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## The effect of demographic characteristics on employment in Sub-Saharan Africa.

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### ABSTRACT

This study aimed at establishing the effect of demographic characteristics on employment in Sub-Saharan Africa. The study used data ranging from the year 1990 to the year 2015 that was obtained from the data banks of World Bank and FAOSTAT. The panel data that was obtained and used was for 30 Sub-Saharan African Countries. The traditional Neo classical production function was utilized in this study in estimating the regression results. Hausman test was carried out and it determined that fixed effects estimations were preferred to random effects and as a consequence, random effects estimations were made use of during the analysis of data. In establishing the relationship between demographic characteristics and employment, demographic characteristics, imports and services sectors variables were found to statistically and significantly influence employment. However, domestic capital was found to negatively influence employment though this was not statistically significant, while exports was found negatively and statistically significantly influencing employment.

**Key words:** Sub-Saharan Africa (SSA), Population stratification, dependent population, working population, economic sectors.

### 1. INTRODUCTION

#### 1.1 Background to the study

The African countries have realized high economic growth rates in the last decade, but this has not translated to majority of the people in this region reaping benefits from the growth. Policies for economic transformation and increasing productivity as well as social protection need to be crafted so as to ensure that vulnerable groups such as women and youth benefit from the economic growth. Such policies need to be supported by the political rulers and owners of businesses so that they can succeed (Dekker et al 2018).

Though Africa creates five million new jobs each year, the number of people seeking for the formal wage jobs generated annually is much higher than the number of jobs created (Filmer and Fox, 2014). Sub-Saharan Africa has a low unemployment rate of about 7.6 percent (Adolwa et al 2017), though this is not accurate information as majority of the people who are employed are underemployed and fewer people seek for work as they engage in the informal employment (Dekker et al 2018).

#### 1.1.1 Africa's youthful population

Africa has a young population that can make the continent economically prosperous in the coming decades, but this will only take place if proper policies and programs are not only put in place, but implemented, which will encourage enhancement of opportunities for the youthful population, and as well reduce fertility rate among women. This will result in emergence of a larger workforce that will be better educated and that has fewer children that will as well in turn be in a position of acquiring better education and as a result garner the required skills for employment. This will happen if institutions are made stronger and much more viable economic policies are put in place and implemented (Ashford 2007).

Ahmed and Amer (2015) were as well of the view that by the year 2050, China and India will have a smaller younger workforce than in the SSA region. They as well stated that 11-15% of GDP between the years 2011 and 2030 could be accounted for by the contribution of the demographic dividend. The labor force is bound to significantly continue to expand continuously given that SSA population will continue growing in a steady manner. So as to avoid social unrest and with an intent of avoiding unemployment, the SSA region has to ensure that it creates enough jobs for the bulging youthful population, and the region has to ensure that it improves the level of education for the young people so as to reap maximum benefits of the demographic dividend (Ahmed and Amer 2015).

### **1.1.2 Gender, employment and economic growth in SSA**

Gender equality is defined as the absence of any form of gender discrimination. If there is gender equality in the labour market then work is distributed fairly between sexes. This study is aimed at establishing the gender parity and employment between sexes as well as level of unemployment and its contribution to economic growth in SSA region. Work ought to be allocated to the most suited person whether male or female without discrimination or favour. If all systems in an economy are running well, this results in better economic outcomes which impact the population in such countries positively in many ways. A society that has higher level of gender equality has higher average levels of productivity which translates to higher GDP levels and to some extent also a faster innovation process. In a nutshell it translates to higher rates of growth. There is however a correlation of rich countries having greater gender balance, as richer countries are capable of making more progress in confronting norms and prejudices especially in the long term. For a country to realize higher levels of productivity, it cannot afford to discriminate, and the female talent ability must be harmonized with the one for males. Higher productivity can as well be achieved by guaranteeing women educational opportunities. The most suitable person irrespective of sex must be given the chance to introduce innovations and start as well as run a business. Higher GDP as well as higher long term growth rate will be realized as a result of enhancing gender equality either spontaneously or as a result of policy measures being put in place (Lofstrom 2009).

## **1.2 Economic Situation**

### **1.2.1 Recent Economic History**

World Bank (2014) in a study found that since African countries got their independence from their colonial masters they have experienced wide fluctuations in their economic performance. The SSA countries have experienced two periods of economic growth, the periods being from 1961 to 1975, and the second one being from 1995 to the current time. But these countries have had periods of economic stagnation in between the two periods. As a result of experiencing economic stagnation, and given that the goods and services that were being produced in Africa were generally of low output in comparison to the rest of the world, SSA countries appear to be doomed to be in persistent situation of underdevelopment. Researches came with three hypotheses to the cause of economic stagnation in SSA countries. They were of the view that the underdevelopment of the SSA countries was as a result of the geographical conditions that the SSA region is situated in, the issue of slave trade as slaves were majorly shipped from this region especially from the East, North and West African countries, and the last cause they postulated was colonization. It was assumed that these three issues put the African countries in a position of underdevelopment even after they acquired their independence. It wasn't surprising then to have African countries having weak economies later on after they attained their independence.

## **2. STATEMENT OF THE PROBLEM**

This study aimed at establishing the effect of demographic characteristics on employment in Sub-Saharan Africa. This is due to there being existing paucity in the SSA region of studies on interrelationship between demographic characteristics and employment, with the existing studies having been carried out on general employment in the region. This study is as a result aimed at contributing to tackling that existing lacunae.

### **3. Objective of the Study**

The specific objectives of the study was as follows:

3.1 To establish the relationship between demographic characteristics and employment in Sub-Saharan Africa.

#### **3.2. Research questions**

3. What is the relationship between demographic characteristics and employment in Sub-Saharan Africa?

## **4. LITERATURE REVIEW**

Most of the unemployed people in SSA are the youth, and this is due to them facing challenges such as lacking the required skills and they face constraints that do not allow creation of adequate jobs for them due to enacted development policies thus there is need of coming up with appropriate short term and long term strategies that will address those under laying challenges so as to avail the needed jobs to the youth's Sub-Saharan Africa

(Allen et al 2016; Baa Boateng, 2016; Barlet and D' Aiglepiere, 2017; Filmer and Fox, 2014; Fox, Senbet and Simbanegazi 2016; Townsend et al 2017).

If all the youth seeking employment get employed in Africa, the GDP would increase by twenty five percent by the year 2050 and by the year 2100 it would have increased by 54 percent. This is a huge increase which will reduce or even eradicate poverty in Africa. This will as well address other problems that face the African continent such as political upheavals, and conflicts, radicalization of the youth, exclusion and migration in search of jobs (Dekker et al 2018).

The World Bank (2016a) found that the youth who join the labour force annually are between ten and twelve million, and out of that number, only about 3.1 million of them get employed each year leaving the large number of them unemployed. It then means that in order to address youth unemployment in Africa, there is need of addressing both the supply and demand sides of labour, and not neglecting any of them.

#### **4.1 Employment in SSA**

It is forecasted that the labour force in SSA will grow rapidly, and that the private sector will not expand as rapidly, thus, governments in SSA ought to put up measures in place so as to attract more investors to establish private firms that will provide wage employment to more people, coupled with setting measures of improving productivity in the traditional agriculture sector as it shall have to employ much of the labor force still. Despite the informality of household enterprises governments in SSA should not discourage them as they shall be a source of employment to a good proportion of the labour force. All these measures should be put in place because employment transformation in SSA region is bound to proceed slowly. In the decade 2010-2020 it had been projected that the actual number of people employed in the agricultural sector was bound to increase, and this was to be in tandem with the increase in people employed in other sectors outside agriculture as the labour force in SSA continues to increase. It is however projected that the contribution of employment in the private firms is not expected to increase much (Fox et al 2013).

#### **4.2 SSA unique population profile**

Haub and Kent (2005) found that the SSA is the youngest region in the world given that 44% of its population is under the age of 15. In contrast, about 30% of the population is under the age of 15 in Asia, Latin America and the Caribbean, while in Europe only about 16% is under the age of 15. The peak in the youthful population in SSA is yet to be reached unlike in other regions of the world. The age structure and the population of many of the SSA countries has not been affected by the ravage of the HIV AIDS pandemic apart from some few countries that have had their population and age structure affected greatly namely Botswana and Lesotho. Average fertility rate in SSA is 5.5 children per woman, which is the highest in the world. The population size and growth have been greatly impacted by the high fertility levels than by the mortality rates as a result of improvement on health care; this has been the driving force that has resulted in Africa's population increase.

#### **4.3 Child labour, employment and dependant population.**

There is need of coming up with a proper definition of dependant population as well as working population in SSA, as among the SSA countries, children remain dependants past fifteen years of age, with some of them starting being productive by the age of 28 years. This was portrayed in a study that had been carried out among six West African countries. It was found that children started producing a surplus by the age of 28 years (CREFAT 2016). This study also found that people in this region stopped producing a surplus at the age of sixty three. The unemployed adults ought to be added back to the dependant population, though their data is very scarce in this region (Turbat and May 2017).

In Sub-Saharan Africa the definition of who constitutes a child or what constitutes child labour differs from among societies and cultures. This is due to the fact that among the traditional Africa societies, children are taught their roles practically in the society through the process of enculturation, and this roles constitutes work that they are supposed to learn through apprenticeship, so that they can gain the required life skills that will earn them their livelihood in their future lives. It is thus not easy to make the SSA communities understand and appreciate what child labour is constituted of. However, child labour ought to be understood to constitute of activities that children engage in so as to assist his or her family earn a living, or activities that are undertaken

by the same child or children so as to earn their own livelihood; whether such activities end up being paid for provided that such activities are detrimental to their social, psychological, mental and physical growth and development, whether such engagement is dictated by their parents or by the children themselves (Admassie 2002).

According to Grootaert and Kanbur (1995) this term has broad coverage in terms of legal, social, and ethical issues. It has not been resolved whether to consider child labour as wage employment only, or whether paid or unpaid in the family farm, or in the household businesses, or even providing domestic labour in one's household whether on full or part time basis; all this considered to result in impacting health, education, and normal development of the child negatively. According to United Nation convention on the rights of children ILO Convention number 138, work that a child is subjected to do should not have a negative effect on a child's education and it shouldn't as well negatively impact on the mental and physical growth of the child. Most labour force surveys start at the age of 15 years, thus the actual number and distribution of children who are underage and working have not been established fully. The data that is available on child labour excludes children providing domestic services, as well as in subsistence farms, and those working in the informal sector. Kebebew (1998) found that the ILO had estimated that about 250 million children in the 5 to 14 years age bracket were established to be working in the following regions; sixty one percent of them in Asia, thirty one percent of them were working in Africa, while 7 Percent of them were working in Latin America.

Admassie (2002) found that a third of the boys and two fifths of the girls were already working though on a part time basis. It was however found that the boys labour participation rate was higher than that of girls, though statistical surveys had not documented economic activities that were being undertaken in the household, thus girls labour participation rates might have been under estimated. This is because boys were reported to have been working in the employment activities that were more visible than girls, as girls were mostly providing domestic labour that was mostly unpaid. It was reported that most girls work was full-time though not of economic nature, like for instance they were performing housekeeping duties so that they could avail a chance to their parents to go to work, while some of them took care of their sick or physically or mentally impaired members of their families. In Sub-Saharan Africa, traditionally, girls work for longer hours than boys. In the event that such full time duties that were performed by girls were taken into consideration, the difference between boys and girls labour participation rates would either be significantly narrowed or would be none existent.

Admassie (2002) found a declining trend in the children labour participation rate in SSA. It was found that this rate was smaller in Africa than in other parts of the world. Asia was reported to have in actual terms more children working, though Africa was said to have the highest rate of child labour. The economic activities that children engage in include working in small scale manufacturing firms, working as commercial sex workers, hawking items on the streets, working in restaurants as waiters, as well as working as domestic servants and working in farms owned by family members. Child labour in SSA is worsened by factors such as rapid population increase, dwindling standards of living, high poverty levels, lack of adequate investment in basic economic and social services such as education, civil wars, breakdown of family structure resulting in female headed families, and prevalence of epidemic diseases such as HIV and Aids.

There are however variation in the rate of child labour participation among the SSA countries. In the year 1995, it was estimated that child labour participation in countries such as Mali, Ethiopia, Kenya, Uganda as well as Burundi was at forty percent, while in the same year, South Africa and Mauritius reported a child labour participation rate of less than three percent. Children participation in labour force is highest in the Eastern African region, because in this region, children between the ages of ten and fourteen are approximated to be already working. On the other hand, only a quarter of the children in the same age group are estimated to be working in central and western African regions. South Africa was found to have the lowest number of children who were gainfully employed, and as a result she had the lowest rate of child labour participation (Admassie 2002).

More than seventy percent of the population in SSA was found to be living in the rural areas, and, as a result, most of the children workers are found working in farms as subsistence farm workers. Some other children were engaged in household jobs as domestic workers, and others are engaged in unpaid family work. Some children however were found engaged in commercial farm as workers as for instance, a study that was conducted in Kenya found that children were found working in plantation farms, and they constituted between twenty to

thirty percent of the employees who were engaged in casual labour in the plantation farms (ILO 1997a). Other children are found engaged in domestic work in Africa, which constitutes the second sector that is the greatest employer of children in Africa. It is however not possible to accurately determine the number of children who work as domestic workers in Africa, as the engagement is normally hidden and it is dispersed, and to make it even much more harder to unearth is the fact that it is normally undertaken in an informal manner. The children who are engaged as domestic workers normally come from very poor backgrounds, and they are made to work for up to 18 hours a day, they being the first to wake up in the morning and the last to retire to their beds at night. As a result, they do not go to school and neither do they play with other children (ILO 1996a).

Some children work in the streets as street vendors, and this subjects them to vehicle accidents as well as heat from the sun. Some other children are found tied in the York of slavery and slave like engagements in this region. This especially prevalent among the West African countries. There are incidences in which parents are found to have given out their children to be engaged in informal slavery kind of engagements in return for the upbringing of such children in the SSA region (Admassie 2002).

#### **4.4 Gender disparity in employment in SSA**

Sub-Saharan African countries have experienced increased economic growth in the past decade resulting in more economic opportunities being realized. In spite of this, women in this region still find it harder to realize employment unlike their male counterparts. As a result, there is gender inequality in the SSA labour market, but this again differs from country to country (Dieterich et al., 2016).

Among the low and middle income countries in SSA, both men and women participate equally in informal jobs, as women work so as to fend for their families, but the differences in employment differ in the wage employment sector, and the gender gap in employment widens and becomes more conspicuous when such countries attain lower middle income level status. Much of the labour force in the Agricultural sector among the low income countries is comprised of women in spite of the fact that much of the population in those countries reside in the rural areas even though women find it hard to own land as well as farm inputs and credit facilities (Croppendstedt et al., 2013).

Fox and Sohnesen, (2012), and Fox et al. (2013) opined that more people end up working in household businesses and other wage sectors as they move out of the Agricultural sector among the middle income countries in SSA. Married women particularly find it hard to get formal employment, and those who get employed find it hard to maintain it, and they end up working in household businesses that are majorly informal. This women find it hard to access credit, and are thus unable to grow such ventures in comparison to their male counterparts. The gender gap in formal employment diverges and becomes very conspicuous among the middle income countries.

Dieterich et al (2016) found primary and secondary education as essential in enabling women to get employed in the wage sector than males enabling them to move from the Agricultural sector in the process of economic transformation. It was as well established that better education enabled both men and women be more productive in the Agricultural sector which resulted increased output that translates into generation of more revenue and reduction in poverty as well as improving on food security. Married women were found to have more domestic responsibilities which resulted in them finding a way of deriving a livelihood through seeking gainful employment or running a family business in comparison to those women who were not married. The study found that females who had primary and secondary education had lesser chance of being employed than their male counterparts.

#### **4.5 Improved political and macroeconomic climate**

The main contributing factors to the economic rise of the African continent has been said to be as a result of her improvement in the entire security situation in the continent and adoption of democratic systems of government and discarding autocracy. The SSA region has seen a decline in the number of conflicts since the year 2000 and as a result realized political stability and democratic governments in many countries (World Bank 2014).

The growth of the SSA countries' economies has as well been attributed to improvement in macroeconomic and business climate. The region started by having the external debt reduced as in the 1990s, many SSA countries were riddled with debts. However from 2002, the SSA countries external debts reduced after they had their debts cut. There was an initiative that was mooted in 1996 of having the debts of heavily indebted poor countries (HIPC) reduced, and in 2005 another initiative was created that was referred to as multilateral debt relief initiative and this two initiatives resulted in cutting of debts of 30 SSA countries by about one hundred billion US Dollars ( UNECA and AU, 2013).in comparison to OECD countries SSA countries debt is lower than 50% of GDP, and this is generally considered to be a limit that is sustainable . The issue with SSA countries is that its debt level is rising again, and this is the new risk among this countries as debt levels in the SSA countries are not supposed to match those of developed economies so as to be said to have triggered an economic crisis, as the developed countries have a lot of resources and their current account balances are much better than those of the SSA countries that are still developing (Adams 2015).

#### **4.6 Previous empirical studies on gender, employment and economic growth**

Abu Ghaida and Klasen (2004) found that many empirical studies had been conducted in both developed and developing countries on gender equality on a global scale. The studies found the role of women being crucial to economic development and resources were to be therefore used in such a way as to eliminate existing inequalities. In the millennium development goals that were put forward by the United Nations, four of the eight goals that were established were directly related to women. This is for instance enhanced gender equality and the right of all which included girls to education.

Forsythe et al (2000) and Stotsky (2006) found that some hypothesis had been raised regarding correlation between GDP level and gender equality. The first one stated that the correlation was positive due basically to more equal human capital investment. The second hypothesis stated that the correlation is not equivocally positive and that it varies with level of development in the country. As a country develops, inequality might initially increase as men and not women get into the labour market and get jobs boosting their incomes. Later when women starts getting into the labour market their incomes increase and the gender inequality decreases.

Gender in development approach states that gender inequality will go on despite a country's economic growth and argues that gender inequality might increase as the economy grows. This is explained by the fact that differences between men and women are a result of norms, traditions, family perceptions, discrimination, structures and legislation than of economic growth (Stotsky 2006).

Forsythe et al (2000) found a positive correlation between the level of gender equality and the GDP level. Nearly all countries in the EU had improved women status, though progress had been more among richer countries than among poorer ones and women had improved their status much more in countries that had higher growth rates. It was found that in the long term there was a positive and significant correlation between gender equality and GDP

Knowles et al (2002) found that educational differences between the sexes (the gender education Gap) negatively affected growth and the level of education among women had a great impact on labour productivity though this was not clear among men.

#### **4.7 Effect of Corona virus (Covid – 19) pandemic on Employment and economic growth in SSA.**

Socrates (2020) found that the covid-19 pandemic had had great disruption in international trade, and that there existed inadequate evidence of the extent to which the disruption had affected developing countries. In a study on how export and import trade fared in Kenya as a result of the lockdown policies that were enacted and implemented in order to contain the spread of the corona virus, it was found that effecting of those policies resulted in an increase in average rise in weekly exports in the country by 12 % while the exports declined by 28%. The cause of the decline in imports was due to the reduction in sea cargo trade affecting those countries that had effected lockdown measures and which resulted in a significant increase air cargo importation in compensation to the reduction in sea cargo importation.

In a study Socrates (2020) found that the lockdown policies that were effected in Kenya had a negative impact on imports and a positive impact on export of commodities. The imports from countries that had enacted and

effected lockdown policies declined by a weekly average of about 28%, while on the other hand, exports to the same countries rose by a weekly average of 12%. The analysis indicated changes in response to both demand and supply; though there was a greater effect on demand than on supply.

The Covid-19 pandemic initially made people buy and stock essential items such as food, medicines and personal protective equipment, a scenario that increased the demand of this commodities, creating demand shocks (Kassa 2020; Banga et al 2020; Mold and Mveyange, 2020). Unemployment levels soured due to the effects of lockdown policies, that made some businesses to close down due to dwindling economic activities which had an impact in reduction of demand and supply of goods that were traded internationally especially trade on durable goods (Verma and Gustafsson, 2020; Djiofack, Dudu and Zeufack, 2010; Kassa 2020). Instabilities were as well created in the financial services sectors affecting international trade as a result of the aftermath of the effects of the Covid-19 pandemic (Bonga et al., 2020; Demir and Javorcik, 2020).

The level of productivity in the Sub-Saharan African region was normally low at three percent. During the pandemic period, the productivity level worsened as fewer employees were working, as a result, more effort and corrective measures needed to be put in place so as to return production to its normal state in the region. As a result of cross border lockdowns, there was supply chain interruptions which resulted in interruption of importation of agricultural products, a situation that needed to be corrected. The Agricultural production position was worsened by reduction in agricultural output as a result of seasonal floods and drought, as it had a low resilience index of eight percent. In order to fully recover, the Sub-Saharan African governments had to come up with desirable policies that were needed to boost the agricultural sector and other sectors of the economy so as to increase production output, so as to rejuvenate the economic growth. Meanwhile, some measures were being implemented by the Sub-Saharan African governments so as to surmount the business shocks. Such measures included tax relief and coming up with business stimulus packages such as loans that were availed to businesses in order to keep them afloat (Ndiili 2020).

The impact of the covid-19 pandemic on the Sub-Saharan African countries economy would be realized in the midterm after relaxing the lockdown and other containment measures. This was especially felt fully after the economic activities commenced fully. The level of unemployment that resulted as well as reduction in income from the export sector, and the expenditure deficit that the governments in this region were faced with was evidence to the full impact of the covid-19 pandemic (Ndiili 2020).

The tourism and hospitality sector bore the greatest impact due to international hotel bookings having been cancelled, and the flights were cancelled too. Domestic tourism bore the brunt of the pandemic as well. Supply chains at both macro and micro levels were disrupted, which resulted in an increase in the cost of production, and as a consequence, there was shortage of basic commodities which resulted in an increase in price of commodities. Unemployment levels increased due to people losing their jobs as a result of closure of businesses, and the quantity of money in circulation reduced, impairing the ability of household consumption. The governments in this region had to take fiscal measures so as to arrest the situation of the economic decline that was realized in the midterm. The policies that were to be implemented ought to address production enhancement as well as boost the agricultural sector (Ndiili 2020).

The implementation of measures such as social distancing in the Sub-Saharan African region greatly helped in reducing infection rates in the densely populated urban areas. The urban centers had been growing due to the increase in population as the population in the urban areas had been rising at the rate of ten percent per annum from the year 1995 to the year 2020. As a result, about a half of the population in Sub-Saharan African region was living in the urban areas. Due to the congestion in the urban areas as well as strain on social amenities that resulted, there was a higher spread of the corona virus infection rate in the urban areas than in the rural areas.

With reference to the world meter data (2020), the regions that were more densely populated in Sub-Saharan Africa were in Eastern Africa, which were reported to have 67 persons per square kilometer and 66 persons per square kilometer respectively. The region in the middle of Africa had 28 persons per square kilometer, while the southern African region had 25 persons per square kilometer. The towns that were more congested reported higher spread of corona virus infections, a situation that was realized more in Sub-Saharan Africa region than in North America as the Sub-Saharan African region was more densely populated than the North American region.

The Sub-Saharan African region did not have in place proper health infrastructure and health resources, and it remained to be seen how this region managed the covid-19 pandemic. This region had a problem of high debt burden, and was as well affected by climate change and an undesirable doctor to patient ratio. Unlike the one prescribed by the world health organization of one doctor for every a thousand members of a population, this region n had an average of 0.2 doctors for a population of one thousand people (Kumar and Pal 2018). This presented a great challenge as this region could not be able to outsource doctors given that this pandemic had affected all regions in the world, and as a result, doctors were in great demand in the whole world (World Bank 2020 a b).

**5. METHODOLOGY**

**5.1 Data that was used in the study**

An empirical study on 30 Sub-Saharan countries was conducted, the data was obtained from the data banks of the World Bank, World development indicators (WDI) and FAOSTAT ranging from the year 1990 to the year 2015.

**5.2 Theoretical Models**

The theoretical model that was used to establish the effect of demographic characteristics on employment was based on the traditional neo-classical aggregate production function of the following formation:

$$Y_{jt} = AK_{jt}^{\alpha}L_{jt}^{1-\alpha} \dots\dots\dots (1)$$

Where:

- Y = gross domestic product (GDP) in country *j* and year *t*
- K = capital stock (domestic capital investment) in country *j* and year *t*
- L = labour in country *j* and year *t*
- A = parameter that measures total factor productivity
- $\alpha$  and  $1-\alpha$  are the relative shares of capital and labour from the total production.

Taking logarithms on both sides of equation (1), the equation becomes:

$$\ln Y_{jt} = C + \alpha \ln K_{jt} + 1 - \alpha \ln L_{jt} + U_{jt} \dots\dots\dots (2)$$

Equation (2) was further simplified to become:

$$\ln Y_{jt} = a_0 + a_1 \ln K_{jt} + a_2 \ln L_{jt} + U_{jt} \dots\dots\dots (3)$$

Where  $a_0$  is a constant term,  $\ln Y_{jt}$ ,  $\ln K_{jt}$  and  $\ln L_{jt}$  are respectively the natural logarithms of  $Y_{jt}$ ,  $K_{jt}$ , and  $L_{jt}$ .  $U_{jt}$  is the error term.  $a_1$  and  $a_2$  are elasticity coefficients.

Equation (3) was used in the model section to derive the models to be used to find out the effect of demographic characteristics on employment in Sub-Saharan Africa.

**5.2 Model: Demographic characteristics and Employment**

To investigate the relationships between demographic characteristics and employment, the study employed the traditional neo-classical aggregate production function in the estimation of the regression results which was further modified into an appropriate form by including demographic characteristics in the equation. The demographic characteristics were derived from the population structure and were classified into four categories denoted as:

- L1 = children (below 15 years) as a portion of total population
- L2 = Adult (15- 63 years) as a portion of total population
- L3 = Aged (above 64 years) as a portion of total population
- L4 = L1+L3 (total dependent population)





WIW = Women in work implying employed women

(MIW)= Men in work implying employed men

The four levels were included in the estimation differently as follows:

To determine the effect of the respective variables on employment levels in SSA the employment levels (Empl) as the dependent variable was used in the equation as follows:

$$\ln Empl_{jt} = a_0 + a_1 \ln K_{jt} + a_2 \ln L1_{jt} + a_3 \ln X_{jt} + a_4 \ln M_{jt} + \sum_{j=2}^{30} c_j D_j + U_{jt} \dots (4)$$

$$\ln Empl_{jt} = a_0 + a_1 \ln K_{jt} + a_2 \ln L2_{jt} + a_3 \ln X_{jt} + a_4 \ln M_{jt} + \sum_{j=2}^{30} c_j D_j + U_{jt} \dots (5)$$

$$\ln Empl_{jt} = a_0 + a_1 \ln K_{jt} + a_2 \ln L3_{jt} + a_3 \ln X_{jt} + a_4 \ln M_{jt} + \sum_{j=2}^{30} c_j D_j + U_{jt} \dots (6)$$

$$\ln Empl_{jt} = a_0 + a_1 \ln K_{jt} + a_2 \ln L4_{jt} + a_3 \ln X_{jt} + a_4 \ln M_{jt} + \sum_{j=2}^{30} c_j D_j + U_{jt} \dots (7)$$

$$\ln Empl_{jt} = a_0 + a_1 \ln K_{jt} + a_2 \ln miw_{jt} + a_3 \ln X_{jt} + a_4 \ln M_{jt} + \sum_{j=2}^{30} c_j D_j + U_{jt} \dots (8)$$

$$\ln Empl_{jt} = a_0 + a_1 \ln K_{jt} + a_2 \ln wiw_{jt} + a_3 \ln X_{jt} + a_4 \ln M_{jt} + \sum_{j=2}^{30} c_j D_j + U_{jt} \dots (9)$$

The equation was used to establish the contribution of the L1 group constituting of those below 15 years of age, the L2 group constituting of the members of the population that ranged from 15 years of age to 63 years of age, the L3 group comprising of those that were 64 years of age and above, and the L4 group comprising of the dependant population which constituted of those members of the population that were below 15 years of age and those that were 64 years of age and above to employment, and establishing which gender was employed more in SSA region.

### 5.3 Estimation Methods

Data of 30 sub Saharan African countries was sourced from the World Bank, World development indicators and Faostat for a period of 26 years. The Study Period being from the year 1990 to the year 2015. Hausman test was carried out and it determined that fixed effects specifications were preferred to random effects specifications for the data that was made use of in this study. In order to take care of country differences as different countries operated in different conditions, Country dummies were used in the estimations. The Stata software program was used in data analysis, in carrying out the regression. The coefficients as presented in the model were read directly as elasticity's for all the variables in the study. The sign and significance of the coefficients indicated the direction of the impact by the independent variables on the dependent variable.

## 6. RESULTS AND DISCUSSION

### 6.1 Effect of Demographic Characteristics on Employment in Sub Saharan Africa over the period 1990 to 2015

This sub section presents regression findings for the research question on the effect of economic growth on employment in SSA. The estimated results were obtained based on the traditional neo-classical aggregate production function as indicated in equations 4 to 9. The results were estimated after carrying out a Hausman test. The Hausman test implied that fixed effects were preferred to Random effects. To take care of the possible problem of heteroskedasticity, robust was included in the stata command during the running of the results using fixed effects with country dummies. The results as presented in table 1 presents elasticity's of demographic characteristics that is stratified into various age groups which constitute of L1 comprising of children below 15 years of age, L2 constituting of 15 to 64 years of age, which comprise of the working population, L3 constituting those above 64 years of age and L4 constituting of a combination of dependant population (L1 + L3), domestic capital, imports, exports, service sector, women in employment, and men in employment in Sub Saharan Africa.

The estimation in table 1 generates results that are consistent for all the variables and also indicates that the coefficients are different from zero. The R<sup>2</sup> value for the estimates is very high at 0.919 using fixed effects with country dummies as shown in table 1 implying that over 92 percent of employment is explained by the included independent variables.

Columns 1 to column 4 in Table 1 provides the results of interest for the contribution of demographic characteristics to employment, which is demonstrated using stated population stratifications in SSA constituting of L1, L2, L3 and L4 strata, while columns 5 and six shows the results of interest in contribution of labour by employed men and employed women. The elasticity for the contribution of other economic sectors to employment are shown in column one in table three, and they constitute of domestic capital, imports, exports, and the service sector. The results were estimated based on equations 16 and 17.

A number of findings can be drawn from the results in table 1. The first finding indicated that L1 which represent Children below 15 years of age was found to have a positive and significant coefficient of 0.987 at 1% significance level. This meant that on average, 1% increase in the L1 group (Children below 15 years of age) in the population will lead to an increase in employment by about 0.987% which was significant. This is not an expected result as most Sub-Saharan African countries have not only legislated laws against child labour but most of them have policies that aim at curbing child labour. It is however worth noting that children in SSA majorly provide free domestic labour in most of subsistence farms and in other domestic ventures. In some instances, though outlawed in most Sub-Saharan African countries, children below 15 years of age are engaged in gainful employment as a result of death of their parents and guardians due to diseases such as HIV and Aids, as a result, such children end up eking out a living to provide them as well as their other siblings with a livelihood. This result is congruent with those of Ahmed and Amer (2015), Bloom and McKenna (2015), and Boulhol (2009), CREFAT (2016), Admassie (2002), Kebebew (1998), ILO (2016) among others.

Secondly, the L2 population group (15 – 64 years of age) was found to have positively and significantly influenced economic growth as per the regression result with an elasticity coefficient of 1.010 at 0.01 significance level. This translated to mean that a 1% increase in population of the 15 to 64 years age group will lead to an increase in employment by about 1.010%. This was a significantly high response to employment and as indicated earlier the youth who constitute more than 40 percent in Sub-Saharan African population are included in this group, and the youth are known to be in search of jobs so this indication supports the finding as they are in need of the jobs. Majorly, this group provide needed labour force in Sub-Saharan Africa, as this is the main productive group. Any other member of this group who is unemployed increases the demand for jobs in this group. Addition of any member of this group increases the demand for jobs thus need for employment. This result is in line with those of with those of Aggarwal et al (2018), Ahmed and Amer (2015), Bloom and McKenna (2015), Boulhol (2009), among others.

Thirdly, the regression result as per table 1 column 3 indicated that the L3 group comprising of the 64 years old and above group of population in SSA was found to positively and significantly influence employment in Sub-Saharan Africa as its regression results posted an elasticity of 0.988 at 0.01 significance level. This meant that a 1% increase in population of this group (above 64 years of age) will lead to an increase in employment by about 0.988 %. This group is majorly comprised of retirees, and in the course of their working life members of this group did various forms of investments setting up various forms of investment ventures, and it is in this ventures that members of this group join while some other members of this group start some form of ventures with the pension funds and other benefits that they earn after retiring. This ventures employ more people resulting in them contributing in the growth of the Sub-Saharan Africa economies. However, some members of this group who had not set up business ventures that they would end up working in after retirement end up seeking employment as the Sub-Saharan African countries do not provide welfare to the ageing population. This result is in line with those of Bloom and McKenna (2015), and Boulhol (2009) among others.

The fourth regression result as per table 1 column 3 findings indicated that the members of the population classified as dependants group in SSA labeled as L4 group (a combination of children below 15 years of age and aged population above 64 years) was found to have a positive and statistically significant coefficient of 1.055 at 0.01 significance level. This implied that on average, an increase in this group by 1% will result in an increase in employment by about 1.055% among the Sub Saharan African countries. This is because young children provide free labour in domestic ventures while the aged population invested and came up with worthwhile investments in their working life that continue to provide them with income even after they retire from gainful employment in which they retire and get engaged in. However, some members of this group who had not set up business ventures that they would end up working in after retirement end up seeking employment as the Sub-Saharan

African countries do not provide welfare to the ageing population. This result is in line with those of Bloom and McKenna (2015), Boulhol (2009), among others.

The fifth finding as per table 1 column 5 indicated that women in work was found to positively and statistically significantly influence employment in Sub-Saharan Africa as the regression results posted an elasticity coefficient of 0.567 at 0.01 significance level. This implied that an increase in this group by 1% will result in an increase in demand for employment by 0.567 percent. This is a significant outcome and this is due to the fact that women in Sub-Saharan Africa are as well in search of gainful employment so that they can fend for themselves and their families and be in a position to provide themselves with the necessities of life as well as comforts and where possible acquire some luxuries of life from the income they derive from employment. This implies that an increase in this group by one person will lead to an increase in demand for employment by about 0.567 %. This result is similar with that of World Bank, (2015), Dieterich et al., 2016; Hakura et al., 2016 and Duflo, (2012) among others.

The fifth finding as per table 1 column 6 indicated that men in work was found to positively and statistically significantly influence employment in Sub-Saharan Africa as the regression results posted an elasticity coefficient of 1.035 at 1% significance level. This implied that an increase in this group by 1% will lead to an increase in demand for employment by about 1.035%. This significantly high regression result is majorly due to the fact that any able bodied man in Sub-Saharan Africa is expected to work and provide for himself as well as the family. This is unlike the lower regression result of women in comparison to that of men in Sub-Saharan Africa as culturally mainly men are expected to be bread winners for their families thus all men have to find a way of working so as to provide for themselves as well as their families, unlike some women whose husbands do not prefer them to work and they remain at home taking care of their families, and this brings out the reason why we have more men than women working in Sub-Saharan Africa. This result is in line with that of Hakura (2016), Dieterich et al (2016) and Klasen, (2006) among others.

The fifth finding as per table 1 column 1 indicates that domestic capital was found to negatively and insignificantly influence employment in Sub-Saharan Africa as the regression results posted an elasticity coefficient of negative 0.00363. The result could suggest that Sub-Saharan African countries were not investing adequate domestic capital that was needed to create critical employment opportunities that were needed in this region, for instance this region is not investing adequately on human capital, for instance, through education and training, as a result the workforce is not adequately competent, and ends up either being unemployed or misemployed, as they lack the needed skills, which results in expatriates being hired to do jobs that could be done by the locals. The other reason could be that with technical progress and acquisition of sophisticated machinery, some employees ends up being laid off or rendered redundant which again increases unemployment levels as one automated machine can do work that could be done by many employees. This result is in line with those of Frey and Osborne ( 2015) who found that domestic investment for instance in acquisition of technologically sophisticated equipment such as machinery leads to job losses as one machine can do work that can be done by many people. However some other researchers had posted positive relationship between domestic capital investment and employment such as Locoviu (2012), Mohsen and Maysam (2013).

The sixth finding as per table 1 column 1 indicates that import was found to positively and statistically significantly influence employment in Sub-Saharan Africa as the regression results posted an elasticity coefficient of 0.0681 at 1% significance level. This meant that a 1% increase in imports will lead to an increase in employment by 0.0681% which was a significant contribution. This creation of employment by importation of goods could be due to income derived in the supply chain sectors in Sub-Saharan Africa being used to employ more people as more investment ventures are set up, while on the other hand more people are employed in the importation supply chain. This result is in line with those of Bigsten (2012) and IMF (2013) among others.

The fifth finding as per table 1 column 1 indicates that export was found to negatively and statistically significantly influence employment in Sub-Saharan Africa as the regression results posted an elasticity coefficient of negative 0.0311 at 1% significance level. On average, 1% increase in exports will lead to a decrease in employment by about 0.0311%. This normally is not the expected result as exports are expected to be a source of foreign exchange that is expected to aid in generating more employment in Sub-Saharan Africa. The main explanation that can plausibly be provided here is the difference between exports and imports, which makes the

trade among the Sub-Saharan African region be unfavorable to them as imports are much more expensive than the income they derive from their exports. The main reason for this predicament is that most countries in Sub-Saharan Africa majorly export agricultural raw products without processing or refining them so as to add value to them, and they end up fetching lower prices in comparison to the dearer imports that this countries buy from abroad. They also export minerals from extractive industries without adding much value on them, and this reduces the income that would have been used in generating more employment, and by exporting such kind of products, they export the jobs to other nations that are buying them. This result is in line with those of ACET (2014), and World Bank (2014) among others.

Lastly, as per table 1 column 1 the service sector is found to positively and statistically significantly influence employment in Sub-Saharan Africa as the regression results posted an elasticity coefficient of negative 0.0327 at 0.01 significance level. This implies that a 1% increase in revenue in the service sector in SSA will lead to an increase in employment by about 0.0327%. This is the expected outcome because this industry is very vibrant in Sub-Saharan Africa and it not only generates a lot of revenue among the Sub-Saharan African countries, but it as well creates a lot of employment in this region. This sector is the second greatest source of employment in Sub-Saharan Africa, the first being Agriculture, and this sectors are a great source of economic development in the sub Saharan Africa region, as the young and technologically survey population in this region is in great need of means of communication for instance using mobile phones and the internet. The services sector has tourism and hospitality industry in it and this two sectors are vibrant in this region, but currently slowed down by the impact of Covid 19 global pandemic (Ndiili 2020). This result is in line with that of Yeboa & Jayne (2016), Townsend et al (2017) and Fox et al (2013), African travel and tourism association (2018), among others.

**Table 1: Relationship between demographic Characteristics and Employment in SSA over the period 1990-2015**

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	lnempl	lnempl	lnempl	lnempl	lnempl	lnempl
l1_log	0.987*** (0.0351)					
l2_log		1.010*** (0.0123)				
l3_log			0.988*** (0.0324)			
l4_log				1.055*** (0.0345)		
dc_log	-0.00363 (0.00649)	-0.00391 (0.00272)	-0.0190*** (0.00583)	-0.00791 (0.00621)	0.0408*** (0.00531)	-0.00663*** (0.00178)
impo_log	0.0681*** (0.0143)	0.00342 (0.00640)	0.000406 (0.0142)	0.0564*** (0.0137)	0.0404*** (0.0131)	0.0152*** (0.00415)
expo_log	-0.0311*** (0.0112)	-0.0174*** (0.00484)	-0.0101 (0.0104)	-0.0330*** (0.0107)	0.0296*** (0.00990)	-0.0205*** (0.00317)
serv_log	0.0327*** (0.00926)	0.00249 (0.00412)	0.0317*** (0.00884)	0.0293*** (0.00884)	0.0229*** (0.00846)	0.00914*** (0.00268)

wiw_log					0.567*** (0.0172)	
miw_log						1.035*** (0.00803)
Constant	-1.778*** (0.362)	-0.201 (0.123)	-1.120*** (0.267)	-2.352*** (0.352)	3.798*** (0.206)	0.105 (0.0779)
Country Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Observations	672	672	672	672	672	672
R-squared	0.919	0.977	0.893	0.893	0.903	0.990
Number of ID	30	30	30	30	30	30

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

## 5. CONCLUSION AND RECOMMENDATIONS

### Conclusions and recommendations on relationship between demographic characteristics and employment

On the relationship between demographic characteristics and employment, all the demographic characteristics variables namely L1(below 15 years of age) L2 (15-64 years of age), L3(above 64 years of age), L4 which comprised of a combination of L1 and L3 variables and women in work and men in work which refers to employed men and employed women respectively, all of them were found to statistically and significantly influence employment in SSA. On the other hand, the imports and services sector variables were as well found to statistically and significantly influence employment in SSA, while domestic capital was found to negatively influence employment among the SSA countries though this was not statistically significant. The export variable was found to negatively and statistically significantly influence employment in the sub Saharan region.

Based on the above conclusion it is recommended that the Sub-Saharan African countries should adopt better policies on improving the value of the commodities they export like for instance Agricultural produce as well as the raw minerals that they export, and the policies should address the export chain so as to create more jobs in it and so that the increased revenue generated can aid in more job creation in this region. The Sub-Saharan African governments should re-evaluate their policies on domestic capital investment as well as export policies so as to enable this sectors make this region realize much higher economic growth so as to create more jobs.

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