Change and Rigidity in Employment Patterns in Malawi, 2004 to 2016

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Abstract

We examine how dynamic have been movements of labor in Malawi out of agriculture and into industry and services in recent years and the role that youth might play in these changes. In particular, is there evidence based on employment patterns that a process of structural transformation in the economy of Malawi is now underway away from one centered on traditional subsistence agriculture to an economy more strongly dominated by modern industrial and services sectors? We then extend the analysis to investigate the factors associated with decisions by individuals on whether to participate in different patterns of employment.

Using a primarily descriptive analysis of data from three nationally representative household surveys for Malawi conducted between 2004 and 2016, we find no evidence in the employment data of a structural transformation in Malawi's economy or of youth being in the vanguard of any changes in cross-sectoral patterns of employment. Most Malawians spend all of their working years in the farm sector – indeed, the share of employment in agriculture in Malawi rose slightly between 2004 and 2016. Although we find that higher educational attainment is strongly associated with non-farm employment and educational attainment levels in Malawi are rising, agriculture remains the sector in which most Malawians first obtain employment. It is only later in their working life cycle that Malawian workers, particularly males, are likely to be in a position to obtain employment outside of agriculture alone, particularly in the services sector.

Keywords: employment, Malawi, structural transformation, youth

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1. Introduction

In the more than fifty years since Malawi attained independence in 1964, the country's population more than quadrupled to over 19 million people in 2018. Yet, most of the population continues to reside in rural areas pursuing agricultural livelihoods – at the last census in 2008, only 19 percent of the population lived in cities or towns. Due to high fertility rates, Malawi has one of the youngest age structures in the world with 45.5 percent of its population being under the age of 15 years, and 35.7 percent being between 15 and 35 years of age (NSO 2011a). In 2015, the agriculture sector contributed 28 percent of the total Gross Domestic Product (GDP) of Malawi's economy (World Bank 2018). While the significance of agriculture has dropped from 50 years ago when the sector provided one-half of total economic output, Malawi's economy remains among the 15 national economies globally that are most dependent upon agriculture. Although the services sector has grown significantly over the past 20 years, with a small manufacturing sector and limited non-agricultural natural resources to exploit, agricultural production remains at the center of most economic production. This is most evident in how the work force of the country is allocated across sectors. Estimates from the 2016 fourth Malawi Integrated Household Survey (IHS4) are that 87.8 percent of those of working age (15 to 64 years) who are employed work in agriculture.[2]

Building on the broad model of economic development in countries with a large subsistence agricultural sector and relatively large populations, like Malawi, that initially was proposed by Lewis (1954), it is quite widely accepted, if not unchallenged (e.g., Gollin 2014), that the pattern of development in such economies will involve a significant share of workers moving out of agriculture into the manufacturing and services sectors of the economy. As more workers find remunerative employment outside of agriculture, underemployment in the farm sector declines and prospects for more profitable agricultural production that fosters increased productivity rise for those remaining on-farm (Ranis and Fei 1961; Dabalen et al. 2017). In the sectoral structure of employment in Malawi, are we seeing any early indications of such a process of structural transformation in the economy getting underway? This is the objective of the research here, with specific attention to where new entrants into the workforce, the younger youth, are finding employment – are they finding it outside of agriculture (Maïga, Christiaensen, and Palacios-Lopez 2016)?

The factors that might push Malawians out of agriculture and into employment in other sectors have only intensified with time. Although dropping fertility rates may result in the annual population growth rate starting to decline soon, current estimates place it just above 3.0 percent (World Bank 2016). In consequence, population prT{essure on land continues to build: the average farm size in Malawi now is around 0.6 ha per household, with a median value 0.45 ha (IFPRI 2018; NSO 2010). The low-input, low-

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[2] Using a stricter definition of employment, estimates from the 2013 Malawi Labour Force Survey are that 64.1 percent of those who are of working age and are employed worked in agriculture (NSO 2014).

output smallholder farming systems that dominate agriculture in Malawi call into question whether most Malawians will be able to obtain sustainable livelihoods primarily from agriculture for much longer.

In parallel, the factors that might attract Malawians to seek employment outside of agriculture have also intensified. Growth in the economy since 2000 has been slowly positive overall, if erratic from year to year. Average annual growth in GDP between 2000 and 2016 was 4.4 percent. The services sector has expanded significantly over this period rising from a 43 percent share of the economy in 2000 to 56 percent in 2016, while manufacturing has declined slightly, contributing 10 percent of Malawi's economic output in 2016 (World Bank 2018). At the same time, stocks of human capital have improved since the introduction of free primary education in 1994. While problems related to the quality of instruction and facilities continue to plague education in Malawi, improved access to schooling has increased average educational attainment among younger youth (ages 15 to 24 years), particularly for females.

Using data from the 1998 and 2008 population censuses and the 2013 Labour Force Survey, Dorosh, Pauw, and Thurlow (2015) reviewed the macro-level dynamics of Malawi's economy between 1998 and 2013 and concluded that workers moving out of agriculture and into somewhat more productive non-farm jobs explained some of the moderate economic growth realized in Malawi between 1998 and 2013 (Table 1). The manufacturing and services sectors grew faster than the agricultural sector in part due to the movement of labor into those sectors from agriculture. But, at the same time, the productivity of workers who remained within agriculture, in terms of their value-added per worker, increased. These changes in sectoral employment patterns, although modest, are congruent with a pattern of structural change in the economy. Similar patterns of inter-sectoral movements of workers in Malawi are seen in McMillan and Harttgen (2014), although these authors find virtually no improvements in overall labor productivity.

[Table 1 about here]

However, the patterns seen in Table 1 and those found by McMillan and Harttgen (2014) could be artefacts of changes in census and survey instruments and in statistical definitions, so should be validated. Through a primarily descriptive analysis of data from the nationally-representative Integrated Household Survey (IHS) series, we examine changes in the patterns of employment among those of working age in Malawi. Does analysis of this data confirm the movements of labor out of agriculture into other sectors, particularly services, that were seen in the macro-level analyses? At the same time, we also examine how the sector of employment of an individual may change over his or her working life cycle to determine whether the youth of Malawi are central to any changes occurring in employment patterns in the country. We then extend the analysis to investigate the individual characteristics associated with the type of

employment an individual has using the 2010 IHS-3 survey data in a two-stage logit and multinomial logit model.

2. Employment in Malawi

Malawi has experienced moderate, if erratic economic growth over the past 15 years. Between 2000 and 2015, annual economic growth was lower than population growth in six years. Given the significance of agriculture in the economy, overall annual economic growth broadly tracks the annual growth of the agriculture sector– the correlation coefficient between the two time series over this period is 0.63. Growth trends in the agricultural sector are more volatile than those of the economy as a whole, reflecting the exposure of the sector to adverse weather-related production shocks.

Greater economic growth is needed. Malawi has one of the fastest growing populations in the world, with a population estimated at 19.2 million in 2018. Projections from the 2008 Census estimate that the population will be in the neighborhood of 45 million by 2050. Without significant changes in how livelihoods are obtained by Malawians, it is difficult today to see a bright economic future for the country in 35 years when the population will be 2.5 times larger.

The principal investments that the government of Malawi have made to enable its citizens to obtain good jobs are in education and agriculture. Free primary education was put in place in 1994 and continues. While politically popular, the program has been subject to continual criticism since its launch for the poor quality of education provided, despite government and its development partners investing heavily in teacher training and in building classrooms. For example, due to large numbers of primary students repeating classes or dropping out, the system in 2007 provided 23 student-years of instruction for every student who successfully completed the eight years of primary education (World Bank 2010). Nonetheless, the free primary education program has resulted in improved educational outcomes. The average years of education successfully completed for the 15 to 24 year age-cohort increased by 1.2 years between the 1998 and 2008 censuses from 5.0 to 6.2 years (analysis by authors). Tracer studies done as part of the World Bank 2010 study demonstrated strong social returns (e.g., improvements in social behaviors and health outcomes), particularly from primary education. Private financial returns to education in Malawi obtained through the labor market also were found to be significant at all levels of education, being especially large at higher levels (World Bank 2010, ch. 8).

The Government of Malawi has also invested significant resources to enhance agricultural productivity over the past 10 years, particularly through the Farm Input Subsidy Program (FISP). Started in the 2005/06 cropping season, FISP annually benefitted over half of all smallholder farming households in the country, providing each with 100 kg of fertilizer and 10 kg of hybrid maize seed.[3] The increased maize

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[3] The design of FISP has been scaled back since 2014 from targeting between 50 and 70 percent of farming households to about 30 percent of households, e.g., 900,000 households for the 2016/17 and 2017/18 FISP programs.

production resulting from FISP has contributed to agricultural sector growth. There is also evidence that reasonably significant second-round benefits have been achieved through FISP linked to the increased economic activity, lower food prices, and increased demand for labor the program fostered (Arndt, Pauw, and Thurlow 2016). Although all independent assessments conclude that the program could be implemented more efficiently and achieve significantly broader impact (Lunduka, Ricker-Gilbert, and Fisher 2013), FISP has the potential to propel the sector towards sustained improvements in agricultural productivity. This in turn should allow for increased investment in other areas of the economy and release considerable labor to work elsewhere than in agriculture.

However, despite continuing public investment to improve the education system and to increase the productivity of the agriculture sector and in the context of fair, although not stellar, economic growth over the past 15 years, there is no consistent evidence to show that there has been any growth in employment in higher productivity jobs. Using data from the household surveys, we now examine the evolution in the sectoral structure of employment in Malawi over this period.

3. Structure of and trends in employment in Malawi, 2004 to 2016

We analyze three rounds of data from the Malawi IHS series for individuals of working age – those aged 15 to 64 years. After describing the data sets, we first examine the structure of employment among this population from the most recent survey round of 2016. Thereafter, we examine how employment patterns have changed over the previous twelve years by bringing into the analysis information from the two previous survey rounds. In these analyses, we also seek to identify any emerging trends related to how Malawi's youth choose to engage in employment.

Data

Malawi has a number of nationally representative data sets that include information on employment. For the analysis here, data was used from the second Integrated Household Survey (IHS-2) of 2004, the IHS-3 of 2010, and the Integrated Household Panel Survey (IHS-4) of 2016. These nationally representative data were collected by the National Statistical Office (NSO) of the government of Malawi with technical assistance from the World Bank. These three multi-topic household surveys have very similar questionnaires so that we were able to categorize individuals of working age in the survey samples into comparable employment categories across years. [4]

The IHS surveys are the principal living standard measurement surveys for Malawi. The nationally representative samples for the surveys are selected using a two-stage cluster sampling approach. Using the districts of Malawi and the four major urban centers as strata, enumeration areas (EA) within each stratum

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[4] The 1998 IHS-1 questionnaire differs significantly from those of the other IHS survey rounds, so this data set was excluded from our analysis.

were randomly selected with the probability of selection being proportional to the population of the EA. Either 16 or 20 households, depending on the survey round, were then randomly selected in each selected EA to make up the survey sample. The IHS surveys were administered over 12 to 13 months to capture annual seasonal variation in household consumption and expenditures, while the IHPS was administered over a nine-month period. Table 2 provides selected descriptive statistics on the three IHS surveys.

[Table 2 about here]

The employment categories used are as follows.[5] The *working age population* are those aged 15 to 64 years. These individuals are categorized as being either *economically active* or *not economically active* depending on whether or not they are engaged in economic activities or actively seeking employment in such activities. The economically active are further disaggregated into *employed* and *unemployed*, depending upon whether they are working or not working, but actively seeking work, respectively. The employed can be further disaggregated into the economic sector of employment – *agriculture*, *industry*, or *services*. Similarly, the not economically active can be disaggregated into students, homemakers, retired or ill individuals, or otherwise not economically active. In the analysis here, for the not economically active category we focus on *students* and all *other not economically active*. Given our interest in youth employment patterns, within the working age population, we further distinguish for our analysis *younger youth* aged 15 to 24 years, *older youth* aged 25 to 34 years, and *non-youth* aged 35 to 64 years.

Information was used from both the household and the agricultural questionnaires of the IHS surveys to assign an individual to one employment category or another. In doing so, we privileged certain information in assigning an individual to an employment category. Individuals stating that they were students; were not working, but actively seeking work; or were formally employed (primarily for a wage) were assigned to the student, unemployed, and employed categories, respectively, even if the individual also reported that they had also engaged, most commonly, in agricultural production. Similarly, individuals who worked in a non-agricultural household enterprise, even if also engaged in farming, were considered to be employed in either the industrial or services sector, depending on the nature of the household enterprise. However, in our subsequent analysis, we compiled information on individuals who reported working in more than one sector, which is used to create the dependent variable for the multivariate analysis discussed later.

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[5] These employment categories reflect those established by the International Labour Organization, which were used for the analysis of the 2013 Malawi Labour Force Survey (NSO 2014).

Our analysis is not comparable to those typically done with labor force survey data. Such surveys usually involve strict recall periods of the previous one week to determine the employment status of survey respondents. The data used here from the IHS surveys, however, involved varying recall periods – for farming activities, this typically was for the previous twelve months. As working age individuals are much more likely to report having worked sometime over the past year than over the past week, our approach results in a larger share of individuals being categorized as employed, rather than 'not economically active', (as would be the case if we used labor force survey data). Given these differences, our results should not be considered comparable to results on employment from the 2013 Labour Force Survey (NSO 2014) or the most recent population censuses for Malawi. However, we are confident that our approach to assigning working age members of the IHS survey samples to employment categories allows for valid comparisons to be made over the three rounds of the IHS examined.

Results

Structure of employment in Malawi in 2016

The share of the population by working age population age cohort (younger youth, older youth, and non-youth) assigned to each employment category estimated from a weighted analysis of the 2016 IHS-4 data is presented in Figure 1 as 100 percent bar charts. The dominance of agricultural employment in Malawi is apparent. Among the older youth and non-youth, over two-thirds of all individuals are working in agriculture. Of all those who are employed in these two age categories, 85 percent work in agriculture. While students are the largest employment category for the young youth group, most members of this age group who are not students work in agriculture. Across all age groups, females are slightly more likely than men to work on-farm. Given the customary land tenure system that provides access to land for almost all Malawians, agriculture is observed to be the default employment category for all, including for many individuals residing in urban centers.

[Figure 1 about here]

The shares of each population group employed in industry and services are relatively small compared to agriculture. In cities and towns, shares of those employed in the non-farm sectors are higher, particularly for services. Moreover, of those employed, the share of older youth and non-youth working in industry and services is somewhat higher than it is for the younger youth. This suggests that younger youth are unable to readily obtain work outside of agriculture when they enter the labor force.

Any individual of working age in the survey sample who reported not having work over the past four weeks, but who was actively looking for work, was categorized as unemployed. They were considered unemployed regardless of whether they indicated elsewhere in the survey that they earlier had worked in

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some capacity. However, few were categorized as such. In the report on the 2013 Labour Force Survey, it is asserted that this strict definition of unemployment is not useful in the Malawi context, since the country's underdeveloped labor markets make it quite difficult to actively seek work (NSO 2014). With broad access to agricultural land through the dominant customary land tenure system, most individuals can engage in farming to provide for some of their basic subsistence. However, given the small agricultural landholdings and the strongly seasonal pattern of rain-fed agricultural production, they are unable to farm full-time at a scale sufficient to meet all of their welfare needs. In consequence, there is significant underemployment. The low unemployment figure obtained in our analysis masks this deficiency in the quantity and quality of employment available.

Over a third of Malawi's working age population is not economically active. However, there are strong age-specific patterns to those who fall into this category. Given that so many are students, more than two-thirds younger youth are not economically active. Most students end their education by age 20 years. For older youth and non-youth, the share of the not economically active is relatively small, reflecting in part the long recall period used to define employment in this analysis. Nonetheless, in these age groups, women are more likely than men to be not economically active, likely reflecting maternal responsibilities, particularly for older youth. For urban dwellers, the higher rates of individuals not being economically active relative to rural residents likely reflects the greater barriers to employment in towns and cities, where opportunities for obtaining work, particularly formal employment, remain quite restricted.

Evidence of structural shifts in employment in Malawi, 2004 to 2016

While Figure 1 provides a static, cross-sectoral overview of employment among the working age in Malawi in 2016, the details presented in Table 3 sketch out what changes, if any, have occurred in employment patterns between 2004, 2010, and 2016 nationally and among the rural population. While information is presented for the three years for which we have data from the IHS series, our discussion here primarily focuses on differences in the annual compound growth rate between 2004 and 2016 in the number of individuals that fall in each employment category reported.

[Table 3 about here]

Growth in the number of employed is less than growth in the working age population for all age groups. This is due to higher growth over this period in the share of the population that is not economically active across all age groups and in the number of students among younger youth.

For those employed, the share working in the agriculture sector, by far the largest sector of employment, is relatively stable across the three surveys. There is no evidence in these data that any movement of labor out of agriculture is occurring in Malawi. While we can point to small changes in

employment patterns that might encourage one to see the start of such a process, particularly with the modest growth of employment in services, these changes are not sufficiently large as yet to convince us that a process of structural change in Malawi's economy might now be gaining momentum.

Where growth in employment is seen is in services among the older youth and the non-youth. For the younger youth, there has been a reduction in employment across all sectors, as increasing numbers maintain their student status. Growth rates for all sectors of employment for younger youth are negative, reflecting increasing delays in their entering the work force. Nationally, agriculture is the dominant sector for those younger youth who enter into employment. Two factors likely account for this. First, many of the younger youth, particularly males, are still dependents in their households – analysis of the IHS-4 shows that 62 percent of females and 82 percent of males in the younger youth age category are dependents, i.e., not household head or spouse of the household head. These dependent household members will be obligated to provide farm labor to the household. Secondly, most younger youth will not have sufficient capital to engage in petty trading, in particular, in the services sector. While there are barriers to participation in non-agricultural employment for all individuals of working age in Malawi, as well as elsewhere in sub-Saharan Africa (McCullough 2017), these barriers are highest for younger youth. The non-farm employment sectors are not absorbing their labor and this pattern did not change over the period examined.

It is among the older youth that one observes growth in employment in services, even if the absolute numbers involved are dwarfed by those working in agriculture. The national growth rate for employment of older youth in services, but not agriculture and industry, is higher than the rate of population growth for this age group. Older youth tend to live independently – 88 percent are either a household head or the spouse of a household head – and many will have achieved higher educational levels than did their elders in the non-youth age cohort, providing them with skills that can be used in employment in the services sector.

Nonetheless, the largest growth in employment in the services sector is among non-youth. This higher growth suggests that broad capital accumulation over time may be a more important factor than education in enabling individuals to find employment in the services sector.

In contrast to growing employment in services and a high and relatively constant share of the employed in agriculture, employment in the industrial sector in Malawi declined between 2004 and 2016. Malawi's national accounts indicate that the recent performance of the industrial sector has been positive but erratic, with a mean annual growth rate in production between 2000 and 2014 of 4.0 percent. However, this pattern is not reflected in the decline in employment share for the sector shown in the IHS data. This may be a result of labor-intensive operations in manufacturing being replaced by more capital-intensive operations.

Outside of the employed categories, younger youth increasingly are delaying their entry into employment by extending their education. This is an outcome of the increased access to education for all offered by the free primary education program first introduced in 1994. The positive trends in educational attainment between 2004 and 2016 for all working age individuals and by age group are detailed in Table 4.

[Table 4 about here]

Over this period, the share of younger youth who are students rose from 35 to 45 percent (Table 3)[6] The highest growth rates are seen in rural areas and among women. However, educational attainment levels differ between rural and urban younger youth. Analysis of the IHS-4 shows that in rural areas in 2016 two-thirds of younger youth students were still in primary school, albeit it at upper levels. Only one-third of rural younger youth students attend secondary school, and almost none attend university or training colleges. In contrast, for urban younger youth who are students, one-third attend primary school, 60 percent attend secondary school, and 7 percent are in university or training colleges.

Finally, the growth rates computed for the base working population presented in Table 3 pose some puzzles. Overall the working age population grew at 2.7 percent per year, about one-fifth of a percent lower than the growth of the population as a whole over the period examined. Emigration out of Malawi may be a factor in this, as emigration for wage labor, whether temporary or permanent, has been an important economic strategy for many Malawians since early in the colonial period (Coleman 1979; Vail 1983). In the 2008 census, heads of household were asked about household members that had left Malawi in the past ten years. Of the almost 130,000 emigrants enumerated, 61 percent were men aged 20 to 39 years of age (NSO 2011b). This pattern of age-specific male emigration is consonant with the pattern of working age population growth seen in Table 3, which show that male older youth have the second lowest rate of growth in population among the groups examined. The lowest rate of population growth is among younger youth in urban areas, which shows an absolute decline in numbers between 2004 and 2010. While this may reflect increased educational choices in rural areas, given significant public investment in rural education since 1994, reducing the traditional flow of secondary and post-secondary students of rural origin to urban schools, the determinants of population growth among younger youth in urban centers of Malawi requires additional study.

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[6] The highest growth rates for the student category are seen among older youth and the non-youth. However, note that the absolute number of students in these older groups remains very small. The increase in student numbers in these age groups likely reflects the recent expansion in tertiary education opportunities from about 8,400 places nationally in 2008 to 11,600 in 2011 (Mambo et al. 2016).

The key finding from this tabular analysis of the IHS data on the structure of employment and changes over time is that there was no net movement of labor out of the agricultural sector of Malawi's economy and into the industry or services sectors between 2004 and 2016. The share of those of working age nationally who are employed in agriculture has increased slightly over this period from 85 to 88 percent. However, there has been some growth in employment in the services sector, particularly among older youth and the non-youth. Younger youth aged 15 to 24 years are seen to be extending their period of schooling and generally enter into employment in the agriculture sector after they complete their schooling. From a working life cycle perspective, that it is older workers who are more likely to be employed in the services sector suggests that broad capital accumulation, work experience, or the development of personal social and economic networks over time may be more important factors than education in enabling individuals to find employment outside of agriculture in Malawi.

4. Analysis of the determinants of category of employment

The tabular analyses on the structure and trends in employment in Malawi presented in the previous section allows one to consider only a few factors at a time. In this section, a multivariate analysis is conducted of the factors associated with the decision by an individual to participate in a specific pattern of employment. To do so, we use an analytical sequence of a logit regression model followed by multinomial (MNL) logit model with data for sample members of working age from the 2016 IHS-4 survey (Amemiya 1985, Greene 1997). The first stage of the analysis is a simple logit model to examine the determinants of the choice by individuals to engage in employment rather than to not be economically active. The second stage focuses on those individuals who are employed and involves an MNL logit model to examine the determinants of their decision to engage in a particular employment category. This second stage of the analysis involves splitting our sample of employed working age individuals into five employment categories. We use a similar set of explanatory variables for both analyses.

Data

We use the IHS-4 from 2016 and 2017 for this analysis. It should be noted that the employment categories that we use as the dependent variable for the MNL model are different from those which were used in the analyses presented earlier. The employment categories used for the earlier tabular analysis, based on definitions of the International Labour Organization, rely upon a relatively restricted understanding of the economic engagements individuals of working age in Malawi might pursue. In particular, this categorization scheme does not allow for individuals to work in more than a single sector, e.g., working in both agriculture and services. Such diversification of livelihoods within households and by individuals is relatively common in Malawi. In consequence, for the MNL analysis to identify factors associated with the employment choice of an individual, we developed five broad employment categories consisting of individuals who are employed:

i. In agricultural sector only;

ii. Both in agricultural sector and in household enterprise(s) in the industry or services sectors;

iii. Both in agricultural sector and in wage employment in the industry or services sectors;

iv. Only in household enterprise(s) in the industry or services sectors; or

v. Only in wage employment in the industry or services sector.

In these employment categories, we maintain a distinction between informal (categories ii and iv above) and formal (iii and v) employment in the industry and services sectors (e.g., Hart 1973; Fox, Senbet, and Simbanegavi 2016). Informal employment is centered on the operations of generally small-scale, minimally-capitalized enterprises within the household that make use primarily of household labor. In contrast, formal employment generally involves an individual having some type of working agreement with an employer with salary and benefits, a specific work location outside the household residence, and regular hours, with payroll taxes and social security payments being made to government agencies as part of the formal working arrangement. Obtaining informal employment is generally easier than obtaining formal wage employment, but the nature of informal employment is less stable. Also, the returns to informal employment are usually lower than what can be obtained in formal employment. In most developing countries, including Malawi, youth have the greatest opportunities for entering the non-agricultural work force through informal employment, something they do generally with ambitions to obtain formal employment as soon as possible (ILO 2015).

Note that sample size considerations dictate that we cannot differentiate employment in the industrial sector from employment in the services sector in the second analysis. We also exclude from our analysis the small number of formally unemployed.

The Venn diagram in Figure 2 provides a graphical representation of the manner in which these categories are organized for the working age sample of the IHS-4 as a whole. The diagram, however, does not differentiate those who are employed for wages in the industry or services sectors (formal employment) from those employed in household enterprises (informal employment) in these sectors. The dominance of exclusive agricultural sector employment is apparent in the diagram.

[Figure 2 about here]

The potential factors associated with an individual pursuing employment or, if employed, being a member of a particular employment category that we consider include demographic characteristics, educational attainment, household assets, physical access to markets, and recent experiences of economic shocks. These are described in Table 5 for the entire working age sample that is the basis for the first logit

analysis on choosing to be economically active or not, and for the employed working age sample that is the basis for the second MNL analysis on the type of employment pursued by those employed. The explanatory variables included in the model have been selected based on research literature assessing determinants of participation in non-agricultural activities, including being not economically active, particularly in rural communities in developing countries.

[Table 5 about here]

Broadly, individuals may choose to engage in non-farm activities because of the potential benefits, such as high returns or to diversify risk (Lucas and Stark 1985). External shocks and risks associated with agricultural production may also lead to individuals being forced to move away from agriculture and into other sectors. Factors associated with these two distinct scenarios are referred to as 'pull' and 'push' factors. In both scenarios, an individual's labor allocation – both in amount and across sectors – is a function of incentives and capacity variables (Reardon et al. 2007).

Specifically, the demographic variables included in the MNL model are linked to the broader question of how youth in Malawi enter the work force. However, we also include two factors that may be associated with an individual not being economically active: whether an individual is a dependent within the household. As gender plays a key role in employment status, being an important determinant of access to land, labor, technology, and other productive assets that will affect the propensity of an individual to obtain employment within a specific category (Andersson Djurfeldt, Djurfeldt, and Bergman Lodin 2013), the model's covariates include the sex of the individual.

We include several dummy variables on ethnicity based on language spoken in the household. Ethnicity tends to be correlated with other economic and social disadvantages that impact on the employment choices that an individual might exercise. As has been shown in other countries, ethnic disadvantage tends to increase cumulatively over the life course as a result of the complex interplay of several overlapping layers of disadvantage, which start from conception and continue through adult life (Hall and Patrinos 2014).

We include a range of educational attainment variables to assess the importance of human capital accumulation by an individual on the type of employment obtained. Education is expressed in terms of education levels, as educational attainment credentials plays an important role in screening for formal wage jobs in Malawi and many other African countries (Lewin 2009). In order to capture the effect of household capital stocks on employment choice, we include a dummy variable of whether the individual lived in a house that was at least partly constructed of modern, permanent building materials as a proxy

identifier of households that are likely to be able to offer a member financial resources to establish a business. Several dimensions of agricultural production that might affect employment choice are also included, including agricultural landholding size and whether an individual was a member of a FISP beneficiary household, as well as the broad agro-ecological potential of the area in which an individual was resident.

Physical access to markets may be expected to influence the extent to which individuals work outside of agriculture (Jonasson and Helfand 2010; Deichmann, Shilpi, and Vakis 2009). We include travel time to the nearest populated area with greater than 5,000 persons and greater than 50,000 persons, respectively, as proxies for access to markets at different ends of the market size distribution in Malawi.

Important factors affecting incentives to diversify away from agriculture include volatile variables such as exogenous shocks (Ellis 2000). We include variables indicating if the household of which the individual is a member experienced an idiosyncratic shock (illness, child birth, death, etc.) in the last year and whether the community in which the individual resides experienced drought or floods over the last five years.

Results of Logit Analysis of Determinants of Engagement in Employment

The results of the logit model of the determinants of whether a working age individual engages in employment and is economically active are presented in column 3 of Table 6. As the majority of our explanatory variables are indicator (dummy) variables, the results are presented as odds ratios.

[Table 6 about here]

Among the demographic characteristics considered, a male individual of working age is significantly more likely to be economically active than are females. Younger youth under 24 years old are significantly less likely to be working than are individuals aged 35 to 64 years. This is expected, given that many individuals in this age group are still completing their education. However, for older youth aged 30 to 34 years, the likelihood of an individual being economically active increases and is higher than non-youth. Individuals who are dependents within the household are significantly less likely to be economically active than are household heads or their spouses. [7]

With regard to ethnic affiliation, all of the groups considered, except for the other Northern ethnic groups, are not significantly different from the dominant Chewa/Nyanja base category in terms of their

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[7] A similar analysis for IHS-3 (Benson et al, …) found that a woman having given birth in the past two years significant determinant of engaging in work, rather than withdrawing from employment. This result likely reflects that the pressing economic needs for many Malawian households generally outweigh the perceived benefits associated with providing dedicated care to infants in the household. Unfortunately, this variable was not retained in the IHS-4 household questionnaire.

engagement in employment. Further investigation of the result for the other Northern ethnic groups shows that members of this ethnic sub-sample are slightly more likely (17.7 percent) to be students than is the full sample (16.6 percent).

The odds ratios for the education completed categories present an expected rising pattern. Higher levels of education are generally associated with higher probabilities of engaging in employment. Those who have completed secondary school or have some tertiary level education are considerably more likely to be employed than those who did not complete primary school. However, we unexpectedly find that those who have completed primary school (but not secondary school) are less likely to be employed than those who have not completed primary school. The principal explanation for this result is that a large number of younger youth who have completed primary school are still continuing their education and, consequently, are considered to not be economically active.

The housing materials variable, a rough proxy for household wealth, shows that households that live in houses made of permanent materials are no more likely to have their members employed. Similarly, those living in households with more agricultural land per capita are also no more likely to have their members working. Since these asset variables are to some extent endogenous, these associations should not be treated as structural.

The model results also show that individuals residing in the Lower Shire Valley are more likely to be economically active than are those found elsewhere in Malawi. With regards to location relative to urban centers, distance to smaller or larger urban centers is not associated with whether an individual is employed. Finally, neither idiosyncratic shocks in the past year and covariant shocks (such as drought and floods) in the past five years appear as factors that push individuals to seek employment.

Results of Multinomial Logit Analysis of Category of Employment for those Employed

The results of the MNL model for type of employment of the employed working age population in the IHS-4 sample are presented in columns 4 to 7 in Table 6. Again, as the majority of the explanatory variables are indicator variables, the results are presented as relative risk ratios (RRRs).[8] The base category for the MNL model is being employed in the agriculture sector only, so all the relative risk ratios are expressed relative to this category.

The validity of MNL results is predicated on the assumption of the independence of irrelevant alternatives (IIA). The IIA assumption states that the RRRs obtained in the MNL model are independent of the other states (Greene 1997). The validity of the IIA assumption is often questionable in the application of

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[8] Relative risk ratios show how a one-unit change in an explanatory variable will change the relative probability of an individual being in one employment category relative to the base category (Long and Freese 2014). An RRR less than 1.0 indicates a decrease in the relative probability of being in a particular employment category, while an RRR greater than 1.0 indicates an increase.

an MNL model to discrete choice issues as in the analysis of the choice of employment category here. However, we are unable to reject the IIA assumption for our preferred MNL model in Table 6 using the Small-Hsaio post-estimation test (Small and Hsaio 1985).

Examining the results of our MNL analysis, we find that male workers are more likely than females to combine agricultural employment with home enterprise or wage employment or to be employed exclusively in wage employment, rather than solely in agriculture. Work solely in a household enterprise is also more likely to be done by men than by women.

Examining the youth components of our model, our results confirm the findings from our tabular analysis that younger youth, ages 15 to 24, are either in agriculture or are not economically active, as evidenced by the relative risk ratios for individuals of these ages all being significantly less than 1.0 for any employment categories that include non-farm work. In contrast, the statistically insignificant relative risk ratios across two employment categories for those aged 25 to 29 years suggest that these somewhat older youth are in something of a transitional period in terms of the nature of their employment, with a clearer pattern of employment being established in later years–during which we find oldest youth more likely to be employed both in agriculture and household enterprises. The youth are not in the vanguard of those Malawians taking up employment, whether informal or formal, in the services and industrial sectors and abandoning agriculture.

Our expectation from the earlier tabular analysis is that household members who are dependents within a household and are working are likely to work solely in agriculture, not finding work in the industry or services sectors. This is confirmed in the model results, where the odds ratios are less than one expect for sole wage employment,

With regards to employment patterns and ethnicity, the larger ethnic groups of the South (Yao and Lomwe) are less likely than the reference ethnic group of the Chewa/Nyanja to work for wages out of agriculture. Only workers who are members of the other Northern ethnic groups show any significantly greater likelihood of diversifying their employment out of agriculture alone than the Chewa/Nyanja, and then primarily in household enterprises rather than in wage employment.

The important role for education in moving people out of farming and into the non-farm sectors is consistently and strongly seen in the association between educational attainment and the employment category of an individual – greater educational attainment results in much higher probabilities of working outside of agriculture and in formal, wage-based employment. Workers who have completed primary education are about twice as likely to work outside of agriculture as those who have not completed primary school. Having completed secondary or tertiary education increase the probably of working outside of agriculture, in particular the likelihood of a wage job, very substantially.

In contrast to the logit model, the multinomial logit shows a strong association between the level of household wealth, as proxied by the quality of housing for an individual, and engagement in any non-farm employment, with somewhat stronger associations for purely non-farm employment. This points to capital or other financial hurdles restricting working-age individuals from poorer households engaging in non-farm employment.

Turning to the results for the agriculture-related determinants, larger landholdings are associated with a lower propensity to be in all categories non-farm employment.[9] The relative risk ratio in the fouth and fifth column of Table 6 shows that household enterprises in the industry and service sectors and wage employment are strongly associated with smaller landholdings. This is evidence that declining landholding size, driven by population pressure, potentially is a significant push factor propelling working age individuals to seek a portion of the livelihoods for their households in wage labor off-farm.

Our MNL results provide some evidence that the receipt of Farm Input Subsidy Program (FISP) benefits by a household in the cropping season prior to the IHS-4 survey encouraged individuals to obtain work outside of agriculture. The significant associations between a household having received FISP benefits and working age individuals in such households being unlikely to be employed both in agriculture and in non-farm wage labor (column 4 and 5 in Table 6) can be interpreted in two ways: first, as the receipt of FISP benefits forestalling the need for an individual to engage in wage labor off-farm or, secondly, as simply reflecting the targeting of FISP, the eligibility criteria for which include the requirement that beneficiary households be full-time 'productive' farmers.

We do not find many effects of broad agro-ecological potential on employment choice. The base category is the relatively productive mid-altitude Plateau and Highland agro-ecological zone. However, residence in the the Lakeshore (which here includes the Upper Shire Valley) zones, which experience more erratic or lower rainfall and are subject to more weather-related shocks than is seen in the mid-altitude Plateau and Highland zone, does result in a lower probability of combining agriculture with wage employment in the industry and service sectors.

The variables on market access (travel time) to small (5,000 population size and up) and large (over 50,000 population) urban centers provide contrasting results. While the overall pattern for small population centers is that the longer it takes for an individual to travel to a small center, the more likely they are to engage in non-farm activities, poor access to large urban centers is negatively associated with exclusive non-farm employment. Given that larger urban centers are where most formal non-farm

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[9] The results on the landholding size and the FISP variables for the two exclusively non-farm employment categories (columns 6 and 7 in

Table 6) should be disregarded, as these individuals principally will come from non-agricultural households.

employment opportunities are concentrated, this result is not surprising – although many urban households in Malawi still have their own farms or garden plots for growing some of their own food consumption. The positive association that travel time to smaller population centers has on the employment choices of individuals located close to them calls into question whether these smaller towns have much of a role to play in changing labor patterns in Malawi and contributing to a structural transformation of the economy.

Finally, with regards to an individual experiencing a recent economic shock, we find that idiosyncratic shocks are positively associated with a propensity to engage in non-farm employment. This may be a result of the economic costs of such shocks (in particular, ill-health) driving household members to seek non-farm employment (Kochar, 1995). In contrast, workers resident in communities that experienced drought in the last five years are no more likely to engage in non-farm employment either exclusively or in combination with farming. This result reflects the limited employment opportunities and general economic downturn following the poor harvests of 2015 and 2016.

To summarize the findings from our multinomial logit modeling of employment choice in Malawi, we find further confirmation that younger youth are not implicated in any shift in the sectoral composition of employment in Malawi. Older youth and non-youth, particularly males, are more central to such shifts. Educational attainment is strongly associated with employment outside of agriculture. This suggests that there are incentives associated with employment in the industry and services sectors operating to 'pull' people out of agriculture. However, the model results also show that small agricultural landholdings and experience of household-level shocks are factors 'pushing' people out of agriculture to seek non-farm employment, whether on a part-time or exclusive basis or under formal (wage-labor) or informal (household enterprise) working arrangements.

5. Summary and conclusions

A close analysis of patterns and trends in the sectoral composition of employment in Malawi does not provide evidence of any process of structural transformation of the economy of the country now getting underway. The analysis here of the IHS data sets does not confirm the macro-analysis of sectoral shifts in employment and labor productivity done using recent censuses and the 2013 Labour Force Survey suggesting nascent sectoral transformation processes underway in Malawi's economy (Dorosh, Pauw, and Thurlow 2015), nor do our results replicate other analyses showing a significant net movement of workers out of agriculture in Malawi in recent years (McMillan and Harttgen 2014).[10]

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[10] In studying why the findings of the macro-level analysis and those of the survey analysis here diverge, significant changes were found between the 1998 and 2008 censuses for Malawi in how employment information was obtained and categorized. Categorizing the working age population into similarly defined employment groups based on the censuses proved impossible. Consistent categories of employment also could not be developed with data from either census and data from the 2013 Labour Force Survey.

The historical pattern of agriculture being the principal sector of engagement for those entering the work force remains in place. We see some small movements of labor into the services sector, particularly by older workers. However, the share of those employed who work in agriculture remained relatively stable from 2004 to 2013, while a decline in the share of those who work in the industrial sector is observed. This decline balances any increase in the share of workers in services. Our analysis of employment in Malawi dampens hopeful thoughts that a process of transformation in the structure of Malawi's economy might now be gaining momentum. The structure of employment in Malawi remains dominated by agriculture, as it has been for generations.

We find that working in the non-farm sectors is a step that increasing numbers of workers, but still relatively few, will take later in their work lives after they have built, presumably, the financial capital, experience, and social networks needed to succeed outside of agriculture. The factors that push Malawians out of agriculture, some of which we have identified in our analysis, will persist and intensify over coming decades due to continuing rapid population growth.

The strong association between educational attainment and engagement in remunerative formal non-farm employment is clear. The free primary education program over the past 20 years has played a role in the increasing share of older youth employed outside of agriculture. Maintaining high levels of investment in education is likely to be a factor in turning the small trickle of older youth seeking employment in the non-farm sectors into a much more substantial flow.

Nevertheless, it remains the case that for most education alone is not sufficient to enable them to obtain non-farm employment. There are relatively few high-quality jobs in Malawi in which well-trained Malawians can use their skills productively. Designing programs and incentives to supply such jobs should be as pressing a public policy concern for the government of Malawi as improving the skills of the population through improved education. Many of the jobs which are being created in the non-farm sectors today are relatively low productivity and offer little more in terms of economic output than can be achieved in smallholder farming (McMillan and Harttgen 2014). Promoting more foreign direct investment may help create some higher productivity jobs, as foreign investors can provide greater access to new technology and foreign markets. Government will also need to continue its efforts to upgrade energy and transport infrastructure and significantly increase its investments in urban development, as most of these new jobs will be located in the cities of Malawi and will require reliable power and better connections to regional and global markets (Dabalen et al. 2017).

However, agriculture still remains the entry point into the work force for younger youth in Malawi at the end of their schooling. Better training may equip these young farmers to adopt improved agricultural technologies and be more productive, and we find mixed, if somewhat encouraging, evidence in analysis of the IHS-3 of this being the case. Households headed by youth aged 15 to 34 years are more likely than households headed by non-youth to receive visits from extension agents (20 percent for youth-headed

households, as against 15 percent for non-youth headed households) and to use inorganic fertilizer (33 percent, as against 25 percent). This pattern raises expectations that as younger youth engaged in agricultural employment become heads of their own households, they will have a greater propensity than their parents' generation to seek out and use improved farming techniques. Continued investments in agricultural research and extension to ensure access by these emerging farmers to improved agricultural technologies and input will contribute to an agricultural sector in Malawi with significantly higher labor productivity.

Consequently, while government needs to act in a manner that puts in place adequate incentives for all Malawians to find and engage in sufficiently remunerative work in all three sectors of the economy, agriculture will remain the sector in which most Malawians are employed for the foreseeable future. Consequently, it is important that public investments made to support growth and to promote change in the structure of the economy of Malawi do not neglect agriculture. Investments that strengthen agriculture's linkages with the industry and services sectors are especially important. Increased value-addition activities on agricultural products that involve more complex processing techniques and an expansion in the range of commodities used and products manufactured are likely to be central components in any structural transformation of the economy that results in significant expansion in employment in both the industry and services sectors. In consequence, we should expect that any growth in employment in the non-farm sectors will primarily find its origins in a more vibrant, diverse, and productive agriculture sector.

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Figures

Figure 1: Size of employment categories by age cohort, disaggregated by rural and urban and by male and female, percentage share of population, 2016-17
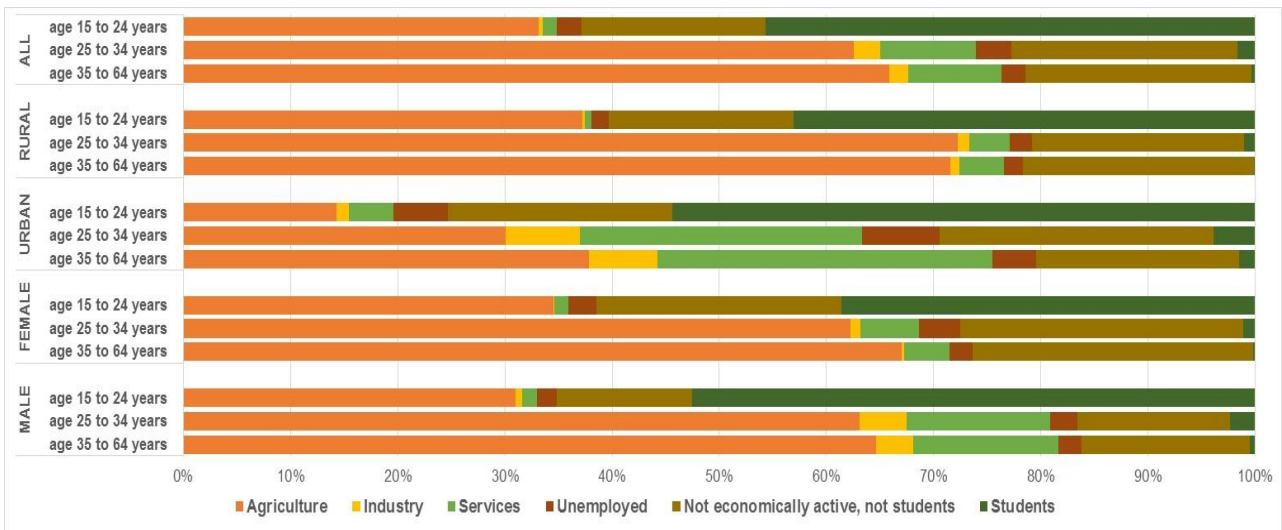
Source: Analysis by authors of IHS-4. Weighted analysis.

Figure 2: Venn diagram of the relative sizes of the employment categories, for working-age sample from IHS-4

N=25,384

1 - Employed in agricultural sector only;

2 - Employed in agricultural sector <u>and</u> in the industry or services sectors (not differentiated between employment in household enterprise or for wages);

3 - Employed only in the industry or services sectors (not differentiated between employment in household enterprise or for wages);

4 - Not economically active
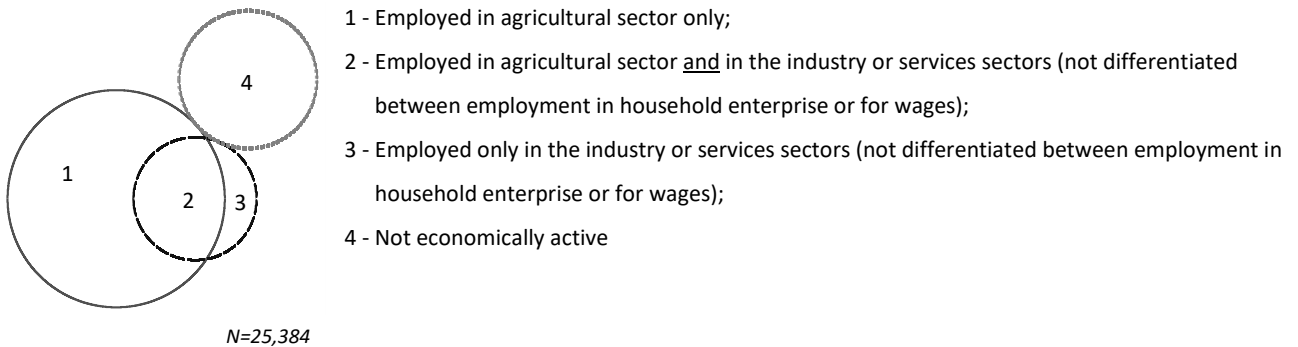
Source: Analysis by authors of IHS-4.

Tables

Table 1: Economic sector growth and employment in Malawi, 1998, 2008, and 2013

	1998		2008		2013		Annual growth, %		
	value	share, %, or index relative to average	value	share, %, or index relative to average	value	share, %, or index relative to average	1998-2008	2008-2013	overall
GDP, US$ millions	4,053	*(share)*	5,636	*(share)*	7,287	*(share)*	3.4	5.3	4.0
Agriculture	1,491	36.8	1,863	33.0	2,315	31.8	2.3	4.4	3.0
Manufacturing	512	12.6	827	14.7	1,135	15.6	4.9	6.5	5.4
Services	2,050	50.6	2,947	52.3	3,837	52.7	3.7	5.4	4.3
Employment, '000s	4,446	*(share)*	5,148	*(share)*	5,550	*(share)*	1.5	1.5	1.5
Agriculture	3,736	84.0	3,730	72.5	3,556	64.1	0.0	-1.0	-0.3
Manufacturing	193	4.3	389	7.6	412	7.4	7.3	1.1	5.2
Services	517	11.6	1,028	20.0	1,582	28.5	7.1	9.0	7.7
GDP per worker, US$	911	*(index)*	1,095	*(index)*	1,313	*(index)*	1.9	3.7	2.5
Agriculture	399	0.44	499	0.46	651	0.50	2.3	5.4	3.3
Manufacturing	2,658	2.92	2,124	1.94	2,756	2.10	-2.2	5.4	0.2
Services	3,962	4.35	2,867	2.62	2,426	1.85	-3.2	-3.3	-3.2

Source: modified from Dorosh, Pauw, and Thurlow (2015).

Note: A statistical definition of 'employment' is used here which only considers those of working age – individuals aged 15 to 64 years – who are economically active and employed. Employed individuals are those who over the past seven days did some work for pay, profit, or family gain, in cash or in kind, but it excludes those who farmed their own land on less than a full-time basis solely for family consumption and not for sale (NSO 2014).

Table 2: Sample size and period of administration of Malawi Integrated Household Surveys used

	IHS-2	IHS-3	IHS-4
Sample size, households	11,280	12,271	12,447
Working age (15 to 64 years of age) sample size, individuals	25,144	27,842	27,475
Survey administration period	03/2004 to 03/2005	03/2010 to 03/2011	04/2016 to 04/2017

Source: Analysis by authors of IHS-2, IHS-3, and IHS4.

Table 3: Change in size of employment categories by age cohort, for national and rural working age populations

	Ages 15 to 64 years				Younger youth, ages 15 to 24				Older youth, ages 25 to 34				Non-youth, ages 35 to 64			
	2004	2010	2016	Annual growth, 2004-16, %	2004	2010	2016	Annual growth, 2004-16, %	2004	2010	2016	Annual growth, 2004-16, %	2004	2010	2016	Annual growth, 2004-16, %
NATIONAL Working age population, '000s	5,975	6,871	8,264	2.7	2,338	2,556	3,185	2.6	1,603	1,980	2,066	2.4	2,034	2,335	3,013	3.3
	(42.5)	(120.4)	(150.0)		(30.9)	(51.6)	(56.8)		(19.1)	(47.3)	(47.6)		(23.9)	(45.1)	(61.8)	
Employed, % share of working age population	76.7	72.8	60.71	0.8	53.7	46.6	35.5	-0.9	90	85.6	75.2	0.6	92.7	90.6	77.4	1.8
	(0.4)	(0.5)	(0.1)		(0.8)	(0.8)	(0.8)		(0.5)	(0.7)	(0.8)		(0.4)	(0.5)	(0.7)	
Agriculture, % share of employed	85.3	87.1	87.8	0.7	89.8	93.1	95.1	-0.6	82	83.8	84.7	0.6	84.7	86.3	86.2	1.6
	(0.6)	(0.6)	(0.1)		(0.6)	(0.6)	(0.4)		(0.8)	(0.9)	(1.0)		(0.7)	(0.6)	(0.7)	
Industry, % share of employed	5.8	3.2	2.3	(6.8)	4.0	1.6	1.0	(11.7)	7.3	4.3	3.3	(6.1)	5.9	3.4	2.3	-5.9
	(0.4)	(0.3)	(0.0)		(0.4)	(0.3)	(0.2)		(0.5)	(0.4)	(0.4)		(0.4)	(0.3)	(0.3)	
Services, % share of employed	8.9	9.7	9.9	1.3	6.1	5.3	3.9	-4.7	10.7	11.9	12.0	1.3	9.4	10.3	11.4	3.0
	(0.5)	(0.5)	(0.5)		(0.5)	(0.5)	(0.4)		(0.6)	(0.7)	(0.8)		(0.6)	(0.5)	(0.6)	
Unemployed, % share of working age pop.	0.7	1.3	2.4	13.8	0.9	1.4	2.2	10.7	0.9	2	3.1	13.6	0.4	0.8	2.1	19.8
	(0.1)	(0.2)	(0.0)		(0.1)	(0.2)	(0.2)		(0.2)	(0.3)	(0.3)		(0.1)	(0.1)	(0.2)	
Not economically active and not students, % share of working age pop.	8.6	10.1	19.2	9.8	10.5	11.3	17.7	7.2	8.2	10.7	20	10.1	6.8	8.3	20.2	13.1
	(0.3)	(0.4)	(0.1)		(0.4)	(0.5)	(0.6)		(0.4)	(0.5)	(0.7)		(0.4)	(0.5)	(0.6)	
Students, % share of working age pop.	13.9	15.7	17.7	4.8	34.9	40.7	44.6	4.7	1	1.8	1.6	24.7	0.1	0.3	0.3	19.0
	(0.3)	(0.3)	(0.0)		(0.7)	(0.7)	(0.7)		(0.1)	(0.2)	(0.2)		(0.0)	(0.1)	(0.1)	
RURAL Working age population, '000s	4,804	5,683	6,501	2.6	1,855	2,118	2,546	2.7	1,249	1,570	1,534	1.7	1,700	1,995	2,421	3.0
	(69.9)	(99.5)	(137.8)		(35.0)	(45.4)	(61.3)		(23.0)	(33.5)	(39.9)		(29.6)	(40.8)	(57.5)	
Employed, % share of working age population	80.4	75.9	61.9	0.3	58.8	50.4	38.4	-0.9	93.4	89.6	77.4	0.2	94.3	92.4	76.8	1.2
	(0.5)	(0.5)	(0.1)		(0.9)	(0.9)	(0.9)		(0.4)	(0.7)	(0.9)		(0.4)	(0.5)	(0.8)	
Agriculture, % share of employed	89.9	92.3	94.6	0.7	93.3	96.3	97.8	-0.6	88.1	90.3	93.8	0.5	89	91.4	93.5	1.6
	-0.5	-0.4	0.0		-0.5	-0.5	-0.6		-0.7	-0.7	-0.6		-0.6	-0.5	-0.5	
Industry, % share of employed	5.1	2.3	1.1	-11.9	3.4	1	0.5	-16.1	6.4	3.1	1.4	-11.7	5.2	2.3	1.1	-10.8
	(0.4)	(0.3)	(0.0)		(0.4)	(0.3)	(0.1)		(0.6)	(0.4)	(0.3)		(0.5)	(0.3)	(0.2)	
Services, % share of employed	5	5.5	4.3	1.0	3.3	2.7	1.8	-6.1	5.5	6.7	4.7	-1.1	5.8	6.2	5.4	0.5
	(0.3)	(0.3)	(0.3)		(0.4)	(0.4)	(0.3)		(0.5)	(0.5)	(0.5)		(0.5)	(0.5)	(0.4)	
Unemployed, % share of working age pop.	0.2	0.8	1.7	20.9	0.3	0.7	1.6	16.6	0.2	1.1	2.1	16.1	0.2	0.7	1.8	24.8
	(0.0)	(0.1)	(0.0)		(0.1)	(0.1)	(0.2)		(0.1)	(0.2)	(0.3)		(0.1)	(0.1)	(0.2)	
Not economically active and not students, % share of working age pop.	6.2	7.9	19.2	9.8	7.4	9	17.1	10.2	5.5	8	19.5	13.0	5.5	6.7	21.3	15.4
	(0.3)	(0.4)	(0.1)		(0.5)	(0.5)	(0.6)		(0.4)	(0.6)	(0.9)		(0.4)	(0.5)	(0.7)	
Students, % share of working age pop.	13.2	15.3	17	4.8	33.5	40	42.8	4.8	0.9	1.3	0.98	2.9	0	0.2	0.1	14.7
	(0.3)	(0.3)	(0.1)		(0.7)	(0.8)	(0.9)		(0.2)	(0.2)	(0.2)		(0.0)	(0.1)	(0.0)	
Observations (national)	25,144	27,842	27,447		9,844	10,427	10,637		6,772	8,026	6,844		8,528	9,389	9,995	

	Ages 15 to 64 years			
	2004	2010	2016	Annual growth, 2004-16, %
NATIONAL Working age population, '000s	5,975	6,871	8,264	2.7

	(42.5)	(120.4)	(150.0)	
Employed, % share of working age population	76.7	72.8	60.71	0.8
	(0.4)	(0.5)	(0.1)	
Agriculture, % share of employed	85.3	87.1	87.8	0.7
	(0.6)	(0.6)	(0.1)	
Industry, % share of employed	5.8	3.2	2.3	(6.8)
	(0.4)	(0.3)	(0.0)	
Services, % share of employed	8.9	9.7	9.9	1.3
	(0.5)	(0.5)	(0.5)	
Unemployed, % share of working age pop.	0.7	1.3	2.4	13.8
	(0.1)	(0.2)	(0.0)	
Not economically active and not students, % share of working age pop.	8.6	10.1	19.2	9.8
	(0.3)	(0.4)	(0.1)	
Students, % share of working age pop.	13.9	15.7	17.7	4.8
	(0.3)	(0.3)	(0.0)	
RURAL Working age population, '000s	4,804	5,683	6,501	2.6
	(69.9)	(99.5)	(137.8)	
Employed, % share of working age population	80.4	75.9	61.9	0.3
	(0.5)	(0.5)	(0.1)	
Agriculture, % share of employed	89.9	92.3	94.6	0.7
	-0.5	-0.4	0.0	
Industry, % share of employed	5.1	2.3	1.1	-11.9
	(0.4)	(0.3)	(0.0)	

Services, % share of employed	5	5.5	4.3	1
	(0.3)	(0.3)	(0.3)	
Unemployed, % share of working age pop.	0.2	0.8	1.7	20.9
	(0.0)	(0.1)	(0.0)	
Not economically active and not students, % share of working age pop.	6.2	7.9	19.2	9.8
	(0.3)	(0.4)	(0.1)	
Students, % share of working age pop.	13.2	15.3	17	4.8
	(0.3)	(0.3)	(0.0)	
Observations (national)	25,144	27,842	27,447	

Source: Analysis by authors of data from the Malawi Integrated Household Survey (IHS) series for 2004 (IHS-2), 2010 (IHS-3), and 2016 (IHS-4).

Note: Weighted analysis. 'Annual growth' is the compound annual growth rate in the number of individuals that fall in the employment category in question between 2004 and 2016. Standard errors corrected for sampling design are reported in parentheses.

Table 4: Changes in educational attainment among working-age individuals in Malawi, 2004 to 2016

	Ages 15 to 64 years			Younger youth, ages 15 to 24			Older youth, ages 25 to 34			Non-youth, ages 35 to 64		
	2004	2010	2016	2004	2010	2016	2004	2010	2016	2004	2010	2016
NATIONAL – Years of schooling completed, avg.	5	5.8	6.5	6.1	6.7	7.3	5.2	6.3	7.1	3.7	4.5	5.2
Completed primary school, percent	*23.2*	*27.3*	*31.7*	*27.1*	*30.4*	*34.1*	*26.3*	*32.7*	*38.7*	*16.3*	*19.5*	*24.4*
Completed secondary school, percent	*4.4*	*7.1*	*9.4*	*3.1*	*4.9*	*6.8*	*6.8*	*10.5*	*14*	*4.1*	*6.8*	*9*
Rural – Years of schooling completed, avg.	4.4	5.3	5.9	5.6	6.3	6.8	4.5	5.7	6.2	3.2	3.9	4.4
Urban – Years of schooling completed, avg.	7.5	8.6	9.04	8	8.9	9.3	7.9	8.8	9.6	6.4	8	8.3
Female – Years of schooling completed, avg.	4.1	5.1	5.7	5.6	6.5	7.2	4	5.4	6.5	2.5	3.2	4
Male – Years of schooling completed, avg.	6.0	6.6	7.1	6.6	6.9	7.4	6.4	7.3	7.7	5	5.8	6.4
Observations (national)	*25,098*	*27,736*	*27,475*	*9,839*	*10,370*	*10,637*	*6,762*	*7,998*	*6,844*	*8,497*	*9,368*	*9,994*

Source: Analysis by authors of data from the Malawi Integrated Household Survey (IHS) series for 2004 (IHS-2), 2010 (IHS-3), and 2016 (IHPS).

Note: Weighted analysis. Sample design corrected standard errors are not reported here, but are available upon request.

Table 5: Descriptive statistics of variables used for logit analysis and multinomial logit analysis of determinants of employment status and type of employment

	Variable	Variable definition	Logit analysis mean (s.e.)	MNL analysis mean (s.e.)
Dependent categorical variable components:				
Logit analysis of determinants of engagement in employment				
	econ_active	Economically active, 0/1	0.654 *(0.0052)*	*na*
Multinomial logit analysis of determinants of type of employment for those engaged in employment				
	farm_only	Employed in agricultural sector only, 0/1	*na*	0.663 *(0.0084)*
	farm_NFent	Employed both in agriculture and in household enterprise(s) in the industry or services sectors, 0/1	*na*	0.143 *(0.0043)*
	farm_NFwage	Employed both in agricultural sector and in wage employment in the industry or services sectors, 0/1	*na*	0.094 *(0.044)*
	NFent_only	Only employed in household enterprise(s) in the industry or services sectors, 0/1	*na*	0.035 *(0.0026)*
	NFwage_only	Only employed for wages in the industry or services sector, 0/1	*na*	0.066 *(0.0041)*
Explanatory variables:				
Demographic	male	male, 0/1	0.477 *(0.0027)*	0.492.l*(0.0035)*
	youth15_19	age 15 to 19 years, 0/1	0.209 *(0.0032)*	0.066 *(0.0024)*
	youth20_24	age 20 to 24 years, 0/1	0.160 *(0.0032)*	0.158 *(0.0039)*
	youth25_29	age 25 to 29 years, 0/1	0.125 *(0.0026)*	0.150 *(0.0033)*
	youth30_34	age 30 to 34 years, 0/1	0.126 *(0.0030)*	0.160 *(0.0035)*
	dependent	Individual is a dependent within household (not head or spouse of head), 0/1	0.298 *(0.0042)*	0.135 *(0.0038)*
Ethnicity	Chewa_Nyanja	Chewa or Nyanja ethnicity, 0/1	0.726 *(0.0100)*	0.731 *(0.0097)*
	Yao_Lomwe	Yao or Lomwe ethnicity, 0/1	0.095 *(0.0071)*	0.087 *(0.0061)*
	Tmbka_Ngoni_Tnga	Tumbuka, Ngoni, or Tonga ethnicity, 0/1	0.111 *(0.0064)*	0.107 *(0.0069)*
	Other_north	Other northern ethnic groups, 0/1	0.018 *(0.0021)*	0.020 *(0.0024)*
	Other_ethncty	Other ethnic groups, 0/1	0.050 *(0.0033)*	0.055 *(0.0040)*
Education Completed	ed_not_fin_prmry	Did not complete primary school, 0/1	0.703 *(0.0063)*	0.702 *(0.0067)*
	ed_prmry_cmplt	Completed primary school, 0/1	0.210 *(0.0050)*	0.195 *(0.0048)*
	ed_scndry_cmplt	Completed secondary school, 0/1	0.061 *(0.0025)*	0.071 *(0.0029)*
	ed_tertiary	Received tertiary level education - university or vocational, 0/1	0.025 *(0.0027)*	0.033 *(0.0035)*
Household wealth	house_perm_mtrl	Lives in house constructed with some permanent materials, e.g., metal roofing sheets, cement, 0/1	0.656 *(0.0077)*	0.645 *(0.0080)*
Agriculture	land_cap_ha	Household agricultural landholding per capita, ha	0.178 *(0.0013)*	0.018 *(0.0015)*
	FISP_hh	Household benefiting from Farm Input Subsidy Program, 0/1	0.167 *(0.0063)*	0.164 *(0.0060)*
	mid_alt_plt	Resident in Mid-altitude Plateau and Highlands agro-ecological zone, 0/1	0.749 *(0.0068)*	0.759 *(0.0065)*
	Lower_Shire_Valley	Resident in Lower Shire Valley agro-ecological zone, 0/1	0.053 *(0.0027)*	0.061 *(0.0029)*
	Lakeshore	Resident in Lakeshore and Upper Shire Valley agro-ecological zone, 0/1	0.198 *(0.0123)*	0.203 *(0.0130)*
Access to markets	trvl_5k_town_hr	Travel time to nearest urban center with population above 5,000, hours	0.088 *(0.4062)*	0.088 *(0.4027)*
	trvl_50k_town_hr	Travel time to nearest urban center with population above 50,000, hours	0.912 *(0.4097)*	0.910 *(0.4064)*
Shocks	shock_idiosync	Household experienced idiosyncratic shock in past 12 months, 0/1	0.352 *(0.008)*	0.359 *(0.0082)*
	Shock_cov	Drought or floods in community in past five years, 0/1	0.472 *(0.0206)*	0.474 *(0.0209)*
		Observations	*25, 384*	*16,107*

Source: Analysis by authors of IHS-4. Weighted estimates. Standard errors corrected for sampling design reported in parentheses. 0/1 denotes indicator (dummy) variable and *na* means not applicable.

Table 6: Results of logit and multinominal logit analysis of determinants of employment status/type of employment

Explanatory variable category	Explanatory variable (potential determinants)	Logit Analysis odds ratios	Multinomial logit analysis of type of employment relative risk ratios			
		Employed	In agriculture and in household enterprise in industry or service sectors	In agriculture and in wage employment in industry or services sectors	Only in household enterprise in industry or services sectors	Only in wage employment in industry or services sectors
Demography	Male	1.515***	1.241***	3.807***	1.405**	1.626***
		(0.06)	(0.0741)	(0.3371)	(0.1813)	(0.1615)
	Youth 15_19	0.217***	0.412***	0.482**	0.595	0.181***
		(0.0172)	(0.0887)	(0.1146)	(0.2982)	(0.0819)
	Youth 20_24	0.849*	0.876	0.664**	0.835	0.541**
		(0.0595)	(0.0827)	(0.0842)	(0.1823)	(0.1061)
	Youth 25_29	1.117	1.167*	0.825	1.182	1.390*
		(0.0887)	(0.0887)	(0.1082)	(0.2136)	(0.2201)
	Youth 30_34	1.330***	1.228**	0.924	1.093	1.251
		(0.1006)	(0.0974)	(0.0959)	(0.2074)	(0.1725)
	Dependent	0.236***	0.257***	0.447***	0.186***	1.096
		(0.0156)	(0.0352)	(0.0732)	(0.0556)	(0.2432)
Ethnicity	Yao_Lomwe	0.854	0.996	0.876	0.599	0.535*
		(0.0966)	(0.1298)	(0.153)	(0.1854)	(0.1473)
	Tumbuka_Ngoni_Tnga	1.094	0.943	0.991	0.943	0.991
		(0.0923)	(0.0975)	(0.151)	(0.3033)	(0.2471)
	Other_north	1.944***	1.501	0.549	4.695*	1.139
		(0.3193)	(0.4009)	(0.1682)	(2.8324)	(0.6542)
	Other_ethncty	1.025	1.193	1.077	1.344	1.43
		(0.1471)	(0.1799)	(0.2605)	(0.6221)	(0.6703)
Education completed	Primary	0.825***	1.769***	2.263***	2.178***	1.663***
		(0.0375)	(0.1321)	(0.1972)	(0.3567)	(0.2231)
	Secondary	1.352**	1.553**	5.852***	5.235***	8.884***
		(0.1347)	(0.2071)	(0.7038)	(1.0778)	(1.2338)
	Tertiary	1.961**	1.358	29.246***	18.313***	112.966***
		(0.4516)	(1.3496)	(13.6071)	(8.7307)	(51.3805)
Housing	Permanent house	0.956	1.536***	2.454***	8.514***	8.406***
		(0.053)	(0.1076)	(0.2705)	(3.2276)	(2.2563)
Agriculture	Land per capita (ha)	1.352	0.466*	0.069***	0.000***	0.000**
		(0.4084)	(0.1799)	(0.055)	(0.0000)	(0.0000)
	FISP beneficiary	1.027	1.129	0.615***	0.000***	0.057***
		(0.067)	(0.084)	(0.0688)	(0.0000)	(0.024)
	Lower Shire Valley	1.790***	1.077	0.951	1.959	0.962
		(0.1998)	(0.1487)	(0.2849)	(1.0786)	(0.513)
	Lakeshore	0.700***	0.934	0.719*	0.738	0.926
		(0.0548)	(0.0991)	(0.1028)	(0.1947)	(0.2154)
Access to markets	Travel time to nearest town of 5,000+ (hours)	0.958	1.136*	1.191*	2.431***	2.031***
		(0.0436)	(0.0673)	(0.1018)	(0.3647)	(0.2125)
	Travel time to nearest town of 50,000+ (hours)	1.045	0.879*	0.836*	0.415***	0.493***
		(0.0474)	(0.0519)	(0.0712)	(0.0619)	(0.0514)
Shocks	Idiosyncratic	1.104	1.704***	1.242**	2.705***	1.540***
		(0.0615)	(0.1023)	(0.1018)	(0.4372)	(0.1893)
	Covariant	1.058	0.997	0.773*	0.622*	0.815
		(0.0736)	(0.0798)	(0.0944)	(0.1465)	(0.1851)
	Constant	3.475***	0.131***	0.042***	0.011***	0.016***
		(0.2691)	(0.0127)	(0.0069)	(0.005)	(0.0049)
	Observations	23,829	2,422	1,650	564	1,022

Total observations in analytical data set: 23,829; Employed: 16,634; Employed in agricultural sector only (MNL base category): 10,976.

Logit analysis: pseudo-R^2: 0.2466; $F_{(22, 681)}$ = 142.20, Prob > F= 0.0000

MNL analysis: pseudo-R^2: 0.1590; $F_{(88, 615)}$ = 1685.43, Prob > F= 0.0000

Source: Analysis by authors of IHS-4.

Notes: Weighted estimates. Statistical significance of relative risk ratios denoted by * for p<.05, ** for p<.01, and *** for p<.001. Standard errors corrected for sampling design reported in parentheses. Reference employment category for the MNL is 'Agricultural sector employment only'. For the categorical explanatory variables, the base case for age

cohort is those aged 35 to 64 years, for ethnicity is 'Chewa or Nyanja'; for educational attainment is 'Did not complete primary school'; and for agro-ecological zones is 'Mid-altitude Plateau and Highlands'. Pseudo-R^2 should be considered indicative, as they are estimated from unweighted logit and multinomial logit analyses with the same specifications.