

AFRICA'S EVOLVING EMPLOYMENT STRUCTURE

By

F. Kwame Yeboah and T.S. Jayne



Food Security Policy *Research Papers*

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AUTHORS' ACKNOWLEDGMENT

We gratefully acknowledge funding for this study from The MasterCard Foundation through the Agri-food Youth Employment and Engagement Study (AgYees), the Bill and Melinda Gates Foundation through the Guiding Investments in Sustainable Agricultural Intensification in Africa (GISAIA) grant, and the Feed the Future Innovation Lab for Food Security Policy (Cooperative Agreement AID-OAA-L-13-00001 between Michigan State University and the USAID Bureau for Food Security, Office of Agriculture, Research, and Technology).

We are also grateful to Michael Bratton for the information on citizens' opinions on policy priorities and to Felicity Proctor, Karen Brooks, Louise Fox, Julius Gatune Kariuki, David Tschirley, and Julie Howard for valuable comments on earlier iterations of this paper. We further would like to acknowledge the editorial and formatting assistance of Patricia Johannes.

The authors bear full responsibility for the contents and interpretation of the findings reported here.

This paper is also published as MSU International Development Working Paper 148

This study is made possible by the generous support of the American people through the United States Agency for International Development (USAID) under the Feed the Future initiative. The contents are the responsibility of the study authors and do not necessarily reflect the views of USAID or the United States Government.

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Published by the Department of Agricultural, Food, and Resource Economics, Michigan State University, Justin S. Morrill Hall of Agriculture, 446 West Circle Dr., Room 202, East Lansing, Michigan 48824, USA

EXECUTIVE SUMMARY

Using nationally representative, multi-year survey data for nine African countries, this study documents trends in the sectoral composition of Africa's work force. The study highlights differences in sectoral employment trends by age category, gender, and rural vs. urban areas. By analyzing sectoral employment shifts over the past decade, we can gain insights about the strength and robustness of economic transformation processes in much of Sub-Saharan Africa.

While substantial differences across countries warrant caution against overgeneralization, the last decade has witnessed a sharp increase in the rate at which Africans are exiting farming in favor of off-farm activities. Today, farming accounts for 50 to 70% of the total number of jobs recorded among Africa's working-age population, down from 70 to 80% just 10 years ago. These employment shifts signify that economic transformation is clearly underway in much of the region. In some countries, however, the labor force is moving out of farming very slowly. Countries experiencing the most rapid labor force exit out of farming over the past decade tend to have achieved relatively strong agricultural productivity growth since 2000.

The share of the labor force in a given sector of the economy can be reported in terms of survey respondents' stated primary employment in a given year, the total numbers of jobs in which a person has engaged (in recognition that many people have multiple jobs), or *full-time equivalents* or FTEs, which weight the importance of various jobs that a person has according to the share of their work time over the year. This study reports and compares labor force trends using the latter two measures. Labor force trends are similar when examining employment in terms of total number of jobs vs. full-time equivalents, but the share of the work force in non-farm employment is considerably higher in all years and all countries using the FTE measure. Within the off-farm sector, the greatest number of new jobs for youth is in the non-farm informal sector, particularly in construction, commerce, and manufacturing. Off-farm jobs in the agri-food system are also growing rapidly in percentage terms, but from a low initial base. In terms of absolute numbers of jobs created, the off-farm segments of the agri-food system are generating relatively few new jobs compared to farming and especially the non-farm sectors. This finding underscores the policy and programmatic importance of understanding which sectors are creating the greatest absolute numbers of new jobs, not just which sectors are growing at the annual rate (which may involve relatively few new jobs if starting from a low initial base). Farming will continue to be the single largest source of employment in most countries at least for the next decade or more. Nevertheless, employment patterns today in most African countries are substantially different and less farm-centered than they were even only ten years ago.

Sectoral employment trends will also depend on the rate at which farm productivity grows in the future. The rate of growth in farm productivity will influence the rate of employment growth in the off-farm segments of the agri-food system and in the broader economy because of the strong employment and income multiplier effects emanating from agriculture. For these reasons, the role of agriculture in the national policy agenda of most African countries remains fundamental. Because the rapid shifts in the work force over the past decade occurred during an era of strong agricultural productivity growth influenced by high world food prices, it is not clear whether these trends will continue at the same pace over the next decade.

Shifts in employment trends among Africans in the 15-24 and 25-34 age range are remarkably similar to those in the 35-64 age range. Unemployment and economic inactivity among the working-age population is rising most rapidly among rural youth. Strategies that effectively raise the returns to labor in farming will be among the most important steps that African governments can take to improve youth livelihoods, especially for women. Agricultural productivity growth, especially if broadly based, will generate strong multiplier effects that expand job opportunities in the off-farm segments of the agri-food system as well as in the broader non-farm economy. The particular policy levers to support agri-food system growth are becoming more varied and complex as countries' economic transformations continue to unfold.

Highlights

- Major economic and demographic transformation has been underway in Africa since 2000, characterized by rapid but highly variable rate of labor exit from farming to off-farm employment.
- Variable urbanization patterns across countries. Share of urban workforce rising rapidly in most countries (e.g., Tanzania, Ghana,) but declining in some countries (e.g., Rwanda and Nigeria). Over 60% of the workforce still resides in rural areas.
- Pace of economic transformation in last decade linked to agricultural productivity growth.
- Off-farm employment is growing at a faster rate in rural areas than in urban areas.
- Employment in off-farm segments of the agri-food system is growing rapidly in percentage terms, but starting from a very low base and generates less number of new jobs than farming.
- There are many more jobs opening up for young people and the entire workforce in the non-farm sectors of the economy than in off-farm segments of the agri-food system.
- Farming accounts for the largest share of total number of new jobs in most countries but the largest share of new FTE jobs comes from non-farm sector outside the agri-food system.
- Public investments that raise labor productivity in agriculture will be essential to absorb the growing labor force into gainful employment.
- The economically inactive comprise 30% or more of the youth population (15-24 years), reflecting major increases in education and training. Africa's labor force in 2030 will be substantially better educated than it was in 2000.
- Rising rural unemployment particularly in countries experiencing rapid declines in farming's share of employment (e.g., Rwanda, Zambia). Youth and females are more likely to be unemployed and economically inactive.
- Rapid percentage growth in wage employment particularly in private sector but from low initial base. Hence, self-employment and informal sector jobs will remain a key feature of African economies at least in the next few decades.

ACRONYMS

AfDB	African Development Bank,
DHS	Demographic Health Surveys
EICV	Integrated Household Living Survey
FAO	Food and Agriculture Organization (United Nations)
FTE	Full-time equivalents
GDP	Gross Domestic Product
GGDC	Groningen Growth and Development Center
ILO	International Labour Organization (United Nations)
IMF	International Monetary Fund (United Nations)
IPUMS	Integrated Public Use Microdata Series
ISIC	International Standard for Industrial Classification
LSMS-ISA	Living Standard Measurement Survey-Integrated Surveys on Agriculture
LSMS	Living Standards Measurement Surveys
OECD	Organisation for Economic Co-operation and Development
SSA	Sub-Saharan Africa
TFP	Total factor productivity
UN	United Nations
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
USAID	United States Agency for International Development

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1. INTRODUCTION

Sub-Saharan Africa (SSA) has recorded impressive economic growth rates in recent years after a long period of economic stagnation (AfDB, OECD, and UNDP 2014; IMF 2013)¹. At the same time, Africa's workforce is growing at roughly three percent per year – more rapidly than any other region of the world. Moreover, 60% of Sub-Saharan Africa's population is below the age of 25. Each year over 8 million young Africans are entering the labor market, constituting the majority of the 220 million new people projected to be in the labor force by 2035 (Losch 2012; Fox et al. 2013).

Africa's expanding labor force poses both major opportunities and challenges. If investment incentives are favorable and opportunities for viable employment are expanding as rapidly as the labor force, Africa's economies may experience rapid transformation and income growth. By contrast, if an unsupportive enabling environment chokes off new investment and job opportunities, economic transformation may be accompanied by a rapidly rising but under-employed youth labor force, stubbornly high poverty rates, disillusionment, and potentially social instability. There are worrying signs that African economies, even with impressive economic performance, have not created sufficient formal wage jobs to absorb the growing labor force (Fine et al. 2012; Filmer and Fox 2014; Page and Shimeles 2015). In fact, Page and Shimeles (2015) document that Africa's fastest growing economies tended to make the least progress in employment growth and poverty alleviation. In Ghana for instance, an annual average growth of real Gross Domestic Product (GDP) of 5% between 1992 and 2008 translated into only a 2.7% rate of annual employment growth over the same period (Aryeetey et al. 2014). This divergence between economic growth and wage-job employment generation raises concerns about the nature and sustainability of economic transformation in the region.

Another concern is the apparent *low-quality* nature of the employment being generated. *Vulnerable employment* rates, defined as the share of unpaid family workers or *own account* workers as a percentage of total employment, was estimated at 76.6% for Sub-Saharan Africa in 2014 compared to a 45.3% global average (ILO 2014). Unsurprisingly, the most recent round of nationally representative AfroBarometer data for 34 African countries revealed that Africans feel that addressing unemployment should be the greatest priority for government action; addressing unemployment received 15 percentage points more than the next most important perceived priority (Dome 2015). This view is shared across residential locations, age categories, and gender but is more pronounced among males, young adults (18-30 years), and urban dwellers. Unemployment was cited by 49% of urban dwellers as the most important priority requiring policy action, compared to 30% of rural dwellers. Unemployment was also cited by 46% of males between the ages of 18 and 30 relative to 39% of females within the same age category and 35% of males and females over 30 years old.² There is also a general dissatisfaction among Africans regarding their governments' management of their economies; over two-thirds of all respondents gave failing marks to their governments in the areas of job creation and reducing income inequality (Hofmeyr 2013).

In response to these perceptions, African policymakers and their development partners are implementing policies and programs to expand the number of remunerative jobs and develop new skills, particularly for youth and women. However, these policies and programs are taking

¹ Six of the world's ten fastest growing economies in the 2000s were in Africa and several African countries recorded GDP growth rates above 5% during the period.

² We are grateful to Michael Bratton, a senior advisor to Afrobarometer and Professor at Michigan State University, for providing us with this information on citizens' opinions on priorities for governmental action disaggregated across gender, rural-urban status and age categories.

place within a limited evidence base given the general lack of knowledge about labor markets in SSA. Previous analysis has largely focused on the sustainability of Africa's economic recovery and the prospects of structural transformation (McMillan and Harttgen 2014). The question of employment transformation and its implications for future economic transformation in SSA has received little attention in the literature (Fox and Thomas 2016). A fundamental understanding of the evolving dynamics of Africa's workforce and employment structure could strengthen on-going youth employment strategies and provide insights into promising areas for future interventions. As a contribution to current policy and research challenges this paper aims to achieve the following objectives:

- to first document age/sex/location-disaggregated demographic and employment movements and trends within Africa's working-age population;
- to compare the robustness of these findings between three different nationally representative data sets—the Living Standards Measurement Surveys (LSMS), Labor Force Surveys, and the Integrated Public Use Micro-level Surveys (IPUMS), which are described in detail below;
- to identify the demographic and economic factors associated with these employment shifts using the three alternate data sets, and to identify potential differences in the causal factors identified;
- to examine the specific relationships between overall sectoral productivity growth rates and changes in sectoral employment trends; and
- to consider the consequences of these trends in employment for policy actions, especially in light of other important economic processes documented by other research.

The study breaks new ground in two ways: First, building on Filmer and Fox (2014) using data prior to 2010, we use more recent data to explore the extent to which sectoral employment patterns have shifted and do so in a more disaggregated way that distinguishes between different types of sectors within the non-farm economy and also disaggregates *agriculture* into farm-based activities vs. off-farm employment in agri-food value chains, which has been projected to be a major vehicle for economic transformation in the region (Tschirley et al. 2015). Second, we compare sectoral employment trends both in terms of the total number of jobs as stated by survey respondents (given that many people report multiple jobs), and by computing full-time equivalents (FTE). The FTE approach computes the share of individuals' work time over the survey year that can be allocated to various work activities, many of which are seasonal in nature. The FTE approach, therefore, provides a more accurate (yet still somewhat crude) estimate of the relative importance of various activities and sectors in the labor force.

The report is organized as follows: Sections 2 and 3 describe the data and analytical methods used in this study. This is followed by a discussion of the results in Section 4 starting with broad demographic and employment trends among the working-age population in various African countries and then examining youth employment trends specifically. Section 5 examines the linkages between observed patterns of sectoral employment shifts, agricultural productivity growth and other land and agricultural policies. Section 6 concludes by summarizing key findings and their implications for the nature and pace of economic transformation in Africa.

2. DATA

Our analysis draws on four data sets: First, the *Africa Sector Database* is utilized as a starting point for understanding broad trends in employment by sector for multiple African countries. The Groningen Growth and Development Center developed this dataset. Employment and labor productivity data was derived for particular years from national micro-surveys, and the remaining years were interpolated to arrive at annual data on employment for various sectors between 1960 and 2010.

Our primary empirical analysis utilizes micro-level data from three sources: the Living Standards Measurement Study with its Integrated Surveys of Agriculture (LSMS-ISA)³; Labor Force Surveys; and the Integrated Public Use Microdata Series (IPUMS) that are based on 10% random samples of national population censuses conducted between 1990 and 2010 and managed by the University of Minnesota Population Center (see <https://international.ipums.org/international/>). Each of these data sources had multiple waves of nationally representative surveys for numerous African countries. We focus on labor market information on individual household members, by age, gender, and rural/urban location.

Classifications of individuals into employment sectors were based on the respondents' stated industry of employment, defined as the activity or product of the establishment or sector in which the person is employed based on the International Standard for Industrial Classification (ISIC) categories established by the United Nations Statistics Division. The classification is subdivided into a hierarchical, four-level structure of mutually exclusive categories: section, division, group, and class.

Table 1. Data Sets Included in the Analysis

Country	Name of survey	Year collected	Type/source
Ghana	Ghana Living Standard Survey	2005/06, 2012/13	LSMS
Kenya	Population and Housing Census	1999, 2009	Census data from IPUMS
Malawi	Household and Population Census	1998, 2008	Census data from IPUMS
Mali	Quatrieme recensement general de la population et de l'habitat	1998, 2009	Census data from IPUMS
Nigeria	General Household Survey	2005/06, 2010/11, 2012/13	LSMS
Rwanda	Integrated Household Living Survey (EICV)	2005/6, 2010/11	Household data from National Institute of Statistics, Rwanda
Tanzania	National Panel Survey	2008, 2010, 2012	LSMS
Uganda	National Panel Survey	2005/06, 2011/12	LSMS
Zambia	CSO Labor Force Survey	2005, 2012	LFS

Source: Authors.

³ LSMS-ISA surveys are implemented by national statistical offices with technical assistance from the World Bank Economic Research Group. Datasets and survey descriptions for the various countries can be found at <http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/EXTLSMS/0,contentMDK:23617057~pagePK:64168445~piPK:64168309~theSitePK:3358997,00.html>

Our primary empirical analysis covered nine countries in Sub-Saharan Africa: Ghana, Kenya, Malawi, Mali, Nigeria, Rwanda, Tanzania, Uganda, and Zambia. Table 1 presents data sources used for each country. In addition to the availability of data, these countries were selected on the basis of their status as among key economic forces in their sub-region enabling us to achieve some regional representation across Sub-Saharan Africa.

Some limitations to the data should be acknowledged. The IPUMS census data reported only the type of employment in which individuals are primarily engaged. This limited our ability to account for secondary and other seasonal economic activities for the three countries using IPUMS census data (Kenya, Malawi, and Mali). There were also some cross-country variation in the recall period for employment and level of information on reported economic activity; some countries (e.g., Zambia) only reported employment in the past 7 days instead of the past 12 months. Others did not provide information on the work time allocated to the reported activity. For those in the latter case, FTE-based sectoral employment shares could not be computed. Moreover, country surveys differed in the level of ISIC coding detail. As a result, it was possible to clearly categorize individuals into specific employment sectors in some countries but not in others. For instance, sufficient ISIC code detail was available in some countries to enable individuals listed as being engaged in *wholesaling and retailing* to be categorized into the wholesale and retail trade of agricultural commodities vs. wholesale and retail trade of non-farm commodities. In other countries, this level of detail was not available. In the latter cases, we apportioned those specifying *wholesale and retail trade*, for instance, into off-farm segments of the agri-food system vs. non-farm employment (outside the agri-food system) based on relative consumer expenditure shares within these categories. Details of the classification scheme used to categorize individuals into the various employment categories across the nine countries are provided in Appendix 1.

3. ANALYTICAL METHODS

Our analysis covers the working-age population, defined as those individuals between the ages of 15 and 64 years (OECD 2015), and focuses in particular on those in the 15 to 34 year age range. The first step involves the classification of the working-age population into three employment categories: (i) farming, (ii) off-farm within agri-food system (upstream and downstream), and (iii) non-farm sectors. Jobs in these categories were further disaggregated between self-employment and wage employment, and between public and private sector jobs. The employment category *farming* includes all activities related to growing crops and raising livestock including aquaculture and hunting. The off-farm segments of the agri-food system included all pre- and post-farm value addition activities within the agricultural value chains including assembly trading, wholesaling, storage, processing, retailing, preparation of food for selling to others outside the home, beverage manufacturing, farmer input distribution and irrigation equipment operators etc. The third employment category, *non-farm sectors* included all other types of employment not counted above, which are not part of the agri-food system. This employment classification scheme allowed us to estimate the relative size and job growth in the agrifood system,⁴ which is envisioned to be a major vehicle for economic transformation given the rapid urbanization, rising income growth and dietary transformations reportedly underway in Africa (Filmer and Fox 2014; Tschirley et al. 2015). We focused on all employment activities of respondents, defined as economic activities during the past 12-month period, enabling us to account for the seasonal effects of employment arising from fluctuations in labor demand and employment during the year.

We also created two additional economic activity categories following the definition of the International Labour Organization (ILO 1982): (iv) the unemployed and (v) the economically inactive. The unemployed is comprised of individuals not engaged in any economic activity during the reference period, available to work, and either looking for employment or not seeking employment because they thought no work was available.⁵ The economically inactive category was made up of individuals who were not engaged in any economic activity during the set period and are neither looking for work nor available to work for various reasons.

From these five classifications, employment shares and employment changes over time are computed. We report employment both in terms of the full range of jobs as stated by survey respondents (many people have multiple jobs), and by computing FTEs. The FTE approach computes the share of individual's work time over the year that can be allocated to a range of work activities, many of which are seasonal in nature, and hence provides a crude estimate of the relative importance of various activities and sectors in peoples' livelihoods. A full time equivalent of 40 hours a week, four weeks per month for a 12-month period was computed as one FTE.

Next, given the historical importance of agricultural productivity growth to economic transformation process, we conducted a time-series analysis to explore the extent to which observed labor shifts among the working-age population is related to agricultural productivity growth. Lastly, we estimated multinomial logit models for each country (unit of observation is an

⁴ Agrifood systems include the set of activities, processes, people, and institutions involved in supplying a population with food and agricultural products. Jobs in the agrifood system include those involved in the provision of farming inputs and services, production at farm level, post-farm marketing, processing, packaging, distribution, and retail, as well as the preparation of foods for others (e.g., restaurants, street food vendors, etc.).

⁵ By the definition of the International Labour Organization (1982), an individual cannot be classified as unemployed if he/she has worked for even one hour on any economic activity including household enterprises during the reference period.

individual of working-age between 15-64 years) to identify the socio-economic, demographic and geographical factors shaping the employment structure over time, building on the work of McMillan and Harttgen (2014). However, unlike that study, we employ multiple and newer datasets (IPUMS, LSMS,) to identify the factors influencing individuals' primary engagement in agricultural employment, vs. off-farm employment, the unemployed, and the economically inactive. Our analysis is also disaggregated by geographical region and controls for gender and age categories allowing us to identify potential gender, age, and regional differences in the factors associated with sectoral employment patterns in both rural and urban areas.

4. RESULTS AND DISCUSSION

4.1. Urbanization and Demographic Shifts among the Working-age Population

Africa's urban population is growing rapidly, but the rate at which the region is urbanizing is in fact slowing down (United Nations 2016). In the 1960s, 1970s, and 1980s, massive rural-to-urban migration fueled rapid growth in Africa's urban population and this was accompanied by high rates of urbanization (the percentage of the total population residing in urban areas). However, since 2000, and despite considerable country-specific variability, a major underappreciated demographic fact is that Africa's urban population growth is mainly due to natural growth of urban population (birth rates minus death rates of people residing in urban areas) (Bocquier 2005; Potts 2012; United Nations 2016).⁶

While rural-to-urban migration continues, it appears to have slowed down considerably in most of Sub-Saharan Africa. Some scholars contend that most migration in the region is rural-to-rural, with young people accounting for most of it (Bilsborrow 2002). As a result, United Nations projections of rural population growth have been revised considerably upward in recent years. Revised projections now indicate that rural Sub-Saharan Africa will contain 53% more people in 2050 than it did in 2015 (United Nations 2016). Current rural population growth rates for the region have been revised upward considerably from roughly 1.0% per year (based on UN projections around 2000) to 1.71% over the next decade (United Nations 2016). These demographic trends are all based on (and sensitive to) changes in relative employment opportunities in rural vs. urban areas and, hence, are potentially influenced by government policy and programs. Early models attributed rural-urban migration to differences in labor market conditions (specifically expected earnings) between rural and urban areas (Harris and Todaro 1970), and the search for viable job opportunities continues to be regarded as the major determinant of migration patterns. Access to employment opportunities and access to land for farming are the two most important reasons cited by rural Zambian youth having migrated between 2000 and 2012 according to a nationally representative rural survey (Chamberlin et al. forthcoming). Potts (2009) observed slowing levels of urbanization in some parts of Africa partly due to circular migration of people between urban and rural areas in response to growing economic hardship in urban centers, where rates of income growth are outpaced by the increasing cost of living. Potts (2013) argues that the price of low-income housing in urban areas will be a major determinant of future rate of urbanization in the region. Therefore, to the extent that national conditions and policies differ across countries, with respect to relative expected earnings and costs of living in urban and rural areas, we would expect to see cross-country differences in sectoral employment trends associated with differential rural/urban population growth patterns.

Table 2 presents the number of working-age individuals in the base year and the year of the most recent nationally representative surveys. Specific survey years are listed on the top column of Table 2. Several surprises emerge from the data. First, while the conventional view of a rising percentage of the working-age population residing in urban areas is borne out in four of the nine countries examined (Ghana, Kenya, Tanzania, and Zambia), this is not the case in the remaining five countries.

⁶ SSA countries are urbanizing at different rates. For instance, while over 50% of people in Ghana, Angola, and Cape Verde live in urban areas, the share of the urban population in a number of countries (e.g., Niger, Uganda, Malawi, Rwanda, Ethiopia, Burundi) is still less than 20%.

Table 2. Changes in Number of Working-Age Population over Time by Locality

	Ghana 2005-2013	Kenya* 1999-2009	Malawi* 1998-2008	Mali* 1998-2009	Nigeria 2006-2010	Rwanda 2006-2011	Tanzania 2008-2012	Uganda 2005-2012	Zambia 2005-2012
Total # of working age individuals (15-64) in base year	12,531,725	14,979,080	5,195,510	4,957,820	77,170,563	5,075,138	19,017,377	13,779,475	6,236,683
% of working age in urban area	41.7	28.2	16.0	29.4	26.0	18.2	26.8	20.0	39.6
% of working age in rural area	58.3	71.8	84.0	70.6	74.0	81.8	73.2	80.0	60.4
Total # of working age individuals (15-64) in end year	14,679,955	20,543,290	6,802,300	7,021,500	95,866,202	5,795,397	24,113,058	16,027,014	7,478,049
% of working age in urban area	53.4	36.0	16.7	26.0	22.4	16.2	31.1	19.6	44.6
% of working age in rural area	46.6	64.0	82.5	74.0	77.6	83.8	68.9	80.4	55.4
Annual % change in # of working age individuals from base to end year	2.1	3.7	3.1	3.8	6.1	2.8	6.7	2.3	2.8
Urban	6.3	7.5	3.6	2.3	1.8	0.9	11.8	2.0	5.0
Rural	-0.8	2.2	2.9	4.4	7.5	3.6	4.8	2.4	1.4

Source: Author's estimates from Ghana Living Standard Survey 5 and 6; CSO Zambia Labor Force Surveys 2005 and 2012; Rwanda Integrated Household Living Survey; Tanzania National Panel Survey; Uganda National Panel Survey; General Household Survey. *Microdata of population and housing census data in IPUMS.

In Malawi, the share of the working-age population residing in urban areas rose by less than one percentage point over a 10-year period, whereas in four countries (Mali, Nigeria, Rwanda, and Uganda) the urban share of the working-age population actually declined. In Nigeria for instance, the share of working-age population in urban areas declined by 3.6% over a four-year period while that in Rwanda declined by 1.5% over a five-year period. Analogously, while the working-age population in urban areas is growing at a faster rate than in rural areas in Ghana, Kenya, Tanzania, and Zambia, the rural workforce is actually growing more rapidly in Nigeria, Uganda, Rwanda,⁷ and Mali. This pattern of growth in the rural workforce is also replicated among young people (15-34 years) in Rwanda and Nigeria. Even in Tanzania, where the share of workforce and young people in the 25-34 age bracket residing in urban areas is increasing, the share of youth population (15-24 years) living in urban areas is declining (See Tables 8 and 9). In addition, the share of the youth population (15-24 years) living in rural areas remains high in all the countries examined, ranging from about 50% in Ghana to about 83% in Rwanda. Although urbanization is expected to continue, it appears that the majority of the youth (15-24 years) who may be seeking employment may still come from rural areas. We must, therefore, acknowledge highly variable patterns across Sub-Saharan Africa in the pace of urbanization and rates of expansion of the urban and rural labor force. This conclusion is in accord with Potts (2013), who cautions against overgeneralization about rapid urbanization and shifts in the locus of job growth in the region.

Another important observation is the rapid growth rates in the workforce. The workforce in the countries examined is growing on average about 3.7% per year, more rapidly than any other region in the world. A recent flagship report of the World Bank indicates that Africa's demographic transition has been slow. The region has witnessed significant declines in child mortality and morbidity arising from improvements in the quality and access to health care. Fertility rates, however, remain stubbornly high, with an estimated average of 5.4 children per woman between 2005 and 2010, down from 6.5 children per woman in the 1950s. Comparatively, fertility declined from 5.6 to 1.6 over the same period in East Asia (Canning, Raja, and Yazbeck 2015). Such high fertility rates hinder the region's ability to reap a

⁷ Rural-urban classification of both surveys in Rwanda are based on the corresponding geographical designations from the 2002 Rwanda Census of Population and Housing. Hence, the estimated total urban population for the 2010/11 survey data does not reflect the expected urban expansion of the population.

demographic dividend. Persistently high fertility rates increase youth dependency depress private and public savings, and reduce the fiscal space for investments in human capital (education, socio-behavioral skills) required for productive employment (Fox and Prata forthcoming). High fertility rates also rapidly expand the number of new people who may be seeking employment each year in an already overstretched labor market. Therefore, public actions targeted at speeding up Africa's demographic transition remain an essential step to achieving successful economic transformation in SSA. Reviews show that policy actions that promotes girls' education, empower women to have greater control over their fertility decisions, and make reproductive health information and contraceptive methods more accessible are effective strategies to reduce fertility rates (Canning, Raja, and Yazbeck 2015; Upadhyay et al. 2014)

4.2. Employment Structure among the Working-Age Population

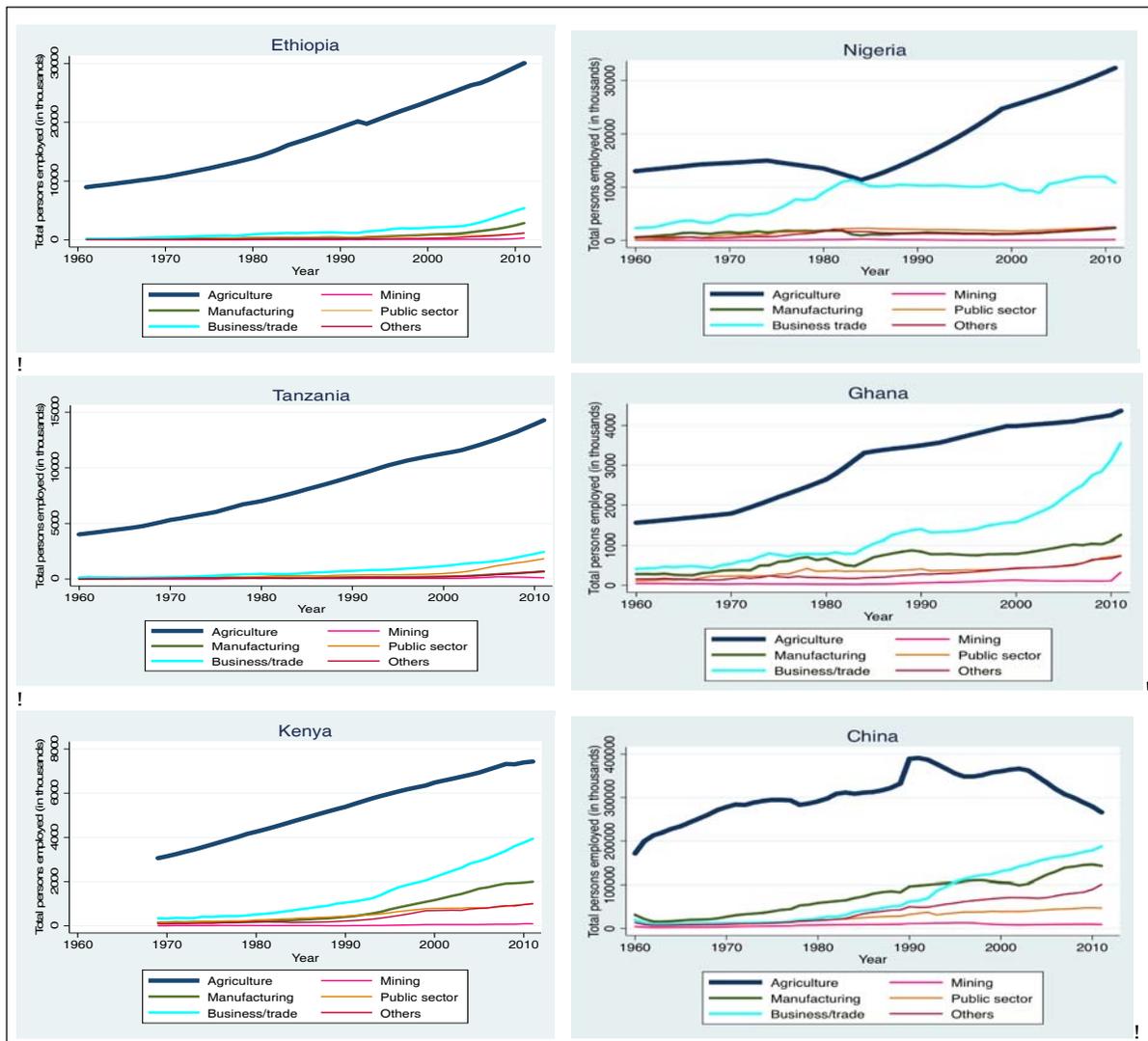
Structural transformation, involving the reallocation of economic activity away from less productive sectors of the economy to more productive ones, has long been considered a fundamental driver of economic development (Timmer 2009; Barrett, Carter, and Timmer 2010; Duarte and Restuccia 2010; McMillan, Rodrik, and Verduzco-Gallo 2014). Both in theory and actual experiences of currently developed countries, movement of labor from low-productivity semi-subsistence agriculture to more productive manufacturing and service sectors has generally been associated with overall increases in productivity, living standards and poverty reduction. Countries in the early stages of development typically devote a disproportionate share of their abundant labor to traditional agriculture. Productivity growth in agriculture accumulates additional purchasing power among millions of rural families that generates powerful multiplier effects on the rest of the economy, expanding job opportunities in off-farm sectors and thereby releasing labor to non-farm sectors. Consequently, a reduction in the share of the work force in agriculture has generally been associated with success of the agricultural sector in setting in motion the initial stages of economic transformation through expenditure multipliers. In this section, we examine the extent to which these familiar patterns are playing out in the region.

4.2.1. Sectoral Employment Trends across Africa

Using nationally representative household-level data as described in Section 2, we explore the evolving employment structure in the countries studied. Figure 1 reports trends in employment across industrial sectors in select African countries and China using the GGDC's *Africa Sector Data*. An important observation from the figure is an increasing trend in the number of people engaged in primary agriculture⁸ among all African countries. Compared to China, where the agricultural labor force peaked around 1990 and has since been declining, each of the African countries examined is still experiencing increases in the number of people involved in agriculture over time (Figure 1).

⁸ Agriculture is defined in the traditional sense to include crop and livestock production, hunting and related services, forestry and logging and fishery and aquaculture.

Figure 1. Trends in Sectoral Employment in Various Countries



Source: Authors based on GGDC data.

While the share of the labor force engaged in farming is generally declining, farming still remains the single largest employment category. For instance, in 2011, agricultural employment accounted for nearly 40% of total employment in Ghana and 47% in Kenya. Over 60% of total employment in the remaining countries is in agriculture. The declining share of agricultural employment over time in most countries is consistent with the findings from many previous studies using different datasets (Proctor and Lucchesi 2012; de Vries, Timmer, and de Vries 2015; Sackey et al. 2012). This decline is particularly pronounced post-2000 but with some variations across countries.

For most countries, the declining share of labor in agriculture has been accompanied by higher labor shares in the service-related sectors such as commerce and hospitality, making it the second largest contributor to total employment. The share of jobs in the manufacturing sector has however either stagnated or declined over time, in most countries, but is increasing slightly in Kenya and Ethiopia. These results are also consistent with the broader literature including the works of Badiane, Ulimwengu, and Badibanga (2012) and McMillan and Harttgen (2014) who

found the service sector to be the primary driver of the rapid growth in non-agricultural employment. While growing rapidly in percentage terms, results from the GGDC database shows that growth in employment in each of the non-agricultural sectors has started from a relatively low base with little indications of eclipsing agriculture as the single largest source of employment at least over the next few decades.

4.2.2. Economic Activity Status of Working-Age Population

The trends observed from the GGDC Africa sector data are reasonably consistent with the results of our primary analysis of employment structure of the working-age population using multi-year nationally representative household data. Table 3 presents the share of the working-age population primarily engaged in the various economic activities from the most recent nationally representative survey based on total job counts. The results confirm the role of farming as the single largest economic activity in all the countries studied. Farming serves as the primary economic activity for over 50% of the workforce in Mali, Rwanda, Tanzania and Uganda. At least a third of the workforce in the remaining countries is also primarily engaged in farming, with the vast majority of people engaged in farming not surprisingly residing in rural areas.

The second largest share of working-age population is primarily engaged in non-farm employment. This sector accounts for about 19% to 32% of the working-age population in those countries with available data. The off-farm segment of the agri-food system accounts for less than 15% of the working-age population and is particularly small in Rwanda (5%) and Zambia (4.5%). The share of the working-age population who are economically inactive, primarily due to education, disability, and housekeeping activities, range from about 11% in Tanzania to 33% in Nigeria. Unemployment is generally low and accounts for less than 9% of the working-age population in most countries. This could be explained by the fact that most Africans of working-age have no access to social protection schemes such as unemployment compensations and hence cannot afford not to work even if the returns to labor are very low (Fox et al. 2013; Fields 2015).

4.2.3. Sectoral Employment Shifts among the Working-age Population over Time

We also estimated the changes in employment patterns over time. Using nationally representative surveys from two time periods for each country (and always including the most recent available survey), the annual growth rates and the relative shares in total number of jobs from each employment sector were computed. Table 4 provides estimates of sectoral employment growth rates between the two survey periods. Table 5 shows how total jobs are apportioned among farming, off-farm jobs within the agri-food system, and the non-farm sector both in terms of total number of jobs and full-time equivalents over time. The off-farm segment of the agri-food is further disaggregated into agro-processing, and downstream commerce and distribution. Table 5 differs from our previous tables and most prior analysis in that it reports, where possible, employment shares based on the full range of jobs individuals undertake in the year (primary and all other jobs).

Table 3. Economic Activity Status of the Working-Age Population (15-64 Years) from Most Recent Nationally Representative Survey

		Total working age population (millions)	% of working age population primarily engaged in				
			Farming	Off-farm within AFS	Non farm outside AFS	Economically inactive	Unemployed
Ghana (2012/13)	Total	14.3	35.6	14.3	31.8	16.0	2.3
	Rural	6.7	62.2	9.6	16.6	10.4	1.1
	Urban	7.6	12.0	18.5	45.2	20.8	3.4
Nigeria (2012/13)	Total	89.6	27.3	13.3	24.2	33.1	2.1
	Rural	54.3	40.9	11.7	14.5	31.9	1.0
	Urban	35.3	6.4	15.8	39.0	35.1	3.7
Rwanda (2010/11)	Total	5.8	55.4	5.0	21.2	17.7	0.8
	Rural	4.8	61.6	4.4	16.7	17.1	0.2
	Urban	1.0	23.0	8.2	44.3	20.7	3.7
Tanzania (2012/13)	Total	23.5	51.2	12.0	23.3	11.7	1.8
	Rural	16.2	67.0	9.1	16.1	7.2	0.6
	Urban	7.3	16.2	18.5	39.2	21.5	4.6
Uganda (2011/12)	Total	14.2	59.7	6.3	18.5	15.5	0.0
	Rural	11.4	67.5	5.2	14.8	12.5	0.0
	Urban	2.8	27.6	10.5	33.9	27.9	0.1
Zambia (2012)	Total	7.5	42.5	4.5	23.4	23.6	6.1
	Rural	4.1	63.4	2.5	11.4	20.1	2.7
	Urban	3.3	16.5	7.1	38.2	28.0	10.2
Kenya (2009)*	Total	20.5	31.6	37.7		23.3	7.4
	Rural	13.2	43.0	27.7		23.3	6.1
	Urban	7.4	11.3	55.5		23.4	9.7
Malawi (2008)*	Total	3.3	32.4	27.8		24.7	8.6
	Rural	2.7	36.5	21.8		25.0	9.4
	Urban	0.6	14.0	55.1		23.3	5.1
Mali (2009)*	Total	3.4	49.7	27.8		20.0	2.4
	Rural	2.5	64.5	16.0		16.8	1.7
	Urban	0.9	10.7	59.0		27.0	3.3

Source: Author's estimates from Ghana Living Standard Survey 5 and 6; CSO Zambia Labor Force Surveys 2005 and 2012; Rwanda Integrated Household Living Survey; Tanzania National Panel Survey; Uganda National Panel Survey; General Household survey. *Microdata of population and housing census data in IPUMS.

* Data does not permit disaggregation of off-farm jobs into off-farm within agrifood system and non-farm sector. - Reference period of employment for Zambia is previous 7 days.

Table 4. Changes in Economic Activity Status among Working-age Population, By Sector

	Ghana	Nigeria	Rwanda	Tanzania	Uganda	Zambia	Kenya	Malawi	Mali
	2005-2013	2011-2013	2006-2011	2011-2013	2005-2012	2005-2012	1999-2009	1998-2008	1998-2009
Farming									
# of working age people in end year	6,105,975	29,299,579	6,101,014	12,062,327	10,696,861	3175577.5	6,490,390	2,190,530	2,614,640
Urban	1,223,515	3,509,024	459,981	1,188,194	1,084,535	550460.9	837,790	83,180	99,080
Rural	4,882,461	25,790,554	5,641,032	10,874,133	9,612,326	2625116.6	5,652,600	2,107,350	2,515,560
Annual % change in # of working age people from base to end year	3.2	13.5	6.8	5.3	18.5	-4.3	0.7	-3.2	0.9
Urban	68.3	8.2	7.2	18.9	27.3	16	6.9	0.7	-5.2
Rural	7.4	14.3	6.8	4.2	5.0	-2.6	0.2	-3.3	1.6
Off-farm within the agri-food system									
# of working age people in end year	2,633,020	14,651,519	612,524	2,834,179	1,501,476	337,823	-	-	-
Urban	1,575,947	6,025,676	105,966	1,352,747	387,207	236,282	-	-	-
Rural	1,057,073	8,625,843	506,558	1,481,432	1,114,270	101,542	-	-	-
Annual % change in # of working age people from base to end year	15.8	13.1	9.6	5.1	39.1	66.3	-	-	-
Urban	146.4	9.6	1.5	8.8	1.5	16.2	-	-	-
Rural	27.0	15.8	12.2	2.1	21.4	27.9	-	-	-
Non-farm outside agri-food system									
# of working age people in end year	5,173,690	25,723,248	2,342,336	5,477,802	3,742,274	1,746,941	7,738,710	1,352,300	1,355,590
Urban	3,669,932	14,992,524	558,051	2,871,345	1,110,327	1,274,439	4,098,730	477,390	793,500
Rural	1,503,758	10,730,724	1,784,285	2,606,457	2,631,947	472,501	3,639,980	874,910	562,090
Annual % change in # of working age people from base to end year	10.7	-3.4	23.0	5.5	38.7	30	5.2	9.5	11.1
Urban	70.2	0.2	7.6	6.0	3.2	5.5	7.7	3.3	7.4
Rural	24.1	-7.7	32.2	4.9	20.6	26.4	3.2	16.0	20.2
Unemployed									
# of working age people in end year	341,632	1,865,493	46,177	426,269	4,896	452,607	1,521,100	865,860	69,500
Urban	265,133	1,307,103	34,867	335,112	4,053	339,992	720,160	127,340	45,980
Rural	76,499	558,390	11,310	91,157	843	112,615	800,940	738,520	23,520
Annual % change in # of working age people from base to end year	-6.9	-6.0	31.1	-16.5	-49.0	133.4	2.5	54.8	17.3
Urban	-36.1	5.5	28.5	-5.4	-16.2	29.9	3.4	10.9	17.1
Rural	-28.1	-20.4	40.9	-32.5	-16.5	106.1	1.7	91.8	17.6
Economically inactive									
# of working age people in end year	2,565,943	29,716,963	1,019,472	2,745,060	2,189,430	1,763,629	4,793,090	1,854,950	2,849,850
Urban	1,784,988	12,389,755	192,960	1,572,302	772,207	932,314	1,730,510	353,130	851,360
Rural	780,955	17,327,208	826,512	1,172,758	1,417,223	831,315	3,062,580	1,501,820	1,998,490
Annual % change in # of working age people from base to end year	-5.0	5.0	4.2	-13.0	-2.2	13.8	8.3	6.3	4.4
Urban	7.2	4.3	-2.4	-4.4	-1.1	-1.5	9.9	0.5	1.1
Rural	-55.7	5.6	6.5	-20.4	-0.6	20.6	7.5	8.8	6.6

Source: Author's estimates from Ghana Living Standard Survey 5 and 6; CSO Zambia Labor Force Surveys 2005 and 2012; Rwanda Integrated Household Living Survey; Tanzania National Panel Survey; Uganda National Panel Survey; General Household survey. *Microdata of population and housing census data in IPUMS.

* Data does not permit disaggregation of off-farm jobs into off-farm within agri-food system and non-farm sectors.

Table 5. Changes in Sectoral Share of Total Jobs among Working-Age Population (15-64 Years) over Time

Country	Survey years	Total # of jobs in millions	Farming		Off-farm within AFS				Non-farm outside AFS	
			% of jobs	% of FTE jobs	Agro-processing		Downstream		% of jobs	% of FTE jobs
					% of jobs	% of FTE jobs	% of jobs	% of FTE jobs		
Ghana	2005/06	10.1	52.1	43.5	7.5	6.3	7.1	8.6	33.3	41.6
	2012/13	13.9	43.6	34.3	3.7	3.7	13.8	15.5	38.9	46.5
Nigeria	2010/11	62.3	37.0	30.6	2.6	2.3	16.1	18.7	44.4	48.2
	2012/13	69.7	42.1	33.7	4.8	4.6	16.2	18.6	36.9	43.1
Rwanda	2005/06	6.1	75.2	65.7	0.4	0.4	6.5	7.4	18.0	26.6
	2010/11	9.1	67.4	54.0	1.1	1.2	5.7	7.7	25.9	37.0
Tanzania	2010/11	18.4	59.0	47.3	1.7	2.5	12.5	15.0	26.8	35.2
	2012/13	20.4	58.7	48.3	1.5	1.6	12.5	15.6	27.3	34.5
Uganda	2005/06	10.8	72.6	57.0	2.1	2.8	5.7	10.2	19.6	30.0
	2011/12	15.9	67.1	48.6	2.8	1.7	6.6	12.0	23.5	37.7
Zambia	2005	4.7	73.8	61.2	1.2	1.6	1.9	3.1	23.1	34.1
	2012	5.3	60.4	46.7	1.6	2.1	4.9	7.1	33.2	44.1
Kenya~	1999	11.1	54.4	-				45.6		
	2009	14.2	45.6	-				54.4		
Malawi~	1998	1.9	73.3	-				26.7		
	2008	2.0	53.9	-				46.1		
Mali~	1998	2.0	79.6	-				20.4		
	2009	2.6	64.2	-				35.8		

Source: Author's estimates from Ghana Living Standard Survey 5 and 6; CSO Zambia Labor Force Surveys 2005 and 2012; Rwanda Integrated Household Living Survey; Tanzania National Panel Survey; Uganda National Panel Survey; General Household survey. ~Microdata of population and housing census data in IPUMS.

* Data does not permit disaggregation of off-farm jobs into off-farm within agri-food system and non-farm sectors; AFS represents the agri-food system.

Several new findings emerge from the data in Tables 4 and 5. First, the employment share of farming in terms of FTEs is almost always lower than that based on total job numbers. In Rwanda for instance, farming accounts for about 67% of the total number of jobs but only 54% of FTE jobs in 2011. The relatively low share of farming in FTE terms reflects the seasonal nature of farming in these economies. Due to the dominance of rain-fed agriculture, most people do not work as farmers year round. In fact, farming is estimated to take up about 500-1000 hours per year whereas most jobs in the off-farm sectors entails more than 2000 hours per year (McCullough 2015). Hence, in any given year, the share of farming jobs declines when weighted by the amount of time allocated to it during the year.

Correspondingly, FTE-based employment shares in the off-farm sectors are relatively high. Nevertheless, the employment trends based on FTEs are remarkably similar to that based on total job numbers (Table 5).

Second, the results reveal a rapid exit of labor from farming to off-farm employment, signifying fundamental economic transformation in the region. The rate of exit of labor from farming is more pronounced when job shares are computed in FTE terms. The extent of decline in farming's employment share is at least one percentage point per year more in FTE terms than counts (Table 5). This implies that estimates based on counts could potentially mask the pace of the economic transformation underway in the region. In addition, there is substantial variation across countries in the rate at which labor is transitioning out of farming. Our analysis uncovered three main categories of countries: The first category comprises countries where the absolute number of people employed in farming is still increasing but the share of the workforce engaged in farming is declining over time, largely due to more rapid growth in the share of off-farm employment. Most African countries fall in this category including Ghana, Kenya, Rwanda, Mali, Tanzania, and Uganda (Table 5). For instance, Rwanda experienced a decline of about eight percentage points (11 in FTE) in farming's share of total jobs between 2006 and 2011. Ghana and Uganda recorded declines of about 9 and 6 percentage points in the share of the workforce in farming over a seven-year period. The second category includes countries where both the shares and absolute number of workforce engaged in farming is declining over time, as in Malawi and Zambia.

The third category consist of countries where both the share of jobs and number of the growing workforce engaged in farming is rising, which probably reflects temporary and somewhat unique causes rather than a departure from the historical structural transformation process. In these countries, the workforce appears to be engaging in farming at a faster rate than the rate at which their population is growing and the rate of job creation in the off-farm sector. An example is Nigeria, which experienced a 5 percentage point (3 percentage points in FTE terms) increase in farming's employment share over a two-year period at an annual growth rate of 14%. Other studies using different dataset has also observed similar employment patterns in Nigeria, which potentially reflect the negative effect of natural resource boom on economic transformation (McMillan and Harttgen 2014). A steady growth in the oil sector in 1960s and subsequent *oil boom* in the 1970s in Nigeria served to draw labor away from agriculture into primarily the service-related sectors of the economy.

However, with declines in oil prices and associated debt crisis in the 1980s, the Nigerian economy was unable to support these off-farm economic activities, whose growth was largely dependent on the oil revenues, resulting in labor reallocation towards agriculture since 1980s. Sackey et al. (2012) also highlights the increased public investment in agriculture particularly in Nigeria's rural areas in the 2000s as part of efforts to stem rural-urban migration. The Federal Government of Nigeria through its Agricultural Transformation Agenda sought to create 3.5 million jobs in agriculture for youth and women through direct investment in farming and agribusiness (Adesugba and Mavrotas 2016). It is also possible that these renewed public investments in the agricultural sector following decades of neglect under an oil sector-driven economy might have contributed to temporary labor entry into farming in Nigeria.

Third, there is rapid percentage growth in share of jobs in the off-farm sectors both within the agrifood system and the non-farm sector. In most countries, the number of working-age population employed in the off-farm sectors (both within and outside the agri-food system) grew at least about three times faster than the rate of growth in the working-age population (Table 4). However, the off-farm sectors particularly the off-farm segment of the agri-food system is growing from a low base. For those countries where it was possible to measure employment in the off-farm segment of the agri-food system, these jobs currently account for less than 20% of the total number of jobs and between 9% to 23% in FTE terms. Comparatively, between 24%-39% of total jobs and 35%-47% of all FTE jobs come from the non-farm sector.

Fourth, the agrifood system dominates employment in the region, contributing about 61% -77% (54%-66% in FTE terms) of all jobs. Most of the jobs in the agrifood system are still in farming and not in the other segment of the agrifood value chain. In fact, farming comprises of about 67%-91% (60%-86% in FTE terms) of all jobs within the agrifood system. In every country, farming accounts for a greater share of the jobs than the off-farm segment of the agri-food system, about 4 to 10 times more in share of jobs in Rwanda, Uganda, Tanzania and Zambia and about twice as many in Nigeria and Ghana. Similarly, the share of jobs in the non-farm sector is higher than that of the off-farm segment of the agri-food system. Only in Nigeria and Ghana do we find that the non-farm sector has already overtaken farming as the single largest employer of the workforce in FTE terms (Table 5).

Fifth, the rate of increase in farm-based self-employment is particularly pronounced in urban areas, where it is generally rising more rapidly than the growth of the working-age population (e.g., Ghana, Rwanda, Nigeria, Zambia, Tanzania, and Kenya). This result may be partially influenced by the reclassification of localities from rural to urban once a threshold number of households is exceeded. But it also reflects an increasing engagement of urban dwellers in farming to defray the cost of living in cities or as an investment. Moyo (2015) describes how urban farming is mushrooming in African cities and towns with an associated scramble for unoccupied land in urban and peri-urban areas for food crop and/or livestock production. Jayne et al. (2015) also show that urban household control 15-45% of the land on farms over 20 hectares in size, suggesting a growing proportion of urban-based *investor farmers* in many African countries. These developments are consistent with the national data sets in Kenya, Nigeria, Tanzania, and Uganda, where the fastest growth in farming employment is among urban men and women in the 45-54 and 55-64 year age categories (see Tables A2.7, A2.9, A2.11, and A2.13 in Appendix 2). The growing engagement of urban dwellers in farming is also confirmed in other studies using different data set (McMillan and Harttgen 2014). Nonetheless, the rate of job growth in farming in urban areas is starting from a very low base.

Sixth, the result also revealed an increasing trend in the level of economic inactivity among the working-age population over time but with some variation across countries and localities. For instance, in Zambia, Nigeria, Malawi, Kenya, Rwanda, and Mali, the number of working-age population who are economically inactive is growing at a faster rate than that of overall growth in working-age population. While the share of the working-age population who are economically inactive is greater in urban areas than in rural areas, the number of working-age individuals becoming economically inactive is rising more rapidly in rural areas than in urban area—particularly pronounced in Rwanda, Mali, Malawi, and Zambia (Table 4).

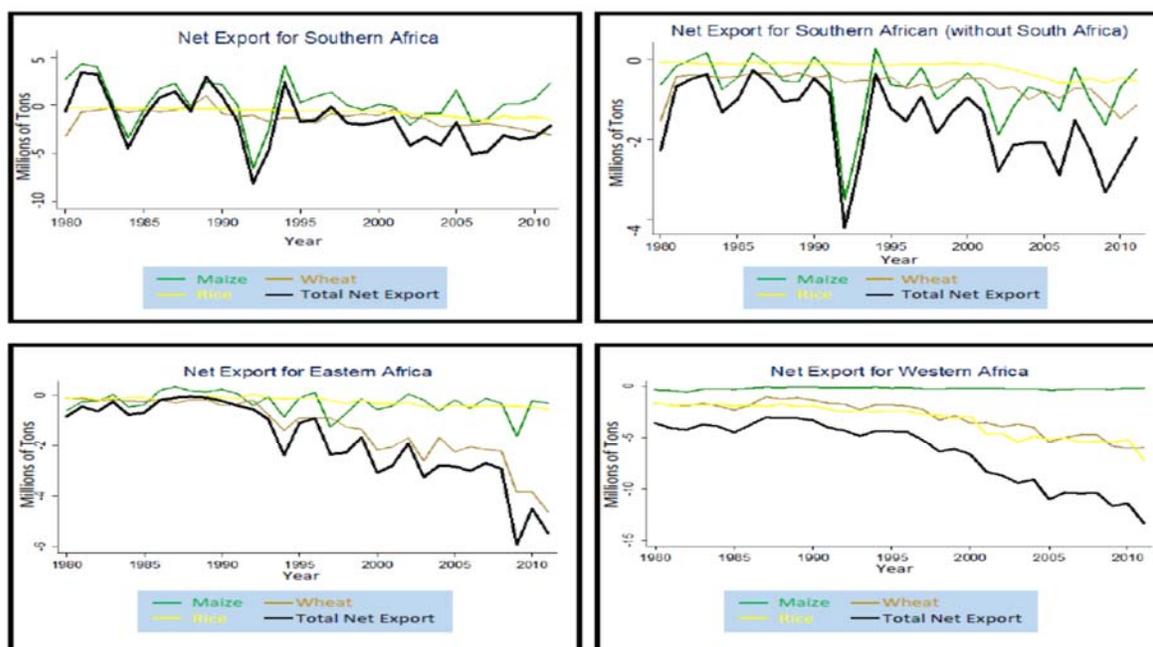
Seventh, unemployment among the working-age population is also growing very rapidly but at different rates across countries. In Zambia, Rwanda, and Malawi, unemployment among the working-age population is growing at about 10 times the growth in working-age population. Moderate growth rates are recorded in Mali, Kenya, and Nigeria while declines in share of working-age population unemployed are observed in Ghana, Tanzania, and Uganda (Table 4). Also, while the share of working-age population who are unemployed is generally lower in rural areas than urban settings, the number of working-age population in rural areas becoming unemployed over time is rising at a faster rate than that of those in urban areas. The fastest growth in rural unemployment is witnessed in Zambia, Malawi, Rwanda, countries that also happen to be experiencing the greatest declines in the share of rural workforce engaged in farming. Comparatively, the rise in farming's share of jobs in Nigeria is associated with significant decline in unemployment among the working-age particularly in the rural areas. While no causal interpretation is implied, the rise of unemployment amidst rapid declines in the share of the work force in farming may deserve more detailed study.

A further examination of the composition of the jobs in the off-farm segment of agri-food system reveals the bulk of the jobs in this sector are concentrated in downstream commerce, food transportation, handling and distribution, and less from agro-processing. For those countries with sufficient data to determine jobs in agro-processing, the sector was found contribute less than 5% of the total share of jobs in both counts and FTE terms. Relatedly, the downstream commerce and distribution sector contributed between 5% (7% in FTE) and 17% (19% in FTE) of total jobs. Moreover, the rapid percentage growth in the share of jobs from agro-processing is not replicated in all countries. The share of jobs from agro-processing is increasing over time in Nigeria, Rwanda, and Zambia but somewhat declining in Ghana and Tanzania, while that from downstream commerce and distribution is generally increasing over time in most countries particularly in Ghana and Zambia. From its present low base, the agro-processing sector and the rest of the off-farm segment of the agri-food system are not likely to employ more than 20% of the work force in most African countries over the next decade, even if these sectors continue to growth rapidly in percentage terms.

The relatively low share of jobs from agro-processing is perhaps reflective of the continent's rising dependence on food imports. Evidence from FAO suggests that a rising share of Africa's growing demand for semi-processed, processed, and high value foods is increasingly being supplied through imports. Estimates of exports of grains (rice, maize, and wheat) across the various regions of Africa also revealed the continent as a net importer of grains (Figure 2). Hence, while trading and distribution of the imported grain and processed agricultural products seems to be boosting employment in the off-farm segment of agri-food system, the pattern of trade in Figure 2 suggests that employment prospects arising from agricultural processing have not been fully realized as potential gains in job creation from this sector are increasingly being lost to overseas suppliers. A recent FAO report also points to some bottlenecks underlying the slower transformation in the agro-processing sector in Africa, which is characterized by a dualistic structure comprising of large industrial processors and small-scale informal processors (Hollinger and Staatz 2015). It is noted that growth among the more dynamic large-scale industrial processors is usually impeded by a general lack of a reliable supply of local raw materials of consistent quality. As a result, these large industrial operators often rely on imported food inputs, with adverse effects on production cost. A large part of processing of domestically produced food products (especially those based on domestic staples) is still in the hands of the relatively less efficient, small-scale and largely informal-sector operators, characterized by low capacity utilization rates and low productivity levels. Their activities are also seasonal, and often generate outputs of variable quality limiting their entry into emerging urban food distributions system (Hollinger and Staatz 2015). Addressing the capacity and productivity constraints to growth in the agro-processing sector is critical to expanding job opportunities in the agri-food system.

Nonetheless, this needs to be complemented with improvement in local farm production to ensure an adequate supply of raw material for local agri-businesses and processors and reduce a reliance on imported inputs. Improvement in local farm production would also promote job growth in upstream sector including agri-input supply and farm service delivery. Farm production growth will thus remain a crucial source of broader economy-wide multiplier effects (Mellor 1976; Johnston and Kilby 1975; Lipton 2005).

Figure 2. Trends in Grain Export from Africa by Region



Source: Authors based on FAO 2015 data.

4.2.4. Sectoral Shares of New Jobs among the Working-Age Population

So far, we have reported changes over time in the share of jobs in various sectors of the economy. We now examine changes over time in the number and share of *new jobs being created* in various sectors. Table 6 presents the shares in new jobs in both counts and FTEs across employment categories. Total number of new jobs is computed as the number of jobs in the second survey year minus the number in the first survey year. The results confirm farming as a key source of new jobs in African economies particularly in rural areas. It is however important to acknowledge the variability in the sources of new jobs across countries. In terms of the total number of new jobs created, farming is the largest contributor in Nigeria (84%), Tanzania (59.1%), Uganda (55.8%), Rwanda (51.6%); farming is the second largest contributor of new jobs in Mali (24.7%), and Kenya (14%). Because the rapid percentage growth rates in the off-farm sectors is beginning from a low base, the total number of new jobs generated is small relative to farming. There are many more new jobs created in the non-farm sector than the off-segment of the agri-food system. The non-farm sector contributed at least twice as many jobs than the off-farm segment of the agri-food system in Ghana, Uganda, Tanzania, and Zambia and as much as six times more jobs in Rwanda.

Table 6. New Jobs Created by Sector (Farming, Off-Farm Agri-Food System, and Non-Farm) within the Working-Age Population, Various Countries.

Country and Survey years		Total # of new jobs	Farming		Off-farm within AFS		Non-farm outside AFS	
			% in count	% in FTE	% in count	% in FTE	% in count	% in FTE
Ghana (2005/06 - 2012/13)	Total	3,783,690	20.5	2.1	30.8	39.1	48.7	58.7
	Urban	215,429	16.5	9.6	31.0	33.8	52.5	56.6
	Rural	851,814	39.3	34.3	26.4	30.2	34.3	35.5
Nigeria (2010/11-2012/13)	Total	7,386,564	84.6	58.8	41.2	40.1	-25.8	1.2
	Urban	1,512,289	32.8	-100.2	64.2	232.9	3.1	-32.7
	Rural	5,874,275	97.9	1306.7	35.3	166.8	-33.2	-1373.5
Rwanda (2005/06-2010/11)	Total	2,999,869	51.6	32.5	6.6	11.1	41.8	56.5
	Urban	283,086	43.2	12.8	2.6	9.7	54.2	77.5
	Rural	2,716,783	52.4	36.3	7.1	11.3	40.5	52.4
Tanzania (2010/11 - 2012/13)	Total	1,963,982	59.1	52.1	13.4	16.0	27.5	31.9
	Urban	835,034	39.0	9.9	24.2	32.0	36.8	58.1
	Rural	1,128,948	74.0	80.0	5.4	5.3	20.6	14.5
Uganda (2005/06 - 2011/12)	Total	5,185,412	55.8	-140.1	12.7	-6.3	31.5	46.4
	Urban	884,620	76.2	-1.7	3.6	-47.3	20.2	-50.9
	Rural	4,300,793	51.6	-233.0	14.6	21.2	33.8	111.8
Zambia (2005-2012)	Total	553,685	-53.8	-21.5	34.8	29.9	119.0	91.6
	Urban	765,423	37.6	27.0	16.4	20.1	46.0	52.9
	Rural	-211738	-276.5	-995.6	31.7	175.8	144.8	719.8
Kenya* (1999-2009)	Total	3,088,180	14.0			86.0		
	Urban	2,123,200	16.1			83.9		
	Rural	964,980	9.3			90.7		
Malawi* (1998-2008)	Total	-384020	-271.4			171.4		
	Urban	125,470	4.6			95.4		
	Rural	-509490	-205.7			105.7		
Mali * 1998-2009	Total	988,480	24.7			75.3		
	Urban	226,390	-57.6			157.6		
	Rural	762,090	49.2			50.8		

Source: Author's estimates from Ghana Living Standard Survey 5 and 6; CSO Zambia Labor Force Surveys 2005 and 2012; Rwanda Integrated Household Living Survey; Tanzania National Panel Survey; Uganda National Panel Survey; General Household survey. *Microdata of population and housing census data in IPUMS. Total # of new jobs= # of jobs in Year 2 - # of jobs in Year 1. *AFS represents the agri-food system.

The only exception to this is Nigeria, where the off-farm segment of the agri-food system was the sole contributor of off-farm employment between 2011 and 2013 because of the decline in the number of non-farm jobs during this brief period.

These findings are robust for Ghana, Nigeria, Tanzania, and Zambia when new jobs are computed in terms of FTEs. However, in Rwanda and Uganda the largest share of new FTE jobs comes from the non-farm sectors of the economy. Over time, it is expected that the non-farm sectors will eventually account for a higher number of new jobs in line with historical patterns of structural transformation in the rest of the world.

4.3. Employment Structure among Youth and Young Adults

Slightly over 60% of Sub-Saharan Africa's population is below the age of 25. Policy-makers and development scholars increasingly recognize the importance of young people to growth prospects, sustainable development, and social cohesion. The youth bulge-related demographic dividend is estimated to have accounted for about a third of the rapid economic growth among East Asian nations (Bloom, Canning, and Malaney 2000; Christiaensen and Devarajan 2013). The comprehensive study of Africa's youth bulge and ensuing demographic shifts by Filmer and Fox (2014) indicate that over the next several decades the agri-food system and the informal sector are going to be called upon to absorb rural youth for employment, especially in light of the poor performance of manufacturing. With the youth constituting the largest share of the population in most African countries, youth employment has become a major policy priority in the region's quest to reap a demographic dividend. This section, therefore, explores the labor force dynamics among Africa's youth.

From a statistical perspective, the United Nations classifies individuals between the ages of 15-24 years as youth, compared with the African Union definition of 15-35 years, which has been adopted by national youth development programs in some African countries. Hence, to accommodate these two definitions of youth, we classify our youth population into two categories: individuals aged 15-24 years, whom we refer to as the *youth* in the traditional sense, and individuals aged 25-34 years, hereafter referred to as *young adults*. Considering that the majority of individuals within the 15-24 year age bracket still reside with their parents or remain dependent on their parents for their sustenance (Bezu and Holden 2014a), their current employment situation would at least partially reflect their parents' family labor allocation decisions. The young adult category, by contrast, is more likely to reflect the decisions of more independent young adults.

4.3.1. Economic Activity Status of Youth and Young Adults

Table 7 presents the results of the primary economic activity of the youth and young adults. The first striking observation is the huge share of the total working-age population that is accounted for by individuals in the 15-24 year age category. In each country, people in the 15-24 year age category account for at least a third of the total working-age (15-64 year) population. In Nigeria, for example, there are 31.2 million people in the 15-24 year age category, representing about 35% of the entire working-age population. In Rwanda and Tanzania, the youth constitute about 39.6% and 39.4% of the working-age population respectively. The young adults (25-34 years) also account for at least an additional one-fourth of the working-age population in each country. Together, the two age categories constitute about 58% of the working-age population in Nigeria and Ghana, 63% in Tanzania, 66% in Rwanda, 68% in Zambia, and 69% in Uganda.

Second, because the youth and young adults account for such a large fraction of the total labor force, it is, therefore, unsurprising that the employment structure of young Africans generally mirrors that of the entire working-age population. We find that among young people, farming remains the single largest source of employment. Between 21% and 52% of the youth population (15-24 years) reported farming as their primary economic activity, with variations across countries. About 21.4% of the youth in Nigeria, 29.6% in Zambia, 32.7% in Ghana, 46.7% in Uganda, 47% in Rwanda, and 51.4% in Tanzania are engaged in farming (Table 7). When considering only those in the labor force, over 55% (40% in FTEs) of the jobs held by the youth in all the countries in this analysis is in farming (Table 8). The dominance of farming is also replicated among the young adults (25-34 year age category). With the exception of Nigeria and Ghana, where the non-farm sector accounts for the largest share of employment, over 40% of young adults in the remaining countries are primarily engaged in farming (Table 7).

Third, farming's share of total employment is generally lower among the young adults relative to the youth. For instance, from the most recent surveys, about 33.4% (26.2% in FTE) of the jobs held by young adults in Nigeria, 49.7% (41.2% in FTE) in Tanzania and 64.1% (49% in FTE) in Rwanda is in farming. Relatedly, over 60% of the jobs held by the youth (15-24 years) in all three countries are in farming. Previous studies (e.g., Bezu and Holden 2014b; Mdoe et al. forthcoming) find that youth decisions to remain in farming or migrate out of their home areas are related to factors that influence the expected earnings of staying, such as the amount and productivity of land owned by their parents, the number of siblings in the household, the educational attainment of the individual and market access conditions.

Table 7. Sectoral Employment Shares for 15-35 Year Age Category from Most Recent Nationally Representative Survey

		Total working age population between 15-35 years (millions)		% of working age population between 15-35 years engaged in									
				Farming		Off-farm stages of agri-food system		Non-farm outside agri-food system		Economically inactive		Unemployed	
		15-24	25-35	15-24	25-35	15-24	25-35	15-24	25-35	15-24	25-35	15-24	25-35
Ghana (2012/13)	Total	5.0	3.6	32.7	30.6	9.6	15.6	17.9	44.5	36.8	6.6	3.0	2.6
	Males	2.4	1.6	38.5	32.0	5.2	5.5	18.6	56.1	35.3	4.5	2.4	1.9
	Females	2.6	2.0	27.4	29.4	13.7	24.3	17.2	34.6	38.1	8.5	3.5	3.2
Nigeria (2012/13)	Total	31.2	20.6	21.4	23.5	5.1	16.6	8.5	30.3	62.7	25.7	2.3	3.8
	Males	16.6	8.1	28.1	31.0	3.6	9.3	7.7	35.9	58.3	18.6	2.3	5.3
	Females	14.6	12.4	13.7	18.4	6.9	21.6	9.5	26.5	67.7	30.7	2.2	2.8
Rwanda (2010/11)	Total	2.3	1.5	47.0	62.7	5.0	7.6	20.1	27.4	27.2	1.7	0.7	0.6
	Males	1.1	0.7	42.6	53.7	5.6	8.1	24.1	36.2	27.1	1.6	0.6	0.4
	Females	1.2	0.8	51.2	71.7	4.5	7.2	16.2	18.5	27.4	1.8	0.7	0.8
Tanzania (2011/12)	Total	9.5	5.8	51.9	46.1	7.0	16.3	15.6	29.6	22.5	6.1	2.9	1.8
	Males	4.7	2.7	54.1	41.5	6.4	14.6	17.5	40.5	19.3	2.6	2.7	0.8
	Females	4.8	3.1	49.7	50.1	7.7	17.9	13.8	20.1	25.7	9.2	3.1	2.7
Uganda (2011/12)	Total	7.2	3.8	48.7	49.2	3.0	9.2	10.5	24.5	37.4	16.7	0.5	0.4
	Males	3.8	1.7	50.0	42.4	3.1	9.2	13.7	35.8	32.8	12.4	0.5	0.2
	Females	3.4	2.0	47.5	55.0	3.0	9.2	7.6	14.9	41.6	20.3	0.4	0.6
Zambia (2012)	Total	3.1	2.0	29.6	43.2	2.7	7.7	12.6	35.4	48.2	7.0	7.0	6.8
	Males	1.5	0.9	25.1	39.8	2.6	6.6	12.8	43.2	53.7	5.0	5.9	5.4
	Females	1.6	1.0	33.8	46.2	2.8	8.6	12.5	28.5	43.0	8.8	8.0	8.0

Source: Author's estimates from Ghana Living Standard Survey 6; Nigeria General Household Survey 2012/13; Tanzania National Panel Surveys 2012; Rwanda Integrated Household Living Survey (EICV3); CSO Zambia Labor Force Surveys 2012; Uganda National Panel Survey. Rows add to 100%.

Notes: Farming comprises crop and livestock production activities including fishing and aquaculture.

Off-farm stages of agri-food system includes assembly, wholesale and retail trading of agricultural products, street food vendors, chop bars and restaurants, and food processing such as processing of fish, fruits, grain products, etc.

There are gender differences, with a somewhat higher proportion of male youth (15-24 years) being engaged in farming than female youth, except in Rwanda and Zambia. However, this trend is reversed among young adults where a larger proportion of females than males are engaged in farming in most countries.

Fourth, non-farm sectors of the economy account for the second largest percentage of jobs for young people in most countries. About 8.5% of the youth population in Nigeria and up to about 20.1% in Rwanda is engaged in this sector as their primary economic activity (Table 7). The non-farm sector also serves as the primary activity for between 24.5% and 44.5% of the young adult population, and accounts for over a third of all jobs held by this population in most countries. In all cases, young males are more likely than females to be employed in non-farm sector and this gender disparity appears more pronounced among young adults; males are about twice as likely as females to engage in non-farm employment. Off-farm segment of the agri-food system (including agro-inputs, commerce and processing) is the primary activity for less than 10% of the youth, employing about 3% in Uganda and Zambia, 5% in Rwanda and Nigeria, 7% percent in Tanzania, and 9.6% in Ghana. Less than 20% of young adults are employed in the off-farm stages of the agri-food system in all the countries. Between 7.6% (Rwanda) and 16.6% (Nigeria) of the young adults are primarily engaged in this sector. A slightly greater share of females than males are engaged in the off-farm stages of the agri-food system in most countries, perhaps reflective of the socio-cultural role of females as food preparers and handlers in these societies. Nearly 7% and 22% of Nigerian women aged 15-24 years and 25-35 years respectively are primarily employed in this sector, compared to 3.6 percent of male youth and 9.3% of young adult males. This trend does not appear to hold for Rwanda, where young males have a higher level of engagement than females in off-farm activities within the agri-food system. About 5.6% and 8.1% of male youth and young adults respectively are employed in the off-farm sector within the agri-food system compared to 4.5% and 7.2% of female youth and young adults. Likewise, there are no differences between young males and females in Uganda in terms of their level of engagement in this sector.

Fifth, a large proportion of youth (15-24 years) in most of the countries examined is economically inactive. This means that they are not working and are not looking for work mainly because they are still in school or raising children. The percentage of individuals in the 15-24 year category that are economically inactive range from 22.5% in Tanzania to 62.7% in Nigeria. In each instance, education was cited as the main reason for economic inactivity. For instance, about 92% of the youth and 58% of the young adults in Rwanda who were economically inactive in 2011 were students. Globally, labor participation rates among the youth (15-24 years) are declining partly due to increasing enrollment in school—youth labor force participation rates declined from 59% to 47.3% between 1991 and 2014 (ILO 2015).⁹

In the present analysis, about 66% and 79% of the working-age population determined to be economically inactive in Ghana in 2005 and 2013 were students. Globalization and technology are creating an economy that demands more education to be competitive and the youth in particular appear to be responding to this increased demand for a more educated workforce by staying longer in school. As Filmer and Fox (2014) noted, young Africans entering the labor force today tend to have considerably more schooling than previous generations. Assuming the education these students are receiving is valuable, the increased inactivity among the youth could mean a more educated, competitive, and productive labor force that possesses the skills necessary to transform the region's economies in the next several decades. However, there are major concerns about the quality of education being delivered in Africa's primary, secondary,

⁹ In most countries, the 15-24 years age range spans the period during which secondary and tertiary education is obtained.

and tertiary systems. According to the ILO, two-thirds of the young workers in SSA do not have the level of education expected to work productively on the job (ILO 2015) and those with higher education often do not have the skill sets employers require (AfDB et al. 2012). Improving the quality of training is thus critical to any strategies to expanding youth employment opportunities.

The level of economic inactivity among young adults (25-34 years) is relatively low, ranging from about 1.7% in Rwanda to 25.7% in Nigeria. Generally, young females are more likely to be economically inactive than young males. Unemployment accounts for a relatively small fraction of the working-age population, but is generally higher among the youth and young adults than the overall population. The limited prevalence of unemployment among the working-age population may partly be due to the strict ILO definitions employed in this study.

4.3.2. Changes in Employment Structure over Time among Youth and Young Adults

Table 8 summarizes the changes in sectoral employment shares among young people both in terms of numbers of jobs and in FTE terms. Tables 9 and 10 present the changes in the employment structure over time among young people within 15-24 year and 25-34 year age category respectively. Similar to patterns observed among the entire workforce, the number of young people engaged in farming is increasing in absolute terms over time in most countries but at different rates. In Nigeria, youth and young adults are entering farming at a faster rate than the rate at which their population segment is growing as well as the rate of job creation in the off-farm sector (Table 9 and 10). Hence, the overall share of young males and females engaged in farming is increasing over time. For instance, the share of total jobs coming from farming increased from 50.5% (41.5% in FTE) to about 61.1% (50.8% in FTE) among the youth (15-24 years) between 2010/11 and 2012/13. During the same period, young adults experienced about a five-percentage point (4% in FTE) increase in jobs coming from farming (Table 8). By contrast, farming share of employment is generally declining among the youth and young adults in Ghana, Rwanda, Tanzania, Uganda, and Zambia. In these countries, young males and females within the 15-24 years age category are engaging in farming at least about the same rate as their population growth rate. However, since the total number of jobs in off-farm sector is growing more rapidly than farming, the total share of farm-based employment among the youth is declining over time (Table 8). Young adults (25-34 years) are entering farming at an even faster rate than their population growth rate but are also experiencing declines in farming's shares of total jobs partly due to the more rapid growth in the number of jobs in the off-farm sectors of the economy. For the youth sub-sample (15-24 years), farm-based employment is growing more rapidly among males than females in most countries. In Nigeria, Rwanda, and Uganda for instance, youthful males are entering farming at about twice the rate of their female counterparts. This is however not the case among young adults, where there appears to be a shift towards more female involvement in farming than males particularly in Nigeria and Zambia.

Table 8. Changes in Share of Jobs among Young People (15-35 Years)

Country	Age category	Total # of jobs millions	Farming		Off-farm within AFS		Non-farm outside AFS	
			% of jobs	% of FTE jobs	% of jobs	% of FTE jobs	% of jobs	% of FTE jobs
Ghana	15-24							
	2005/06	1.8	58.0	47.9	11.8	11.9	30.2	40.2
	2012/13	2.9	54.5	39.9	14.6	15.5	30.9	44.6
	25-34							
	2005/06	2.8	46.2	37.4	14.2	13.8	39.6	48.8
	2012/13	3.2	31.8	25.4	16.5	17.8	51.7	56.8
Nigeria	15-24							
	2010/11	8.0	50.5	41.5	15.2	16.5	34.3	42.1
	2012/13	10.9	61.1	50.8	14.6	16.7	24.4	32.5
	25-34							
	2010/11	12.7	28.1	22.5	24.4	25.6	47.6	51.8
	2012/13	16.0	33.4	26.2	23.6	24.5	43.0	49.3
Rwanda	15-24							
	2005/06	2.0	76.0	65.3	6.0	6.3	17.9	28.4
	2010/11	2.4	65.1	50.0	7.0	8.2	27.9	41.7
	25-34							
	2005/06	1.6	70.7	59.3	8.3	10.3	21.0	30.4
	2010/11	2.9	64.1	49.0	7.8	11.4	28.0	39.6
Tanzania	15-24							
	2010/11	5.5	72.1	63.2	9.2	11.9	18.8	24.9
	2012/13	6.9	69.6	60.3	9.4	11.1	21.0	28.6
	25-34							
	2010/11	5.0	50.7	37.4	17.2	21.8	32.0	40.9
	2012/13	5.3	50.1	39.3	17.8	21.9	32.2	38.8
Uganda	15-24							
	2005/06	3.6	81.2	65.5	5.7	11.4	13.1	23.1
	2011/12	5.5	75.5	57.2	5.7	9.4	18.8	33.4
	25-34							
	2005/06	3.1	62.9	48.3	10.2	14.8	26.9	36.9
	2011/12	4.1	57.6	40.7	13.1	17.9	29.2	41.4
Zambia	15-24							
	2005/06	1.6	84.5	75.9	2.4	3.8	13.2	20.3
	2012/13	1.4	70.3	56.3	4.7	7.8	24.9	35.9
	25-34							
	2010/11	1.4	64.6	49.7	4.0	6.0	31.4	44.4
	2012/13	1.7	53.9	41.1	7.0	9.5	39.1	49.4

Source: Author's estimates from Ghana Living Standard Survey 6; Nigeria General Household Survey 2012/13; Tanzania National Panel Surveys 2012; Rwanda Integrated Household Living Survey (EICV3); CSO Zambia Labor Force Surveys 2012; Uganda National Panel Survey.

Table 9. Changes in Employment of Youth Population (15-24 Years) By Sector, Gender, and Location

	Ghana		Nigeria		Rwanda		Tanzania		Uganda		Zambia	
	2006-2013		2011-2013		2006-2011		2011-2013		2006-2012		2005-2012	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Total # of youth (15-24 years) in base year	2,186,020	2,224,061	15,113,745	13,662,873	1,055,617	1,148,661	4,626,428	4,716,267	2,821,420	3,082,299	1,221,043	1,318,188
% of youth (15-24 years) in urban area	40.9	45.0	39.2	43.3	18.0	18.6	28.5	33.0	20.0	21.0	37.2	40.5
% of youth (15-24 years) in rural area	59.1	55.0	60.8	56.7	82.0	81.4	71.5	67.0	74.9	73.2	62.8	59.5
Total # of youth (15-24 years) in end year	2,394,159	2,600,430	16,581,622	14,560,918	1,074,227	1,157,424	4,746,597	4,777,415	4,097,933	4,302,705	1,491,273	1,584,804
% of youth (15-24 years) in urban area	49.1	54.0	37.0	39.3	15.9	17.4	27.7	32.4	15.2	17.0	42.5	45.8
% of youth (15-24 years) in rural area	50.9	46.0	63.0	60.7	84.1	82.6	72.3	67.6	71.0	66.7	57.5	54.2
Annual % change in # of youth from base to end year	1.4	2.4	4.9	3.3	0.4	0.2	1.3	0.6	7.5	6.6	3.2	2.9
Urban	4.5	5.8	1.8	-1.7	-2.0	-1.2	-0.1	-0.3	1.8	2.2	5.6	5.1
Rural	-0.8	-0.3	6.9	7.1	0.9	0.5	1.9	1.1	6.3	4.5	1.7	1.4
Employment status												
Farming												
# of youth (15-24 years) in end year	984,444	767,808	4,695,431	1,965,854	698,059	855,020	2,486,417	2,285,979	2,119,322	2,065,380	385,111	584,561
Urban	184,059	130,195	376,042	190,750	42,097	52,235	260,480	187,922	210,710	214,492	53,784	130,834
Rural	800,385	637,613	4,319,389	1,775,104	655,962	802,785	2,225,938	2,098,057	1,908,612	1,850,887	331,327	453,727
Annual % change in # of youth from base to end year	2.0	1.8	41.5	16.1	0.4	0.2	11.7	9.4	29.1	14.0	-21.0	-8.0
Urban	32.7	28.2	46.9	26.1	-1.7	-0.3	33.4	24.3	23.7	30.1	1.7	25.6
Rural	7.5	7.2	41.1	15.2	0.5	0.2	9.8	8.4	8.7	3.4	-6.6	-4.3
Off-farm within agrifood system												
# of youth (15-24 years) in end year	132,450	382,914	599,511	991,977	91,197	74,747	292,987	354,389	147,678	168,471	32,825	32,382
Urban	76,875	213,793	227,570	265,963	12,770	12,446	121,461	193,358	26,144	49,551	23,376	17,189
Rural	55,576	169,121	371,941	726,014	78,427	62,301	171,527	161,031	121,534	118,920	9,449	15,192
Annual % change in # of youth from base to end year	6.8	3.4	12.8	17.0	11.6	3.3	17.1	12.8	26.2	27.5	31.1	40.3
Urban	40.0	27.3	-9.2	1.9	0.0	-4.3	11.6	19.6	-4.8	-1.4	4.9	8.4
Rural	27.3	9.8	43.7	25.1	14.9	5.8	21.7	6.2	17.0	19.6	34.0	16.3
Non-farm outside agrifood system												
# of youth (15-24 years) in end year	474,106	482,656	1,295,846	1,362,300	394,964	270,220	802,838	635,722	637,716	402,048	184,092	159,428
Urban	292,498	295,425	795,623	797,827	80,884	74,838	367,908	326,571	152,846	136,182	125,769	102,719
Rural	181,608	187,230	500,223	564,473	314,081	195,381	434,930	309,151	484,870	265,866	58,323	56,709
Annual % change in # of youth from base to end year	2.4	1.9	-0.9	-2.5	15.8	18.4	20.8	19.3	55.8	65.2	25.8	38.0
Urban	13.1	10.8	-1.7	2.4	2.5	0.5	20.0	9.9	3.1	5.9	3.9	5.8
Rural	10.6	7.9	0.5	-8.1	22.2	37.8	21.5	33.0	30.1	43.3	22.2	32.2
Unemployed												
# of youth (15-24 years) in end year	62,446	98,590	383,446	320,096	9,936	12,211	123,433	143,963	-	-	88,025	127,442
Urban	46,826	71,569	232,406	210,777	5,807	9,776	90,440	112,567	-	-	63,432	93,525
Rural	15,621	27,021	151,039	109,319	4,129	2,435	32,993	31,396	-	843	24,593	33,918
Annual % change in # of youth from base to end year	-1.2	-0.7	-12.6	-8.6	22.6	56.4	-10.4	-17.9	-	-	177.3	117.1
Urban	-6.3	-3.1	-10.2	19.5	11.8	68.3	1.6	-4.8	-	-	36.4	26.9
Rural	-5.8	-4.9	-15.8	-26.7	61.6	29.7	-25.9	-34.3	-	-16.1	222.5	70.2
Economically inactive												
# of youth (15-24 years) in end year	902,295	1,068,054	9,763,930	9,743,992	442,830	457,041	888,529	1,184,048	631,741	963,026	801,045	680,991
Urban	606,033	743,359	4,393,858	4,191,618	72,198	87,377	437,307	681,184	235,229	330,561	366,946	381,418
Rural	296,262	324,696	5,370,072	5,552,374	370,632	369,665	451,223	502,864	396,512	632,465	434,099	299,573
Annual % change in # of youth from base to end year	-0.8	-0.4	4.0	5.8	4.7	5.6	-20.8	-11.4	-14.7	2.2	51.3	21.6
Urban	0.5	2.3	5.9	1.0	-0.8	-1.2	-13.9	-3.2	-3.1	-1.2	5.0	0.4
Rural	-7.9	-6.7	2.5	10.0	6.2	8.0	-25.4	-18.9	-5.7	2.0	36.1	26.3

Source: Author's estimates from Ghana Living Standard Survey; Nigeria General Household Survey; Rwanda Integrated Household Living Survey; Tanzania National Panel Survey; Uganda National Panel Survey; and CSO Zambia Labor Force Surveys.

Table 10. Changes in Employment of Youth Population (25-34 Years) By Sector, Gender, and Location

	Ghana		Nigeria		Rwanda		Tanzania		Uganda		Zambia	
	2005/06-2012/13		2011-2013		2006-2011		2011-2013		2006-2012		2005-2012	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Total # of young adults (25-34 years) in base year	1,337,024	1,642,745	8,103,892	12,481,381	526,990	652,465	2,651,225	3,046,509	1,675,976	1,848,226	856,591	904,874
% of young adults in urban area	45.2	41.7	45.3	41.6	21.4	20.3	34.6	35.8	21.9	21.0	44.0	44.1
% of young adults in rural area	54.8	58.3	54.7	58.4	78.6	79.7	65.4	64.2	74.7	75.4	56.0	55.9
Total # of young adults (25-34 years) in end year	1,632,049	1,954,889	8,110,483	12,445,777	704,534	829,130	2,730,052	3,106,494	2,381,026	2,481,372	927,487	1,044,892
% of young adults in urban area	57.3	57.6	43.9	40.7	19.9	17.2	35.4	37.3	14.3	14.6	49.8	48.0
% of young adults in rural area	42.7	42.4	56.1	59.3	80.1	82.8	64.6	62.7	77.0	75.2	50.2	52.0
Annual % change in # of young adults from base to end year	3.2	2.7	0.04	-0.1	6.7	5.4	1.5	1.0	7.0	5.7	1.2	2.2
Urban	7.8	9.2	-1.4	-1.2	4.9	1.6	2.8	3.2	-1.2	-1.1	3.2	3.7
Rural	-0.7	-1.9	1.3	0.6	7.2	6.4	0.8	-0.3	7.7	5.7	-0.4	1.0
Employment status												
Farming												
# of young adults (25-34 years) in end year	606,328	653,400	2,866,337	2,460,120	808,539	1,068,033	1,106,075	1,534,185	1,040,119	1,336,828	373,522	542,306
Urban	112,557	114,760	299,983	229,302	55,498	91,839	89,818	160,791	65,842	79,473	42,647	134,378
Rural	493,770	538,639	2,566,353	2,230,818	753,041	976,194	1,016,257	1,373,395	974,277	1,257,355	330,875	407,928
Annual % change in # of young adults from base to end year	-0.2	-0.1	21.7	28.1	12.4	12.1	2.8	2.1	14.7	9.4	-7.7	5.4
Urban	3.6	13.4	29.0	29.2	13.5	12.7	12.8	12.6	16.0	10.4	8.3	37.4
Rural	-1.7	-1.6	20.9	27.9	12.3	12.0	2.1	1.1	4.4	2.8	-2.9	-1.4
Off-farm within agrifood system												
# of young adults (25-34 years) in end year	104,677	540,441	860,738	2,898,739	122,189	106,610	388,624	547,687	255,166	286,997	53,520	66,064
Urban	64,955	342,335	420,145	1,122,192	24,699	19,555	172,901	316,306	58,110	65,667	38,927	45,739
Rural	39,722	198,106	440,593	1,776,547	97,489	87,054	215,723	231,381	197,056	221,330	14,593	20,325
Annual % change in # of young adults from base to end year	1.0	1.9	-1.9	15.6	14.3	12.8	1.4	7.5	44.8	30.9	35.4	76.1
Urban	6.9	26.1	-10.5	9.6	12.8	-2.3	-0.8	14.8	6.6	-4.1	5.5	25.9
Rural	2.3	-0.4	10.6	20.1	14.8	20.7	3.3	-0.1	18.7	24.3	51.5	15.0
Non-farm outside agrifood system												
# of young adults (25-34 years) in end year	1,064,116	771,074	3,320,355	3,547,013	544,984	275,788	1,080,144	614,783	797,652	408,200	403,908	260,881
Urban	754,180	565,639	2,025,228	2,000,234	129,807	77,879	612,974	383,939	202,477	125,427	309,582	198,172
Rural	309,936	205,434	1,295,127	1,546,778	415,177	197,909	467,170	230,844	595,174	282,774	94,326	62,709
Annual % change in # of young adults from base to end year	2.1	1.4	13.5	1.4	25.9	30.6	3.0	3.8	20.1	30.3	18.5	32.6
Urban	12.5	10.8	9.5	2.4	12.4	7.5	3.3	6.8	-2.9	-1.5	3.5	5.3
Rural	7.2	0.5	20.8	0.2	32.7	55.5	2.7	-0.6	13.9	23.8	14.7	54.5
Unemployed												
# of young adults (25-34 years) in end year	35,893	72,288	489,847	379,480	6,021	11,771	22,091	83,793	-	-	50,058	83,840
Urban	31,557	54,337	345,904	306,202	4,004	9,954	17,890	69,218	-	4,053	39,792	64,428
Rural	4,336	17,951	143,943	73,279	2,017	1,817	4,201	14,574	-	-	10,266	19,412
Annual % change in # of young adults from base to end year	-1.3	-0.7	6.3	-8.6	11.9	48.5	-27.2	-16.5	-	-	104.4	77.3
Urban	-7.1	-4.0	17.1	7.9	6.2	51.0	-16.5	-12.0	-16.7	-13.8	23.2	16.0
Rural	-3.1	-0.6	-9.4	-31.1	36.6	37.3	-40.3	-28.6	-	-	127.8	96.7
Economically inactive												
# of young adults (25-34 years) in end year	85,020	188,945	1,723,797	4,107,894	23,786	27,393	69,167	281,908	81,512	191,896	46,309	91,712
Urban	60,257	139,069	896,357	1,565,356	6,245	13,210	39,374	213,126	14,988	87,081	31,143	59,223
Rural	24,763	49,875	827,441	2,542,538	17,541	14,184	29,793	68,782	66,525	104,814	15,165	32,489
Annual % change in # of young adults from base to end year	-1.2	-0.9	15.4	5.6	7.5	-3.0	-4.8	7.1	4.0	-1.0	-18.1	-26.9
Urban	-1.7	-0.7	18.1	9.8	-0.2	-8.0	0.1	8.6	-7.1	-0.5	-6.6	-9.3
Rural	-9.8	-8.9	12.7	3.3	11.9	7.9	-10.0	3.0	5.9	-0.2	0.3	2.2

Source: Author's estimates from Ghana Living Standard Survey; Nigeria General Household Survey; Rwanda Integrated Household Living Survey; Tanzania National Panel Survey; Uganda National Panel Survey; and CSO Zambia Labor Force Surveys.

The number of young males and females engaged in off-farm employment including off-farm segment of the agri-food system is increasing, and generally at a faster rate than their population segment's growth rate (Table 9 and 10). As a result, the percentage share of off-farm employment is growing over time among the youth and young adults. This growth is occurring in most countries more rapidly in the non-farm sector relative to the off-farm segment of the agri-food system. For instance, the share of jobs non-farm sector increased by 10 and 7 percentage points among the youth and young adults in Rwanda compared to about one percentage point growth in the share of jobs in the off-farm segment of the agri-food system. Similarly, the percentage share of jobs in the non-farm sector grew more than twice that of the growth in the off-farm sector within the agri-food system, while Tanzania and Uganda experienced about 2.2% and 5.7% increase in share of jobs in non-farm sector even as the percentage share of jobs from their off-farm sector within the agri-food system stagnates over time among the youth. The contrast is however observed in Nigeria, which experienced rapid declines in the share of jobs in the non-farm sector making the off-farm segment of the agri-food system the sole contributor of off-farm jobs (Table 8).

4.3.3. Source of New Jobs among Youth and Young Adults

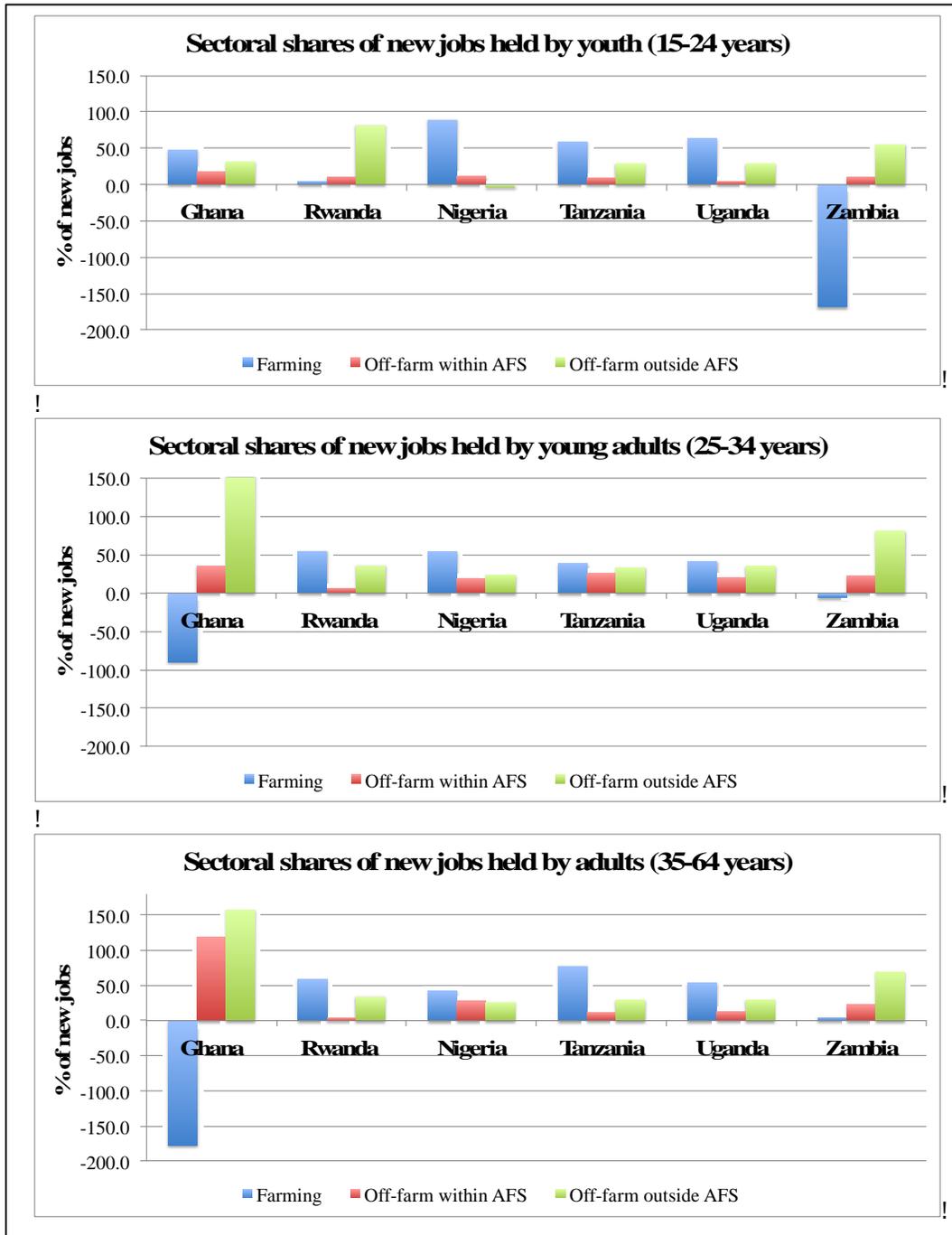
Several recent studies suggest that about 60% of *new* jobs in Africa are being created off the farm (Filmer and Fox have not created sufficient formal wage jobs to absorb the growing labor force (Fine et al. 2012; Filmer and Fox 2014 2014; McMillan and Harttgen 2014). This has sometimes been taken to mean that the majority of the jobs being taken by young people will also be off the farm. We thus explore the sources of new jobs for the three age categories: youth (15-24 years), young adults (25-34 years), and adults (35-64 years).

The results in Figure 3 indicate that farming remains a key contributor to new jobs for young people. Farming accounts for the single largest share of new jobs held by youth in Ghana, Nigeria, Tanzania, and Uganda but contributes only marginally to jobs in Rwanda and negatively in Zambia. Farming is also the largest contributor of new jobs among the young adults (25-34 years) and adults (35-64 years) in Nigeria, Rwanda, Tanzania, and Uganda. The non-farm sector is the next largest contributor of new jobs. For most countries, the number of new jobs arising from within the non-farm sector is at least twice as large as that from the off-farm segment of the agri-food system for all three age categories, and regardless of whether we measure jobs in terms of FTEs or total number of jobs reported by respondents.¹⁰

Hence, despite the conventional wisdom that young Africans are exiting farming in great numbers leading to an ageing of rural areas, the evidence presented here for nine countries indicates that this view is greatly exaggerated. The proportion of young rural people entering farming is certainly lower today than it was several decades ago. Nevertheless, farming still accounts for a large proportion of jobs for young Africans, even if most of these jobs are essentially part-time jobs due to the seasonal nature of the farming season. Most young rural people cannot afford to be idle during the off-season in increasingly cash-based economies and this largely explains why employment shares off the farm are relatively high and rising even in rural areas.

¹⁰ See Table A2.2 for a comparison of FTE vs. total reported jobs.

Figure 3. Sectoral Shares of New Jobs Held by Various Age Groups



Source: Authors.

4.4. Trends in Public vs. Private Sector Wage Employment vs. Self-Employment

While addressing unemployment remains critical, an overriding challenge in many developing countries is a lack of remunerative jobs that generate adequate income (Fields 2015). As countries transform their economies, the importance of self-employment, typically indicative of informality, in the labor market is hypothesized to decline over time (La Porta and Schleifer

2014; Yamada 1996). A slowing workforce growth rate following demographic transition, and rapid growth in registered firms during the development process, combine to increase the availability of wage/salary employment and eventually make wage jobs a dominant livelihood forms (La Porta and Schleifer 2014). Here we examine the extent to which the relative share of self-employment is declining as part of the ongoing economic transformation in the region. Table 11 presents the share of self-employment/unpaid family labor and wage/salary employment over time. The self-employment/unpaid family labor category consists of three types of workers: (i) own account workers (persons operating their own economic enterprises without employees); (ii) employers (persons operating their own economic enterprises with employees); and (iii) unpaid family workers (persons working without pay in an economic enterprise operated by a household member). We combine these three groups here as most available data did not permit disaggregation at this level. The share of own account workers and unpaid family workers in total employment is suggestive of the level of *vulnerable* employment in the labor market (ILO 1993).

The wage employment category is comprised of persons working for a public or private employer and receives remuneration in wages/salary or in kind. Wage employment is further disaggregated between public and private sector. Note that wage employment includes both formal wage (where employee has contract and may be entitled to social security) and informal wage employment. The two types of wage employment are grouped together here, as most datasets do not allow consistent disaggregation of wage employment at this level.

Fox and Thomas (2016) estimate about half of all wage workers in SSA to be in non-contract jobs often referred to as informal employment. Similarly, a recent report on Africa's economic transformation, ACET (2014) noted that the share of formal employment in the labor force in most African economies for which data was available, is seldom above 25%.

As shown in Table 11, self-employment, including unpaid family labor, accounts for over 75% of total employment, indicative of the degree of informality of the labor market. Farming is the largest source of self-employment constituting between 46% (Nigeria) and 65% (Rwanda) of all self-employment jobs, followed by the non-farm sectors (30%-35%). More strikingly, further analysis revealed that those engaged in unpaid or family labor constitutes about 25%-40% of the total employment and about 33%-47% of all self-employment jobs for those countries with available data. Nearly 90% of all unpaid family labor jobs are in farming. The youth (15-24 years) are more likely than any other age group to engage in unpaid jobs or family labor. From the most recent surveys, about 43% of all unpaid jobs or family labor in Rwanda, 50.8% in Nigeria, and 63% in Tanzania and Ghana were held by the youth (15-24 years). Individuals in the 15-24-year age range who are active in the labor force are typically out-of-school, and often lack significant employable skills, experience, and connections to secure employment, especially in the formal wage sector. Their job prospects are, therefore, often restricted to farming and informal enterprises, which are associated with low skill requirements, low entry barriers and generally low returns to labor. The fact that such a high proportion of young people remain in such work despite much greater educational attainment of the work force reflects the relatively slow pace of expansion of quality high-return jobs in these countries' economies.

Table 11. Wage vs. Non-Wage Jobs as a Share of Total Employment over Time

Countries	% of employment		
	Wage/salary		Self-employed/ unpaid family labor
	Public	Private	
Ghana			
2005/06	5.7	11.9	82.4
2012/13	5.9	16.6	77.5
Nigeria			
2010/11	6.5	7.26	86.2
2012/13	4.41	6.99	88.6
Rwanda			
2005/06	3.2	20.4	86.6
2010/11	3.6	28.4	77.8
Tanzania			
2010/11	2.6	16.9	80.5
2012/13	3.1	15.2	81.7
Uganda			
2005/06	2.7	17.4	79.9
2011/12	3.9	14.8	81.3
Zambia			
2005/06	3.3	3.5	93.3
2011/12	5.3	6.5	88.2
Malawi			
1998		14.1	85.9
2008		21.6	78.4
Mali			
1998		5.7	84.2
2009		4.5	85.9

Source: Authors' estimates from data sources described in Table 1.

The data in Table 11 also indicate that self-employment will remain a key feature of the labor market in African economies in at least in the next few decades. Most of the observed wage job growth is being accounted for by the private sector. Indeed, in Ghana, Rwanda, Zambia and Malawi, wage employment is growing nearly about three times the rate of growth in self-employment (Table A2.3). However, this rapid growth is starting from a very low base and thus translates into a relatively small absolute number of jobs. As a result, the share of wage jobs in total employment remains low in most countries, typically less than 30 percent (Table 11). The massive importance of self-employment jobs in these economies indicates that the share of self-employment in total employment is likely not to differ greatly from the figures shown in Table 11 for at least the next decade.

In fact, a recent analysis suggests the share of wage/salary employment in total employment in SSA grew only slightly from 25% to 28% between 2000 and 2014 despite the number of wage/salaried jobs having increased by roughly 70% during this period. Vulnerable employment, comprised of self-employment and unpaid/family labor, constituted the majority of the jobs created during the period (Ulimwengu et al. 2016). The low share of wage employment is partly explained by the general slow growth in wage employment in the public sector, which has historically been the predominant source of wage/salaried employment. According to Aryeetey et al. (2014), most African countries have witnessed a shedding of public sector wage jobs since the 1990s owing to policies aimed at reducing government wage bill. Consequently, the private sector now accounts for a greater share of wage jobs than the public sector. As shown in Table 11, the share of private sector wage jobs in total employment is at least three times that of public sector wage jobs in Ghana, Tanzania, Uganda, and Rwanda. The non-farm sector is the main

source of wage employment, contributing over 85% and 60% of the public and private sector wage jobs respectively.

With the current small size of wage employment and a relatively rapid labor force growth rates, it is unlikely that wage employment will become the dominant employment type for the foreseeable future. Self-employment enterprises, therefore, will remain an important pathway to employing a large share of the workforce, especially those youths without secondary school education. Recognizing these oft-neglected informal self-employment enterprises as a potentially viable livelihood option, and developing supportive policies to raise the returns to labor in this sector would be an important step towards improving livelihoods in Africa. Moreover, the persistence of low-productivity and low-quality jobs among the working-age population also raises questions about the appropriateness of the widely used ILO definition of unemployment as a measure of joblessness in Sub-Saharan Africa. Poverty and lack of social protection for the unemployed often forces Africans to work in some fashion, even if under poor conditions and at very low returns to labor, in order to support themselves. By virtue of their engagement in these low quality economic activities, such individuals are often excluded from the account of joblessness as per ILO standards. As a result, they may be excluded from policy interventions aimed at combating joblessness. Expanding the definition of joblessness to cover the quality of employment and underemployment would provide a better picture of the extent of the employment challenge facing the continent.

4.5. Socio-Demographic Factors Correlated with Employment Structure

We also conducted multivariate analysis to explore the effects of socio-demographic and geographical factors on the employment status of working-age individuals and to understand the characteristics associated with the individuals engaged in various employment categories.

For each country, we developed an individual-level multinomial logit model to estimate the likelihood that working-age individuals engaged in farming, non-farm employment, unemployed or economically inactive. Where possible, non-farm employment was further disaggregated between off-farm within agrifood system and non-farm and included as one of the categories in the dependent variable. The independent variables consisted of individuals' age, educational attainment, and gender, as well as geographical region dummies, survey year dummies, and interactions terms allowing us to estimate the joint effect of these factors. Age is represented by dummy variables for various age categories with the youth (15-24 years) as the omitted reference category. We included three educational attainment dummies for individuals having less than primary education, completed primary education, and completed tertiary education. The omitted reference category for education is individuals with secondary education. We included a male categorical variable as well. Regions of residence are represented by dummy variables, which are included to control for differentials in employment opportunities across regions. For each country, the region of the capital city was used as the reference category. Given the categorical nature of our dependent variable and the case specific nature of the independent variables, a multinomial logit model was employed to estimate the parameters in the model using maximum likelihood estimation. For each country, a separate model was estimated for rural and urban setting.

Tables 12-18 present the marginal effects of each variable on the probability of joining a particular employment category. Generally, gender, educational level, and age were found to be significant determinants of the working age individual's employment status in both rural and urban areas. Among countries in Eastern and Southern Africa (Zambia, Malawi, Tanzania, Rwanda) females were generally either equally likely or more likely to be employed in farming than males. The contrast is seen among the West African countries (Ghana, Nigeria, Mali) where

males dominate the farming sector. In concert with the dominant narrative about the youth fleeing agriculture, we observe in most countries that the youth (15-24 years) are generally less likely to be involved in farming than the other age categories holding all other factors constant. This is particularly true for Tanzania and Rwanda in both rural and urban settings. In other countries, there are differences between the urban and rural settings in terms of the youth engagement in farming relative to other age groups. For instance, the results revealed that the youth in urban areas are either equally likely or more likely to engage in farming than those individuals within the ages of 25-45 years in Ghana, Malawi, Nigeria, and Zambia (Tables 12, 13, 14, 18). With respect to education, farming was found to be generally associated with individuals with lower educational levels. Individuals with less than primary education were about 25% and 22% more likely than those with some secondary education to be employed in farming in rural and urban areas of Ghana respectively. This number is even higher in Rwanda where less than primary school makes one about 33% and 27% more likely to engage in farming in rural and urban areas respectively.

We also observe differences across countries regarding the effect of gender on employment in the off-farm sectors both within and outside the agri-food system. In both rural and urban areas, females were more likely to be employed in off-farm sectors than males in Mali and Nigeria. This is however not the case for Zambia, Malawi, and Tanzania where off-farm employment is dominated by men. In addition, the youth are less likely to be employed in the off-farm sector relative to all other categories with the exception of those in the 55-64 year age group. The likelihood of employment in the off-farm sector increases for those in the 25-34 year bracket, peaks among those within the 34-44 year bracket, then begins to decline among those within the 45-54 and 55-64 year age groups.

The results also indicate a generally positive relationship between education and off-farm employment. This positive relationship could be explained by education's effect on job seekers' ability to process information, identify alternative work opportunities, and satisfy employers' credential and human capital requirements. The 15-24 age bracket spans the period for secondary and tertiary education. Hence, individuals in this age bracket who are active in the labor force are typically out-of-school, and relatively less experience in the labor market. Their low educational level and labor market experience limit their ability to identify off-farm self-employment opportunities and/or secure off-farm wage employment (Aryeetey et al. 2014).

In addition, the effect of education differs for off-farm employment within the agrifood system and the non-farm sector. Employment in the non-farm sector appears to require greater level of education than that within the agrifood system. Increases in educational attainment are associated with a greater likelihood of employment in the non-farm sector but either has no effect or decreased the likelihood of employment in the off-farm segment of the agrifood system especially in urban settings. Indeed, in all the countries examined, those with post-secondary education were generally less likely than those with only secondary education to be employed in the off-farm segment of the agri-food system. Secondary education however, appears to be a key requirement for employment in the non-farm sector.

In line with previous studies, unemployment was primarily the domain of the youth (15-24 years) (Filmer and Fox 2014). Among all the countries explored in this analysis, the results indicate the youth are more likely to be unemployed than any of the other age categories in both urban and rural settings. The effect of gender and education on unemployment varied across countries. In both rural and urban settings in most countries, males did not significantly differ from females in terms of their likelihood of being unemployed. However, females were more likely to be unemployed in both rural and urban settings of Zambia whereas in Malawi unemployment is associated more with males than females. Interestingly, increases in educational attainment were

found to be associated with greater likelihood of unemployment in rural areas in most of the countries examined. Working-age individuals with secondary school education or higher were generally more likely to be unemployed compared to those with primary education or less in rural settings. Interestingly, this picture is replicated in the urban settings for some countries. In Mali and Nigeria for instance, increases in educational attainment is associated with increased chances of a working-age individuals being unemployed in urban areas. In the case of Mali, the analysis revealed that those with less than primary school education and those completing primary education are about 4.7% and 1.3% less likely to be unemployed than those who have received secondary education in urban areas. Possibly, a combination of socio-cultural factors such as perceptions about farming being for the uneducated and the lack of off-farm employment opportunities may be consigning the educated population in the rural areas to unemployment. Because the growth in the working-age population seeking employment outside of farming have not been matched with adequate job creation in the off-farm sector, a number of these educated individuals end up joining the ranks of the unemployed. The observed positive relationship between education and unemployment also confirms a growing evidence of a rising unemployment among higher education graduates in some African countries, partly attributed to a slow expansion of jobs in the public sector, a traditional employer of this group, as well as a general skills mismatch between what employers are seeking and what jobseekers receive from African educational institutions (Aryeetey et al. 2014; Filmer and Fox 2014).

Table 12. Multinomial Logit Estimates of the Effect of Socio-Demographic and Geographical Factors on Employment Category, Ghana

	Farming				Off-farm within agri-food system				Non-farm outside agri-food system				Unemployment				Economically inactive			
	Rural		Urban		Rural		Urban		Rural		Urban		Rural		Urban		Rural		Urban	
	ME*	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value
Male	0.150	0.000	0.041	0.001	-0.077	0.000	-0.039	0.097	-0.056	0.005	-0.044	0.127	-0.001	0.776	0.015	0.138	-0.017	0.287	0.027	0.143
age_25_34	0.060	0.000	-0.012	0.028	0.033	0.000	0.045	0.000	0.047	0.000	0.251	0.000	-0.004	0.001	-0.022	0.000	-0.136	0.000	-0.262	0.000
age_35_44	0.129	0.000	0.007	0.268	0.045	0.000	0.126	0.000	-0.014	0.141	0.199	0.000	-0.010	0.000	-0.047	0.000	-0.150	0.000	-0.285	0.000
age_45_54	0.157	0.000	0.025	0.002	0.033	0.000	0.141	0.000	-0.046	0.000	0.124	0.000	-0.009	0.000	-0.048	0.000	-0.134	0.000	-0.243	0.000
age_55_64	0.157	0.000	0.075	0.000	0.011	0.179	0.107	0.000	-0.062	0.000	0.024	0.375	-0.008	0.000	-0.042	0.000	-0.097	0.000	-0.164	0.000
Less than primary education	0.241	0.000	0.085	0.000	-0.002	0.832	0.136	0.000	-0.134	0.000	-0.155	0.000	-0.010	0.000	-0.006	0.407	-0.096	0.000	-0.060	0.000
Primary education	0.088	0.000	0.031	0.001	0.009	0.321	0.064	0.000	-0.037	0.008	-0.042	0.022	-0.005	0.007	-0.013	0.090	-0.054	0.000	-0.041	0.001
Higher education	-0.393	0.000	-0.045	0.000	-0.012	0.411	-0.048	0.001	0.433	0.000	0.187	0.000	0.012	0.148	-0.007	0.498	-0.040	0.050	-0.087	0.000
male_less_pri	-0.004	0.883	0.004	0.735	-0.029	0.029	-0.029	0.174	-0.006	0.736	0.056	0.081	-0.005	0.033	-0.013	0.226	0.045	0.023	-0.017	0.462
male_primary	0.018	0.509	-0.003	0.799	-0.022	0.122	-0.061	0.000	0.002	0.932	0.090	0.000	-0.003	0.335	-0.012	0.207	0.004	0.785	-0.014	0.442
male_higher	-0.026	0.728	0.017	0.506	-0.020	0.364	-0.027	0.364	-0.046	0.028	-0.047	0.197	-0.003	0.377	0.009	0.565	0.095	0.149	0.048	0.184
male_age25_34	-0.009	0.670	-0.003	0.684	-0.019	0.066	-0.043	0.016	0.080	0.000	0.182	0.000	-0.005	0.003	-0.011	0.181	-0.048	0.000	-0.125	0.000
male_age35_44	-0.002	0.944	0.006	0.526	-0.023	0.011	-0.082	0.000	0.085	0.000	0.273	0.000	-0.003	0.435	-0.022	0.019	-0.057	0.000	-0.174	0.000
male_age45_54	-0.006	0.823	0.007	0.479	-0.029	0.002	-0.110	0.000	0.109	0.000	0.264	0.000	-0.004	0.263	-0.002	0.889	-0.070	0.000	-0.159	0.000
male_age55_64	-0.003	0.937	-0.014	0.083	0.006	0.750	-0.107	0.000	0.069	0.025	0.232	0.000	-0.005	0.052	-0.009	0.596	-0.066	0.000	-0.102	0.000
male_2013	-0.040	0.008	-0.003	0.574	0.001	0.957	-0.057	0.000	0.062	0.000	0.102	0.000	-0.003	0.106	-0.018	0.015	-0.019	0.015	-0.024	0.094
Western	0.108	0.000	0.458	0.000	0.017	0.000	-0.041	0.000	-0.015	0.041	-0.257	0.000	-0.004	0.008	-0.046	0.000	-0.106	0.000	-0.114	0.000
Central	0.195	0.000	0.473	0.000	-0.038	0.000	-0.062	0.000	-0.102	0.000	-0.281	0.000	-0.007	0.000	-0.034	0.000	-0.048	0.000	-0.096	0.000
Volta	0.162	0.000	0.474	0.000	-0.047	0.000	-0.078	0.000	-0.094	0.000	-0.244	0.000	-0.007	0.000	-0.050	0.000	-0.014	0.312	-0.103	0.000
Eastern	0.215	0.000	0.545	0.000	-0.044	0.000	-0.080	0.000	-0.104	0.000	-0.256	0.000	-0.008	0.000	-0.045	0.000	-0.059	0.000	-0.164	0.000
Ashanti	0.202	0.000	0.299	0.000	-0.031	0.000	-0.057	0.000	-0.091	0.000	-0.104	0.000	-0.009	0.000	-0.037	0.000	-0.071	0.000	-0.101	0.000
Brong	0.217	0.000	0.709	0.000	-0.047	0.000	-0.119	0.000	-0.088	0.000	-0.361	0.000	-0.010	0.000	-0.054	0.000	-0.072	0.000	-0.175	0.000
Northern	0.260	0.000	0.619	0.000	-0.053	0.000	-0.098	0.000	-0.119	0.000	-0.338	0.000	-0.009	0.000	-0.048	0.000	-0.079	0.000	-0.134	0.000
Upper East	0.282	0.000	0.716	0.000	-0.057	0.000	-0.124	0.000	-0.129	0.000	-0.383	0.000	-0.010	0.000	-0.050	0.000	-0.086	0.000	-0.160	0.000
Upper West	0.204	0.000	0.534	0.000	-0.057	0.000	-0.107	0.000	-0.098	0.000	-0.299	0.000	-0.009	0.000	-0.040	0.000	-0.041	0.000	-0.088	0.000
Y2013	0.266	0.000	0.019	0.000	-0.058	0.000	0.098	0.000	-0.129	0.000	0.008	0.530	-0.010	0.000	-0.048	0.000	-0.069	0.000	-0.077	0.000
# of observations	34,750		23,864																	
R-square	0.165		0.2228																	
Log likelihood	-13369718		-14067086																	

*ME is marginal effect

Table 13. Multinomial Logit Estimates of the Effect of Socio-Demographic and Geographical Factors on Employment Category, Nigeria

	Farming				Off-farm within AFS				Non-farm outside AFS				Unemployment				Economically inactive			
	Rural		Urban		Rural		Urban		Rural		Urban		Rural		Urban		Rural		Urban	
	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value
Male	0.150	0.000	0.008	0.604	-0.099	0.000	-0.030	0.233	-0.045	0.006	0.015	0.624	0.000	0.987	0.010	0.059	-0.005	0.713	-0.003	0.881
age_25-34	-0.004	0.853	-0.038	0.001	0.087	0.000	0.163	0.000	0.118	0.000	0.203	0.000	0.000	0.986	-0.006	0.136	-0.201	0.000	-0.323	0.000
age_35-44	0.055	0.114	-0.025	0.030	0.102	0.000	0.189	0.000	0.099	0.000	0.241	0.000	-0.001	0.986	-0.020	0.000	-0.255	0.000	-0.386	0.000
age_45-54	0.140	0.000	0.009	0.553	0.063	0.000	0.165	0.000	0.061	0.002	0.227	0.000	-0.001	0.986	-0.026	0.000	-0.264	0.000	-0.375	0.000
age_55-64	0.135	0.000	0.010	0.572	0.044	0.007	0.191	0.000	0.048	0.036	0.148	0.000	-0.001	0.986	-0.021	0.000	-0.226	0.000	-0.329	0.000
Less than primary education	0.025	0.464	0.051	0.007	-0.003	0.808	0.003	0.871	-0.046	0.008	-0.125	0.000	-0.001	0.986	-0.029	0.000	0.025	0.202	0.100	0.000
Primary education	0.102	0.000	0.038	0.017	-0.005	0.651	0.034	0.030	-0.043	0.003	-0.043	0.069	-0.001	0.986	-0.007	0.177	-0.053	0.003	-0.022	0.297
Tertiary education	-0.252	0.000	-0.079	0.000	-0.063	0.000	-0.063	0.000	0.298	0.000	0.070	0.008	0.001	0.986	0.037	0.000	0.016	0.640	0.035	0.150
Male with less than primary	0.349	0.000	0.075	0.019	-0.063	0.000	0.056	0.115	-0.093	0.000	0.072	0.203	0.001	0.986	0.056	0.444	-0.193	0.000	-0.259	0.000
Male with primary education	-0.003	0.904	0.010	0.580	-0.013	0.356	-0.017	0.437	-0.016	0.330	-0.011	0.750	0.000	0.987	-0.005	0.461	0.032	0.127	0.023	0.507
Male with tertiary education	-0.028	0.584	0.136	0.026	0.035	0.311	-0.055	0.013	-0.088	0.000	-0.066	0.117	0.000	0.986	-0.007	0.131	0.081	0.062	-0.008	0.848
Male aged 25-34	-0.002	0.948	0.039	0.159	0.023	0.263	-0.035	0.168	0.079	0.005	0.068	0.087	0.001	0.986	0.000	0.946	-0.101	0.000	-0.072	0.009
Male aged 35-44	0.027	0.703	0.047	0.110	0.017	0.501	-0.010	0.721	0.203	0.001	0.212	0.000	0.002	0.986	-0.005	0.559	-0.248	0.000	-0.244	0.000
male aged 45-54	-0.068	0.221	-0.012	0.495	0.042	0.106	-0.015	0.615	0.255	0.000	0.270	0.000	-0.002	0.978	0.002	0.912	-0.227	0.000	-0.245	0.000
male aged 55-64	-0.095	0.093	0.007	0.773	0.039	0.189	-0.050	0.062	0.219	0.000	0.077	0.151	-0.002	0.983	-0.002	0.885	-0.161	0.000	-0.031	0.526
North east	-0.031	0.412	0.074	0.000	0.041	0.007	0.004	0.821	0.000	0.999	-0.085	0.001	0.001	0.986	0.006	0.424	-0.012	0.567	0.000	1.000
North west	-0.240	0.000	0.044	0.010	0.034	0.000	-0.029	0.062	0.022	0.048	-0.137	0.000	-0.001	0.986	-0.012	0.021	0.185	0.000	0.134	0.000
South east	-0.014	0.937	0.044	0.007	-0.002	0.960	0.007	0.657	0.027	0.705	-0.094	0.000	0.006	0.986	0.038	0.001	-0.017	0.852	0.005	0.826
South south	-0.180	0.170	0.072	0.000	0.016	0.744	-0.033	0.027	0.066	0.475	-0.150	0.000	0.007	0.986	0.028	0.006	0.091	0.507	0.083	0.001
South west	-0.070	0.096	0.000	0.996	0.036	0.082	0.037	0.011	0.009	0.678	-0.034	0.077	0.002	0.986	0.005	0.392	0.023	0.478	-0.007	0.732
Last year (2013)	0.059	0.002	0.007	0.249	0.004	0.474	0.005	0.586	-0.043	0.000	-0.016	0.208	-0.001	0.986	-0.002	0.410	-0.019	0.157	0.006	0.601
# of observations	18,137		7,996																	
R-square	0.1765		0.1966																	
Log likelihood	-19716.436		-8537.8097																	

*ME is marginal effect

Table 14. Multinomial Logit Estimates of the Effect of Socio-Demographic and Geographical Factors on Employment Category, Malawi

	Farming				Off-farm employment				Unemployment				Economically inactive			
	Rural		Urban		Rural		Urban		Rural		Urban		Rural		Urban	
	ME~	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value
Male	-0.143	0.000	-0.041	0.000	0.050	0.000	0.131	0.000	0.017	0.000	0.027	0.000	0.076	0.000	-0.117	0.000
age_25_34	0.131	0.000	-0.015	0.000	0.064	0.000	0.284	0.000	-0.009	0.000	-0.019	0.000	-0.186	0.000	-0.250	0.000
age_35_44	0.127	0.000	-0.015	0.000	0.076	0.000	0.348	0.000	-0.018	0.000	-0.063	0.000	-0.185	0.000	-0.271	0.000
age_45_54	0.137	0.000	0.018	0.000	0.054	0.000	0.292	0.000	-0.023	0.000	-0.066	0.000	-0.169	0.000	-0.244	0.000
age_55_64	0.149	0.000	0.061	0.000	0.017	0.000	0.209	0.000	-0.027	0.000	-0.074	0.000	-0.139	0.000	-0.197	0.000
Less than primary education	0.361	0.000	0.086	0.000	-0.287	0.000	-0.324	0.000	-0.015	0.000	0.036	0.000	-0.059	0.000	0.202	0.000
Primary education	0.141	0.000	0.013	0.001	-0.099	0.000	-0.230	0.000	-0.022	0.000	0.017	0.000	-0.020	0.000	0.201	0.000
Higher education	0.059	0.035	-0.003	0.792	-0.004	0.750	0.192	0.000	-0.036	0.000	-0.060	0.000	-0.020	0.419	-0.128	0.000
male_less_pri	-0.063	0.000	-0.016	0.000	0.064	0.000	0.272	0.000	-0.005	0.029	-0.065	0.000	0.004	0.418	-0.191	0.000
male_primary	-0.039	0.000	-0.002	0.718	0.040	0.000	0.176	0.000	-0.013	0.000	-0.075	0.000	0.012	0.027	-0.099	0.000
male_higher	-0.079	0.053	0.014	0.445	0.051	0.014	-0.133	0.000	-0.012	0.509	-0.004	0.818	0.041	0.296	0.124	0.000
male_age25_34	0.140	0.000	0.071	0.000	0.024	0.000	0.216	0.000	-0.008	0.000	-0.018	0.000	-0.156	0.000	-0.269	0.000
male_age35_44	0.151	0.000	0.083	0.000	0.019	0.000	0.206	0.000	-0.007	0.000	-0.012	0.018	-0.163	0.000	-0.276	0.000
male_age45_54	0.148	0.000	0.041	0.000	0.018	0.000	0.205	0.000	-0.005	0.003	0.011	0.197	-0.161	0.000	-0.257	0.000
male_age55_64	0.127	0.000	0.016	0.035	0.022	0.000	0.131	0.000	0.004	0.085	0.061	0.000	-0.152	0.000	-0.208	0.000
Chitipa	-0.042	0.000	0.062	0.000	0.021	0.000	0.064	0.000	-0.038	0.000	-0.073	0.000	0.059	0.000	-0.053	0.000
Karonga	-0.197	0.000	-0.009	0.055	0.031	0.000	-0.103	0.000	0.002	0.406	-0.008	0.148	0.164	0.000	0.120	0.000
Nkhata	-0.117	0.000	0.073	0.000	0.092	0.000	-0.052	0.004	-0.009	0.000	-0.010	0.286	0.033	0.000	-0.010	0.500
Rumphi	-0.186	0.000	-0.048	0.000	0.045	0.000	-0.101	0.000	0.035	0.000	0.006	0.521	0.106	0.000	0.144	0.000
Mzimba	-0.165	0.000	-0.048	0.000	0.058	0.000	-0.006	0.324	0.028	0.000	0.006	0.077	0.079	0.000	0.048	0.000
Kasungu	-0.001	0.680	-0.009	0.070	-0.035	0.000	0.022	0.031	0.005	0.000	0.002	0.671	0.031	0.000	-0.016	0.072
Nkhota_Kota	-0.071	0.000	0.094	0.000	-0.003	0.130	-0.124	0.000	0.009	0.000	0.005	0.502	0.066	0.000	0.025	0.028
Ntchisi	0.041	0.000	0.059	0.000	-0.046	0.000	-0.084	0.000	-0.002	0.337	-0.017	0.167	0.007	0.065	0.042	0.044
Dowa	-0.033	0.000	0.148	0.000	-0.040	0.000	-0.146	0.000	0.018	0.000	-0.061	0.000	0.055	0.000	0.059	0.001
Salima	-0.136	0.000	0.089	0.000	0.012	0.000	-0.050	0.000	0.026	0.000	-0.020	0.001	0.098	0.000	-0.019	0.068
Mchinji	0.063	0.000	0.043	0.000	-0.040	0.000	-0.119	0.000	-0.017	0.000	-0.023	0.003	-0.007	0.014	0.099	0.000
Dedza	-0.032	0.000	0.016	0.026	0.013	0.000	-0.018	0.207	0.014	0.000	-0.001	0.879	0.005	0.054	0.003	0.812
Ntcheu	-0.039	0.000	0.029	0.002	0.019	0.000	-0.018	0.277	0.024	0.000	-0.002	0.808	-0.003	0.195	-0.008	0.583
Mangochi	-0.108	0.000	0.031	0.000	0.032	0.000	0.018	0.052	0.045	0.000	-0.023	0.000	0.032	0.000	-0.026	0.001
Machinga	-0.028	0.000	0.063	0.000	0.010	0.000	-0.046	0.000	0.001	0.274	-0.014	0.009	0.017	0.000	-0.004	0.645
Zomba	-0.083	0.000	-0.042	0.000	0.042	0.000	0.011	0.120	0.023	0.000	0.015	0.000	0.018	0.000	0.016	0.014
Chiradzulu	-0.138	0.000	0.037	0.074	0.062	0.000	-0.059	0.119	0.033	0.000	0.006	0.801	0.044	0.000	0.017	0.638
Blantyre	-0.293	0.000	-0.050	0.000	0.157	0.000	0.022	0.000	0.059	0.000	0.023	0.000	0.076	0.000	0.005	0.136
Thyolo	-0.191	0.000	0.008	0.275	0.053	0.000	-0.012	0.410	0.077	0.000	0.030	0.001	0.060	0.000	-0.026	0.044
Mulanje	-0.128	0.000	0.027	0.000	0.064	0.000	-0.017	0.263	0.037	0.000	-0.020	0.007	0.026	0.000	0.010	0.475
Chikwawa	-0.091	0.000	0.188	0.000	0.014	0.000	-0.156	0.000	0.031	0.000	-0.016	0.118	0.046	0.000	-0.016	0.294
Nsanje	-0.002	0.717	0.285	0.000	0.000	0.947	-0.172	0.000	-0.008	0.000	-0.070	0.000	0.009	0.009	-0.044	0.000
Mwanza	-0.003	0.502	0.116	0.000	0.022	0.000	-0.054	0.001	-0.016	0.000	-0.011	0.220	-0.003	0.454	-0.052	0.000
male_2008	0.097	0.000	0.016	0.000	-0.036	0.000	-0.106	0.000	-0.035	0.000	-0.087	0.000	-0.025	0.000	0.178	0.000
Last year (2008)	-0.382	0.000	-0.019	0.000	0.098	0.000	0.054	0.000	0.160	0.000	0.085	0.000	0.125	0.000	-0.120	0.000
# of observations	956,883		183,759													
R-square	0.1777		0.1986													
Log likelihood	-8977637.6		-1725699													

~ME is marginal effect

Table 15. Multinomial Logit Estimates of the Effect of Socio-Demographic and Geographical Factors on Employment Category, Mali

	Farming				Off-farm employment				Unemployment				Economically inactive			
	Rural		Urban		Rural		Urban		Rural		Urban		Rural		Urban	
	ME [~]	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value
Male	0.060	0.003	-0.004	0.686	-0.024	0.000	-0.181	0.000	0.001	0.261	0.001	0.747	-0.037	0.026	0.185	0.000
age_25_34	-0.004	0.055	-0.001	0.484	0.011	0.000	0.059	0.000	-0.001	0.000	0.008	0.000	-0.005	0.001	-0.066	0.000
age_35_44	0.000	0.835	0.008	0.001	0.012	0.000	0.081	0.000	-0.002	0.000	-0.008	0.000	-0.010	0.000	-0.081	0.000
age_45_54	-0.003	0.208	0.013	0.000	0.018	0.000	0.064	0.000	-0.001	0.000	-0.011	0.000	-0.014	0.000	-0.067	0.000
age_55_64	-0.079	0.000	0.001	0.723	0.021	0.000	-0.061	0.000	0.001	0.171	-0.004	0.038	0.058	0.000	0.064	0.000
Less than primary education	0.367	0.000	0.098	0.000	-0.335	0.000	-0.146	0.000	-0.029	0.000	-0.047	0.000	-0.004	0.725	0.095	0.000
Primary education	-0.022	0.232	0.010	0.288	-0.056	0.000	-0.148	0.000	-0.003	0.000	-0.013	0.000	0.081	0.000	0.152	0.000
Higher education	0.078	0.004	0.005	0.755	-0.009	0.303	0.059	0.000	0.001	0.579	0.008	0.001	-0.069	0.001	-0.071	0.000
male_less_pri	0.395	0.000	0.060	0.000	0.008	0.162	0.440	0.000	0.003	0.000	0.025	0.000	-0.406	0.000	-0.524	0.000
male_primary	0.169	0.000	0.025	0.037	-0.019	0.001	0.236	0.000	0.002	0.159	0.008	0.000	-0.152	0.000	-0.269	0.000
male_higher	0.051	0.118	0.049	0.062	-0.014	0.116	0.035	0.086	0.000	0.876	0.000	0.927	-0.036	0.183	-0.084	0.000
male_age25_34	0.158	0.000	0.018	0.000	0.057	0.000	0.369	0.000	0.002	0.000	0.000	0.958	-0.216	0.000	-0.387	0.000
male_age35_44	0.179	0.000	0.021	0.000	0.060	0.000	0.447	0.000	0.001	0.041	-0.001	0.751	-0.240	0.000	-0.467	0.000
male_age45_54	0.185	0.000	0.029	0.000	0.028	0.000	0.407	0.000	-0.001	0.032	0.002	0.378	-0.213	0.000	-0.438	0.000
male_age55_64	0.153	0.000	0.036	0.000	-0.018	0.000	0.273	0.000	-0.002	0.000	-0.010	0.000	-0.133	0.000	-0.299	0.000
Koulikoro	-0.064	0.000	0.074	0.000	0.016	0.000	-0.119	0.000	0.000	0.616	-0.003	0.002	0.048	0.000	0.048	0.000
Sikasso	0.034	0.000	0.134	0.000	-0.020	0.000	-0.114	0.000	-0.002	0.000	-0.011	0.000	-0.013	0.000	-0.009	0.009
Segou	-0.008	0.000	0.059	0.000	-0.007	0.000	-0.078	0.000	-0.001	0.000	-0.005	0.000	0.016	0.000	0.025	0.000
Mopti	-0.001	0.784	0.122	0.000	-0.005	0.000	-0.104	0.000	-0.001	0.000	-0.010	0.000	0.007	0.001	-0.008	0.070
Tombouctou	-0.163	0.000	0.102	0.000	0.019	0.000	-0.138	0.000	0.000	0.091	-0.004	0.000	0.143	0.000	0.041	0.000
Gao_Kidal	-0.204	0.000	0.119	0.000	-0.032	0.000	-0.257	0.000	0.002	0.000	-0.007	0.000	0.235	0.000	0.144	0.000
male_2009	-0.215	0.000	-0.021	0.000	0.060	0.000	-0.057	0.000	-0.001	0.000	-0.005	0.000	0.156	0.000	0.084	0.000
Y2009	-0.054	0.000	-0.064	0.000	0.023	0.000	0.176	0.000	0.002	0.000	0.013	0.000	0.029	0.000	-0.125	0.000
# of observations	837,543		307,649													
R-square	0.1934		0.2415													
Log likelihood	-6286963		-2392383													

[~]ME is marginal effect

Table 16. Multinomial Logit Estimates of the Effect of Socio-Demographic and Geographical Factors on Employment Category, Rwanda

	Farming				Off-farm within agrifood system				Non-farm outside agrifood system				Unemployment				Economically inactive			
	Rural		Urban		Rural		Urban		Rural		Urban		Rural		Urban		Rural		Urban	
	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value
Male	-0.034	0.016	-0.048	0.097	-0.005	0.506	0.004	0.790	0.047	0.000	0.048	0.087	0.000	0.994	0.000	0.953	-0.008	0.000	-0.004	0.659
age_25-34	0.074	0.000	0.167	0.000	0.011	0.003	0.045	0.000	-0.005	0.380	-0.073	0.000	0.000	0.994	0.000	0.948	-0.080	0.000	-0.139	0.000
age_35-44	0.081	0.221	0.231	0.000	0.005	0.451	0.045	0.001	-0.020	0.277	-0.123	0.010	-0.001	0.994	-0.005	0.944	-0.065	0.000	-0.148	0.000
age_45-54	0.082	0.021	0.301	0.000	0.001	0.900	0.040	0.031	-0.035	0.002	-0.220	0.001	0.000	0.994	-0.008	0.944	-0.047	0.000	-0.113	0.000
age_55-64	0.114	0.000	0.346	0.000	-0.015	0.004	-0.017	0.522	-0.065	0.000	-0.247	0.015	0.000	0.994	-0.018	0.924	-0.035	0.000	-0.064	0.003
Less than primary education	0.327	0.000	0.274	0.000	-0.015	0.080	-0.004	0.818	-0.155	0.000	-0.089	0.353	-0.001	0.994	-0.012	0.944	-0.156	0.000	-0.169	0.000
Primary education	0.161	0.000	0.157	0.000	-0.011	0.051	-0.001	0.968	-0.105	0.000	-0.041	0.523	0.000	0.994	-0.008	0.944	-0.046	0.000	-0.108	0.000
Tertiary education	-0.223	0.000	-0.155	0.000	-0.030	0.060	-0.060	0.000	0.210	0.000	0.233	0.000	0.000	0.995	-0.004	0.944	0.042	0.022	-0.013	0.317
Male with less than primary	-0.103	0.000	-0.016	0.646	0.018	0.038	-0.014	0.366	0.071	0.000	0.047	0.229	0.000	0.994	-0.005	0.944	0.014	0.000	-0.012	0.359
Male with primary education	-0.091	0.000	0.009	0.793	0.015	0.121	0.013	0.474	0.065	0.000	-0.004	0.915	0.000	0.994	0.003	0.944	0.011	0.003	-0.021	0.077
Male with tertiary education	-0.038	0.603	0.120	0.066	0.080	0.265	-0.018	0.502	-0.038	0.221	-0.143	0.001	0.000	0.994	0.002	0.944	-0.004	0.707	0.038	0.158
Male aged 25-34	-0.047	0.000	-0.087	0.015	0.002	0.718	0.001	0.972	0.042	0.000	0.165	0.000	0.000	0.994	-0.006	0.944	0.004	0.394	-0.073	0.000
Male aged 35-44	-0.699	0.974	-0.083	0.037	-0.060	0.974	-0.025	0.140	-0.168	0.981	0.172	0.000	0.953	0.978	-0.007	0.944	-0.026	0.994	-0.057	0.003
male aged 45-54	-0.716	0.961	-0.116	0.000	-0.062	0.955	-0.051	0.000	-0.175	0.969	0.214	0.000	0.984	0.965	-0.001	0.949	-0.031	0.986	-0.047	0.006
male aged 55-64	-0.020	0.231	-0.296	0.000	-0.022	0.001	-0.099	0.000	0.032	0.043	-0.494	0.008	0.000	0.994	0.993	0.002	0.010	0.179	-0.104	0.000
Southern province	0.080	0.000	0.326	0.000	-0.020	0.002	-0.032	0.071	-0.056	0.000	-0.256	0.006	0.000	0.995	-0.011	0.944	-0.004	0.255	-0.028	0.126
Western province	0.072	0.000	0.274	0.000	-0.012	0.076	-0.015	0.281	-0.051	0.000	-0.239	0.000	0.000	0.994	-0.008	0.944	-0.008	0.028	-0.012	0.407
Northern province	0.107	0.000	0.352	0.000	-0.016	0.010	-0.054	0.001	-0.069	0.000	-0.254	0.000	0.000	0.994	-0.008	0.944	-0.022	0.000	-0.036	0.018
Eastern province	0.096	0.000	0.323	0.000	-0.016	0.014	-0.042	0.020	-0.070	0.000	-0.227	0.007	0.000	0.994	-0.011	0.944	-0.009	0.011	-0.043	0.020
Last year (2011)	-0.079	0.000	0.044	0.068	0.003	0.174	-0.016	0.019	0.084	0.000	0.022	0.502	0.000	0.994	0.004	0.944	-0.008	0.000	-0.054	0.000
# of observations	75,192		14,518																	
R-square	0.1413		0.1849																	
Log likelihood	-62940.281		-15633.663																	
~ME is marginal effect																				

Table 17. Multinomial Logit Estimates of the Effect of Socio-Demographic and Geographical Factors on Employment Category, Tanzania

	Farming				Off-farm within agrifood system				Non-farm outside agrifood system				Unemployment				Economically inactive				
	Rural		Urban		Rural		Urban		Rural		Urban		Rural		Urban		Rural		Urban		
	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	
Male	-0.070	0.005	0.000	0.998	0.008	0.169	0.001	0.757	0.057	0.000	0.129	0.003	0.011	0.340	-0.012	0.533	-0.006	0.710	-0.118	0.001	
age_25_34	0.131	0.000	0.079	0.005	0.012	0.060	0.005	0.169	-0.010	0.487	0.174	0.000	-0.002	0.660	-0.020	0.140	-0.131	0.000	-0.238	0.000	
age_35_44	0.190	0.000	0.176	0.000	-0.003	0.543	0.006	0.152	-0.016	0.273	0.157	0.002	-0.012	0.010	-0.057	0.000	-0.158	0.000	-0.283	0.000	
age_45_54	0.212	0.000	0.315	0.000	-0.001	0.854	0.003	0.467	-0.043	0.002	0.010	0.888	-0.014	0.009	-0.078	0.000	-0.154	0.000	-0.250	0.000	
age_55_64	0.210	0.000	0.378	0.000	-0.009	0.005	-0.003	0.430	-0.077	0.000	-0.072	0.348	-0.011	0.089	-0.078	0.000	-0.113	0.000	-0.225	0.000	
Less than primary education	0.155	0.000	0.137	0.000	-0.006	0.143	0.002	0.462	-0.085	0.000	-0.218	0.000	-0.005	0.379	0.009	0.553	-0.059	0.002	0.069	0.022	
Primary education	0.108	0.000	0.055	0.000	-0.001	0.734	0.002	0.380	-0.056	0.000	-0.122	0.000	-0.002	0.759	0.003	0.768	-0.049	0.008	0.062	0.008	
Higher education	-0.417	0.085	-0.020	0.573	-0.011	0.000	-0.017	0.000	0.412	0.061	-0.014	0.845	-0.027	0.000	-0.057	0.001	0.044	0.758	0.108	0.123	
male_age25_34	-0.021	0.542	-0.024	0.248	0.001	0.882	-0.003	0.480	0.068	0.017	0.226	0.000	0.004	0.622	-0.051	0.000	-0.053	0.014	-0.148	0.000	
male_age35_44	-0.099	0.027	-0.039	0.014	0.008	0.545	-0.007	0.007	0.060	0.056	0.285	0.000	-0.003	0.749	-0.036	0.059	0.034	0.388	-0.202	0.000	
male_age45_54	-0.087	0.080	-0.026	0.183	-0.010	0.000	-0.005	0.230	0.063	0.106	0.248	0.000	-0.005	0.567	-0.058	0.012	0.040	0.350	-0.158	0.003	
male_age55_64	-0.047	0.453	-0.020	0.375	-0.007	0.185	-0.012	0.000	0.080	0.211	0.148	0.067	-0.001	0.948	-0.019	0.654	-0.024	0.481	-0.097	0.145	
Dodoma	0.267	0.000	0.746	0.000	-0.010	0.000	-0.023	0.000	-0.091	0.000	-0.482	0.000	-0.030	0.000	-0.065	0.000	-0.136	0.000	-0.177	0.000	
Arusha	0.174	0.000	0.145	0.022	-0.010	0.000	-0.001	0.693	-0.055	0.000	-0.078	0.217	-0.027	0.000	-0.089	0.000	-0.083	0.001	0.023	0.676	
Kilimanjaro	0.129	0.001	0.426	0.000	-0.011	0.000	-0.027	0.000	-0.057	0.000	-0.334	0.000	-0.030	0.000	-0.042	0.006	-0.031	0.373	-0.022	0.699	
Tanga	0.188	0.000	0.424	0.000	-0.010	0.000	-0.010	0.000	-0.075	0.000	-0.370	0.000	-0.031	0.000	-0.058	0.001	-0.073	0.004	0.014	0.845	
Morogoro	0.219	0.000	0.138	0.010	-0.011	0.000	-0.006	0.025	-0.086	0.000	-0.171	0.001	-0.029	0.000	-0.039	0.010	-0.094	0.000	0.078	0.152	
Pwani	0.121	0.006	0.346	0.000	-0.011	0.000	-0.010	0.000	-0.061	0.000	-0.253	0.000	-0.024	0.000	-0.044	0.006	-0.025	0.524	-0.039	0.445	
Lindi	0.149	0.000	0.193	0.002	-0.009	0.000	-0.006	0.036	-0.068	0.000	-0.189	0.001	-0.027	0.000	-0.054	0.000	-0.045	0.144	0.057	0.348	
Mtwara	0.164	0.000	0.316	0.000	-0.010	0.000	-0.005	0.096	-0.070	0.000	-0.186	0.000	-0.028	0.000	-0.046	0.003	-0.056	0.045	-0.079	0.081	
Ruvuma	0.187	0.000	0.490	0.000	-0.012	0.000	-0.011	0.000	-0.082	0.000	-0.319	0.000	-0.028	0.000	-0.052	0.000	-0.066	0.014	-0.109	0.016	
Iringa	0.168	0.000	0.385	0.000	-0.009	0.000	-0.007	0.007	-0.075	0.000	-0.216	0.000	-0.028	0.000	-0.059	0.000	-0.056	0.060	-0.102	0.017	
Mbeya	0.220	0.000	0.380	0.000	-0.010	0.000	-0.008	0.002	-0.078	0.000	-0.157	0.048	-0.029	0.000	-0.083	0.000	-0.103	0.000	-0.131	0.009	
Singida	0.224	0.000	0.092	0.146	-0.011	0.000	-0.012	0.000	-0.079	0.000	0.100	0.227	-0.026	0.000	-0.020	0.535	-0.108	0.000	-0.160	0.004	
Tabora	0.234	0.000	-0.001	0.987	-0.012	0.000	-0.008	0.004	-0.087	0.000	0.005	0.951	-0.027	0.000	-0.007	0.817	-0.107	0.000	0.011	0.876	
Rukwa	0.229	0.000	0.427	0.000	-0.012	0.000	-0.011	0.000	-0.098	0.000	-0.335	0.000	-0.028	0.000	-0.048	0.015	-0.091	0.000	-0.033	0.582	
Kigoma	0.236	0.000	0.357	0.000	-0.011	0.000	-0.003	0.487	-0.089	0.000	-0.106	0.146	-0.031	0.000	-0.076	0.000	-0.104	0.000	-0.171	0.000	
Shinyanga	0.229	0.000	0.254	0.002	-0.011	0.000	-0.003	0.583	-0.082	0.000	-0.033	0.655	-0.033	0.000	-0.039	0.083	-0.103	0.000	-0.180	0.000	
Kagera	0.236	0.000	0.181	0.290	-0.011	0.000	0.003	0.737	-0.083	0.000	-0.020	0.909	-0.032	0.000	-0.108	0.000	-0.109	0.000	-0.057	0.626	
Mwanza	0.203	0.000	0.094	0.075	-0.011	0.000	-0.005	0.124	-0.083	0.000	0.027	0.605	-0.032	0.000	-0.047	0.001	-0.077	0.002	-0.070	0.069	
Mara	0.233	0.000	0.059	0.354	-0.010	0.000	-0.008	0.064	-0.085	0.000	-0.034	0.698	-0.028	0.000	-0.064	0.000	-0.110	0.000	0.046	0.572	
Manyara	0.175	0.000	0.234	0.010	-0.011	0.000	-0.019	0.000	-0.082	0.000	-0.198	0.004	-0.029	0.000	-0.051	0.015	-0.053	0.091	0.034	0.648	
Zanzibar	0.089	0.036	0.080	0.023	-0.010	0.000	-0.009	0.000	-0.059	0.000	-0.284	0.000	-0.023	0.000	-0.004	0.769	0.003	0.936	0.217	0.000	
Last year (2012)	-0.146	0.000	-0.010	0.472	0.010	0.010	0.000	0.846	0.048	0.000	0.010	0.736	0.076	0.000	0.034	0.006	0.012	0.344	-0.034	0.178	
# of observations	8,005		4,545																		
R-square	0.12		0.1932																		
Log likelihood	-15068566		-7591329.4																		

Table 18. Multinomial Logit Estimates of the Effect of Socio-Demographic and Geographical Factors on Employment Category, Zambia

	Farming				Off-farm within AFS				Non-farm outside AFS				Unemployment				Economically inactive			
	Rural		Urban		Rural		Urban		Rural		Urban		Rural		Urban		Rural		Urban	
	ME*	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value	ME	P-value
Male	0.016	0.211	0.00	0.81	-0.016	0.001	0.07	0.00	0.029	0.002	0.11	0.00	-0.009	0.007	-0.04	0.00	-0.02	0.01	-0.13	0.00
age_25_34	0.075	0.000	0.00	0.80	0.013	0.000	0.07	0.00	0.025	0.000	0.26	0.00	-0.002	0.077	-0.02	0.01	-0.11	0.00	-0.31	0.00
age_35_44	0.050	0.000	-0.01	0.15	0.020	0.000	0.12	0.00	0.025	0.003	0.24	0.00	-0.005	0.000	-0.05	0.00	-0.09	0.00	-0.30	0.00
age_45_54	0.093	0.000	0.00	0.84	0.009	0.057	0.10	0.00	0.001	0.950	0.23	0.00	-0.003	0.057	-0.05	0.00	-0.10	0.00	-0.28	0.00
age_55_64	0.077	0.000	0.02	0.35	-0.003	0.423	0.12	0.00	-0.005	0.671	0.11	0.01	-0.005	0.000	-0.04	0.00	-0.06	0.00	-0.21	0.00
Less than primary education	0.150	0.000	0.09	0.00	-0.011	0.000	0.01	0.12	-0.058	0.000	-0.09	0.00	-0.009	0.000	-0.01	0.12	-0.07	0.00	0.00	0.85
Primary education	0.097	0.000	0.07	0.00	-0.005	0.012	0.02	0.06	-0.045	0.000	-0.10	0.00	-0.006	0.000	-0.02	0.01	-0.04	0.00	0.02	0.12
Higher education	-0.536	0.000	-0.08	0.00	-0.020	0.000	-0.04	0.00	0.612	0.000	0.37	0.00	-0.005	0.169	-0.02	0.07	-0.05	0.05	-0.23	0.00
male_less_pri	-0.042	0.001	-0.01	0.65	0.008	0.082	-0.02	0.04	0.002	0.786	-0.03	0.31	0.002	0.442	0.00	0.80	0.03	0.00	0.05	0.07
male_primary	-0.016	0.286	-0.01	0.45	0.000	0.949	-0.02	0.02	0.003	0.762	0.06	0.03	0.000	0.980	0.01	0.75	0.01	0.21	-0.04	0.13
male_higher	-0.812		0.06	0.22	0.986		0.02	0.56	-0.071	0.000	-0.17	0.00	-0.008	0.000	-0.03	0.06	-0.09		0.13	0.07
male_age25_34	0.038	0.006	-0.01	0.49	-0.002	0.514	-0.02	0.09	0.038	0.001	0.18	0.00	-0.003	0.035	0.00	0.73	-0.07	0.00	-0.15	0.00
male_age35_44	0.070	0.000	0.02	0.29	-0.007	0.006	-0.03	0.00	0.039	0.004	0.24	0.00	-0.005	0.001	-0.01	0.39	-0.10	0.00	-0.22	0.00
male_age45_54	0.025	0.244	0.02	0.28	-0.005	0.134	-0.03	0.00	0.056	0.005	0.18	0.00	-0.006	0.000	0.00	0.85	-0.07	0.00	-0.17	0.00
male_age55_64	0.046	0.067	0.06	0.04	-0.005	0.418	-0.04	0.00	0.035	0.134	0.11	0.02	-0.001	0.690	0.01	0.70	-0.08	0.00	-0.15	0.00
Muchinga	0.128	0.000	0.13	0.00	-0.010	0.000	0.00	0.56	-0.061	0.000	-0.21	0.00	0.009	0.023	0.12	0.00	-0.07	0.00	-0.03	0.16
Western	0.118	0.000	0.00	0.79	-0.008	0.000	0.01	0.19	-0.046	0.000	-0.07	0.00	-0.006	0.000	0.03	0.00	-0.06	0.00	0.02	0.25
Southern	0.157	0.000	0.18	0.00	-0.010	0.000	-0.04	0.00	-0.067	0.000	-0.13	0.00	-0.007	0.000	0.02	0.16	-0.07	0.00	-0.03	0.06
Northwestern	0.145	0.000	0.27	0.00	-0.001	0.815	-0.02	0.03	-0.058	0.000	-0.18	0.00	-0.009	0.000	0.00	0.93	-0.08	0.00	-0.08	0.00
Northern	0.155	0.000	0.25	0.00	-0.011	0.000	-0.03	0.00	-0.058	0.000	-0.11	0.00	-0.005	0.003	0.01	0.29	-0.08	0.00	-0.13	0.00
Luapula	0.141	0.000	0.40	0.00	-0.009	0.000	-0.04	0.00	-0.060	0.000	-0.20	0.00	-0.004	0.006	-0.05	0.00	-0.07	0.00	-0.12	0.00
Eastern	0.182	0.000	0.07	0.00	-0.015	0.000	-0.01	0.40	-0.085	0.000	-0.11	0.00	-0.001	0.557	0.08	0.00	-0.08	0.00	-0.03	0.19
Copperbelt	0.057	0.000	0.00	0.96	-0.006	0.007	-0.03	0.00	-0.040	0.000	-0.14	0.00	0.016	0.003	0.08	0.00	-0.03	0.00	0.09	0.00
Central	0.114	0.000	0.18	0.00	-0.007	0.000	-0.01	0.13	-0.062	0.000	-0.15	0.00	0.001	0.698	-0.01	0.21	-0.05	0.00	-0.01	0.61
male_last year	-0.057	0.000	-0.06	0.00	0.012	0.025	-0.05	0.00	-0.038	0.000	-0.07	0.00	0.007	0.094	0.01	0.23	0.08	0.00	0.17	0.00
Last year	-0.173	0.000	0.04	0.00	0.015	0.000	0.06	0.00	0.087	0.000	0.09	0.00	0.014	0.000	0.05	0.00	0.06	0.00	-0.25	0.00
# of observations	26,884		22,961																	
R-square	0.182		0.1668																	
Log likelihood	-5335124		-6441435																	

*ME is marginal effect

The positive relationship between education and unemployment, however, appears not to hold for Kenya, Malawi, and Tanzania where the likelihood of unemployment decreases with education in urban setting. In interpreting this observed general positive relationship between education and unemployment, it is worth considering the type of employment in which the less educated is engaged. As revealed in this analysis, a significant portion of the employed population is engaged in unpaid/family labor. The low skill requirement nature of these vulnerable employments makes them an acceptable source of employment for individuals with low levels of education (Bezu and Holden 2014b; ILO 2014). Those with low educational levels are also less likely to secure wage employment in the long term. Therefore, while appearing less likely to be unemployed, the working-age individuals with low levels of education may be equally susceptible to economic hardships and possibly faces greater risk of future unemployment relative to those with high levels of education.

Gender, age, and educational level of working-age individuals were also found to influence participation in the labor force. In most countries examined (e.g., Zambia, Mali, Tanzania, Rwanda and Nigeria) females were found to be more likely than males to be economically inactive probably a reflection of females traditional role as caregivers. Economic inactivity was also associated more with the youth (15-24 years) than any of the other age categories in both rural and urban settings in concert with global trends (ILO 2014). Generally, education is not linearly related to economic inactivity. Individuals with secondary education are more likely to be economically inactive relative to those with primary education or less or post-secondary education. The age group of the youth spans the period during which secondary and tertiary education is received. Hence, the bulk of the youth making up economically inactive individuals are in school. For instance, using the latest round of surveys, about 79% and 58% of the working population determined to be economically inactive in Ghana (2013) and Zambia (2012) respectively cited being a student as a reason for their inactivity. Should their education equip them with the requisite skills, the bulk of this currently inactive population could potentially be well placed to face labor market challenges if the education and training they are receiving equips them with the entrepreneurial, behavioral and socio-emotional skills required for productive employment in the future.

5. RELATIONSHIP BETWEEN EMPLOYMENT STRUCTURE AND AGRICULTURAL PRODUCTIVITY GROWTH

Agricultural productivity growth has historically been an important driver of economic transformation. Most development economists accept the notion that for countries in their early stages of development, agricultural productivity growth is the main engine of structural transformation. The pioneering work of Johnston and Mellor (1961), Johnston and Kilby (1975), and Mellor (1976) first documented the structural transformation process in the regions of Asia that experienced Green Revolutions. In much of Asia, green revolution technologies and supportive government policies kick-started rural economic growth processes, primarily in irrigated lowland areas. As millions of rural farmers had more cash to spend, this stimulated the demand for off-farm goods and services, created new jobs in the off-farm economy, and pulled millions of people off the farm into more productive jobs. Over time, the gradual shift of the work force from farming to off-farm sectors transformed the economic and demographic structure of much of Asia. Agricultural productivity growth in these areas of Asia is widely regarded as a major catalyst (if not *the* major catalyst) to this structural transformation process.

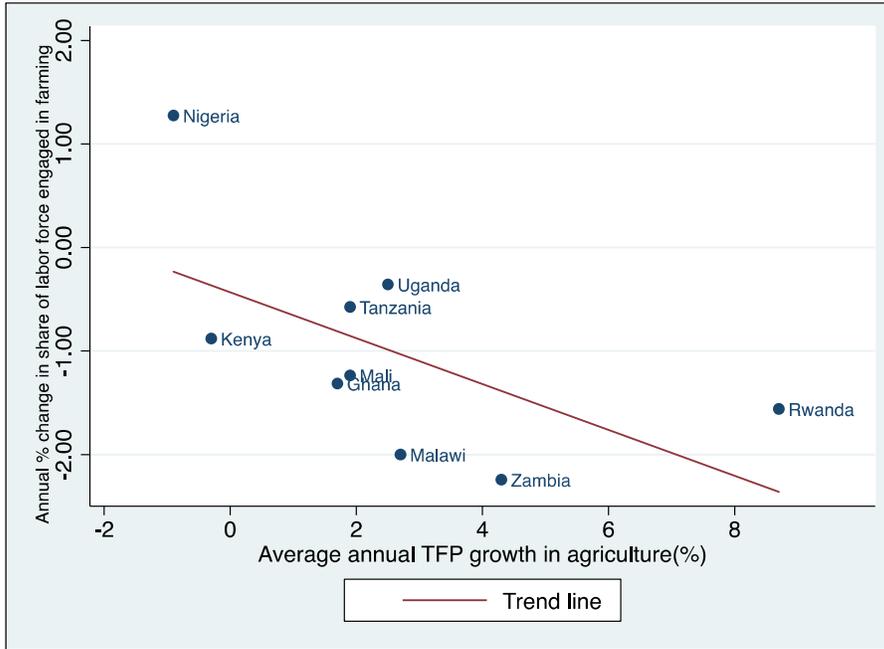
Therefore, in an effort to understand the evolving employment shifts in Africa, we explored the relationship between the pace of labor exit from farming and agricultural productivity growth. First, we explore the bivariate relationship by computing the change in farming's employment shares between the available survey years for the countries in our analysis and pairing them with average annual agricultural total factor productivity growth over the comparable period.¹¹ From the results, we find a strong evidence that agricultural productivity growth has been a major determinant of the pace of labor transition out of farming as well as labor productivity in the broader economy over the past 15 years in Africa.

Figure 4 suggests that agricultural productivity growth is correlated with the pace of labor exit from farming over the past decade. In addition, countries achieving the highest rates of agricultural productivity growth (over two distinct periods since 2000) also tended to have relatively high increases in labor productivity in the off-farm sectors of the economy (Figure 5).

We explore these relationships in more depth by pooling the multi-country data over time and regressing the agricultural sector employment share variable on lagged agricultural productivity growth, non-agricultural labor productivity, country governance indicators, population density, market access indicator (road density), a time trend, and country fixed effects. We use annual data over the 1995 to 2011 period. Table 19 provides summary statistics of the variables included in the model. Our analysis relied on the *GGDC's Africa Sector Data*, which provided information on employment shares and labor productivities in the agricultural and non-agricultural sectors for an expanded set of countries in SSA. Labor productivity in agriculture was computed as the ratio of gross value added in constant 2005 prices in U.S. dollars to the number of persons engaged in farming, while non-farm labor productivity was the weighted average of productivities from all non-farm sectors. To ensure confidence about the direction of causality, the variables for labor productivity in farm and non-farm sectors as well as governance variables were computed as lagged moving averages over the five years prior to the year of the dependent variable, the share of the labor force in farming.

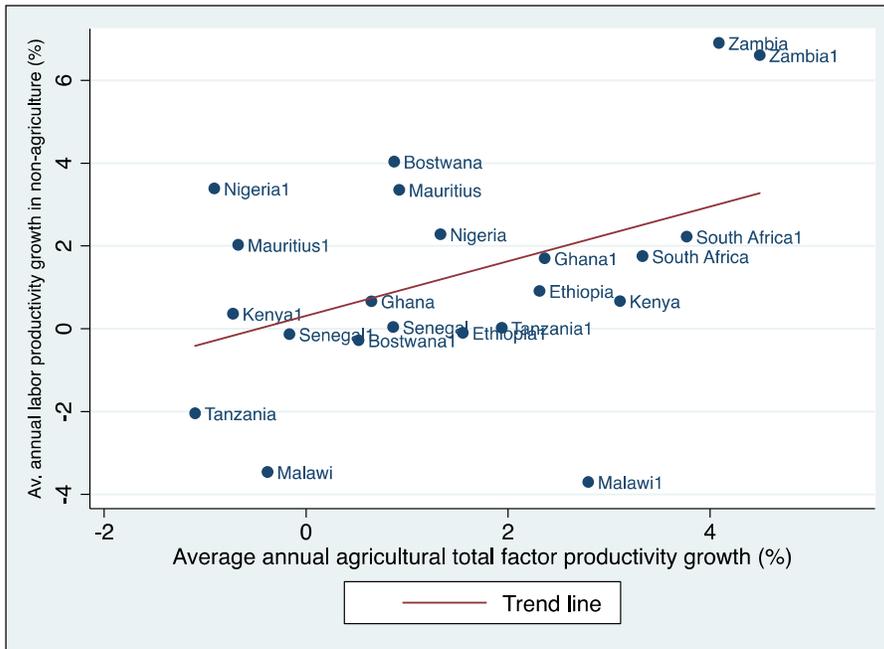
¹¹ TFP growth rates were obtained from the Economic Research Service Total Factor Productivity Database, compliments of Keith Fuglie.

Figure 4. Relationship between Total Factor Productivity Growth and Change in Share of Labor Force Engaged in Farming



Source: Authors. Mean annual agricultural TFP growth rates for 2003-2012 from USDA TFP dataset (Fuglie 2015); Spearman Correlation coefficient = -0.6862, $prob > |t| = 0.0412$.

Figure 5. Relationship between Total Factor Productivity Growth and Labor Productivity in Non-agricultural Sector



Source: Authors. Agricultural total factor productivity growth rates derived from USDA TFP dataset (Fuglie 2015) and computed as mean annual rates over 2001-2005 and 2006-2011 periods; labor productivity growth rates (mean annual rates over 2001-2005 and 2006-2011 period) derived from Groningen Global Development Centre employment. NB: two points are shown for each country; the latter period (2006-2011) for each country is denoted with "1" (e.g., Malawi1 represents Malawi 2006-2011). Spearman Correlation coefficient = 0.3721, $rob > |t| = 0.0881$.

Varying the time lag period did not alter the main conclusion of the results, which are robust to whether we use a 3-, 4- or 5-year moving average of lagged labor productivities as well as governance indicators. Farming's employment shares and the lagged labor productivities in agriculture and non-agriculture were subsequently transformed into log form to enable us to interpret the coefficients as elasticities.

Country-level governance indicators were obtained from the Worldwide Governance Indicator database, 2015 Update (1996-2014). The database provides aggregate indicators of six broad dimensions of governance: (i) voice and accountability, (ii) political stability and absence of violence/terrorism, (iii) government effectiveness, (iv) regulatory quality, (v) rule of law, and (vi) control of corruption. Estimates of governance in each dimension ranges from -2.5 representing weak governance to 2.5 indicating strong governance performance. From our initial analysis, the six dimensions of governance were determined to be highly correlated, so we included only one of them (government effectiveness),¹² in our model as an indicator of governance.

There has been tremendous improvement in the quality of governance across Africa over the past two decade (Ibrahim 2016). In fact, Bediane et al. (2015) considered the improving governance environment to be a key contributing factor to Africa's recent economic recovery. In light of this, we included governance indicators in our model to explore its influence on the observed labor exit from agriculture and for the main purposes of this study to control for other factors to mitigate potential omitted variable bias when examining the relationship between labor productivity growth and changes in the sectoral composition of the labor force.

Farm sizes per capita in Africa is declining particularly in areas with high population density. Headey and Jayne (2014) estimates that average farm sizes in land-constrained African countries have shrunk by 30% to 40% since 1970. Rising population density reduces the amount of arable land available for agriculture and limits opportunities for agricultural employment and hence promote labor exit from agriculture. Lack of access to land as a result of rising population density has been identified as a key barrier to youth engagement in agriculture (Kosec et al. 2016). We, therefore, control for population density in our model using a country-level indicator of population density from the World Development Indicators. Population density was computed as the number of people per square kilometers of land area and increasing population density was hypothesized to increase labor exit from agriculture.

The model also controlled for market access using a time-varying country-level measure of road density obtained from FAOSTAT database. Improved market access facilitates farmers' ability to sell their produce and generate additional income, which is subsequently spent on off-farm goods and services, generating important income and employment multiplier effects on the rest of the economy. Road density was computed as the roads per 100 km square of land. Data for several years were missing for the various countries and no data was available for Tanzania. Hence, when controlling for road density, the sample reduces to about 78 observations and 10 countries. We, therefore, run separate estimations controlling for population density in set of models and not in the other. Interestingly, the key conclusions from our analysis remain unchanged.

¹² From the World Governance Indicator database, government effectiveness "reflects perception of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies". See www.govindicators.org.

Table 19. Summary Statistics of Variables in the Model

Variable	Unit	Mean	Percentiles			
			25th	50th	75th	99th
Agriculture employment share	Percentage of labor force	54.5	38.9	58.1	73.7	86.3
Ag labor productivity	Dollars per worker per year	1.4	0.3	0.7	1.3	9.0
non Ag labor productivity	Dollars per worker per year	6.5	2.1	3.3	10.0	24.7
Time trend	Years	8.6	5.0	9.0	13.0	17.0
Index of governance	Annual governance score on a scale from -2.5 to 2.5	-0.2	-0.7	-0.4	0.4	0.7
Population density	Number of people per square km of land area	116.2	37.7	62.0	117.1	617.0
Road density	Roads per 100km square of land area	26.7	7.4	11.0	27.7	102.0

Source: Authors.

We ran a series of alternative models to examine robustness of results to model specification (pooled OLS, fixed effects, and first-differenced OLS models). For each model, Nigeria was used as the omitted reference country dummy.

Table 20 reports the estimation results. For all of the models run, the results confirm that lagged labor productivity in agriculture is strongly associated with a declining employment share in farming. Results from pooled Ordinary Least Squares (OLS), fixed effect and first differenced OLS models suggest a one percentage increase in average agriculture labor productivity over the previous five-year period results in about 0.02% to 0.3% decline in the share of the labor force engaged in agriculture, holding other factors constant. The other covariates in the model appears not be related to the labor exit from agriculture. The log of lag labor productivity in the non-agriculture sector, index of governance, population density and road density were all found to be negatively related to changes in farming's employment share. However, their effect on the share of the labor forced in farming over the last decade and half was generally not statistically significant.

We also see important differences in the pace at the the labor force is exiting farming. The rate of decline of agriculture's employment share is significantly slower in Nigeria than in most other countries. For instance, the agriculture's share of employment in Ghana and Ethiopia declined roughly 19% and 51% more over the past 15 years than that experienced in Nigeria.

The observed strong relationship between agricultural labor productivity and labor exit from agriculture is consistent with historical structural transformation processes in Asia and elsewhere, where agricultural productivity growth was a major driver of economic transformation and associated shifts in the labor force to non-farm sectors among countries in their early stages of development (Timmer 1988; Mellor 1976). These descriptive multivariate results, therefore, lend support to the notion that the expansion of job opportunities in the overall economy will be greatly affected by government policies and programs affecting the rate and inclusivity of productivity growth in farming. With differential resource endowment and prevailing low productivity nature of farming in SSA, it is possible that in some countries, other sectors may have a comparative advantage over farming for public investment, especially from a static and partial equilibrium perspective. However, this may not necessarily be the case when the long term income and employment multipliers from farming is accounted for in a more dynamic and general equilibrium analysis. As concluded by the majority of the applied studies of early developing countries, multiplier effects resulting from agricultural productivity growth are

considerably higher than multiplier effects resulting from off-farm growth (see Haggblade, Hazell, and Dorosh 2007 for a useful review; also Christiaensen, Demery, and Kuhl 2011). Therefore, even in those countries where it may not be comparatively advantageous to invest in farming in the present, farming's strong linkages with other sectors and potential employment multipliers may justify continued major policy attention.

Table 20. Determinants of Changes in Agriculture's Employment Shares over Time

	Model without road density variable					Model with road density variable		
	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)
	Pooled OLS	Pooled OLS	Random effect	Fixed effect	First difference	Pooled OLS	Random effect	Fixed effect
Log lag labor productivity in agriculture	-0.443*** (-2.07)	-0.133* (-2.07)	-0.133* (-2.15)	-0.133* (-2.15)	-0.0228*** (-3.98)	-0.284* (-2.01)	-0.284** (-2.77)	-0.284** (-2.77)
Log lag labor productivity in non-agriculture	-	-0.0121 (-0.20)	-0.0121 (-0.23)	-0.0121 (-0.23)	0.00271 (1.28)	-0.176 (-1.34)	-0.176 (-1.89)	-0.176 (-1.89)
Other covariates								
Index of governance (lagged)	-	-0.0205 (-0.47)	-0.0205 (-0.45)	-0.0205 (-0.45)	-0.00173 (-0.22)	0.0698 (0.80)	0.0698 (1.06)	0.0698 (1.06)
Time trend	-	-0.00961*** (-3.65)	-0.00961*** (-4.62)	-0.00961*** (-4.62)	0.000178 (0.54)	-0.00458 (-0.97)	-0.00458 (-0.96)	-0.00458 (-0.96)
Population density	-	-0.00181 (-0.92)	-0.00181 (-1.51)	-0.00181 (-1.51)	-0.00116 (-0.55)	-0.00475 (-1.64)	-0.00475 (-1.89)	-0.00475 (-1.89)
Road density	-	-	-	-	-	-0.000260 (-0.26)	-0.000260 (-0.21)	-0.000260 (-0.21)
Countries								
Bostwana	-0.512*** (-15.34)	-0.720** (-2.88)	-0.720*** (-3.69)	-	-0.000929 (-0.10)	-0.894 (-1.77)	-0.894 (-1.90)	-
Ethiopia	-0.448*** (-4.75)	-0.101 (-0.57)	-0.101 (-0.94)	-	-0.0128* (-2.22)	-0.625*** (-4.17)	-0.625*** (-4.85)	-
Ghana	-0.195*** (-6.43)	-0.333* (-2.19)	-0.333*** (-3.30)	-	-0.0133* (-2.57)	-0.448* (-2.11)	-0.448** (-2.82)	-
Kenya	-0.356*** (-9.40)	-0.390* (-2.08)	-0.390*** (-3.69)	-	-0.00851 (-1.31)	-0.680** (-3.16)	-0.680*** (-3.80)	-
Mauritius	-1.043*** (-8.47)	-0.808 (-0.97)	-0.808 (-1.73)	-	0.00425 (0.83)	1.020 (0.91)	1.020 (1.05)	-
Malawi	-0.478*** (-5.28)	-0.0395 (-0.37)	-0.0395 (-0.42)	-	-0.0174*** (-4.47)	-0.340 (-1.89)	-0.340* (-2.28)	-
Senegal	-0.349*** (-8.54)	-0.356* (-2.00)	-0.356*** (-3.32)	-	-0.00655 (-1.00)	-0.623* (-2.59)	-0.623** (-2.97)	-
Tanzania	-0.285*** (-4.12)	-0.120 (-0.61)	-0.120 (-1.11)	-	-0.0132 (-1.89)	-	-	-
South Africa	-0.926*** (-14.49)	-1.363*** (-5.72)	-1.363*** (-6.90)	-	-0.00594 (-0.69)	-1.277** (-2.84)	-1.277** (-3.14)	-
Zambia	-0.0807* (-2.07)	-0.156 (-0.68)	-0.156 (-1.10)	-	-0.00491 (-0.55)	-0.407 (-1.20)	-0.407 (-1.30)	-
Constant	-0.486*** (-17.51)	-0.118 (-0.35)	-0.118 (-0.58)	-0.519** (-3.07)	0.000667 (0.07)	0.401 (0.89)	0.401 (1.24)	0.0690 (0.20)
Number of observations	183	161	161	161	95	78	78	78
Number of Countries	11	11	11	11	11	10	10	10
Adjusted/Overall R-square	0.98	0.992	0.99	0.71	0.398	0.997	0.99	0.87
Time period	1995-2011	1995-2011	1995-2011	1995-2011	1995-2011	1995-2011	1995-2011	1995-2011
t and z statistics in parentheses*								
** p<0.05	** p<0.01	*** p<0.001"						

5.1. Farmland Ownership and Productivity Growth, and Economic Transformation

Farmland ownership patterns in Sub-Saharan Africa are also changing rapidly. While farms under five hectares still account for 90% of all farms in the region, an increasing portion of agricultural land is controlled by medium-scale and large-scale farms owned by African investor farmers. While most survey datasets are unable to provide accurate estimates, our work to date indicates that medium-scale farms between 5 and 100 hectares control between 30 and 50% of total farmland in Ghana, Kenya, Zambia, and Malawi (Jayne et al. 2015; Lowder 2016). Farmland ownership patterns are also shifting between rural and urban areas. Evidence now indicates that

urban people control between 15% and 35% of national agricultural land and an even greater portion of farm holdings over 20 hectares. Moreover, the share of urban households' control of national agricultural land is rising rapidly in some countries (Jayne et al. 2015). Anecdotal evidence also suggests strong interest among urban workers to buy some rural land for retirement. Consistent with these studies, our results from appendix tables A2.7, A2.9, A2.11, and A2.13 show that urban people over 45 years of age represent a fast growing segment of the population entering into farming in Tanzania, Uganda, Nigeria, and Kenya.

Driving these changes, in part, are population pressures and increased world food prices, which in turn increase demand for land (Otsuka and Place 2014; Landesa 2012). Land prices appear to have risen dramatically in areas of high agro-ecological potential within reasonable proximity of urban areas (Jayne et al. 2015; Ricker-Gilbert, Mason, and Chamberlin 2016). These trends have created new stresses on the ability of customary tenure systems to protect small-scale farmers' land from encroachment or appropriation. The region has experienced rising demand for agricultural land by both international and national companies (Jayne et al. 2014; Deininger and Byerlee 2011), as well as urban investor farmers (Jayne et al. 2015; Sitko, Chamberlin, and Hichaambwa 2014). Increased interest in African farmland may also be explained by the perception that there are large areas of unclaimed *available* arable land in Africa for investment; however, recent approximations estimate a much smaller amount of available land (Sitko and Chamberlin 2015; Chamberlin, Jayne, and Headey 2014).

Governments have also become increasingly aware of the potential for revenue generation from the lease or sale of agricultural land, and many are reportedly putting pressure on customary land administration institutions to gain leverage over *unutilized* rural land. This trend is particularly problematic given that land rights under most customary systems are, almost by definition, undocumented. This suggests that even if customary rights holders or their leaders do have the authority to (re-)allocate rights, in particular to non-community members, these decisions may be based on less than complete information on the actual amount and location of truly unclaimed land. Moreover, Deininger and Byerlee (2011) and Diao et al. (2013) report widespread allegations that local chiefs sometimes perceive themselves to be essentially private owners of the land instead of trustees on behalf of their communities, and inefficient land administration systems have led to the sale or lease of customary land without the participation or even knowledge, in many cases, of communities and individuals who have customarily used the land.

As land scarcity and land values rise over time, African land rental markets are growing in importance (Holden, Otsuka, and Place 2009). The research evidence generally finds that land markets are positive developments – they shift land from less productive to more productive users and support overall agricultural productivity growth (Jin and Jayne 2013; Chamberlin and Ricker-Gilbert forthcoming). However, because of risks associated with renting out land (especially when land tenure is insecure), there is mounting evidence that the demand for rented land greatly exceeds the willingness of individuals to rent out their land, resulting in an unmet demand for rented land (Chamberlin and Ricker-Gilbert forthcoming) and a consequent rise in land rental rates in many parts of the region. While evidence is patchy, in some places, the returns to renting in land are generally advantageous for renters, but not always for those renting out land (Ibid). If land tenure policies do not adequately protect current users or actively restrict land rentals, as in Ethiopia, it is likely that the rate of growth of land rental and sales markets will be low and hence the rate of growth of agricultural production and productivity and the type of farmer and employment effects from land use will also be retarded.

These trends raise questions about how land policies influence both the process of economic transformation and the degree to which such transformations are accompanied by rapid poverty reduction and equitable growth. Here we review the evidence to date about the relationships

between land policy, agricultural transformation, and broader economy-wide transformation, with particular emphasis on the influence of policies related to land allocation, land tenure formalization, and land administration on these economic transformation processes.

5.2. Land Distribution Patterns and the Multiplier Effect

Surprisingly little research has addressed why agricultural growth multipliers are larger in some cases than in others. A specific line of enquiry is whether land distribution patterns might influence the relationship between agricultural productivity growth and broader economic transformation. As a thought experiment, consider whether a given rate of annual agricultural productivity growth in a 1,000 hectare country would produce stronger growth multipliers if there were 1,000 one-hectare farms, or 100 ten-hectare farms, or 10 one hundred-hectare farms, or one 1,000 hectare farm? The distribution of income and expenditures within the population of this heuristic country could be very different.

Johnston and Kilby (1975), Mellor (1976), and more recently, Deininger and Squire (1998) and Vollrath (2007) have demonstrated that relatively egalitarian land distribution patterns have tended to generate more broadly based growth and consequently higher rates of economic growth than in cases where land distribution was highly concentrated. The basic reason for this is that broad-based agricultural growth tends to engage more people earning and spending money in the cash economy, which generates greater second-round expenditures in support of local non-tradable goods and services in rural areas and towns. These multiplier effects tend to be much weaker when the source of agricultural growth is concentrated in relatively few hands. Regions of Latin America dominated by large *latifundia* farms and South Africa are often invoked as examples where agricultural growth may have contributed relatively little to broadly-based economic growth (Binswanger, Deininger, and Feder 1995).¹³

Moreover, evidence indicates that not only does the initial distribution of assets affect the rate of economic growth, but it also affects the poverty-reducing effects of the growth that does occur. For example, Ravallion and Datt (2002) found that the initial percentage of landless households significantly affected the elasticity of poverty to off-farm output in India. In a sample of 69 countries, Gugerty and Timmer (1999) found that, in countries with an initial *good* distribution of assets, both agricultural and non-agricultural growth greatly benefitted the poorest households with positive poverty reducing effects. In countries with a *bad* distribution of assets, however, economic growth was skewed toward wealthier households, causing the gap between rich and poor to widen. It is especially noteworthy that in this latter group of countries, agricultural growth was associated with greater increases in inequality than was non-agricultural growth.

All this would lead one to believe that highly concentrated patterns of land ownership in Africa would contribute to lower growth multipliers from agricultural productivity, but that is not exactly what we are finding. A nearly completed set of studies of Kenya, Tanzania, and Zambia undertaken by a consortium of Michigan State University, CIMMYT, University of Pretoria, and ReNAPRI are finding that the relationship between labor productivity and land distribution patterns is complex (Jayne, et al. forthcoming; Hichaambwa, et al. forthcoming; Chamberlin and Jayne forthcoming; Muyanga, Chamberlin, and Jayne forthcoming). It is usually the case that the local Gini coefficients of land ownership are indeed inversely related to mean household labor productivity in farming after controlling for other household and community level covariates.

¹³ Land and credit policies biased toward large-scale agriculture have been found to dispossess small-scale farmers of their land, encourage mechanized rather than labor-intensive production, and largely fail to reduce rural poverty even during periods of rapid agricultural growth (López and Valdés 2000; World Bank 2009). Latin America has the most concentrated farm structure of all regions of the world. Landholding size Gini coefficients reported by Vollrath (2007) range from 0.81 for Latin America to 0.59 for South Asia to 0.49 for Sub-Saharan Africa.

However, and perhaps surprisingly, the Gini coefficient of land ownership at the district level is not highly correlated with other dimensions of land distribution patterns, such as the percentage of landless people in the district or the percentage of cultivated area on farms over five hectares of land. The lack of strong correlation between these measures indicates that *land concentration* is a multi-dimensional concept and that care must be taken to understand how land policies may affect these indicators of land distribution in different ways.

We find that in most cases the strongest multiplier effects of localized agricultural productivity growth on off-farm and total labor productivity in a given area are generated from farms over five hectares of operated farm size, which account for a relatively small proportion of the region's farms but a more sizeable portion of its area under cultivation. It is on these farms that the greatest marketable surpluses are generated and, therefore, where cash injections into the local economy are greatest. By contrast, small farms generate little surplus production and very little injection of cash into the local economy. In other words, agricultural commercialization and injections of cash into the local economy are needed before growth multiplier effects can be generated from farming. These findings are similar to those of Mellor (2014), who finds that small-scale commercial farmers in the 5-20 hectare range of operating farm size are generating the strongest growth multiplier effects from agriculture in Ethiopia. They account for a relatively small portion of total farms but a relatively large portion of area under cultivation. All of this points to the hypothesis that in contemporary Sub-Saharan Africa, a farm structure capable of generating significant farm commercialization (both from the sales of agricultural products and the purchasing of inputs and agribusiness services) may generate the greatest employment and income multipliers within the local economy.

Africa's agricultural experience to date may be somewhat different than Asia's Green Revolution. In Asia, agricultural transformation was led by small-scale farmers, whose tenure was in many cases secured through large-scale land rights formalization interventions that encouraged their investment into the land. For instance, in the 1980s and 90s, Vietnam de-collectivized land, allocated plots to households in a relatively equitable way, and then introduced official land titles and newly permitted land transactions (Ravallion and van de Walle 2006). Increased farmer investment into the land led to higher productivity and better rural livelihoods just as urban growth drove demand for agricultural commodities and provided off-farm employment, thus leading to a large multiplier effect and robust economic growth.

African land titling programs that were designed to enhance tenure security in the hopes of stimulating agricultural productivity and broad-based economic growth à la the Asian experience have had mixed results. The majority of farms in Sub-Saharan Africa access land via customary or traditional tenure systems that allow them to cultivate individual plots and/or use communal land for grazing, firewood harvesting, and other rural livelihood strategies. In many cases, the land they use is legally held by the state (a common land ownership structure throughout the continent); thus, small-scale farmers often do not have legal ownership of the land. Nonetheless, in many places, customary tenure systems have historically provided farmers with sufficient tenure security to make long-term investments on their plots, and emerging evidence suggests these systems continue to provide high levels of tenure security (Stickler and Huntington 2015).

5.3. Youth Access to Land

Access to land by rural youth is becoming an increasingly important factor influencing labor productivity in farming and hence youth's decisions to stay where they are in farming or migrate in search of better opportunities. The search for employment and land are the two most important reasons cited by rural Zambian youth having migrated to other rural areas of the country between 2000 and 2012 according to a nationally representative rural survey (Chamberlin

et al. forthcoming). Rural outmigration from densely populated and land-constrained areas of Kenya has been four times higher than in relatively sparsely populated rural areas (Jayne and Muyanga 2012). Bezu and (2014a) find that rural youth whose parents have relatively little land or farm assets are more likely to migrate out of the area than other youth.

The apparent paradox of rising land scarcity amidst overall land abundance in Africa is largely reconciled after considering that 91% of Africa's remaining arable land is concentrated in nine countries (including the Democratic Republic of the Congo, Angola, and Sudan), many of which are politically fragile states. The recent rise in land investment by both local and foreign investors reflects rising land value and land scarcity in Africa's other 45 countries. Roughly a third of the region's surplus land is currently under forest cover. The conversion of forests to cropland would entail major global environmental costs, but it is likely to happen under the land institutions currently prevailing in much of the region. The concentration of surplus land resources in just a few countries—many of them afflicted by long-running civil conflicts—means that even improving roads and reducing yield gaps will not be sufficient to improve access to land for youth in high-density rural areas. After excluding the few African countries where most of the unutilized arable land is located, the remaining 40, or so countries are either already land constrained, or close to approaching the full extent of their arable land area (Chamberlin, Jayne, and Headey 2014). The list of countries with little surplus land remaining includes some of Africa's most populous countries (Nigeria, Ethiopia, Uganda) as well as countries where land pressures have contributed to fomenting civil conflicts (Kenya, Rwanda, Burundi). In east and southern Africa, the amount of arable land has risen only marginally over the 1980-2010 period, but the percentage of households engaged in agriculture has grown threefold. Headey and Jayne (2014) used FAOSTAT data to separate African countries for which we have farm size data into land constrained and land abundant groups. In most of the land-constrained countries most smallholder farms are gradually shrinking. Headey and Jayne (2014) estimate that average farm sizes in this group of countries have shrunk by 30 to 40% since the 1970s.

A final and emerging cause of increased land scarcity in Africa concerns the region's unique demographic trends. There are two relevant features of this trend. First, Africa is the only region in the world that will experience continued rural population growth until 2050. Rural Africa's population is estimated to be 53% larger in 2050 than it was in 2015. Africa will have more rural people as in China and Southeast Asia combined by 2050. In contrast, China is already experiencing declining rural populations, and most of Asia will do so by 2030.

Second, Africa is only beginning its demographic transition, and the share of young people in the total population will be unusually high for the next several decades. As at 2015, 63% of its rural population was under 25 years of age. Roughly 122 million young people will enter the labor force between 2015 and 2025, with slightly more than half of them from rural areas, putting immense pressure on both agriculture and off-farm sectors to generate employment opportunities. However, even under highly favorable conditions, Filmer and Fox (2014) estimate that over this same period less than 25% of the youth will be able to find wage jobs. This means that farming and the informal sector (including the downstream stages of the food system) will be called upon to provide gainful employment for at least half of Africa's young labor force in most countries. However, for agriculture to effectively fulfill this mandate, young people growing up in densely populated areas will require access to technologies that are radically more productive and profitable, as well as access to new land.¹⁴

¹⁴ The fact that yield gaps remain on the order of 80% in Africa for current technologies (Deininger and Byerlee 2011) suggests that the existence of improved technologies is not sufficient to guarantee their implementation.

A related consequence of Africa's demographic *youth bulge* is that intergenerational subdivision of land will constrain the options of rural youth entering the labor force. Intergenerational and inter-sibling conflicts may intensify further because rural parents in their 50s and 60s may not yet be ready or able to retire and bequeath their land assets to their children, or otherwise subdivide their land. Inheritance of land, long considered a birthright of people growing up in rural areas, will be increasingly difficult. In Kenya, roughly a quarter of young males and females born in rural areas start their families without inheriting any land from their parents, forcing them to either commit themselves to off-farm employment (including migration), to renting land, or to buying land from an increasingly active land sales market (Yamano et al. 2009). Land-related intergenerational conflicts are also likely to rise when younger family members have to rely on land as a source of livelihood because of limited non-agricultural income generating opportunities. Youth returning home from cities reproach elderly members for selling or renting out too much land to migrants (Ngaido 1993; Le Meur 2006). Evidence from Northern Tanzania shows that as land increases in value due to emerging commercial interests, fathers are less willing to provide land to their children, which further increases the prevalence of intergenerational conflict (Le Meur and Odgaard 2006). Land-related conflicts may be part of broader processes undergirding recent evidence of a strong correlation between countries prone to civil conflicts and those with burgeoning youth populations (e.g., Fuller 1995; Beehner 2007).

5.4. Summary

In summary, Sub-Saharan Africa is clearly very heterogeneous and many countries do not yet suffer from land scarcity (to the extent we can detect it through labor-land ratios). However, most of the region's rural young people already live in relatively highly densely populated areas where the potential for crop area expansion is very limited. The demographic forecasts for the region suggest that the scarcity of land resources will intensify over the next several decades.

Countries such as Japan and South Korea, which now rely on manufacturing and technology-driven service economies, were predominantly smallholder-farming societies 60 years ago. Through good policies and public investments in infrastructure, agricultural research breakthroughs, and extension services to help farmers benefit from new technologies, smallholder farmers in these countries increased their productivity and incomes, thereby supporting the demand for off-farm businesses and the growth of employment opportunities off the farm. Over time, most young people who would have otherwise remained small-scale farmers eventually moved into these off-farm jobs.

Africa's transformation from a semi-subsistence, small-scale agrarian economy to a more diversified and productive economy will require unwavering support for smallholder farmers so that they are able to participate in and contribute to the region's economic transition rather than be marginalized by it. While migration from farm to off-farm sectors and from rural to urban areas will provide the brightest prospects for the transformation and modernization of Africa's economies, it will happen only as fast as educational advances and growth in the off-farm job opportunities will allow. These advances in turn depend on income growth among the millions of families still engaged in smallholder agriculture. Hence, even as Africa slowly urbanizes, smallholder agriculture will remain fundamental to absorbing much of Africa's burgeoning young labor force into gainful employment.

Government policies and public investment can make agriculture much more attractive to young people—by making it profitable. Public investments in agricultural R&D, extension programs and rural infrastructure will surely help. So will government policies to promote incentives and scope for investment by the private sector. Markets for smallholder farmers are also central determinants in the success and timing of how developing country economies move out of

poverty. They relate specifically to youth employment objectives in two ways. First, agricultural input, output, land, labor, and financial market opportunities influence production choices (e.g., adoption of improved seeds and farm management practices); without improvements in output markets, our attempts to increase the productivity of smallholder farmers will progress relatively slowly. Second, the link between productivity and poverty reduction is governed by how well agricultural input, output, labor, land, and financial markets function (Christiaensen, Demery, and Kuhl 2011; Gollin 2010). In addition, public efforts to protect the land rights of rural communities can be achieved while also encouraging the development of investor farms and large commercial operations in appropriate locations. Judicious land policies can promote synergies and minimize sacrifices. In these ways, governments hold the key to determining whether the region's economic transformation will be a relatively smooth, robust, and peaceful process or a painful and protracted one.

6. CONCLUSIONS AND IMPLICATIONS

This paper has examined the demographic and employment shifts within the working-age population in nine African countries. Despite variations across countries, some broad observations are apparent. First, many African countries have experienced significant economic transformation since 2000. Among the nine countries examined, all but Nigeria have experienced significant shifts in the labor force from farming to off-farm sectors across countries. While the number of working-age and young people engaged in farming is increasing in most countries, the share of farming in total employment is declining over time because of more rapid growth of employment in the non-farm sectors. Despite its declining employment share, farming remains the single largest source of livelihood/employment in most African countries and is likely to remain so for at least the next decade. There are several important exceptions, such as Nigeria and Ghana where already less than half of the work force is in farming. Nevertheless, the rate of growth in agriculture will greatly influence rate at which new jobs in the off-farm economy are created, through the multiplier effects of agricultural productivity growth.

Second and relatedly, the pace of countries' economic transformation from farm to off-farm over the past decade in Africa appears to be related to the rate of agricultural productivity growth. Rapid declines in farming's employment share and labor productivity growth in non-agricultural sectors were observed among countries having experienced rapid growth in agricultural productivity. These patterns, also seen in Asia's structural transformation process, suggest that the expansion of job opportunities will be greatly affected by government policies and programs affecting the rate of productivity growth in farming. Hence, a major entry point to influence the on-going economic transformation would be to promote investment in on-farm productivity growth. The sheer number of people engaged in agriculture and its strong growth linkages with the rest of the economy imply that public investment directed at increasing productivity in farming holds considerable prospects for broad-based and inclusive economic growth and transformation.

Third, the share of new jobs in the off-farm segment of the agri-food system is growing rapidly in percentage terms. However, this growth is starting from a low base, currently accounting for less than 10% of the jobs held by the youth (15-25 years of age) and 23% of the working-age population in most countries. Hence, even with rapid percentage growth, as in countries like Tanzania and Ghana, the off-farm segment of the agri-food systems will not match either farming or the non-farm sector in the absolute number of new jobs created, at least over the next decade.

Fourth, observed trends are generally robust whether *employment* in the nationally representative datasets used in this study are defined in terms of counts of jobs or in terms of *full-time equivalents*. The latter measure computes the share of individual's work time over the year that can be allocated to a range of jobs. Due to the seasonal nature of farming, the share of employment from farming was consistently lower when computed using the FTE approach, while that from the off-farm sectors rises. The rate of labor exit from farming is also pronounced when job shares are computed in FTE terms suggesting that estimates based on counts potentially mask the pace of the economic transformation underway in the region. Nonetheless, the sectoral employment trends are highly similar regardless of whether defined in terms of primary employment sources, the range of all jobs undertaken by individuals, or the FTE approach.

Fifth, employment trends observed for the youth are remarkably similar to that of the total working-age population, regardless of whether we define youth as between 15-24 or 15-35 years of age. This might not be surprising, considering that the 15-24 age range contains roughly 40%

of the total workforce, whereas the 15-35 age range contains over 55%. The main difference observed is the high level of economic inactivity among the 15-24 age group primarily due to increase educational enrollment. It appears Africa's future workforce will be substantially more educated and perhaps well placed to navigate labor market challenges if policy ensures that their education equips them with the skills required for productive employment.

The encouraging finding of increasing educational attainment among Africa's workforce is tempered, though, by the fact that even in 2025 over 50% of the rural work force in any of the countries examined will not have more than a primary school education (Filmer and Fox 2014). With such low educational and skill levels among such a large portion of the labor force, a rapid transition of the workforce into well-paying off-farm jobs is infeasible in most areas. This coupled with the large share of the population currently engaged in farming suggest the sector will continue to be a dominant source of employment for most working-age individuals (including young people) in at least in the next few decades even if its share is declining. It is thus essential that farming remains viable and productive to enhance employment opportunities for the expanding labor force (Losch 2012).

Sixth, a key constraint to promoting broad based agricultural productivity growth through farming is access to land especially in land-scarce regions like Rwanda, Kenya, Uganda, and Malawi. Population pressures, increases in world food prices, and associated rising interest in Africa's arable land appears to be driving up land prices in the region, limiting the ability of the youth in particular, to access land. Advocating for judicious land tenure and land allocation policies will, therefore, be crucial in such areas in order for farming to be attractive and profitable for the youth, and more importantly for farming to generate strong growth multipliers that rapidly expand the number of jobs being created in the off-farm segments of the economy and ultimately pull rural youth out of farming and into more attractive off-farm jobs.

Lastly, an examination of the type of employment suggests the informal sector will continue to be a key feature of African labor markets for the foreseeable future. Growth in wage employment in both private and public sectors is starting from a low base and even with high annual growth rates will not generate enough jobs to employ more than a small fraction of the rapidly expanding labor force. The slow pace of demographic transition and prevailing low educational and skill levels among a large portion of Africa's expanding labor force also implies that a rapid transition into well-paying formal wage jobs in the off-farm sector in the immediate future is nearly infeasible. Consequently, the majority of the new entrants to the labor market would most likely end up working in informal enterprises and farming. The informal sector is ironically viewed by many policymakers as a hindrance to economic growth and hence generally outside the scope of most public policy interventions. This negative posture towards the informal sector would need to change to help improve the livelihoods of the millions of young Africans whose livelihoods will depend on this sector. At the very least African policymakers may, therefore, need to re-orient their policies to recognize informal enterprises as a viable livelihood option and institute productivity enhancing strategies to harness employment gains from this sector.

APPENDIX 1. METHODOLOGICAL DETAILS ON CLASSIFICATION OF EMPLOYMENT SECTORS

Classifications of individuals into employment sectors were based on survey respondents' stated industry of employment defined as the activity or product of the establishment or sector in which the person is employed. Each dataset provided information on respondents' industry of employment that had been coded following conventions established by International Standard for Industrial Classification (ISIC). The ISIC codes created by the United Nations Statistics Division offer an international reference classification module for all economic activities. The classification is subdivided into a hierarchical, four-level structure of mutually exclusive categories—section, division, group, and class. Each level offers more detailed information of the activity being described. For instance, depending on the level of classification employed, a person engaged in maize production will be classified at the first to fourth levels as follows: 1) agriculture, forestry and fishing; 2) crop and animal production, hunting, and related service activities; 3) growing of non-perennial crops; and 4) growing of cereals, leguminous crops, and oil seeds.¹⁵ Similarly, a person engaged in meat processing will be classified as follows: 1) manufacturing; 2) manufacture of food products; 3) processing and preserving meat; and 4) Processing and preserving meat. The industrial classification scheme was employed in this study in line with the study's stated interest in understanding the contribution of the various industries to employment creation while also allowing for cross-country comparison. Using the ISIC codes in the data, respondents were classified into farming, off-farm stages of the food system, and the non-farm sector (outside the food system). Table A1.1. provides a description of these categories and the key sections of the ISIC classification from which they were drawn. Note that forestry and logging were classified as employment in the non-farm sector.

The various country data employed different levels of ISIC hierarchical classification in their coding of economic activities allowing for different levels of disaggregation of our sample into various industrial sectors. Generally, the LSMS data (Ghana, Nigeria, Tanzania, Rwanda, Uganda) and labor force survey data (Zambia) employed at least the second level ISIC classification codes allowing for a distinction between off-farm jobs within the agri-food system and the non-farm sector. It also allowed for further disaggregation of the activities in the non-farm sector into different industrial sectors. However, the data from IPUMS (Kenya, Malawi, Mali) largely used the first and second level of classification, which made disaggregation between off-farm stages within and non-farm jobs infeasible. Hence, for those countries, both activities were combined as off-farm employment.

¹⁵ See link for details of the classification <http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=27>

A1. 1. Description of Employment Sector

Industry	Description
Farming	Consist of all those coded under the crop and animal production, hunting, and related service activities under the broad section of Agriculture, forestry, and fishing.
Off-farm stages of the agri-food system	<p>Consist of both upstream and downstream activities within the agri-food system. Individuals were drawn from three main sections of the ISIC classification scheme:</p> <ol style="list-style-type: none"> 1. Individuals coded under the Manufacturing section engaged in the manufacture of food products, beverages, and tobacco products, including processors of meat, fish, dairy, and crop products as well as livestock feed and concentrates. 2. Individuals coded under the Wholesale and Retail section engaged in the wholesale and/or retail of agricultural raw materials or live animals, food, beverages, tobacco, and agro-chemicals. 3. Individuals coded under the Accommodation and Food Service Activities' section engaged in food and beverage service activities including restaurants and mobile food service activities, event catering, beverage serving, and other food service activities.
Non-farm (outside the agri-food system)	Consist of all economic activities not classified as farming or off-farm stages within the agri-food system. Individuals were drawn mainly from the remaining sections of the ISIC classification and those engaged in activities under the agriculture, manufacturing, wholesale and retail sections unrelated to the agri-food system. This includes non-food related manufacturing, wholesale and retail trade of non-agricultural products, public administrative services, mining and quarrying, forestry and logging, and personal services such as hairdressing, etc.

Source: Authors.

A1.1. Partial Allocation (Treatment of Jobs in Transportation, Wholesale and Retail, and Textile)

For each country, the most detailed ISIC code provided is used for the classification. However, the various country data employed different levels of ISIC hierarchical classification in their coding of economic activities. Those countries providing less detailed codes necessitated a partial allocation of some of the jobs between off-farm stages of the food system and non-farm jobs. For instance, at a third level of ISIC coding, *wholesale and retail trade except for motor vehicles and motorcycles* will be subdivided into the following sub-codes consisting of both jobs within and outside the agri-food system.

- Wholesale on a fee or contract basis;
- Wholesale of agricultural raw materials and live animals;
- Wholesale of food and beverages and tobacco;
- Wholesale of household goods;
- Wholesale of machinery equipment and supplies; and
- Other specialized wholesale.

However, if only two levels of ISIC codes is employed, all jobs falling in each of the six sub-codes will be coded as *wholesale and retail trade except for motor vehicles and motorcycles*. In such instances, the jobs coded in under such codes are proportionally distributed between the off-farm stages of the agri-food system and non-farm sector. The proportion of jobs assigned to the downstream stages of the agri-food system varies by country and locality (rural and urban) and is

based on the mean ratio of households' share of cash food expenditure in all cash expenditure to the share of non-food agriculture in all agriculture.

Generally, partial allocation of jobs to agri-food system applied mainly to jobs in wholesale, retail trade, and transportation. Table 2 provides the detailed coding scheme indicating which codes were fully or partially allocated to the agri-food system. The statements below highlight the proportional allocation for the affected countries:

- In Rwanda, about 38.2% and 42.7% of jobs in wholesale, retail trade, and transportation in urban and rural settings respectively, are allocated to the off-farm stages of the agri-food system. This amounted to a total of 3,351 unweighted observations (591 urban and 2,760 rural) in 2010/11 and 584 (220 urban and 364 rural) unweighted observations in 2005/06.
- In Nigeria 52.5% and 60.7% of jobs in wholesale, retail trade, and transportation in urban and rural respectively, are assigned to the off-farm stages of the agri-food system. This amounted to a total of 1,685 unweighted observations (583 urban and 1,102 rural) in 2012/13 and 2,117 unweighted observations (721 urban and 1,396 rural) in 2010/11.
- In Tanzania, 52.7% and 57.9% of jobs in wholesale, retail trade, and transportation in urban and rural respectively, are assigned to the off-farm stages of the agri-food system. This amounted to 1,035 unweighted jobs (405 urban and 630 rural) in 2010/11 and 4661 unweighted observations (1,699 urban and 2,962) in 2012/13.

A1.1.1. Textiles and Wearing Apparel

In addition to the above, 25% of all jobs in the manufacture, wholesale and retail of textiles, and wearing apparel, were also assigned to the agri-food system. The proportional allocation of 25% of textile jobs is based on the percent share of cotton in total fiber consumption in developing countries as per results from the World Apparel Fiber Consumption Survey¹⁶ (FAO 2013). Note however that, this 25% allocation does not take into account whether the product was manufactured locally or imported. For Rwanda, a total of 152 unweighted textile-related jobs in 2010/11 and 4 unweighted observations in 2005/06 were allocated to the off-farm stages of the agri-food system. Similar allocations of 30 and 115 unweighted textile-related jobs were done for Tanzania 2010/11 and 2012/13 respectively. In Nigeria, textile-related jobs contributed 75 unweighted jobs to the agri-food system in 2012/13. The ISIC codes for Nigeria 2010/11 were at the first level, which does not distinguish textile-related manufacturing or wholesale and retail trade from other activities in the broad category.

A1.2. Sensitivity Analysis on Classification

We examined how results may differ if all transportation and textile jobs are assigned to the non-farm sector (outside the agri-food system). Generally, the share of employment in the off-farm stages of the agri-food system declines, by about 3% in Nigeria, 1 percentage point in Rwanda and Tanzania and about 0.5 percentage points in Ghana. Generally, the bulk of the jobs in off-farm stages of the agri-food system are in wholesale and retail activities. The proportional allocation of jobs in this sector between the agri-food system and the non-farm sector thus has the greatest influence on estimates of employment shares between these two sectors.

¹⁶ <http://www.textileworld.com/textile-world/fiber-world/2015/02/man-made-fibers-continue-to-grow/>

A1.3. Full Time Equivalent

In addition to the simple count of people employed in each sector, we also computed the full time equivalent jobs for each employment sector to examine the extent to which the population is dependent on each sector for their employment. A full-time equivalent was computed as 40 hours a week, four weeks per month for a 12-month period, and fractions thereof were computed for all jobs listed for all working age individuals in the survey data as reported by respondents.

There were instances where data limitations made this general rule inapplicable.

- In Tanzania 2010/11, data was available for only the total number of months worked per year for those engaged in non-farm self-employment activities. In this case, working 12 months was considered full time. Similarly, engagement in farming activities and unpaid non-farm household enterprises reported only hours worked in the past 7 days. Hence, a full time equivalent of 40 hours in the past week was assumed for those jobs.
- Rwanda 2005/6 had data on total number of hours worked per day for the past seven day period and number of months worked per year. Total number of hours worked per day was converted into hours per week and a 4 weeks/month was assumed for all jobs. Working 40 hrs./week, 4 weeks/month, and 12 months/year was then considered full time.

Note: Hours worked per week derived from the person's activity in the past seven days may not adequately account for seasonality of jobs and, hence, result in lower FTE levels for seasonal jobs. For instance, where a survey is conducted during the outside the cropping season, the reported time in farming may be zero, which could put the total time devoted to farming to zero and, hence, lower the total number of FTE jobs in farming.

A1.4. Other Classification Notes

A1.4.1. Mali

The analysis explored changes in employment status between 1998 and 2009 using micro-data available at IPUMS, which was based on 10% of the households interviewed in the General Census of Population and Housing for 1998 and 2009. The ISIC codes reported in the data were at the first level. Therefore, for both years, the farming population consisted of individuals classified under agriculture, fishing, and forestry industrial category, which includes some individuals involved in primary forestry activities such as afforestation and logging.

A1.4.2. Malawi

The analysis explored changes in employment status between 1998 and 2009 using micro-data available at IPUMS, which was based on 10% of the households interviewed in the Population and Housing Census for 1998 and 2009. The ISIC codes were detailed enough to identify those employed in farming but not those in the off-farm stages of the agri-food system. Hence, in both years, farming consists of those engaged in crop and animal production including fishing and aquaculture.

A1.4.3. Kenya

The analysis explored changes in employment status between 1999 and 2009 using micro-data available at IPUMS, which was based on 5% and 10% of the households interviewed in the original Population and Housing Census for 1999 and 2009 respectively. The data did not report

on the industry of employment. Hence, individuals employed in a family holding agricultural activity as primary occupation were classified as farmers for both years.

A1.4.4. Nigeria

Two main analyses were conducted for Nigeria. The first analysis explored changes in employment status between 2006 and 2010 using micro-data available at IPUMS, which was based on 0.6% and 0.5% of the households interviewed in the original General Household Survey for 2006 and 2010 respectively. The ISIC codes reported in the data were at the first level. Therefore, for both years, the farming population consisted of individuals classified under agriculture, fishing, and forestry industrial category, which includes some individuals involved in primary forestry activities such as afforestation and logging.

The second analysis used a more recent data from LSMS and focuses on changes between 2010/11 and 2012/13. Unlike IPUMS, this data consisted of the full sample of households interviewed and contained ISIC codes at least at the second level allowing for a disaggregation of off-farm employment into those within the agri-food system and the non-farm sector and account for secondary sources of employment.

A1.2. Classification Coding Scheme

ISIC Section^	ISICx	Description	Assumptions	Justification*	
AGRICULTURE, HUNTING, FORESTRY & FISHING	1	Crop and animal production, hunting and related service activities			
	2	Forestry and logging			
	3	Fishing and aquaculture			
MANUFACTURING	10	Manufacture of food products			
	11	Manufacture of beverages			
	12	Manufacture of tobacco products			
	13	Manufacture of textiles	25% of jobs in this industry is apportioned to downstream AFS	25% assigned to textiles and clothing items based on FAO report suggesting 26% share of cotton in total fibre consumption in developing countries	
	14	Manufacture of wearing apparel	25% of jobs in this industry is apportioned to downstream AFS	25% assigned to textiles and clothing items based on FAO report suggesting 26% share of cotton in total fibre consumption in developing countries	
	141	<i>Manufacture of wearing apparel except for fur</i>	25% of jobs in this industry is apportioned to downstream AFS	25% assigned to textiles and clothing items based on FAO report suggesting 26% share of cotton in total fibre consumption in developing countries	
	142	<i>Manufacture of articles of fur</i>			
	143	<i>Manufacture of knitted and crocheted apparel</i>	25% of jobs in this industry is apportioned to downstream AFS	25% assigned to textiles and clothing items based on FAO report suggesting 26% share of cotton in total fibre consumption in developing countries	
	15	Manufacture of leather and related products	x% of jobs in this industry is apportioned to downstream AFS	Jobs here include activities involving the use of leather and leather substitute in manufacturing. Hence, the partial allocation	
	151	<i>Tanning and dressing of leather; manufacture of luggage, handbags, saddlery and harness; dressing and dyeing of fur</i>	x% of jobs in this industry is apportioned to downstream AFS	Jobs here include activities involving the use of leather and leather substitute in manufacturing. Hence, the partial allocation	
	1511	<i>Tanning and dressing of leather; dressing and dyeing of fur</i>			
	1512	<i>Manufacture of luggage, handbags and the like, saddlery and harness</i>	x% of jobs in this industry is apportioned to downstream AFS	Jobs here include activities involving the use of leather substitute in manufacturing. Hence, the partial allocation	
	152	<i>Manufacture of footwear</i>	x% of jobs in this industry is apportioned to downstream AFS	Jobs here include activities involving the use of leather and leather substitute in manufacturing. Hence, the partial allocation	
	WHOLESALE AND RETAIL TRADE	46*	Wholesale trade, except of motor vehicles and motorcycles	x% of jobs in this industry is apportioned to downstream AFS	x% depends on the proportion of agricultural trade in the economy and varies by country and locality (rural, urban)
		461	<i>Wholesale on a fee or contract basis</i>	x% of jobs in this industry is apportioned to downstream AFS	Jobs in industry include those related to agricultural products sales
45.5			Misspecified code: Code as 46		
4619			Misspecified code: Code as 461		
462		<i>Wholesale of agricultural raw materials and live animals</i>			
463		<i>Wholesale of food, beverages and tobacco</i>			
464		<i>Wholesale of household goods</i>	25% of jobs in this industry is apportioned to downstream AFS	Jobs in industry involves wholesale of textiles	
4641		<i>Wholesale of textiles, clothing and footwear</i>	25% of jobs in this industry is apportioned to downstream AFS	25% assigned to textiles and clothing items based on FAO report suggesting 26% share of cotton in total fibre consumption in developing countries	
4649	<i>Wholesale of other household goods</i>				

Color code Completely within agri-food system Partially within agri-food system Misspecified codes Completely outside agri-food system

Table A1.2. Classification Coding Scheme (cont'd)

ISIC Section^	ISICx	Description	Assumptions	Justification*
WHOLESALE AND RETAIL TRADE	465	<i>Wholesale of machinery equipment and supplies</i>	x% of jobs in this industry is apportioned to downstream AFS	1 of 4 subcodes is directly AFS (sale of agricultural machinery)
	4651	<i>Wholesale of computers, computer peripheral equipment and software</i>		
	4652	<i>Wholesale of electronic and telecommunications equipment and parts</i>		
	4653	<i>Wholesale of agricultural machinery, equipment and supplies</i>		
	4659	<i>Wholesale of other machinery and equipment</i>		
	466	<i>Other specialized wholesale</i>		
	4661	<i>Wholesale of solid, liquid and gaseous fuels and related products</i>		
	4662	<i>Wholesale of metals and metal ores</i>		
	4663	<i>Wholesale of construction materials, hardware, plumbing and heating equipment and supplies</i>		
	46.75		Misspecified code: Code as 46	
	4669	<i>Wholesale of waste and scrap and other products n.e.c.</i>		
	4690	<i>Non-specialized wholesale trade</i>		
	47*	<i>Retail trade, except of motor vehicles and motorcycles</i>	x% of jobs in this industry is apportioned to downstream AFS	Subcodes include AFS related activities
	471	<i>Retail sale in non-specialized stores</i>	x% of jobs in this industry is apportioned to downstream AFS	1 out of 2 sub codes in AFS
	4711	<i>Retail sale in non-specialized stores with food, beverages or tobacco predominating</i>		
	4712		Misspecified codes. Code as 471	
	4714		Misspecified codes. Code as 471	
	4718		Misspecified codes. Code as 471	
	4719	<i>Other retail sale in non-specialized stores</i>		
	472	<i>Retail sale of food, beverages and tobacco in specialized stores</i>		
	4721	<i>Retail sale of food in specialized stores</i>		
	4722	<i>Retail sale of beverages in specialized stores</i>		
	4723	<i>Retail sale of tobacco products in specialized stores</i>		
	4728		Misspecified codes. Code as 472	
	473	<i>Retail sale of automotive fuel in specialized stores</i>		
	474	<i>Retail sale of information and communication equipment in specialized stores</i>		
	4741	<i>Retail sale of computers, peripheral units, software and telecommunications equipment in specialized stores</i>		
	4742	<i>Retail sale of audio and video equipment in specialized stores</i>		

Color code Completely within agri-food system Partially within agri-food system Misspecified codes Completely outside agri-food system

Table A1.2. Classification Coding Scheme (cont'd)

ISIC Section^	ISICx	Description	Assumptions	Justification*
WHOLESALE AND RETAIL TRADE	475	<i>Retail sale of other household equipment in specialized stores</i>		AFS share is negligible. Textile which we are allocating 25% is just 1 of 4 subcodes
	4751	<i>Retail sale of textiles in specialized stores</i>	25% of jobs in this industry is apportioned to downstream AFS	25% assigned to textiles and clothing items based on FAO report suggesting 26% share of cotton in total fibre consumption in developing countries
	4752	<i>Retail sale of hardware, paints and glass in specialized stores</i>		
	4753	<i>Retail sale of carpets, rugs, wall and floor coverings in specialized stores</i>		
	4759	<i>Retail sale of electrical household appliances, furniture, lighting equipment and other household articles in specialized stores</i>		
	476	<i>Retail sale of cultural and recreation goods in specialized stores</i>		
	4761	<i>Retail sale of books, newspapers and stationary in specialized stores</i>		
	4762	<i>Retail sale of music and video recordings in specialized stores</i>		
	4763	<i>Retail sale of sporting equipment in specialized stores</i>		
	4764	<i>Retail sale of games and toys in specialized stores</i>		
	477	<i>Retail sale of other goods in specialized stores</i>		AFS share is negligible. Retail of clothing which we are allocating 25% is just 1 of 4 subcodes
	4771	<i>Retail sale of clothing, footwear and leather articles in specialized stores</i>	x% of jobs in this industry is apportioned to downstream AFS	
	4772	<i>Retail sale of pharmaceutical and medical goods, cosmetic and toilet articles in specialized stores</i>		
	4773	<i>Other retail sale of new goods in specialized stores</i>		
	4774	<i>Retail sale of second-hand goods</i>		
	4775		Misspecified code: Code as 477	
	478	<i>Retail sale via stalls and markets</i>	x% of jobs in this industry is apportioned to downstream AFS	Sub-codes includes jobs directly related to the AFS
	4781	<i>Retail sale via stalls and markets of food, beverages and tobacco products</i>		
	4782	<i>Retail sale via stalls and markets of textiles, clothing and footwear</i>	25% of jobs in this industry is apportioned to downstream AFS	
	4784		misspecified codes. Code as 478	
	4785		misspecified codes. Code as 478	
4787		misspecified codes. Code as 478		
4789	<i>Retail sale via stalls and markets of other goods</i>			
479	<i>Retail trade not in stores, stalls or markets</i>	x% of jobs in this industry is apportioned to downstream AFS	x% depends on the proportion of agricultural trade in the economy and varies by country and locality (rural, urban)	
4791	<i>Retail sale via mail order houses or via Internet</i>			
4799	<i>Other retail sale not in stores, stalls or markets</i>	x% of jobs in this industry is apportioned to downstream AFS	x% depends on the proportion of agricultural trade in the economy and varies by country and locality (rural, urban)	

Color code Completely within agri-food system Partially within agri-food system Misspecified codes Completely outside agri-food system

Table A1.2. Classification Coding Scheme (cont'd)

ISIC Section^	ISICx	Description	Assumptions	Justification*
TRANSPORTATION AND STORAGE	49*	Land transport and transport via pipelines	x% of jobs in this industry is apportioned to downstream AFS	x% depends on the proportion of agricultural trade in the economy and varies by country and locality (rural, urban)
	491	<i>Transport via railways</i>	x% of jobs in this industry is apportioned to downstream AFS	x% depends on the proportion of agricultural trade in the economy and varies by country and locality (rural, urban)
	4911	<i>Passenger rail transport, interurban</i>		
	4912	<i>Freight rail transport</i>	x% of jobs in this industry is apportioned to downstream AFS	x% depends on the proportion of agricultural trade in the economy and varies by country and locality (rural, urban)
	492	<i>Other land transport</i>	x% of jobs in this industry is apportioned to downstream AFS	x% depends on the proportion of agricultural trade in the economy and varies by country and locality (rural, urban)
	4921	<i>Urban and suburban passenger land transport</i>		
	4922	<i>Other passenger land transport</i>		
	4923	<i>Freight transport by road</i>	x% of jobs in this industry is apportioned to downstream AFS	x% depends on the proportion of agricultural trade in the economy and varies by country and locality (rural, urban)
	493	Transport via pipeline		
	50	Water transport	x% of jobs in this industry is apportioned to downstream AFS	x% depends on the proportion of agricultural trade in the economy and varies by country and locality (rural, urban)
	501	<i>Sea and coastal water transport</i>	x% of jobs in this industry is apportioned to downstream AFS	x% depends on the proportion of agricultural trade in the economy and varies by country and locality (rural, urban)
	5011	<i>Sea and coastal passenger water transport</i>		
	5012	<i>Sea and coastal freight water transport</i>	x% of jobs in this industry is apportioned to downstream AFS	x% depends on the proportion of agricultural trade in the economy and varies by country and locality (rural, urban)
	502	<i>Inland water transport</i>	x% of jobs in this industry is apportioned to downstream AFS	x% depends on the proportion of agricultural trade in the economy and varies by country and locality (rural, urban)
	5021	<i>Inland passenger water transport</i>		
	5022	<i>Inland freight water transport</i>	x% of jobs in this industry is apportioned to downstream AFS	x% depends on the proportion of agricultural trade in the economy and varies by country and locality (rural, urban)

Color code Completely within agri-food system Partially within agri-food system Misspecified codes Completely outside agri-food system

Table A1.2. Classification Coding Scheme^ (cont'd)

ISIC Section^	ISICx	Description	Assumptions	Justification*
TRANSPORTATION AND STORAGE	51	Air transport	x% of jobs in this industry is apportioned to downstream AFS	x% depends on the proportion of agricultural trade in the economy and varies by country and locality (rural, urban)
	511	Passenger air transport		
	512	Freight air transport	x% of jobs in this industry is apportioned to downstream AFS	x% depends on the proportion of agricultural trade in the economy and varies by country and locality (rural, urban)
	52*	Warehousing and support activities for transportation	x% of jobs in this industry is apportioned to downstream AFS	x% depends on the proportion of agricultural trade in the economy and varies by country and locality (rural, urban)
	521	Warehousing and storage	x% of jobs in this industry is apportioned to downstream AFS	x% depends on the proportion of agricultural trade in the economy and varies by country and locality (rural, urban)
	522	Support activities for transportation	x% of jobs in this industry is apportioned to downstream AFS	x% depends on the proportion of agricultural trade in the economy and varies by country and locality (rural, urban)
	53	Postal and courier services		
FOOD SERVICES	56	Food and beverage service activities		
OTHER	75	Veterinary activities		

Color code Completely within agri-food system Partially within agri-food system Misspecified codes Completely outside agri-food system

Source: Authors

^This table covers only the sections of the ISIC classification involving agrifood related jobs. Jobs in the following sections of the ISIC classifications not covered in this table were all coded as off-farm employment outside the agrifood system: 1. Mining and quarrying; 2. Electricity, gas, steam and air conditioning supply, 3. Water supply, sewerage, waste management and remediation activities; 4. Construction; 5. Information and communication; 6. Finance, insurance and real estate; 7. Professional scientific and technical activities; 8. Administrative and support services; 9. Public Administration and defense; 10. Education, human health and social work; 11. Arts, entertainment and recreation, 12. Activities of households as employers; 13. Activities of extraterritorial organizations and bodies

*x% of jobs assigned to the downstream stages of the agrifood system varies by country and locality (rural and urban) and is based on the ratio of the share of cash food expenditure in all cash expenditure to the share of non-food agriculture in all agriculture.

APPENDIX 2. DETAILED EMPLOYMENT TABLES

A2. 1. Sectoral Employment Shares from Most Recent Nationally Representative Survey

		Total working age population (millions)	% of working age population primarily engaged in							
			Farming		Off-farm stages of agri-food system		Non-farm outside agri-food system		Economically inactive	Unemployed
			% in counts	% in FTE	% in counts	% in FTE	% in counts	% in FTE	% in counts	% in counts
Ghana (2012/13)	Total	14.3	35.6	34.3	14.3	19.2	31.8	46.5	16.0	2.3
	Rural	6.7	62.2	64.9	9.6	12.0	16.6	23.1	10.4	1.1
	Urban	7.6	12.0	10.6	18.5	24.9	45.2	64.6	20.8	3.4
Nigeria (2012/13)	Total	89.6	27.3	34.0	13.3	22.7	24.2	43.3	33.1	2.1
	Rural	54.3	40.9	54.1	11.7	19.6	14.5	26.3	31.9	1.0
	Urban	35.3	6.4	7.3	15.8	26.9	39.0	65.8	35.1	3.7
Rwanda (2010/11)	Total	5.8	55.4	50.2	5.0	9.3	21.2	40.4	17.7	0.8
	Rural	4.8	61.6	60.5	4.4	8.0	16.7	31.4	17.1	0.2
	Urban	1.0	23.0	14.9	8.2	13.8	44.3	71.3	20.7	3.7
Tanzania (2012/13)	Total	23.5	51.2	48.3	12.0	17.2	23.3	34.5	11.7	1.8
	Rural	16.2	67.0	69.2	9.1	11.3	16.1	19.4	7.2	0.6
	Urban	7.3	16.2	11.4	18.5	27.6	39.2	61.0	21.5	4.6
Uganda (2011/12)	Total	14.2	59.7	48.7	6.3	13.6	18.5	37.6	15.5	0.0
	Rural	11.4	67.5	58.8	5.2	11.5	14.8	29.7	12.5	0.0
	Urban	2.8	27.6	13.7	10.5	21.1	33.9	65.2	27.9	0.1
Zambia (2012)	Total	7.5	42.5	46.7	4.5	9.2	23.4	44.1	23.6	6.1
	Rural	4.1	63.4	75.8	2.5	4.5	11.4	19.7	20.1	2.7
	Urban	3.3	16.5	17.6	7.1	13.8	38.2	68.6	28.0	10.2
Kenya (2009)*	Total	20.5	31.6	-	37.7				23.3	7.4
	Rural	13.2	43.0	-	27.7				23.3	6.1
	Urban	7.4	11.3	-	55.5				23.4	9.7
Malawi (2008)*	Total	3.3	32.4	-	27.8				24.7	8.6
	Rural	2.7	36.5	-	21.8				25.0	9.4
	Urban	0.6	14.0	-	55.1				23.3	5.1
Mali (2009)*	Total	3.4	49.7	-	27.8				20.0	2.4
	Rural	2.5	64.5	-	16.0				16.8	1.7
	Urban	0.9	10.7	-	59.0				27.0	3.3

Source: Author's estimates from Ghana Living Standard Survey 5 and 6; CSO Zambia Labor Force Surveys 2005 and 2012; Rwanda Integrated Household Living Survey; Tanzania National Panel Survey; Uganda National Panel Survey; General Household survey. *Microdata of population and housing census data in IPUMS).

Table A2. 2. Sectoral Shares of New Jobs by Age Categories

Country and Survey years		Total # of new jobs		Farming		Off-farm within AFS		Non-farm outside AFS	
		# in Counts	# in FTEs	% in count	% in FTE	% in count	% in FTE	% in count	% in FTE
Ghana	15-24	1,051,511	305,385	48.4	5.3	19.4	31.2	32.2	63.5
(2005/06 - 2012/13)	25-34	336,797	534,869	-89.7	-29.2	36.2	36.0	153.5	93.1
	35-64	212,063	4,016,194	-177.8	34.1	119.6	24.3	158.1	41.6
Nigeria	15-24	2,888,402	828,105	90.3	119.7	13.0	18.4	-3.3	-38.1
(2010/11-2012/13)	25-34	15,953,302	505,034	54.5	112.9	20.4	-3.0	25.1	-10.0
	35-64	13,758,805	3,750,868	43.7	42.9	29.2	50.0	27.1	7.1
Rwanda	15-24	368,146	134,753	5.5	-45.2	12.0	20.3	82.5	124.9
(2005/06-2010/11)	25-34	1,278,338	604,532	55.7	37.3	7.3	12.5	37.1	50.2
	35-64	1,353,385	610,854	60.2	44.9	4.6	7.5	35.2	47.6
Tanzania	15-24	1,392,970	1,083,380	59.8	53.4	10.6	9.2	29.7	37.3
(2010/11 - 2012/13)	25-34	309,512	864,352	39.5	45.7	26.5	22.4	34.0	31.9
	35-64	261498.4	969,723	78.8	56.3	12.9	17.8	8.4	25.8
Uganda	15-24	1,906,097	-445,590	64.6	-96.6	5.8	-18.8	29.6	15.5
(2005/06 - 2011/12)	25-34	1,061,071	-170,639	42.3	-144.8	21.7	24.2	36.0	20.6
	35-64	2,218,244	-62,969	54.7	-434.8	14.3	-0.9	31.0	335.7
Zambia	15-24	-232,459	-157,719	-168.2	-203.5	11.6	21.8	56.6	81.6
(2005-2012)	25-34	362,121	362,121	-5.8	11.5	24.0	21.8	81.9	66.7
	35-64	527,050	615,570	20.6	16.7	19.6	21.4	59.8	61.9

Source: Author's estimates from Ghana Living Standard Survey; Nigeria General Household Survey; Rwanda Integrated Household Living Survey; Tanzania National Panel Survey; Uganda National Panel Survey; and CSO Zambia Labor Force Surveys.

A2. 3. Changes in Type of Employment over Time

	Year	Public wage	Private wage	self-employment /unpaid labor
Ghana	2005/06	517,000	1,081,354	7,483,327
	2012/13	703,611	1,981,302	9,255,002
	Annual % change	5.2	11.9	3.4
Nigeria	2010/11	4,541,316	5,074,409	60,255,760
	2011/13	3,648,946	5,790,039	73,393,837
	Annual % change	-9.8	7.1	10.9
Rwanda	2005/06	171,496	1,485,373	4,407,729
	2010/11	249,555	3,108,986	5,651,814
	Annual % change	9.1	21.9	5.6
Tanzania	2010/11	524,271	1,933,276	16,316,898
	2012/13	526,741	2,564,628	13,766,424
	Annual % change	0.2	16.3	-7.8
Uganda	2005/06	297,859	1,893,866	8,694,248
	2011/12	452,695	1,711,723	9,407,808
	Annual % change	7.4	-1.4	1.2
Zambia	2005/06	523	551	15,038
	2011/12	1,136	1,385	18,829
	Annual % change	16.8	21.6	3.6
Mali*	1998	17,060		280,962
	2009	17,999		372,388
	Annual % change	0.5		3.0
Malawi*	1998	55,455		337,230
	2008	77,929		282,666
	Annual % change	3.7		-1.5

Author's estimates from Ghana Living Standard Survey 5 and 6; CSO Zambia Labor Force Surveys 2005 and 2012; Rwanda Integrated Household Living Survey; Tanzania National Panel Survey; Uganda National Panel Survey; General Household survey. *Microdata of population and housing census data in IPUMS).

A2. 4. Changes in Primary Employment of Working-age Population by Sector, Ghana

	# of people in working age population (weighted #s)			Annual % change in # of working age individuals in age categories				
	2005	2013	Annual % change	15-24	25-34	35-44	45-54	55-64
Urban								
Farming	515,019	925,412	15.9					
Male	289,946	511,172	15.3	46.1	5.7	8.5	7.1	16.4
Female	225,073	414,240	16.8	43.2	20.2	14.9	1.6	16.3
Off-farm within agri-food system	575,020	1,437,666	30.0					
Male	115,038	206,759	15.9	52.2	8.8	4.0	12.1	19.4
Female	459,982	1,230,907	33.5	37.7	34.9	35.4	25.6	37.5
Off-farm outside agri-food system	2,042,250	3,388,598	13.2					
Male	1,138,686	1,988,885	14.9	17.3	17.6	13.8	11.5	11.8
Female	903,564	1,399,713	11.0	13.8	14.5	6.3	7.3	12.6
Unemployed	415,161	265,133	-7.2					
Male	194,137	101,702	-9.5	-8.9	-9.9	-10.4	-10.4	-10.8
Female	221,024	163,431	-5.2	-4.8	-5.7	-4.1	-5.7	-11.9
Economically inactive	1,664,341	1,784,988	1.4					
Male	717,400	732,898	0.4	0.7	-2.3	-10.5	-3.8	15.2
Female	946,941	1,052,090	2.2	3.2	-1.0	-1.9	3.1	3.4
Total # urban individuals in working-age	5,227,644	7,846,306	10.0	7.2	12.0	12.0	9.6	13.2
Total # of males	2,467,381	3,565,112	8.9	6.3	11.0	10.2	8.6	12.1
Total # of females	2,760,263	4,281,194	11.0	8.1	12.8	13.6	10.5	14.2
Rural								
Farming	4,010,854	4,211,265	1.0					
Male	2,036,735	2,130,157	0.9	9.1	-3.2	-1.5	-2.0	1.5
Female	1,974,119	2,081,108	1.1	9.1	-2.2	0.2	-1.7	1.4
Off-farm within agri-food system	520,484	641,670	4.7					
Male	66,653	88,918	6.7	22.2	0.5	2.4	9.9	-2.2
Female	453,831	552,753	4.4	14.1	1.0	3.8	-0.9	14.8
Off-farm outside agri-food system	890,636	1,095,388	4.6					
Male	468,221	658,394	8.1	13.0	12.0	10.6	-0.1	-4.5
Female	422,416	436,994	0.7	8.2	0.2	-5.3	-3.0	3.0
Unemployed	106,422	76,499	-5.6					
Male	37,179	22,307	-8.0	-8.1	-4.3	-16.2	-11.8	6.5
Female	69,243	54,192	-4.3	-7.1	-0.9	-6.5	31.7	-8.4
Economically inactive	1,763,323	780,955	-11.1					
Male	841,012	345,471	-11.8	-11.1	-13.7	-18.2	-15.9	-8.8
Female	922,311	435,484	-10.6	-9.4	-12.4	-15.1	-12.2	-11.5
Total # of rural individuals in working-age	7,304,082	6,833,649	-1.3	-0.8	-1.9	-1.1	-2.4	0.1
Total # of males	3,454,332	3,258,026	-1.1	-1.1	-1.0	-0.7	-2.3	-0.3
Total # of females	3,849,750	3,575,624	-1.4	-0.4	-2.7	-1.4	-2.5	0.5
Totals								
Total in working age population	12,531,725	14,679,955	3.4	2.7	4.1	4.3	2.3	5.0
Total # of males	5,921,713	6,823,137	3.0	1.9	4.4	4.0	2.0	4.2
Total # of females	6,610,012	7,856,818	3.8	3.4	3.8	4.6	2.6	5.6

Color scheme Negative red 0.1-10. yellow 10.1-20. green above 20 blue

Source: Ghana Living Standard Survey 5 and 6.

*Working-age group defined as those within 15-64 years old.

Farming comprises of activities of growing crops and raising animals including fishing and aquaculture and hunting.

Urban refers to localities with 5,000 or greater population.

Only primary source of employment included.

A2.5. Changes in Employment of Working-age Population in Ghana

	# of people in working age population (weighted #s)			Annual % change in # of working age population in age categories				
	2005	2013	Annual % change	15-25	25-35	35-45	45-54	55-64
Urban								
Farming	727,074	1,223,515	13.7	43.1	10.5	11.4	2.9	14.9
Male	427,979	659,233	10.8	45.8	5.0	5.7	3.4	10.3
Female	299,095	564,282	17.7	39.5	18.8	20.5	2.2	21.4
Off-farm within agri-food system	639,681	1,575,947	29.3	42.1	29.3	26.8	23.3	30.9
Male	131,652	231,365	15.1	56.1	9.6	2.7	9.7	21.7
Female	508,029	1,344,582	32.9	38.2	36.5	33.7	25.4	32.3
Off-farm outside agri-food system	2,156,423	3,669,932	14.0	16.6	16.5	11.7	11.3	12.8
Male	1,210,107	2,153,288	15.6	18.4	17.5	14.5	12.9	13.1
Female	946,316	1,516,644	12.1	15.1	15.2	7.8	8.9	12.4
Unemployed	415,161	265,133	-7.2	-6.5	-7.5	-6.8	-7.8	-11.4
Male	194,137	101,702	-9.5	-8.9	-9.9	-10.4	-9.7	-10.8
Female	221,024	163,431	-5.2	-4.3	-5.6	-4.1	-5.7	-11.9
Economically inactive	1,664,341	1,784,988	1.4	2.0	-1.4	-4.1	1.2	7.1
Male	717,400	732,898	0.4	0.7	-2.3	-10.5	-3.8	15.2
Female	946,941	1,052,090	2.2	3.2	-1.0	-1.9	3.1	3.4
Total # urban individuals in working-age	5,227,644	7,846,306	10.0	7.2	12.0	12.0	9.6	13.2
Total # of males	2,467,381	3,565,112	8.9	6.3	11.0	10.2	8.6	12.1
Total # of females	2,760,263	4,281,194	11.0	8.1	12.8	13.6	10.5	14.2
Rural								
Farming	4,547,561	4,882,461	1.5	10.3	-2.3	0.1	-1.4	1.5
Male	2,299,999	2,492,054	1.7	10.5	-2.3	-0.3	-1.1	1.1
Female	2,247,562	2,390,407	1.3	10.0	-2.3	0.5	-1.6	1.8
Off-farm within agri-food system	832,412	1,057,073	5.4	17.7	-0.1	3.3	4.6	13.2
Male	132,146	203,459	10.8	38.3	3.2	7.8	8.4	4.9
Female	700,265	853,614	4.4	13.8	-0.6	2.5	3.9	16.0
Off-farm outside agri-food system	1,211,505	1,503,758	4.8	12.8	5.5	3.3	-2.1	3.1
Male	639,858	878,443	7.5	14.9	10.1	9.5	-1.6	0.6
Female	571,647	625,315	1.9	11.1	0.6	-2.9	-2.7	8.1
Unemployed	106,422	76,499	-5.6	-7.4	-1.7	-10.0	11.7	-5.8
Male	37,179	22,307	-8.0	-8.1	-4.3	-16.2	-7.1	6.5
Female	69,243	54,192	-4.3	-6.9	-0.9	-6.5	31.7	-8.4
Economically inactive	1,763,323	780,955	-11.1	-10.3	-12.9	-16.3	-13.4	-10.6
Male	841,012	345,471	-11.8	-11.1	-13.7	-18.2	-15.9	-8.8
Female	922,311	435,484	-10.6	-9.4	-12.4	-15.1	-12.2	-11.5
Total # of rural individuals in working-age	7,304,082	6,833,649	-1.3	-0.8	-1.9	-1.1	-2.4	0.1
Total # of males	3,454,332	3,258,026	-1.1	-1.1	-1.0	-0.7	-2.3	-0.3
Total # of females	3,849,750	3,575,624	-1.4	-0.4	-2.7	-1.4	-2.5	0.5
Totals								
Total in working age population	12,531,725	14,679,955	3.4	2.7	4.1	4.3	2.3	5.0
Total # of males	5,921,713	6,823,137	3.0	1.9	4.4	4.0	2.0	4.2
Total # of females	6,610,012	7,856,818	3.8	3.4	3.8	4.6	2.6	5.6

Color scheme Negative red 0.1-10. yellow 10.1-20. green above 20 blue

Source: Ghana Living Standard Survey 5 and 6.

*Working-age group defined as those within 15-64 years old.

Farming comprises of activities of growing crops and raising animals including fishing and aquaculture and hunting.

Urban refers to localities with 5,000 or greater population.

Primary and secondary source of employment included.

A2.6. Changes in Primary Employment of Working-age Population by Sector, Tanzania

	# of people in working age population (weighted #s)			Annual % change in # of working age population in age categories				
	2008/09	2012/13	Annual % change	15-24	25-34	35-44	45-54	55-64
Urban								
Farming								
Male	218,545	329,400	12.7	7.9	23.1	2.4	15.4	21.9
Female	389,950	519,750	8.3	2.5	9.3	-4.0	31.4	11.4
Off-farm within agri-food system								
Male	130,011	208,063	15.0	19.0	8.5	40.5	3.7	-8.8
Female	208,048	331,893	14.9	8.2	16.5	10.4	26.2	150.7
Off-farm outside agri-food system								
Male	1,113,785	1,870,715	17.0	39.6	13.1	17.4	8.4	11.0
Female	729,846	1,182,237	15.5	22.9	8.9	23.1	17.0	4.4
Unemployed								
Male	107,111	320,087	49.7	40.8	52.1	140.1	684.6	16.9
Female	181,883	498,547	43.5	33.2	43.6	70.0	76.9	379.6
Economically inactive								
Male	696,504	699,740	0.1	0.2	-1.4	5.0	-3.4	2.7
Female	1,105,701	1,376,885	6.1	6.8	4.5	11.4	1.3	2.8
Total # urban individuals in working-age	5,105,038	7,504,586	11.8	10.4	11.5	14.6	13.7	10.4
Total # of males	2,362,614	3,516,672	12.2	10.9	13.0	15.6	9.9	11.0
Total # of females	2,742,425	3,987,914	11.4	10.0	10.4	13.7	17.7	9.7
Rural								
Farming								
Male	4,118,699	4,212,582	0.6	6.4	-1.2	-4.4	1.0	-0.6
Female	5,138,233	5,110,558	-0.1	0.0	-1.9	0.3	2.3	-0.6
Off-farm within agri-food system								
Male	102,983	186,039	20.2	71.0	-2.5	39.0	74.5	-24.4
Female	71,336	139,819	24.0	41.4	9.8	48.2	905.0	-17.7
Off-farm outside agri-food system								
Male	804,598	1,567,402	23.7	69.1	13.0	11.6	14.9	16.0
Female	282,327	625,759	30.4	96.8	13.3	14.8	3.3	27.4
Unemployed								
Male	56,457	501,130	196.9	172.6	122.7	231.2	-	-
Female	33,815	625,858	437.7	421.9	410.7	442.6	366.4	1751.6
Economically inactive								
Male	1,314,424	1,368,957	1.0	-2.5	24.0	13.6	2.5	16.3
Female	1,457,161	1,733,897	4.7	2.1	13.0	8.7	13.8	7.5
Total # of rural individuals in working-age	13,912,338	16,608,472	4.8	7.0	3.6	2.9	4.6	3.2
Total # of males	6,730,073	8,101,169	5.1	7.8	4.0	1.6	4.1	4.3
Total # of females	7,182,265	8,507,303	4.6	6.2	3.2	4.1	5.1	2.2
Totals								
Total in working age population	19,017,377	24,113,058	6.7	7.9	6.1	5.9	6.5	4.7
Total # of males	9,092,687	11,617,840	6.9	8.6	6.7	5.3	5.4	5.7
Total # of females	9,924,690	12,495,217	6.5	7.3	5.5	6.4	7.7	3.8

Color scheme Negative red 0.1-10. yellow 10.1-20. green above 20 blue

Source: Tanzania National Panel Survey (2008 and 2012).

*Working-age group defined as those within 15-64 years old.

Farming comprises of activities of growing crops and raising animals including fishing and aquaculture and hunting.

Only primary source of employment included: primary employment is respondent stated main source of employment.

A2.7. Changes in Employment of Working-age Population in Tanzania (Based on All Sources of Employment Specified by Survey Respondents)

	# of jobs (weighted #s)			Annual % change in # of working age population in age categories				
	2010/11	2012/13	annual % change	15-24	25-34	35-44	45-54	55-64
Urban								
Farming	862,520	1,188,194	18.9	29.3	12.7	8.2	20.0	14.8
Male	369,899	528,905	21.5	33.4	12.8	15.7	16.4	6.3
Female	492,621	659,289	16.9	24.3	12.6	4.3	21.9	22.6
Off-farm within agri-food system	1,150,698	1,352,747	8.8	16.3	8.3	20.8	-9.4	-9.1
Male	488,330	530,195	4.3	11.6	-0.8	22.9	-13.1	-13.9
Female	662,367	822,552	12.1	19.6	14.8	19.0	-6.8	-5.5
Off-farm outside agri-food system	2,564,033	2,871,345	6.0	14.9	4.6	4.9	-3.1	8.5
Male	1,509,523	1,723,549	7.1	20.0	3.3	10.8	-6.9	17.7
Female	1,054,510	1,147,795	4.4	9.9	6.8	-2.4	5.9	-4.4
Unemployed	375,292	335,112	-5.4	-2.1	-13.0	-4.9	-13.2	401.0
Male	117,048	118,674	0.7	1.6	-16.5	149.8	47.4	
Female	258,244	216,437	-8.1	-4.8	-12.0	-8.2	-24.2	164.0
Economically inactive	1,724,528	1,572,302	-4.4	-8.1	7.1	11.6	11.6	2.1
Male	669,149	509,371	-11.9	-13.9	0.1	348.8	139.5	-13.8
Female	1,055,379	1,062,930	0.4	-3.2	8.6	5.1	7.3	16.7
Total # urban individuals in working-age	7,193,137	7,504,586	2.2	-0.2	3.0	7.5	-0.9	5.1
Total # of males	3,333,024	3,516,672	2.8	-0.1	2.8	14.1	-4.7	6.0
Total # of females	3,860,113	3,987,914	1.7	-0.3	3.2	2.2	3.0	4.2
Rural								
Farming	10,038,742	10,874,133	4.2	9.1	1.5	-0.3	1.7	3.4
Male	4,620,234	4,997,809	4.1	9.8	2.1	-2.8	-1.9	4.2
Female	5,418,508	5,876,324	4.2	8.4	1.1	1.3	4.9	2.7
Off-farm within agri-food system	1,420,713	1,481,432	2.1	13.3	1.4	-8.1	18.2	-5.3
Male	654,421	692,994	2.9	21.7	3.3	-13.8	23.5	-1.9
Female	766,293	788,438	1.4	6.2	-0.1	-2.9	14.3	-7.8
Off-farm outside agri-food system	2,373,618	2,606,457	4.9	25.9	1.5	0.9	-4.9	-3.2
Male	1,499,624	1,644,377	4.8	21.5	2.7	1.1	-3.5	0.9
Female	873,995	962,080	5.0	33.0	-0.6	0.7	-7.5	-10.4
Unemployed	261,004	91,157	-32.5	-30.9	-33.2	-37.1	-43.5	-34.9
Male	101,049	39,649	-30.4	-25.9	-40.3	-48.2	-50.0	-16.1
Female	159,955	51,508	-33.9	-34.3	-28.6	-33.8	-40.9	
Economically inactive	1,980,741	1,172,758	-20.4	-22.3	-1.7	-27.6	3.6	-5.9
Male	1,006,421	526,088	-23.9	-25.4	-10.0	-22.3	32.9	-13.0
Female	974,320	646,670	-16.8	-18.9	3.0	-31.5	-6.2	-2.6
Total # of rural individuals in working-age	16,436,125	16,608,472	0.5	1.5	0.2	-2.1	1.5	0.8
Total # of males	8,023,215	8,101,169	0.5	1.9	0.8	-3.6	-0.2	2.1
Total # of females	8,412,910	8,507,303	0.6	1.1	-0.3	-0.8	3.1	-0.4
Totals								
Total in working age population	23,629,262	24,113,058	1.0	1.0	1.2	0.7	0.9	1.8
Total # of males	11,356,239	11,617,840	1.2	1.3	1.5	1.4	-1.4	3.1
Total # of females	12,273,023	12,495,217	0.9	0.6	1.0	0.0	3.1	0.7

Color scheme Negative red 0.1-10. yellow 10.1-20. green above 20 blue

Source: Tanzania National Panel Survey 2010/11 and 2012/13.

Include jobs from all sources of employment. 2007/08 NPS survey was not used because it was structured to ask about a relatively limited number of potential employment options.

A2. 8. Changes in Primary Employment of Working-age Population by Sector, Zambia

	# of people in working age population (weighted #s)			Annual % change in # of working age population in age categories				
	2005	2012	Annual % change	15-24	25-34	35-45	45-54	55-64
Urban								
Farming	262,642	550,461	15.7	13.5	25.2	16.4	8.1	8.9
Male	121,911	157,137	4.1	1.7	8.3	5.4	3.8	2.9
Female	140,731	393,324	25.6	25.6	37.4	25.4	10.8	16.5
Off-farm within agri-food system	110,846	236,282	16.2	6.2	12.9	23.0	46.7	19.6
Male	67,195	108,465	8.8	4.9	5.5	18.6	18.4	5.9
Female	43,651	127,816	27.5	8.4	25.9	27.5	119.6	42.7
Off-farm outside agri-food system	922,271	1,274,439	5.5	4.7	4.2	8.0	6.2	5.6
Male	584,225	791,563	5.1	3.9	3.5	7.9	6.8	4.6
Female	338,046	482,876	6.1	5.8	5.3	8.4	5.3	8.5
Unemployed	110,035	339,992	29.9	30.3	18.3	41.0	70.5	694.3
Male	39,511	132,646	33.7	36.4	23.2	24.8	57.5	-
Female	70,524	207,346	27.7	26.9	16.0	53.6	81.2	340.7
Economically inactive	1,040,960	932,314	-1.5	2.4	-8.6	-8.7	-5.0	-1.5
Male	367,188	427,442	2.3	5.0	-6.6	-3.1	-1.4	-3.9
Female	673,772	504,871	-3.6	0.4	-9.3	-9.6	-6.1	0.3
Total # urban individuals in working-age	2,446,754	3,333,487	5.2	5.4	3.5	6.6	6.9	7.6
Total # of males	1,180,030	1,617,255	5.3	5.6	3.2	7.9	7.1	4.5
Total # of females	1,266,724	1,716,233	5.1	5.1	3.7	5.4	6.8	12.0
Rural								
Farming	3,210,560	2,625,117	-2.6	-5.4	-2.1	1.3	-0.5	-0.6
Male	1,517,516	1,195,290	-3.0	-6.6	-2.9	2.4	0.0	1.1
Female	1,693,044	1,429,827	-2.2	-4.3	-1.4	0.3	-1.0	-1.9
Off-farm within agri-food system	34,415	101,542	27.9	21.3	23.8	31.3	44.9	186.0
Male	8,455	38,796	51.3	34.0	51.5	87.5	27.4	-
Female	25,960	62,746	20.2	16.3	15.0	20.3	57.3	100.3
Off-farm outside agri-food system	165,923	472,501	26.4	26.6	23.4	29.9	26.5	30.8
Male	117,797	284,774	20.3	22.2	14.7	28.3	18.6	25.2
Female	48,126	187,727	41.4	32.2	54.5	33.4	60.4	51.3
Unemployed	13,364	112,615	106.1	101.5	105.8	45.4	438.8	-
Male	3,804	42,234	144.3	222.5	127.8	12.3	-	-
Female	9,560	70,381	90.9	70.2	96.7	87.4	313.6	-
Economically inactive	340,449	831,315	20.6	31.6	1.5	-7.0	0.8	-0.4
Male	153,408	464,806	29.0	36.1	0.3	4.9	0.6	-4.3
Female	187,041	366,510	13.7	26.3	2.2	-8.8	0.8	1.8
Total # of rural individuals in working-age	3,764,711	4,143,090	1.4	1.5	0.3	3.1	1.7	0.8
Total # of males	1,800,980	2,025,899	1.8	1.7	-0.4	5.5	2.1	2.6
Total # of females	1,963,731	2,117,191	1.1	1.4	1.0	1.3	0.5	-0.5
Totals								
Total in working age population	6,211,465	7,478,049	2.9	3.0	1.7	4.5	-5.5	2.8
Total # of males	2,981,010	3,644,108	3.2	3.2	1.2	6.5	3.9	3.3
Total # of females	3,230,455	3,833,941	2.7	2.9	2.2	2.8	3.1	2.3

Color scheme **Negative** red 0.1-10. yellow 10.1-20. green above 20 blue

Source: CSO Zambia Labor Force Surveys 2005 and 2012.

*Working-age group defined as those within 15-64 years old.

Farming comprises of activities of growing crops and raising animals including fishing and aquaculture and hunting.

Urban refers to localities with 5,000 or greater population.

Only primary source of employment included: primary employment is respondent stated main source of employment.

A2. 9. Changes in Primary Employment of Working-age Population by Sector, Uganda

	# of jobs (weighted #)		annual % change	Annual % change in # of working age population in age categories				
	2005/06	2011/12		15-24	25-34	35-44	45-54	55-64
Urban								
Farming	410,693	1,084,535	27.3	26.7	12.7	39.7	26.0	41.9
Male	181,994	512,013	30.2	23.7	16.0	-13.7	15.2	61.1
Female	228,699	572,521	25.1	30.1	10.4	25.3	33.4	27.7
Off-farm within agri-food system	354,931	387,207	1.5	-2.8	-0.7	2.8	18.6	1.4
Male	137,229	141,615	0.5	-4.8	6.6	3.1	-8.8	1.7
Female	217,702	245,592	2.1	-1.4	-4.1	2.5	47.7	1.2
Off-farm outside agri-food system	931,824	1,110,327	3.2	4.3	-2.4	6.6	9.4	33.6
Male	594,694	644,301	1.4	3.1	-2.9	2.0	10.1	13.3
Female	337,130	466,026	6.4	5.9	-1.5	16.2	7.9	111.7
Unemployed	138,510	4,053	-16.2	-	-15.1	-16.7	-16.7	-16.7
Male	50,418	-	-	-	-16.7	-16.7	-16.7	-16.7
Female	88,092	4,053	-15.9	-	-13.8	-16.7	-16.7	-
Economically inactive	826,240	772,207	-1.1	-2.1	-2.0	14.6	27.9	4.8
Male	330,687	308,404	-1.1	-3.1	-7.1	30.2	501.0	-2.6
Female	495,554	463,803	-1.1	-1.2	-0.5	-3.6	-4.1	7.9
Total # urban individuals in working-age	2,757,849	3,792,641	6.3	2.0	-1.1	11.6	16.5	23.8
Total # of males	1,329,057	1,829,258	6.3	1.8	-1.2	11.1	11.9	22.8
Total # of females	1,428,792	1,963,383	6.2	2.2	-1.1	12.2	21.9	24.8
Rural								
Farming	7,393,378	9,612,326	5.0	5.8	3.5	5.0	6.7	3.4
Male	3,212,513	4,440,258	6.4	8.7	4.4	4.9	9.2	-0.1
Female	4,180,865	5,172,069	4.0	3.4	2.8	5.0	5.1	6.5
Off-farm within agri-food system	487,811	1,114,270	21.4	18.3	21.5	22.3	21.9	31.4
Male	256,200	503,783	16.1	17.0	18.7	8.8	30.4	7.6
Female	231,611	610,486	27.3	19.6	24.3	39.6	16.3	122.3
Off-farm outside agri-food system	1,176,561	2,631,947	20.6	34.1	16.5	22.6	11.3	12.0
Male	882,263	1,711,525	15.7	30.1	13.9	16.5	2.7	6.8
Female	294,298	920,422	35.5	43.3	23.8	44.4	39.8	47.2
Unemployed	94,701	843	-16.5	-16.4	-	-	-16.7	-
Male	54,713	-	-	-	-	-	-16.7	-
Female	39,989	843	-16.3	-16.1	-	-	-16.7	-
Economically inactive	1,466,305	1,417,223	-0.6	-2.0	1.7	2.5	28.5	4.1
Male	705,033	580,550	-2.9	-5.7	5.9	16.8	45.2	11.3
Female	761,272	836,672	1.7	2.0	-0.2	-4.4	17.1	-0.1
Total # of rural individuals in working-age	11,021,626	16,354,230	8.1	5.4	6.6	8.4	8.5	5.2
Total # of males	5,299,179	7,955,014	8.4	6.3	7.7	8.0	8.9	2.0
Total # of females	5,722,447	8,399,216	7.8	4.5	5.7	8.8	8.0	8.4
Totals								
Total in working age population	13,779,475	20,146,871	7.7	7.0	6.3	9.9	10.5	7.9
Total # of males	6,628,236	9,784,272	7.9	7.5	7.0	9.8	10.5	5.3
Total # of females	7,151,239	10,362,599	7.5	6.6	5.7	9.9	10.5	10.4

Color scheme Negative red 0.1-10. yellow 10.1-20. green above 20 blue

Source: Uganda National Panel Survey 2006 and 2012.

*Working-age group defined as those within 15-64 years old.

Farming comprises of activities of growing crops and raising animals including fishing and aquaculture and hunting. Criteria for rural urban status not specified.

Only primary source of employment included: primary employment is respondent stated main source of employment.

A2. 10. Changes in Primary Employment of Working-age Population by Sector, Nigeria

	# of people in working age population (weighted #s)			% change in # of working age population in age categories				
	2006	2010	% change	15-24	25-34	35-44	45-54	55-64
Urban								
Farming								
Male	1,026,513	1,490,938	11.3	30.5	12.5	6.2	7.1	13.3
Female	408,500	1,136,484	44.6	82.1	36.2	78.0	38.8	20.9
Off-farm								
Male	4,391,742	5,296,810	5.2	-4.8	5.2	8.8	6.2	1.4
Female	4,220,006	4,350,332	0.8	-9.7	2.3	5.6	1.4	-4.8
Unemployed								
Male	317,363	367,940	4.0	1.0	1.9	10.8	33.1	31.6
Female	327,761	386,256	4.5	-2.2	11.1	1.4	11.6	-9.8
Economically inactive								
Male	3,736,044	3,287,148	-3.0	-2.3	-0.3	-13.9	-13.3	-4.5
Female	4,795,136	4,709,352	-0.4	-1.3	3.0	-2.6	-1.6	0.2
Total # urban individuals in working-age	20,030,234	21,506,931	1.8	-1.6	3.6	5.1	3.0	1.3
Total # of males	9,951,607	10,676,907	1.8	-1.8	2.9	5.7	3.2	2.7
Total # of females	10,078,626	10,830,024	1.9	-1.4	4.2	4.5	2.8	-0.4
Rural								
Farming								
Male	13,764,662	18,192,822	8.0	28.8	7.8	3.7	5.0	4.5
Female	7,769,007	16,148,472	27.0	77.5	31.3	24.7	12.3	12.2
Off-farm								
Male	4,309,173	5,212,430	5.2	13.9	6.3	5.1	1.3	4.4
Female	4,504,329	5,957,256	8.1	10.5	13.0	6.4	7.5	-3.7
Unemployed								
Male	497,023	779,902	14.2	3.7	17.0	55.7	62.5	26.0
Female	430,177	532,340	5.9	-4.6	6.9	122.9	170.1	-
Economically inactive								
Male	8,448,734	9,272,655	2.4	0.2	6.2	12.3	13.0	23.5
Female	16,109,345	16,410,928	0.5	3.3	-2.6	-1.6	1.3	1.9
Total # of rural individuals in working-age	57,140,329	74,359,271	7.5	8.6	7.8	7.1	6.4	6.0
Total # of males	27,814,080	34,302,543	5.8	6.3	7.1	4.7	4.8	5.5
Total # of females	29,326,249	40,056,728	9.1	11.1	8.2	9.2	8.2	6.6
Totals								
Total in working age population	77,170,563	95,866,202	6.1	5.8	6.7	6.6	5.6	4.8
Total # of males	37,765,688	44,979,450	4.8	4.1	5.9	5.0	4.4	4.8
Total # of females	39,404,875	50,886,752	7.3	7.6	7.2	8.1	6.8	4.8

Color scheme: Negative (red), 0.1-10. (yellow), 10.1-20. (green), above 20 (blue)

Source: Nigerian General Household Survey (IPUMS).

For both years, the farming population includes individuals involved in primary forestry activities such as afforestation and logging.

Working-age group defined as those within 15-64 years old.

Definition of urban not specified in the data source but determined from source.

Only primary source of employment included: primary employment is respondent stated main source of employment.

A2. 11. Changes in Employment of Working-age Population by Sector, Nigeria, LSMS Data

	# of jobs (weighted #s)		annual % change	Annual % change in # of working age population in age categories				
	2010/11	2012/13		15-24	25-34	35-44	45-54	55-64
Urban								
Farming	3,013,181	3,509,024	8.2	38.7	29.1	49.2	49.2	31.9
Male	1,933,636	2,184,948	6.5	46.9	29.0	40.7	69.3	27.4
Female	1,079,546	1,324,076	11.3	26.1	29.2	67.3	29.7	42.3
Off-farm within agri-food system	5,055,425	6,025,676	9.6	-3.9	2.3	28.4	25.4	25.7
Male	1,988,630	1,860,802	-3.2	-9.2	-10.5	11.7	6.2	29.8
Female	3,066,795	4,164,874	17.9	1.9	9.6	39.2	37.2	23.9
Off-farm outside agri-food system	14,946,329	14,992,524	0.2	0.3	5.8	15.3	11.3	14.9
Male	8,011,475	8,177,845	1.0	-1.7	9.5	15.7	9.9	23.5
Female	6,934,853	6,814,679	-0.9	2.4	2.4	14.8	13.3	6.1
Unemployed	1,177,531	1,307,103	5.5	-0.1	12.5	5.4	-13.9	2.4
Male	637,652	710,483	5.7	-10.2	17.1	75.5	-3.3	9.7
Female	539,878	596,620	5.3	19.5	7.9	-16.9	-34.6	-7.1
Economically inactive	11,413,139	12,389,755	4.3	3.4	12.5	2.4	-14.1	3.6
Male	4,927,212	5,621,582	7.0	5.9	18.1	40.8	-17.3	-7.7
Female	6,485,926	6,768,173	2.2	1.0	9.8	-2.6	-13.4	12.9
Total # urban individuals in working-age	34,725,711	34,598,504	-0.2	0.0	-1.3	-0.2	-1.5	4.3
Total # of males	16,576,363	16,420,094	-0.5	1.8	-1.4	-2.8	-5.3	5.7
Total # of females	18,149,348	18,178,410	0.1	-1.7	-1.2	2.2	2.6	3.0
Rural								
Farming	20,040,249	25,790,554	14.3	31.6	24.0	23.8	21.1	30.6
Male	11,932,042	16,105,825	17.5	41.1	20.9	28.1	28.3	31.4
Female	8,108,207	9,684,730	9.7	15.2	27.9	18.2	11.6	29.2
Off-farm within agri-food system	6,550,443	8,625,843	15.8	30.5	18.0	42.3	58.4	53.9
Male	2,105,059	2,459,939	8.4	43.7	10.6	65.7	82.7	66.0
Female	4,445,384	6,165,904	19.4	25.1	20.1	36.0	49.3	47.3
Off-farm outside agri-food system	12,682,155	10,730,724	-7.7	-4.4	7.9	8.5	21.2	33.0
Male	6,685,848	6,063,825	-4.7	0.5	20.8	26.2	25.2	39.0
Female	5,996,306	4,666,899	-11.1	-8.1	0.2	-6.7	15.1	23.7
Unemployed	944,071	558,390	-20.4	-21.4	-20.8	-19.4	52.0	-27.0
Male	463,160	345,713	-12.7	-15.8	-9.4	-11.0	-	-
Female	480,911	212,676	-27.9	-26.7	-31.1	-34.9	52.0	-27.0
Economically inactive	15,585,071	17,327,208	5.6	6.1	5.4	5.0	12.8	-4.8
Male	6,094,414	6,492,004	3.3	2.5	12.7	77.3	-8.2	-21.0
Female	9,490,658	10,835,204	7.1	10.0	3.3	2.3	15.1	1.0
Total # of rural individuals in working-age	50,834,045	54,476,627	3.6	7.0	0.9	-0.6	4.7	5.5
Total # of males	24,104,669	25,749,353	3.4	6.9	1.3	-0.7	0.6	5.6
Total # of females	26,729,376	28,727,274	3.7	7.1	0.6	-0.5	8.9	5.3
Totals								
Total in working age population	85,559,756	89,075,132	2.1	4.1	-0.1	-0.5	2.1	5.0
Total # of males	40,681,032	42,169,447	1.8	4.9	0.0	-1.5	-1.9	5.6
Total # of females	44,878,724	46,905,684	2.3	3.3	-0.1	0.4	6.3	4.4

Color scheme Negative red 0.1-10. yellow 10.1-20. green above 20 blue

Source: Nigerian General Household Survey 2010/11 and 2012/13.

Working-age group defined as those within 15-64 years old.

Farming comprises of activities of growing crops and raising animals including fishing and aquaculture and hunting. Includes both primary and secondary jobs

A2. 12. Changes in Primary Employment of Working-age Population by Sector, Malawi

	# of people in working age population (weighted #s)			Annual % change in # of working age population in age categories				
	1998	2008	Annual % change	15-24	25-34	35-44	45-54	55-64
Urban								
Farming								
Male	38,790	43,270	1.2	9.2	1.9	-1.9	-4.0	-3.9
Female	38,630	39,910	0.3	3.7	1.0	-2.1	-3.0	-2.2
Off-farm								
Male	274,710	326,850	1.9	-1.1	2.7	2.9	1.1	6.6
Female	82,970	150,540	8.1	4.1	9.3	8.4	13.2	19.1
Unemployed								
Male	28,470	30,490	0.7	0.3	3.1	1.2	-3.3	-4.4
Female	32,600	96,850	19.7	15.7	29.6	16.5	13.6	9.2
Economically inactive								
Male	107,680	137,830	2.8	1.6	9.7	13.9	12.4	33.6
Female	229,700	215,300	-0.6	-0.5	-0.8	-2.3	-0.2	4.7
Total # urban individuals in working-age	833,550	1,136,000	3.6	2.7	5.0	3.4	2.6	6.4
Total # of males	449,650	592,740	3.2	2.6	4.2	3.2	1.0	5.5
Total # of females	383,900	543,260	4.2	2.9	6.1	3.6	5.1	7.8
Rural								
Farming								
Male	1,374,810	986,770	-2.8	-3.3	-2.1	-2.3	-4.1	-3.1
Female	1,780,640	1,120,580	-3.7	-4.4	-2.8	-3.6	-4.4	-3.3
Off-farm								
Male	253,810	589,510	13.2	13.9	12.6	14.0	10.6	18.4
Female	82,490	285,400	24.6	20.5	24.7	26.6	25.1	39.4
Unemployed								
Male	37,090	254,170	58.5	35.6	74.4	115.8	82.0	72.0
Female	35,480	484,350	126.5	94.8	183.0	175.1	128.8	86.2
Economically inactive								
Male	407,350	675,570	6.6	2.9	35.3	114.1	115.9	151.5
Female	390,290	826,250	11.2	5.8	22.7	26.8	34.1	51.4
Total # of rural individuals in working-age	4,361,960	5,613,370	2.9	2.6	4.1	2.8	0.7	3.3
Total # of males	2,073,060	2,704,800	3.0	2.9	4.2	3.6	0.5	3.0
Total # of females	2,288,900	2,908,570	2.7	2.4	4.0	2.2	1.0	3.7
Totals								
Total in working age population	5,195,510	6,802,300	3.1	2.8	4.4	3.0	1.0	3.6
Total # of males	2,522,710	3,325,040	3.2	2.9	4.3	3.6	0.7	3.3
Total # of females	2,672,800	3,477,260	3.0	2.6	4.5	2.4	1.4	4.0
Color scheme	Negative	red	0.1-10.	yellow	10.1-20.	green	above 20	blue

Source: Malawi Household and population census (IPUMS).

*Working-age group defined as those within 15-64 years old.

Farming comprises of activities of growing crops and raising animals including fishing and aquaculture and hunting. Urban refers to all townships, town planning areas, and all district centers.

Only primary source of employment included: primary employment is respondent stated main source of employment.

A2. 13. Changes in Primary Employment of Working-age Population by Sector, Kenya

	# of people in working age population (weighted #s)			Annual % change in # of working age population in age categorie				
	1999	2009	Annual % change	15-24	25-34	35-45	45-54	55-64
Urban								
Farming								
Male	199,500	290,280	4.6	1.8	4.7	5.4	7.6	10.9
Female	295,820	547,510	8.5	7.8	9.2	7.6	9.2	10.0
Off-farm								
Male	1,487,460	2,476,430	6.6	3.9	7.0	7.3	8.4	12.3
Female	830,540	1,622,300	9.5	5.9	10.0	11.1	16.6	22.1
Unemployed								
Male	247,300	357,500	4.5	1.1	6.8	12.6	16.9	27.8
Female	289,820	362,660	2.5	-0.3	7.2	9.8	9.1	5.6
Economically inactive								
Male	273,740	588,410	11.5	12.9	7.4	4.1	2.7	6.6
Female	594,640	1,142,100	9.2	10.2	7.8	7.1	7.6	11.7
Total # urban individuals in working-age	4,218,820	7,387,190	7.5	6.1	7.9	8.2	9.8	12.3
Total # of males	2,208,000	3,712,620	6.8	5.6	6.9	7.3	8.4	11.8
Total # of females	2,010,820	3,674,570	8.3	6.4	9.1	9.5	12.0	12.8
Rural								
Farming								
Male	2,345,220	2,423,090	0.3	-1.8	1.3	2.0	1.8	2.5
Female	3,217,540	3,229,510	0.0	-1.6	0.8	0.6	1.3	1.2
Off-farm								
Male	1,797,480	2,225,780	2.4	0.9	2.4	2.7	3.7	5.7
Female	967,360	1,414,200	4.6	2.5	4.6	5.2	7.9	9.5
Unemployed								
Male	272,380	459,580	6.9	2.7	8.2	18.1	24.9	33.0
Female	409,780	341,360	-1.7	-4.1	1.1	7.5	7.5	5.7
Economically inactive								
Male	644,780	1,241,780	9.3	9.4	13.3	8.8	5.8	4.1
Female	1,105,720	1,820,800	6.5	8.1	4.7	3.5	4.7	5.5
Total # of rural individuals in working-age	10,760,260	13,156,100	2.2	1.6	2.4	2.5	3.1	3.5
Total # of males	5,059,860	6,350,230	2.6	2.0	2.5	0.8	1.6	4.1
Total # of females	5,700,400	6,805,870	1.9	1.2	2.2	4.5	4.8	3.0
Totals								
Total in working age population	14,979,080	20,543,290	3.7	2.8	4.2	4.1	4.6	4.9
Total # of males	7,267,860	10,062,850	3.8	3.0	4.1	4.4	4.7	5.5
Total # of females	7,711,220	10,480,440	3.6	2.7	4.3	3.9	4.6	4.4

Color scheme Negative red 1-50. yellow 51-100 green 101 or more blue

Source: Kenya Population and Housing Census (IPUMS).

*Working-age group defined as those within 15-64 years old.

Farming comprises of activities of growing crops and raising animals including fishing and aquaculture and hunting. Farming population comprises of individuals employed in a family holding agricultural activity as primary occupation.

Data source do not define urban but indicates coding all peri-urban areas as urban.

Only primary source of employment included: primary employment is respondent stated main source of employment.

A2. 14. Changes in Primary Employment of Working-age Population by Sector, Mali

	# of people in working age population (weighted #s)			Annual % change in # of working age population in age categorie				
	1998	2009	Annual % change	15-24	25-34	35-44	45-54	55-64
Urban								
Farming								
Male	164,170	62,780	-5.6	-6.3	-5.7	-5.2	-4.7	-5.2
Female	65,210	36,300	-4.0	-4.8	-3.5	-3.7	-3.4	-3.9
Off-farm								
Male	329,730	547,370	6.0	6.7	6.6	4.6	5.6	8.1
Female	107,080	246,130	11.8	14.2	13.2	7.7	9.2	9.2
Unemployed								
Male	12,430	30,240	13.0	18.5	10.2	6.5	15.6	31.8
Female	3,500	15,740	31.8	49.4	22.4	12.7	49.1	111.4
Economically inactive								
Male	206,850	265,160	2.6	4.0	-0.8	-2.7	-1.3	-0.6
Female	552,750	586,200	0.6	1.7	0.0	-0.7	-0.2	-0.4
Total # urban individuals in working-age	1,456,420	1,827,150	2.3	3.1	2.4	1.2	1.7	1.0
Total # of males	722,020	927,000	2.6	3.1	2.8	1.8	2.3	1.5
Total # of females	734,400	900,150	2.1	3.1	2.0	0.6	1.2	0.6
Rural								
Farming								
Male	1,399,820	1,584,990	1.2	0.0	1.9	1.8	1.9	1.4
Female	741,040	930,570	2.3	1.2	3.8	2.4	3.3	1.1
Off-farm								
Male	86,820	392,660	32.0	47.2	35.5	23.0	27.1	22.3
Female	87,880	169,430	8.4	12.9	7.8	4.8	7.1	6.2
Unemployed								
Male	5,960	16,830	16.6	24.2	15.5	7.3	11.1	10.7
Female	2,050	6,690	20.6	30.9	16.5	4.1	22.7	14.2
Economically inactive								
Male	138,840	412,320	17.9	18.1	20.0	20.2	19.7	12.2
Female	1,020,540	1,586,170	5.0	6.3	5.3	3.9	4.0	3.3
Total # of rural individuals in working-age	3,501,400	5,194,350	4.4	4.6	5.0	3.8	4.2	3.2
Total # of males	1,640,650	2,458,900	4.5	4.7	5.1	4.2	4.3	3.5
Total # of females	1,860,750	2,735,450	4.3	4.6	4.9	3.4	4.1	3.0
Totals								
Total in working age population	4,957,820	7,021,500	3.8	4.2	4.2	3.0	3.5	2.7
Total # of males	2,362,670	3,385,900	3.9	4.2	4.4	3.4	3.7	3.0
Total # of females	2,595,150	3,635,600	3.6	4.1	4.1	2.7	3.4	2.5

Color scheme **Negative** red **0.1-10.** yellow **10.1-20.** green **above 20** blue

Source: *Quatrième Recensement Général de la Population et de l'habitat* 1998 and 2009 (IPUMS).

*Urban is defined as localities with population of 5000 or more.

For both years, the farming population includes individuals involved in primary forestry activities such as afforestation and logging.

Working-age group defined as those within 15-64 years old.

Only primary source of employment included: primary employment is respondent stated main source of employment.

A2. 15. Changes in Employment of Working-age Population by Sector, Rwanda

	# of jobs (weighted #s)		annual % change	Annual % change in # of working age population in age categories				
	2005/6	2010/11		15-24	25-34	35-44	45-54	55-64
Urban								
Farming	337,684	459,981	7.2	-0.9	13.0	8.3	8.1	14.6
Male	134,505	179,420	6.7	-1.7	13.5	7.5	11.0	12.6
Female	203,178	280,562	7.6	-0.3	12.7	8.7	6.5	15.8
Off-farm within agri-food system	98,746	105,966	1.5	-2.4	3.8	5.1	0.1	-6.6
Male	39,550	54,972	7.8	0.0	12.8	14.7	3.3	0.3
Female	59,196	50,994	-2.8	-4.3	-2.3	-0.6	-1.7	-9.1
Off-farm outside agri-food system	404,482	558,051	7.6	1.5	10.4	14.0	7.3	13.8
Male	235,716	328,624	7.9	2.5	12.4	9.7	5.6	8.9
Female	168,766	229,427	7.2	0.5	7.5	23.0	11.1	23.3
Unemployed	14,369	34,867	28.5	33.1	27.6	29.3	1.9	-
Male	8,223	11,493	8.0	11.8	6.2	6.3	-6.8	-
Female	6,146	23,374	56.1	68.3	51.0	51.2	24.3	-
Economically inactive	218,757	192,960	-2.4	-1.0	-6.3	-5.5	-11.8	-4.7
Male	89,291	84,632	-1.0	-0.8	-0.2	-1.6	-8.1	-2.5
Female	129,465	108,328	-3.3	-1.2	-8.0	-7.5	-14.1	-5.9
Total # urban individuals in working-age	897,611	937,357	0.9	-1.5	3.1	2.9	-0.4	4.4
Total # of males	424,174	445,640	1.0	-2.0	4.9	2.5	-0.8	3.7
Total # of females	473,437	491,717	0.8	-1.2	1.6	3.4	0.0	4.9
Rural								
Farming	4,216,393	5,641,032	6.8	0.3	12.1	7.2	7.6	15.6
Male	1,817,689	2,428,028	6.7	0.5	12.3	7.5	7.1	15.3
Female	2,398,704	3,213,004	6.8	0.2	12.0	7.0	8.0	15.9
Off-farm within agri-food system	314,849	506,558	12.2	10.2	17.3	9.3	7.9	53.3
Male	159,978	262,580	12.8	14.9	14.8	11.5	6.8	7.9
Female	154,871	243,978	11.5	5.8	20.7	7.4	9.0	-
Off-farm outside agri-food system	683,850	1,784,285	32.2	27.1	38.4	28.6	35.0	34.5
Male	495,409	1,161,536	26.9	22.2	32.7	23.3	28.0	30.6
Female	188,441	622,749	46.1	37.8	55.5	43.0	55.3	44.8
Unemployed	3,717	11,310	40.9	45.9	36.9	-4.9	-	-
Male	2,102	7,038	47.0	61.6	36.6	-4.9	-	-
Female	1,615	4,271	32.9	29.7	37.3	-	-	-
Economically inactive	623,009	826,512	6.5	7.0	10.0	-2.7	5.0	-2.5
Male	332,962	428,148	5.7	6.2	11.9	-3.1	8.7	-3.9
Female	290,047	398,364	7.5	8.0	7.9	-1.3	-2.9	0.1
Total # of rural individuals in working-age	4,125,610	4,858,039	3.6	0.7	6.8	3.3	3.7	8.4
Total # of males	1,886,639	2,238,443	3.7	0.9	7.2	3.9	4.0	7.3
Total # of females	2,238,972	2,619,596	3.4	0.5	6.4	2.8	3.5	9.4
Totals								
Total in working age population	5,075,138	5,795,397	2.8	0.2	6.0	3.2	3.1	7.9
Total # of males	2,334,636	2,684,083	3.0	0.4	6.7	3.7	3.3	6.9
Total # of females	2,740,502	3,111,314	2.7	0.2	5.4	2.9	3.0	8.8

Color scheme Negative red 1-50 yellow 51-100 green 101 or more blue

Source: Rwanda Integrated Household Living Survey (EICV2 & 3).

Working-age group defined as those within 15-64 years old.

Rural-urban classification of both surveys are based on the corresponding geographical designations from the 2002 Rwanda Census of Population and Housing and, hence, may not reflect current status of these areas.

Hence, the estimated total urban population from the 2010/11 survey data does not represent the expected urban expansion of the population.

~Accounts for all jobs per person.

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