International Journal of Advanced Research in Economics and Finance
e-ISSN: 2682-812X | Vol. 7, No. 2, 259-278, 2025
http://myjms.mohe.gov.my/index.php/ijaref

Government Spending and Gender Equality in West African Countries: A Panel Cointegration Approach

Nor Asmat Ismail[1*], Rayyanu Abdulkarim Kaita[1], Alshuaibi Maan Homad[1]

[1] School of Social Sciences, Universiti Sains Malaysia, Malaysia

*Corresponding Author: norasmat@usm.my

Received: 29 May 2025 | Accepted: 21 July 2025 | Published: 1 August 2025

DOI: https://doi.org/10.55057/ijaref.2025.7.2.20

Abstract: *While the nexus between government expenditure and gender equality is well debated in literature, the impact of government expenditure in promoting gender equality remains partially explored. This study investigated the impact of government expenditure in achieving gender equality in West African countries. The study also explored the existence of long run relationship between government expenditure and gender equality in West Africa. The author employed a Panel data for a period of thirty (30) years spanning from (1991-2020) for sixteen (16) West African Countries and Panel Autoregressive Distributed Lag (PARDL) approach was employed in analyzing the data. The countries covered are: Benin, Burkina Faso, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, and Togo. The selection of the period and the set of countries are based on the availability of data. All the data were sourced from the World Development Indicators (WDI, 2023). The major variable of interest is Government Expenditure (GEX) serving as a predictor of Gender equality (SDG 5). Meanwhile, to capture the effect of other variables on the dependent variable, three other variables are included as control variables. These are: (i) GDP Per Capita Growth Rate, (ii) Inflation and (iii) Gross Capital Formation. The overall findings revealed that, government expenditure has a positive and significant impact on Gender equality in West African countries. The results also showed that, long-run relationship exists between government expenditure and gender equality. In line with the findings of the study, Governments in West Africa are encouraged to increase funding on gender related projects to close the current gender gaps and meet the SDGs' targets by 2030.*

Keywords: Government Spending, Gender equality, Sustainable Development Goals (SDGs)

1. Introduction

1.1 Background of the Study

Real development process can only happen in a nation when the required emphasis and consideration are given to the balance that exist between male and female in the economy (Mgdalena & Katarzyna, 2020). Limiting female participation in all spheres of the economy prevents the economy from experiencing progress and prosperity. Gender equality is not simply a basic human right, it also has a substantial economic potential of promoting sustainable economic growth and development (OECD, 2016). Economies are more vigorous, productive, and inclusive when the disparity between genders is reduced, and equal inclusion of women and girls is actively supported in every aspect of life (Ferrant & Kolev, 2016; World Bank,

2012). However, in developing economies particularly across West African region, the rate of disparity between male and female in many aspects of development is very alarming despite the enormous importance of attaining significant rate of gender equality (Kumar, 2016). In West Africa, Significant gender gaps remain persistent in virtually every aspect of social and economic development. Women and girls face numerous disadvantages and do not have the same opportunities as males. This is true for all public sectors, ranging from unequal access to fundamental social services to unequal property rights and persistent gender disparities in the labor market and public sphere.

In response to this serious development challenge, every West African country and regional organization has established a gender policy or strategy to mitigate the increasing rate of gender gap which has been an apparent impediment to national development. Consequently, six nations (Burkina Faso, Cabo Verde, Guinea, Mauritania, Niger, and Senegal) established quotas to encourage women's political involvement at national and subnational levels. Only at the national level Sierra Leone implemented electoral quotas. Women's parliamentary representation in the region has raised from 13% in 2017 to almost 16% in 2021 (IPU, 2022). However, a wide discrepancies remain among countries, ranging from 43% in Senegal to 6% in Nigeria (IPU, 2022). Senegal's experience underscores the potential of quotas in fast-tracking women's representation in national parliaments. Senegal witnessed an increase in parliamentary seats held by women from 23% in 2015 to 43% in 2019, after amending its electoral law in 2015, calling for parity on all candidate lists and alternating male and female candidates. However, quotas tend to have no significant impact if they are not accompanied by other broader measures that enforce women's position in social institutions (Kroll, 2015).

Empirical evidence has shown that, government expenditure through responsive budgeting is among the most effective strategies that is employed to bridge the gap between male and female which is paramount to achieve sustainable socio-economic development (Osuji, 2016). Gender Responsive Budgeting Initiative being an important tool used in promoting gender equality involves a gender analysis on some dimensions involving the use of public funds (Elson 1998; Budlender & Sharp, 1999). Gender Responsive Budget initiatives seek to create a direct linkage between social and economic policies through the application of a gender analysis to the formulation and implementation of government budgets. Factors, such as race and ethnicity, caste and class, age or geography could additionally disaggregate Gender responsive budget initiatives (Sharp & Broomhill, 1990).

To address gender disparity in West African sub region using gender responsive budgeting, three different categories of government expenditure are employed as stressed by (Elson 1998; Budlender & Sharp, 1999). They include Gender Specific Expenditure, Expenditure that promote gender equality within the public service and General or Mainstream Expenditures. Gender Specific Expenditure are allocations to programs that are specifically targeted to groups of women, men, boys or girls, such as programs on men's health or violence against women. Expenditures that promote gender equality within the public service on the other hand are allocations to equal employment opportunities, such as programs that promote equal representation of women in management and decision making across all occupational sectors, as well as equitable pay and conditions of service. This is distinct from programs that promote the employment of equal numbers of women and men. General or mainstream expenditures are allocations that are not covered in the two categories above. This analysis focuses on the differential impact of the sectorial allocations on women and men, boys and girls. Although the analysis is challenging due to the lack of gender-disaggregated data in many instances,

these expenditures are also the most critical because more than 99 percent of government expenditure usually falls into this category.

Sub-Saharan African states were among the first countries in the world to implement gender budgeting the use of monetary policies and financial management to promote gender equality and the development of women. Following in the footsteps of Australia, South Africa was the very first country in Sub-Saharan Africa to implement gender budgeting, sparking attempts in Uganda and Tanzania that were subsequently accompanied by efforts in other nations in the region to follow. Interestingly, Ministries of Finance are leading the way; for example, in many West African states, the Ministries of Finance have stipulated that other departments or units of government charged with social services of gender development aim to tackle gender disparities and women's requirements within their budgets. However, official development assistance ODA for gender equality in the West African regions has increased from an amount equal to USD 2.7 billion in 2012-13 to USD 4.2 billion in 2018-19. As a result, the portion of ODA that includes gender priorities has risen from 31 percent to 41 percent. In 2018-19, the top five grantees were Burkina Faso, Guinea, Guinea Bissau, Sierra Leone, and Mali. The United States (USD 734 million), Germany (USD 608 million), and France (USD 515 million) were among the most committed contributors to this subject. Health (69%), education (64%), governance and civil society (61%), and water supply and sanitation (58%), are the areas receiving the most gender-focused aid. Humanitarian (20 percent) and economic fields, such as transportation (9%), energy (21%), and urban development (23%), trail behind. (Sahel and West Africa Club Secretariat (SWAC/OECD2022).

1.2 Objectives of the Study

The main objective of this study is to explore the impact of government expenditure on promoting gender equality in West African countries. The study also sets to examine if there is a long run relationship between government expenditure and gender equality.

2. Conceptual Framework

This part of the literature provides a concise overview on the different concepts related to the study. Issues on gender equality are adequately explained which serves as a basis to create a conceptual framework for the study.

2.1 The Concept of Gender Equality

Gender equality also known as sexual equality or equality of the sexes, is the state of equal ease of access to resources and opportunities regardless of gender, including economic participation and decision-making; and the state of valuing different behaviours, aspirations and needs equally, regardless of gender. Gender Equality according to United Nation (2015) is the elimination of all forms of discrimination against women and girls; empowerment of women; and. achievement of equality between women and men as partners and beneficiaries of development, human rights, humanitarian action and peace and security. UNICEF (2017) defined gender equality as "women and men, and girls and boys, enjoy the same rights, resources, opportunities and protections. It does not require that girls and boys, or women and men, be the same, or that they be treated exactly alike. As of 2017, gender equality is the fifth of seventeen sustainable development goals (SDG 5) of the United Nations; gender equality has not incorporated the proposition of genders besides women and men, or gender identities outside of the gender binary. Gender equality is the goal, while gender neutrality and gender equity are practices and ways of thinking that help in achieving the goal.

Gender parity, which is used to measure gender balance in a given situation, can aid in achieving gender equality but is not the goal in and of itself (Guerrero & Gonzalo, 2019). Gender inequality is measured annually by the Program's Human Development Reports. Gender equality is more than just equal representation, it is strongly tied to women's rights, and often requires policy changes. On a global scale, achieving gender equality also requires eliminating harmful practices against women and girls, including sex trafficking, femicide, wartime sexual violence, gender wage gap and other oppression tactics. UNFPA stated that, "despite many international agreements affirming their human rights, women are still much more likely than men to be poor and illiterate. They have less access to property ownership, credit, training and employment. This partly stems from the archaic stereotypes of women being labelled as child-bearers and home makers, rather than the bread winners of the family. They are far less likely than men to be politically active and far more likely to be victims of domestic violence.

2.2 Gender Equality and Sustainable Development Goal (SDGs)

The culmination of the MDGs in 2015 called for continuity and consolidation of its results while making these more sustainable through the 2030 Agenda for Sustainable Development United Nation, 2014). In September 2015, 193 United Nations Member States gathered for the United Nations Sustainable Development Summit and adopted the new global plan of action entitled, "Transforming Our World: The 2030 Agenda for Sustainable Development." The 2030 Agenda, its 17 Goals and 169 targets, are a universal set of goals and targets aimed at eliminating poverty, protecting the planet, and improving the lives of everyone, fighting inequalities and increasing country's productive capacity, increasing social inclusion and curbing climate change and protecting the environment, while ensuring that no one is left behind over the next fifteen years. Among the 17 goals of the United Nation agenda, gender equality is goal number 5 which aimed to **"**achieve gender quality and empower all women and girls", or simply on "Gender Equality". It has nine (9) targets and fourteen (14) indicators. SDG 5 is focused on pursuing the main goal of real and sustained gender equality in all aspects of women and girls' lives which includes (1) ending gender disparities, (2) eliminating violence against women and girls' lives, (3) eliminating early and forced marriage, (4) securing equal participation and opportunities for leadership, and (5) universal access to sexual and reproductive rights.

Table 1: SDG Goal number 5: Achieve gender equality and empower all women and girls; Targets and Indicators.

Target 5.1: End all forms of discrimination against women and girls everywhere
Indicator 5.1.1: Whether or not legal frameworks are in place to promote, enforce and monitor equality and non-discrimination on the basis of sex.
Target 5.2: Eliminate all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other type of exploitation.
Indicator 5.2.1: Proportion of ever-partnered women and girls aged 15 years and older subjected to physical, sexual or psychological violence by a current or former intimate partner in the previous 12 months, by form of violence and by age.
Indicator 5.2.2: Proportion of women and girls aged 15 years and older subjected to sexual violence by persons other than an intimate partner in the previous 12 months, by age and place of occurrence.
Target 5.3: Eliminate all harmful practices, such as child, early and forced marriage and female genital mutilation.
Indicator 5.3.1: Proportion of women aged 20-24 years who were married or in a union before age 15 and before age 18.
Indicator 5.3.2: Proportion of girls and women aged 15-49 years who have undergone female genital mutilation/cutting, by age.

Target 5.4: Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate.
Indicator 5.4.1: Proportion of time spent on unpaid domestic and care work, by sex, age and location.
Target 5.5: Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision making in political, economic and public life.
Indicator 5.5.1: Proportion of seats held by women in national parliaments and local governments.
Indicator 5.5.2: Proportion of women in managerial positions.
Target 5.6: Ensure universal access to sexual and reproductive health and reproductive rights as agreed in accordance with the Program of Action of the International Conference on Population and Development and the Beijing Platform for Action and the outcome documents of their conferences.
Indicator 5.6.1: Proportion of women aged 15-49 years who make their own informed decisions regarding sexual relations, contraceptive use and reproductive health care.
Indicator 5.6.2: Number of countries with laws and regulations that guarantee full and equal access to women and men aged 15 years and older to sexual and reproductive health care, information and education.
Target 5.a: Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws.
Indicator 5.a.1: (a) Proportion of total agricultural population with ownership or secure rights over agricultural land, by sex; and (b) share of women among owners or rights-bearers of agricultural land, by type of tenure.
Indicator 5.a.2: Proportion of countries where the legal framework (including customary law) guarantees women's equal rights to land ownership and/control.
Target 5.b: Enhance the use of enabling technology, in particular, information and communications technology, to promote the empowerment of women.
Indicator 5.b.1: Proportion of individuals who own a mobile telephone, by sex.
Target 5.c: Adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and the empowerment of all women and girls at all levels.
Indicator 5.c.1: Proportion of countries with systems to track and make public allocations for gender equality and women's empowerment.

Source: (UN, 2015).

2.3 Factors responsible for increasing Gender Inequality in West Africa

Over the years, the world has gotten closer to achieving gender equality. There is better representation of women in politics, more economic opportunities, and better healthcare in many places of the world (Danlami, 2014). However, the World Economic Forum estimates that it will take another century before true gender equality becomes a reality. What are the factors responsible for increasing rate of inequality? Here are some of the factors responsible as opined by (Elson 1998; Budlender & Sharp, 1999):

Inadequate access to education

Research across the globe has revealed that, women still have less access to education than men. ¼ of young women between 15-24 will not finish primary school. That group makes up 58% of the people not completing that basic education. Of all the illiterate people in the world, ⅔ are women (Dibie, 2014). When girls are not educated on the same level as boys, it has a huge effect on their future and the kinds of opportunities they'll get (Ebong, 2016).

Inadequate Employment Opportunities

Only 6 countries in the world give women the same legal work rights as men. In fact, most economies give women only ¾ the rights of men. Studies show that if employment became a more even playing field, it has a positive domino effect on other areas prone to gender inequality.

Job Discrimination

One of the causes for gender inequality within employment is the division of jobs. In most societies, there's an inherent belief that men are simply better equipped to handle certain jobs. Most of the time, those are the jobs that pay the best. This discrimination results in lower income for women. Women also take on the primary responsibility for unpaid labor, as even as they participate in the paid workforce, they have extra work that never gets recognized financially.

Absence of Legal Protection

According to research from the World Bank (2018), over one billion women don't have legal protection against domestic sexual violence or domestic economic violence. Both have a significant impact on women's ability to thrive and live in freedom. In many countries, there's also a lack of legal protections against harassment in the workplace, at school, and in public. These places become unsafe and without protection, women frequently have to make decisions that compromise and limit their goals.

Lack of Independence

Many women around the world do not have authority over their own bodies or when they become parents. Accessing birth control is frequently very difficult. According to the World Health Organization, over 200 million women who don't want to get pregnant are not using contraception. There are various reasons for this such as a lack of options, limited access, and cultural/religious opposition. On a global scale, about 40% of pregnancies are not planned and while 50% of them do end in abortion, 38% result in births. These mothers often become financially dependent on another person or the state, losing their freedom.

Deprived Medical Care

In addition to limited access to contraception, women overall receive lower-quality medical care than men. This is linked to other gender inequality reasons such as a lack of education and job opportunities, which results in more women being in poverty (Christobal, 2021). They are less likely to be able to afford good healthcare. There's also been less research into diseases that affect women more than men, such as autoimmune disorders and chronic pain conditions. Many women also experience discrimination and dismissal from their doctors, broadening the gender gap in healthcare quality.

Lack of Religious Liberty

When religious freedom is attacked, women suffer the most. According to the World Economic Forum, when extremist ideologies (such as ISIS) come into a community and restrict religious freedom, gender inequality gets worse. In a study performed by Georgetown University and Brigham Young University, researchers were also able to connect religious intolerance with women's ability to participate in the economy. When there's more religious freedom, an economy becomes more stable.

Absence of Political Representation

Of all national parliaments at the beginning of 2019, only 24.3% of seats were filled by women. As of June of 2019, 11 Heads of State were women. Despite progress in this area over the years, women are still grossly underrepresented in government and the political process. This means that certain issues that female politicians tend to bring up – such as parental leave and childcare, pensions, gender equality laws and gender-based violence – are often neglected (Chletsos & Kollias, 1997).

Racism

It would be impossible to talk about gender inequality without talking about racism. It affects what jobs women of color are able to get and how much they're paid, as well as how they are viewed by legal and healthcare systems (Cataneda & Guerrero, 2018). Gender inequality and racism have been closely-linked for a long time. According to Sally Kitch, a professor and author, European settlers in Virginia decided what work could be taxed based on the race of the woman performing the work. African women's work was "labor," so it was taxable, while work performed by English women was "domestic" and not taxable. The pay gaps between white women and women of color continues that legacy of discrimination and contributes to gender inequality.

Societal Mentalities

It's less tangible than some of the other causes on this list, but the overall mindset of a society has a significant impact on gender inequality. How society determines the differences and value of men vs. women plays a starring role in every arena, whether it's employment or the legal system or healthcare. Beliefs about gender run deep and even though progress can be made through laws and structural changes, there's often a pushback following times of major change. It's also common for everyone (men and women) to ignore other areas of gender inequality when there's progress, such as better representation for women in leadership. These types of mindsets prop up gender inequality and delay significant change.

2.4 Empirical Review

Adigun and Awoyemi (2011) examined the relationship between government spending on education and gender gap. The overall findings from the analyses showed a convex relation between government spending and the gender gap in education in secondary schools in a sample of 100 poor and rich countries. The study also found the existence of negative correlations between religion, regional factors, and civil liberty and gender equality in education and health. The study based on its findings concluded that gender inequality in education has a negative impact on economic growth.

Afonso and Alves (2017) examined the impact of government spending on gender inequality for a group of developed and developing countries over the period 1980-2010. The study constructed a gender inequality index that covers three dimensions of inequality, covering education, health, and income. The results of the study showed that government spending significantly reduces gender inequality. The findings from the study also indicated that countries with high percentage of budgetary allocation on education and women empowerment achieve significant reduction in gender inequality. The study also concluded that government spending on education significantly reduces gender inequality and that the effect is particularly pronounced in countries with relatively high public spending on education in year 1980. The study also found that globalization, measured by the share of exports to GNP, has an insignificant effect on gender inequality index constructed in the study.

Afzal and Abbas (2010) examined the impact of economic growth and ICT on gender equality for a sample of 78 countries over the period 1960-2002. The study constructed a multi-dimensional index of gender equality consisting of; Education, Employment and Political participation. The findings from the study showed that ICT has a positive and significant impact on gender equality in education and employment. Moreover, the study found a positive correlation between economic growth and gender equality, which suggests ICT could improve society by improving gender equality and therefore economic growth, which has myriad benefits to society. But Chen also found that government spending on education has no

significant effect on gender equality in education. Along the same lines, Allen and Wiedman (2018) confirmed the findings from previous studies that ICT increases gender equality in employment, health outcomes, and education. It attributes ICT's contribution to social transformation and closing gender gap to ease of access and efficiency at a low cost.

Alinska and Kosztowniak (2018) examined the relationship between government budget and gender equality in education and health. The study found that government budget positively affects women's education and health, but economic growth provides more job opportunities for women, which promotes greater educational enrollment and health outcomes and thus helps to close the gender inequality gap. Furthermore, Qaisrani and Ahmed's study (2014) of a group of lower and lower-middle–income countries, measured by per capita income, over the period 2000-2010concludes that ICT has a limited impact on gender equality in education because those countries that have it had poor integration of it into the community and unreliable access. Moreover, they found that in the countries in their sample, the government provides free primary education but not secondary or tertiary education, so growth in average per capita income only affects gender equality at higher levels, but public spending on education significantly increases gender equality in primary education. The study found that the average years of schooling of the adult population predicts gender equality more strongly than other factors including per capita income, ICT, and public spending on education. The study also found that gender equality at low levels of education has a greater impact on economic growth than gender equality at higher levels of education.

Along the same lines, Seguino's (2006) study of 101 countries divided into 4 quartiles based on per capita income and ranging from the poorest to the richest countries over the years 1980-1985 examined the relationship between economic growth and gender equality index, which covers five dimensions of the gender gap in education, life expectancy, senior positions, participation in the labor force, and parliamentary seats. The study found that economic growth negatively impacts on gender equality in countries that are located in the first and second quartile and positively impacts on countries in the third and fourth quartile. At the sub-national level, Anderson and Esposito (2018) studied the relationships between economic growth and globalization and gender equality in India among individual states. The study found that states with high per capita GDP had higher levels of gender inequality, but high globalization overall correlates with low gender equality. Andreas and Alexander (2019) used literacy as an indicator of gender equality for a group of 62 countries over the period 1990-1999. The study found that economic growth and globalization negatively affect gender equality in Sub-Saharan African countries but have an insignificant effect in non-Sub-Saharan countries.

Seguino's (2007) study of 21 Latin America and Caribbean countries on the impact of government spending on gender equality over the period 1970-2000 found that economic growth and the annual growth rate of government spending has an insignificant effect on gender equality in education, while globalization and openness, measured as annual growth in exports and the ratio of total exports and imports to GDP, have a negative impact on gender equality.

In a study of 22 Middle East and North African countries over the period 1990-2007, Apergies and Abbas (2012) emphasized that economic growth will not close the gender gap in education by 2015, as the MDGs propose. The study asserts that governments must stimulate international trade and increase spending on both infrastructure and education to meet the goal.

3. Empirical Methodology

3.1 Description of the variables and Sources of Data

This study utilized annual panel data covering the period of thirty years (1991-2020) for sixteen (16) West African Countries. The countries are: Benin, Burkina Faso, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, and Togo. The selection of the period and the set of countries is based on the availability of data. All the data were sourced from the World Development Indicators (WDI, 2023). The major variable of interest is Government Expenditure (GEX) serving as a predictor of Gender equality (SDG 5). Meanwhile, to capture the effect of other variables on the dependent variable (s), three different variables are included as control variables. These are: (i) GDP per Capita Growth Rate, (ii) Inflation and (iii) Gross Capital Formation. These variables are explained in table 2 below:

Table 2: Definition of variables and data sources

Variables	Definition	Source
	Proxies of the Main Independent Variable	
General Government Final Consumption Expenditure	These are all government current disbursements for purchases of goods and services (including employee compensation) are comprised in general government final consumption expenditure (general government consumption). It also covers the majority of national security and defense expenditure but excludes government military spending that is part of government capital formation (Babatunde, 2018).	WDI, 2023
	Proxies of the Dependent Variables	
Female Labor Force Participation (Gender Equality).	The labor force participation rate for females aged 15 to 24 is the proportion of the female population aged 15 to 24 who are economically active and supply labour for producing goods and services over a given period.	WDI, 2023
	Proxies of the Control Variables	
GDP Per Capita Growth (annual %)	The justification for including this variable as a control variable is its role as a macroeconomic variable.	WDI, 2023
Gross Fixed Capital Formation.	The annual growth rate of gross capital formation (formerly gross domestic investment) consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. It is a control variable used in the model because it determines economic development (Blackwood, 2004).	WDI, 2023
Inflation	The consumer price index measures inflation as the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be set or modified at predetermined intervals, such as yearly. This variable is also controlled in the model because of its role as the macroeconomic variable in the economy (Boarimi and McGregor, 2014).	WDI, 2023

3.2 Models Specification

This research aims to look into the impact of government spending on gender equality in West African countries. To achieve this objective, the baseline functional form of the model is specified in equation (3.1):

$$G\_EQUALITY_t = f(GEX_t) \quad (3.1)$$

$$G_{EQUALITY}{}_t = \delta_0 + \delta_1 G_{GEX}{}_t + \delta_2 GDP_t + \delta_3 INFL_t + \delta_4 GCF_t + \varepsilon_{i,t} \quad (3.2)$$

Where: Gender Equality (G_EQUALITY) is proxied by Female Labor Force Participation Rate, G_GEX denotes Government Consumption Expenditure, GDP represent Gross Domestic Product per capita, INFL is an inflation rate, and GCF is Gross Capital Formation. In equation 3.1 above, Gender equality is the dependent variable, and government expenditure is the independent variable, whereas GDP, Inflation and Gross Capital Formation are control variables.

3.3 Model Estimation Techniques

Given the nature of the data in this study, which comprises of both cross sectional and time series elements (panel data), then the traditional cross-country approach largely employed in the literature is not suitable. According to Ayyagari, Demirguc-Kunt and Maksimovic (2012) in the pure cross-country approach, the unobserved country specific heterogeneity is contained within the disturbance term. This causes the estimated coefficients of the included variables to be biased.

Another short coming of the cross-country approach is that it gives all countries equal weight, in that they are presumed to be identical. Likewise, the estimated coefficients only signify average relationships, which are not likely to apply to each and every country in the panel (Aziakpono, 2003; Ahmed, 2010). Generally, panel data approach has many advantages over pure cross-country and time series approaches. Some of these advantages are, it enables effects that are basically not detectable in pure cross-section or pure time series approaches to be identified. As a result, degrees of freedom are increased, improve the efficiency of parameter estimates, particularly in diagnostic testing, more variability and informative data as well as reduce collinearity between the explanatory variables (Evans et al., 2000; Bokpin, 2010). Moreover, according to Evans et al. (2000), differences among cross sectional units (or countries) can be properly controlled for in panel data approaches. This can be done either during model specification and/or via the estimation technique.

To achieve the objectives of this study, four methodological approaches are applied. First, the study employed panel first-and second-generation unit root tests to check for stationarity and integration order of the variables. Second, the study used Pedroni (1999, 2004) and Kao (1999) panel cointegration tests to check for the existence of co-integration (long-run) relationship among the variables. Third, the coefficients of both the short-run and long-run relationship are estimated by using the Panel Autoregressive Distributed Lag (PARDL)-ECM Framework. Forth, residual diagnostic and model stability tests have been be carried out to ensure the fitness of the models.

3.3.1 Panel first- and second-generation unit root tests

The initial step in this empirical approach is to check the integration properties of the data and order of integration in the series. This is important since in order to estimate a panel ARDL model, it needs to be ensured that the variables in the regression models are either integrated of order zero I (0) or at most integrated of order one I (1). This is because in the presence of integration of order two I (2) variables, the ARDL bounds testing approach fails to provide robust results. Hence, this study tested the unit root in the group of panel series, using the LLC and IPS tests panel unit root tests. These tests were proposed by Levin, Lin and Chu (2002)

and Im, Pesaran and Shin (2003) respectively. The baseline framework of these two tests is an ADF regression for panel data and is specified as follows:

$$\Delta y_{it} = \gamma_i y_{i,t-1} + \sum_{j=1}^{p} \varphi_j \, \Delta y_{i,t-j} + \varepsilon_{it} \tag{3.3}$$

Where: $\gamma_i = \rho_i - 1$

Both two tests assess the null of unit root H_0: $\gamma i = 0$ ($\rho i = 1$) against the alternative of stationarity H_1: $\gamma i < 0$ ($\rho i < 1$). The LLC test assumes that the parameters tested are equal across all the panels and thus $\rho i = \rho$ for all i countries in the panel. Meanwhile, the IPS test is less restrictive than the LLC test and is obtained as an average of the ADF statistic and allows the parameters to vary across panels.

However, both the IPS and LLC panel unit root tests are considered as first-generation unit root tests as they do not consider the cross-section dependency problem that could emerge due to macroeconomic linkages, unaccounted residual independence and unobserved common factors. Therefore, second-generation unit root tests are also be carried out to check for cross-section dependence between the variables in this study's models. To determine the CD test Pesaran (2007) proposed the following model:

$$CD = \sqrt{\frac{2T}{N(N-1)}} \left(\sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \left(T\rho_{ij}^2 \right) \right) \tag{3.4}$$

In equation (3.7), T is the time period dimension and *N* is the cross- sectional dimension, ρ_{ij}^2 is the sample estimation for the pairwise residual correlation. After estimating the CD regression for each cross-section, the CIPS (Cross-sectional augmented IPS) statistics can be calculated by averaging the t-statistics of the coefficient β in the CADF model:

$$CIPS = N^{-1} \sum_{i=1}^{N} CADF_i \tag{3.5}$$

Where the $CADF_i$ is the cross-sectional augmented Dickey–Fuller statistics for I^{th} cross-section unit. In the existence of CD, this test gives more consistent and accurate results than the first generation.

3.3.2 Pedroni and Kao Panel Cointegration Tests

After confirming the order of integration of the variables, the second stage of the analysis is checking the evidence of cointegration (long-run) relationship between government expenditure and gender equality. For this purpose, the Pedroni (2004) and Kao (1999) panel cointegration tests are applied. The superiority of this cointegration techniques over other panel cointegration tests like Westerlund (2007) is that the test is robust even with small sample size. The Pedroni (1999, 2004) and Kao (1999) tests are based on the panel-data model for an I (1) dependent variable (y), and test the null hypothesis of no cointegration against the alternative of cointegration:

$$y_{it} = x'_{it}\beta_i + z'_{it}\tau_i + \varepsilon_{it} \tag{3.6}$$

Where for each panel i, the covariates in x_{it} is an I (1) series and both tests require the covariates to not be integrated amongst themselves. The Kao test assumes a common cointegration vector across all countries in the panel and thus restricts βi = β.

3.3.3 Panel Autoregressive Distributed Lag (PARDL) Models Estimates

After carrying out unit roots tests and confirming the existence of cointegration relationship among the variables in the models, the parameters of the models were estimated by using panel ARDL approach. Noteworthy is that, the panel unit root tests outline the methodology to be used. For example, when one has a mixture of variables that are stationary at level (I(0)) and at the first difference (I(1)), the panel ARDL is a suitable model to be employed Three alternative panel ARDL approaches are considered, namely; the Mean Group (MG), Pooled Mean Group (PMG) and Dynamic Fixed Effects (DFE). The best estimator among the three approaches was selected based on Hausman (1978) test.

3.3.4 Mean Group

Pesaran, Shin and Smith (1995) suggest Mean Group (MG) model in order to resolve the bias due to heterogeneous slopes in dynamic panels, the MG estimator provides the long-run parameters for the panel through making an average of the long-run parameters from ARDL models for individual countries. For instance, if the ARDL model follows:

$$Y_t = \alpha_i + \alpha_i Y_{i,t-1} + \alpha_2 X_{i,t-1} + \varepsilon_t \quad (3.7)$$

Here, i stands the country where i=1, 2, 3……N. then the long run parameter is θ_i

$$\theta_i = \frac{\beta_i}{1-\gamma_i}$$

And the MG estimators for the whole panel will be given by

$$\hat{\theta}_i = \frac{1}{N}\sum_{i=1}^{N}\theta_i$$

$$\hat{\alpha}_i = \frac{1}{N}\sum_{i=1}^{N}\alpha_i$$

The above equations reveal how the model estimates separate regressions for each country and calculate the coefficients as unweighted mean of the estimated coefficients for the individual countries. This does not impose any restriction. It allows for all coefficients to vary and be heterogeneous in the long-run and short-run. However, the necessary condition for the consistently and validity of this approach is to have a sufficiently large time-series dimension of the data.

3.3.5 Pooled Mean Group

The Pool Mean Group on the other hand, will be applied in order to detect the long and short run association between government expenditure and gender equality, and also investigate the possibly heterogeneous dynamic issue across countries. The ARDL specification is formulated as follows:

$$Y_{it} = \sum_{j=1}^{p-1} \gamma_y^{!} (y_i)_{t-j} + \sum_{j=0}^{q-1} \delta_y^i (X_i)_{t-j} + \varphi^i (y_i)_{t-1} + \mu_i + \varepsilon_{it} \quad (3.8)$$

Where $(X_i)_{t-j}$*the (k x 1) is* vector of explanatory variables for group i and μ_i represents the fixed effect. In principle, the panel can be unbalanced, and p and q may vary across countries. This model can be reparametrized as a VECM system:

$$\Delta Y_{it} = \theta_i \left(Y_{i,t-1} - \beta_i X_{i,t-1}\right) + \sum_{j=1}^{p-1} \gamma_y^i \, \Delta Y_{i.t-j} + \sum_{j=0}^{q-1} \delta_y^i \, \Delta(X)_{.t-j} + \mu_i + \varepsilon_{it} \quad (3.9)$$

Where the β_i are the long-run parameters and θ_i are the equilibrium (or error)-correction parameters. The pooled mean group restriction is that the elements of β are common across countries:

$$\Delta Y_{it} = \theta_i \left(Y_{i,t-1} - \beta_i X_{i,t-1}\right) + \sum_{j=1}^{p-1} \gamma_y^i \, \Delta Y_{i.t-j} + \sum_{j=0}^{q-1} \delta_y^i \, \Delta(X)_{.t-j} + \mu_i + \varepsilon_{it} \quad (3.10)$$

Where, **y** is SDG, **X** is a set of independent variables including the government expenditure, γ and δ represent the short-run coefficients of dependent and independent variables respectively, β are the long-run coefficients, θ is the coefficient of speed of adjustment to the long run status, while the subscripts **i** and **t** represent the country and time, respectively.

3.3.6 Dynamic Fixed Effect

The dynamic fixed effect (DFE) estimator is remarkably similar to PMG estimator, however; it confines the coefficient of the co-integrating vector to be equal across all panels in the long run. The DFE model further restricts the speed of adjustment coefficient and the short-run coefficient to be equal.

3.3.7 Hausman (1978) Test

Hausman test can be used to test whether there is a significant difference between the MG and PMG estimators. The null hypothesis of this test is that the difference between MG and PMG estimations is not significant. From the outcome of the Hausman (1978) test, we can decide the estimator to be used between MG and PMG in estimating the model (s).

3.3.8 Residual Diagnostic Tests

To ensure the fitness of the models, two residual diagnostics and model stability tests are carried out in this study. These are: normality and Ramsey reset tests to ensure that there is no omitted variable in the models.

4. Empirical Results

4.1 Results of the Unit Root Tests

This study checked the integration properties of the data and stationarity status of the variables using first- and second-generation unit root tests. The tests employed are: Levin, Lin and Chu (LLC) and Im, Pesaran and Shin (IPS). These two tests are called first generation unit root tests because, they assume cross-sectional independence of the variables across the countries. While,

the second-generation unit root test like: Cross-sectional Augmented Dickey-Fuller (CADF) unit root test assume cross-sectional dependence of the variables across the West African countries.

The results of the LLC and IPS unit root tests presented in Table 3 revealed that the variables have a mixed order of integration.

Table 3: LLC and IPS Unit Root Tests Results

Variables	LLC		IPS		Stationarity Status
	Level	First difference	Level	First difference	
G-Equality	-0.426	-1.472*	7.115	-7.075***	I(1)
G_GEX	-6.103***	-9.314***	-7.874***	-15.146***	I(0)
GDP	-5.941***	-11.170***	-7.685***	-17.003***	I(0)
Inflation	-9.067***	-8.1360***	-8.040***	-14.008***	I(0)
GCF	-8.818***	-14.907***	-9.922***	-16.728***	I(0)

Notes: ***, ** and * denote significance at 1%, 5% and 10%, respectively and lag length are selected based on Schwarz Information Criterion (SIC).
Source: Researcher's computation (2023)

However, both the LLC and IPS panel unit root tests do not consider the cross-section dependence problem that could emerge due to macroeconomic linkages among West African countries, unaccounted residual independence and unobserved common factors. Cross-section dependence is identified as a problem in macro panel data. Therefore, the cross-sectional dependence test was performed and the results are presented in table 4.

Table 4: Cross-section Dependence (CD) Test Results

Variables	Pesaran CD Test		Cross-Section Dependence Status
	Statistic	P-Value	
G-Equality	31.626	0.000	↔
G_GEX	0.707	0.480	↕
GDP	4.513	0.000	↔
Inflation	16.769	0.700	↕
GCF	0.102	0.918	↕

Notes: ↔ and ↕ are respectively denote the presence and absence of cross-section dependence of the series across the West African countries.
Source: Researcher's computation (2023)

The results of Pesaran (2004) cross-section dependence (CD) test in table 5 suggest the presence of cross-section dependence of some of the series across West African countries. This implies that the countries share common characteristics for these variables, consistent with the fact that the panel is composed by 16 West African Countries and have similar living standards. Therefore, to overcome the short-comings of first generation (LLC and IPS) unit root tests, the Cross-sectional Augmented (CIPS) unit root tests are also carried out and the results are presented in table 5.

Table 5: Cross-sectional Augmented (CIPS) Unit root Test Results

Variables	Peseran CIPS Test		Critical Values (5%)
	t-statistic	P-Value	
G-Equality	-0.386	>= 0.10	-2.44
G_GEX	-2.999***	< 0.01	-2.76
GDP	-3.310***	< 0.01	-2. 47

Inflation	-2.427**	< 0.05	-2.69
GCF	-3.315**	< 0.01	-2.76

Note: *** and ** indicate statistically significance 1% and 5% respectively.
Source: Author's computation (2023)

The results of Pesaran cross-section dependence (CIPS) unit root test presented in table 5 revealed that most of the variable are stationary even when there is cross-sectional dependency among the West African countries the variables are still either I(0) or I(1). Hence, the null hypothesis of non-stationary is rejected for all the variables at level of significance of 1%, or 5%. Therefore, taking into account the nature of the variables (that is a mixture of I (0) and I (1)) and the presence of cross-sectional dependency, the panel ARDL is the suitable approach to apply in estimating the parameters of the models. According to Fuihans (2017), cointegration can be confirmed by the significance of the error correction term (ECT) of the panel ARDL model(s). Hence, testing for cointegration separately is not necessary (optional). However, for robustness, this study used Pedroni (2004) and Kao (1999) panel cointegration tests in order to check for the existence of cointegration (long-run) relationship between government expenditure and gender equality in West African countries and the results are presented in the next section.

Table 6: Pedroni and Kao Panel Co-Integration Test Results for Model-4 (Gender Equality)

Pedroni Residual Co-integration Test
Dependent Variable: Gender Equality
Alternative hypothesis: common AR coefficients (within-dimension)

			Weighted	
	Statistic	Prob.	Statistic	Prob.
Panel v-Statistic	-4.132	1.000	-3.871	0.999
Panel rho-Statistic	3.511	0.999	4.209	0.000
Panel PP-Statistic	2.448	0.992	4.428	0.000
Panel ADF-Statistic	4.683	0.000	6.906	0.000
Alternative hypothesis: individual AR coefficients (between-dimension)				
	Statistic	Prob.		
Group rho-Statistic	5.781	0.000		
Group PP-Statistic	5.345	0.000		
Group ADF-Statistic	8.017	0.000		
Kao Residual Cointegration Test				
ADF	t-Statistic	Prob.		
	-6.293	0.000		

Note: only individual intercept included in the Pedroni and Kao tests.
Source: Author's computation (2023).

The Pedroni and Kao Panel Co-Integration Test Results for the model of the study revealed that, the null hypothesis of no co-integration among the variables in the models can be rejected because, majority of the statistic are statistically significant. This implies that the variables in the models are cointegrated.

Table 7: Results of the Hausman (1978) Tests

Models	**Chi-Sq. Statistic**	**Chi-Sq. d. f**	**Prob.**
Model-1	1.290	3	0.731

Source: Author's computation (2022)

The results of the Hausman (1978) test in table 7 revealed that the null hypothesis cannot be rejected. Which implies that there is significance difference between MG and PMG estimators. Since, the results favour the PMG estimator, this study employed the PMG-ARDL panel approach and estimated the statistical significance of the long-run coefficients, and the size of the group specific error adjustment coefficients and the short-run coefficients then interpreted the results accordingly in the next section.

5. Results and Discussion

This section presents the results of the estimation of the model on the impact of government expenditure on gender equality in West African countries. The results are presented in table 8. Panel A of the table contains the long run results of the model whereas under panel B, the short run results are presented.

The long-run results in panel-A: showed that the general government final consumption expenditure (G_GEX) is statistically significant and possess a positive long-term impact on the gender equality proxied by labor force participation rate for female population ages 15-24. Specifically, an increase in general government final consumption expenditure by 1% will bring about an increase in labor force participation rate for female population ages 15-24 by 0.162% other things being constant. This result is consistent with the findings of (Shultz, 2006; Qaisrani & Ahmed, 2014; Forsythe et al., 2003).

Table 8: PMG estimations of ARDL results for the impact of Government Expenditure on Gender Equality

Panel A: Long Run Equation: Dependent variable is Gender Equality				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
G_GEX	0.162	0.051	3.204	0.002
GDP	0.081	0.031	2.638	0.009
INFLATION	0.00023	0.005	-0.056	0.956
GCF	0.510	1.124	-0.454	0.650
Panel B: Short Run Equation: Dependent variable is Δ Gender Equality				
ECT_{t-1}	-1.087	0.105	-10.332	0.000
Δ(G_GEX)	0.128	0.105	1.223	0.223
Δ(GDP)	0.003	0.002	1.492	0.137
Δ(INFLATION)	0.014	0.011	1.303	0.194
Δ(GCF)	0.001	0.001	1.103	0.271
C	-5.891	4.628	-1.273	0.204

Note: The lag selected by Akaike info criterion is (1, 1, 1, 1, 1) and Δ is the difference operator
Source: Researcher's computation (2022) using E-views 12.

This implies that government expenditure contributes significantly in achieving the fifth Sustainable Development Goal 5 (Gender Equality) in West African countries. This finding is consistent with the hypothesis of this study that government expenditure has positive and significant impact on achieving gender equality as part of sustainable development goals (SDGs).

The results in table 8 also revealed that the impact of government expenditure on gender equality in West African countries is among others transmitted through economic growth as represented by Gross Domestic Product (GDP) Per Capita. The result showed that holding other factors constant, economic growth proxied by Gross Domestic Product (GDP) per capita

has a positive and significant impact on labor force participation rate for female population ages 15-24 (gender equality) in the long-run. Specifically, the coefficient (0.081) indicate that a 1% increase in GDP per capita leads to an increase in labor force participation rate for female population ages 15-24 by 0.081%. Thus, increasing in economic growth is associated with high gender equality in West African countries. This finding is in agreement with the hypothesis of this study that government expenditure contribute positively in achieving gender equality of sustainable development goals through economic growth (GDP). However, the finding revealed that the inflation and GCF have positive but insignificant impact on gender equality in West Africa.

The short-run results showed that government expenditure has positive but insignificant impact on gender equality. In another words, government expenditure has positive but insignificant influence in achieving the firth sustainable development goals (SDGs) of gender equality in West African countries in the short-run. Similarly, the short-run results of other control variables (inflation and GCF) are very different as compared to the long-run coefficients. Most of the estimated coefficients are statistically insignificant even at the 10% significance level. However, the coefficient of the error correction terms lagged by one period (ECTt-1) is negative and significant at 1%, and therefore meets the expectation. The adjustment from the short run to the long run is taking place as suggested by the negative and statistically significant one-lagged error correction terms (ECTt-1). The coefficient (-1.087) implies that 10.87% of substantial portion of the deviations from the equilibrium path, is adjusted in one year.

5.1 Post Estimation Tests

After estimating the model, the next task is to conduct the residual diagnostic and model stability tests. This is important in order to ensure the fitness of the model and to enable the result to be relevant for policy recommendations. Thus, the residual diagnostics and model's stability tests results are presented in table 9.

Table 9: Results of Diagnostic Tests

Model	Normality test		Ramsey RESET test	
	Jarque-Bera	Prob.	F-Statistic	Prob.
Gender	2217.006	0.000	0.004	0.952

Source: Researcher's computation (2023)

Two diagnostic evaluations were applied to verify the normality and stability of the model. The normality assessment was employed to verify whether the residual error is normally distributed. The results showed that the residual in the model is normally distributed. Similarly, the Ramsey RESET (Regression Equation Specification Error Test) was also used to ensure that the model was specified correctly and the result revealed that the model is correctly specified.

6. Conclusion

The purpose of this study is to investigate the impact of Government spending on attaining gender equality in West African Countries, using the Panel Data of the sampled West African Countries. The overall findings from this study revealed that Government Expenditure used in this study as an independent variable has a positive and statistically significant impact on the proxy of gender equality (i.e., female labour force participation rate). The policy implication of this finding is that government expenditure raises the rate of female labour force participation, which has been used in this study as a measure of the rate of gender equality in the sampled countries. Therefore, this study in line with its findings and the methodology

adopted reiterates the positive effect of government expenditure on gender equality in West African Countries as being debated currently in literature across the globe.

Acknowledgement
The authors would like to express sincere gratitude to everyone who contributed, both directly and indirectly, to the completion of this study.

Conflict of Interest Statement
The authors declare that there is no conflict of interest regarding the publication of this study.

References

Adigun, G.T., Awoyemi, T.T., & Omonana, B.T. (2011). Estimating economic growth and inequality elasticity of poverty in rural Nigeria. International Journal of Agricultural Economics and Rural Development, 4(1), 25-35

Afonso, A. & Alves, J. (2017). Reconsidering Wagner's law: Evidence from the functions of the government. Applied Economics Letters, 24(5), 346-350.

Afzal, M. & Abbas, Q. (2010). Wagner's law in Pakistan: Another look. Journal of Economics and International Finance, 2(1), 12-19.

Allen, C., Metternicht, G. & Wiedmann, T. (2018). Initial progress in implementing the sustainable development goals: A review of evidence from countries. Sustainability Science, 13(5), 1453-1467.

Alinska, A., Filipiak, B. & Kosztowniak, A. (2018). The importance of the public sector in sustainable development in Poland. Sustainability, 10(9), 32-78.

Anderson, E., d' Orey, M. A. J., Duvendack, M., & Esposito, L. (2018). Does Government Responsive Budgeting Affect gender equality? A Meta-regression Analysis. World Development, 103, 60–71.

Andreas, A., Indra, W. & Alexander, S. A. (2019). Financial Crises and the Attainment of SDGs: An adjusted Multi-Dimensional Poverty Approach. International Journal of Management, Economics and Social Sciences, 6(4), 38-60.

Apergis, A. & Alves, J. (2011). Reconsidering Wagner's law: Evidence from the functions of the government. Applied Economics Letters, 24(5), 346-350.

Apergis, M. & Abbas, Q. (2012). Wagner's law in Pakistan: Another look. Journal of Economics and International Finance, 2(1), 12-19.

Babatunde, S. A. (2018). Government spending on infrastructure and economic growth in Nigeria. Economic Research- Ekonomskaistraživanja, 31(1), 997-1014.

Blackwood, T. G. (2004). Exploration of public spending and gross domestic product's growth in agricultural sector: Comparative analysis of Nigerian agricultural sector. African Journal of Economic and Sustainable Development, 6(3), 119-137.

Boarini, R., & Cohen, G. (forthcoming). The OECD study on measuring distance to the SDG targets: A methodological discussion. OECD Publishing. OECD Statistics Working Papers, OECD Publishing, Paris.

Boarini, R., Kolev, A., & McGregor, A. (2014). Measuring well-being and progress in countries at different stages of development: Towards a more universal conceptual framework. OECD Development Centre Working Papers, (325), 1.

Castaneda, G., Chavez, F., & Guerrero, O. (2018). How Do Governments Determine Policy Priorities? Studying Development Strategies through Networked Spillovers. Journal of Economic Behavior & Organization, 154, 335-361.

Chletsos, M., & Kollias, C. (1997). Testing Wagner's law using disaggregated public expenditure data in the case of Greece. Applied Economics, 29(3), 371-377.

Cristobal, J., Ehrenstein, M. & Michael, D. (2021). Unravelling the Links between Public Spending and Sustainable Development Goals: Evidence from Data Envelopment Analysis.

Danlami, S. A. (2014). Government spending on infrastructure and economic growth in Nigeria. Economic Research- Ekonomskaistraživanja, 31(1), 997-1014.

Dibie, R. (2018). Public management and sustainable development in Nigeria: Military–bureaucracy relationship. London: Routledge.

Ebong, F., Ogwumike, F. Udongwo, U. & Ayodele, O. (2016). Impact of government expenditure on economic growth in Nigeria: A disaggregated analysis. Asian Journal of Economics and Empirical Research, 3(1), 113-121.

Englama, A., & Bamidele, S. A. (1997). Financial Crises and the Attainment of SDGs: An adjusted Multi-Dimensional Poverty Approach. International Journal of Management, Economics and Social Sciences, 6(4), 38-60.

Gould, F. (1983). The growth of public expenditures: Theory and evidence from six advanced democracies. In C.E. Taylor (Ed.), Why governments grow: Measuring public sector size, 217-239. Beverly Hills, London, New Delhi: Sage Publications.

Guerrero, O. A., & Castañeda, G. (2022). How does government expenditure impact sustainable development? Studying the multidimensional link between budgets and development gaps. Sustainability science, 17(3), 987-1007.

Guerrero, O. A., & Castañeda, G. (2020). Quantifying the coherence of development policy priorities. Development Policy Review, 39(2), 155-180.

Guerrero, O. A., & Castañeda, G. (2021). Does expenditure in public governance guarantee less corruption? Non-linearities and complementarities of the rule of law. Economics of Governance, 22(2), 139-164.

Hege, E. & Brimont, L. (2018). Integrating SDGs into national budgetary processes. Studies, (05/18). IDDRI, Paris, France.

Henrekson, M. (1993). Wagner's law-a spurious relationship? Public Finance, 46(3): 406-415

Ikeji, O. N., Akujinma, D. & Emanuel, R. P. (2017). Evaluation of the impacts of oil spill disaster on communities and its influence on restiveness in Niger Delta region in Nigeria. Procedia Engineering, 212, 1054-1061.

Khaijamang, M., Kaushiki, S., Bichitrananda, S., Indrani, M., Neeraj, K., Prayag, S.R. & Sangita, M. (2018). On states' social sector spending and sustainable development goals. Reserve Bank of India Occasional Papers, 39, 1-2.

Kroll, C. (2015). Sustainable Development Goals: Are the rich countries ready?. Sustainable Governance Indicators, SDSN and Bertelsmann Stiftung, September 2015.

Kumar, S., Kumar, N. & Vivekadhish, S. (2016). Millennium development goals (MDGS) to sustainable development goals (SDGS): Addressing unfinished agenda and strengthening sustainable development and partnership. Indian Journal of Community Medicine, 41(1), 1-4.

Lloyd, W. F. (1833). Two lectures on the checks to population: Delivered before the University of Oxford, in Michaelmas Term 1832. JH Parker.

Magdalena, Z., Iwna, B. & Katarzyna, C. (2020). The Role of Sustainable Finance in achieving Sustainable Development: Does it work? Journal of Technological and Economic Development, Issues, 27(1), 45-70.

OECD. (2016). Better policies for 2030: An OECD action plan on the Sustainable Development Goals. OECD Week 2016. www.oecd.org/dac/Better%20 Policies%20for%202030.pdf.

OECD (2016). Measuring distance to the SDGs targets: A pilot assessment of where OECD countries stand. www.oecd.org/fr/std/measuring-distance-to-the-sdgs-targets.htm.

OECD. (2016). OECD expertise relevant to the implementation of the Sustainable Development Goals (SDGS). An inventory of existing OECD tools, data and dialogue platforms. for the Meeting of the OECD Council at Ministerial Level, June 2016, OECD Expertise Relevant to the Implementation of the Sustainable Development Goals (SDGS).

OECD Network of Senior Officials from Centers of Government. (2016). OECD survey on planning and coordinating the implementation of the SDGs: First results and key issues. www.oecd.org/gov/cob-sdg-survey-overview-of-results.pdf.

Olowa, N. M. (2012). Public expenditure and economic growth in Kenya: A multivariate dynamic causal linkage. Working Paper 24/2018, 1-20.

Stotsky, J. G., Kolovich, L., & Kebhaj, S. (2016). Sub-Saharan Africa: a survey of gender budgeting efforts. International Monetary Fund.

Osuji, E. & Nwani, S. E. (2020). Achieving Sustainable Development Goals: Does Government Expenditure Framework matter? International Journal of Management, Economics and Social Sciences (IJMESS), 4(2), 512-529.

Qaisrani, A., & Ahmed, A. M. (2014). Exploring new pathways to gender equality in education: Does ICT matter? S3H Working Paper Series.

Sachs, J., Schmidt-Traub, G., & Durand-Delacre, D. (2016). Preliminary Sustainable Development Goal (SDG) index and dashboard (UN SDSN Working Paper, February 15, 2016). United Nations Sustainable Development Solutions Network. http://unsdsn.org/wp-content/uploads/2016/02/160215-Preliminary-SDG-Index-and-SDGDashboard-working-paper-for-consultation.pdf.

Seguino, S. (2006). The Road to Gender Equality: Global Trends and the Way Forward. MPRA Paper. Munich: University Library of Munich.

Seguino, S. (2007). The great equalizer? Globalization effects on gender equity in well-being in Latin America and the Caribbean. In A. Shaikh (Ed.), Globalization and the myth of free trade (Chap. 8). London: Routledge.

Shultz, T. P. (2006). Does the Liberalization of Trade Advance Gender Equality in Schooling and Health? (Working Papers): Economic Growth Center, Yale University.

United Nations. (2015). Transforming our world: the 2030 Agenda for Sustainable Development. https://sustainabledevelopment.un.org/post2015/transformingourworld

United Nations Environment Programme (UNEP). (2016). The green economy report 2016: Fiscal policies and the SDGs. UNEP, New York. Google Scholar.

United Nations Sustainable Development Solutions Network. (2015). SDG guide: Getting started with the Sustainable Development Goals. A guide for stakeholders. https://sdg.guide/

United Nations Sustainable Development Solutions Network. (2015). Indicators and a monitoring framework for the Sustainable Development Goals: Launching a data revolution for the SDGs (Revised working draft, Version 7). Report by the Leadership Council of the Sustainable Development Solutions Network. https://unsdsn.org/wp-content/uploads/2015/03/150320-SDSN-Indicator-Report.pdf.