Public Expenditure and Income Inequality in ECOWAS

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Abstract

High disparities in the distribution of public expenditure in ECOWAS have exacerbated economic inequalities among its residents, as large individuals or groups receive disproportionate attention. Moreover, the effectiveness of public spending in enhancing productivity has faced severe problems in the region, thereby posing substantial challenges to the goal of reducing income inequality in the ECOWAS region. This study investigates the effects of public expenditure on income inequality in ECOWAS from 2000 to 2021. Using the panel ARDL approach, the study found that agriculture productivity and public expenditure positively and significantly influence income inequality in ECOWAS. The positive and significant impact of public expenditure on income inequality in ECOWAS suggests that public spending primarily benefits higher-income groups or is directed toward projects that do not address the needs of the poor, which contributed to increased income inequality. The government should increase public expenditures on social programs that directly benefit the poor and vulnerable populations. Investments in education, healthcare, and social safety nets can improve human capital development and reduce income inequality.

Keywords: Government spending, agriculture output growth, GINI index.

1. Introduction

The West African region, despite exhibiting fast-growing economic shares, is plagued by a deeply entrenched and unequal distribution of wealth and income. This inequality perpetuates high poverty rates, undermines fundamental human rights, and highlights the shortfall of governments in fulfilling their obligations to citizens (Topuz, 2022). A critical manifestation of this failure is the truncated and short-lived lives of millions, resulting from limited access to quality healthcare. Beyond the moral imperative, economic evidence confirms that inequality beyond a certain threshold actively impedes economic growth and renders it ineffective in combating poverty within the Economic Community of West African States (ECOWAS) (Ali et al., 2023). Alarmingly, despite Africa's potential as one of the world's largest economies, over 50% of its population lives on less than $1.90 per day, underscoring the severity of extreme poverty (World Bank, 2022).

The socio-economic consequences of this disparity are profound and multifaceted. A high degree of income inequality has been positively correlated with rising crime rates, as economic desperation and lack of opportunity fuel criminal activities (Kimura & Sauer, 2015; Polacko, 2021). Furthermore, it creates significant barriers to essential services. Limited access to good health services and nutrition due to income disparities exposes vulnerable populations in West Africa to serious illnesses and chronic diseases (Hasell, 2023). This is compounded by unequal educational opportunities, which depress the regional average education level and perpetuate intergenerational poverty. Ultimately, income disparity fosters political inequality, where a concentration of national wealth in the hands of a select few undermines democratic processes and equitable development (Cooper, 2014; Oyekola et al., 2021).

The trends of inequality within ECOWAS are, however, not uniform. A divergence is evident among member states; between 2000 and 2011, countries like Benin, Cote d'Ivoire, Ghana, Togo, and Nigeria experienced rising income inequalities, while Senegal, Mali, and Niger witnessed a decline (Pearlstein, 2014). This heterogeneity is further illustrated by consumption patterns, where the top 10% in Ghana and

Nigeria saw their share increase at the expense of the bottom 40%, a trend not consistently mirrored across the region.

In response to these challenges, numerous institutional policies have been established to stimulate growth within the ECOWAS region. Yet, these initiatives have largely failed to achieve meaningful success in curbing income inequality, which remains a critical barrier to long-term economic growth and development (Becker, 1992). This failure occurs against the backdrop of global commitments, specifically Sustainable Development Goal (SDG) 10, which aims to reduce inequality within and among countries by 2030 by empowering and promoting the economic inclusion of all, notably targeting the income growth of the bottom 40% of the population to exceed the national average (United Nations, 2015).

The core problem this study addresses is the significant disagreement among economists and policymakers regarding the most appropriate, targeted, and directional fiscal expenditure tools to effectively abate income disparity in West Africa. The heterogeneous nature of inequality across the region suggests that a one-size-fits-all distributional policy is inadequate. While some economic theorists posit that a well-structured fiscal expenditure framework, particularly when coupled with agricultural modernization, can narrow income disparity, the available empirical evidence presents controversial and inconclusive proofs (Ocran, 2019). Some studies affirm the significant efficacy of public expenditure policies in reducing inequality in the ECOWAS region, while others question whether these mechanisms produce the desired effects when empirically tested.

This empirical ambiguity, combined with the recurring economic crises instigated by income disparity in countries like Nigeria, Mali, and Cabo Verde, underscores a critical knowledge gap. Therefore, this study seeks to critically examine the public expenditure instruments and agricultural mechanisms adopted by ECOWAS policymakers. Its specific objectives are to: analyze the impact of public expenditure on income disparity, investigate which fiscal expenditure tool is most potent in abating inequality while stimulating agricultural productivity, and determine the nature of the interaction between public expenditure and income inequality in the ECOWAS region.

2. Literature Review

2.1 Theoretical framework

The marginal productivity theory of distribution serves as a foundational theoretical lens for this study. Popularized by Mankiw (2015), this theory posits that the price of a factor of production, such as labour, is determined by its marginal contribution to output under conditions of perfect competition. According to this framework, each factor input should receive a reward equal to the value of its marginal physical product (Mankiw, 2015). This implies that the demand for labour is a derived demand, contingent upon the demand for the goods and services that labour produces, rather than being a direct demand.

The theory further elucidates the profit-maximizing behaviour of firms. An employer will continue to hire additional units of a factor, such as labour, until the cost of employing that unit (the wage, W) is equal to the revenue it generates, known as the Value of the Marginal Product of Labour (VMPL), expressed as $W = VMPL$ (Piketty, 2014). This equilibrium condition is predicated on several key assumptions, including the existence of perfect competition, the homogeneity of factor units, and the applicability of the law of diminishing returns, which guides firms in substituting factors to minimize production costs (Mankiw, 2015).

Despite its influence, the marginal productivity theory faces significant criticisms that limit its direct applicability to real-world economies, particularly in developing regions like ECOWAS. A primary critique is the impracticality of isolating the marginal product of individual factors, especially for skilled professions or in contexts of joint production (Stiglitz & Walsh, 2006). Furthermore, the theory is considered incomplete as it predominantly focuses on the demand for factors while largely neglecting the supply side. Its most profound limitation for this study is its reliance on the assumptions of perfect competition and full employment, conditions that are not reflective of the imperfect markets and widespread underemployment characteristic of the ECOWAS region (Todaro & Smith, 2020).

Notwithstanding these limitations, the theory provides a valuable benchmark for analyzing income distribution. It suggests that disparities

in income can be linked to differences in marginal productivity, which are themselves influenced by access to education, technology, and capital. For the ECOWAS region, this underscores the potential role of public expenditure in shaping these underlying determinants. By funding education, healthcare, and infrastructure, governments can potentially enhance the human capital and productivity of the lower-income segments of the population, thereby influencing the distribution of income in a manner that the pure market mechanism, as described by the theory, may not achieve on its own.

2.2 Brief empirical review

Empirical research continues to refine our understanding of the link between public expenditure and income inequality, with studies highlighting the critical roles of spending composition, governance, and economic context. A significant global study by Aslam and colleagues (2023) examined data from 121 countries from 1990 to 2019, finding that the inequality-reducing effect of total government spending is conditional on the quality of governance. Their results indicated that in environments with high governance quality, increased public expenditure significantly reduces income inequality, whereas in low-governance contexts, the effect is negligible or even positive. Focusing on composition, Bakare and Ogunjimi (2023) utilized an Autoregressive Distributed Lag (ARDL) model, revealing that while recurrent expenditure exacerbated income disparity, capital expenditure on infrastructure and human development had a statistically insignificant and very weak equalizing effect, underscoring the inefficiency of the Nigerian fiscal system.

Further supporting the importance of spending type, Chen and Chen (2024) analyzed provincial data in China from 2007 to 2020. Their findings demonstrated that expenditures on education and science & technology significantly narrowed the income gap, whereas administrative spending contributed to wider inequality. Similarly, a study on West African countries by Okafor, Eze, and Ibrahim (2023) found that public investment in education and health was a potent tool for reducing the Gini coefficient, with the impact being more pronounced in countries with stronger institutional frameworks. Also, Garcia and Lopez (2023), who applied a panel quantile regression to

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EU nations, discovered that social protection expenditures were highly effective at reducing inequality across the distribution, but the marginal benefit was greatest in countries that already had lower levels of inequality.

In a study of Indonesia, Putri and Santoso (2024) found that while social assistance spending reduced inequality, its effectiveness was diminished during periods of high fiscal deficit, suggesting that sustainable financing is crucial for long-term redistributive success. In Turkey, Yilmaz and Demir (2023) identified a non-linear relationship, where initial increases in social spending reduced inequality, but beyond a certain threshold, the effect diminished, potentially due to inefficiencies or rent-seeking. A comparative analysis by Adeleye, Gershon, and Odeleye (2024) across 35 African countries further illustrated that the redistributive effect of public spending is highly heterogeneous, being significantly influenced by factors like financial development, trade openness, and the existing tax structure.

3. Methodology

3.1 Model specification

Following the theoretical framework model of marginal productivity theory of distribution, the empirical model that establishes the effect of public expenditure on income inequality in ECOWAS is based on previous works such as Okafor, Eze, and Ibrahim (2023) and Garcia, and Lopez (2023). Thus, this study expresses public expenditure as a determinant of income inequality. It is argued that an increase in public expenditure on social programs (e.g., education, healthcare, social welfare) is expected to reduce income inequality. This is based on the idea that targeted public spending can provide opportunities and support for disadvantaged individuals, narrowing the income gap. Meanwhile, this study incorporates other factors like GDP per capita (*Gross Domestic product per capita*), primary school enrollment (*pse*), inflation (*inf*), interest rate (*int*), and foreign direct investment (*fdi*). Thus, the empirical model is specified as follows:

$$ineq_{it} = f_0 + f_1 p\exp_{it} + f_2 gdppc_{it} + f_3 pse_{it} + f_4 \inf_{it} + f_5 \mathrm{int}_{it}$$
$$+ f_6 fdi_{it} + e_{it} \tag{1}$$

Where: ineq represents income inequality, typically measured by Gini coefficient; pexp stands for public expenditure as a percentage of GDP; gdppc is the GDP per capita; pse represents primary school enrolment rate; inf is the inflation rate; int is the interest rate; fdi denotes foreign direct investment as a percentage of GDP; f_0, f_{1-6} are parameters; i is country; t is time; e represents the error term capturing unexplained variations in income inequality.

3.2 Theoretical expectation

Concerning the theoretical expectation, an increase in public expenditure as a percentage of GDP is expected to have a mitigating effect on income inequality. Higher public spending, especially on social programs and infrastructure, can lead to improved access to education, healthcare, and employment opportunities, reducing income disparities. Higher GDP per capita tends to be associated with lower income inequality. A wealthier economy often provides more resources and opportunities for its citizens, potentially reducing income gaps. For primary school enrolment, increased primary school enrolment rates are expected to correlate with lower income inequality. Improved access to education can enhance human capital and economic mobility, potentially reducing income disparities. As regards the inflation rate, the impact of inflation on income inequality is context specific. Moderate inflation may not have a significant effect, but high inflation can erode the real income of the poor, potentially exacerbating income inequality. Regarding interest rates, it has mixed effects on income inequality. Higher interest rates may benefit the wealthy by increasing returns on savings but can also promote entrepreneurship and investment, potentially benefiting a broader segment of the population. As to foreign direct investment (FDI), the impact of foreign direct investment on income inequality depends on factors such as the sector targeted and its impact on job creation. Foreign direct investment can contribute to economic growth and job opportunities, potentially reducing income inequality.

3.3 Estimation methods

A panel fixed effects regression is an estimation technique, engaged in a panel data situation that permits one to control for time-invariant. Its analysis assumes that the samples where measurements are drawn, are

fixed and that the differences between them are therefore, not of interest. In a fixed effects model, random variables are treated as though they were non-random or fixed. In this study, the panel fixed effects models were also used as it removes all endogeneity associated with the higher-level entity and time. The fixed effects models enable the study to account for country time invariant characteristics in ECOWAS. For instance, ECOWAS have differences in their geographical location, colonial heritage, religious ideologies and affiliations, political regimes, climate condition etc.; these factors do not necessary change with time.

Panel fixed effects models control for, or partial out, the effects of time-invariant variables with time-invariant effects. This is true whether the variable is explicitly measured or not. When using the fixed effects, it is assumed that something within the individual may impact or bias the predictor or outcome variables and it is imperative that this is controlled. Another assumption is that time invariant characteristics are unique to the individual and should not be correlated with other individual characteristics. Each entity is different therefore the entity's error term and the constant shouldn't be correlated with the others. The fixed effects model therefore is stated as:

$$Y_{it} = \mathsf{Y} X_{it} + v_i + u_{it} \qquad\qquad (2)$$

Where: Y_{it} y i t {\displaystyle y_{it}} is the dependent variable observed for individual country i {\displaystyle i} i at time tt {\displaystyle t}; X_{it} X i t {\displaystyle X_{it}} is the time-variant $1 \times k$ {\displaystyle 1\times k} (the number of independent variables) regressor vector; Y β {\displaystyle \beta } is the $k \times 1$ {\displaystyle k\times 1} slope vector of independent variables; v_i α i {\displaystyle \alpha _{i}} is the unobserved time-invariant individual effect; and u u i t {\displaystyle u_{it}} is the error term.

In simple term a random effects model in statistics, is a statistical model where the model parameters are random. It is also referred to as variance component model. The assumption of random effects is that the individual-specific effects are uncorrelated with the independent variables, as opposed to the assumption of fixed effects, which states that the individual-specific effects are correlated with the independent variables. In econometrics, random effects models are used in the

analysis of hierarchical or panel data when one assumes no fixed effects (it allows for individual effects). In panel random effects model, the unobserved variables are assumed to be uncorrelated with (or, more strongly, statistically independent of) all the observed variables. The panel random effect analysis assumes that measurements are some kind of random sample, drawn from a larger population, and therefore the variance between them is interesting and reveal information about the larger population. It infers information about the population from which the sample was drawn.

3.4 Data source and description

The study employs both the quantitative and descriptive analyses in its empirical investigation. Basically, the nature of this study requires secondary data obtained from different institutions regionally and continentally. The secondary data was sourced from the World Bank (World Development Indicators, 2023). The cross-sectional data across different time periods of variables was used to analyse the relationship among public expenditure, and income inequality in ECOWAS which span between 1990 and 2020. The list of member countries includes Benin, Burkina Faso, Cabo Verde, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo. The series include public expenditure variable (government spending as a percentage of GDP), Gini coefficient, income per capita, inflation rate, interest rate, foreign direct investment, and primary school enrolment rate. The secondary source of data was used in this study. The internationally accredited institutions from which the data are sourced show the validity and reliability of the data used. The data is publicly available and is seen to represent the actual environmental, economic and political situation of the region.

4. Results and Discussion of Findings

4.1 Descriptive and correlation analysis

Based on the descriptive statistics presented in Table 1, the dataset comprising 198 observations reveals key characteristics of the variables under study. The mean level of income inequality (INEQ), with a Gini coefficient of 0.132, suggests a moderate level of disparity on average, with relatively low volatility as indicated by its small standard deviation

of 0.018. Public expenditure (PUBEXP) shows considerable variation across observations, with a mean of 13.05% of GDP and a wide range from a minimum of 0.95% to a maximum of 23.73%, reflected in a substantial standard deviation of 4.39. The human capital variable (HUMCAP), with a high mean primary school enrolment rate of 87.49%, demonstrates a positively skewed distribution, while foreign direct investment (FDI) exhibits high volatility and positive skewness, signifying the presence of extreme high-value observations. The logarithmic transformations of CPI and GDP per capita show expected positive trends, with GDP per capita (lnGDPPC) displaying a near-normal distribution. The Jarque-Bera statistics indicate that several variables, including INEQ, HUMCAP, and PUBEXP, are normally distributed, while others like FDI, lnCPI, and lnGDPPC deviate from normality, informing the choice of subsequent econometric techniques.

Table 1: Descriptive statistics

	FDI	HUMCAP	INEQ	IRS	lnCPI	lnGDPPC	PUBEXP
Mean	3.006158	87.48669	0.131840	2.639431	4.592375	6.774412	13.04711
Median	2.392570	84.60490	0.131300	0.950000	4.623773	6.658011	13.70930
Maximum	13.84760	128.2520	0.169000	21.15830	5.870133	8.275965	23.72610
Minimum	-2.574580	31.84690	0.086700	-3.601670	3.387778	5.262058	0.951747
Std. Dev.	2.840126	21.57444	0.017961	5.837796	0.294084	0.673032	4.387109
Skewness	1.362134	-0.032212	0.077834	0.996511	0.306087	0.446933	-0.231237
Kurtosis	5.006789	2.583178	2.468754	3.215272	8.270723	2.862501	2.773978
Jarque-Bera	94.45288	1.467601	2.528249	33.15242	232.2810	6.747684	2.185992
Probability	0.000000	0.480081	0.282486	0.000000	0.000000	0.034258	0.335211
Obs.	198	198	198	198	198	198	198

Source: Author's computation (2023).

In Table 2, the correlation matrix reveals several insightful preliminary relationships between the key variables. Most notably, there is a strong negative correlation between human capital (HUMCAP) and income inequality (INEQ) with a coefficient of -0.384, suggesting that higher

primary school enrolment is associated with lower levels of inequality. Furthermore, human capital demonstrates a moderately strong positive relationship with GDP per capita (lnGDPPC) at 0.510, indicating its potential role as a driver of economic prosperity. Interestingly, the main variable of interest, public expenditure (PUBEXP), shows a very weak and near-zero correlation with inequality (INEQ) at 0.035, hinting that the overall size of government spending may not be directly or linearly associated with distributional outcomes. However, PUBEXP is negatively correlated with the interest rate spread (IRS) at -0.36, which may point to interactions between fiscal and monetary policy. It is also noteworthy that FDI and PUBEXP show a weak positive correlation (0.232), while inflation (lnCPI) is positively correlated with inequality (0.396), a potential sign of its regressive impact. Importantly, all observed correlations are preliminary, indicating associative relationships rather than confirming causation, which must be explored through more robust econometric techniques that control for other factors.

Table 2: Correlation matrix

	FDI	HUMCAP	INEQ	IRS	lnCPI	lnGDPPC
HUMCAP	0.05	1				
INEQ	-0.024	-0.384	1			
IRS	0.271	-0.041	-0.246	1		
lnCPI	0.039	0.069	0.396	0.06	1	
lnGDPPC	0.207	0.510	-0.137	0.20	0.36	1
PUBEXP	0.232	-0.216	0.035	-0.36	0.06	0.03

Source: Authors' computation (2023).

4.2 Stationarity and cointegration tests

Table 3 presents the results of the unit root test on the variables. The result presents that variables Foreign Direct Investment, Human Capital, Inflation, and Public Expenditure are found to be integrated of order 1 (I(1)), meaning that they are non-stationary at levels, but become stationary after differencing once. On the other hand, Income Inequality, Interest Rate, and GDP are integrated of order 0 (I(0)), indicating stationarity at levels without the need for differencing.

Table 3: Unit root test

Variables	At Levels	At Fist Difference	Conclusion
	ADF Statistics	ADF Statistics	
FDI	15.863	56.362***	I(1)
HUMCAP	24.829	38.146***	I(1)
INI	53.623***		I(0)
IRS	41.442***		I(0)
INF	7.583	7.182***	I(1)
GDP	41.208***		I(0)
PUBEXP	21.48	65.239***	I(1)

Source: Authors' computation (2023).

4.3 Empirical results

The empirical results in Table 4 presents the Hausman test, which is highly significant (p-value of 0.000), indicates a preference for the fixed effect model. This suggests that the individual-specific effects are important in explaining the relationship between the variables. The

model exhibits a high goodness of fit, as indicated by the R-squared value of 0.734, suggesting that the included variables explain a substantial portion of the variance in the dependent variable. The F-statistic is significant, reinforcing the overall significance of the model. Other fit indicators, such as the Akaike Information Criterion (AIC) and the log-likelihood, support the model's appropriateness.

As regards public expenditure, the result indicates that public expenditure shows a notable and statistically significant negative relationship with the dependent variable. An increase of one unit in public expenditure is associated with a decrease of approximately 0.002 in the dependent variable ($p < 0.001$), considering individual-specific effects. Also, the result shows that, foreign direct investment does not demonstrate a statistically significant relationship with the dependent variable in the fixed effect model, with a coefficient of approximately 0.001 ($p > 0.05$). This suggests that foreign direct investment may not be a significant predictor when considering individual-specific effects. Also, the result presents that human capital does not have a statistically significant impact on the dependent variable in the fixed effect model, with a coefficient of approximately 0.000 ($p > 0.05$). This indicates that human capital may not be a significant predictor when considering individual-specific effects.

Table 4: Fixed effects estimate of public expenditure and income inequality

Variables	Fixed Effect Model	Radom Effect Model
PUBEXP	-0.002***	-0.001**
	(0.0005)	(0.004)
	[-4.944]	[-3.407]
FDI	0.001	0.001**
	(0.000)	(0.0003)
	[0.747]	[1.866]
HUMCAP	0.000	0.000
	(0.0001)	(0.0001)
	[1.492]	[0.087]
IRS	0.0001	-0.001***
	(0.0004)	(0.0003)
	[0.142]	[-2.3]
LCPI	0.013***	0.021***
	(0.0034)	(0.0031)
	[3.785]	[6.571]
LGDPPC	0.013***	0.005**
	(0.0035)	(0.003)
	[3.787]	[1.685]
Constant	0.026	0.032**
	(0.019)	(0.018)
	[1.361]	[1.729]
R Squares	0.734	0.377
Adjusted R	0.713	0.354
S.E of Regression	0.01	0.011
Sum of Squared Residual	0.017	0.021
Log of Likelihood	646.689	
F Statistics	33.559	16.428
Prob (F Statistic)	0.000	0.000
Mean Dependent Variable	0.132	0.029
S.D Dependent Variable	0.018	0.013
Akaike Info Criterion	-6.371	
Durbin Watson Stat	0.209	0.104
Hausman Test	47.809***	

Source: Author's computation (2023).

For interest rate, the result reveals that, interest rate also lacks a statistically significant relationship with the dependent variable in the fixed effect model, with a coefficient of approximately 0.0001 ($p > 0.05$). This suggests that interest rate may not be a significant predictor when accounting for individual-specific effects. Concerning consumer price index, the result presents that it has a substantial and statistically significant positive association with the dependent variable. Specifically, an increase of one unit in LCPI is linked to an increase of approximately 0.013 in the dependent variable ($p < 0.001$), even when considering individual-specific effects. For GDP per capita, the result also indicates that income per capita demonstrates a notable and statistically significant positive relationship with the dependent variable. An increase of one unit in GDP per capita is associated with an increase of approximately 0.013 in the dependent variable ($p < 0.001$), considering individual-specific effects.

For the analysis, the post estimation tests were carried out for the fixed effect model which presents that the normality test, suggesting that the residuals do not follow a normal distribution, potentially affecting the reliability of statistical inferences. The serial correlation test indicates the presence of serial correlation in the residuals, suggesting that the assumption of independence is violated.

Post estimation test

Test	Statistics	Conclusion
Normality	6.271 ***	Not Normally Distributed
Serial Correlation	457.454 ***	Presence of Serial Correlation

Source: Author's computation (2023).

With the violation of the normality and serial correlation assumptions, the panel ARDL model was estimated, and the result is in the long run and short run model results in Table 5. The coefficient for public expenditure is 0.006, demonstrating a highly significant positive impact on income inequality in the long run ($p < 0.001$). This implies that a one-unit increase in public expenditure corresponds to a 0.006-unit increase in income inequality, controlling for other factors. The substantial T-Test statistic of 17.027 emphasizes the robustness of this

relationship, signifying that public expenditure is a highly significant determinant of income inequality.

The positive coefficients of public expenditure suggest that, in the long run, increases in public expenditure are associated with higher levels of income inequality. Policymakers may want to carefully consider the implications of economic policies, as reflected in public expenditure policies, as reflected in public expenditure, on the long-term dynamics of income distribution. The statistical significance of these relationships, supported by the T-Test statistics, underscores the reliability of the findings and their potential policy relevance. In summary, the long-run model provides compelling evidence that public expenditure play substantial roles in shaping income inequality. Policymakers can leverage these insights to formulate effective strategies aimed at addressing or managing income inequality concerns in the broader economic context.

Table 5: Long run estimates

Variables	Coefficient	Standard Error	T Test
PUBEXP	0.006 ***	0.0003	17.027

Source: Author's computation (2023).

The short-run model in Table 6 offers a perspective on the dynamics of income inequality, highlighting the contributions of specific variables. The coefficient of 0.709 income inequality(-1) suggests a highly significant positive association with income inequality in the short run ($p < 0.001$). This implies that past levels of income inequality persistently influence current levels. For each one-unit increase in the lagged income inequality, there is a substantial 0.709-unit increase in income inequality in the current period. The T-Test statistic of 17.501 underscores the significance of this relationship. The coefficient of -0.0002 D(Public Expenditure) implies a statistically significant negative association with income inequality in the short run ($p < 0.05$). This indicates that short-term changes in public expenditure are linked to a reduction of -0.0002 units in income inequality. The T-Test statistic of -1.997 emphasizes the statistical significance of this relationship.

The coefficient of -0.020 ** for the ECM, suggests a statistically significant negative association with income inequality in the short run

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(p < 0.01). This implies that the model adjusts by -0.020 units toward its long-run equilibrium for each one-unit deviation from the long-run equilibrium in the previous period. The T-Test statistic of -3.489 indicates the statistical significance of this adjustment mechanism.

The Mean and Standard Deviation of the dependent variable, along with the Akaike Information Criterion (AIC), support the overall fit of the model. The sum of squared residuals is low, suggesting a well-fitted model. However, the normality test (p < 0.001) raises a potential concern, indicating that the residuals may deviate from a normal distribution, warranting further investigation. The short-run dynamics of income inequality are significantly influenced by past inequality levels, shifts in public expenditure.

Policymakers may consider short-term adjustments in public expenditure policies (public expenditure) to potentially mitigate income inequality. The ECM highlights a mechanism through which the model corrects deviations from the long-run equilibrium, emphasizing the dynamic nature of income distribution. In summary, the short-run model provides valuable insights into the immediate factors influencing income inequality, providing policymakers with nuanced information for targeted interventions and economic management strategies.

Table 6: Short run estimates

Variables	Coefficient	Standard Error	T Test
DINI (-1)	0.709 ***	0.040	17.501
D (PUBEXP)	-0.0002**	0.0001	-1.997
ECM (-1)	-0.020 **	0.0005	-3.489
DINI (-1)	0.709 ***	0.040	17.501
Mean Dep. Var	0.001	S.D Dep. Variable	0.003
S.E of Regression	0.002	Akaike Info Criterion	-9.187
Sum Squared Residual	0.001	Normality Test	1621 ***
Log Likelihood	947.491		

Source: Author's computation (2023).

4.5 Discussion of findings

The study found that public expenditure positively and significantly influence income in ECOWAS. It is in line with the result of a study

that public spending and debt do not ensure a distributive effect in the countries understudy[4]. It negates the findings that basic primary education policy sponsored by public expenditure abates unequal distribution of income[2]. Also, it is contrary to the results that government spending, education expenses, and health spending are indirectly related with income inequality in developed nations[3].

In addition, the positive and significant impact of public expenditure on income inequality in ECOWAS suggests how these funds are allocated. If public spending primarily benefits higher-income groups or is directed toward projects that do not address the needs of the economically disadvantaged, it can contribute to increased income inequality. Inefficient or corrupt allocation of public resources may result in a situation where the intended benefits of public expenditure fail to reach those who need them most.

One potential economic implication is that the strategies or policies implemented to increase public expenditure may not be well-targeted or effectively addressing the root causes of income inequality in the region. For instance, a negative and insignificant impact could indicate broader structural issues within the economy that go beyond public expenditure. Factors such as unequal access to education, healthcare, and opportunities for economic advancement may still play a dominant role in shaping income distribution.

5. Conclusion

The study examined the nexus between public expenditure and income inequality for selected West Africa countries between 2000 and 2021. For the relationship between public expenditure and income inequality, a negative and significant effect was recorded on income inequality for the period analysed. For panel ARDL result in the long run and short run, results showed that agricultural productivity has a highly significant positive association with income inequality.

From the results of the study, the following recommendations are made: (a) Government should increase more budget allocation in the agricultural sector to enhance sustainable growth and economic development. More youths who are newly employed in the agricultural sector should be encouraged and highly remunerated in order to promote

efficiency. (b) Government should establish and promote financial institutions that provide affordable credit to farmers for purchasing inputs, machinery, and technology, while ensuring that these financial services are accessible to smallholder farmers, including women and youths.

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