

Female labour force participation rate and economic growth in sub-Saharan Africa: “a liability or an asset”

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Abstract

Purpose – This paper aimed examining the contribution of female labour force participation rate on economic growth in the sub-Saharan Africa during the period of 1991–2019.

Design/methodology/approach – The study employed a sample of 42 sub-Sahara African countries using annual data from the World Bank development indicators. The long-run causal effect of female labour force and economic growth was analysed using the Autoregressive Distributed Lag model and Granger causality test for causality and direction since the variables did not have the same order of integration.

Findings – The estimated results indicate that a long-run causal relationship exists between female labour force and economic growth in sub-Sahara Africa and the direction of causality is unidirectional running from economic growth to female labour force. The results also showed that female labour force participation rate negatively and significantly contributes to economic growth (GDP) in sub-Saharan Africa in the long run with an insignificantly negative contribution in the short run hence a liability.



Research limitations/implications – The author recommends the promotion of women’s economic empowerment to encourage female labour force participation to increase economic growth in the entire sub-Saharan region.

Practical implications – This paper adds to existing literature by using more comprehensive and up to econometric analysis and variables. This paper also makes further recommendation on how female labour force participation can boost economic growth in sub-Saharan Africa (SSA).

Originality/value – This paper adds to existing literature by using more comprehensive and up to econometric analysis and variables. This paper also makes further recommendation on how female labour force participation can boost economic growth in SSA.

Keywords GDP, Female labour force, Male labour force, Fertility rate, Sub-Saharan Africa, ARDL

Paper type Research paper

1. Introduction

The talk about women’s participation in the labour force and economic growth is complicated and reflect changes in the pattern of economic growth, educational attainment, fertility rates, employment and social norms of a country. Women make up more than half of the world’s population, but what they contribute to measured economic activity, economic growth and well-being does not reflect their number in the economy. According to the [World Bank \(2013\)](#) women account for 40% of the global labour force and more precisely on a country level, women constitute around half of any country’s human endowment. However, in most countries, women labour force participation is much less than that of men. According to the [IMF \(2013\)](#), the average gender participation gap – which is the difference between male and female labour force participation rates (FLFPRs) – has been falling since 1990. However, this may be due to the worldwide decline in male labour force participation rates rather than an increase in female labour participation rate, hence male–female differences still remain substantial.

[Boserup \(1970\)](#) pointed out that in developing countries, the majority of women’s work take place in non-market activities – in the home or the informal sector. However, some developing countries are experiencing an increase in women participation in the labour force. Three reasons account for this statement. First, because of economic development and the consequent population shift from rural and agricultural sectors, more women desire participating in the labour force. Second, because of higher level of education, women tend to participate more in order to capture returns on their investment. Finally, falling real incomes of households and rising poverty in certain countries seem to have persuaded women to participate in the labour force in greater numbers.

Recent economic literature show increasing interest on the role of women labour force towards economic development. According to [Amaina *et al.* \(2019\)](#) increasing rates of female labour force is due to increase in education and an increase in the diversity of economic activities. As the size of the economy expands women access to the labour market easily, leading to an increase in women participation in productive activities. Increasing women participation in economic activities is considered necessary for many reasons; it improves their social and economic position and hence leading to an increase in overall economic efficiency of the nations, it decreases gender gap in human capital leading to higher productivity of women in labour force and increase sectoral share of women employment in different sectors of the economy.

In sub-Saharan Africa (SSA), the place of the woman was known to be in the kitchen and also for childbearing ([Ahinkorah *et al.*, 2020](#)). The propagation of human rights and the worsening living standards of families have now made this idea to become mundane and outdated such that women have become full participants of the labour force. Many women are becoming self-employed (including men), due to difficulty in securing paid jobs from both private and public sectors. According to the [United Nations \(2000\)](#), the proportion of self-employed women among exposed women doubled in sub-Saharan Africa (excluding

Southern Africa) from 44% in 1970 to 90% in 1990. The percentage also increased in Northern Africa.

In sub-Saharan Africa as illustrated in [Figure 1, World Development Indicator \(2020\)](#) reflects that FLFPRs have varied substantially across the years (1991–2019). It shows that the FLFPR among females above 15 years of age in sub-Saharan Africa had registered a steady rise from 1991 right up to 2006 where it recoded 60.71% rate as the highest. The rate substantially dropped sharply to 60.27% in 2012 and was the lowest so far then started rising back steadily in 2014 with a percentage of 60.28% and till present (2019) with a percentage of 60.59%. This clearly indicates that the female labour force rate participation has a U-shape. This follows that in the initial stage of economic growth where limited access to education brought forth a low-skilled population caused the agricultural sector to be very productive. This means that at the primary stage female labour participation was somewhat high but as the economy moves along the growth patterns; the industrial sector is gradually substituted for the agricultural sector, female participation falls. This is due to the fact that activities in these sectors like mining and construction create unfavourable ground for female participation in the labour market.

However, there have been divergent opinions on the importance of female labour force and its impact on a country’s economic growth. Some scholars think its importance is overrated compared to other factors that can improve a country’s economic growth. [Hickel \(2014\)](#) opine that the main factors that improve an economy are factors such as proper infrastructure and access to quality education; to him these factors are under looked while female labour development is wrongly accorded attention as a key driver of the economy. As economic growth increases, the number of female labour force experiences a drop at the early stages, and begins to increase at the following stages. Economists might not be aware of the effects of the higher number of female labour force. In fact, they see it as a good measure to supplement the household’s income, hence ensuring economic growth ([Bhalla and Kaur, 2011](#)). They seem to disregard a potential problem that might loom on the horizon if there are a large number of females in the labour force. An outbreak of child abuse sometimes happen due to the increase in number of female labour force participation, thus perplexing researchers from social

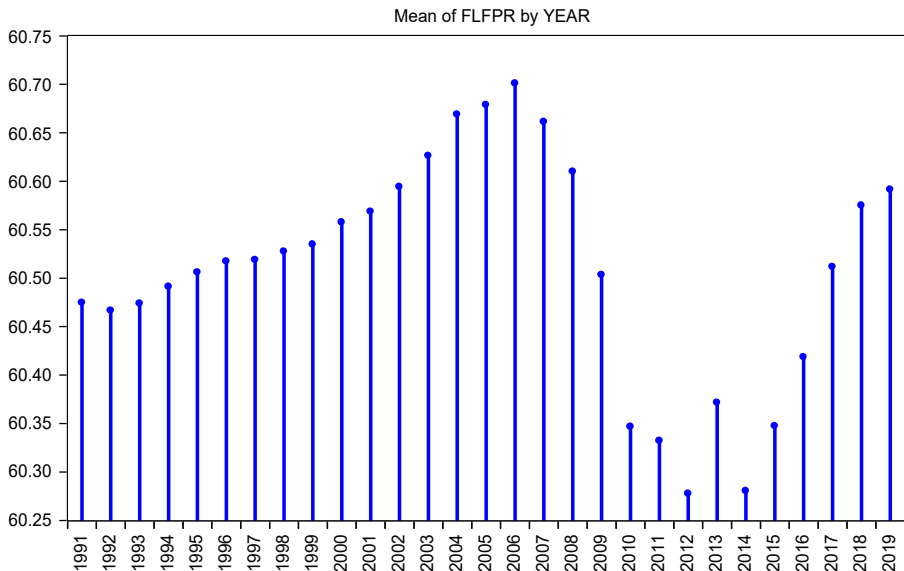


Figure 1.
The mean of current
FLFPR over time
(1991–2019)

science fields. [Aykuz \(2015\)](#) explained the relationship between women labour force participation and growth. Specifically, he discusses the impact that the level of gross domestic product (GDP) has on female labour force participation and concluded that female labour force participation changes with a country's economic development.

According to [Aykuz's \(2015\)](#) modernization theory, when GDP reduces, female work force participation increases due to subsistence farming being the main source of income for less-developed countries. As a country develops, female labour participation decreases as males take on manufacturing and service jobs to provide for the household and women become stay at home mothers. When GDP increases, female work force participation increases, especially in the service sector. Increased female labour force participation with increased GDP is the result of increasing female educational attainment, allowing females to take on more technical jobs ([Luci, 2009](#)). [Akyeampong and Fofack \(2013\)](#) postulated that 1% reduction in the labour force gender gap in Botswana, Kenya and Senegal increased GDP by 0.2%. [Verick \(2018\)](#) acknowledged female labour force participation as a main driver of economic growth and economic development in African countries, like South Africa and Tanzania. To him, there is a significant rise in GDP due to higher labour input. As women earn money, the household's income increases thereby leading to more consumption of goods and services which increases GDP. He said the impact of female work force participation on GDP is base on the grounds of quality of female labour force participation and concluded that the more women migrate into the service sector from the agricultural sector, the more the impact of female labour force participation on economic development. Countries might have the same FLFPR but countries with more women in the service sector will develop economically at a faster rate, all things being equal.

The focus of this study is mainly to examine the contribution of FLFPR to economic growth and to establish if there is a long-run causal relationship between FLFPR and economic growth in the sub-Saharan Africa. The results will establish if female labour force participation in sub-Saharan Africa is a liability or an asset to the region. The result of this paper will inform policy makers and governments in Africa and sub-Saharan region in particular on the main factors that influence women participation in the labour market. This will enable them to formulate and implement policies that consider both supply and demand-side dimensions to enhance employment for women and reduce gender disparities in the labour market.

2. Literature review

This next section presents an overview on the context and trends in female labour force participation in SSA as against male labour force, the supporting theories and the empirical review.

2.1 Conceptual review

The conceptual review will present female labour force participation in SSA compared with male labour force. According to the [World Bank Development Indicator \(2020\)](#), there is a considerable difference between female and male labour force participation rate in sub-Saharan Africa spanning from 1991 to 2019. Male labour force still substantially dominate female labour in the labour market in sub-Saharan Africa with an average mean of 61.2 for female labour force as against 75.5 mean average for male labour force. According to [Çatalbas \(2015\)](#) labour participation rates vary widely between men and women.

As a result, governments and other stakeholders have put in place measures to improve on female labour force supply. The United Nations International Conferences on Females, which began in 1985, gave positive support to women who are relentless in their fight for equal opportunities. Conferences and regional follow-up held by this body have provided a forum for African women to devotedly pursue their own interests for the first time in modern

African history. According to [ILO \(2013\)](#) many African governments have set up women's ministries, the appointment of women to high levels of government increased funding for female education and technological networking opportunities among women's organizations. Women's organizations worldwide have been strengthened. Despite these measures, the level of female participation in the labour force remains comparatively small. In the new era of globalization in which many African women including sub-Saharan women are seen to be the backbones of their families, patriarchal inclinations continue to manipulate the gender division of labour in favour of men. The rationale is that men are "providers and supporters" of the family while women are dependants and are mere caregivers ([Forgha and Mbella, 2016](#)). As such, this paper is meant to examine the contribution of female labour force participation to economic growth and to establish if there is a long-run causal relationship between female labour force participation and economic growth in sub-Saharan Africa.

2.2 Theoretical frame work

The labour participation rate of an economy is considered as one of the most important production factors that determines economic growth and development. The participation rate of female labour force in the total labour force is complex to explain and differ around the world. Some of the theories that guide this paper work are;

2.2.1 Human capital theory. Human capital theory (HCT) is based on the assumption that quality education is highly recommended and is necessary to improve the productive capacity of the population in an economy. The theories argue that an educated population is a productive population. According to [Pierce-Brown \(1998\)](#), human capital stock concept has been widely used by labour economists since the 1960s. The individual's capital stock has an "innate ability" and can be extended to (1) prior participation in the labour force by education, (2) during employment through on-the-job training and (3) experience. According to the theory female with middle-school education or higher education have more economic advantage than women without formal education ([Nam, 1991](#)). The HCT, according to [Pierce-Brown \(1998\)](#), is the first distinctive theory that analyses the gap between the male and female wage. The theory emphasizes voluntary choices as determiners of differences of occupation and remuneration during the lifetimes of employees. An early advocate of the HCT is [Becker \(1975\)](#). Becker postulated that over their working life, women on average are less productive as compared to men because they tend to take an employment break for maternity leave and childcare. More so, women bear the prime responsibility of the unremunerated domestic chores. Thus, the HCT emphasizes the importance of education and training in the development of human capital.

HCT considers that female labour force participation (L) is influenced by women's productive economic advantage reflected by their level of education (E), their non-human capital assets (A), the child survival rate after birth (S) and the social environment influence (T). The education of women is generally expected to have a positive impact on labour market participation, and at the same time reduces the number of children born to the woman.

2.2.2 Work-leisure choice theory. [Mincer \(1962\)](#) developed the neoclassical microeconomics model known as Work-Leisure Choice model. The model considered that households; suppliers of labour in an economy are rational and seek to maximize their utility; deciding on the proportion of time to devote to work and the proportion to devote for leisure. The trade-off happens when the female chooses how to allocate time with both alternatives. The Work-Leisure Choice theory was also explained by [Psacharopoulos and Tzannatos \(1989\)](#) who further postulated that since the choice is based on the payment from work (wage rate) then the more the pay rate, the less attractive leisure becomes and the more eye-catching work becomes. This assertion has two effects: income effect and the substitution effect. Firstly, for any person who is jobless, a higher wage may encourage them to join the labour market for

the opportunity cost of not working will increase hence, higher wages are said to stimulate higher participation in workforce. Secondly, for those already working, a higher wage makes work more interesting and attractive since it has a higher rate of return than leisure. Encouraging work force participation or putting in more in work as a result of an increase in the wage rate is referred to as the substitution effect as leisure time becomes more costly. People tend to devote more time for work rather and less time for leisure. On the other hand, as wage rate increases, an individuals' real income rises this leads to an increase in the consumption of normal goods and if as previously assumed leisure is a normal good, increase in wage would motivate individuals to consume larger quantity (time) of leisure and reduce hours of work and that is known as the income effect resulting from a wage swell (FRF, 1979; Heckman, 2014).

3. Empirical review of FLFPR

Most empirical studies examined and documented the U-shaped hypotheses by analysing the relationship between FLFPRs and economic development and growth. [Khaliq et al. \(2017\)](#) examined the relationship between FLFPR and economic growth in Pakistan using time series data from 1990 to 2014. Using the error correction model (ECM) and Johansen co-integration tests, the results indicated that there exist a long-run and a U-shaped link between economic growth and FLFPR in Pakistan. [Saqib et al. \(2016\)](#) explored the relationship between economic growth and female employment in one stage by employing ordinary least squares (OLS) from 1999 to 2014. The results show that as economic growth is boosted, female employment will increase simultaneously in Saudi Arabia.

Fertility is one of the research's controllable variables, and it's widely acknowledged as one of the key predictors of FLFPR, and it's been examined extensively in the literature ([Oshio, 2019](#); [Shittu and Abdullah, 2019](#); [Tong and Gong, 2020](#); [Klasen et al., 2020](#)). Despite differing opinions on the impact of fertility on FLFPR and the methodology used to quantify it, researchers have come to the conclusion that fertility is one of the most important drivers of FLFPR. On the other hand, the economic development controlling factors which were categorized under socio-economic and labour market conditions were examined and documented as basic determinants for FLFPRs ([Chen et al., 2014](#); [Szulga, 2014](#); [Tsani et al., 2013](#); [Yousefy, 2011](#); [Fatmia and Sultana, 2009](#); [Jaumotte, 2003](#)). Among these are the educational attainment, wage rate, household income, fertility rate, marital status, unemployment rate and urbanization rate. The studies recognized a significant effect on education, urbanization and low fertility rate on FLFPR, while female participation rates varied across countries in terms of unemployment rate. [Forgha and Mbella \(2016\)](#) investigated the implication of female labour force using time series data. Adopting Generalized Method of Moments (GMM) estimation, they observed that fertility rate; dependency ratios per capita income, male labour force are clear determinants of female labour force in Cameroon.

On the contrary, several empirical studies did not support the hypothesis and found that the U-shaped relationship was not applicable in some countries which are characterized with high social and religious restrictions on women's desire to work. [Dogan and Akyüz \(2017\)](#) investigated the relationship between economic growth and female participation in Turkey using co-integration technique and Autoregressive Distributed Lag Model (ARDL) with quarterly data from 2000 to 2010. Their findings reported a reverse U-shaped relationship between economic growth and FLFPR. [Lahoti and Swaminathan \(2013\)](#) explored the relationship between economic development and female labour supply using data from 1983 to 1984 to 2011–2012 in India with OLS technique. The empirical findings did not support the U-shaped hypothesis, rather revealed no significant relationship between economic growth and FLFPRs. [Subramaniam et al. \(2015\)](#) and [Mishra and Smyth \(2010\)](#) in their study, observed an inverse connection between fertility rate and female workforce participation among 28

OECD and ASEAN countries. [Idowu and Owoeye \(2019\)](#) employ seemingly unrelated regression (SUREG) including control variables such as female education, fertility and manufacturing growth rate for geographically sub-grouped 20 African countries, and they suggest that there is an inverted U-shaped relationship. [Abdullah and Bakar \(2011\)](#) investigated the causal relationship between Total Fertility Rate (TFR) and Women Labour Force Participation Rate (WLFPR) in the four selected ASEAN countries from 1980 to 2008. Using the Engle–Granger test for causality, the results showed that there exist long-run relationships among variables in the four countries.

4. Data and methodology

We collected data from the World Bank’s Development Indicators Database. In total, our country sample consists of 42 [1] out of the 48 SSA countries specified by the world. This study examines the contribution of FLFPR to economic growth and establishes if there is a long-run causal relationship between FLFPR and economic growth in the sub-Saharan Africa. An econometric model is use to examine female labour force participation and economic growth. Economic growth is the dependent variable while FLFPR is the independent variable together with other explanatory variables. The choice of variables for FLFPR and economic growth are based on ILO and the World Bank’s Development indicators and subject to data availability for the period (1991–2019) using annual Data.

4.1 Model specification

In order to examine the relationship between female labour force participation and economic growth in sub-Saharan Africa, we carefully took into consideration the study objective, theoretical framework and ample empirical verification along with the distinctiveness of the sub-Saharan Africa environment. The model specification for economic growth and female labour force was adapted and modified from the recent and renown works of [Oshio \(2019\)](#); [Shittu and Abdullah \(2019\)](#); [Tong and Gong \(2020\)](#) and [Klasen et al. \(2020\)](#) used in their model.

$GDP_{it} = F(FLFPR, MLFPR, FRF, URB, SEMF)$.

Accordingly, the log estimated model will be specified as:

$$LN\text{GDP}_{it} = \beta_0 + \beta_1 LN\text{FLFPR}_{it} + \beta_2 LN\text{MLFPR}_{it} + \beta_3 LN\text{SEMF}_{it} + \beta_4 LN\text{URP}_{it} + \beta_5 LN\text{FRF}_{it} + \epsilon_t \quad (1)$$

where

Dependent Variables

GDP_{it} = GDP_{it} per capita (annual %)for equation1

Explanatory Variables

$FLFPR_{it}$ = Female Labour Force Participation Rate of country *i* at time *t*

$MLFPR_{it}$ = Male Labour Force Participation Rate, (% of male population ages 15+) (modelled ILO estimate) of country *i* at time *t*

$SEMF_{it}$ = Self-employed, females (% of female employment) (modelled ILO estimate) of country *i* at time *t*

URP_{it} = Urban population (% of total population) of country *i* at time *t*

FRF_{it} = Fertility rate, total (births per woman) of country *i* at time *t*

5. Presentation and discussion of results

5.1 Descriptive statistics and stationarity test

Table 1 shows that gross domestic product per capita (GDP) has an average value of 53.22831% with a standard deviation of 601.1790%, a maximum value of 19703.95% and a minimum value of 3.05E-06%. This shows that the GDP has been fluctuating over the years of study. FLFPR has a mean value of 61.20712%, a standard deviation 15.83968%, a Maximum Value of 90.33100% and a Minimum Value of 24.22500%. Male labour force participation rate (MLFPR) has an average value of 75.48188%, a standard error of 9.763754% ranging from 93.90800% maximum value to 49.66600% minimum value. This also clearly indicates that men participate more in labour force as compared to women. Self-employed female (SEMF) shows a mean value 78.17648%, standard deviation 23.55348%, a maximum value of 99.23000% and a min. value of 11.81600%. Urban population (URP) has an average value of 36.34945%, a standard error 15.80359% ranging from 89.37000% maximum value to 5.491000% minimum value. Fertility rate of birth per female (FRF) has an average value of 5.217674%, a standard error 1.261193% ranging from 7.761000% maximum value to 1.360000% minimum value.

Furthermore, the descriptive statistical analysis revealed that, GDP and URP were positively skewed meaning that, their mean are peaked to the right of the distribution while FLFPR, MLFPR SEMF and FRF were all negatively skewed meaning that the mean were peaked to the left (negative skewness).

The coefficient of the kurtosis of FLRPR and MLFPR was below 3.000, meaning that they are platokurtic relative to the normal, meaning that their distribution produces fewer and less extreme outliers than does the normal distribution. However, the coefficient of the kurtosis for GDP, SEMFR, URP and FRF were all above 3.000, meaning that they are leptokurtic relative to the normal, meaning that their distribution produces more and more extreme outliers than the mesokurtic distribution.

Generally, it can be observed from the Jarque–Bera and probability statistics that all the variables under the study are not normally distributed since their probability value is less than 5%. The descriptive statistics in Table 1 was done with the raw data and not the transformed data.

Finally before presenting the results of the model specified above, we start by testing for the panel stationarity of the variables used in our models. This will give a feel of our data set and the kind of analysis most suitable to run.

Table 1 also shows that this paper employs four types of unit root tests which are Levin, Lin and Chu (LLC) test, Im, Pesaran and Shin (IPS) test, Augmented Dickey–Fuller (ADF) test and Phillips–Perron (PP) test to check the stationarity properties of the variance. Some of the variables are stationary at level, I(0) while others are stationary at first difference, I(1). This approach can see long-run and short-run responses from dependent variables to changes in independent variables (Gujarati 2003). In the Case of Table 1, four out of six of our variables that is female labour force participation rate (LNFLFPR), male labour force participation rate (LNMLFPR), Self-employed female (LNSEMF) and Fertility rate of birth per female (LNFRF) are stationary at first difference while GDP per capita (LNGDP) and Urbanization of total population (LNURP) are stationary at level. The next test before we carry out the ARDL approach will be the Hausman test. The Hausman test determines whether the test should base its analysis on the fixed effect or the random effect model.

5.2 Hausman test and estimate of long-run and short-run relationship using ARDL

The null hypothesis for the Hausman test is that there is no correlation between the explanatory variables and the error term in the model (random effect model), while the alternative hypothesis is that there is correlation between the explanatory variables and the error term in the model (fixed effect model).

Table 1.
Descriptive statistics
and stationarity test

	GDP	FLFPR	MLFPR	SEMF	URP	FRF
Mean	53.22831	61.20712	75.48188	78.17648	36.34945	5.217674
Median	7.731917	64.23950	77.08700	88.62600	35.60650	5.362500
Maximum	19703.95	90.33100	93.90800	99.23000	89.37000	7.761000
Minimum	3.05E - 06	24.22500	49.66600	11.81600	5.491000	1.360000
Std. Dev	601.1790	15.83968	9.763754	23.55348	15.80359	1.261193
Skewness	30.11520	-0.396284	-0.408570	-1.484238	0.589575	-0.577155
Kurtosis	974.3301	2.317738	2.498323	3.961707	3.310345	3.170622
Jarque-Bera	46.408.384	53.58867	45.05045	477.1000	72.84883	66.71557
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	62596.49	71979.57	88766.69	91935.55	42746.96	6135.985
Sum sq. Dev	4.25 E + 08	294802.0	112013.8	651850.5	293460.5	1868.963
Observations	1,176	1,176	1,176	1,176	1,176	1,176

Stationarity test	Levin, Lin and Chu F^*	Im, Pesaran and Shin W -stat	ADF - Fisher chi-square	PP-Fisher chi-square	Order
LNNGDP	-37.1658***	-40.6670***	1029.41***	1103.31***	I(0)
LNFLFPR	-4.83527***	-5.74078***	190.847***	195.766***	I(0)
LNNMLFPR	-3.86136***	-5.30338***	179.423***	145.857***	I(0)
LNSEMF	-5.27378***	-7.58473***	262.437***	296.954***	I(0)
LNURP	-2.46049***	2.16898	191.488***	350.741***	I(0)
LNFRF	-10.2707***	-9.48141***	306.427***	93.0993	I(0)

Note(s): ***, **, and * represents 1%, 5% and 10% significant level respectively
Source(s): Eview version 10 calculations

The Hausman test in Table 2 results shows that the probability of χ^2 is statistically significant (with p -values of 0.0445) at the 5% level, therefore we reject the null hypothesis (random effect model) and accept the alternative hypothesis (fixed effect model) that there is correlation between the explanatory variables and the error term. Having established that our preferred model is fixed effect model over random effect model with the help of the Hausman test, the ARDL model of long run and short run is established.

From Table 2 also, the results show that female labour participation rate negatively and significantly contributes to economic growth (GDP) in sub-Saharan Africa in the long run with an insignificantly negative contribution in the short run. This implies that a unit rise in female labour force produces a decrease of 8.09 units in economic growth. This confirms to what some scholars think that the importance of FLFPR is overrated compared to other factors that can improve a country's economy growth [Lahoti and Swaminathan \(2013\)](#). Another issue of this negative effect might be resulting from increase in birth rate and the

Correlated random effects–Hausman test
Equation: Untitled

Test cross-section random effects

Test summary	Chi-Sq. Statistic	Chi-Sq. d.f	Prob
Cross-section random	11.369423	5	0.0445

Cross-section random effects test comparisons

Variable	Fixed	Random	Var (Diff.)	Prob
LNFLFPR	2.969501	0.138211	2.461991	0.0712
LNMLFPR	-1.125913	1.927930	4.108262	0.1319
LNSEMF	2.420681	0.135465	1.076291	0.0276
LNURP	0.332488	0.032999	0.510802	0.6752
LNFRF	1.716545	0.218438	0.785369	0.0909

Estimate of Long-Run and Short-Run Relationship Using ARDL

Dependent variable: D(LNGDP2)

Method: ARDL

Dynamic regressors (2 lags, automatic): LNFLFPR LNMLFPR LNSEMF LNURB LNFRF

Fixed regressors: C

Note: Final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-statistic	Prob.*
Long-run equation				
LNFLFPR	-8.093490	2.205409	-3.669836	0.0003***
LNMLFPR	5.070979	2.963674	1.711045	0.0874*
LNSEMF	2.691242	1.323378	2.033615	0.0423**
LNURP	2.225341	1.038062	2.143745	0.0323**
LNFRF	-2.949685	1.113198	-2.649740	0.0082***
Short run equation				
COINTEQ01	-0.080223	0.035582	-30.35883	0.0000***
D(LNFLFPR)	-268.3109	216.2156	-1.240941	0.2150
D(LNMLFPR)	207.9931	86.27493	2.410817	0.0161**
D(LNSEMF)	-468.2731	399.1108	-1.173291	0.2410
D(LNURP)	447.1900	196.7373	2.273031	0.0233**
D(LNFRF)	47.90231	57.38784	0.834712	0.4041
C	-6.842067	2.950585	-2.318885	0.0206

Note(s): Estimated cross-section random effect variance is zero

***, **, and * represents 1, 5 and 10% respectively

Source(s): Eview version 10 calculations

Table 2.
Hausman test and estimate of long-run and short-run relationship using ARDL

more intensive care they need to give to these children. This forces them to make a trade-off between taking part in the labour force and taking care of their children and family. The ultimate choice is often family concerns and the opportunity cost is taking part in the labour force which does not reflect on the GDP. The results are also consistent with the findings of Porter and King (2009), and Forgha and Mbella (2016) and the human capital theory who found a negative contribution of female labour force on economic growth. The male labour force indicates a positive and significant coefficient only at 10% level in the long run and a significantly positive contribution to GDP in the short run at 5%. This means that the contribution of male labour force to GDP can only be felt at 10% significant level in the long term in sub-Saharan Africa. This result confirms that as a country develops, female labour participation decreases as males take on manufacturing and service jobs to provide for the household and women become stay at home mothers. The result is still also consistent with the work of Forgha and Mbella (2016).

Female self-employment significantly and positively contributes to GDP in the long term but negatively and insignificantly influences GDP in the short term. The result is in line with expectations and theory. When women are self-employed, economic growth increases. For total population in urban area, it positively and significantly contributes to the GDP in both short and long run, indicating an agreement with expectation and theory. Female fertility rate has a negative and significant contribution to GDP in the long run with an insignificant positive influence on GDP in the short run, meaning that as GDP increases the fertility rate reduces and as fertility rate increases GDP reduces hence an inverse relationship thereby obeying the economic apriori expectation. Therefore, for sub-Saharan Africa's GDP to increase, female labour has to postpone child birth so that the women can be integrated into the various sectors like agriculture, industrial and service sectors so as to contribute to the overall GDP. The inverse relationship result of fertility rate is consistent with the work of Subramaniam *et al.* (2015) and Mishra and Smyth (2010) who found an inverse relationship between fertility rate and female labour force participation.

The coefficient of the Error Correction Term, *ECT*, is -0.080223 , which implies that the speed of adjustment to long-run equilibrium is approximately 8% annually therefore in the current period; the mistakes generated in the previous period are corrected. The ECT is rightly sign and statistically significant at the 1% level which confirms a long-run causality of FLFPR on economic growth. The results are in line with the results of Khaliq *et al.* (2017), Mujahid *et al.* (2013) and Saqib *et al.* (2016), who all saw a long-run causal relationship between FLFPR and economic growth.

5.3 Granger causality test

Based on Table 3, applying Granger Causality test, it is evident that economic growth granger-causes FLFPR, male labour force participation rate and urban population rate at the 1 and 5% level of significance and the direction of causality is a unidirectional causality and the flow is from GDP to female and male labour force participation rate and urban population rate. This simply explains that GDP gives rise to female and male labour force participation including the rate of those who leave rural area to go to urban towns. Self-employment of female and fertility rate of women present no causality and it's inconclusive in terms of direction. Meaning that we cannot say if it is GDP that causes self-employment of women and fertility rate or is self-employment of women and fertility rate that causes GDP to rise.

6. Conclusion and policy implication

6.1 Conclusion

This study examines the contribution of FLFPR to economic growth and establishes if there is a long-run causal relationship between FLFPR and economic growth in the sub-Saharan

Africa spanning from 1991 to 2019. Before estimating the panel model, we employed unit root tests to check the stationary properties of the data. After conducting the unit root test, we discovered that the variable did not have the same order of integration hence we use the panel ARDL approach to estimate the model.

Empirical results confirm the existence of a U-shape relationship between GDP and female labour participation rate in sub-Saharan Africa as established by Figure 1 of our work. Based on the Granger Causality test, it is evident that economic growth Granger-causes FLFPR, male labour force participation rate and urban population rate at the 1 and 5% level of significance and the direction of causality is a unidirectional causality and the flow is from GDP to female and male labour force participation rate and urban population rate. This simply explains that GDP gives rise to female and male labour force participation including urbanization of population. Self-employment of female and fertility rate of women present no causality and it's inconclusive in terms of direction. Meaning that we cannot say if it is GDP that causes self-employment of women and fertility rate or is self-employment of women and fertility rate that causes GDP.

Furthermore, the results show that female labour participation rate negatively and significantly contributes to economic growth (GDP) in sub-Saharan Africa in the long run with an insignificantly negative contribution in the short run. This means that female labour force participation instead of being a plus to the GDP tends to reduce the GDP of sub-Saharan Africa hence a liability. These results are in line with the work of Porter and King (2009), Akyeampong and Fofack (2013) and Forgha and Mbella (2016).

6.2 Policy implications

Based on the findings women who raise future generations should not be denied the same privileges that men enjoy in society because being actively involved in production activities without separating women and man is the foundation of a country's overall development. It is recommended that policymakers should encourage female labour force participation by facilitating the process for women to access better jobs including access to better training programs and education, access to credit and access to supportive services. Promoting women economic empowerment can be used as a tool to cope with the decrease in labour force. Policymakers should devote more efforts to rendering labour market conditions more female-friendly through revisiting the institutional environment. This can be done by reducing gender discrimination mainly in private and public sectors where the majority of female employment is concentrated. More so, it is recommended that more effort should be made in reducing the fertility rate in the regions through education, since the two will improve on female labour force participation as seen from the human capital theory. This can also be done through increased family planning awareness and utilization through outreach campaigns and messages in the media, enlisting community leaders and women's groups and

Causality flow	F-statistics	Remarks	Direction (General)
LNFLFPR and LNGDP	5.76744 (0.0165)**	Causality	Unidirectional
LNGDP2 and LNFLFPR	0.00124 (0.9719)	No causality	
LNMLFPR and LNGDP	10.2451 (0.0014)***	Causality	Unidirectional
LNGDP and LNMLFPR	0.98910 (0.3202)	No causality	
LNSEMF and LNGDP	2.50001 (0.1141)	No causality	Inconclusive
LNGDP and LNSEMF	2.29334 (0.1302)	No causality	
LNURB and LNGDP	0.55529 (0.4563)	No causality	Unidirectional
LNGDP and LNURP	12.9177 (0.0003)***	Causality	

Note(s): ***, **, and * represents 1%, 5% and 10% significant level respectively

Table 3.
Pair-wise Granger
causality test

providing family planning services that incorporate counselling. Finally the governments of SSA should make efforts to promote female labour force participation; as sub-Saharan Africa will benefit from the growth that it generates.

7. Research limitation and directions for future studies

Given that this study grouped SSA countries with varying social, cultural and institutional environments together, the conclusions' validity may be questioned. Additional variables (mortality rate, young children or childbearing, marital status and educational level) could help shed further light on the FLFPR issue. The results of the study should be interpreted with caution.

Note

1. The countries used in the analysis are Angola, Benin, Botswana, Burkina Faso, Burundi, Cabo Verde, Cameroon, Central African Republic, Chad, Comoros, Congo, Dem. Rep, Congo, Rep, Cote d'Ivoire, Equatorial Guinea, Eswatini, Ethiopia, Gabon, The Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Madagascar, Namibia, Mali, Mauritania, Mozambique, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia and Zimbabwe.

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