
# Do youth work in agriculture? Short-term dynamics of on-farm youth employment in Tanzania and Malawi

by Kashi Kafle, Neha Paliwal, and Rui Benfica

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## Abstract

We examine short-term dynamics of on-farm youth employment in Tanzania and Malawi. Employment dynamics are assessed by mobility between on-farm occupation (farming) and off-farm occupations over time. Using integrated household and agriculture surveys (LSMS-ISA), we show that majority of rural youth engaged in farming in both countries and their on-farm participation between 2011 and 2013 was highly stable. Specifically, about 80 per cent of youth engaged in farming in 2011 and more than 55 per cent of them remained in farming in 2013 as well. On-farm employment of female youth was more stable (58%) than that of males (53%). On-farm youth employment was higher and more stable for those owning land. Results showed considerable mobility between on-farm and off-farm occupations, but the movement into on-farm employment outnumbered the movement out of it over the period. Even though on-farm youth employment was highly stable, it may not mean farming is their preferred occupation. We suspect that many young people participate in on-farm activities due to poor economic prospects outside of farming. Our findings imply that policies that aim to employ and keep the new job seekers in agriculture need to strengthen the sector by improving young people's access to critical resources such as land and capital.

*JEL Codes*: J13, J21, J43

*Key words*: on-farm employment, youth, dynamics, sub-Saharan Africa, LSMS-ISA

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## 1. Introduction

Sub-Saharan Africa (SSA) is the youngest region in the world. Due to rapidly changing demographic transition that has outpaced the sluggish economic growth, the region has seen an unprecedented increase in the number of job-seeking people (AfDB, 2016; Chakravarty et al., 2017; Filmer and Fox, 2014; Fox and Thomas, 2016). Even though today's young people are relatively more educated and skilled, they are less likely to find fitting employment opportunities because African economies have not succeeded in achieving the kind of structural transformation needed to absorb the quality and quantity of the new job seekers (Fox et al., 2016; Fox and Thomas, 2016; Yeboah and Jayne, 2018). Young people are also particularly disadvantaged in accessing employment opportunities due to intra-household dynamics that prevents them from equitable access to household resources and information (Fox et al., 2016; Yeboah and Jayne, 2018). In addition, young people's employment prospects are exacerbated by the slow school-to-work transition and *forced* engagement in low-earning activities (Chakravarty et al., 2017). African youth resort to informal sector 'jobs' because formal wage employment remains elusive for many new job seekers (Betcherman and Khan, 2015). As a result, formal youth unemployment rates in SSA are almost double than that of adult unemployment rates (ILO, 2016).

Youth employment is of particular interest to policymakers and researchers in SSA because youth (individuals of ages between 15 and 34 years)[4] comprise the largest demographic group in the region (AfDB, 2016; Chakravarty et al., 2017; ILO, 2017; Van den Broeck and Kilic, 2019). In 2015, the United Nations estimated that Africa's youth population will increase by about six million each year for the next decade, eventually reaching a median population age of 24 years by 2050 (Betcherman and Khan, 2015). As such, the resulting youth employment

[4] The definition of youth varies by country or context. In this analysis, individuals aged 15-34 are referred to as youth. Our definition is consistent with the Tanzania's and Malawi's official definition of youth, which is in line with the African Union's definition of youth.

challenges are unparalleled. Policymakers are encouraging young people to engage in farming and the agri-food system (Filmer and Fox, 2014; World Bank, 2013) because agriculture has traditionally been the largest 'employer' of the African labor force (Brooks et al., 2013; Chakravarty et al., 2017; Ismail, 2016) and opportunities in the non-agricultural sector are still limited in many countries. African governments have attempted to attract youth into the agricultural sector by creating enabling environment via targeted policies (Ayele et al., 2017). At the regional level, the Malabo Declaration of the Africa Union reiterated the commitment of African countries to create job opportunities for at least 30 per cent of the youth in agricultural value chains by 2025 (African Union, 2014). However, despite favorable policies, youth unemployment rates in SSA are projected to increase in years to come (Fox and Thomas, 2016.

The youth employment challenges are projected to intensify because a growing number of educated youth enter the workforce every year but there are not enough formal jobs available. Off-farm employment opportunities are limited and young people are believed to dislike agriculture. Meaningful participation in agriculture requires improved access to factors of production such as land and capital, productivity enhancing agricultural inputs, and relevant skills (Betcherman and Khan, 2015; Brooks et al., 2013), but African youth have limited access to those and skill development opportunities (Leavy and Hossain, 2014; Noorani, 2015). Low productivity and high risk (Jayne et al., 2010), low return to investment (Sumberg et al., 2012; White, 2012), lack of mechanization and low-skill farming practices (Filmer and Fox, 2014), and lack of access to critical farm inputs such as land, irrigation, and fertilizer have swayed the youth away from agriculture. Lack of access to credit and poor agricultural marketing facilities have also added to youth's disinterest in agriculture. As long as the agricultural sector remains a low-return and high-risk sector, young people will likely find off-farm opportunities more attractive than on-farm activities, which can exacerbate the already grim youth employment prospects.

Working in farming or as agriculture labour is viewed as 'dirty', unrewarding, and physically tough (Leavy and Hossain, 2014). As the lack of love for farming among young people

has evolved into a stylized fact among development practitioners, room has grown for rhetoric regarding the ageing agricultural workforce. At their most extreme, some studies suggest that the average age of the African farmer is approximately 60 years (FAO, 2014).[5] An ageing agricultural workforce is often referred to as a consequence of rural-to-urban migration of young people, in pursuit of occupations and lifestyles that are more secure and profitable than rural agriculture (IFAD, 2018). Although rural-to-urban migration is a common phenomenon, evidence shows that rural population is younger than urban population in sub-Saharan Africa (IFAD, 2019; Mabiso and Benfica, 2019). As the rate of youth migration in SSA is less than 3 per cent, migration alone may not alter the rural population demographics (de Brauw et al., 2014; IFAD, 2019; Menashe-Oren and Stecklov, 2018).

In light of a growing body of unsupported rhetoric about youth employment in SSA, it has become necessary to bust the myths with rigorous evidence. This analysis investigates the rhetoric about youth proclivity to participate in agriculture and provide evidence of actual on-farm employment rates and their short-term dynamics. Policymakers are keen in developing effective policies to strengthen youth participation in agriculture, but the empirical evidence available to them is surprisingly limited. In addition to knowing current on-farm employment rates, policymakers might want to know whether youth participation in agriculture persists over time and how it differs by the gender of the individual or their access to critical farm inputs such as land. Answering these questions requires an analysis of household- or individual-level employment data over time. However, most existing studies provide employment estimates at the country or regional level, with little emphasis on household level employment records. Studies that do provide household level employment estimates primarily report a cross-sectional stock-taking of on-farm employment which clearly fails to capture the stability (or mobility) of youth engagement in and out of agriculture. We probe these questions by examining the

[5] In its original context, this statistic probably referred to the head of farming household but has been interpreted by various platforms as average age of African farmer.

dynamics of youth participation in on-farm activities in Tanzania and Malawi. Employment dynamics are assessed with mobility between on-farm occupation and off-farm occupations over time.

Tanzania and Malawi are chosen because both of these countries have recently enacted policies in creating enabling environment for youth employment in the agricultural sector (Ministry of Agriculture, Tanzania 2016; National Youth Council, Malawi 2013). Tanzania also revised its national agricultural policy and included provisions for youth engagement in agriculture (FAO, 2017). The Government of Tanzania launched a five-year program, the *National Strategy for Involvement of Youth in Agriculture 2016-2021*. Similar efforts were made by Malawi as it launched the *National Youth Policy in 2013* (National Youth Council, Malawi, 2013). Both national programs identify agriculture as a major pillar for strengthening youth employment prospects. They additionally serve as a useful case studies to directly compare, given their divergent economic profiles. In both countries, we used individual and household panel data from a nationally representative sample survey (the LSMS-ISA data) for 2011 and 2013. As employment information are available at individual level over two different time periods, a panel data estimator is used to estimate the stability (or mobility) of youth engagement in and out of on-farm activities.

Our analysis makes three important contributions. First, in contrast to the popular belief that youth are rarely engaged in agriculture, we have no evidence to support that conjecture, as we find that the majority of rural youth engages in farming in both countries. Our finding is consistent with existing evidence highlighted in Asciutti et al. (2016) and Yeboah and Jayne (2018). Second, we study the short-term dynamics of on-farm youth participation and show that youth engagement in agriculture is highly stable. Understanding the stability of youth employment in on-farm activities is critical for the design of targeted policies and programs because as part of the transition from financial dependence to independence, youth are understood to be an economically mobile age cohort. We quantify movements out of on-farm

employment to off-farm employment and *vice versa*, and provide evidence on the extent of sustained individual-level participation in farming, which is not apparent from cross-sectional studies. Finally, we study the on-farm youth employment patterns by gender and land ownership status and show that on-farm youth employment is more stable among female and land owners.

The rest of the analysis proceeds as follows. In section 2, we define the key variables and the methodology employed in the analysis. Section 3 describes the data used in the analysis and presents the population age structure in Tanzania and Malawi. In section 4, we discuss results by first presenting descriptive statistics from dynamics analysis based on transition matrices, and then those from the regression analysis. Section 5 concludes with a summary and the implications of the findings.

## 2. Methodology

### *2.1. Employment variables*

Table 1 summarizes the conceptual definitions of the key employment variables used in the analysis. On-farm employment consists farming participation as the only occupation. Depending on the context, farming (or agriculture) can have both objective and subjective meanings. In this analysis, the definition of farming defers to a binary indicator for participation in family farming during at least one agricultural season in the last 12 months. This definition suffers from less ambiguity or contextual variation than using intensity of engagement in farming. Agricultural wage work on someone else's farm, such as *ganyu* labor in Malawi, is considered under wage employment.

**Table 1. Defining employment variables**

| On-farm employment | Definitions |
|---|---|
| Farming | Individual worked positive hours in family farms during at least one of the last two agricultural seasons |
| **Off-farm employment** | |
| Wage employment | Individual had regular employment in the last 12 months or worked as a wage labor for at least one day in the last week |
| Self-employment | Individual owned or managed a business or enterprise for at least one week in the last 12 months |
| Non-farm agri-food enterprise | Individual worked as a wage employee or was self-employed in non-farm agri-food enterprise |
| Non-farm household labor | Individual worked as a helper in non-farm household daily activities only |

*Source*: Authors' illustrations.

Figure 1 illustrates the conceptual definitions of employment variables and inter-relationships between them. Off-farm employment consists of 1) wage employment, 2) self-employment, and 3) non-farm household work. These categories are not inherently mutually exclusive with relation to participation in farming, or other off-farm activities because an individual can engage in diffident on-farm and off-farm activities in any given day or week. Where applicable, each employment category encompasses two different layers of the recall structure of the survey instrument: "employment in the last 12 months" and "employment in the last seven days". Individuals who have had regular employment in the last 12 months or worked as a wage labor for at least a day in the last week are considered wage employed. Wage employment refers to anyone who earns income at an enterprise that they do not own or manage. This ranges from professionals with fixed contracts to piece workers. The '*wage employment*' category also includes short-term labor which captures short-term engagement in both agricultural and non-agricultural activities for wage.

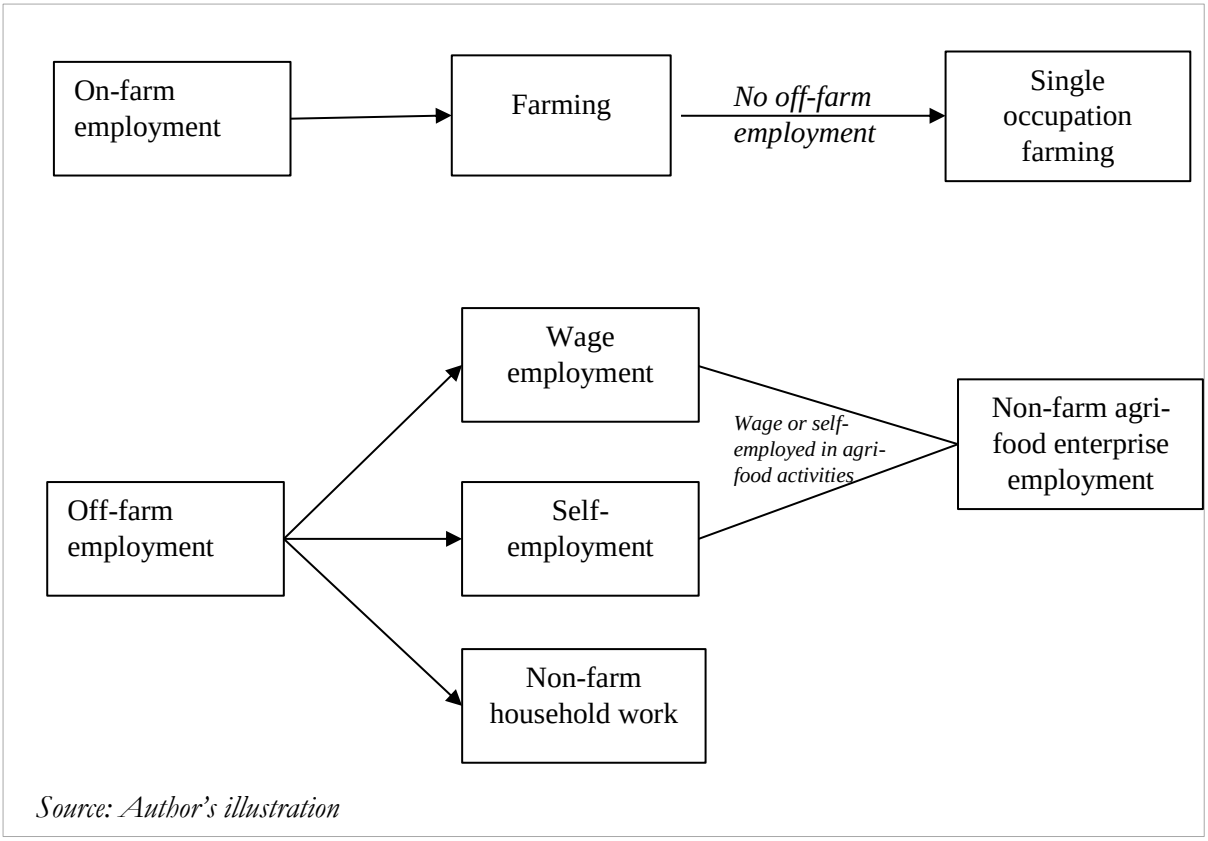



**Figure 1. Employment categories used in the analysis**

Similarly, individuals who worked as owner or manager of a business or enterprise in the last 12 months or owned or managed such enterprise for at least one week are considered self-employed.[6] The respondents were asked to self-report their involvement in household enterprise. The list of enterprises included a variety of businesses, from a grocery-store owner to a street vendor. If an individual works in a household enterprise but is not acknowledged as the owner or manager, then they are considered under the 'wage employment' category. If an individual makes no contribution to a household enterprise through ownership, management or labor, then they are not counted in either category. Individuals who helped in non-farm household activities are labeled 'non-farm household labor'.

[6] It is important to note that between recall periods, the data on the frequency of certain employment are not always comparable with other types of employment. For example, agricultural labor data are available as the number of days worked in the last two agricultural seasons, but employment in the last 12 months is available as the number of months worked.

An individual who was wage-employed or self-employed in the agri-food enterprises in the last 12 months is considered to be employed in the agri-food enterprise. Identification of businesses that count as agri-food enterprises is based on the International Standard Industrial Classification (ISIC), which acknowledges any activity from inputs to outputs as part of the agri-food system value chain.

Apart from farming, wage employment, self-employment, and non-farm household labor, all remaining individuals are referred to as "unemployed". An unemployed person here may be a student or an unpaid apprentice. As we are interested in the dynamics of on-farm employment compared with employment in off-farm occupations, the subsequent analysis does not focus on the unemployed individuals. As reported in the data, employment categories are not mutually exclusive. The first half of the analysis reports the employment figures as available in the data, so an individual could be engaged in multiple occupations. For the employment dynamics analysis, we make these occupations mutually exclusive.

### *2.2. Mutually exclusive employment categories*

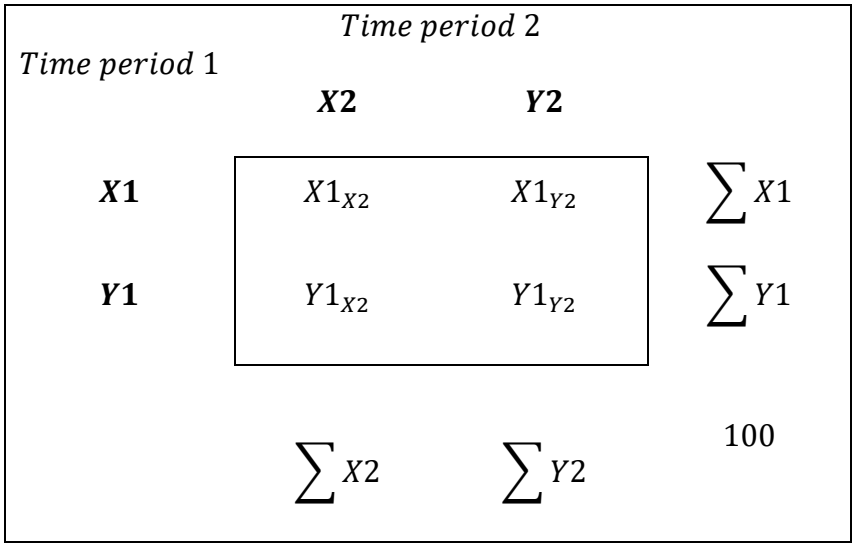
We classify individuals into mutually exclusive employment categories following a hierarchical method. This classification system uses the previous employment categories, but refines them to avoid double counting. The mutually exclusive employment categories are used to understand the dynamics of youth employment (mobility and stability between on-farm and off-farm occupations). Individuals engaged in any form of wage employment, irrespective of their participation in other occupations, are classified as 'wage employed'. Individuals who are self-employed in agricultural or non-agricultural enterprise (but are not wage employed) are classified as 'self-employed'. Individuals who participate in family farming but are neither wage employed nor self-employed are classified as 'single-occupation farmers'. Specifying single-occupation farming allows us to cleanly identify the proportion of the youth who are involved in family farming as their primary occupation. This helps differentiate our primary population of interest

from those who might have a wage-earning job and occasionally provide labor at their family farm. Different employment categories are made mutually exclusive for straightforward econometric analysis and easy interpretation, but the categorization should not be understood as the rural way of life, in any way.

### *2.3. Analytical methods*

#### *2.3.1. Transition matrices*

Transition matrices are used to assess the dynamics of youth employment. This part of the analysis uses mutually exclusive employment categories (e.g. 'single-occupation farming' and 'non-food agri-food enterprise employment' as defined in Figure 1) to avoid double counting and potential ambiguity in interpretation. Transition matrices allow for the simple visual representation of movement across different occupations, which provides deeper insight beyond sample averages across different points in time. Through the use of a transition matrix, we can identify occupation-specific choices such as whether person *i* stayed in a particular occupation or shifted to another one over time. The diagram below provides a schematic representation of a transition matrix.



The matrix comprises two time periods, with mutually exclusive categories $\boldsymbol{X}$ and $\boldsymbol{Y}$. Person *i* can be in either occupation $\boldsymbol{X}$ or $\boldsymbol{Y}$ in Time 1, and similarly can be in either occupation in Time 2. In this 2x2 transition matrix, person *i* has two options in Time 2: either to stay in their original occupation or to move to another occupation. For example, if person *i* started in occupation $\boldsymbol{X}$ and stayed in occupation $\boldsymbol{X}$, then he/she will be in cell $X1_{X2}$. If, instead, the person moved to occupation Y, then will be in cell $X1_{Y2}$.

The proportion of individuals who are in any particular occupation during Time *j* is denoted by the aggregation term $\sum Xj$ or $\sum Yj$, for *j* = 1, 2. All terms in the inner quadrant represent the totality of choices person *i* could make. Therefore, $X1_{X2}$ is the proportion of individuals who stayed in $\boldsymbol{X}$ and $X1_{Y2}$ is the proportion of individuals who moved from *X* to *Y*. The rows and columns add up to 100%.

### *2.3.2. Conditional lag model (probit)*

We use multivariate regressions to unpack the relationship between the individual's age and their on-farm employment status over time. First, we use a conditional lagged model to estimate the relationship between baseline age group ($Age\_group_{jit1}$) on employment outcomes in next period ($Y_{it2}$) – equation 1.

$$Y_{it2} = \alpha_0 + \alpha_1 Y_{it1} + \sum_{j=1}^{4} \widehat{\beta}_j Age\_group_{jit1} + \Theta X_{it1} + \varepsilon_{it} \quad (1)$$

where *j* indicates age group, *i* indicates individual, *t* indicates survey time period ($t_1$ indicates baseline and $t_2$ indicates follow-up round), and *Y* is the outcome of interest; in this case binary indicators for on-farm employment. Age group consists of four discrete categories of individuals' age – children (6 to 14 years), youth (15 to 34 years), adult (35 to 64 years), and elderly (65 years and up). Likewise, *X* is the vector of control covariates and $\varepsilon_{it}$ is an idiosyncratic error term.

Control covariates include per capita consumption, gender, education, household size, household head characteristics, and other demographic variables, as well as individual's access to land and other inputs.

Equation 1 is estimated with the probit model. The estimated coefficients $\beta_j$ provide the probability of on-farm employment for individuals in age group *j*. We use predicted conditional probabilities to understand the dynamics of on-farm employment for different age groups. While our focus is on the coefficient estimates on youth age group, we use estimates on other age groups for comparison. The probability of employment outcome in the follow-up period is contingent on the baseline status and estimated as follows:

$$P_r(Y_{it2}|Y_{it1} = 0,1) = \widehat{\alpha_0} + \widehat{\alpha_1} + \sum_{j=1}^{4} \widehat{\beta_j} Age\_group_j + \widehat{\Theta}\bar{X}$$

### *2.3.3. Panel fixed effects model*

We use panel data fixed-effects model to estimate the probability of on-farm employment for individuals in a particular age group. Even though on-farm employment is a binary indicator, we used the linear fixed effects model to estimate the probability of on-farm employment. Probit fixed effect model is not available and the logit fixed effects leads to that incidental parameter problem (Mundlak, 1978; Wooldridge, 2010). Suppose $Y_{it}$ is the binary indicator of on-farm employment for individual *i* at time *t*. The relationship between individual age group and the probability of on-farm employment can be estimated using equation 2.

$$Y_{it} = \alpha_0 + \sum_{j=1}^{4} \beta_j Age\_group_{jit} + \Theta X + \mu_i + \varepsilon_{it} \qquad (2)$$

Likewise, the relationship between individual age group and intensity of on-farm employment (labor days) is estimated using equation 2. In this case $Y_{it}$ is the number of days individual *i* worked in family farm across the two agricultural seasons at time *t*.

## 3. Data and Descriptive results

### *3.1. Data*

The data come from LSMS-ISA surveys in Tanzania and Malawi. Both datasets are from nationally representative surveys implemented by the respective National Bureau of Statistics with technical support from the World Bank.[7] Multiple rounds of data are available, but only the data from two survey waves, 2010/11 and 2012/13, are used in order to study short-term mobility in on-farm youth employment for comparable time periods between countries. The sample size varies by country, but the survey design and instruments are similar. The datasets include integrated household and agriculture modules and are standardized in their general format and methodology. This allows for cross-country comparisons.

### *3.2. Descriptive statistics on population and youth employment*

Table 2 presents the details of cross-sectional and panel sample sizes for Tanzania and Malawi. Both datasets maintain a fairly low attrition rate of less than four per cent at household level and about seven per cent at individual level. The rate of attrition for the youth cohort (our primary age group of interest) was also about seven per cent. The first half of our analysis uses unbalanced panels to explore the patterns of the demographic structure and youth employment over time. In the second half, we analyze the movements of individuals in and out of the on-farm employment and therefore the analysis is restricted to balanced panels. Summary statistics of all other variables used in the regression analysis are presented in appendix (Table A1).

[7] LSMS-ISA panel data are also available for Ethiopia, Niger, Nigeria and Uganda. Country inclusion was decided on the basis of data comparability for key indicators. For more information on the LSMS-ISA initiative, see www.worldbank.org/lsms-isa

**Table 2. Sample size and attrition**

| | Baseline | | Endline | | Attrition | Panel |
|---|---|---|---|---|---|---|
| | Year | Sample size | Year | Sample size | (%) | Sample size |
| **Tanzania** | | | | | | |
| Household | 2010/2011 | 3,924 | 2012/2013 | 5,010 | 2.9 | 3,786 |
| Individual | | 20,559 | | 25,412 | 6.6 | 16,164 |
| **Malawi** | | | | | | |
| Household | 2010/2011 | 3,246 | 2013 | 4,000 | 3.8 | 3,104 |
| Individual | | 15,597 | | 20,220 | 7.4 | 14,165 |

*Notes*: Both Tanzania and Malawi samples are nationally representative. In both countries, the sample size in the endline includes split-off households. All endline households can be tracked back to baseline households.

### *3.2.1. Population age structure*

Before moving into the distribution and dynamics of youth employment, we introduce a discussion on the population age structure to highlight why it is important to study youth employment in these countries. Table 3 presents population age structure in Tanzania and Malawi between 2010/11 and 2012/13. Youth make up the largest proportion of the population each year, followed by children and adults. From the ages of 6 to 64, a skewed U-shaped pattern of population distribution is observed in both Tanzania and Malawi before tailing off for the population above age 65. Given current estimates of age demographics and high birth rates in the last decade, it is expected that the general U-shaped age pattern will hold, leading to a rapid increase in the labor supply in both countries. The proportion of youth entering the labor market in the coming years is therefore expected to rise rapidly.

**Table 3. Population age structure in Tanzania and Malawi (individuals 5+)**

| Age groups | Tanzania | | Malawi | |
|---|---|---|---|---|
| | 2010/11 | 2012/13 | 2010/11 | 2013 |
| *National sample* | | | | |
| Children (6-14) | 33.19 | 32.90 | 33.89 | 35.95 |
| Youth (15-34) | 39.10 | 41.65 | 40.87 | 42.14 |
| Adult (35-64) | 22.48 | 20.99 | 20.56 | 17.92 |
| Elderly (65 and over) | 5.24 | 4.45 | 4.68 | 3.98 |
| **Observations** | **17,472** | **21,492** | **12,422** | **17,536** |
| *Rural sample* | | | | |
| Children (6-14) | 35.24 | 35.24 | 34.57 | 36.96 |
| Youth (15-34) | 36.32 | 38.8 | 39.36 | 40.36 |
| Adult (35-64) | 22.60 | 20.86 | 20.84 | 18.15 |
| Elderly (65 and over) | 5.85 | 5.03 | 5.24 | 4.53 |
| **Observations** | **12,086** | **14,415** | **9,151** | **12,189** |
| *Urban sample* | | | | |
| Children (6-14) | 27.68 | 26.73 | 30.27 | 30.99 |
| Youth (15-34) | 36.55 | 38.98 | 48.95 | 50.87 |
| Adult (35-64) | 22.16 | 21.36 | 19.06 | 16.82 |
| Elderly (65 and over) | 3.62 | 2.93 | 1.72 | 1.32 |
| **Observations** | **5,114** | **6,708** | **3,271** | **4,285** |

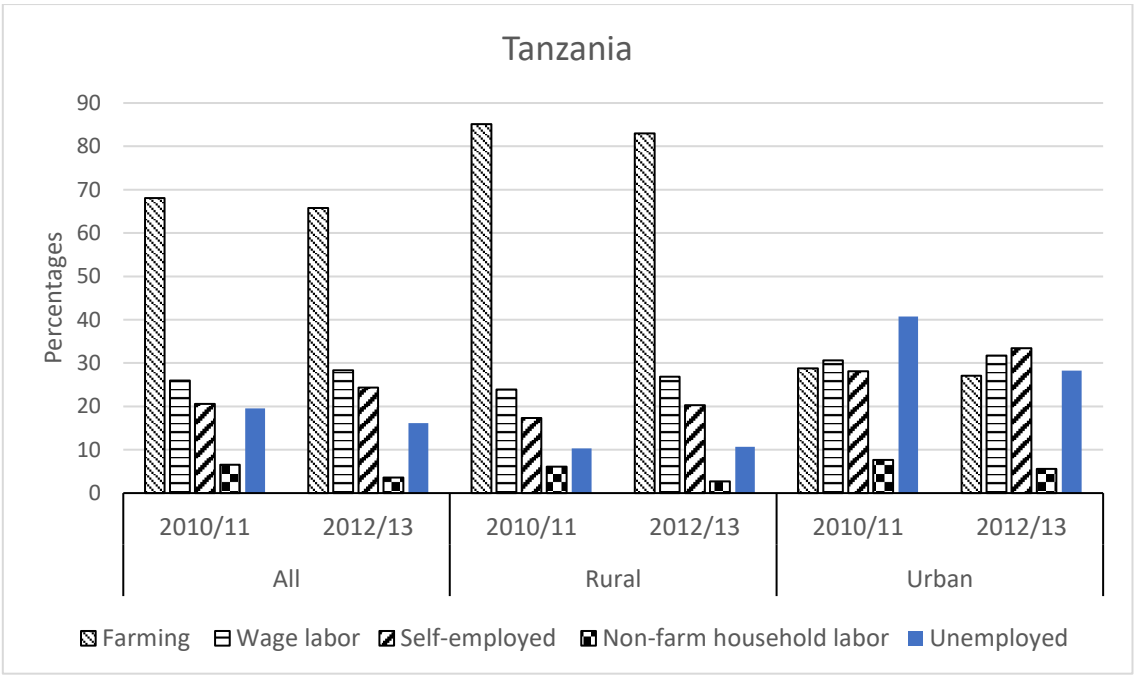
*Notes*: Point estimates are population-weighted proportions.

The last two panels in Table 3 present the population age structure in Tanzania and Malawi for rural and urban areas, respectively. The largest proportion of the rural population is comprised of individuals between the ages of 15 and 34 years. Beyond the relevance of the growing youth cohort is the trend of youth migration from rural to urban areas in search of enhanced economic prospects. The prospect of rural youth out-migration is of concern to policymakers because an increasing rate of rural out-migration may be associated with declining youth engagement in agriculture. Nevertheless, we find that rural areas in Tanzania and Malawi still had a significant number of young people, and the share of youth in the population increased over time. Existing

evidence also points that, despite potential economic benefits associated with rural-to-urban migration, the rate of rural out-migration in sub-Saharan Africa is still low (de Brauw et al., 2014; Kafle et al., 2020). Since youth made up the largest share of population in both Tanzania and Malawi, the question looms large about their employment prospects.

### *3.2.2. Employment distribution*

Figure 2 presents distribution of employment across different occupations for individuals of economically active ages (15 to 64 years) in Tanzania and Malawi. Individual participation in different activities is not mutually exclusive; someone who works in farming can also be working as a wage labor, for example. Overall, family farming employed the most people; 68 per cent in Tanzania and 79 per cent in Malawi in 2010/11 and these numbers slightly decreased over time. In rural areas, more than 85 per cent of working age people were involved in farming in both countries. Other activities in order were wage labor (24 per cent in Tanzania and 31 per cent in Malawi) and self-employment (17 per cent in Tanzania and 9 per cent in Malawi). Unlike involvement in farming, share of people employed in wage labor and self-employment activities increased over time, in both countries, reflecting an ongoing process of structural transformation in those economies.



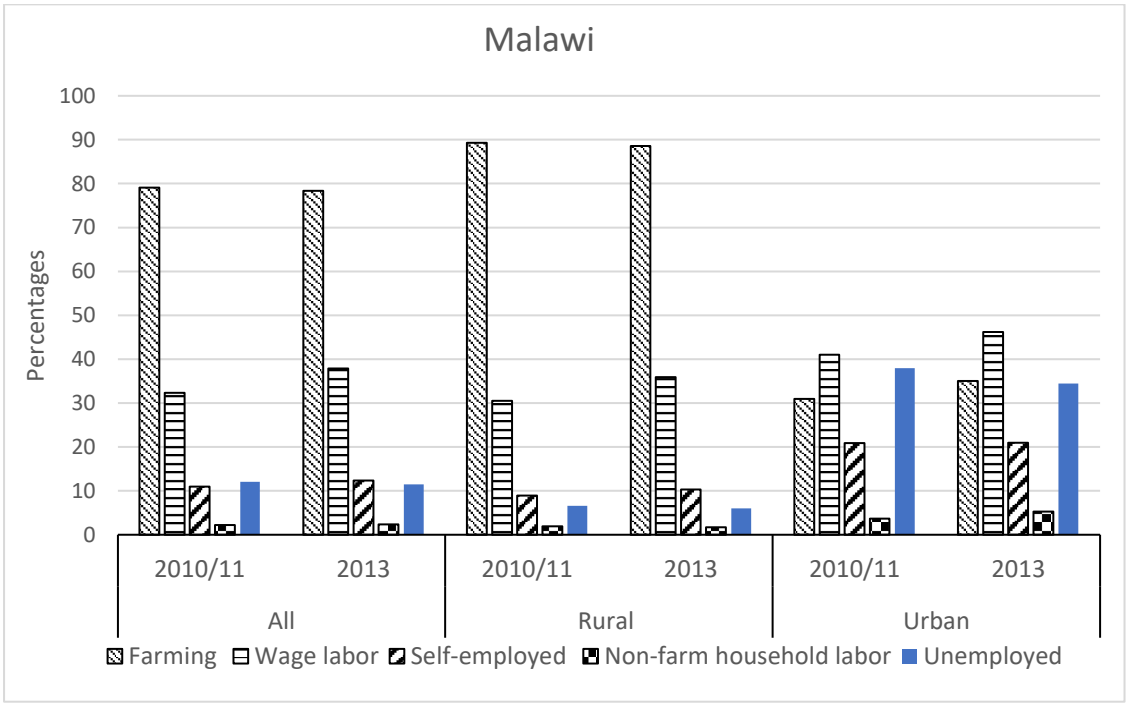




**Figure 2. Employment status of economically active individuals (aged 15 to 64 years)**

In urban areas, more people worked as wage labor than in farming reflecting the urban way of life. Self-employment in entrepreneurial activities was higher in urban areas than in rural areas. Unlike rural areas, unemployment was higher in urban areas in both countries, but the rates of unemployment decreased over time. In 2010/11, unemployment rate of working-age individuals in urban areas was 41 per cent in Tanzania and 38 per cent in Malawi. It decreased to

28 per cent in Tanzania and 34 per cent in Malawi in 2012/13. While the rates of off-farm employment were comparable between rural and urban areas, lower participation in family farming contributed to higher rates of unemployment in urban areas compared to rural areas.[8]

### *3.2.3. Youth employment*

Our emphasis on youth participation in farming is fueled by two things: 1) assumptions regarding young people's preferences and distaste for work on farms that could be construed as "dirty", and 2) youth make up the highest share of population in both countries. While it may be reasonable to assume that many young people may not share a passion for agricultural work, evidence does not substantiate the belief that they do not participate in farming. In 2010/11 and 2012/13, family farming was the largest employer of rural youth compared with any other sector of employment in both Tanzania and Malawi (Figure 3). In 2010/11, more than 80 per cent of rural youth were involved in family farming in these countries. In 2012/13, these shares decreased to 75 per cent in Tanzania and increased to 85 per cent in Malawi. During the same period, rural youth employment in wage labor increased from 17 per cent to 21 per cent in Tanzania and 23 per cent to 32 per cent in Malawi.[9]

[8] It is yet to be assessed whether high unemployment rates in urban areas can be attributed to "true" unemployment or engagement in non-productive activities such as schooling. Future assessments may seek to ascertain this.

[9] Increase in wage employment can be taken as an indicator for economic transformation, but one needs to careful in this case because wage employment also includes wage labor in informal sector such as *Ganyu*.

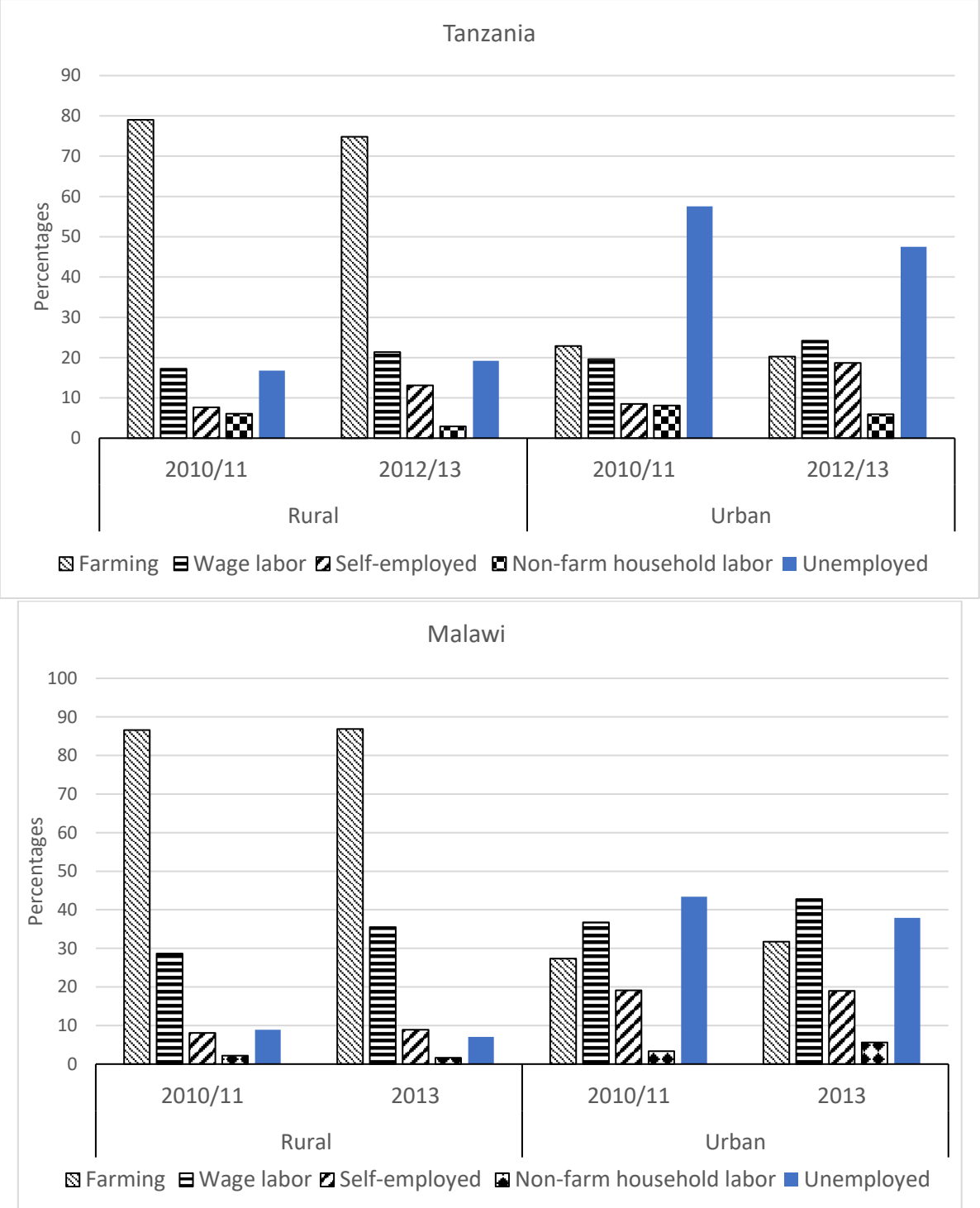



**Figure 3. Youth participation in different occupations**

Following the rhetoric that farming is dirty and undesirable, there is an implication that youth would rather be unemployed (or job-seeking) than engage in farming. Also, youth could consider farming as the last resort and may perceive their on-farm engagement as transitional and temporary. However, after taking into account both on-farm and off-farm participation,

unemployment among rural youth in Tanzania and Malawi was relatively low. Between 2010/11 and 2012/13, rural youth unemployment increased from 17 to 19 per cent in Tanzania but it fell from 13 to 9 per cent in Malawi. The increase (decrease) in the rate of youth unemployment coincided with decrease (increase) in on-farm employment, revealing a likely direct relation between the two.

The case of urban areas is different. In 2010/11, about 23 per cent urban youth were involved in farming in both countries. In 2012/13 it decreased to 20 per cent in Tanzania but increased to 32 per cent in Malawi. Majority of urban youth were unemployed (56 per cent) in 2010/11 but the unemployment rate dropped to 46 per cent in 2012/13.

Figure 4 presents youth participation in non-farm agri-food activities in Tanzania by gender as well as by rural and urban areas. Similar figure for Malawi is provided in appendix (see Figure A1). Wage employment in non-farm agri-food activities was 13 per cent in rural areas and 7 per cent in urban areas in 2010/11. In 2012/13, it increased to 16 per cent in rural areas and 8 per cent in urban areas. Self-employment in non-farm agri-food activities was below 10 per cent in both rural and urban areas.

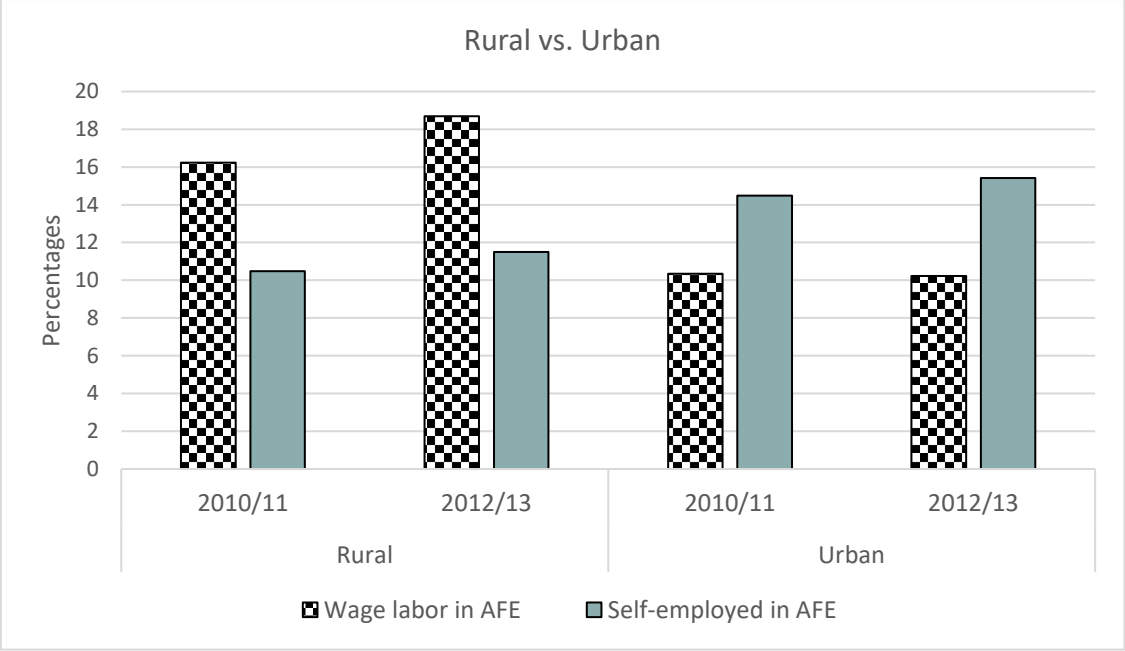




**Figure 4. Youth participation in non-farm agri-food enterprises (AFE) in Tanzania**

Wage employment in non-farm agri-food activities was higher for males but self-employment was higher for females. Employment in non-farm agri-food activities increased over time in both countries but the increase was rather small.

## 4. Analytical Results

This section is organized as follows. First, we present results from the youth employment transition matrix analysis. Those are complemented by the results from the conditional lagged model (equation 1). These results highlight the dynamics (mobility versus stability) of youth employment. Finally, we present the findings from panel data analysis which demonstrate the relationship between individual's age group and on-farm employment (equation 2).

### *4.1. Dynamics of on-farm youth employment*

The purpose of this analysis is to examine the short-term mobility (or stability) of youth employment between on-farm and off-farm occupations (including unemployment) over time. As our focus is on-farm employment, we present the employment dynamics for rural youth only. We borrowed the rural-urban definition from the LSMS survey. As the survey used the administrative definition of rural/urban areas, the definition likely varies by country or even by regions of the same country (Wineman et al., 2020). The same cohort of individuals who were between the ages 15 and 34 years in both 2010/11 and 2012/13 were studied.

Employment categories were made mutually exclusive in this order: wage employment > self-employment > farming > non-farm household work. A potential caveat with this categorization is that estimates of employment can be biased towards off-farm employment. For example, an individual who was employed in both family farming and wage or self-employment would not be counted in the "farming" category. Nevertheless, if youth were in farming by accident or lack of outside opportunities but not by choice, we could expect to see an increasing trend of movement out of farming to off-farm occupations. On the other hand, an increasing trend of movement into farming from off-farm occupations may imply that youth are moving to farming by choice.

**Table 4. Rural youth's movements into farming given baseline occupation**

| Movements into farming | Youth | | | Difference |
|---|---|---|---|---|
| | All | Males | Females | males - females |
| *Tanzania* | | | | |
| Remained in farming | 52.90 | 49.72 | 55.51 | -5.78** |
| | (1.23) | (1.81) | (1.66) | |
| Wage employment to farming | 32.51 | 30.91 | 35.62 | -4.71 |
| | (1.91) | (2.32) | (3.33) | |
| Self-employment to farming | 32.03 | 32.10 | 31.97 | 0.13 |
| | (2.76) | (4.15) | (3.69) | |
| Unpaid labour to farming | 13.94 | 1.95 | 28.23 | -26.27* |
| | (7.80) | (1.55) | (14.96) | |
| Unemployed to farming | 33.12 | 32.94 | 33.28 | -0.34 |
| | (2.24) | (3.36) | (2.99) | |
| **Individuals** | **4,355** | **2,143** | **2,212** | |
| *Malawi* | | | | |
| Remained in farming | 56.29 | 53.35 | 58.28 | -4.93** |
| | (1.26) | (1.98) | (1.64) | |
| Wage employment to farming | 40.17 | 35.56 | 45.97 | -10.41*** |
| | (1.85) | (2.44) | (2.79) | |
| Self-employment to farming | 38.0 | 37.96 | 38.03 | -0.07 |
| | (3.69) | (5.21) | (5.21) | |
| Unpaid labour to farming | 42.99 | 28.78 | 100.0 | -71.22** |
| | (21.85) | (24.14) | (0) | |
| Unemployed to farming | 42.53 | 42.95 | 42.06 | 0.88 |
| | (3.27) | (4.38) | (4.89) | |
| **Individuals** | **3,330** | **1,545** | **1,785** | |

*Notes*: Point estimates are weighted percentages of baseline categories. Standard errors are in parentheses. Asterisks *, **, *** indicate level of significance at 10%, 5%, and 1% levels, respectively

Table 4 provides estimates that indicate the proportion of individuals who moved towards farming in 2012/13 – overall and by gender - given their occupation in 2010/11. In the first row, the share of individuals who 'remained in farming' provides estimates of the rate of retention in farming over time. In the subsequent rows, the point estimates are the proportion of the rural youth who moved towards farming, given the option to either stay in their baseline occupation or move into any other occupations. In Tanzania, about 53 per cent of youth who participated in farming in 2010/11 remained in farming in 2012/13. As expected, the rate of retention in farming was higher for females by about 6 per cent than for males. The movement

into farming from other off-farm occupations was 33 per cent from wage employment and 32 per cent from self-employment. More than 33 per cent of rural youth that were unemployed in 2010/11 also moved into farming in 2012/13. The movement into farming from unpaid household activities was higher for females by 26 per cent than for males.

In Malawi, the rate of retention in farming was 56 per cent and it was higher among females (58%) than males (53%). The movement into farming from other off-farm occupations was higher than in Tanzania; 40 per cent from wage employment, 38 per cent from self-employment, and 43 per cent from non-farm household work. The movement into farming from wage employment was higher for females by more than 10 per cent than for males. Hundred per cent of female youth who were involved in unpaid household work in 2010/11 moved into farming in 2012/13, while only 29 per cent of males did so.

Assuming that each employment option carries equal probability, it can be seen that the choice of single-occupation farming beats every other option, for both males and females. In either case, more than half of youth engaged in off-farm occupations in 2010/11 moved into single-occupation farming in 2012/13. If we discount unemployment from the list of options, the probability of youth participating in farming is equal to or greater than their probability of moving into off-farm occupations.

Table 5 presents point estimates of the movements of rural youth out of single-occupation farming to off-farm occupations. When considering the non-farm income-generating occupations (wage labor and self-employment), young people's mobility towards these occupations is smaller than the rates of retention in farming. In Tanzania, about 22 per cent of youth engaged in farming in 2010/11 moved into wage employment in 2012/13, and 13 per cent moved into self-employment, while nearly 13 per cent became unemployed. The movements out of farming differed by individual's gender. Movement from farming into wage labor was more common among males but the share of rural youth that moved into self-employment or fell back to unemployment was greater among females.

**Table 5. Rural youth's movements out of farming to off-farm occupations**

| Movements out of farming | Youth | | | Difference |
|---|---|---|---|---|
| | All | Males | Females | males - females |
| *Tanzania* | | | | |
| Farming to wage employment | 21.67 | 27.68 | 16.73 | 10.95*** |
| | (1.02) | (1.64) | (1.26) | |
| Farming to self-employment | 12.86 | 10.07 | 14.64 | -3.94** |
| | (0.83) | (1.23) | (1.19) | |
| Farming to unpaid labour | 0.0 | 0.0 | 0.0 | - |
| | - | - | - | |
| Farming to unemployment | 12.57 | 11.90 | 13.12 | -1.22 |
| | (0.81) | (1.16) | (1.13) | |
| **Individuals** | **4,355** | **2,143** | **2,212** | |
| *Malawi* | | | | |
| Farming to wage employment | 30.26 | 34.44 | 27.44 | 6.99*** |
| | (1.16) | (1.88) | (1.47) | |
| Farming to self-employment | 7.36 | 6.53 | 7.91 | -1.38 |
| | (0.74) | (1.08) | (0.99) | |
| Farming to unpaid labour | 0.21 | 0.11 | 0.28 | -0.17 |
| | (0.13) | (0.11) | (0.21) | |
| Farming to unemployment | 5.88 | 5.57 | 6.09 | -0.52 |
| | (0.57) | (0.87) | (0.75) | |
| **Individuals** | **3,330** | **1,545** | **1,785** | |

*Notes*: Point estimates are weighted percentages of baseline categories. Standard errors are in parentheses. Asterisks *, **, *** indicate level of significance at 10%, 5%, and 1% levels, respectively.

Similar patterns held in Malawi, but the share of rural youth that moved out of farming into wage employment was 30 per cent there. Rural youth's movement out of farming into self-employment and unemployment was much smaller than in Tanzania. Perhaps, engagement in farming among rural youth is more stable in Malawi than in Tanzania.

Results indicate that the on-farm employment (farming participation) of rural youth in Tanzania and Malawi is quite high. Young people who move out of farming are more likely to enter other income-generating activities than remain unemployed. While the intensity of mobility towards single-occupation farming from other sectors is encouraging, it does not necessarily mean an increased youth's attraction to farming. It is possible that shifts towards farming are

largely a result of the loss of baseline livelihood options, rather than attraction to the sector as an attractive income-generating opportunity.

### *4.2. Conditional lagged model*

Table 6 presents the results from the conditional lagged model (equation 1). In both countries, the estimated coefficients provide the probability of an average individual remaining in farming over time. The coefficient estimate on the first variable shows the probability of remaining in farming in the follow-up period. In Tanzania, rural youth who were engaged in farming in 2010/11 were 11 per cent more likely to remain in farming in 2012/13. Such probability was slightly higher among females (12 per cent) and much higher among young people that own land (38 per cent). Similar pattern is held for Malawi as well, but the probabilities were lower compared to Tanzania. Results suggest that youth participation in farming was more stable among females and those owning land than males and those who did not own land.

**Table 6. Stability of on-farm rural youth employment between 2010/11 and 2012/13**

| | Dependent variable: farming in 2012/13 | | | | | |
|---|---|---|---|---|---|---|
| | Tanzania | | | Malawi | | |
| | Full sample | Females | Land owners | Full sample | Females | Land owners |
| *Occupations in 2010/11* | | | | | | |
| Farming | 0.11*** | 0.12*** | 0.38*** | 0.054** | 0.061* | 0.26*** |
| | (0.022) | (0.032) | (0.13) | (0.024) | (0.034) | (0.093) |
| Wage employed | 0.034*** | 0.025 | 0.011 | -0.0023 | 0.033* | -0.010 |
| | (0.011) | (0.019) | (0.012) | (0.012) | (0.019) | (0.0086) |
| Self-employed | -0.010 | -0.0045 | -0.0083 | 0.025 | 0.043 | 0.012 |
| | (0.013) | (0.019) | (0.011) | (0.022) | (0.033) | (0.015) |
| Unemployed | -0.066*** | -0.063** | 0.028 | -0.038* | -0.019 | -0.37*** |
| | (0.018) | (0.028) | (0.035) | (0.022) | (0.032) | (0.066) |
| *Age groups* | | | | | | |
| Youth (15-34) | 0.091*** | 0.096*** | 0.54*** | 0.12*** | 0.11*** | 0.28** |
| | (0.012) | (0.017) | (0.088) | (0.014) | (0.020) | (0.11) |
| Adult (35-64) | 0.052** | 0.076** | 0.46*** | 0.0021 | -0.011 | 0.26** |
| | (0.022) | (0.031) | (0.088) | (0.035) | (0.048) | (0.12) |
| Elderly (65 and above) | -0.10*** | -0.11*** | 0.36*** | -0.16*** | -0.13** | 0.28*** |
| | (0.027) | (0.033) | (0.086) | (0.047) | (0.051) | (0.069) |
| *Age group and farming interactions* | | | | | | |
| Farming*Youth | -0.012 | -0.036 | -0.33*** | 0.023 | 0.0045 | 0.067 |
| | (0.017) | (0.023) | (0.12) | (0.019) | (0.026) | (0.089) |
| Farming*Adult | 0.10*** | 0.10*** | -0.25** | 0.13*** | 0.13*** | 0.083 |
| | (0.026) | (0.036) | (0.12) | (0.037) | (0.050) | (0.093) |
| Farming*Elderly | 0.11*** | 0.076* | -0.20 | 0.12** | 0.061 | - |
| | (0.032) | (0.041) | (0.12) | (0.050) | (0.055) | |
| *Individual characteristics* | | | | | | |
| Male | -0.0074 | - | -0.0024 | -0.016** | - | -0.032*** |
| | (0.0068) | | (0.012) | (0.0074) | | (0.012) |
| Currently attending school | -0.12*** | -0.13*** | -0.11 | -0.021* | -0.050*** | 0.20*** |
| | (0.0090) | (0.013) | (0.073) | (0.011) | (0.016) | (0.025) |
| Owns land | 0.16*** | 0.15*** | - | 0.14*** | 0.15*** | - |
| | (0.012) | (0.017) | | (0.013) | (0.019) | |
| *Household variables* | | | | | | |
| Household size | -0.002*** | -0.004*** | -0.003*** | -0.013*** | -0.014*** | -0.004** |
| | (0.0007) | (0.001) | (0.0012) | (0.0016) | (0.0020) | (0.0020) |
| Head's age (years) | -0.001*** | -0.001*** | -0.0003 | -0.0003 | -0.001*** | 0.0004 |
| | (0.0003) | (0.0003) | (0.0006) | (0.0003) | (0.0004) | (0.0005) |

| | | | | | | |
|---|---|---|---|---|---|---|
| Head is male | -0.023*** | -0.017 | -0.0051 | 0.0094 | 0.0098 | 0.041*** |
| | (0.0085) | (0.011) | (0.014) | (0.0092) | (0.012) | (0.013) |
| Log (consumption expenditure) | -0.0096* | -0.013* | -0.025*** | -0.026*** | -0.031*** | -0.022*** |
| | (0.0057) | (0.0079) | (0.0085) | (0.0069) | (0.0093) | (0.0078) |
| Agricultural household | 0.33*** | 0.35*** | 0.22*** | 0.14*** | 0.14*** | 0.093*** |
| | (0.011) | (0.015) | (0.016) | (0.013) | (0.016) | (0.014) |
| Livestock household | 0.14*** | 0.14*** | 0.061*** | 0.016* | 0.0076 | -0.0036 |
| | (0.0071) | (0.0098) | (0.0097) | (0.0082) | (0.011) | (0.0091) |
| **Observations** | **11,335** | **5,792** | **2,633** | **8,177** | **4,280** | **2,013** |

*Notes:* Results from the probit estimator, marginal effects calculated at means. Standard errors in parentheses. Level of significance * $p < .10$, ** $p < .05$, *** $p < .01$. All variables are binary (1=Yes, 0=No) unless otherwise indicated.

The second panel in Table 6 presents results on the relationship between individual's age groups and farming participation. The probability of farming participation was the highest for youth followed by adults and elderly. Elderly individuals who did not own land were less likely to participate in farming, suggesting that as people get older, they are less likely to enter or remain engaged in farming.

Specifically, the probability of farming participation was higher for individuals from farming households, livestock-keeping households, and those that own land. As expected, this probability decreased with household consumption expenditure (proxy for well-being). Perhaps, individuals from well-off households have less incentive (and higher opportunity cost) to work in family farming. The probability of on-farm employment was lower for students and it also decreased with household size, confirming the anecdotal evidence that family labor supply increases with household size.

Figure 5 presents the predicted probability of on-farm employment against individual's age. The probability was predicted for full youth sample, female youth, and land owning youth. For every age group, the probability of on-farm employment was the highest for land owning youth in both countries. The probability of on-farm employment for female youth was similar to that of the full youth sample. The probability of on-farm employment increased at an increasing

rate for children and youth but it started declining around the age of mid-forties. This suggests that contrary to the myth that young people have a distaste for agricultural work, youth are more likely than any other age group to enter or remain engaged in on-farm activities.

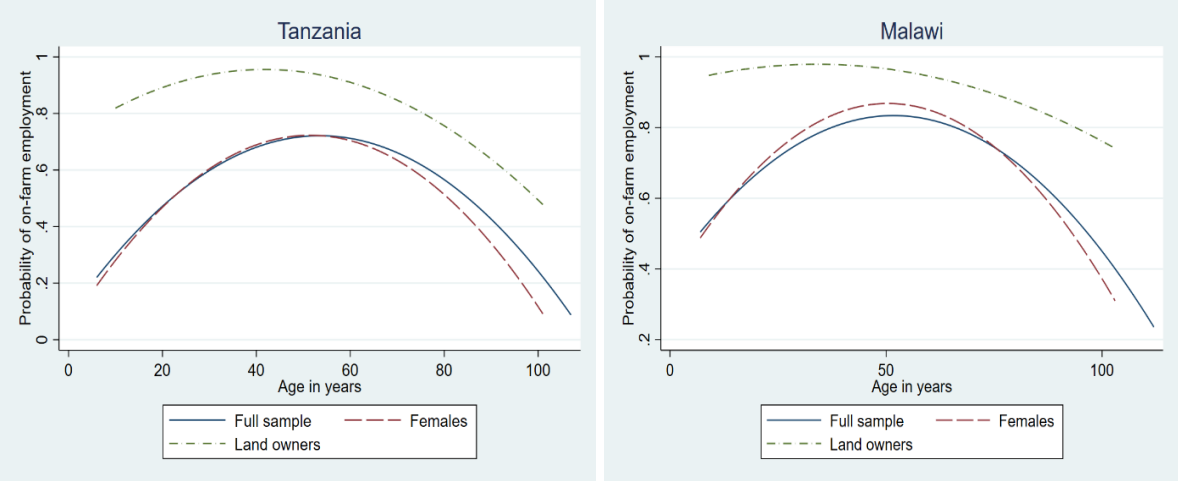



**Figure 5. Probability of on-farm employment by individual's age**

### *4.3. Panel analysis on the probability of on-farm youth employment*

Table 7 presents the results from the panel data analysis. The primary difference between results in Table 6 and Table 7 is that Table 6 results are the probability of farming participation in 2012/13 conditional on baseline occupation status. Our main objective in Table 7 is to estimate the unconditional probability of farming participation for different age groups over time, discounting individual fixed effects. The estimated results confirm that, even after removing individual fixed effects, the probability of farming participation increases with age, but at a decreasing rate. That is youth are more likely to participate in farming than adults and elderly, even though the relationship was not statistically significant in case of Tanzania. In both countries, females and young land owners are more likely to participate in farming than other youth.

**Table 7. Relationship between individual's age group and on-farm employment (Panel fixed effects)**

| | Dependent variable: farming participation | | | | | |
|---|---|---|---|---|---|---|
| | Tanzania | | | Malawi | | |
| | Full sample | Females | Land owners | Full sample | Females | Land owners |
| *Age group* | | | | | | |
| Youth (15-34) | 0.013 | 0.032** | -0.023 | 0.048*** | 0.052*** | 0.024*** |
| | (0.0084) | (0.013) | (0.034) | (0.013) | (0.019) | (0.0079) |
| Adult (35-64) | 0.0009 | 0.070*** | -0.017 | 0.035 | 0.065** | 0.030*** |
| | (0.021) | (0.026) | (0.022) | (0.024) | (0.033) | (0.0091) |
| Elderly (65 and above) | -0.0024 | 0.071* | - | -0.0041 | 0.032 | -0.0066 |
| | (0.028) | (0.037) | | (0.033) | (0.034) | (0.035) |
| *Off-farm occupations* | | | | | | |
| Wage employed | -0.085*** | -0.13*** | -0.0080 | -0.14*** | -0.14*** | -0.014*** |
| | (0.0078) | (0.011) | (0.0083) | (0.0066) | (0.0091) | (0.0052) |
| Self-employed | -0.10*** | -0.22*** | -0.027*** | -0.041*** | -0.051*** | -0.0092 |
| | (0.0093) | (0.012) | (0.0089) | (0.0088) | (0.012) | (0.0057) |
| Unemployed | -0.86*** | -0.72*** | -0.89*** | -0.90*** | -0.90*** | -0.91*** |
| | (0.0071) | (0.0096) | (0.026) | (0.0066) | (0.0092) | (0.060) |
| *Individual characteristics* | | | | | | |
| Male | -0.048 | - | -0.061 | -0.022 | - | 0.049** |
| | (0.049) | | (0.050) | (0.054) | | (0.021) |
| Married | 0.028** | 0.015 | 0.00064 | 0.039*** | 0.024 | 0.023 |
| | (0.012) | (0.015) | (0.031) | (0.013) | (0.016) | (0.017) |
| Currently attending school | 0.0018 | 0.011 | -0.16 | 0.037*** | 0.034** | 0.031** |
| | (0.0054) | (0.0088) | (0.13) | (0.0091) | (0.014) | (0.013) |
| Owns land | 0.043*** | 0.044*** | - | 0.035*** | 0.030*** | - |
| | (0.0068) | (0.0087) | | (0.0060) | (0.0074) | |
| *Household variables* | | | | | | |
| Household size | -0.0009 | -0.0017 | 0.0013 | -0.0053*** | -0.0046** | 0.000088 |
| | (0.00079) | (0.0012) | (0.0026) | (0.0018) | (0.0023) | (0.0025) |
| Head: Age in years | 0.00064* | 0.0006 | -0.0004 | -0.00018 | -0.00002 | -0.0012** |
| | (0.00035) | (0.00041) | (0.0016) | (0.00039) | (0.0005) | (0.0005) |
| Head is male | 0.0037 | -0.024* | -0.018 | -0.013 | -0.0060 | -0.014 |
| | (0.012) | (0.014) | (0.045) | (0.010) | (0.013) | (0.013) |
| Log (consumption expenditure) | -0.014*** | -0.019*** | -0.0071 | -0.0098** | -0.0030 | -0.0037 |
| | (0.0038) | (0.0052) | (0.0074) | (0.0045) | (0.0056) | (0.0042) |

| | | | | | | |
|---|---|---|---|---|---|---|
| Farm household | 0.23*** | 0.21*** | 0.30*** | 0.090*** | 0.057*** | -0.0076 |
| | (0.016) | (0.015) | (0.059) | (0.012) | (0.015) | (0.010) |
| Livestock household | 0.021*** | 0.024*** | 0.028*** | 0.013*** | 0.0078 | -0.0073 |
| | (0.0051) | (0.0070) | (0.0097) | (0.0048) | (0.0061) | (0.0049) |
| Constant | 0.87*** | 0.85*** | 0.81*** | 0.99*** | 0.92*** | 1.05*** |
| | (0.058) | (0.072) | (0.14) | (0.064) | (0.075) | (0.046) |
| **Observations** | **22,184** | **16,385** | **6,437** | **17,110** | **8,957** | **4,547** |

*Notes*: Standard errors in parentheses. Level of significance * p < .10, ** p < .05, *** p < .01.

We calculated marginal effects of age for individuals aged 18 and 40 to understand the relationship between age and participation in farming. For individuals aged 18, a one-year increase in age increased their probability of farming participation by 27 per cent points in Tanzania and 23 per cent in Malawi. For individuals aged 40, this probability was 17 per cent in Tanzania and 1.6 per cent in Malawi.

As expected, participation in off-farm occupations (wage labor, self-employment) decreased individual's probability of farming participation. Among other variables, the probability of farming participation was higher for individuals from agricultural households, livestock-keeping households and land-owner individuals. In addition, household size decreased an individual's likelihood of farming participation. Interestingly, an individual's gender had no effect on likelihood of their farming participation, except for the case of land owners in Malawi. Students were more likely to participate in farming in both countries, but the relationship was not statistically significant in Tanzania.

### *4.4. Robustness checks*

As a robustness check, we estimated the relationship between individual age groups and the intensity of farming participation – count of days an individual worked in family farm over the last two seasons preceding the survey. The base category for individual age groups is children between age 6 years and 14 years. Results in Table 8 confirm our primary finding that youth engagement in on-farm activities is high and fairly stable. In Tanzania, both youth and adults worked in family farm about 7 more days than children. Female youth worked slightly more days

than males and land owner youth worked about 17 days more than children. Elderly individuals worked about 10 days less than children, but it was not statistically significant. The pattern was slightly different in case of Malawi, where the number of days an individual worked in family farm increased with age groups. Youth worked about 11 days more than children but adults and elderly individuals worked higher number of days. Like Tanzania, land owner youth in Malawi worked more days in farming than other youth. Unlike Tanzania, females did not work more days in farming than males in Malawi.

**Table 8**. **Relationship between age groups and the number of on-farm labor days**

| | Dependent variable: farming participation | | | | | |
|---|---|---|---|---|---|---|
| | Tanzania | | | Malawi | | |
| | Full sample | Females | Land owners | Full sample | Females | Land owners |
| *Age group* | | | | | | |
| Youth (15-34) | 6.60*** | 7.74*** | 17.4* | 11.4*** | 11.0*** | 18.5*** |
| | (1.75) | (2.74) | (10.6) | (1.54) | (2.23) | (2.96) |
| Adult (35-64) | 7.02** | 8.25* | 14.0 | 15.1*** | 10.2* | 25.4*** |
| | (3.52) | (4.92) | (9.09) | (3.83) | (5.35) | (6.00) |
| Elderly (65 and above) | -9.06 | -10.8 | - | 17.9** | 16.1 | 28.9** |
| | (7.38) | (10.8) | | (8.35) | (10.4) | (11.4) |
| *Off-farm occupations* | | | | | | |
| Wage employed | -2.22* | -0.10 | -2.89 | -1.77** | -0.69 | -3.74** |
| | (1.27) | (2.00) | (2.22) | (0.82) | (1.13) | (1.85) |
| Self-employed | 1.49 | 1.53 | 2.12 | -0.61 | -0.84 | -1.80 |
| | (1.41) | (1.93) | (2.61) | (1.60) | (2.17) | (2.90) |
| Unemployed | -24.4*** | -25.2*** | -54.9*** | -17.2*** | -16.2*** | -40.5*** |
| | (0.81) | (1.15) | (5.06) | (0.67) | (0.92) | (8.25) |
| *Individual characteristics* | | | | | | |
| Male | 15.2* | - | 36.6** | 5.77 | - | -52.9*** |
| | (9.10) | | (18.1) | (5.30) | | (7.69) |
| Married | 5.34** | 0.79 | 14.3* | 10.8*** | 9.25*** | 3.39 |
| | (2.18) | (2.78) | (7.91) | (1.75) | (2.15) | (4.73) |
| Currently attending school | -7.05*** | -5.78*** | -3.34 | -5.57*** | -5.32*** | -8.47 |
| | (0.97) | (1.37) | (31.1) | (1.12) | (1.53) | (5.42) |
| Owns land | 5.87*** | 5.63*** | - | 9.19*** | 8.11*** | - |
| | (1.61) | (2.02) | | (1.23) | (1.62) | |
| *Household variables* | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Household size | -0.37** | -0.58** | -0.78 | 0.56** | 0.089 | 3.59*** |
| | (0.19) | (0.24) | (0.83) | (0.26) | (0.35) | (0.90) |
| Head: Age in years | 0.50*** | 0.45*** | 0.15 | 0.11** | 0.032 | 0.69*** |
| | (0.063) | (0.088) | (0.32) | (0.055) | (0.073) | (0.26) |
| Head is male | 0.21 | -3.02 | -10.1 | -4.68*** | -4.29*** | -9.86** |
| | (1.89) | (2.51) | (9.93) | (1.25) | (1.66) | (4.39) |
| Log (consumption expenditure) | 0.70 | 0.99 | 3.00 | 2.29*** | 1.56* | 3.22* |
| | (0.71) | (0.98) | (2.08) | (0.69) | (0.93) | (1.85) |
| Farming household | 13.2*** | 12.6*** | 19.0* | 8.75*** | 8.27*** | 5.66 |
| | (1.55) | (2.17) | (9.99) | (1.14) | (1.57) | (4.54) |
| Livestock household | 1.36 | 1.20 | 0.67 | 2.96*** | 2.44*** | 3.09 |
| | (0.96) | (1.34) | (2.56) | (0.71) | (0.94) | (1.93) |
| Constant | -14.2 | -3.64 | -35.2 | -19.9** | 0.025 | -26.5 |
| | (10.9) | (13.9) | (37.6) | (9.53) | (12.3) | (23.3) |
| **Observations** | **21,966** | **11,193** | **5,270** | **16,939** | **8,864** | **4,454** |

*Notes*: Standard errors in parentheses. Level of significance * p < .10, ** p < .05, *** p < .01.

Based on the regression estimates, we also calculated the number of days each age group worked on family farm, on average. Figure 6 presents the estimated labor days. In Tanzania, youth worked the most number of days. The estimated number of on-farm labor days was lower for adults and elderly people. In Malawi, the pattern was different as the estimated number of on-farm labor days increased with age reaching the highest for elderly individuals.

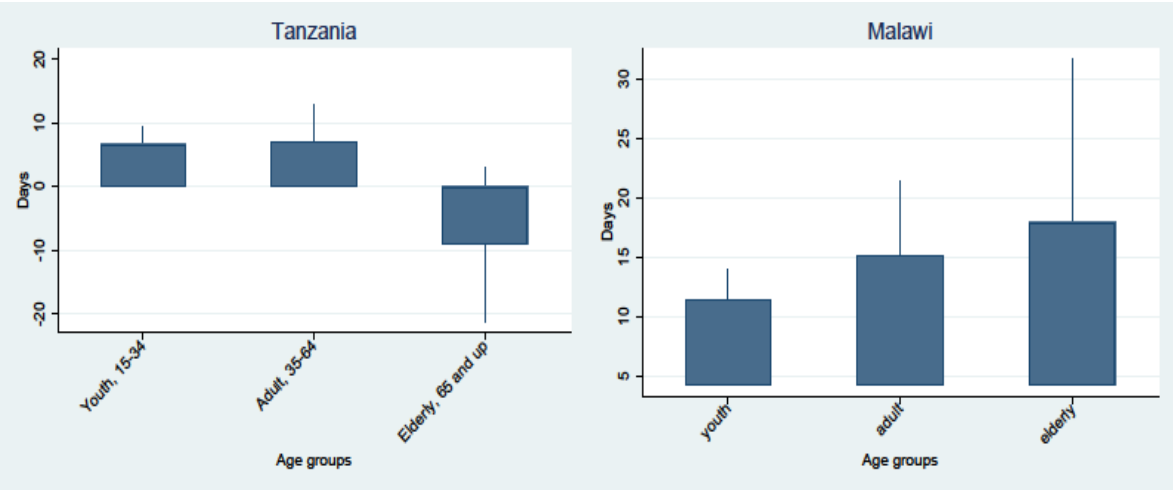


**Figure 6. Estimated relationship between age cohorts on on-farm labor days**

## 5. Conclusion

This analysis examines the short-term dynamics of on-farm employment of rural youth in Tanzania and Malawi. Longitudinal data from two internationally comparable integrated household and agriculture surveys from 2011 and 2013 (the LSMS-ISA data) were used to assess the dynamics of youth employment and the probability of on-farm engagement for youth and other age cohorts. First, the analysis explored youth employment distribution across different on-farm and off-farm occupations allowing cross-occupations engagement. Then the dynamics of employment was assessed by making participation in different employment categories mutually exclusive. Employment dynamics was assessed by using transition matrices and the probability of on-farm employment was estimated by using panel data estimators – conditional probit and panel fixed effects.

Results showed that a significant majority of rural youth engaged in on-farm activities in both countries. On-farm youth participation was higher in Malawi than in Tanzania. In Tanzania, it slightly decreased over time from 79 per cent in 2011 to 75 per cent in 2013, but it increased in Malawi from 86 per cent in 2011 to 87 per cent in 2013. Assessment of employment dynamics revealed a moderate degree of stability of on-farm youth employment over time. More than 53 per cent of rural youth were consistently engaged in farming between 2011 and 2013. There was considerable mobility towards farming out of off-farm occupations. Specifically, more than one-third of youth employed in off-farm occupations in 2011 moved into farming in 2013. The share of youth that was involved in off-farm occupations during the baseline year but moved into farming in the subsequent year was consistently higher than the share of youth who moved out of farming in the subsequent year.

Movements from one occupation to another may be driven by push factors in the baseline occupation or pull factors in the endline occupation. Push factors include factors such

as low profitability of agriculture and pull factors can include factors such as higher opportunity costs of staying in the current occupation. While it is difficult to determine whether either push or pull factors are encouraging the occupational mobility, it is understood that decisions are largely made between either staying in the baseline occupation or moving into single-occupation farming. In this light, the observed stability of youth participation in farming provides rigorous evidence against the myth that African youth are moving away from agriculture. However, it may not necessarily imply youth attraction into agriculture for two reasons. First, young people in rural areas have limited off-farm employment opportunities and, second, they may be unable to afford transaction costs incurred for movements into off-farm occupations.

Results from econometrics analysis largely confirm the findings from transition matrix analysis. We find that the probability of farming participation increased with age but at a decreasing rate. The probability of farming participation was highest for youth. The probability of farming participation was higher for individuals who were already engaged in agriculture in the previous period, confirming a high degree of stability in youth participation in farming. Analysis by gender and land ownership status revealed that on-farm employment of female youth was more stable (58%) than that of males (53%) and it was higher and more stable for the youth owning land.

Overall, our findings suggest that youth are much more likely than individuals in other age groups to participate in farming as opposed to another income-generating sector. Even though this finding is encouraging for policymakers who are concerned about young people's lack of attraction to agriculture, it is likely that the poor economic prospects outside of farming are what is driving strong participation in farming. Our finding that land owning youth are more likely to engage in farming and their on-farm employment in more stable than other youth has an important policy implication. Given that increasing youth employment is a priority public policy for the governments of Tanzania and Malawi and majority of youth do engage in farming, it is necessary to strengthen the agricultural sector by improving young people's access to critical

resources needed for farming such as land, and access to credit. Different rates of on-farm employment for males and females imply a need of targeted policies for sustaining youth participation in agriculture.

One of the limitations of this study is that the analysis makes use of only two rounds of data. The analysis presented in this paper provides a baseline of short-term mobility of on-farm youth employment. Availability of data warrants future studies to determine mid-term retention rates in family farming as well as any structural shifts in overall employment rates. Future studies should make use of longitudinal data over a longer period of time to investigate the dynamics of youth employment in farming as well as the broader agri-food system.

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## APPENDIX

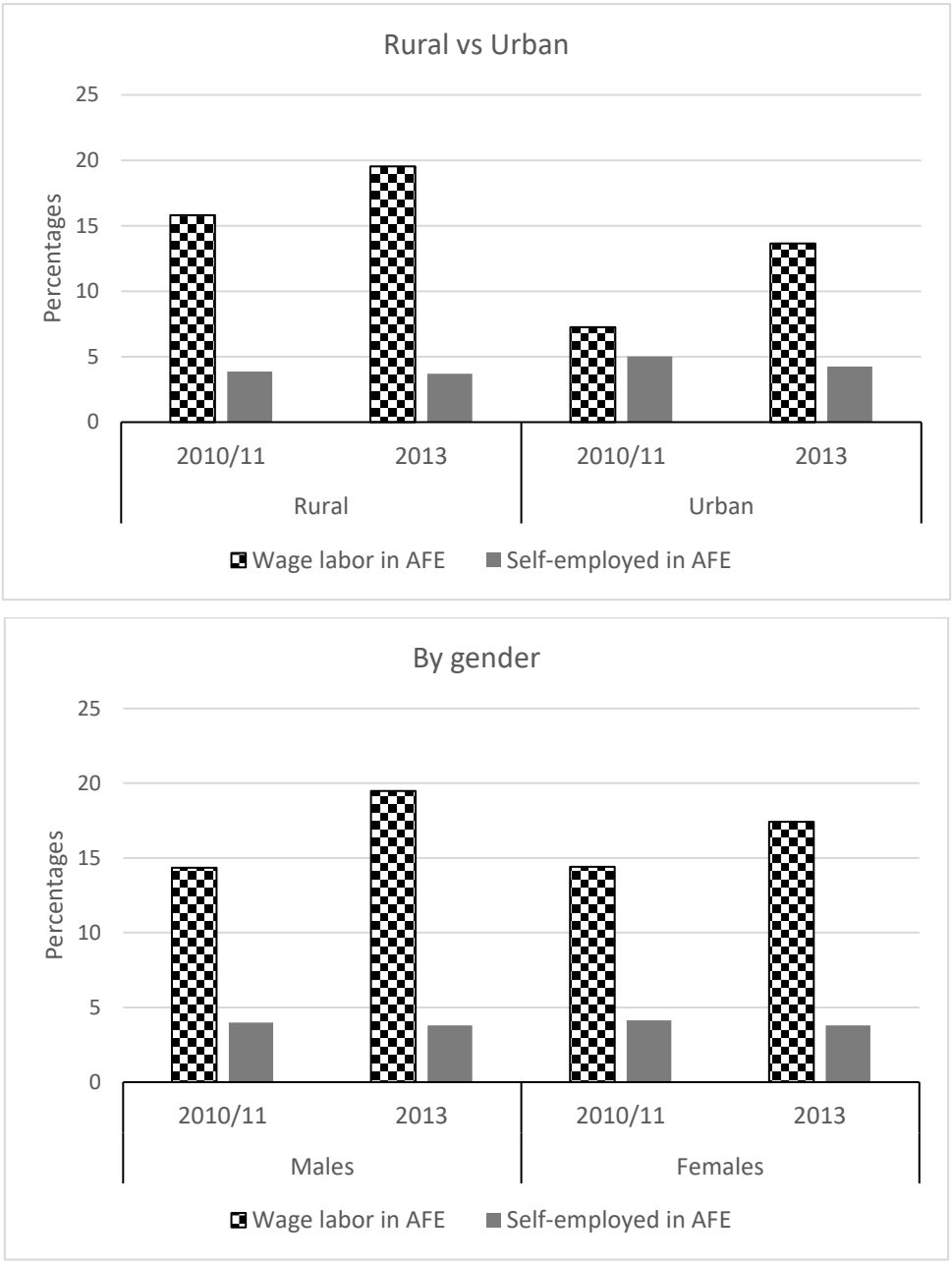


**Figure A1. Youth participation in non-farm agri-food enterprises (AFE) in Malawi**

**Table A1. Summary statistics of variables used in the regression analysis**

| *Individual characteristics (all age groups)* | Tanzania | | Malawi | |
|---|---|---|---|---|
| | 2010/11 | 2012/13 | 2010/11 | 2013 |
| Age in years | 24.81 | 26.60 | 24.37 | 26.27 |
| | (17.95) | (17.71) | (16.95) | (16.80) |
| Gender (1=Male, 0=Female) | 0.48 | 0.49 | 0.49 | 0.49 |
| | (0.50) | (0.50) | (0.50) | (0.50) |
| Participated in Farming (1=Yes, 0=No) | 0.57 | 0.55 | 0.62 | 0.63 |
| | (0.49) | (0.49) | (0.49) | (0.48) |
| Employed in Agri-food enterprise (AFE) (1=Yes, 0=No) | 0.16 | 0.18 | 0.15 | 0.19 |
| | (0.37) | (0.38) | (0.36) | (0.39) |
| Days worked in family farms in the last two seasons | 30.21 | 29.58 | 25.64 | 27.80 |
| | (49.59) | (48.09) | (37.08) | (38.98) |
| Currently attending school (1=Yes, 0=No) | 0.35 | 0.33 | 0.42 | 0.44 |
| | (0.48) | (0.47) | (0.49) | (0.49) |
| *Household characteristics* | | | | |
| Head's age in years | 49.76 | 49.45 | 44.94 | 45.70 |
| | (13.99) | (14.03) | (13.92) | (13.93) |
| Head's gender (1=Male, 0=Female) | 0.81 | 0.81 | 0.82 | 0.79 |
| | (0.39) | (0.39) | (0.38) | (0.40) |
| Household size | 8.84 | 8.31 | 6.77 | 6.87 |
| | (6.22) | (4.85) | (2.53) | (2.49) |
| Agricultural household (1=Yes, 0=No) | 0.83 | 0.82 | 0.84 | 0.84 |
| | (0.37) | (0.38) | (0.36) | (0.36) |
| Livestock household (1=Yes,0=No) | 0.73 | 0.67 | 0.64 | 0.67 |
| | (0.44) | (0.47) | (0.48) | (0.47) |
| Annual per-capita consumption (milion, LCU*) | 4.13 | 5.41 | 0.129 | 0.130 |
| | (3.75) | (5.09) | (0.146) | (0.131) |
| Rural (1=Yes, 0=Urban) | 0.76 | 0.76 | 0.84 | 0.83 |
| | (0.42) | (0.43) | (0.36) | (0.37) |
| **Observations** | **17,472** | **21,492** | **12,428** | **17,650** |

*Notes*: Point estimates are weighted means. Standard deviations are in parentheses.
*Local currency units: Tanzanian Shilling and Malawian Kwacha.