Determinants of changes in youth and women agricultural labor participation in selected African countries

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Abstract

Using data from the Living Standards Measurement Surveys-Integrated Surveys of Agriculture (LSMS-ISA), this paper investigates the determinants of changes in youth and women participation in agriculture. Participation in the agricultural labor force is measured using hours per week in agriculture and change in hours worked per week in agriculture between two survey waves for Nigeria and Uganda. Ordinary Least Squares and Tobit methods are used to estimate the model. The findings suggest that age is a strong determinant in hours worked per week in agriculture in Nigeria but not in Uganda. For both countries, age does not seem to have an impact on changes in hours worked per week in agriculture by the youth or by women. Nigerian men work more hours per week in agriculture than women while the opposite is true for Uganda. Education, gender, rural residence, and non-agricultural wage income strongly affect hours worked per week in agriculture.

Keywords: Youth, Women, Agricultural Labor, Participation

I- Introduction

Recent debates about youth engagement in agriculture focus on whether they are leaving the sector and what to do about it. Evidence suggests that African youth are leaving agriculture in some countries. Using Demographic and Health Surveys (DHS) data, McMillan and Harttgen (2014) estimated the share of workers in agriculture at 49.3% for the period 2006-2012 for 24 African countries. In the 1990s, the average share for these countries was 54.6% indicating a downward trend between the two periods. Maïga et. al. (2015) found evidence that suggest the youth are leaving agriculture in Nigeria but not so much in other countries such as Niger, Malawi and Tanzania. They used the Living Standards Measurement Surveys-Integrated Surveys of Agriculture (LSMS-ISA) data, one of the most reliable, rich, and up-to date data focusing on agriculture in Sub-Saharan countries.

Regarding women, one often reads or hears that women are responsible for the bulk of agricultural labor in African countries but Palacios-Lopez et. al. (2015) busted that myth (60 to 80% of agricultural labor done by women) in African countries. They estimated the share of labor done by women in six Sub-Saharan African countries at 40% with the range being 24% (Niger) to 56% (Uganda) using the LSMS-ISA data. McMillan and Hartgen (2014) found that the share of female workers in agriculture dropped from 49.2% in the 1990s to 42.2% during the period 2006-2012 while that of males dropped even further from 60.2% to 49.3%.

Why should we care about agricultural labor supply adjustments in African countries? Youth unemployment is one of the greatest threats to political stability in African countries as the Arab Spring (Tunisia, Egypt, etc.) and the popular uprising in Burkina Faso demonstrated. Countries need to find ways of creating jobs to avoid youth' idleness. An argument for agriculture as an avenue for job creation is that Africa has the largest share uncultivated of arable in the world (about 60%, McKinsey, 2010). Therefore, more land can be put to work in Africa and provide much needed jobs.

Another argument for seeking to add jobs in agriculture is that recurrent food price crises (2008, 2011, and 2012) indicate the urgency in boosting agricultural productivity so countries' buffer stocks can be appropriately supplied to help alleviate hikes in food prices in order to prevent food riots. Indeed, between 2006 and 2008 average world prices for rice rose by 217%, wheat by 136%, corn by 125% and soybeans by 107% which led to food riots in at least 30 countries in the world, among which 14 African countries[1] (Berazneva and Lee, 2013).

In addition, agriculture sector wages are rising in Asia implying the need for mechanization which is costly to achieve especially on small farm sizes (Otsuka et al., 2014). Given that Asia is a large exporter of agricultural commodities (e.g. rice) inability to mechanize on small farms can adversely impact the global food supply. This suggests that an opportunity exists for Africa to step in to capture market shares on world markets as well as to secure food for its own population. This can be achieved by capitalizing on the energy, dynamism, and resourcefulness of its youth and women (AGRA, 2015).

A relevant question to the debate on youth and women participation in agriculture is what determine changes in their participation in agriculture? What is the pattern regarding determinants of participation and type of activities across Sub-Saharan African countries? Answers to these questions may help policy makers seeking to create jobs with an emphasis on youth and women to know what areas, what characteristics of youth and women and what enabling factors to focus on for interventions to have the desired impact.

This paper extends the work of McMillan and Harttgen (2014) and Maïga et. al. (2015) - who investigated the correlates of the decline in agriculture employment share in African countries- by seeking analyzing countries individually and using panel data.

[1] Burkina Faso, Cameroon, Cote d'Ivoire, Egypt, Ethiopia, Guinea, Madagascar, Mauritania, Morocco, Mozambique, Senegal, Somalia, Tunisia, and Zimbabwe.

For each country, individuals' characteristics, household characteristics and information on environment of the agricultural sector, the local labor markets are used to investigate the determinants of agricultural labor adjustments. Ordinary Least Squares (OLS) with fixed effects and Tobit methods are used to estimate the model. Given the emphasis placed on youth unemployment and female empowerment in the global development debate, this paper will contribute to the discussions and provide evidence for policy making. The findings suggest that age is a strong determinant in hours worked per week in agriculture in Nigeria but not in Uganda. For both countries, age does not seem to have an impact on changes in hours worked per week in agriculture. Nigerian men work more hours per week in agriculture than women while the opposite is true for Uganda.

The remainder of this paper is organized as follows. Section 2 reviews the relevant literature on agricultural labor supply adjustments. Section 3 lays out the methodology used. Section 4 presents the data and descriptive statistics. Section 5 presents and discusses the results. Section 6 concludes.

II- Literature review

Tocco, Davidova, and Bailey (2012) provide a synthesis of the empirical literature on the key issues in agricultural and rural labor markets from the 1960s onwards. They argue, the results from these studies suggest that labor allocation between on-farm and off-farm employment is elastic and seem to depend greatly on the individual's characteristics, farm characteristics and conditions of the macroeconomic environment.

Using data from two different sources, McMillan and Harttgen (2014) estimated the change in the share of labor engaged in agriculture in 19 African countries and found a 10 percentage points decline during the period 2000-2010. This decline in the share of labor engaged in agriculture corresponds to an 8 percentage points increase in the share of labor in services and a 2 percentage points increase in the share of labor in manufacturing during the same period. They present regression results that indicate

that the share of labor engaged in agriculture is negatively correlated with being female, being young (15 to 24 years of age), having a high share of rural population in secondary school, high population growth and having achieved at least one of the CAADP goals.

Palacios-Lopez et. al. (2015) used individual-disaggregated, plot-level labor input data from LSMS-ISA surveys across six Sub- Saharan African countries to estimate the average female labor share in crop production. They found that the average across the six counties is 40 percent. In terms of individual country estimates, the average female labor share in crop production is above 50 percent in Malawi, Tanzania, and Uganda, and noticeably lower in Nigeria (37 percent), Ethiopia (29 percent), and Niger (24 percent). They found no systematic differences across crops and activities, but female labor shares are likely to be higher in households where women own a larger share of the land and for more educated women.

This paper adds to literature by investigating the determinants of labor supply and changes in the labor supply for youth and women in Nigeria and Uganda.

III- Methodology

A good chunk of the literature on agricultural and rural labor markets delved on the determinants of labor adjustments in rural areas and on the allocation decisions across activities (Tocco et. al., 2012). From this literature, the following variables and estimation techniques were used to examine the determinants of changes in agricultural labor supply. Labor is measured either as discrete binary choice variable, participate or not, or as continuous variable, usually hour or days worked during a given period. When participation is used as dependent variable, probit or logit model are employed to conduct the analysis. For continuous case, Tobit or Heckman methods are used. Hours or days worked are not often available in many datasets leading researchers to using the discrete binary variable. Here, I use hours worked per week in agriculture and the change in hours worked per week in agriculture as dependent variables.

In terms of regressors, the literature used variables that can be grouped into individual characteristics (age, gender, education), household characteristics (household size, household composition, father's occupation), farm production characteristics (farm size, land ownership, equipment, livestock, on-farm diversification, farm output prices), financial characteristics (off-farm income, subsidies, retirement benefits), and locational and labor markets characteristics (unfavorable agricultural conditions, land prices, off-farm job opportunities, growth in other sectors, population density, privatization, price and trade liberalization, regional dummy variables).

Given data availability in the LSMS-ISA datasets, the model I estimate is as follows.

$$Y_i = \alpha_0 + \mathbf{\beta X} + R_k + \mu_i$$

Where Y_i is hours worked per week in agriculture or change in hours worked per week in between the two survey periods, X is a vector of controls including age, gender, education, marital status, household size, land ownership, livestock share of household income, distance to nearest city, distance to nearest market, share of off-farm wage income, dummy variables for agro-ecological zones, R_k is region fixed effects and $\mu_i$is the error term.

Given the potential bias from estimating a left or right censored variable using Ordinary Least Squares (OLS) methods, both Tobit and OLS methods are used to estimate the model. Indeed, using OLS on censored data lead to inconsistent parameter estimates (Long, 1997; chapter 7).

IV- Data and descriptive statistics

I use panel data from the Living Standards Measurement Surveys-Integrated Surveys of Agriculture (LSMS-ISA) data and labor force surveys from different sources to investigate the determinants of youth and women participation in agriculture in Nigeria and Uganda. Comparisons are made among the two countries and patterns identified to inform policy makers on what makes the youth and women participate

in agriculture. The advantage of the LSMS-ISA datasets is that information on actual hours or days worked on agricultural activities by members of the households during the seasons and the types of activities undertaken was collected contrary to others studies (e.g. Bezu and Holden, 2014, use information on the youth's aspirations in terms of future livelihood). The countries currently covered by the panel surveys are Ethiopia (2 rounds)[2], Malawi[3] (two rounds), Nigeria (two rounds), Tanzania[4] (two rounds) and Uganda (four rounds). For Nigeria, the data were collected in 2010-11 and 2012-13; for Uganda the data were collected in 2005-06, 2009-10, 2010-11, and 2011-12. The 2005-06 and 2011-12 waves are used to conduct the analysis for Uganda. The description of the variables included in the analysis is presented in Table 1.

Table 1: Variables description

Variable	Definition	Expected sign
Hours worked	Number of hours worked per week in agriculture for waves 1 and 2	Dependent variable
Change in hours worked per week in agriculture	Difference in hours worked per week in agriculture between wave 2 and wave 1	Dependent variable
Youth	People between 16 and 35 years of age	-
Youth1	People between 16 and 20 years of age	-
Youth 2	People between 21 and 35 years of age	-
Prime-age	People between 36 and 60 years of age (omitted category)	Omitted category
Male	Equals 1 if individual is male	+
Education	Years of education completed	-
Married	Equals 1 if individual is in monogamous or polygamous marriage or non-formal union	+
Household size	Number of people who live in the household	+

[2]To be included in the future version of the paper
[3] To be included in the future version of the paper
[4] To be included in the future version of the paper

Rural	Equals 1 if household reside in rural area	+
Land owned per capita(14-60)	Land area owned by household divided by the number of people between 14 and 60 years of age	+
Livestock owned	Equals 1 if household owns livestock	+
Distance to nearest city of 20,000 people or more	Distance in km to the nearest city of 20,000 people or more	+
Distance to nearest market	Distance in km to nearest market or nearest agricultural market	-
Share of non-agricultural wage income at Enumeration Area (EA) level	Household's share of non-agricultural wage income evaluated at the enumeration area level	-
Agro-ecological zone	Categories of climatic zones (humid, arid, cool, etc.)	+/-
Regional dummy variables	Binary variables if household resides in a given region	+/-

Table 2 present the descriptive statistics for the two countries. The average hours worked per week in agriculture across all individuals in the sample increased from 16.24 hours to 21.79 in Nigeria while it decreased from 17.2 hours in Uganda to 13.83 in Uganda between survey waves. The youth (16-35 years) make 46% of the Nigerian sample versus 33% of the Ugandan sample. There are more female individuals in the Nigerian sample (58%) than in the Ugandan one (49%). Educational attainment is higher on average in Uganda with 6.68 years completed versus 4.3 years for Nigeria. About 76% of individuals are married or in a non-formal union in Nigeria versus 85% for Uganda. In both countries, about 88% of people reside in a rural area. Land owned per capita is higher in Uganda but Nigerians have larger household sizes. The share of household's non-agricultural wage income at EA level stands at 10% in Uganda and 9% in Nigeria. On average, Nigerian and Ugandan household live within a similar distance to the nearest city of 20,000 people or more but Nigerians (72.38 km) are farther away from a market than Ugandans are (32.43km).

Table 2: Descriptive statistics

	NIGERIA		UGANDA	
	mean	sd	mean	sd
Hours worked 2010-11	16.24	20.89	17.2	17.35
Hours worked 2012-13	21.79	21.18	13.83	13.88
Change in hours worked	5.55	21.78	-3.36983	19.99
Youth (16-35)	.46	.50	.33	.47
Youth 1 (16-20)	.08	.27	.00097	.03
Youth 2(21-35)	.40	.49	.33	.47
Male	.42	.49	.51	.50
Years of education	4.30	5.24	6.68	4.06
Married	.76	.43	.85	.35
Rural	.88	.32	.88	.33
Land owned (ha) per capita	.26	.30	.54	.72
Share of non-ag wage income at EA level	.09	.14	.10	.12
Household size	8.08	3.45	6.80	2.72
Livestock share of income	.10	.18	.20	.21
Distance to city (km)	22.61	15.57	23.34	15.88
Distance to market (km)	72.38	40.08	32.43	18.63
Agroecological zone 1	.48	.50	.16	.37
Agroecological zone 2	.07	.26	.29	.45
N	5827		2055	

sd= standard deviation

V- Results

For Nigeria, the dependent variables are hours worked per week in agriculture in 2010-11, in 2012-13 and change in hours worked between these two periods. Similarly, for Uganda, the dependent variables are hours worked per week in agriculture in 2005-06, in 2011-12 and change in hours worked between these two periods.

The results for the full sample for Nigeria are presented in Table 3. Both youth groups worked less hours per week in agriculture compared to the 36-60 age group in both survey waves, suggesting less youth involvement in agriculture over time. Male individuals work more hours per week in agriculture than their female counterparts and the results is consistent across all specifications. As expected, education and non-agricultural wage income have a negative effect on hours worked in both OLS and

Tobit regressions for hours worked in 2010-11 and 2012-13. More educated people shy away from agriculture and people with access to opportunities outside agriculture tend to work less hours in agriculture. Rural residence is good indicator for involvement in agriculture and results are consistent across OLS and Tobit regressions for both years. The results from OLS and Tobit are consistent in sign and statistical significance for both 2010-11 and 2011-12.

In terms of change in hours worked, only two variables are strongly significant (1% level), gender and education. Marital status and non-agricultural wage income positively and weakly (10% level) impact change in hours worked per week in agriculture.

Table 3: Comparing youth hours worked to non-youth in Nigeria

VARIABLES	OLS Hours 2010-11	TOBIT Hours 2010-11	OLS Hours 2012-13	TOBIT Hours 2012-13	OLS Change in hours
Youth 1 (16-20)	-5.738***	-14.795***	-5.708***	-10.231***	0.002
	(1.410)	(4.127)	(1.334)	(2.500)	(0.076)
Youth 2 (21-35)	-5.295***	-13.877***	-5.720***	-10.998***	-0.044
	(0.737)	(1.996)	(0.722)	(1.387)	(0.039)
Male	9.769***	25.803***	16.772***	28.059***	0.299***
	(0.893)	(2.214)	(1.081)	(1.872)	(0.047)
Years of education	-0.568***	-1.594*	-0.311***	-0.385***	0.011***
	(0.217)	(0.916)	(0.081)	(0.130)	(0.004)
Married	1.566	1.305	3.137***	4.925**	0.108*
	(1.121)	(2.776)	(1.147)	(2.107)	(0.060)
Rural	4.135**	13.863***	5.513***	11.480***	0.097
	(1.771)	(4.457)	(1.546)	(2.916)	(0.080)
Distance to city	0.028	0.110	0.090**	0.144**	0.003
	(0.035)	(0.087)	(0.036)	(0.061)	(0.002)
Land owned per capita	-0.013	0.021	2.416	3.738	0.120
	(1.694)	(4.030)	(1.652)	(2.688)	(0.092)
Share of non-ag wage income at EA level	-23.917***	-80.008***	-14.219***	-27.915***	0.308*
	(3.436)	(10.403)	(3.005)	(5.828)	(0.180)
Household size	-0.195	-0.583	-0.204	-0.382	-0.001
	(0.131)	(0.359)	(0.132)	(0.240)	(0.007)
Livestock share of income	-0.693	-2.216	0.215	-0.020	0.093
	(1.992)	(4.973)	(2.020)	(3.539)	(0.123)
Distance to market	-0.025*	-0.075**	-0.012	-0.010	0.001
	(0.015)	(0.037)	(0.014)	(0.025)	(0.001)
Sub-humid zone	9.097***	26.539***	5.963**	10.032**	-0.187

	(3.162)	(6.569)	(2.821)	(4.580)	(0.126)
Humid zone	3.251	16.210**	0.782	1.251	-0.155
	(3.952)	(8.132)	(3.989)	(6.486)	(0.197)
Region 1	6.777**	14.223**	6.124**	11.759**	-0.075
	(3.375)	(6.792)	(3.088)	(5.048)	(0.139)
Region 2	2.271*	8.584**	10.320***	19.290***	0.381***
	(1.318)	(3.472)	(1.395)	(2.434)	(0.085)
Region 4	5.532	12.860*	4.626	13.762**	-0.161
	(3.631)	(7.679)	(3.321)	(5.424)	(0.135)
Region 5	7.479**	17.479**	6.588*	15.109**	-0.167
	(3.578)	(7.370)	(3.698)	(5.922)	(0.161)
Region 6	5.537	11.731	3.019	7.404	-0.214
	(3.756)	(7.853)	(3.402)	(5.774)	(0.155)
Sigma		37.158***		28.347***	
		(0.981)		(0.547)	
Constant	6.271**	-31.826***	4.661*	-20.157***	-0.355**
	(2.729)	(6.963)	(2.660)	(4.842)	(0.140)
Observations	5,530	5,530	5,551	5,551	5,542
R-squared	0.221		0.275		0.091

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Turning to the sample restricted to female individuals only (Table 4), age seems to have a positive effect at younger ages. Then the effect becomes negative for older individuals suggesting a non-linear effect of age on hours worked in agriculture by women. The impact of rural residence is positive and strongly significant in OLS and Tobit regression for both years while that of non-agricultural wage income is negative and strongly significant which is similar to the full sample results. For the change in hours worked, only education, marital status and non-agricultural wage income have a positive and significant effect. As the coefficients of the regional dummies indicate, there are some significant regional differences in hours worked per week in agriculture.

Table 4: Female hours worked in agriculture in Nigeria

VARIABLES	OLS Hours 2010-11	TOBIT Hours 2010-11	OLS Hours 2012-13	TOBIT Hours 2012-13	OLS Change in hours
Age	0.282	1.943***	0.440**	2.240***	0.003

	(0.229)	(0.539)	(0.221)	(0.418)	(0.013)
Age squared	-0.001	-0.017**	-0.003	-0.021***	-0.000
	(0.003)	(0.007)	(0.003)	(0.005)	(0.000)
Years of education	-0.748***	-3.013***	-0.066	0.172	0.015***
	(0.208)	(0.887)	(0.115)	(0.154)	(0.006)
Married	-0.133	1.108	2.559*	5.839***	0.143**
	(1.415)	(2.189)	(1.364)	(1.749)	(0.066)
Rural	3.613**	17.888***	3.821**	13.442***	0.011
	(1.751)	(3.023)	(1.623)	(2.264)	(0.079)
Distance to city	0.011	0.026	0.060	0.126***	0.003
	(0.038)	(0.064)	(0.046)	(0.048)	(0.002)
Land owned per capita	-0.249	2.507	0.225	4.152*	0.006
	(1.821)	(3.091)	(2.170)	(2.348)	(0.107)
Share of non-ag wage income at EA level	-21.276***	-71.451***	-13.512***	-30.084***	0.291*
	(3.653)	(7.666)	(3.611)	(5.152)	(0.175)
Household size	-0.052	-0.412	-0.134	-0.587***	-0.003
	(0.133)	(0.254)	(0.176)	(0.191)	(0.008)
Livestock share of income	-2.522	-3.633	-2.731	-5.709	-0.018
	(2.238)	(4.708)	(2.497)	(3.543)	(0.147)
Distance to market	-0.012	-0.012	-0.034*	-0.031*	-0.001
	(0.016)	(0.024)	(0.019)	(0.019)	(0.001)
Sub-humid zone	9.544***	34.886***	8.323*	19.139***	-0.049
	(3.577)	(3.891)	(4.433)	(2.929)	(0.183)
Humid zone	6.548	31.594***	4.251	13.775***	-0.097
	(4.384)	(5.275)	(5.177)	(4.165)	(0.244)
Region 1	8.661**	28.787***	10.620**	27.049***	0.057
	(3.904)	(4.354)	(4.677)	(3.280)	(0.197)
Region 2	3.795***	24.184***	14.397***	40.787***	0.539***
	(1.337)	(3.233)	(2.170)	(2.247)	(0.097)
Region 4	13.723***	40.677***	13.381***	34.715***	-0.125
	(3.891)	(4.786)	(4.622)	(3.662)	(0.190)
Region 5	12.650***	40.496***	15.810***	36.755***	0.011
	(3.919)	(5.064)	(4.822)	(3.945)	(0.214)
Region 6	7.356*	24.424***	5.685	19.974***	-0.169
	(4.198)	(5.209)	(4.939)	(4.049)	(0.200)
_se		36.865***		31.550***	
		(0.887)		(0.633)	
Constant	-8.224*	-113.995***	-12.158**	-99.031***	-0.381
	(4.380)	(10.715)	(4.810)	(8.084)	(0.269)
Observations	3,278	3,400	3,263	3,406	3,261
R-squared	0.285		0.227		0.071

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The full sample results for Uganda are presented in Table 5. Unlike the Nigerian case, age does not have statistically significant impact on hours worked per week in agriculture. Being male has a negative and significant effect on hours worked in 2011-12 which is opposite of what was found in Nigeria. This means that in Uganda,

women are working more hours per week in agriculture than men. Education and non-agricultural wage income have consistently negative effect on hours worked across OLS and Tobit regressions while rural residence has a consistently positive effect. Only region has statistically significant impact on change in hours worked per week in agriculture in Uganda.

Table 5: Comparing youth hours worked to non-youth in Uganda

VARIABLES	OLS Hours 2005-06	TOBIT Hours 2005-06	OLS Hours 2011-12	TOBIT Hours 2011-12	OLS Change in hours
Youth 1	6.031	12.014	-6.768*	-12.064	-0.361
	(6.607)	(16.260)	(3.543)	(10.379)	(0.361)
Youth 2	-0.135	-0.686	-0.910	0.604	-0.044
	(1.032)	(1.156)	(0.797)	(0.918)	(0.067)
Male	-0.222	-1.132	-1.678**	-3.214***	-0.089
	(0.901)	(1.103)	(0.681)	(0.878)	(0.055)
Years of education	-0.208*	-0.606***	-0.132***	-0.127***	0.001
	(0.123)	(0.147)	(0.032)	(0.035)	(0.003)
Married	0.286	0.749	1.425	3.051**	-0.001
	(1.347)	(1.579)	(1.086)	(1.294)	(0.098)
Rural	3.583*	11.624***	6.944***	7.835***	0.013
	(1.910)	(2.034)	(1.600)	(1.545)	(0.125)
Distance to city	0.051	0.003	0.020	0.086***	0.002
	(0.039)	(0.039)	(0.032)	(0.030)	(0.002)
Land owned per capita	0.690	0.730	-0.517	-0.713	-0.028
	(0.665)	(0.767)	(0.635)	(0.653)	(0.049)
Livestock share of income	2.384	3.144	1.793	4.460**	-0.169
	(2.315)	(2.573)	(2.038)	(2.015)	(0.172)
Share of non-ag wage income at EA level	-19.542***	-34.932***	-8.682**	-24.319***	0.294
	(4.207)	(5.531)	(3.883)	(4.411)	(0.305)
Household size	-0.043	0.126	0.027	0.286*	0.002
	(0.202)	(0.204)	(0.143)	(0.161)	(0.012)
Distance to market	0.018	0.047	0.033	-0.015	0.002
	(0.027)	(0.033)	(0.024)	(0.026)	(0.002)
Sub-humid zone	0.971	0.017	2.474	-0.460	-0.047
	(1.942)	(2.224)	(1.623)	(1.735)	(0.124)
Cool- humid zone	-1.789	-2.020	2.911**	1.246	0.181*
	(1.294)	(1.359)	(1.130)	(1.087)	(0.102)
Region 2	-2.000	-2.014	-2.246*	-4.283***	0.013
	(1.599)	(1.614)	(1.172)	(1.310)	(0.112)
Region 3	-7.834***	-9.704***	-2.016*	-1.599	0.264***
	(1.559)	(1.718)	(1.157)	(1.365)	(0.102)
Region 4	1.016	1.208	2.096	2.654	0.171
	(1.911)	(2.081)	(1.361)	(1.635)	(0.113)
_se		22.896***		18.395***	
		(0.469)		(0.377)	
Constant	17.996***	9.302***	9.462***	3.319	-0.217

	(3.305)	(3.510)	(2.715)	(2.791)	(0.208)
Observations	2,055	2,055	1,963	2,100	1,963
R-squared	0.075		0.115		0.017

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The results for the restricted sample are shown in Table 6. Similar to the full sample case, age does not affect hours worked by women in Uganda. Nonagricultural wage income has a consistently negative effect but its coefficient is significant in three out of four cases when comparing 2005-06 to 2011-12. Only the results for rural residence and region 4 are robust to the estimation method used and to the year of survey.

Table 6: Female hours worked in agriculture in Uganda

	OLS	TOBIT	OLS	TOBIT	OLS
VARIABLES	Hours 2005-06	Hours 2005-06	Hours 2011-12	Hours 2011-12	Change in hours
Youth 1	5.452	10.574	-7.882***	-12.025	-0.435
	(6.598)	(13.610)	(2.822)	(9.130)	(0.363)
Youth 2	-0.820	-2.171*	-0.314	0.867	0.043
	(1.330)	(1.318)	(1.028)	(1.070)	(0.078)
Years of education	0.119	-0.049	-0.119**	-0.062	-0.002
	(0.188)	(0.180)	(0.055)	(0.053)	(0.004)
Married	1.114	1.519	0.652	2.786*	-0.086
	(1.645)	(1.716)	(1.492)	(1.455)	(0.127)
Rural	4.120*	9.957***	9.203***	8.869***	0.075
	(2.147)	(2.303)	(1.900)	(1.856)	(0.139)
Distance to city	0.018	-0.003	0.030	0.068*	0.003
	(0.042)	(0.046)	(0.039)	(0.037)	(0.003)
Land owned per capita	0.843	1.212	-1.178*	-1.352*	-0.050
	(0.848)	(0.823)	(0.665)	(0.784)	(0.054)
Livestock share of income	1.744	1.966	-0.574	1.265	-0.358*
	(2.726)	(3.041)	(2.476)	(2.436)	(0.196)
Share of non-ag wage income at EA level	-15.352***	-23.590***	-4.611	-23.093***	0.038
	(5.110)	(6.192)	(4.671)	(5.210)	(0.353)
Household size	-0.065	0.209	0.025	0.347*	-0.001
	(0.237)	(0.243)	(0.168)	(0.196)	(0.015)
Distance to market	-0.022	-0.022	0.011	-0.037	0.002
	(0.032)	(0.039)	(0.028)	(0.032)	(0.002)
Sub-humid zone	-2.840	-2.930	2.054	0.144	0.062
	(2.206)	(2.642)	(2.044)	(2.104)	(0.149)
Cool humid zone	-1.601	-1.722	3.112**	1.639	0.227**
	(1.515)	(1.603)	(1.279)	(1.305)	(0.106)

Region2	0.370	0.520	-1.651	-2.489	-0.051
	(1.717)	(1.868)	(1.293)	(1.546)	(0.119)
Region 3	-5.900***	-7.420***	-2.537*	-1.359	0.177
	(1.800)	(2.054)	(1.428)	(1.662)	(0.122)
Region 4	7.075***	8.227***	4.133**	5.179***	-0.051
	(2.292)	(2.445)	(1.654)	(1.972)	(0.144)
_se		19.116***		15.978***	
		(0.529)		(0.437)	
Constant	14.859***	6.377	7.675**	2.092	-0.056
	(3.595)	(3.998)	(3.342)	(3.346)	(0.239)
Observations	1,017	1,017	1,009	1,061	1,009
R-squared	0.093		0.154		0.030

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

VI- Conclusion

This paper examines the determinants of hours worked per week in agriculture and changes in hours worked per week in agriculture between two periods in Nigeria and Uganda. We focus on both the youth (16-35 years of age) and women.

OLS and Tobit methods are used to estimate the regression of hours worked and change I hours worked per week in agriculture on individual characteristics, household characteristics, financial characteristics, farm characteristics, financial characteristics, and locational and labor market conditions.

The findings show that both youth groups (16-20 years of age and 21-35 years of age) worked significantly less hours per week in agriculture in Nigeria but not in Uganda. This suggests less youth involvement in agriculture in Nigeria which may not be a bad thing if the youth is finding productive employment in other sectors. For both countries, age does not seem to have an impact on changes in hours worked per week in agriculture by the youth or by women.

Education, gender, rural residence, and non-agricultural wage income strongly affect hours worked per week in agriculture, as one would expect. Education has a negative

effect on hours worked indicating that people with more education tend to shy away from agricultural activities. This may be the case because these people are yet to be shown the potential of agriculture as a path to productive and lucrative jobs that can sustain middle class lifestyle. Rural residence is heavily associate with involvement in agriculture suggesting that efforts to draw people to agriculture especially the youth should include setting up a minimum of infrastructure and technology that will make rural areas more attractive as residence.

It is interesting to note that Nigerian men work more hours per week in agriculture than women while the opposite is true for Uganda. Understanding why this is the case is an avenue for further research.

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