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# Gender Inequality and Economic Development: Evidence from Sub-Saharan Africa

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## **Abstract**

*In developed countries, there is a substantial gender convergence over the last century. This cannot be said for Sub-Saharan Africa. Women are underrepresented in most economic and political spheres of the region. The implication is that the overall productivity decreases in the region. This study provides empirical evidence of gender inequality on economic development in the Sub-Saharan Africa region. I conduct panel regression of 29 Sub Sahara African countries over the period from 1996 to 2019. The results show that there is a significant negative impact of gender inequality on economic development in the region, holding other variables constant. Conversely, gender parity has a positive effect on economic development as evidence in the results. I also find that, Capital accumulation (proxy as Gross Capital Formation), trade openness and population growth are key drivers of economic development of the region. I recommend policies that promote gender equity, trade openness, and growth of healthy population to promote economic development in the region.*

**Keywords:** Economic development, Gross Capital Formation, inequality, trade, panel regression

**JEL:**A,B,E,H,J,O,

## **1.0 Introduction**

In developed countries, there is a substantial gender convergence over the last century. This cannot be said for Sub-Saharan Africa. Despite the gender convergence in the developed countries, there is still considerable gender inequality in wage earnings and other measures of labor market outcomes in the countries [18].The gender inequality issue in Africa has become an important discussion in the past few years. It has become visible especially in the economic and political spheres of the region over the years. Women are few in the top positions, economically

and politically, in Africa, especially the Sub-Sahara region. The best explanation for this could be the lack of technological progress and capital accumulation which complement mentally-intensive tasks more than physically-intensive tasks in production, thus favoring the skills in which men are better at or have the comparative advantage over women. The implication is that the productivity of men increases due to a lack of technological progress and capital accumulation relative to women thus decreases the supply of women's labor force and increases the supply of men's labor force. Investigating the impact of this inequality against women is worthy of study at a time like this.

Previous studies mostly focus on gender inequality and economic development [9, 12, 13, 15, 19, 21, 22, 26, 27, 34]. The few studies that focus on gender inequality and development use descriptive analysis [see 18] and state (within country) level panel analysis[30]. In this study, I study gender inequality and economic development using panel data of 29 African countries.

This paper examines the impacts of gender inequality on economic development in Sub-Sahara Africa. It specifically examines if gender inequality has any effect on the economic development of the region. The question becomes very important given the fact that the region is struggling to get out of underdevelopment over the past decades with little progress. The question is also significant as gender inequality is not showing any sign of convergence, even in the future. Again, the question is very important as policymakers are concern about whether the region can successfully integrate with the rest of the world given the inequality. Would the citizens of this region be able to partake in the economic integration for speedy economic development? While others scholars focus on growth and gender inequality, our study contributes to the literature by extending the study to economic development. I did this for Sub-Saharan Africa countries where gender inequality is very visible and development is lacking.

Various scholars have defined gender inequality in different ways. Gender inequality is an unequal opportunity, unequal access to social amenities, education, etc to males or females. It is a disparity between individuals due to gender. According to Sen [32],gender inequality is “not one homogeneous phenomenon, but a collection of disparate and interlinked problems”. He went on to say that gender inequality could be mortality inequality, nasality, and basic amenities inequality, and unequal access to education and professional. There is also inequality in assets ownership and inequality within households in the division of labor. In the workforce, there is wage inequality as well as unequal treatment meted out to women in higher promotions and postings, among others. In this study, I define inequality as inequality in women's access to education, labor market participation, and employment.

I organize the rest of the study as follows: Section 2.0 discusses the literature on gender inequality, economic growth, and development. Section 3.0 analyzes Data and Methodology, while Section 4.0discusses the findings of the study. Section 5.0 concludes base on the findings and recommendations are offered.

## **2.0Literature Review**

There is existing literature on the effects of gender inequality on economic growth, employment, wages, and economic development. However, many of these studies deal with economic growth and one aspect of inequality;

with few studies focusing on the economic development and general aspect of inequality (economic, social, political, etc). Some of the early studies provide evidence of a positive relationship between gender inequality in education on economic growth; implying that a higher level of women's education has a negative relationship with economic growth [5, 6]. These studies are just a few of many studies that find a positive correlation between gender inequality and economic growth. The majority of the studies find that gender inequality is negatively related to economic growth [see 9, 12, 13, 15, 19, 21, 22, 26, 27, 33].

There are considerable empirical studies that favor the negative relationship between gender inequality in education and economic growth in literature. Low level of gender inequality in education increase the quality and quantity of human capital needed for production and thus productivity, and therefore, economic growth [see 9, 12, 13, 15, 19, 21, 22, 26, 27, 33].

Studies [see 1, 3, 9, 12, 13, 15, 19, 21, 22, 26, 27, 33] find that low level of gender inequality in education has indirect effects on economic growth through its effects on fertility rates, infant mortality, and children's health and education. Women's fertility will reduce if there is an improvement in women's education. This will in turn reduces population growth and promote the modification of age structure, by reducing the number of children and increasing the number of young workers. The growth of the working population will decrease the dependency ratios in the economy. Saving will increase as less people are dependent on others for survival. Higher saving will increase aggregate output. Like I pointed out above, these studies focus on economic growth and one aspect of inequality (inequality in education).

It is important to know that differences in education can lead to unequal employment opportunities, especially in the formal sector. This is because employers in the formal sector will prefer to employ well-trained workers, and thus will not employ untrained women [17, 22, and 23]. If women are not educated as men, they will not be employed, especially in the formal sector. This will have negative impacts on economic growth and by extension, economic development. Conversely, with better education for women, there will be better access to employment and positive economic growth [4, 11, 22, 28]. The implication is that low gender inequality in employment will lead to an increase in economic growth.

In a more comprehensive study by Amaia et al [2] using three dimensions of gender inequality (education, labor market, and institutional representation), the results of the panel analysis show that gender inequality in education contributes to economic growth, especially in developing countries. However, the female-male ratio of labor market participation is not statistically significant but the link between women's participation in parliament and economic growth is negative and significant for sub-Saharan Africa. This implies that, though female participation in politics has increased in Sub-Sahara Africa there are still challenges in the ways of women in trying to alter political priorities and affecting economic growth.

In a similar study, Forsythe et al. [14] present evidence for the Gender Kuznet Curve (gkc) in some regions and levels of income and a positive linear relationship between development and gender equality. Closely related to these findings is that of Eastin and Prakash [10]. Specifically, their results suggest a curvilinear- 'a discernible S-

shape gender Kuznets curve'. The result opposes the belief by some scholars that the effect of development on gender equality is monotonic or unidirectional. They concluded that any form of inequality reflects power symmetry. Any attempt to correct the inequality will be met by a force; leading to the normalization of the inequality in the society.

### 3.0 Data and Methodology

I collected unbalanced data for 29 Sub-Saharan African countries throughout the period from 1996 to 2019. I provide the list of the countries used in this study in appendix 1. I obtained data on GDP per Capita, Labour Force participation of females, Labour Force Participation rate of males, population growth rate, Gross Capital Formation (an indicator of capital accumulation), and Trade as a percentage of GDP (an indicator of trade openness) from the World Bank Development Index (WDI). Gender Inequality Index (GII) is another important variable in our model. It measures the gender inequality in health, employment, and economic status in 159 countries. The GII ranges from 0 (where men and women fare equally, to 1, where one gender fares as poorly as possible in all measured dimensions). A higher GII is an indication of higher disparity between men and women and thus more loss to human development. I source GII data from the United Nation Development Program (UNDP). This data is available from 1990-2013. The scope of this study is from 1996-2019. To get the remaining data, I extrapolate the values for the rest of the years (2014-2019). Extrapolation is the extension of range of values by assuming unknown values from the trends in the known data.

The model also includes Gender Parity Index. GPI is a socioeconomic indicator that measures the access to education by males and females. It is calculated as the ratio of the number of females to several males enrolled in primary schools. A GPI of one means parity between males and females. A GPI that is greater or equal to zero and less or equal to one ( $0 \leq GPI \leq 1$ ) is an indication of disparity in favor of males. A GPI that is greater than one means disparity in favor of females. I got this data from UNESCO.

The summary statistics of all the variables used in this study is presented in Table 1 below. From Table 1, it is clear that the natural logarithm of Gross Capital Formation is far away from the mean value. This is follow by natural logarithm of trade as percentage of GDP. This shows that most of the variables are normally distributed around the mean.

**Table 1: Summary Statistics**

Variables	Definition of variables	Mean	Std Deviation
GCF	Natural Logarithm of Gross Capital Formation	21.10338	4.197455
GDP	Natural Logarithm Real GDP Per Capita	7.014631	0.9318541
GII	Gender Inequality Index	-0.43535	0.2600914
GPI	Gender Parity Index	-0.04047	0.2119303
LFPP	Natural Logarithm Labor Force Participation Rate for Females	4.088933	0.2684273

LFPM	Natural Logarithm Labor Force Participation Rate for Males	4.30834	0.1305395
POP	Population Growth Rate	0.804089	0.6445882
TRD	Trade as percentage of GDP	3.848818	1.645222

### 3.1 Methodology

The objective of this study is to evaluate the impact of gender inequality on economic development in Sub-Saharan Africa. I make use of panel data for 29 countries in the sub-region and estimate fixed effect regression. The choice of the fixed effect regression was born out of the result of the Hausman Test. Following Henrikk and Camille [18] and Monira [29] and literature reviews, I capture the effect of gender inequality on economic growth using Gross Capital Formation, labor force participation, population growth, Gender Parity Index, Gender Inequality Index, and trade as a percentage of GDP.

Gender inequality is proxies by the Labour Force Participation Rate of Females (% of female population ages 15+), the Labour Force Participation Rate of Males (% of male population ages 15+), gender parity index (GPI), and Gender Inequality Index (GII). Gender Parity Index measures the ratio of girls to boys enrolled at primary level education in private and public schools. Other control variables are the population growth rate, trade as a percentage of GDP, and Gross Capital Formation (at constant US price). I measure the trade openness using Trade as a percentage of GDP. The Gross Capital Formation is used as an indicator of capital accumulation. Our dependent variable is the real GDP per Capita which is an indicator of economic development.

### 3.2 Econometric Specifications of the Model

I regress the econometric model as follow:

$$\ln \text{GDP/Capita} = \beta_0 + \beta_1 \ln \text{GCF}_i + \beta_2 \text{GII} + \beta_3 \ln \text{LFPF} + \beta_4 \text{GPI} + \beta_5 \ln \text{LFPM} + \beta_6 \text{POP} + \beta_7 \text{Trade} + \varepsilon$$

where

$\ln \text{GDP/Capita}$  is the natural log of real GDP per Capita for the country  $i$ ,  $i=1,2,\dots,29$ .

$\ln \text{GCF}$  is a natural logarithm of real Gross Capital Formation

GII is the Gender Inequality Index

$\ln \text{LFPF}$  is the natural logarithm of Labour Force Participation (age 15+) for female

GPI is the Gender Parity Index

$\ln \text{LFPM}$  is the natural logarithm of Labour Force Participation (age 15+) male

POP is the population growth rate

And Trade is the trade as a percentage of GDP

$\varepsilon$  is the error term

### 3.3 Hausman Test

The Hausman test is a  $\chi^2$  distribution and it is computed thus:

$$H = (\beta_c - \beta_e)' (V_c - V_e)^{-1} (\beta_c - \beta_e)$$

Where

$\beta_c$  is the coefficient vector from the consistent estimator

$\beta_e$  is the coefficient vector from the efficient estimator

$V_c$  is the covariance matrix of the consistent estimator

$V_e$  is the covariance matrix of the efficient estimator

Null Hypothesis  $H_0$ : difference in coefficients not systematic

### 4.0 Empirical Results and Analysis

I first estimate the Hausman test to determine which model is appropriate for the study. The Hausman result in Table 2-B below shows that I accept the null hypothesis and conclude that our initial hypothesis that the individual-level effects are adequately modeled by a random– model is resoundingly rejected. I make do with the fixed effect model.

As shown in Table 2-A below, the estimated FE results give the significant relationship between the interest variables (except for Labour Force participation males male and the dependent variable. There is a negative and significant relationship between Labour Force Participation Rate for Females and economic development in Sub-Saharan Africa. This implies that a 1% increase in the labor force participation rate for females will reduce economic development in the region by about 0.27% (approximately), holding other variables constant. There is also a negative and significant relationship between the Gender inequality index (GII) and economic development in the region. A 1% rise in gender inequality will reduce economic development by about 130%, holding other variables constant. Our Gender Parity Index (GPI) is positive and significant, indicating that a 1% increase or improvement in GPI will increase economic development by 22% in the region, *ceteris paribus*.

It is important to note that all our control variables are statistically significant. A 1% increase in GCF will increase economic development by about 0.034% in the region, holding other variables constant. Population growth has a positive and significant relationship with economic development. Again, a 1% increase in population growth rate will increase economic development by about 0.05% while positive trade openness (1% increase) will promote the economic development of the region by about 9% (approximately).

As for the fitness of the model, the result shows that the variables used in this model are responsible for about 25% of economic development in the region, while other variables not included in this model account for the rest. In addition, all the variables used in the model are jointly significant with F-stat (7,408) = 89.06.

**Table 2-A: Fixed Effect Results of the Panel Regression**

Variables (Dependent Variable = lnGDP/Capita)	Coefficients	Std. Err.	t	Interval	p>t	95% Conf.
lnGCF	0.0345687***	0.006508	5.31	0.047362	0.000	0.0217756
GII	-1.296423***	0.09372	-13.83	-1.11219	0.000	-1.480657
lnLFPF	-0.2663098**	0.133778	-1.99	-0.00333	0.047	-0.5292891
GPI	0.2228288**	0.088029	2.53	0.395875	0.012	0.0497823
lnLFPM	-0.00845	0.190164	-0.04	0.365374	0.965	-0.3822741
POP	-0.0520091***	0.016366	-3.18	0.019838	0.002	-0.0841804
TRADE	0.087895***	0.028543	3.08	0.144005	0.002	0.0317852
Constant	6.585854	0.806259	8.17	8.170794	0.00	5.000914

Fixed Effect (within) regression	Number of Observations	444
R-Squared:	Number of countries	29
Within = 0.6044	F(7, 408)	89.06
Between = 0.2662	Prob>F	0.000
Overall = 0.2473	Corr(u_i, Xb)	-0.0107

Source: Computed by the author using STATA\*\*\* significant at 1%, \*\* significant at 5%, \* significant at 10%

**Table 2-B: Hausman Result of the Panel Regression**

Hausman Test	Value(s)
$\chi$ -Squared (7)	39.02***
Prob> $\chi$ -Squared	0.000

\*\*\* significant at 1% level.



## **5.0 Discussion**

It is important to note that this study covers every aspect of gender inequality. The inclusion of GPI covers gender inequality in education, Labour Force Participation rate for females and males cover gender inequality in the labor market, and Gender Inequality Index is a composite measure of inequality which reflects on inequality on achievements between men and women in three important dimensions: reproductive health, employment, and the labor. This made this study unique and comprehensive.

Most of the previous studies on gender inequality focus on its impact on economic growth. The majority of the results show fit and significant models. Our results follow a similar pattern. Most of the drivers of economic development in Sub-Sahara Africa, according to our results, are Gross Capital Formation (GCF), Gender Inequality, Population growth, and trade openness. The results show that a 1% increase in GCF will lead to a 0.034% increase in economic development. This implies that investment in capital accumulation should be one of the top priorities of the governments of the countries under study. Similarly, a 1% increase in Gender Inequality Index (GII) will lead to a 130% decrease in economic development, holding other variables constant. This demonstrates how big, the impact of gender inequality is on economic development in the region. The implication is that the region will lag behind in development as long as women are not given equal opportunities in the economy, or labor market of the region, and are not adequately empowered. Policymakers must look into cultures, religions, labor market institutions that work to the disadvantage of the female gender in the region to make policies necessary to change it. This will help in promoting the development of the region. To further show how important the role of females is in the economy of the region, our results show that an increase in Labour Force Participation Rate for males has no significant impacts on economic development (as shown by the insignificant coefficient of LFPM). Thus, what the policymakers need to do is how to diversify the economy to include jobs opportunities that favor the female gender, encourage women to go into productive business and further their education, and discourage policies and religious doctrines that stand as stumbling blocks to female participation in the labor market.

## **6.0 Conclusion and Policy Recommendations**

This study provides evidence of gender inequality in economic development in the Sub-Sahara Africa region. I conduct a panel regression of 29 Sub-Sahara African countries over the period from 1996 to 2019. Our results show that there is a significant negative impact of gender inequality on economic development in the region, holding other variables constant. Conversely, gender parity will positively affect economic development as evidence in our results. I also find that Capital accumulation (proxy as Gross Capital Formation), trade openness, and population growth are key drivers of the economic development of the region. These results are rational and consistent with theories of economic growth and development and previous studies [see 19].

I recommend policies that promote gender equity, trade openness, and the growth of a healthy population to promote economic development in the region.

## Declarations

**Availability of data:** Data for this study is available on request.

**Author(s) contribution:** the author is the sole contributor to this study

**Declarations of Interest:** None/not applicable

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#### Appendix 1: 29 included Sub-Sahara African Countries

Sub-Sahara African Countries		
Benin Rep.	Lesotho	Siera Leon
Botswana	Liberia	South Africa
Cameroun	Malawi	Tanzania
Central Africa Rep	Mali	Togo
Congo DR	Mauritania	Uganda
Congo Rep	Mauritius	Zambia
Cote divore	Mozambique	Zimbabwe
Gabon	Niger	
Gambia	Papua New Guinea	
Ghana	Rwanda	
Kenya	Senegal	

