummy)	-8.78	***	4.03		-11.60	***
North region (dummy)	-4.33	**	10.99	**	-9.27	***
Constant	8.65	**	-17.23		18.12	***
Observations	10,734		2,823		7,911	
R^2	0.026		0.030		0.024	

Note: HH = household. *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.
Source: Authors' calculation based on IHS3 and IHPS.

Effects of combined occupational-spatial mobility

The analysis also looked at the effects of the combined spatial and occupational mobility on welfare changes (table 15). The reference category in this case is "agricultural rural – agricultural rural". Results yield some interesting aspects. First, households that engaged in agriculture at baseline experience higher consumption growth if they move from rural to urban areas (agriculture or non-agriculture). Second, for rural people involved in non-agricultural activities in the first period, it would be preferable to either stay in those areas and in the same activity or move to urban agriculture.

Finally, however, those who stay in urban areas, irrespective of their occupational mobility status, always experience welfare losses relative to those who stayed in rural agriculture.

Table 15 Estimated coefficients of welfare regression with combined spatial and occupational dynamics

Variables	Change in per capita consumption (MK 1,000)	
Spatial and occupational dynamics		
Agriculture rural => Non-agriculture rural	0.41	
Agriculture rural => Non-agriculture urban	19.12	*
Agriculture rural => Agriculture urban	14.96	*
Non-agriculture rural => Agriculture rural	-9.24	***
Non-agriculture rural => Non-agriculture rural	-1.17	
Non-agriculture rural => Non-agriculture urban	-33.25	***
Non-agriculture rural => Agriculture urban	98.07	***
Non-agriculture urban => Agriculture rural	-16.61	*
Non-agriculture urban => Non-agriculture rural	17.77	***
Non-agriculture urban => Non-agriculture urban	-25.28	***
Non-agriculture urban => Agriculture urban	-28.95	***
Agriculture urban => Agriculture rural	70.51	***
Agriculture urban => Non-agriculture rural	8.69	
Agriculture urban => Non-agriculture urban	-11.27	**
Agriculture urban => Agriculture urban	-8.16	
Change in other factors		
Change dependency ratio	0.56	
Change age of HH head (years)	-0.47	***
Change education level (years)	2.05	***
Male HH head (dummy)	1.23	
Change land (acres)	0.01	
Shock price (real market maize price)	-2.19	
Shock rain	4.13	
Shock employment (dummy)	1.00	
Shock malaria (dummy)	1.65	
Distance to agricultural market (km)	-0.11	*
Location effects		
Central region (dummy)	-7.77	***
North region (dummy)	-4.31	**
Constant	9.53	**
Observations	10,734	
R^2	0.036	

Note: HH = household. *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.
Source: Authors' calculation based on IHS3 and IHPS.

Shorrocks-Shapley decomposition of R^2

The Shorrocks-Shapley decomposition of R^2 model looks at how much each of the independent variables contributes to explaining changes in welfare, i.e. by decomposing the model's goodness of fit. Table 16 presents results separately at the national level as well as for urban and rural areas. In each case, the first column shows the contribution to the explained variation in absolute terms while the second shows the corresponding contributions in percentage terms.

This model looks at the welfare determinants model that includes as regressors the change in income from each possible source discussed in the bivariate Shapley decomposition, controlling for household's characteristics, such as the change in years of education of the household head, his/her age and the change in the acres of land owned by the family, community-level variables, such as shocks (on price, employment, rain and malaria), and distance to the closest agricultural market, and location dummy variables.

The sources of income that mainly contribute to explaining variations in welfare levels at the national level (percentage of R^2) are non-agricultural wage (28 per cent), self-employment (19 per cent) and crop production and livestock (combined 14 per cent). The same determinants are observed when considering the urban and rural subsamples. In particular, in urban areas, the major contributors were non-farm income-generating activities (combined 37 per cent for self-employment and non-agricultural wage), while in rural areas crop and livestock (combined contribution of 23 per cent) and non-farm income-generating activities (combined about 54 per cent for self-employment and non-agricultural wage) had a relevant role. This analysis also reveals that, while in rural areas changes of welfare come mostly from contributions in composition and changes in income sources per se, in urban areas factors such as education (31 per cent) and age (11 per cent), which resembles experience, also contribute substantially.

Table 16 Estimated Shapley value and percentage decomposition of R^2

Variables	Change in per capita consumption (decomposition of R^2)					
	National		Urban		Rural	
	Shapley value	%	Shapley value	%	Shapley value	%
Change in factors						
Sources of income						
Crop	0.00469	**11.9**	0.00204	5.8	0.0126	**13.0**
Livestock	0.00085	2.2	0.00010	0.3	0.01055	**10.9**
Agricultural wage	0.00063	1.6	0.00049	1.4	0.00143	1.5
Non-agricultural wage	0.01095	**27.9**	0.00638	**18.0**	0.03729	**38.5**
Self-employment	0.00751	**19.1**	0.00672	**18.9**	0.01484	**15.3**
Transfers	0.00182	4.6	0.00077	2.2	0.00449	4.6
Other factors						
Education (years)	0.00444	**11.3**	0.01126	**31.8**	0.00017	0.2
Land area	0.00011	0.3	0.00018	0.5	0.00046	0.5
Age of head	0.00341	8.7	0.00399	**11.3**	0.00554	5.7
Price shock	0.00003	0.1	0.00027	0.8	0.00049	0.5
Weather shock	0.00027	0.7	0.00159	4.5	0.00134	1.4
Total	0.03925	100.0	0.03538	100	0.09689	100.0

Source: Authors' calculation based on IHS3 and IHPS.

5 Summary and policy implications

This paper analyses the effects of income composition, and occupational and spatial mobility on household welfare and poverty reduction in Malawi in the period 2010-2013, using panel data from IHS3 and IHSP surveys. The analysis uses alternative poverty/welfare decomposition approaches, departing from traditional methods and proposing an augmented panel data decomposition methodology. The proposed methodology creates both static and dynamic categories of occupational, spatial and combined occupational-spatial mobility to access the full scale of intra- and inter-sectoral effects using both bivariate descriptive non-regression and multivariate regression-based approaches.

Descriptive analysis indicates that there was some occupational mobility between 2010 and 2013, in both urban and rural areas, but that overall 62 per cent of households remained in the same activities. Among the 38 per cent that changed main activity, there was a greater tendency to move from agriculture to diversified sources of income, especially in rural areas. Overall, spatial mobility was relatively limited.

Shapley decomposition analysis for rural areas shows that the increase in non-farm self-employment was the most important contributor to poverty reduction. Farming sources and transfers also made a modest contribution. These results underscore the continued importance of agriculture along with income diversification, particularly self-employment. Quite different results are revealed for urban areas.

The augmented panel decomposition approach was used to assess the effects of occupational dynamics by area of residence, and overall occupational-spatial mobility. The analysis reveals that intrasectoral effects explain the bulk of total poverty changes. In particular, they had a significant weight in the combined occupational-spatial dynamic decomposition, which is in part due to the limited spatial mobility and the persistence of agriculture in rural areas.

Regarding the effects of occupational dynamics, we find that, at the national level, the occupational mobility category that contributed most to poverty reduction is represented by people who remained specialized in agriculture in 2010 and 2013. However, the level of poverty among people involved in agriculture in 2013 was still very high compared to those staying in non-agricultural or moving to diversified sources of work. The next most important dynamic in terms of positive effects on total poverty decline is represented by households that shifted their occupation from agriculture to a more diversified income-source set. Significant differences were observed in rural and urban areas. The augmented panel decomposition to assess the effects of the combined occupational-spatial mobility on poverty change at the national level shows some consistent patterns.

The decomposition analysis using regression-based approaches (welfare regression decompositions with sectoral dummies and Shapley decomposition of R^2) reveals some results that complement and confirm important findings from the bivariate analysis.

First, the welfare regression decomposition analysis to assess the effects of occupational dynamics reveals that moving away from agriculture to non-agriculture or diversified income sources in rural areas is positively linked to welfare improvement, while the opposite shift leads to lower levels of consumption. In line with the bivariate analysis, it confirms that persistence in sustaining a diversified income portfolio results in higher welfare relative to remaining in agriculture, especially in urban areas. Second, the regression analysis also looked at the welfare effects of the combined occupational-spatial mobility, using the reference category "agriculture rural – agriculture rural". Households that engaged in agriculture at baseline experienced higher consumption growth if they moved from rural to urban areas (agriculture or non-agriculture). For rural people involved in non-agricultural activities in the first period, it would have been preferable to either stay in those areas and in the same activity or move to urban agriculture. However, those that stayed in urban areas, irrespective of their occupational mobility status, always experienced welfare losses relative to those that stayed in rural agriculture. Finally, all these results are confirmed by the Shapley decomposition of R^2 analysis, which highlights the importance of the different dynamics in explaining variations in welfare levels.

Several implications emerge from this analysis. First, overall, the results indicate that agriculture continued to play an important role in poverty reduction. This is due to the fact that on-farm activities represented the main sources of income for many rural households. The results are consistent with other evidence (Christiansen and Todo, 2014; World Bank, 2017) and emphasizes the fact that agriculture is still an important sector in the Malawian economy with considerable potential to lift people out of poverty. Efforts to strengthen productivity and the linkages of agriculture with the broader economy are necessary if the country is to succeed in improving household welfare. That said, efforts are needed to strengthen the sector through appropriate incentives to farmers in a market environment that allows them to respond. It also requires institutional and physical infrastructure investments that support a more dynamic and flexible sector.[9] The development process also requires intensification of crop production and a switch away from staple foods to more labour-intensive crops such as vegetables, fruit and livestock products (FAO, 2001). As Malawi has overconcentrated on maize self-sufficiency for food and on tobacco as a cash crop, there is a need to balance investments in favour of other crops vital for food security (FAO, 2015) and income growth. Moreover, the sector remains predominantly subsistence-oriented, which prompts the need for more market orientation.

Second, there is a need to diversify away from farming, preferably towards a well-balanced set of income sources. If the agriculture sector does well, its effects on poverty reduction can be substantial; but it will leave households vulnerable if it does not. Achieving and sustaining a diversified portfolio is the key. As economies transform, improving the ability of households to realize economic diversification will enable the realization of development prospects. Barrett, Reardon and Webb (2001) point out that rural non-farm incomes represent a strategy after a shock to assist and help farm households to purchase food and invest in other sectors, including

9. In the last decade, the economic environment in Malawi has been particularly challenging due to deteriorating governance and to macroeconomic challenges. These have affected both the performance of the agriculture sector and the level of public expenditure allocated to agriculture, which increased at a rate significantly lower than the total national budget in the 2006–2013 period (FAO, 2015). Moreover, climatic shocks and hostile weather conditions that occurred in 2005, 2010 and 2012 further weakened agricultural growth.

in agricultural intensification. Diversification of income sources assures a portfolio of activities that allows stabilization of income flows and consumption, against constraints in labour and land markets, climatic uncertainty and incomplete or weak financial systems.[10]

Finally, moving out of agriculture into the non-agricultural sector is in some cases linked to a movement from rural to urban areas (small towns and large cities). This raises the need for investments that strengthen the linkages between rural and urban areas in terms of access to market and capital development. Some complementary investments include improving job skills and entrepreneurship capacity, supporting small business through specific programmes, as well as investing in infrastructure, facilitating financial access and reducing transaction costs.

10. Since 2005, the Government of Malawi has started to address this issue by introducing the Farm Income Diversification Programme. The overall objective of this programme is "to achieve a sustainable improvement in livelihood of rural communities through diversifying farmers' income to increase food security and income levels of rural households" (GoM, 2012).

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www.ifad.org
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