The Changing Employment Landscape in Uganda

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Abstract

The employment landscape in Uganda and across the globe has continued to change at an unprecedented rate. This has mostly manifested in employment shifts within and between sectors. A large share of Labour force has shifted towards the service sub-sectors with a corresponding shift away from agriculture and other goods-producing sectors. Employment intensities of growth were estimated in this study to ascertain whether employment shifts have occurred in Uganda and also establish the causes of the variations using multivariate regression and autoregressive distributed lag modelling. The study established that there is no evidence of sectoral employment shifts in Uganda. The agriculture sector has the least employment intensity of growth followed by the industry and the service sectors. Trade and repairs, arts, entertainment & recreation, cash crop, food crop, construction, and manufacturing have the highest employment intensity of growth.

Keywords: Employment shift; employment Intensity of growt; autoregressive distributed lag model; Uganda

JEL Classification Codes: C51, E24

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1. Backgroud

The employment landscape across the globe has continued to change at an unprecedented rate and this has created enormous ambiguities regarding the future of work for thousands and millions of workforces (Hurren, Nand and Cotterill, 2018). This has been mostly manifested in terms of employment shifts within and between economic sectors both in developed and developing countries. In some countries, a substantial share of the workforce has shifted towards the service sub-sectors with a corresponding shift away from agriculture and other goods-producing sub-sectors (Dosi et a*l.*, 2021). As a result, the role of some economic sectors in the economic development process is as well changing (Kotlorz and Jarus, 2020). However, the magnitude of this shift has not been well studied and documented in a developing country like Uganda.

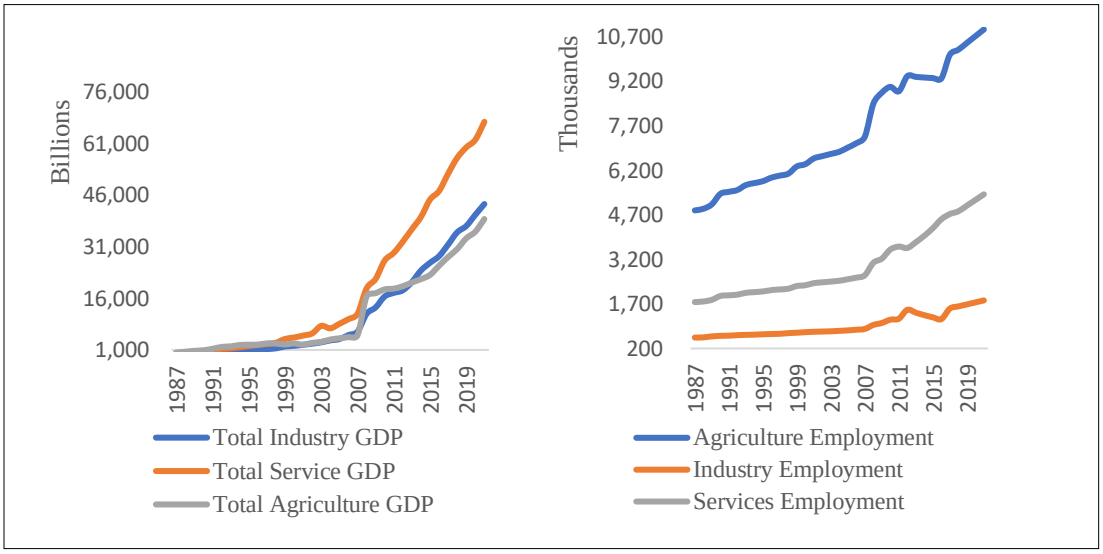
Globally, the traditional classification of economies into three economic sectors is steadily losing importance, as borderlines between these sectors are becoming increasingly difficult to define. Sector overlaps have become a new phenomenon in all countries (Urquhart, 1984). The global share of the service sector in employment has more than tripled in the past four (4) decades and currently accounts for more than 70 percent of total employment, especially in developed countries, but also the share of agriculture employment has continued to shrink (Kotlorz & Jarus, 2020, and Urquhart, 1984). While Sustainable Development Goal 8 calls for full, freely chosen, and productive employment and decent work for all, the prevailing sectoral employment transformations have put risk to jobs for thousands of workforces (ILO, 2020b). This is because sectoral transformation and adjustments point to either job creation or job loss potential.

Evidence from Sub-Saharan Africa (SSA) indicates that, although agriculture is still the major employer, its share in total employment has declined over the years (ILO, 2020a). The proportion of people employed in Agriculture decreased from 62 percent in 2000 to 50.7 percent in 2020. The industrial sector which is believed to offer productive and decent employment continues to employ the smallest share of sub-Saharan Africa's labour force. The share of people employed in the industry sector has hovered just around 10 percent and 13 percent between 2000 and 2020 with only two countries whose share of employment in the industry exceeds that of the agricultural sector; that is Mauritius and South Africa (ILO, 2020a). The share of people employed in the service sector increased from 28.1 percent in 2000 to 36.4 percent in 2020. This indicates that the SSA has experienced structural transformation, especially in terms of sectoral employment composition, but less is known as to whether SSA countries have experienced sectoral employment shifts.

The employment landscape for Uganda has not been anyhow different from the situation of SSA countries and has also considerably changed at unparalleled rates. The country has registered sectoral shifts in terms of gross value added and total employment *(see figure 1)*. A case in point is the share of services in GDP which increased from 30.4 percent in 1990 to 44.5 percent in 2020 while the proportion of people employed has only increased by less than 5 percentage points from 19 percent

in 1990 to 23 percent in 2020. Similarly, the share of agriculture in GDP has drastically reduced from 53.4 percent in 1990 to only 21.2 percent in 2020 yet the proportion of people employed by the same sector has only floated around 66 and 72 percent over the same period. Moreover, the share of industry in GDP more than doubled between 1990 and 2020 increasing from 10.4 to 26.5 percent respectively but its share in employment instead reduced from 7.8 to 6.5 percent over the same period. There is thus a need to unpack and understand the existing sectoral dynamics as sectoral transformations advance for employment and economic policy determination in Uganda.

Figure 1: Uganda's sectoral GDP and employment trend between 1987-2020



Source: WDI 2021

Uganda's macro-economic strategy has for many years focused more on economic growth and price stabilisation as primary objectives in anticipation that jobs would inevitably be created (NPA, 2021). Employment creation, therefore, remained a secondary effect of economic reforms. Priority sectors, sub-sectors, programs, and projects have been selected based on their growth potential with limited consideration of their potential for employment creation. Subsequently, the quality and number of jobs created have remained less than those seeking employment, notwithstanding the recent sectoral transformation and the momentous employment shifts within and between sectors (Byiers *et al.*, 2015). While some sub-sectors are shrinking and others are expanding, some are stagnant, and little is known about the magnitude of such transformations and the impact on jobs.

Several empirical studies have analyzed the trends and determinants of sectoral employment variations, but the majority have focused more on the broad economic sectors (Khan & Fatima, 2018; Ghazali & Mouelhi, 2018; Akinkugbe, 2015; Kotlorz & Jarus, 2020; Guloba et al., 2021). There is scanty literature that dissects the three broad economic sectors to give a much clearer picture, and even then, there is no consensus on the magnitude and direction of employment intensities. Some studies

have reported stable and significant short-term linkage between growth and employment (Anderson et al.,2020; Guloba et al., 2021; Pattanaik & Nayak, 2014; Ghazali & Mouelhi, 2018; Thuku et al.,2019; Ellis et al., 2018; Cörvers & Dupuy, 2009). Others have found a stable and significant long-term linkage between growth and employment both at the national and sectoral levels (Dosi et al.,2021; Mkhize, 2019; Urquhart, 1984; Döpke, 2001). But also, several empirical studies have reported mixed results (Turyareeba et al., 2020; Akinkugbe 2015; Islam & Nazara, 2000; and Bbaale, 2013).

In this study, we provide an empirical analysis of employment intensity of growth for the entire economy, for the three broad economic sectors (agriculture, industry, and service) and the twenty-five (25) sub-sectors in line with the National Accounts System (NAS). This helps to shed more light on the trends in employment shifts within and between sectors, establish sub-sectors that are more employment-intensive than the others, and the causes of the variations in the identified employment intensities of growth for Uganda.

The remainder of this study is organised as follows. Section review the empirical literature. Section 3 describes the methodology and data source. Section 4 presents and discusses the estimated results. Section 5 concludes.

2. Empirical Literature

Several studies have examined the linkage between economic growth and employment worldwide, but there is no consensus on the magnitude and direction of trends. Some studies report stable and significant short-term linkage between growth and employment. For example, Anderson et al. (2020) examined the sectoral employment dynamics in Australia using disaggregated data for 19 sectors using a multivariate dynamic model. The study found that the manufacturing and construction sectors generate the largest positive spillovers in the short run. However, the study did not use seasonally adjusted data that would allow the system to identify total employment as the sum of sectoral employment figures. Relatedly, Guloba et al. (2021) studied the employment creation potential, labor skills requirements, and skill gaps for young people in Uganda and showed that the importance of manufacturing as a source of jobs declined between 2012/13 and 2016/17 yet the sector has been considered a major driver of structural transformation and a source of decent jobs.

In a related study, Pattanaik & Nayak (2014) analysed the macroeconomic determinants of employment intensity of growth across the 15 major Indian states in a panel data framework and established a positive relationship between the shares of employment in the tertiary and secondary sectors and the employment elasticities in the short-run. However, panel data methods utilized are prone to reciprocal causality and measurement errors and do not deal with unobserved heterogeneity. Additionally, Ghazali & Mouelhi (2018) assessed the job creation ability of Tunisia using a rolling regression technique. They found a significant decrease in aggregate employment

elasticity in the short run. Although the study was mainly based on industry-level data which could not provide a complete picture. Also, Murphy & Kevin (2013) analyzed the changes in the U.S. wage structure using a simple supply and demand framework and concluded that rapid growth in the demand for more-educated and skilled workers caused the changes in the wage structure in the U.S.

Thuku et al. (2019) studied the employment intensity of output growth in Kenya using a multivariate log-linear regression model to determine the employment intensities in priority sectors. They found that employment elasticities were positive and in the range of 0.115 to 0.412 within priority sectors. On the other hand, Ellis et al. (2018) studied the employment and productivity growth in Tanzania's Service Sector using the growth decomposition methodology and concluded that manufacturing and trade services under the tourism sector had a positive and significant short-run impact on job creation. Cörvers & Dupuy (2009) estimated the employment dynamics across occupations and sectors of industry in the Netherlands using system dynamic OLS techniques to decompose intra and inter-sectoral dynamics and found that employment by occupation and sector was significantly affected by the short-run intersectoral dynamics. Islam (2006) analyzed the nexus between growth, employment, and poverty reduction in both developed and developing countries using OLS regression. The study concluded that a shift of workers to manufacturing reduced poverty in the short run, while the concentration of workers in agriculture caused poverty in the long run.

On the other hand, many studies have found a stable and significant long-term linkage between growth and employment both at the national and sectoral levels. Dosi et al. (2021) for example analysed the sectoral patterns of job creation and job destruction in a cross-country study comprising 19 European countries using a System Generalized Method of Moment. They found out that the replacement of machines, tools, and software in the downstream industries exerted a negative impact on labour demand in the long run. However, the GMM-SYS approach utilized ignores the cross-sectional dependence and assumes that the panel members have homogenous slope coefficients. In a related study, Mkhize (2019) employed the Engle and Granger approach to study the employment intensity of growth in South Africa and concluded that non-agricultural employment and GDP do not move together in the long run, an inference of jobless growth in South Africa. Additionally, Urquhart (1984) investigated the source of the employment shift to services in the US using a descriptive approach. The study concluded that in the long run, the service sector gained its jobs from the expansion of the labor force but not necessarily from the jobs lost in the agriculture sector. The paper provided a good starting point to analyze long-term employment shifts between and within sectors, although it lacked methodological rigor by basing the analysis only on descriptivism and the level of disaggregation remained at broad economic sectors. Similarly, Döpke (2001) analysed the employment intensity of growth in Europe using dynamic OLS and concluded that there is a strong link between employment and growth in the long run but differed with regard to the business cycle and other factors.

Lastly, several other empirical studies have reported mixed results regarding the linkage between growth and employment. Turyareeba et al. (2020) for instance analyzed the employment-growth nexus in Uganda using Error Correction Modelling and concluded that economic growth and employment showed no causal link in the short run, but in the long run, a positive and statistically significant causal link was established. They also found that the long-run economic growth for Uganda was not employment intensive. However, the analysis was only done at a macro level and thus did not uncover the transitional dynamics within and between sectors. Further to that, Akinkugbe (2015) investigated economic growth and sectoral capacity for employment creation in Zambia using multivariate log-linear regression analysis. The study reported mixed results on employment intensities. While employment intensities were positive and significant for most sectors, they were negative for mining, finance, insurance, and business services indicating their declining propensities to create jobs. The extent of disaggregation in this study was however limited to only nine (9) subsectors.

In summary, the literature review has demonstrated a lack of convergence among scholars about the linkage between economic growth and employment, especially at a micro level. While some studies have established stable and significant short-term linkage between growth and employment (Anderson et al., 2020; Guloba et al., 2021; Pattanaik & Nayak, 2014; Ghazali & Mouelhi, 2018; Murphy & Kevin, 2013; Thuku et al., 2019; Ellis et al., 2018; Cörvers & Dupuy, 2009; Islam, 2006) among others, other studies have reported a stable and significant long-term linkage (Dosi et al., 2021; Mkhize, 2019; Urquhart, 1984; Döpke, 2001). Yet a section of other researchers has reported mixed results (Turyareeba et al., 2020; Islam & Nazara, 2000; Bbaale, 2013) among others. There is thus no consensus on the magnitude and direction of employment intensities. This study contributes to the debate by analyzing the inter and intra-sectoral employment intensity of growth in Uganda using disaggregated data for 25 GDP sub-sectors in line with the National Accounts System (NAS).

3. Methodology and Data

3.1 Theoretical Framework

The theoretical foundation of this study is based on the production function framework as adopted by Mkhize, (2019b) and Kapsos (2005) using the Constant Elasticity of Substitution (CES) production function. The approach involves deriving a labour demand function from the CES production function by solving the marginal product of labour equation. The CES production function considered in this study is specified as:

$$Y_{it} = A\left\{\alpha K_{it}^{-\rho} + (1-\alpha)E_{it}^{-\rho}\right\}^{-\eta/-\rho} \quad (1)$$

where,

Y_{it} is the Gross Value-Added output and can also be taken as the sectoral value-added output in the context of this study, K_{it} is the Capital input in the production function, E_{it} is the labour input and can also be taken as the Employment in this production function, A is the efficiency parameter and is positive $(A > 0)$, η is the returns to scale

parameter and is also positive ($\eta > 0$), α is the distribution parameter and ranges between zero and one ($0 < \alpha < 1$) while ρ is the extent of substitution between labour and capital inputs. The objective is to derive the Marginal Product of Labour (MPL) from this CES production function. This is achieved by differentiating the production function concerning labour as in equation 2.

$$\frac{dY_{it}}{dE_{it}} = \frac{\eta(1-\alpha)}{A^{\frac{\rho}{\eta}}} . \frac{Y_{it}^{\frac{1+\rho}{\eta}}}{E_{it}^{\rho+1}} \tag{2}$$

From equation 2 of the marginal product of labour, we solve for labour input or employment variable E_{it} in order to obtain the labour demand function/employment function.

$$E_{it}^{\rho+1} = \frac{\eta(1-\alpha)}{A^{\frac{\rho}{\eta}}} . Y_{it}^{\frac{1+\rho}{\eta}} \tag{3}$$

$$E_{it} = \left[\frac{\eta(1-\alpha)}{A^{\frac{\rho}{\eta}}} . Y_{it}^{\frac{1+\rho}{\eta}}\right]^{\frac{1}{\rho+1}} \tag{4}$$

$$E_{it} = \left[\frac{\eta(1-\alpha)}{A^{\frac{\rho}{\eta}}}\right]^{\frac{1}{\rho+1}} . Y_{it}^{\frac{1+\rho}{\eta}\left(\frac{1}{\rho+1}\right)} \tag{5}$$

From equation 4, we define γ_0 and γ_1 as follows:

$$\gamma_0 = \left[\frac{\eta(1-\alpha)}{A^{\frac{\rho}{\eta}}}\right]^{\frac{1}{\rho+1}} \tag{6}$$

$$\gamma_1 = \frac{1+\rho}{\eta}\left(\frac{1}{\rho+1}\right) \tag{7}$$

$$\gamma_1 = \frac{1+\rho}{\eta} . \sigma \tag{8}$$

Where $\sigma = \left(\frac{1}{\rho+1}\right)$ and is the elasticity of substitution. After these transformations, equation iv becomes:

$$E_{it} = \gamma_0 {Y_{it}}^{\gamma_1} \tag{9}$$

Undertaking a log-transformation of equation 9, we obtain the following employment function/labour input demand function:

$$lnE_{it} = ln\gamma_0 + \gamma_1 lnY_{it} \tag{10}$$

Equation 10 is our final model that formed the basis of our estimation. The model is linear in parameters γ_0 and γ_1 hence it is a linear regression model. While in equation 1, it is observable that the association between the value-added output (Y_{it}) and the two inputs labour (E_{it}) and capital (K_{it}) is non-linear, it is linear in the logs of these variables. Therefore, our final equation as specified in 10 is a double-log linear regression model. After determining the employment elasticities of sectoral output growth, we then moved to the second part of the study to establish the determinants of the employment elasticities at the national, sector, and sub-sector levels in Uganda.

3.2 Empirical model

In this study, two empirical models were employed, the multivariate double log-linear regression to determine the employment elasticities between and within sectors as well as the autoregressive distributed lag (ARDL) model to establish the determinants of employment intensities of growth at national, sectoral, and sub-sectoral levels. In so doing, four (4) multivariate double log-linear regression models were estimated as in equations $11-14$. In addition to gross value-added output (Y_i), the study introduced other variables. The choice of explanatory variables utilized was informed by the findings of the previous empirical studies undertaken on the determinants of employment elasticities. The explanatory variables included in this study included: labour productivity; domestic savings, inflation, labour supply, government expenditure, and Foreign Direct Investment.

$$lnE_t = \gamma_0 + \gamma_1 lnY_t \tag{11}$$

$$lnAgriEMP_{it} = \gamma_0 + \gamma_1 lnAgricY_{it} \tag{12}$$

$$lnSVCEMP_{it} = ln\gamma_0 + \gamma_1 lnSVCY_{it} \tag{13}$$

$$lnINDEMP_{it} = ln\gamma_0 + \gamma_1 lnINDY_{it} \tag{14}$$

After determining the employment elasticities at national, sectoral, and sub-sectoral levels, we then analysed the factors that account for the differences in the observed. This was achieved by regressing the estimated elasticities at national, sectoral, and sub-sectoral on several explanatory variables as elaborated earlier. The estimation methodology utilized in this study is the autoregressive distributed lag (ARDL) approach. The choice of the ARDL model over other econometric methods was based on the behavioral characteristics of the time series used in the analysis. Some variables were stationary in levels {I (0)} while others at first difference {I (1)}. The ARDL model was thus the most suitable approach for establishing the short-run and long-run determinants of employment elasticities of growth. At the national level, the following ARDL equation was estimated.

$$\Delta lnE_t = \alpha_{0i} + \sum_{k=1}^{n} \gamma_i \Delta lnE_{t-k} + \sum_{k=1}^{n} \beta_1 \Delta lnY_{t-k} + \sum_{k=1}^{n} \beta_{i-1} \Delta lnX_{t-k} + \delta_i lnE_{t-k} + \theta_1 lnY_{t-k} + \theta_{i-1} lnX_{t-k} + \varepsilon_t \tag{15}$$

where

E_t is the national level employment elasticity at time t. Y_t is the total value-added output at time t while X_t is a set of all other explanatory variables used in the analysis. At sectoral and sub-sectoral levels, twenty-five (25) sub-sectors were considered and the following ARDL equations were estimated.

$$\Delta lnAgricEMP_t = \alpha_0 + \sum_{k=1}^{n} \gamma_i \Delta lnAgricEMP_{t-k} + \sum_{k=1}^{n} \beta_1 \Delta lnAgricVA_{t-k} + \sum_{k=1}^{n} \beta_{i-1} \Delta lnX_{t-k} + \delta_i lnAgriEPM_{t-k} + \delta_1 lnAgricVA_{t-k} + \theta_{i-1} lnX_{t-k} + \varepsilon_t \quad (16)$$

Where:

$AgricEMP_t$ is the agriculture employment elasticity at time t, $AgricVA_t$ is the agriculture sector value-added output at the time t and the following agriculture sub-sectors were considered in the analysis:

a) Cash crops
b) Food crops
c) Livestock
d) Agriculture Support Services
e) Forestry
f) Fishing

$$\Delta lnSVCEMP_t = \alpha_0 + \sum_{k=1}^{n} \gamma_i \Delta lnSVCEMP_{t-k} + \sum_{k=1}^{n} \beta_1 \Delta lnSVCVA_{t-k} + \sum_{k=1}^{n} \beta_{i-1} \Delta lnX_{t-k} + \delta_i lnSVCEPM_{t-k} + \delta_1 lnSVCVA_{t-k} + \theta_{i-1} lnX_{t-k} + \varepsilon_t \quad (17)$$

Where:

$SVCEMP_t$ is service sector employment elasticity at time t, $SVCVA_t$ is the service sector value-added output at time t and the following service sub-sectors were considered in the analysis:

a) Trade and Repairs
b) Transportation and Storage
c) Accommodation and Food Service Activities
d) Information and Communication
e) Financial and Insurance Activities
f) Real Estate Activities
g) Professional, Scientific, and Technical Activities
h) Administrative and Support Service Activities
i) Public Administration
j) Education
k) Human Health and Social Work Activities

l) Arts, Entertainment, and Recreation
m) Other Service Activities
n) Activities of Households as Employers

$$\Delta lnINDMP_t = \alpha_0 + \sum_{k=1}^{n} \gamma_i \Delta lnINDEMP_{t-k} + \sum_{k=1}^{n} \beta_1 \Delta lnINDVA_{t-k} + \sum_{k=1}^{n} \beta_{i-1} \Delta lnX_{t-k} + \delta_i lnINDEPM_{t-k} + \delta_1 lnINDVA_{t-k} + \theta_{i-1} lnX_{t-k} + \varepsilon_t \quad (18)$$

Where:

$INDMP_t$ is the industrial sector employment elasticity at time t and $INDVA_t$ is the industrial sector value-added output at time t, α_0 is the drift component, ε_t is the white noise, Δ is the difference operator while other variables are as defined earlier. The following industrial sub-sectors were considered in the analysis:

a) Mining & quarrying
b) Manufacturing
c) Electricity
d) Water
e) Construction

Positive employment elasticities indicate that a percentage increase in the value-added output results in an expansion in employment. Employment elasticity of unity or close to unity implies that employment is expanding at nearly the same rate as the growth rate of value-added output. Negative employment elasticities indicate contraction of employment as growth occurs and this is an indication of labour movement out of that sector or sub-sectors. Employment elasticities of zero (0) imply that, regardless of the value-added growth, employment does not grow at all, and this is a phenomenon of jobless growth (Dahal and Rai, 2019).

3.3 Data Sources

Data on sectoral employment and sectoral value-added output was sourced from the World Bank Development Indicators (WDIs). Data on sub-sectoral shares of employment and GDP was obtained from the Social Accounting Matrix (SAM) at the Uganda Bureau of Statistics (UBOS) and the National Planning Authority. The National Planning Authority operates a national macro model for human resource and employment planning using SAMs data on sectoral and sub-sectoral coefficients/shares. Data on other macroeconomic variables including domestic savings, inflation, interest rate, capital stock, labour supply, government expenditure, labour productivity, and foreign direct investment was obtained from the WDIs accessible at: https://databank.worldbank.org/source/world-development-indicators.

4. Results and Discussion

Results of preliminary investigation of the time series properties using the Phillips Peron (PP) and the Augmented Dickey-Fuller (ADF) showed that the variables used were all I (0) and I (1) (*see appendix 1*). The Pesaran et al. (2001) ARDL bound test confirmed the existence of cointegration among the variables used in the analysis since

the computed F-statistic exceeded the upper critical bounds value at a 5 percent level of significance *(see appendix 2)*. The null hypothesis of no cointegration was rejected. We thus employed, the multivariate double log-linear regression to determine the employment elasticities at national, sectoral, and sub-sectoral levels and the ARDL model to establish the determinants of employment intensity of growth, and the results are discussed in the sections that follow.

4.1 Employment intensity of growth at national, sectoral, and sub-sectoral levels

Our findings indicate that Uganda's employment intensity of growth for the period of study is positive and statistically significant (0.0754) *(see table 1)*. This implies that a percentage increase in gross value-added results in approximately a 0.08 percentage point increase in employment. Although the employment intensity of growth was significant, the magnitude was so weak and this confirms the jobless growth that has always characterized Uganda's economy as illustrated by the NPA (2016). A study by the National Planning Authority conducted in 2016 indicated that, although Uganda registered an impressive economic performance, this was not accompanied by an absorption of the increasing labor force into employment, and thus a signal of lack of employment-intensive growth (NPA, 2017). Our findings were close to the findings by Turyareeba et al. (2020) who established an employment elasticity coefficient of 0.148 for Uganda in the long run, for the period between 2000 and 2018.

Table 1: Employment intensity of growth at national, sectoral, and sub-sectoral levels

Variable	Coefficient	Std. Error	t-Statistic	Prob.
National and Sectoral level				
National	0.075335***	0.019622	3.839308	0.0006
Agriculture	0.069510***	0.016292	4.266484	0.0002
Service	0.456266***	0.012117	37.65461	0.0000
Industry	0.235953***	0.038096	6.193680	0.0000
Agriculture sub-sectors				
Cash crops	0.409958***	0.036826	11.13243	0.0000
Food crops	0.490273***	0.032552	15.06144	0.0000
Livestock	0.122423***	0.032303	3.789823	0.0016
Agriculture Support Services	0.141677***	0.026720	5.302235	0.0000
Forestry	0.119402***	0.037762	3.162011	0.0054
Fishing	0.097938***	0.015253	6.420709	0.0000
Industrial sub-sectors				
Mining & quarrying	0.458760***	0.039367	11.65348	0.0000
Manufacturing	0.477303***	0.051474	9.272639	0.0000
Electricity	0.368275***	0.069131	5.327226	0.0000
Water	0.373240***	0.035274	10.58130	0.0000
Construction	0.495053***	0.038774	12.76751	0.0000
Service Sub-sectors				
Trade and Repairs	0.591168***	0.081044	7.294391	0.0000
Transportation and Storage	0.088091	0.056402	1.561858	0.1300
Accommodation and Food Service Activities	0.315328***	0.040289	7.826641	0.0000

Information and Communication	0.244094	0.192754	1.266350	0.2235
Financial and Insurance Activities	0.159928	0.184075	0.868819	0.3978
Real Estate Activities	-0.036961	0.140740	-0.262623	0.7962
Professional, Scientific and Technical Activities	0.396867***	0.119632	3.317397	0.0038
Administrative and Support Service Activities	0.258911*	0.143443	1.804969	0.0899
Public Administration	0.243423*	0.136402	1.784601	0.0922
Education	0.307969***	0.058763	5.240865	0.0001
Human Health and Social Work Activities	0.044199	0.121320	0.364315	0.7201
Arts, Entertainment and Recreation	0.457129***	0.038513	11.86942	0.0000
Other Service Activities	0.338728***	0.078288	4.326717	0.0004
Activities of Households as Employers	0.181395***	0.065978	2.749319	0.0132

Notes: Against each coefficient, * Significant at 10%, **Significant at 5% and *** significant at 1%

At the sectoral level, the findings as presented in table 1 indicate that Agriculture has the least employment intensity of growth (0.0695), followed by Industry (0.2359) and Service (0.456), and there is no evidence of sectoral employment shift as explained by Bbaale (2013) and Bhorat & Oosthuizen (2008). Our findings showed that a percentage increase in agriculture value-added was accompanied by approximately a 0.07 percent increase in agriculture employment for the period of study. While employment expanded by about 0.24 and 0.47 percent in Industry and Service sectors respectively. The findings contradict Bbaale (2013) who used the Job Generation and Decomposition (JoGGs) Tool of the World Bank to analyze the inter-sectoral shifts in Uganda and concluded that there was a relocation of labor from less efficient to more efficient sectors (Bbaale, 2013). However the findings are in line with Turyareeba et al. (2020); Alamá-Sabater et al. (2020); Loo (2000); Antonov (2019); Kapsos (2005); Mkhize (2019b), and others that established the lowest employment intensity of growth in Agriculture and highest intensity in the service sector.

Now that there is no evidence of sectoral employment shifts, where did service and industry sectors gain all their employment from if there was no movement of labour from agriculture? Our analysis shows that, although the share of agriculture in total employment has reduced in Uganda, the magnitude is so insignificant and both service and industry sectors have not had a significant rise in the total employment share. Further, a review of the total labour force in employment shows that Uganda's labour force has more than doubled in the past 2 decades rising from about 9,000,000 in 2000 to about 18,500,000 in 2021 *(see figure A.2 in appendix 4).* However, between 1987 and 2000, the total labour force in employment only increased from about 7,000,000 to about 9,000,000. This sharp rise in the total labour force could partly explain where the service and industry sectors gained all their employment even when Uganda has not registered the movement of labour from agriculture.

At the sub-sector level, our findings show that cash crops and food crops have the highest employment intensity of growth in the agriculture sector while fishing and forestry have the least employment intensity of growth for the same period of study. The agriculture sub-sector employment intensity of growth is positive and significant implying there is no evidence of intra-employment shifts within the agriculture sector. Under industry, construction (0.495) and manufacturing (0.477) have the highest

employment intensity of growth while electricity (0.368) and water (0.373) have the least employment intensity of growth for the same period of study. The employment elasticity in the service sector shows that there is a movement of labour out of Real Estate Activities, although the movement is not statistically significant. Trade and Repairs (0.59) as well as Arts, Entertainment, and Recreation (0.46) sub-sectors have the highest employment intensity of growth while Transportation and Storage (0.088) and Human Health and Social Work Activities (0.044) have the least employment intensity of growth for the period of study. The high employment intensity of growth in Trade and Repairs as well as Arts, Entertainment, and Recreation signify the fact that the labour absorptive capacity in these sub-sectors is relatively high.

4.2 Determinants of employment intensity of growth at national and sectoral levels

After establishing the employment intensities of growth at national, sectoral, and sub-sectoral levels, we moved on to the second stage of identifying the factors that account for the differences in the observed elasticities at national and sectoral levels. An ARDL model was utilized to establish the determinants of employment intensity of growth and the results are presented in table 2.

Table 2: Determinants of employment intensity of growth at the National and sectoral level

Variable National and Sectoral level	National	Agriculture	Industry	Service
Labour productivity	-0.014269***	-0.015621***	-0.006456***	0.013010***
	[0.000766]	[0.000509]	[0.001886]	[0.001128]
	(0.00000)	(0.00000)	(0.00261)	(0.00000)
Domestic savings	-0.000832**	-0.001710**	0.000341	0.001347***
	[0.000398]	[0.000777]	[0.001022]	[0.000433]
	(0.0528)	(0.0438)	(0.7429)	(0.0060)
Inflation	-0.000154	-0.000272*	-0.000450**	-0.000199**
	[9.39E-05]	[0.000132]	[0.000195]	[8.92E-05]
	(0.1205)	(0.0562)	(0.0315)	(0.0386)
Capital stock	-0.002635**	-0.001764	0.000699	-0.001782
	[0.001117]	[0.001364]	[0.000699]	[0.001315]
	(0.0313)	(0.2155)	(0.7870)	(0.1921)
Labour supply	-0.001543	-0.009160*	0.012321***	-0.006187
	[0.002369]	[0.004947]	[0.004331]	[0.004896]
	(0.5248)	(0.0869)	(0.0112)	(0.2285)
Government expenditure	0.000346	0.001759*	0.000449	-0.001782
	[0.000521]	[0.000977]	[0.001215]	[0.001020]
	(0.5157)	(0.0918)	(0.7163)	(0.2938)
Foreign Direct Investment	0.000205	0.000875*	-0.002896**	-0.001401**
	[0.000421]	[0.000419]	[0.000665]	[0.000664]
	(0.6342)	(0.0573)	(0.0004)	(0.0547)
R-squared	0.999507	0.999323	0.996537	0.999031
Adjusted R-squared	0.999229	0.998872	0.995548	0.998601
S.E. of regression	0.000334	0.000404	0.001068	0.000412
Sum squared resid	1.79E-06	2.44E-06	2.39E-05	3.05E-06
Log-likelihood	177.5008	173.4517	155.8767	177.6370
F-statistic	3601.669	2215.150	1007.258	2320.153
Prob(F-statistic)	0.000000	0.000000	0.000000	0.000000

Notes: Against each coefficient, * Significant at 10%, **Significant at 5% and *** significant at 1%

The study established a systematic negative relationship between labour productivity and employment intensity of growth at both the national and sectoral levels. At the national level, a percentage point increase in labour productivity was associated with an approximate 0.014 percentage point reduction in the employment intensity of growth. At the sectoral level, labour productivity has a greater negative impact on agriculture employment intensity (0.0156) compared to services and industry employment intensities at 0.013 and 0.0065 respectively for every point increase in the respective sectoral value added. The findings thus revealed that labour productivity is inversely related to employment intensity of growth, and this correlates with findings by Pattanaik & Nayak (2011); Dahal & Rai (2019); Mkhize (2019b), and Antonov (2019). This finding implies that a rise in labour productivity signifies a decline in the demand for labour since less output is produced with a more productive labour force. While the study finds that trade and repairs, mining & quarrying, food crops, manufacturing, and construction have the highest employment intensity of growth, these sub-sectors have not created enough decent and productive jobs. Sub-sectors with low employment elasticities such as financial and insurance activities, information and communication, professional, scientific and technical activities, accommodation and food service activities, agriculture support services, and fishing have created most of the decent formal jobs. Therefore, there is a need to balance productivity gains and employment growth.

On domestic savings and employment intensity of growth, the study revealed a negative relationship both at the national and in the agriculture sector. The impact was however positive both in the industry and service sectors. At a national level, a percentage point increase in domestic savings reduces employment elasticity by approximately -0.0008 percentage points. At the sector level, a percentage point increase in domestic savings reduces agriculture employment elasticity by approximately 0.0017 percentage points but increases industry and service sector employment intensities by approximately 0.000341 and 0.00135 percentage points respectively. The findings are in line with Cirillo (2018); Soininen (2014); and Madariaga (2018). Further, the study findings established a negative relationship between Inflation and employment intensity of growth, however, the impact was not statistically significant at the national level. The effect of inflation was stronger in Industry at 0.00045 compared to agriculture and industry sectors at 0.00027 and 0.00020 respectively. This finding implies that inflation rises uncertainty and thus frustrates investment leading to a decline in the demand for labour and low employment intensity of growth (Madariaga, 2018).

On capital stock and employment intensity of growth, the findings established a systematic negative relationship between Capital stock and employment intensity of growth. While the impact of inflation is significant at the national level, it is not at the sectoral level. Our findings showed that a percentage point in the capital stock reduces employment intensity of growth by approximately 0.0026 percentage points all other things remaining constant. In addition, our empirical findings established a negative relationship between Labour supply and employment intensity of growth, but the impact was only significant in the agriculture sector. The implication of this is that a rise in labour supply leads to a fall in agricultural wages and thus increases demand for labour leading to a more labour-intensive growth (Dahal and Rai, 2019). Similarly, the

impact of government expenditure on employment intensity was found positive but only significant at a 10 percent level of significance. Also, the study established a mixed impact of foreign direct investment on employment intensity of growth. While the impact was not significant at the macro level, the impact was positive in agriculture and negative in the industry and service sectors.

5. Conclusion and Policy Reccomendations

The study has provided an empirical analysis of the employment intensity of growth for the entire economy, for the three broad economic sectors (agriculture, industry, and service), and the twenty-five (25) sub-sectors in line with the NAS. Our findings showed that, although the country has registered sectoral value-added shifts with more than 45 percent of output coming from the service sub-sectors, there is no evidence of inter and intra sectoral employment shifts. Indeed, the number of jobs has also increased in the service sub-sectors, but there is no evidence of labour movement from other sub-sectors. The rise in the share of services in total employment can be attributed to the rise in the total labour force and labour force participation especially with more youths and women joining the labour market and this was in line with Urquhart (1984); Kapsos (2005); Anderson, Caggiano, Vahid, et al. (2020), and Ghazali & Mouelhi (2018), but contrary to the findings by Bbaale (2013) and Bhorat & Oosthuizen (2008).

Further, the study revealed that, although the employment intensity of growth was significant, the extent was weak and this confirmed the jobless growth occurrence that has always characterized Uganda's economy as confirmed by the NPA (2016). At the sectoral level, the findings indicated that Agriculture has the least employment intensity of growth followed by Industry and Service. This is similar to the findings by Turyareeba et al. (2020); Alamá-Sabater et al. (2020); Loo (2000); Antonov (2019); Kapsos (2005); Mkhize (2019b). The employment elasticity in the service sector demonstrated that there is a movement of labour out of Real Estate Activities, although the movement was not statistically significant. Trade and Repairs as well as Arts, Entertainment, and Recreation sub-sectors had the highest employment intensity of growth while Transportation and Storage and Human Health and Social Work Activities had the least employment intensity for the period of study. The high employment intensity in Trade and Repairs as well as Arts, Entertainment, and Recreation signify the fact that the labour absorptive capacity in these sub-sectors is relatively high.

Additionally, the analysis revealed a systematic negative relationship between Labour productivity and employment intensity of growth both at the national and sectoral levels. Further, the study revealed a negative relationship between savings and employment elasticity both at the national and in the agriculture sector. The impact was however positive both in the industry and service sectors. Inflation was also found to negatively impact employment intensity of growth, but the impact was not statistically significant at the national level. Government expenditure was also associated with a positive impact on employment intensity but the effect of FDI was mixed. While the

impact of FDI was not significant at the macro level, the impact was positive in agriculture and negative in the industry and service sectors.

The study recommends the need to refocus government priorities on investment and promotion of self-aid projects in highly employment-intensive sub-sectors. These include trade and repairs, arts, entertainment and recreation, construction and manufacturing, cash crop and food crop as well as accommodation and food service activities. These sub-sectors have proved to be more employment-intensive than any other activities in all three broad economic sectors. Further, the study recommends the need to increase government expenditure, promote and provide a more convenient saving mechanism to the nationals and favorable investment climate to attract more foreign direct investments, and design and implement more stringent and suppressive measures to inflation to promote investment in the sub-sectors identified with high potential for employment creation.

6. Declaration

6.1 Availability of data and material

Data on sectoral employment and sectoral value-added output was sourced from the World Bank Development Indicators (WDIs). Data on sub-sectoral shares of employment and GDP was obtained from the Social Accounting Matrix (SAM) at the Uganda Bureau of Statistics (UBOS) and the National Planning Authority. The National Planning Authority operates a national macro model for human resource and employment planning using SAMs data on sectoral and sub-sectoral coefficients/shares. Data on other macroeconomic variables including domestic savings, inflation, interest rate, capital stock, labour supply, government expenditure, labour productivity, and foreign direct investment was obtained from the WDIs accessible at: https://databank.worldbank.org/source/world-development-indicators. All the data analyzed are available on request from the corresponding author.

6.2 Competing interests

The Authors declare that they have no competing interest in this publication whatsoever.

6.3 Source of Funding

Not Available

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APPENDICES

1. Unit root test results

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	0.19430	0.5770	161	5313
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	13.0310	1.0000	161	5313
ADF - Fisher Chi-square	833.640	0.0000	161	5313
PP - Fisher Chi-square	703.312	0.0000	161	5455

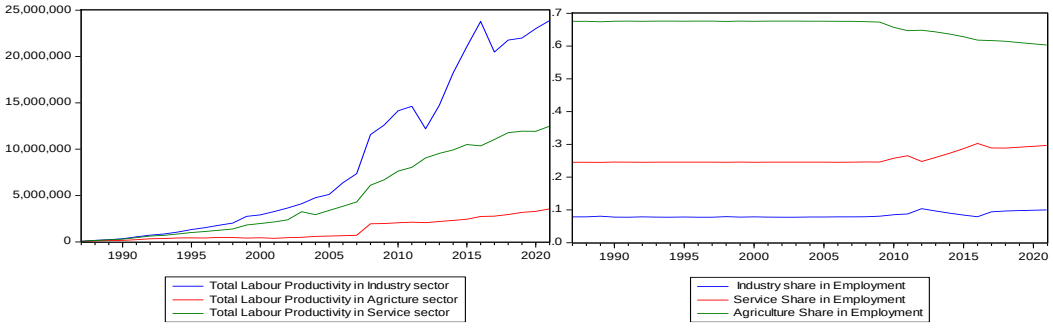
2. F-Bounds Cointegration test results

Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	13.07977	10%	1.8	2.8
K	9	5%	2.04	2.08
		2.5%	2.24	3.35
		1%	2.5	3.68

3. Sectoral share in employment and labour productivity

Figure A.1: Sectoral share in employment and labour productivity



4. Labourforce in Employment

Figure A.2: Labourforce in Employment