

Unpacking the Sources of Income Growth in Sub-Saharan Africa

By

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Executive summary

This paper provides a micro-level analysis of trends and sources of income growth over the past decade among households in Sub-Saharan Africa (SSA) disaggregated by locality of residence (rural vs urban areas), households' landholding size, proximity to urban markets, and the gender and age of the household head. The results are derived from nationally-representative household surveys from seven countries (Ghana, Ethiopia, Nigeria, Malawi, Tanzania, Uganda, and Zambia) between 2003 and 2015.

While cross-country variations warrant caution against overgeneralization, the analysis confirms a general rise in inflation-adjusted household incomes in SSA over the past decade. Behind this positive overarching picture, we highlight five important disaggregated findings. First, real household income in most countries has grown more rapidly among female-headed households than male-headed households (Ghana, Ethiopia, Nigeria, and Uganda). On average, real incomes of female-headed households rose by 105% compared to 33% for male-headed households. However, baseline real incomes of female-headed households were only 68% those of male headed households. Therefore, although female-headed households are catching up, their incomes still lag behind those of male-headed households in the most recent surveys by 27% on average.

The second key finding is that households with favorable market access conditions have higher incomes and experienced about 2 to 5 times more growth in their incomes than those with relatively unfavorable market access conditions. In fact, in Ghana, Ethiopia and Malawi, average incomes for households with more favorable market access were about twice that of those with relatively unfavorable market access conditions. Third, households headed by a youth (15-24 years) have the lowest average income and experienced the lowest growth in income over the past decade. From the most recent surveys, incomes for households headed by youth (15-24 years) is, on the average, about 36% and 45% lower than that of households headed by young adults (25-34 years) and adults (35 years or more) respectively. Annual growth in the average income for youth-headed households is also about 8-10 percentage points lower. Fourth, we find that real incomes have grown more rapidly among urban households than rural households in most countries (Ghana, Ethiopia, Malawi, Nigeria, Zambia) with annual growth rates about two times more than that of rural households. Average incomes of urban households, for the most recent surveys are also nearly about twice that of rural households in most countries (Ghana, Ethiopia, Malawi, Tanzania, Zambia) Fifth, the results suggest landless households, on the average, have the highest income in most countries (Ghana, Ethiopia, Malawi, Nigeria, Zambia) and also experienced the fastest annual income growth of about 47% compared to 31% for households owning less than 2 hectares, 24% for those between 2 and 10 hectares and 13% for those with 10 hectares or more. While households owning less than 2 hectares of land experienced the fastest growth rates in income among households owning land, the growth is starting from a relatively low base and their current incomes are about 14% lower than that of households with landholdings between 2 and 10 hectares.

A decomposition analysis of household real income per labor time revealed three main groups of countries. The first group consists of countries where the largest proportion of the observed growth in real household income per labor time over the past decade is linked to increases in returns to labor from the non-farm sectors. Ghana and Malawi fall into this group. Among this group, the share of

income growth attributed to farming, while generally increasing, is less than that from the non-farm sector. The second group of countries, exemplified by Tanzania, is where the reallocation of labor time from farming into non-farm activities accounts for the largest share of observed growth in the returns to labor. Farming and non-farm sectors in these countries also contributed to increases in income. The third group is composed of countries where growth in the returns to labor from farming is the largest contributor to changes in household income per labor time. These countries, which include Nigeria generally experienced significant declines in the returns to labor in the non-farm sector. In Nigeria's case, labor has been reallocated from non-farm activities back into farming, which decreased the growth in household income per labor time. This is most likely a temporary trend influenced partially by the country's slumping oil sector in recent years. These cross-country variations reflect the diverse ways in which African economies are transforming, and call for tailored country-specific strategies to achieve economic growth and poverty reduction.

A generalized finding across almost all countries is that households are increasingly devoting more of their labor time to non-farm sources as their economies transform. However, despite its declining share in households' labor time and incomes, farming remains extremely important for livelihoods and economic growth for several reasons: First, farming still accounts for the largest share (over 50%) of households' labor time and a significant source of income for the majority of households in all countries. The most recently available surveys indicate that 44% to 87% of the households in the countries examined derive at least part of their income from farming. Over one-third of total household income is coming from farming. Considering the large share of people dependent on farming, investments aimed at increasing the return to labor in farming would thus directly affect the greatest number of people and promote broad-based and inclusive growth.

The second and more fundamental reason why the farming sector - farm productivity growth in particular - remains crucial pertains to the sector's relevance in the generation of new jobs in the rest of the economy. We demonstrate that the pace of growth in employment and incomes in the non-farm sector over the past decade is closely linked to productivity growth in farming. In line with historical industrialization experiences, our time-series econometric analysis found that countries that achieved the highest agricultural productivity growth are those that experienced the most rapid exit of labor from farming into off-farm sectors, and the highest growth in labor productivity in non-farm sector. As demonstrated in the literature, farm productivity growth, especially if broad based, results in greater employment and income multiplier effects than off-farm productivity growth. Therefore, strategies that effectively improve productivity and profitability of farming remains critical to expanding employment opportunities and improving livelihoods.

Highlights

- We observe increases in inflation-adjusted average household income in SSA over the last decade at the national level and among most sub-categories of households
- In most countries, average household income has grown more rapidly among female-headed households than male-headed households but starting from a relatively low base (Ghana, Ethiopia, Uganda, Zambia, Nigeria). Consequently, average income of female-headed households still lag behind that of male-headed households by about 27% on the average.
- Households located in relatively favorable market access conditions have incomes about twice higher on average and experienced more rapid growth in their incomes than those with relatively unfavorable access to market.
- Households headed by a youth (15-24 years) have the lowest income levels of any age category and experienced the lowest growth in income over the past decade. Income of the young adults (25-34 years) grew at a comparable rate with that of adults (35-64 years)
- Real incomes have grown more rapidly among urban households than rural households in most countries with annual growth rates about two times more than that of rural households. Average income of urban households are nearly about twice that of rural households in most countries
- Households are increasingly devoting more of their labor time to non-farm sources as their economies transforms. However, farming still accounts for the largest share of households' labor time in most countries and hence remains an extremely important source of livelihood.
- Among the different classes of households, male- and adult-headed households, households residing in areas that are relatively distant from urban areas and those owning larger parcels of land appears to devote a larger share of their work time to farming activities.
- Farm and non-farm activities differed in their relative contribution to the observed growth in household incomes across countries, pointing to important variations in countries' economic transformation process in Sub-Saharan Africa.
- The pace of the growth in employment and incomes in the non-farm sector over the past decade is closely linked to productivity growth in farming.
- Investments in on-farm productivity growth will be critical for building broad-based and inclusive economic growth with expanded employment opportunities.

1. Introduction

After decades of stagnation, Africa's economies have been transforming quite rapidly since 2000. The continent was home to six of the ten fastest growing economies in world in the 2000s and several African countries recorded GDP growth rates above 5% during the period (The Economist 2011). African economies also demonstrated a much stronger resilience compared to the world economy after the global financial crisis, recording GDP per capita growth of about 3 percent in 2010 while that of the world declined by 1.4 percent (World Bank 2015). Even in the face of recent challenges in the external environment (e.g. declines in commodity prices and rise of US interest rates) that is markedly slowing this economic progress, Africa's prospects for continued positive growth, at least in the medium term, remains favorable.

The trend of economic growth recovery in SSA is observed in both the agriculture and the non-agriculture sectors. Recent cross-country analysis suggest Africa is making steady progress towards agricultural transformation with most African countries enjoying sustained agricultural productivity growth since 2005. Farming's value added is estimated to have increased by 5.2 percent between 2000 and 2014 compared to less than 3 percent in the previous decade (World Bank 2015, Fuglie 2015). Both public and private sectors are increasingly investing in Africa's agriculture value chains. This is evidenced in the rise of the number of medium- and large-scale farms, which are increasingly accounting for a sizeable and rising portion of total farmland in many African countries (Jayne et al. 2016), and the growth in agribusinesses that are dynamically responding to population growth, urbanization and changing food diets associated with the income growth (Tschirley et al. 2015). There is also evidence of a rapid but highly variable shifts in the labor force from farming to off-farm sectors over the past decade in most African countries as part of the on-going economic transformation (Yeboah and Jayne, 2016; Macmillan et al., 2014). Significant growth is also experienced in the non-farm economy where sectors such as construction, wholesale, transport and communication enjoyed value added growth rates more than twice those of previous decades (Ulimwengu et al, 2016).

While recent evidence points to a new dynamism in much of Africa, there is little clarity on what exactly is driving it, the role of the agriculture sector in particular, how widely shared this growth is, and what it all means for agricultural development policies and programs focused on improving livelihoods and poverty reduction. Evidence suggests Africa's recent impressive economic performance has been accompanied by rural poverty reduction only in some countries, but not in others.² While it is generally well established that agricultural productivity growth does contribute to the reduction of poverty in areas where most of the workforce is still engaged in agriculture, this relationship is conditioned by numerous factors, including the initial distribution of productive assets that determines the degree to which agricultural productivity growth is inclusive and that, in turn, governs the strength of subsequent income and employment multipliers (Johnston & Kilby, 1975; Lipton, 2005; Mellor, 1976; Vollrath, 2007). Therefore, this observation

² Examples of where agricultural growth does not appear to have had much effect on poverty reduction include Zambia (Jayne et al., 2012); Malawi, Benin and Madagascar (AASR 2016)

of a variable cross-country relationship between growth and poverty reduction raises questions about the nature and inclusivity of the growth the various countries are experiencing and their implications for poverty reduction programs.

Moreover, most recent analyses on Africa's economic transformation process have been based on aggregate data at the national level (McMillan and Heady 2014; McMillan and Rodrik 2011; Rodrik 2014). While illuminating, these studies offer little insights into how the observed transformation translates into real income growth and welfare improvements among different classes of households. Indeed, there are few studies providing empirical estimates of the rate of real household income growth in different African countries across different classes of households and across different historical periods. Even fewer studies have decomposed such household income growth into its various sources. The latter is important because decomposition can identify the major contributing factors to the growth that is occurring, as well as suggest important bottlenecks that need to be addressed if income growth is going to accelerate.

2. Objectives

As a contribution to the on-going policy and research challenges, this study seeks to achieve the following objectives:

- Document real household income growth over time for various countries disaggregated across different classes of households
- Examine the sectoral contribution to household income growth by decomposing real household income per household labor time into growth components linked to farming and non-farm sources and reallocation effects
- Identify the sources of farming income growth by further decomposing farming income into constituent components including terms of trade effect (changes in relative prices), a productivity effect (yield increases), an area expansion effect (change in cultivated area relative to total area controlled by the household) and labor productivity effect
- Explore the evolving role of agriculture in the on-going economic transformation process
- Consider the implications of these trends for agricultural policy and poverty reduction strategies in Africa

3. Data

The primary analysis relies on data from two waves of nationally representative, multi-year household level surveys from seven countries in SSA– Ghana, Ethiopia, Malawi, Nigeria, Tanzania, Uganda and Zambia. Table 1 presents the data sources, the years covered and the total number of households surveyed for each

country. Most of these datasets are publicly available at the World Bank page as part of the Living Standard Measurement Survey with Integrated Survey of Agriculture (LSMS-ISA)³.

Table 1 Countries and Datasets Included in the Analysis

| Country | Name of survey | Year collected | # of HH |
|----------|---------------------------------------|----------------|---------|
| Ghana | Ghana Living Standard Survey 5 | 2005/06 | 8,686 |
| | Ghana Living Standard Survey 6 | 2012/13 | 16,772 |
| Ethiopia | Ethiopian Rural Socioeconomic Survey | 2011/12 | 3969 |
| | Ethiopian Socioeconomic Survey II | 2013/14 | 5262 |
| Malawi | Integrated Household Survey II | 2004/05 | 11,280 |
| | Integrated Household Survey III | 2010/11 | 12,271 |
| Nigeria | Nigeria Living Standard Survey | 2003/04 | 19, 158 |
| | General Household Survey-Panel | 2012/13 | 4,706 |
| Tanzania | National Panel Survey | 2008/09 | 3,280 |
| | National Panel Survey | 2012/13 | 5,015 |
| Uganda | National Household Survey | 2005/06 | 7417 |
| | National Panel Survey | 2011/12 | 2850 |
| Zambia | Rural Incomes and Livelihoods Survey | 2008 | 3969 |
| | Rural Agricultural Livelihoods Survey | 2015 | 5262 |

Each of the data sources contained among other things, detailed information on employment and time use for all household members, income from various economic activities, demographic characteristics of household members and household assets (e.g., land owned) and expenditures. We used this information to explore changes in household income between the two most recent waves of surveys disaggregated across different kinds of households by locality of residence (rural vs urban area), households' landholding, households' access to market, gender and age of household head. In some countries, we supplemented the data with information from the Rural Income Generating Activities (RIGA) database developed by the Food and Agriculture Organization of the United Nations⁴. The RIGA database provides information on

³<http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/EXTLSMS/0,,contentMDK:23617057~pagePK:64168445~piPK:64168309~theSitePK:3358997,00.html>

⁴<http://www.fao.org/economic/riga/rural-income-generating-activities/en/>

household income from various economic activities based on the same LSMS surveys we employed in this analysis. The income indicators are computed using a systematic approach across countries making them comparable across countries. The database also contains variables that allowed us to link households to the original datasets.

Some limitations of the data however need to be acknowledged. In some countries, certain key variables were present in one wave but absent in another making computation of household categories impossible. For instance, information on the nearest distance from the community in which households reside to a motorable road was only available in Nigeria General Household Survey of 2012/13 and not in the 2003/04 survey. Hence, we were unable to compare changes in real income over time across households with relatively different access to market in Nigeria. Similarly, available data for some countries (Ethiopia, Zambia) are missing key information on how household members allocated their time between farming and non-farm activities. Consequently, we were unable to compute full time equivalents and decompose income per FTE into constituent components.

4. Analytical Method

4.1 Measurements

We focus our analysis on the post 2000s period, during which much progress towards economic transformation in SSA has occurred. The first stage of the analysis involves the computation of real household income over time. Household income were computed as the aggregate sum of income received from all the income-generating activities household members undertook in the year the survey was conducted. We distinguished between income from farming and non-farm sources. Income from farming sector consists of wages from agricultural activities (including fishing, hunting) and revenues from crop and livestock production. Incomes from all other activities including those from economic activities within the upstream and downstream stages of the agrifood system were designated as non-farm income. For each country, computed nominal household income in local currency were converted into constant 2010 prices by deflating them using consumer price indices obtained from the World Bank's World Development Indicators database⁵. This was subsequently converted into US dollar to facilitate comparison across countries over time.

Time use information was then used to compute the share of each households' time devoted to farming and non-farm activities as an aggregate of the *full time equivalents* (FTE) of employment of household members. The FTE approach computes the share of individual's work time over the year devoted to a range of work activities and hence provides an estimate of the relative importance of various activities and sectors

⁵ http://databank.worldbank.org/data/reports.aspx?Code=FP.CPI.TOTL.ZG&id=1ff4a498&report_name=Popular-Indicators&populartype=series&ispopular=y

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. Most decomposition studies use employment shares based on the stated number of people engaged in the sector (McMillan and Rodrik 2011; Marouani and Mouelhi, 2016). However, such employment shares do not account for the intensity of the employment and potentially overestimate households' engagement in particular sectors (Yeboah and Jayne, 2016). We therefore employ the FTE approach of accounting for households' engagement in economic activities in our decomposition of income.

In an attempt to gauge the extent to which observed economic transformation in the region has been inclusive, we explored changes in income across different classes of households based on various household characteristics. We first explored the extent to which observed income growth is experienced among rural and urban households. Poverty in SSA is generally considered endemic to rural areas. Over 70 of the continent's poor resides in rural areas and countries with relatively large proportion of rural population tend to be associated with higher incidence of poverty (Beegle et al. 2016). Income growth among rural households could thus signify progress towards poverty reduction in a country. Classification of households by locality relied on their designation in the data by their national statistical services⁶. Hence, households living in areas designated as "urban" in the data were classified as "urban" and vice versa.

We also explored differences between male-headed and female-headed households. An estimated 60% of world's poor population are women (McFerson, 2010). The prevalence of traditional restrictions to women property rights and gender-based discrimination in the workforce often put women at a disadvantage to securing needed resources to leap out of poverty. Consequently, female-headed households are generally associated with higher incidences of poverty relative to male-headed households. A recent analysis also suggests a rising share of female-headed households across the continent largely driven by changes in marriage behavior, education and health (Milazzo and de Walle, 2015). This raises concerns about how well these households are sharing in the gains from the sustained economic growth witnessed over the past decade and half.

In addition, changes in income patterns are explored for different groups of households based on their relative access to market. 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. In terms of market access, we distinguished between households with "low" and those with "high" market access based on the proximity of their community to nearest motorable roads. Households living in communities that are at least one kilometer away from a motorable road were classified as low-market-access household.

For agrarian societies, land is one of the most important asset to generating income. Evidence suggests rapid changes in the farmland ownership patterns in SSA. While farms under five hectares still account for

⁶ Various national statistical services employ different criteria in their classification of areas as "urban". For instance, in Ghana localities with a population of 5000 or more are classified as urban. Whereas in Malawi, urban refers to all townships, town planning areas and all district centers.

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 (Jayne et al., 2016). Rising population density particularly in land constrained regions of SSA is also increasingly shrinking farm sizes per capita and reducing the amount of land available for agricultural purposes (Headey and Jayne, 2014). It is well recognized that inequality in land distribution negatively affects future economic growth (Deninger and Squire 1998), and even in the process of growth, poor households appear to benefit less than non-poor households when income and assets are distributed unequally (Gugerty and Timmer 1999). Hence, we examine the extent to which the changing landownership patterns is mediating households' ability to share in the gains of the economic transformation being experienced in region. We distinguish between four groups of households based on household landholdings namely 1. Landless households 2. Households owning less than 2 ha, 3. Households owning between 2 ha and 10 ha, and 4. Households owning 10 ha or more of land.

Lastly, our analysis is also disaggregated by the age of household head in light of reported differential access to resources for various age groups (Filmer and Fox 2014). Using the reported age of the head of each household, three age categories were created namely 1. Youth (15-24 years) 2. Young adult (25-34 years) 3. Adults (35 or more years).

4.2 Decomposition of Real Household Income per FTE

To help us understand the contributing factors and constraints to income growth, we decomposed the observed changes in real household income into constituent components and attributed to each component or sector a share of the total observed growth. We adopt the Shapley decomposition methodology, a simple additive method that decomposes changes in total real income to particular components by accounting for the relative size of the component in the initial year as well as the magnitude of the change in that component between the initial and most recent survey year.

As household income from each sector is a function of the work time devoted to the sector, real household income is first normalized by a measure of households' labor time allocated to each sector (full time equivalent) to give us a measure of the return to household labor, real income per FTE. Using the Shapley methodology, the real income that households receive for an hour of their labor time (income per FTE) can be decomposed using several consecutive steps, as illustrated in Figure 1, with each subsequent step offering additional insights into the sources of income growth over the last decade.

The changes in household real income per FTE may occur in two main ways. First, it could arise from changes in the return to labor (income) from the economic activities/sectors in which households are employed, perhaps as a result of total factor productivity growth in those sectors. It could also arise from structural change, which entails households reallocating their labor time from less remunerative sectors to other sectors that offer relatively higher returns to labor and thereby increasing overall income. Consequently, in the first step of the decomposition, growth in real income per FTE is decomposed into

changes in income growth arising from farming and non-farm sectors and from the reallocation of household labor time between the two sectors. In the second stage, farming income per FTE is further decomposed into changes linked to crop production and other agricultural activities such as livestock and agricultural wages. Next, the changes in crop income per FTE is decomposed into components attributed to growth in income per cropland cultivated, the share of total cropland under cultivation and total cropland per FTE in step 3. In the fourth step, income per cropland is decomposed into growth linked changes in income from the various crops cultivated on the land and the reallocation of land between crops. Lastly, we determine the contribution of changes in prices of crops and yield from crops to the growth in income received from the various crops.

This report focuses on the first stage of decomposition exploring the relative contribution of the changes in income from farming and non-farm sector and sectoral reallocation of labor time between sectors to income growth per FTE.

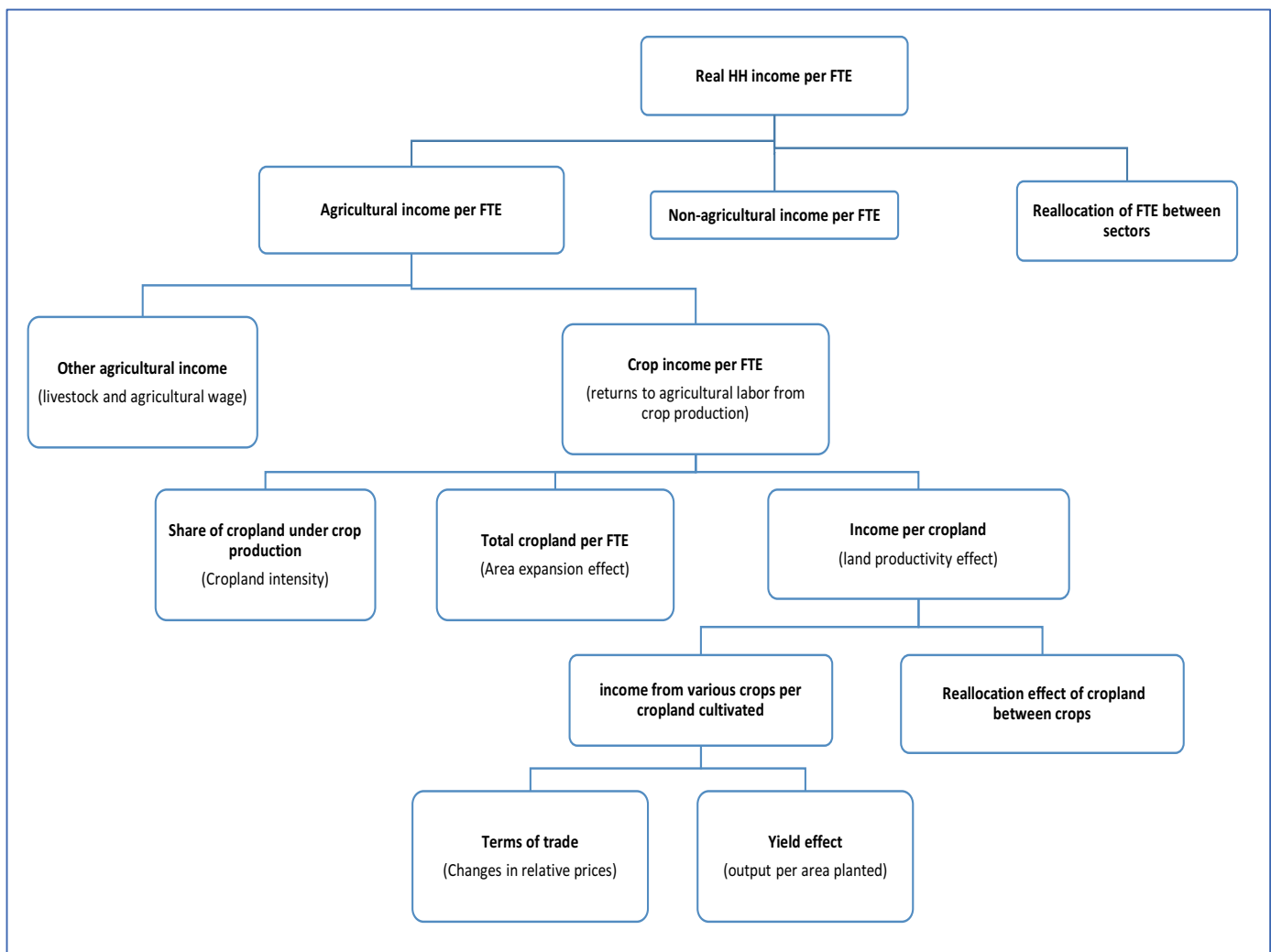


Figure 1 Stepwise approach to decomposing household income per FTE

5. Results and Discussions

5.1 Trends in real income growth

Table 2 presents estimates of average inflation adjusted income among different classes of households over time. Note that the reported inflation adjusted income is net of all observable cost associated with generating the income. While the differences in survey design, time periods and sample across surveys warrant caution against strict comparison of absolute values of income and overgeneralization of income patterns, a few observations are apparent. First, the results indicate a general positive growth in average inflation adjusted income among households in the countries studied. With the exception of Uganda, all the six remaining study countries have experienced significant growth in household income over the last decade. This is consistent with the broad literature pointing to Africa's progress towards an economic recovery (Ulimwengu et al. 2016; McMillan & Harttgen, 2014). There are however substantial variations across countries in the rate at which growth in real income is occurring. For our seven study countries, the growth in average real household income has been most rapid in Ghana, where average net household income grew about 137% annually between 2006 and 2013. This is followed by Nigeria and Ethiopia, recording annual growth rates about 45% and 25% respectively. Average inflation adjusted household income growth was comparatively less rapid in Tanzania, Zambia, and Malawi but generally robust with annual growth rates of about 10%, 11% and 6% respectively.

Second, the growth in average household income at the aggregate levels is reflected among both rural and urban households. However, income growth appears to be more rapid among urban households relative to rural households particularly in Ghana, Ethiopia⁷ and Malawi with average income growth rates of about 43% relative to 22% for rural households. Average real income of urban households also remains higher and is typically more than twice that of rural households in all the countries examined.

Third, the observed growth in income is generally experienced among female-headed and male-headed households. In most countries, average income has grown more rapidly among female-headed households than male-headed households (Ghana, Ethiopia, Nigeria and Uganda). On the average, female-headed households experienced an annual growth of about 105% increase in their household income compared to about 33% of male-headed households. In a recent cross-country analysis using Demographic Health Surveys for 24 countries in SSA, Milazzo and van de Walle (2015) also observed declining incidences of poverty among both male and female-headed households but indicated a faster rate of decline among the later. In examining the contribution of various demographic groups to the changes in poverty reduction, the authors found the contribution of female-headed households to changes in poverty reduction to be nearly as much as that of male-headed households although female-headed households constituted a

⁷ For Ethiopia, the rapid growth in income among urban households may have been influenced by the difference in sampling used for the two surveys. The 2011/12 focused primarily on rural households and sampled a few households from small towns who were classified as urban. The 2013/14 however includes households from bigger cities who on the average have higher incomes.

Table 2 Changes in Mean Real Household income over Time across Different Classes of Households

| | Ghana | | | Ethiopia | | | Malawi | | | Nigeria | | | Tanzania | | | Uganda | | | Zambia | | |
|---------------------------------|---------|---------|-----------------|----------|---------|-----------------|---------|---------|-----------------|---------|---------|-----------------|----------|---------|-----------------|---------|---------|-----------------|--------|--------|-----------------|
| | 2005/06 | 2012/13 | Annual % change | 2011/12 | 2013/14 | Annual % change | 2004/05 | 2010/11 | Annual % change | 2003/04 | 2012/13 | Annual % change | 2008/09 | 2012/13 | Annual % change | 2005/06 | 2011/12 | Annual % change | 2008 | 2015 | Annual % change |
| All Households | 1,048 | 11,110 | 137.2 | 333 | 503 | 25.4 | 486 | 665 | 6.1 | 404 | 2,048 | 45.3 | 867 | 1,228 | 10.4 | 745 | 735 | - 0.2 | 1,906 | 3,335 | 10.7 |
| Locality | | | | - | - | | | | | | | | | | | | | | | | |
| Urban | 1,276 | 13,830 | 140.5 | 372 | 737 | 49.1 | 739 | 1,377 | 14.4 | 815 | 2,178 | 40.8 | 1,428 | 1,936 | 8.9 | 1,166 | 820 | - 4.9 | 2,198 | 10,122 | 51.5 |
| Rural | 872 | 7,699 | 111.8 | 333 | 449 | 17.5 | 452 | 531 | 2.9 | 1,408 | 1,953 | 4.3 | 665 | 901 | 8.9 | 654 | 716 | 1.6 | 1,839 | 3,014 | 9.1 |
| Gender | | | | - | - | | | | | | | | | | | | | | | | |
| Male-head | 1,133 | 11,731 | 133.7 | 353 | 535 | 25.9 | 531 | 741 | 6.6 | 487 | 2,181 | 38.7 | 945 | 1,347 | 10.6 | 797 | 768 | - 0.6 | 1,998 | 3,757 | 12.6 |
| Female head | 848 | 9,706 | 149.3 | 258 | 401 | 27.9 | 336 | 420 | 4.2 | 34 | 1,641 | 543.5 | 637 | 903 | 10.4 | 607 | 666 | 1.6 | 1,586 | 1,714 | 1.1 |
| Land size | | | | - | - | | | | | | | | | | | | | | | | |
| Landless | 1,192 | 12,152 | 131.4 | 308 | 658 | 56.9 | 656 | 1,080 | 10.8 | 229 | 2,131 | 114.3 | 1,296 | 1,661 | 7.1 | 825 | 517 | - 6.2 | 4,712 | 9,291 | 13.9 |
| Less than 2 hectare | 715 | 9,370 | 173.0 | 330 | 431 | 15.3 | 431 | 537 | 4.1 | 1,665 | 1,913 | 1.7 | 657 | 929 | 10.4 | 625 | 720 | 2.5 | 1,508 | 2,594 | 10.3 |
| 2-10 hectare | 1,044 | 9,115 | 110.4 | 381 | 627 | 32.2 | 592 | 683 | 2.6 | 1,770 | 1,724 | - 0.3 | 857 | 1,119 | 7.7 | 887 | 1,040 | 2.9 | 1,731 | 3,020 | 10.6 |
| Over 10 hectare | 1,574 | 6,821 | 47.6 | - | - | - | 621 | - | - | 1,997 | 1,024 | - 5.4 | 1,126 | 1,779 | 14.5 | 1,199 | 1,444 | 3.4 | 4,005 | 5,139 | 4.0 |
| Market access conditions | | | | - | - | | | | | | | | | | | | | | | | |
| High | 864 | 8,014 | 118.1 | 330 | 647 | 48.2 | 578 | 1,058 | 13.9 | - | - | - | 712 | 1,247 | 18.8 | - | - | - | 2,398 | 3,701 | 7.8 |
| Low | 786 | 4,021 | 58.8 | 334 | 445 | 16.7 | 452 | 522 | 2.6 | - | - | - | 735 | 1,190 | 15.5 | - | - | - | 1,524 | 2,214 | 6.5 |
| Age | | | | - | - | | | | | | | | | | | | | | | | |
| Youth | 582 | 5,643 | 124.1 | 286 | 348 | 10.9 | 359 | 445 | 4.0 | 422 | 1,496 | 28.2 | 690 | 722 | 1.2 | 496 | 372 | - 4.2 | 1,537 | 1,226 | - 2.9 |
| Young adult | 977 | 10,857 | 144.5 | 279 | 468 | 33.8 | 496 | 674 | 6.0 | 982 | 1,478 | 27.8 | 881 | 1,234 | 10.0 | 738 | 744 | 0.1 | 2,108 | 2,885 | 5.3 |
| Adult | 1,110 | 11,627 | 135.4 | 357 | 528 | 23.9 | 504 | 696 | 6.4 | 687 | 2,205 | 24.6 | 872 | 1,269 | 11.4 | 785 | 776 | - 0.2 | 1,866 | 3,489 | 12.4 |

Notes: Average household income are in constant 2010 prices in US dollars

smaller share of the population. While welcoming this progress, it is worth noting that income growth among female-headed households is often starting from a low base of income relative to that of male-headed households (32% lower, on average). Consequently, although female-headed households are catching up, the average income of female-headed households still lags behind that of male-headed households in the most recent surveys in by about 27%, on the average.

Fourth, the various household landholding groupings have also experienced some growth in their average income. In Tanzania, growth in income has been most rapid among households owning more than 10 ha of land. However, for the remaining countries with available data (Ghana, Ethiopia, Malawi, Nigeria, Zambia), the rate of growth in average income has been most rapid among landless households with growth rates of about 47% on the average. This compares to 31% for households owning less than 2 hectares, 24% for those between 2 and 10 hectares and 13% for those with 10 hectares or more. Interestingly, average household income, computed from the most recent surveys, is also highest among landless households in these countries. Although this is not the case for Uganda, this finding may suggest that landholding size may not be a good indicator of a household wealth. As the economies of these countries transforms, more opportunities are being created in off-farm sectors like finance and telecommunication, which are relatively less dependent on land to generate outputs. These off-farm sectors often offer high paying jobs and provide avenues for skilled individuals from landless households to earn a good income. While households owning less than 2 ha of land are also experiencing rapid growth over time, their growth is starting from an initial relatively low base and as such remains the lowest income group in most countries (Ethiopia, Uganda, Malawi, Tanzania, Zambia). Indeed, income for households owning less than 2 hectares of land is on the average about 14% lower than that of those with landholdings between 2 and 10 hectares.

Fifth, for those countries for which we have comparable survey pairs, access to market appears to play a key role in the rate at which average income is growing. Generally, households with more favorable access to market were associated with higher incomes and experienced about 2-5 times more growth in their income than those with relatively unfavorable market access conditions. In fact, in Ghana, Ethiopia and Malawi, average income among households with more favorable market access was about twice that of those with relatively poor market access (Table 2).

Sixth, all households regardless of the age of the household head appears to share in the economic recovery as evidenced in the general positive growth among the various household categories based on age of the household head (Table 2). However, the extent to which the growth is shared differ across household categories. Indeed, the largest average income is observed among households headed by adults (35 years or more) and the growth rate of their income is generally comparable with that of the households whose head is a young adult (25-34 years). Youth-headed households also experienced increases in income of about 23% relative to 33% and 31% for households headed by young adults (24-35 years) or adults. Households headed by a youth (15-24 years) are associated with the least average real income in the most recent year and the lowest growth in income over time. This is not surprising considering the relatively challenging labor market conditions and the difficulties the youth faces to secure a job. In most African countries, the 15-24-year age bracket represents a period during which formal secondary and tertiary education or informal vocational trainings are received. Hence, individuals in this age category who are

active in the labor force are typically out-of-school youth who often lack the skills, experience and trusted networks to secure gainful employment. Their employment prospects are thus restricted to low-earning activities, which eventually consign them to the bottom of the income ladder.

An examination of the sectoral shares in household income reveals a growing importance of non-farm income to households as the economies transform. In most of countries, we observe declines in the share of total household income from the farming sector with a corresponding rise in non-farm income share total real household income. In fact, income shares from farming declined from about 61% to 48% in Malawi over the six-year period while Tanzania experienced about a ten-percentage point decline over a four-year period. Nonetheless, farming still accounts for a significant share of total household income. Estimates from the most recently available data suggest at least a third of real household income at the national level is derived from farming. Farming's income share is particularly higher among households living in rural areas, those owning land regardless of landholding size, and those living in communities with limited access to market. For these classes of households, over 50% of their average income is still coming from farming. The farming sector also remains a significant source of livelihood for most households. About 44% of households in Ghana to as much as 87% of households in Malawi are dependent on farming for some share of their household income (Table A2).

5.2 Household labor time allocation between farming and non-farm sectors

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 farming to more productive manufacturing and service sectors has generally been associated with overall increases in productivity, living standards and poverty reduction. For countries in the early stages of development, household members 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 and total work time devoted to farming has generally been associated with success of the farming sector in setting in motion the initial stages of economic transformation through expenditure multipliers. Hence, in effort to understand the patterns of income growth among households in SSA, we examine the extent to which households' work time devoted to the various sectors is shifting over time as the economy transforms.

Table 3 present provides information on the proportion of household adult's working time devoted to farming. We compute 'full time equivalents' (FTE) expressed as a percentage of an adult's total work time over the entire year. Note that farming's share of total FTE is significantly lower than farming's employment share based on the number of people engaged in farming. Recent estimates suggest that farming's share

Table 3 Changes in share of household work time allocated to each sector over time

| | Proportion of total work time allocated to farming sector (%) | | | | | | | | | |
|---------------------------------|---|------|--------|------|---------|------|----------|------|--------|------|
| | Ghana | | Malawi | | Nigeria | | Tanzania | | Uganda | |
| | 2006 | 2013 | 2005 | 2011 | 2004 | 2013 | 2009 | 2013 | 2006 | 2012 |
| All Households | 46.1 | 37.2 | 72.2 | 68.2 | 22.5 | 38.3 | 62.6 | 53.8 | 49.2 | 47.4 |
| Locality | | | | | | | | | | |
| Urban | 13.8 | 12.9 | 21.4 | 17.9 | 9.8 | 8.7 | 14.9 | 15.5 | 17.6 | 23.3 |
| Rural | 68.7 | 64.4 | 78.4 | 80.0 | 30.7 | 58.6 | 77.5 | 72.3 | 56.3 | 53.4 |
| Gender | | | | | | | | | | |
| Male-head | 48.5 | 40.8 | 71.0 | 66.3 | 22.8 | 39.6 | 63.5 | 54.5 | 50.5 | 48.9 |
| Female head | 35.3 | 24.8 | 77.8 | 77.3 | 19.9 | 27.4 | 58.3 | 50.9 | 45.6 | 43.8 |
| Land size | | | | | | | | | | |
| Landless | 22.5 | 18.0 | 28.3 | 30.1 | 17.4 | 21.8 | 22.0 | 17.7 | 32.0 | 52.1 |
| Less than 2 hectare | 55.6 | 56.7 | 78.6 | 80.0 | 26.9 | 65.2 | 72.5 | 66.4 | 59.3 | 58.5 |
| 2-10 hectare | 75.8 | 70.7 | 82.3 | 86.0 | 31.7 | 68.4 | 79.2 | 75.4 | 58.6 | 62.7 |
| Over 10 hectare | 82.7 | 80.5 | - | - | - | - | 85.6 | 83.2 | 59.3 | 59.4 |
| Market access conditions | | | | | | | | | | |
| High | 24.7 | 10.0 | 50.5 | 43.8 | - | - | 73.3 | 52.2 | - | - |
| Low | 48.0 | 39.0 | 79.4 | 78.4 | - | - | 74.0 | 61.8 | - | - |
| Age | | | | | | | | | | |
| Youth | 28.0 | 25.7 | 70.5 | 68.9 | 20.4 | 34.5 | 53.8 | 29.7 | 41.6 | 42.3 |
| Young adult | 38.6 | 25.8 | 64.2 | 59.6 | 21.1 | 28.2 | 51.4 | 39.4 | 44.4 | 38.7 |
| Adult | 48.8 | 40.9 | 75.9 | 72.0 | 22.7 | 39.6 | 66.3 | 58.6 | 52.2 | 51.3 |

of total work time (FTE) is often about 10 percentage points lower than farming's employment shares. This is because most people do not work as farmers year round in rain fed agricultural systems. 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, which is what the FTE approach does.

The results from Table 3 shows that households in most countries are increasingly devoting more of their work time to non-farm activities. Farming's share of total work time has significantly declined by about 9 percentage points in Ghana and Tanzania over a seven- and four-year period respectively. Similar declines are also observed for Malawi which witnessed farming's share of labor time decline from 72% to 68% between 2005 and 2011 while Uganda experienced about a two-percentage point decline over a six-year period. These patterns are consistent with the findings of several other studies that provide evidence of labor exit from farming to non-farm sectors of the economy in Africa (McMillan & Harttgen, 2014; de Vries, Timmer, & de Vries, 2015; Yeboah & Jayne, 2016). In an analysis involving 11 Sub-Saharan African countries, de Vries et al. (2014) reported declines in the share of employment in farming from 61.6 percent in 1990 to 49.8 percent in 2010. Most recently, Yeboah and Jayne (2016) also observed declines in the share of farming in total employment, although the absolute number of people engaged in farming is still increasing in most SSA countries due to population growth. The authors attributed the declining farming's employment share to the more rapid percentage growth in the off-farm sectors of the economy, including the upstream and downstream segments of the agri-food system. A notable exception to this trend is Nigeria where households appears to be increasing the share of their work time devoted to farming. Other studies using different dataset have also observed similar employment patterns in Nigeria, which potentially reflect the negative effect of natural resource boom on economic transformation (McMillan and Harttgen 2014)⁸. Sackey et al. (2012) 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 the observed reallocation of labor time towards farming in Nigeria.

Although a growing share of the household's work time is being devoted to non-farm activities, it is essential to note that farming still accounts for the largest share of households' labor time in most countries and hence an extremely important source of livelihood. A significantly higher proportion (over 50%) of all households' work time in Tanzania, Malawi and Uganda is still devoted to farming activities. As expected, rural households particularly devote a disproportionate share of their labor hours to farming. Among the

⁸ 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.

different classes of households, rural households, male- and adult-headed households, households with less favorable access to market and those owning relatively larger parcels of land appear to devote a disproportionate share of their work time to farming activities. For instance, about 53% of the work time of rural households in Uganda and 80% in Malawi is accounted for by farming (Table 3).

5.3 Sectoral contribution to real household income over time

Real household income per labor time was decomposed into constituent components to enable us establish the contribution of the various sectors and reallocation of labor across sectors to the observed income growth over the past decade. The results for each of the study countries for which available data permitted decomposition analysis, are presented in Tables 4-8. For each country, we present information on the annual percentage change in total income per full time employment and the relative contribution from the various sectors and reallocation of labor time between sectors to the observed income growth. We highlight a few salient observations here. First, households are generally experiencing growth in the average earnings they receive from the activities to which they devote their labor time. With the exception of Uganda, households in all the remaining countries experienced a positive growth in income per FTE with annual percentage growth ranging from about 5% in Tanzania to as high as 125% in Ghana during the period.

There are however cross-country differences regarding the relative sectoral contribution to this growth in the returns to household labor time signifying the diverse ways in which various African economies are transforming. At the national level, three main groups of countries based on the component with the largest contribution can be discerned. The first group consists of countries where the largest proportion of observed growth in household income is linked to increases in income growth from the non-farm sectors. Ghana and Malawi fall into this group. About 92% of the total growth in household income per FTE in Ghana and 56% in Malawi is attributed to changes in the returns to household labor time in the non-farm sector. In other words, changes in income that households receive for every full-time employment in the non-farm sector alone would have resulted in an annual increase in household income per FTE by 115% and 9% in Ghana and Malawi respectively, if the income from farming and the relative shares of household time allocated to various sectors remained constant over the period. The contribution of the farming sector to overall growth in household income per FTE during the period is nearly negligible in Ghana but quite robust in Malawi where it accounted for about 39% of the growth in total income per FTE (Table 4 and 5). With the returns to labor in the farming sector growing slowly in Ghana, the reallocation of household labor away from farming activities contributed positively to income growth and accounted for about 8% of the total change in household income per labor time (Table 4). Similarly, labor exit from farming accounted for about 5% of the total change in income per FTE in Malawi (Table 5).

In the second group of countries, the greatest share of the change in total income per household labor time is linked to the sectoral reallocation of labor time. An example is Tanzania, where the reallocation of labor time from farming to non-farm sector contributed about 47% of the total growth in income per FTE. The non-farm sector in Tanzania therefore appears to have generated employment and good earning opportunities to absorb the excess labor from farming. Indeed, returns to labor in the non-farm increased during the period, enabling the sector to account for about 43% of the total income per FTE. The growth in

the returns to labor in farming was also important, contributing about 10% of household income growth (Table 7). Another example is Uganda, where overall growth in income per FTE declined over the period largely due to worsening returns to labor, which translated into negative contributions to overall change in income per FTE from the non-farm (-77%) and farming (-22%) sectors (Table 8).

Table 4 Decomposition of change in real household income per FTE in Ghana, 2006-2013

| Type of household | Annual % change in mean HH income per FTE | Share of total change linked to | | |
|-------------------------|---|---------------------------------|----------|---------------------|
| | | Within sectoral growth | | Reallocation effect |
| | | Farming | Non-farm | |
| All households | 124.7 | 0.002 | 92.1 | 7.9 |
| Locality | | | | |
| Urban | 129.3 | 0.1 | 99.3 | 0.6 |
| Rural | 97.2 | -0.4 | 93.5 | 6.9 |
| Gender | | | | |
| Male-headed HH | 123.4 | -0.1 | 92.9 | 7.2 |
| Female-headed HH | 123.8 | 0.2 | 91.8 | 7.9 |
| Landholding size | | | | |
| Landless | 117.8 | -0.1 | 97.0 | 3.2 |
| Less than 2 ha | 148.9 | 0.3 | 101.1 | -1.4 |
| 2-10 ha | 91.9 | 0.1 | 90.3 | 9.5 |
| 10 ha or more | 42.7 | 2.5 | 90.6 | 6.9 |
| Market access | | | | |
| High | 102.3 | 0.0 | 88.5 | 11.5 |
| Low | 50.9 | -8.6 | 112.5 | -3.9 |
| Age groupings | | | | |
| Youth-head (15-24) | 109.9 | 0.5 | 97.8 | 1.7 |
| Young adult (25-34) | 138.0 | -0.1 | 90.6 | 9.4 |
| Adults (35 or more) | 121.4 | 0.0 | 92.5 | 7.5 |

Table 5 Decomposition of change in real household income per FTE in Malawi, 2005-2011

| | Annual % change in mean HH income per FTE | Share of change due to: | | |
|---------------------------------|---|-------------------------|------------------------------------|---------------------|
| | | Farming | Within sectoral growth Non-farm | Reallocation effect |
| All households | 15.5 | 38.8 | 56.2 | 5.0 |
| Locality | | | | |
| Urban | 17.1 | 8.7 | 88.6 | 2.7 |
| Rural | 12.3 | 57.9 | 44.0 | -1.9 |
| Gender | | | | |
| Male-head | 15.8 | 39.2 | 55.2 | 5.6 |
| Female head | 13.5 | 36.6 | 62.6 | 0.8 |
| Land size | | | | |
| Landless | 17.3 | 7.8 | 93.9 | -1.7 |
| Less than 2 hectares | 12.8 | 62.3 | 39.3 | -1.6 |
| 2-10 hectares | 5.4 | 67.7 | 41.0 | -8.7 |
| Over 10 hectares | - | - | - | - |
| Market access conditions | | | | |
| High | 19.7 | 21.6 | 72.7 | 5.7 |
| Low | 12.2 | 55.8 | 42.8 | 1.4 |
| Age | | | | |
| Youth | 15.0 | 51.1 | 48.0 | 1.0 |
| Young adult | 14.6 | 35.9 | 59.7 | 4.3 |
| Adult | 15.8 | 39.1 | 55.1 | 5.8 |

Source: Integrated Household Surveys 2 and 3

Table 6 Decomposition of change in real household income per FTE in Nigeria, 2004-2013

| | Annual % change in mean HH income per FTE | Share of total change linked to: | | Reallocation effect |
|-----------------------|---|-----------------------------------|----------|------------------------|
| | | Within sectoral growth Farming | Non-farm | |
| All Households | 21.2 | 160.7 | -14.3 | -46.4 |
| Locality | | | | |
| Urban | 26.5 | 132.0 | -39.7 | 7.7 |
| Rural | -1.6 | -391.8 | 159.3 | 132.5 |
| Gender | | | | |
| Male-head | 16.5 | 170.5 | -15.5 | -55.0 |
| Female head | 338.5 | 120.5 | -9.0 | -11.5 |
| Land size | | | | |
| Landless | 66.0 | 150.7 | -33.1 | -17.6 |
| Less than 2 hectares | -3.2 | -318.7 | 74.9 | 143.8 |
| 2-10 hectares | -4.7 | -248.1 | 70.6 | 77.5 |
| Over 10 hectares | - | - | - | - |
| Age | | | | |
| Youth | 15.0 | 148.8 | -50.5 | 1.7 |
| Young adult | 20.3 | 138.5 | -18.4 | -20.0 |
| Adult | 9.1 | 166.5 | -13.3 | -53.1 |

Source: General Household Survey 2012/13 and Nigeria Living Standard Survey 2003/04

Table 7 Decomposition of change in real household income per FTE in Tanzania, 2009-2013

| | Annual % change in mean HH income per FTE | Share of total change linked to: | | |
|---------------------------------|--|----------------------------------|----------|------------------------|
| | | Within sectoral growth | | Reallocation effect |
| | | Farming | Non-farm | |
| All households | 5.2 | 10.1 | 42.7 | 47.2 |
| Locality | | | | |
| Urban | 0.3 | 26.8 | 105.9 | -32.7 |
| Rural | 5.3 | 14.1 | 60.0 | 25.9 |
| Gender | | | | |
| Male-head | 5.4 | 10.9 | 40.5 | 48.6 |
| Female head | 4.6 | 6.0 | 53.8 | 40.2 |
| Land size | | | | |
| Landless | 2.4 | 48.0 | 15.6 | 36.4 |
| Less than 2 hectares | 6.0 | 11.5 | 60.1 | 28.3 |
| 2-10 hectare | 1.5 | -107.4 | 147.0 | 60.4 |
| Over 10 hectares | 6.0 | 105.1 | -28.1 | 23.0 |
| Market access conditions | | | | |
| High | 13.8 | 10.2 | 43.5 | 46.4 |
| Low | 8.4 | -25.2 | 82.4 | 42.8 |
| Age | | | | |
| Youth | 1.2 | 289.2 | -569.0 | 379.9 |
| Young adult | 10.5 | 20.9 | 49.7 | 29.3 |
| Adult | 4.1 | -1.2 | 45.7 | 55.5 |

Source: Tanzania National Panel Survey (2008/09 and 2012/13)

Table 8 Decomposition of change in real household income per FTE in Uganda, 2006-2012

| | Annual % change in mean HH income per FTE | Share of total change linked to: | | |
|----------------------|---|----------------------------------|----------|---------------------|
| | | Within sectoral growth | | Reallocation effect |
| | | Farming | Non-farm | |
| Total sample | -8.4 | -22.1 | -76.5 | -1.5 |
| Urban | -5.8 | 20.6 | -120.4 | -0.2 |
| Rural | -9.4 | -28.0 | -86.4 | 14.4 |
| Gender | | | | |
| Male-head | | | | |
| Female head | -9.1 | -22.4 | -76.2 | -1.4 |
| | -6.3 | -20.5 | -77.3 | -2.2 |
| Land size | | | | |
| Landless | -9.6 | -20.3 | -65.0 | -14.7 |
| Less than 2 hectares | -8.2 | -26.0 | -82.3 | 8.3 |
| 2-10 hectare | -8.3 | -23.4 | -82.7 | 6.2 |
| Over 10 hectares | -8.5 | -14.9 | -132.4 | 47.3 |
| Age | | | | |
| Youth | -10.2 | -22.1 | -76.6 | -1.3 |
| Young adult | -8.5 | -18.4 | -80.9 | -0.7 |
| Adult | -8.4 | -23.4 | -75.4 | -1.2 |

Source: Ugandan National Panel Surveys, 2005/6 and 2011/12

The third group comprise of countries where changes in the return to labor in farming is the largest contributor to changes in income per FTE. For instance, in Nigeria, observed changes in real household income per FTE at the national level is largely as a result of increases in returns to labor in the farming sector. About 161% of the increase in income per FTE during the period is attributed to growth in the returns to labor in farming. In other words, had the returns to labor in non-farm sector and the relative shares of household time allocated to various sectors remained constant over the period, the growth in income for full-time employment in the farming sector would have resulted in average income increasing by about 34%. Unfortunately, returns to labor in the non-farm sector, which accounts for a significant

share of labor time in Nigeria, declined during the period. The non-farm sector therefore contributed negatively to income growth (-14%). In spite of worsening economic conditions in the non farm sector, the returns to labor in the sector was still higher than that from the farming sector. As a result, shifts in labor time away from the non-farm sector into farming sector, as seen in Nigeria, was associated with a negative contribution to overall change in total income per FTE (-46%). The negative contributions to income change from the non-farm sector and the sectoral reallocation of labor time resulted in the recorded 21% growth in the total income per FTE instead of the 34% that could have been achieved with growth in the farming sector alone (Table 6).

The patterns observed at the national level for each country is generally replicated among the different classes of households who did not generally differ in terms of the contribution of various components to income growth. There are however some interesting insights worth highlighting: First, landownership appears to be a key factor determining the contribution of farming to household income growth. Despite a general negative contribution to growth in the national level and among landless households, changes in the return to labor in the farming sector was linked with a general positive effect on the income of households who own land (Ghana, Malawi). In Malawi, increasing landholdings of households was associated with increasing contribution of the farming sector to changes in household income per labor time. For instance, increasing returns to labor in farming accounted for just 8% of income changes among landless household in Malawi, but contributed about 62% and 68% to observed changes in household income among households owning less than 2 hectares of land and those with between 2 and 10 hectares of land. It thus appears the gains from the improvement in returns to labor in farming was largely captured by the households who land.

Moreover, farming's negative effect on growth in real income per FTE appears more pronounced among households with relatively unfavorable market access conditions. Unlike households with favorable access to market, the farming sector contributed negatively to growth in income per FTE experienced by households with unfavorable access to market in Ghana (Table 4). Similarly, in Tanzania, farming's contribution to income growth was relatively lower among households with unfavorable access to market relative to those with higher market access (Table 7).

In addition, farming appears to be a significant source of income for households headed by youth and those in rural settings. In Malawi, about half (51%) of the growth in income per FTE among youth-headed households is largely linked to increasing returns to labor in the farming sector unlike young adult- and adult-headed households who seem to have a more diversified source of livelihoods. A similar trend is observed in Tanzania. Also, while the non-farm sector accounted for the largest share of the income growth among the urban dwellers and those households with favorable access to market (87%), growth in income among rural households and those with unfavorable access to market seems to be much more dependent on farming (56%) in Malawi (Table 5)

5.4 *Linkages between agriculture productivity growth and economic transformation process*

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 observed shift in household labor time away from farming to non-farm sector, we examined 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 and pairing them with average annual agricultural total factor productivity growth over the comparable period.⁹ 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 SSA. As shown in Figure 2, 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 3).

We explore these relationships in more depth by conducting a time series multivariate analysis using annual data on 11 African countries over the 1995-2011 period from the *Africa Sector Dataset*¹⁰. Our model controls for factors that could plausibly influence agricultural employment shares including population density, country-level governance indicators, road density (tarmac roads per 100 km² of land)

⁹ TFP growth rates were obtained from the Economic Research Service Total Factor Productivity Database, compliments of Keith Fuglie.

¹⁰ Africa sector data is compiled by the Groningen Growth and Development Center and is available at <http://www.rug.nl/ggdc/productivity/10-sector/>

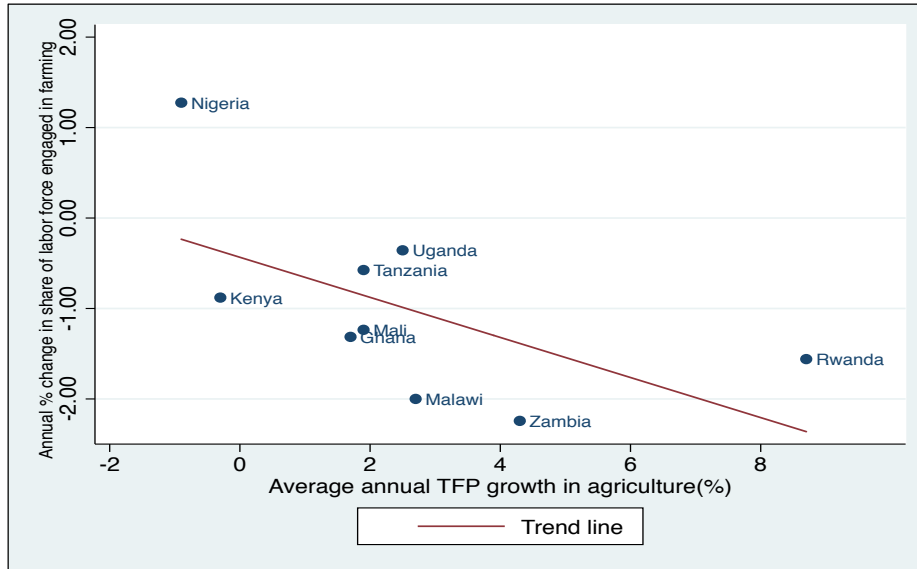


Figure 2. Relationship between Total Factor Productivity Growth and Change in Share of Labor Force Engaged in Farming

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.

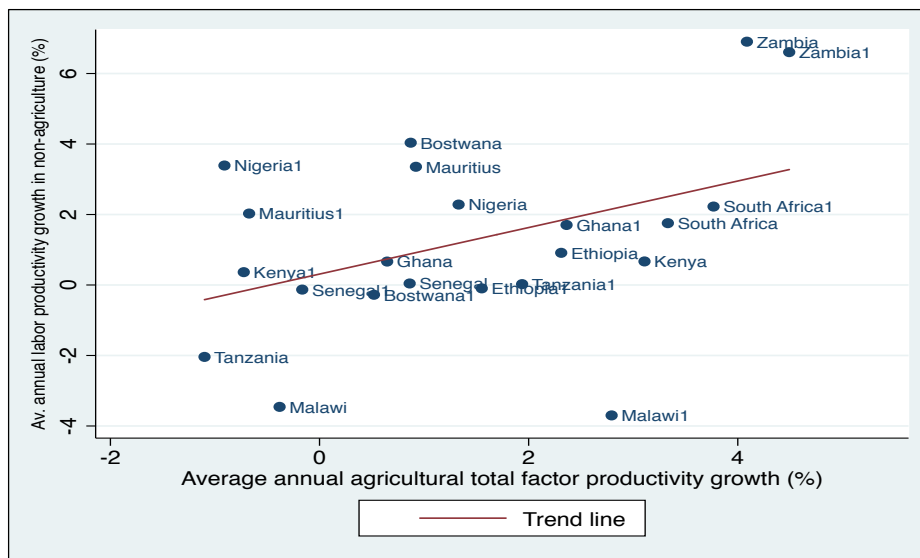


Figure 3. Relationship between Total Factor Productivity Growth and Labor Productivity in Non-agricultural Sector

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.

as proxy for market access conditions, a time trend, and country fixed effects to control for unobserved time-constant heterogeneity. 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. 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. Data on road density 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 road density in a set of models and not in the others. Interestingly, the key conclusions from our analysis remain unchanged.

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 9 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 force in farming over the last decade and half was generally not statistically significant. We also see important differences in the pace at which 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, confirming our earlier finding of a relatively slower decline farming's share of household total work time 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

Table 9. Determinants of Changes in Agriculture's Employment Shares over Time

| | Model without road density variable | | | | Model with road density variable | |
|--|-------------------------------------|---------------|--------------|------------------|----------------------------------|--------------|
| | (i) | (ii) | (iv) | (v) | (vi) | (viii) |
| | Pooled OLS | Pooled OLS | Fixed effect | First difference | Pooled OLS | Fixed effect |
| Log lag labor productivity in agriculture | -0.443*** | -0.311*** | -0.133* | -0.0228*** | -0.157* | -0.284** |
| | | (-9.82) | (-2.15) | (-3.98) | (-2.39) | (-2.77) |
| Log lag labor productivity in non-agriculture | - | -0.0179 | -0.0121 | 0.00271 | -0.0963* | -0.176 |
| | | (-0.65) | (-0.23) | (1.28) | (-2.64) | (-1.89) |
| Other covariates | | | | | | |
| Index of governance (lagged) | - | -0.456*** | -0.0205 | -0.00173 | -0.321*** | 0.0698 |
| | | (-14.12) | (-0.45) | (-0.22) | (-6.50) | (1.06) |
| Time trend | - | -0.00494 | -0.00961*** | 0.000178 | -0.00808 | -0.00458 |
| | | (-1.56) | (-4.62) | (0.54) | (-1.88) | (-0.96) |
| Population density | - | -0.00111*** | -0.00181 | -0.00116 | -0.000791 | -0.00475 |
| | | (-8.38) | (-1.51) | (-0.55) | (-1.15) | (-1.89) |
| Road density | - | - | - | - | -0.00627 | -0.000260 |
| | | | | | (-1.16) | (-0.21) |
| Countries | | | | | | |
| Bostwana | -0.512*** | - | - | -0.000929 | - | - |
| | (-15.34) | | | (-0.10) | | |
| Ethiopia | -0.448*** | - | - | -0.0128* | - | - |
| | (-4.75) | | | (-2.22) | | |
| Ghana | -0.195*** | - | - | -0.0133* | - | - |
| | (-6.43) | | | (-2.57) | | |
| Kenya | -0.356*** | - | - | -0.00851 | - | - |
| | (-9.40) | | | (-1.31) | | |
| Mauritius | -1.043*** | - | - | 0.00425 | - | - |
| | (-8.47) | | | (0.83) | | |
| Malawi | -0.478*** | - | - | -0.0174*** | - | - |
| | (-5.28) | | | (-4.47) | | |
| Senegal | -0.349*** | - | - | -0.00655 | - | - |
| | (-8.54) | | | (-1.00) | | |
| Tanzania | -0.285*** | - | - | -0.0132 | - | - |
| | (-4.12) | | | (-1.89) | | |
| South Africa | -0.926*** | - | - | -0.00594 | - | - |
| | (-14.49) | | | (-0.69) | | |
| Zambia | -0.0807* | - | - | -0.00491 | - | - |
| | (-2.07) | | | (-0.55) | | |
| Constant | -0.486*** | -0.797*** | -0.519** | 0.000667 | -0.529*** | 0.0690 |
| | (-17.51) | (-10.70) | (-3.07) | (0.07) | (-4.99) | (0.20) |
| Number of observations | 183 | 161 | 161 | 95 | 78 | 78 |
| Number of Countries | 11 | 11 | 11 | 11 | 10 | 10 |
| Adjusted/Overall R-square | 0.98 | 0.936 | 0.71 | 0.398 | 0.965 | 0.87 |
| Time period | 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." | | | | |
| ~ Not enough data to run a first difference model controlling for road density | | | | | | |

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.

6. Conclusions and Implications

Using data from nationally representative multi-year household surveys, this paper sheds light on the evolving trends in and sources of income growth in SSA over the past decade. While acknowledging substantial variations across countries and hence a caution against overgeneralization, the analysis from the seven countries points to several conclusions. First, the paper confirms the findings of several earlier studies reporting significant economic recovery in SSA over the past decade (Ulimwengu et al. 2016). We found a general positive growth in inflation adjusted average household income in SSA over the past decade with annual growth rates ranging from about 6% in Malawi to about 137% in Ghana .

Second, the observed positive growth trends in average household income is being experienced by different classes of household although at varying growth rates across household groups. In most countries, average household income has grown more rapidly among female-headed households than male headed households. However, income growth among female-headed households is generally starting from a relatively low base (Ghana, Ethiopia, Nigeria, Uganda). Consequently, average income of female-headed households still lag behind that of male-headed households by about 27% on the average. Also, households with more favorable access to markets have higher incomes and experienced more rapid growth in their incomes than those with relatively poor access to market. With respect to the age of household heads, households headed by a youth (15-24 years) have the least average income and experienced the lowest growth in income over the past decade. Landless households are recorded the highest average income and also experienced the most rapid growth in incomes.

Third, a decomposition analysis examining the sources of the changes in household real income per labor time revealed three main groups of countries. The first group consists of countries where the largest proportion of observed growth in real household income per labor time over the past decade is linked to increases in returns to labor from the non-farm sectors. Ghana and Malawi falls into this group. Among this group, the share of income growth attributed to farming while generally positive is less than that from non-farm sector. Tanzania and Uganda exemplifies the second group of countries where the reallocation of labor time from farming into non-farm activities accounts for the largest share of observed growth in the

returns to labor. Farming and non-farm sectors in these countries also contributed positively to income growth. The third group comprises of countries where growth in the returns to labor from farming is the largest contributor to changes in household income per labor time. These countries, which includes Nigeria, generally experienced significant declines in the returns to labor in the non-farm sector, and in the case of Nigeria, a reallocation of labor into farming, which contributed negatively to growth in household income per labor time. These cross-country variations reflect the diverse ways in which African economies are transforming, and call for tailored country-specific strategies to achieve economic growth and poverty reduction.

Moreover, the results indicate that households are increasingly devoting more of their labor time to non-farm sources as the economies transforms. Despite its declining share in households' labor time and incomes, farming remains extremely important for livelihoods and economic growth for several reasons: First, the farming sector still accounts for the largest share (over 50%) of households' labor time and a significant source of income for large share of households in most countries. From the most recent available surveys, about 44% to 87% of the households in the countries examined derive some share of their income from farming and over one-third of total household income of the average household is coming from farming. Considering the large share of people dependent on farming, investments aimed at increasing the return to labor in farming would thus affect the greatest number of people and promote broad-based and inclusive economic growth.

The second reason why the farming sector - farm productivity growth in particular - remains crucial pertains to the sector's relevance in the generation of new jobs in the rest of the economy. We demonstrate that the pace of the growth in employment and incomes in the non-farm sector over the past decade is closely linked to productivity growth in farming. In line with historical industrialization experiences, our time-series econometric analysis identified labor productivity in agriculture as an important driver of the observed economic transformation in Africa. Over the past decade, countries that achieved the highest agricultural productivity growth are those that experienced the most rapid exit of labor from farming into off-farm sectors, and the highest growth in labor productivity in non-farm sector. As demonstrated in the literature, farm productivity growth, especially if broad based, results in greater employment and income multiplier effects than off-farm productivity growth. Therefore, strategies that effectively improve productivity and profitability of farming remains critical to expanding employment opportunities and improving livelihoods.

Improving productivity is particularly important for the region which is currently experiencing rising food demand particularly high value food products like meat and horticulture and high youth unemployment rates (Tschirley et al., 2015). Persistent low productivity levels have saddled the regions ability to adequately respond to this growing food demand resulting in an increasing reliance on food imports, which is estimated at \$38 billion in 2015 (Figure 4). Addressing the productivity constraints in African agri-food systems would enable local producers to re-capture this growing food market and expand job opportunities in the rest of the economy and improve livelihoods.

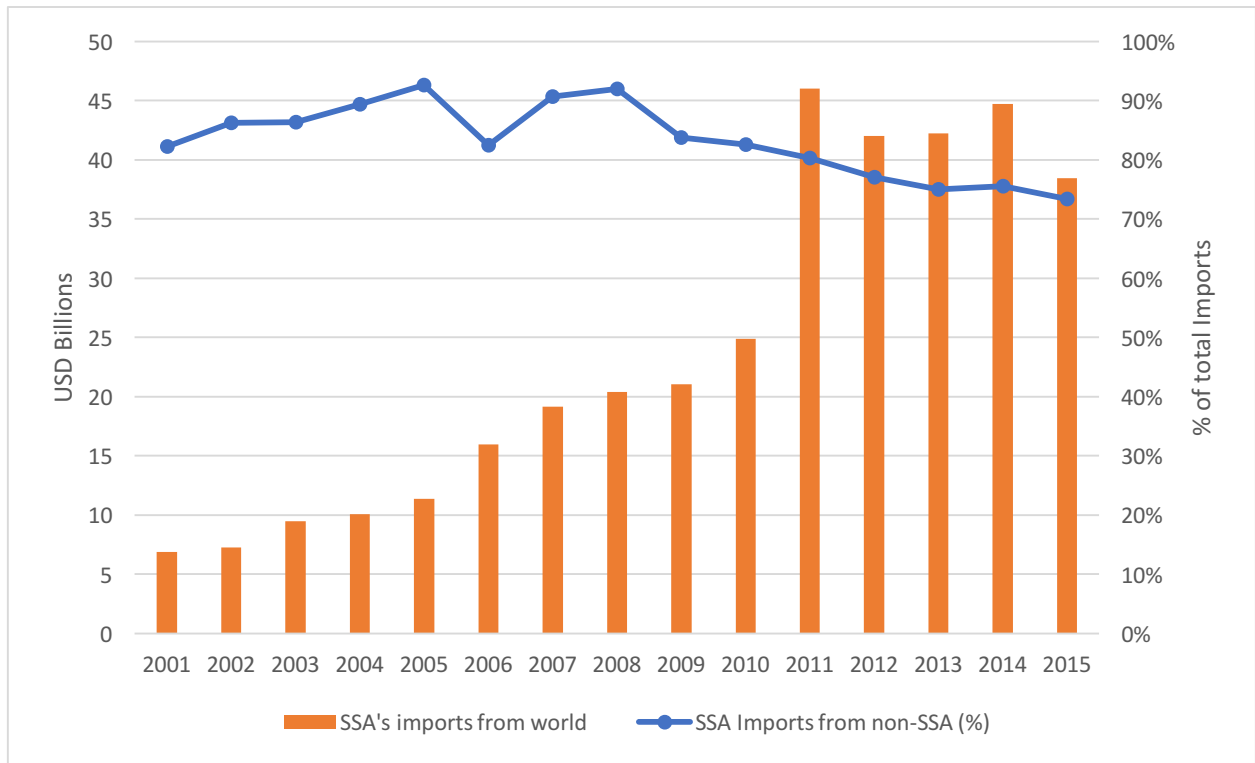


Figure 4: Non-SSA Countries’ Share of Total Food Products Imported by SSA

Source: Computed by Lulama Traub (2017) using Trade map data

Despite the positive growth in agricultural productivity in Africa in the past decade, there is still much to do, especially for countries that have not adequately invested in their smallholder farmers or rural job creation. Many of the actions that governments need to take are well understood and backed by strong evidence, for example, investing in physical infrastructure, agricultural research and extension, creating enabling environments for rural entrepreneurship and business creation, education, health and inclusive growth policies that provide economic incentives and opportunities for millions of rural people. However, implementation has not been forthcoming. Even in the present era where agricultural development has taken center stage in African policy dialogue, the annual expenditure of African governments in agricultural research and development is still about 8 times less than that of Asian governments (Pardey et al., 2006). Harnessing public and private resources for an effective implementation of these productivity enhancing strategies should be a priority.

7. Next Steps and Future Studies

This study has provided some insights into the relative importance of the various sectors to household income growth. Increasing returns to labor from both farming and the non-farm sectors were identified to have contributed significantly to the observed household income growth although at different degrees across countries. While this is insightful, it remains unclear what key factors undergird the growth in return to labor in both sectors as well as the contribution of the subsectors to the aggregate trends we observe. Hence, as a next step, we intend to further explore the sources of the return to labor in farming by decomposing it into constituent components including terms of trade effect (changes in relative prices), a productivity effect (yield increases), an area expansion effect (change in cultivated area relative to total area controlled by the household) and labor productivity effect. We will also explore the key drivers of change in return to labor in the non-farm and uncover the relative contribution of the subsectors (construction, finance, mining) to aggregate return to labor in off-farm employment. These additional analyses would provide insights into targeted areas for policy action.

Appendix

Table A1. Changes in the share of total household income coming from farming over time

| | Share of real household income from farming over time | | | | | | | | | | | | | |
|---------------------------------|---|---------|----------|---------|---------|---------|---------|---------|----------|---------|---------|---------|--------|------|
| | Ghana | | Ethiopia | | Malawi | | | | Tanzania | | Uganda | | Zambia | |
| | 2005/06 | 2012/13 | 2011/12 | 2013/14 | 2004/05 | 2010/11 | 2003/04 | 2012/13 | 2008/09 | 2012/13 | 2005/06 | 2011/12 | 2008 | 2015 |
| Total sample | 23.8 | 2.0 | 84.1 | 61.0 | 61.2 | 48.2 | -166.2 | 35.5 | 38.3 | 28.8 | 33.8 | 48.1 | 30.3 | 33.1 |
| Urban | 6.4 | 0.7 | 15.1 | 6.6 | 14.1 | 9.9 | 314.1 | 12.4 | 6.1 | 6.6 | 5.1 | 25.8 | 31.5 | 9.9 |
| Rural | 43.3 | 4.9 | 84.9 | 81.3 | 71.7 | 66.9 | 63.0 | 54.3 | 63.0 | 50.9 | 44.9 | 54.0 | 30.0 | 36.8 |
| Gender | | | | | | | | | | | | | | |
| Male-head | 26.7 | 2.3 | 85.0 | 64.7 | 59.6 | 47.0 | -136.9 | 33.5 | 38.7 | 9.5 | 33.8 | 49.7 | 29.8 | 29.6 |
| Female head | 14.7 | 1.2 | 79.0 | 45.4 | 70.1 | 54.8 | 2027.1 | 49.6 | 36.5 | 27.7 | 33.8 | 44.1 | 32.9 | 40.4 |
| Land size | | | | | | | | | | | | | | |
| Landless | 9.9 | 0.8 | 71.6 | 12.3 | 19.7 | 14.3 | 700.7 | 23.7 | 6.0 | 8.2 | 14.5 | 59.0 | 9.2 | 5.5 |
| Less than 2 hectare | 32.2 | 3.1 | 85.1 | 81.7 | 71.3 | 68.4 | 71.9 | 61.5 | 54.6 | 42.5 | 49.5 | 66.1 | 23.6 | 22.6 |
| 2-10 hectare | 54.2 | 6.9 | 94.0 | 87.1 | 75.2 | 76.3 | 80.2 | 51.4 | 67.2 | 54.3 | 45.9 | 64.3 | 47.3 | 47.0 |
| Over 10 hectare | 50.4 | 14.1 | - | - | 71.2 | - | - | - | 52.1 | 60.9 | 39.8 | 52.2 | 64.0 | 48.0 |
| Market access conditions | | | | | | | | | | | | | | |
| High | 43.0 | 4.7 | 73.4 | 27.2 | 38.8 | 26.3 | - | - | 55.1 | 28.3 | - | - | 25.3 | 30.4 |
| Low | 77.0 | 10.4 | 85.8 | 80.5 | 71.8 | 64.3 | - | - | 60.7 | 32.2 | - | - | 36.5 | 47.0 |
| Age | | | | | | | | | | | | | | |
| Youth | 18.0 | 2.3 | 73.4 | 38.3 | 67.2 | 58.5 | -44.1 | 75.7 | 24.7 | 22.5 | 27.5 | 45.9 | 30.8 | 40.3 |
| Young adult | 22.6 | 1.4 | 78.5 | 56.8 | 55.0 | 43.4 | 196.2 | 32.9 | 28.0 | 20.5 | 25.8 | 34.9 | 32.3 | 32.6 |
| Adult | 24.4 | 2.2 | 86.3 | 63.4 | 63.6 | 49.5 | -62.2 | 35.6 | 42.4 | 32.0 | 37.9 | 54.1 | 29.5 | 33.2 |

Source: Authors. Computed from the various nationally representative surveys

Table A2. Shares of households deriving income from farming in the most recent surveys.

| | Ghana | Ethiopia | Malawi | Nigeria | Tanzania | Uganda | Zambia |
|---------------------------------|----------------|-----------------|----------------|----------------|-----------------|----------------|---------------|
| | 2012/13 | 2013/14 | 2010/11 | 2012/13 | 2012/13 | 2011/12 | 2015 |
| Total sample | 44.1 | 81.4 | 86.6 | 54.2 | 72.9 | 74.0 | 97.2 |
| Urban | 23.7 | 21.9 | 52.8 | 26.7 | 36.0 | 50.0 | 95.1 |
| Rural | 69.5 | 94.9 | 93.0 | 74.2 | 90.0 | 79.5 | 97.3 |
| Gender | | | | | | | |
| Male-head | 46.8 | 85.9 | 85.7 | 56.8 | 74.1 | 73.6 | 97.3 |
| Female head | 38.2 | 67.3 | 89.7 | 48.2 | 69.8 | 74.7 | 96.7 |
| Land size | | | | | | | |
| Landless | 24.5 | 32.3 | 58.7 | 36.6 | 36.4 | 88.7 | 76.8 |
| Less than 2 hectare | 77.7 | 96.2 | 95.0 | 87.7 | 92.6 | 95.7 | 97.1 |
| 2-10 hectare | 86.5 | 97.8 | 97.1 | 82.3 | 95.0 | 99.2 | 99.2 |
| Over 10 hectare | 87.3 | | | 100.0 | 93.7 | 93.1 | 99.4 |
| Market access conditions | | | | | | | |
| High | 69.8 | 52.2 | 73.0 | - | 72.0 | - | 96.8 |
| Low | 85.1 | 93.0 | 91.7 | - | 79.8 | - | 98.3 |
| Age | | | | | | | |
| Youth | 25.6 | 46.0 | 86.2 | 69.7 | 47.6 | 60.3 | 96.0 |
| Young adult | 31.1 | 76.1 | 83.4 | 40.7 | 59.6 | 61.4 | 97.1 |
| Adult | 49.9 | 86.1 | 88.4 | 57.8 | 79.8 | 81.4 | 97.2 |

Source: Authors. Computed from the various nationally representative surveys.

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