POLAC INTERNATIONAL JOURNAL OF ECONS & MGT SCIENCE (PIJEMS)
DEPARTMENT OF ECONOMICS & MANAGEMENT SCIENCE
NIGERIA POLICE ACADEMY, WUDIL-KANO

THE EFFICIENCY OF PUBLIC SPENDING IN ECOWAS COUNTRIES

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Abstract

The study examine the effectiveness of public spending among ECOWAS nations using panel data for 15 ECOWAS countries spanning the period 2012-2024. This study uses a two-stage, output-oriented DEA technique. This study also examines the causes of public expenditure distortions in ECOWAS region. Results indicate that between 2012 and 2024, the average bias-corrected inefficiency score was 47 percent, compared to 32.3 percent for the uncorrected inefficiency. The effectiveness of governmental spending is largely influenced by institutional quality. As a result, the ECOWAS countries must increase their oversight of government spending in order to practice fiscal restraint.

Keywords: Public Spending, Efficiency, Two-Stage Bootstrap Output-Oriented DEA

JEL CODE: C14; H52; I22; N36

1. Introduction

Effective government expenditure has a positive impact on long-term growth and is crucial for maintaining macroeconomic stability. Due to the limited resources available to ECOWAS nations, it is critical to look into the effectiveness of public spending because even little changes can have a significant impact on the achievement of governmental goals that are in line with the United Nation's Sustainable Development Goals (SDGs). In order to account for government wastes, an empirical study that describes the degree of efficiency of government spending is essential. Additionally, care must be taken at the times when government allocates its budgeted funds and the implementing procedures to increase the effectiveness of public spending (Afonso & Kazemi, 2017).

Dickson, Wafule and Samuel, (2021) observed that the growth of the economy is accelerated by an efficient government, this was further reinforced by Tanz, (2004) who observed that, effective management of public resources is necessary to achieve economic growth, through responsible public spending and stable public finances; sustainable economic growth is feasible. However, Brini and Jemmali, (2016), observed that most Sub- African nations have less effective fiscal policies than other developing regions in Latin America and Asia, public debt has increased as a result of wasteful government spending combined with limited domestic resource mobilization. Since 2015, inefficient government spending has increased public debt in the majority of African nations; as a result, African nations have deficit spending (Dickson et al 2021). Therefore, in order to finance deficits, governments have turned to both internal and external borrowing. However, the ECOWAS countries' domestic borrowing has contributed to the issue of private investment being crowded out (Afonso & Vencio, 2022). While high interest rates on loans and higher borrowing costs have dramatically lowered local investment and raised unemployment (Chan, Ramly & Karim, 2017; D'Inverno, Carosi & Ravagli, 2018).

Sufficient public spending is necessary for healthy economic growth, but if the government lacks fiscal restraint, further spending may be counterproductive.

For instance, ECOWAS nations have a reputation for having high levels of corruption (Fonchommyo & Sama, 2016). For the ECOWAS region, the average Corruption Perception Index (CPI) score from Transparency International for the period 2010-2020 was 2.7 out of a possible 10. Therefore, the high level of corruption in ECOWAS nations could lead to inefficiency in public spending. The factors that determine the effectiveness of public spending for ECOWAS countries has not been examined in other studies such as (Kimora, Keong & Sea, 2017; Iheoma 2014; Olanubi & Osode, 2016) done on ECOWAS region. In addition, the efficiency of public expenditures has not been measured in the extant literature using a variety of methods, which has led to a range of conflicting outcomes.

Therefore, this study specifically examined the effectiveness of several government spending categories (such as health and education) in ECOWAS nations by applying efficiency analysis. The goal of efficiency analyses is to provide information on the highest level of attainment. This is important for policy makers looking to understand the scope of inefficiencies in public spending among ECOWAS countries. Secondly, the study examined how institutional quality affects the effectiveness of government spending in order to incorporate these exogenous influences into the analysis. Such proof can offer a framework within which governments can set up institutional measures meant to combat corruption in order to achieve sound fiscal policy (Dickson, et al 2021; Afonso, Jallas & Venancio, 2022). Hence, this paper is structured into five sections. Next to this is the review of existing literature and theoretical framework followed by methodology and data used, results, conclusion and policy recommendations in that order.

2. Literature Review

2.1 Theoretical foundations

The advocates of Keynesian economics in African economies might be seen as the model of effective government spending. Following ideas from Wagner (1883), Peacock and Wiseman (1967), Musgrave (1969), and the argument from several empirical standpoints (Iheoma, 2014; Prasetyo & Zuhdi, 2013; Razmi, Abbasian & Mohammed, 2014), it has been suggested that government spending has a positive association with well-being. The Wagner law of state activity specifically emphasizes an endogenous relationship because as an economy grows so does government spending, and an increase in government spending on social progress will cause an increase in the economy's spending on things like education, public health, old age pensions or retirement insurance, food subsidies, environmental protection programs, natural disaster aid, and other welfare functions. However, a quick glance at the socioeconomic results in Africa especially in the ECOWAS region, reveals that the relationship between rising government spending and socioeconomic results is really the opposite.

African nations that are ranked first in terms of development are also among the least developed globally (UNDP, 2020). Low development indicators in contrast to high government spending in Africa show low spending efficiency. The study is divided into two sections to determine how well government spending is used to enhance social welfare. The government is transforms into a producer of social welfare through the input-output approach in the first phase, where the DEA approach was applied to determine the level of government spending efficiency in the ECOWAS countries. Through a single input (government expenditure on health and education) and many outputs (life expectancy, infant mortality, and primary and secondary school enrolment), this explains the effectiveness of government investment. By creating a link between government spending efficiency and its institutions, the second phase evaluates the factors that affect how effectively the government spends its resources.

2.2 Empirical Review

The effectiveness of government expenditure has been the subject of an increasing number of studies in recent years. The research that is now available reports a variety of conclusions, some of which show efficiency and others inefficiency. Some of these studies are reviewed below.

Afonso, Jallas and Venancio (2022) used panel date for a sample of 35 OECD countries for the period 2007-2020 and applying the data envelopment analysis (DEA), the results showed that, of all the OECD countries under review, non is efficient in spending how the increase in public spending is rewarded by

growth in the financial market and therefore recommended an increase in the spending be it efficient or not.

In another study by Afonso and Venancio (2022), for 278 mainland Portuguese municipalities using data from 2005 to 2011 and applying the DEA, found out that that average input efficiency scores declined from 0.575 to 0.4848 which shows that they are inefficient in there spending for the period under review. Similarly, Andonova and Trenovski (2022), examines the effectiveness and performance of public spending in South East European (SSE) nations from 2010 to 2019, using DEA as a tool of analysis, the study showed that the best performer in SEE countries was Slovenia, while Greece is the worst. There were even more education and infrastructure sector specific efficiency variations, indicating performance improvement potentials.

Pula and Xhelili (2022) assessed the effectiveness of Kosovo's government's public spending in relation to other Western Balkan nations and EU nations for the period 2007 to 2016. Kosovo's public sector performance and efficiency were evaluated using the Public Sector Performance Index (PSP) and the Public Sector Efficiency Index (PSE). Along with the Production Frontier Technique, this study also employs the non-parametric DEA method to assess the input-output efficiency. According to the study's findings, the PSP value ranges from 0.78 at its lowest point to 1.39 at its highest. Kosovo has a performance index of 0.86, which is 15 percent below the sample average of 1.00, and ranks 30th out of 35 countries. Results for PSE range from 0.76 at the lowest end to 1.35 at the highest. Kosovo's efficiency index of 0.96, which is 5 percent below the average of 1.00 and places it 23rd out of 35 nations in this sample, is based on this sample. Results of the analysis of input-output efficiency show that the average efficiency for the study's participating nations is 46.70. This demonstrates that nations may cut total public spending by 54 percent while still maintaining the same level of overall public performance.

Kosor, Perovic and Golem (2019) investigated the efficiency of public expenditure on advanced educational institutions in EU Nations. Applying DEA on public spending on tertiary institutions and inputs and graduates of tertiary education per 1000 of population and Employment rates of young people not in education and training with completed tertiary education level one to three years beforehand aged 20 to 34 as output for the period 2012 to 2015, results showed that all the EU countries under study were efficient in spending on higher education.

In the-same vein, Ouertani, Naifar and Haddad (2018) used a non-parametric approach to quantify the relative efficiency of Saudi Arabia's public spending from 1988 to 2013, as well as the DEA-Bootstrap analysis to explain the inefficiency scores by including environmental variables. The empirical findings reveal that public spending is inefficient on average, meaning that Saudi Arabia may enhance its health, education, and infrastructure performance without increasing spending.

D'Inverno, Carosi and Ravagli (2018) use non-parametric methods to investigate the global public spending efficiency in Tuscan municipalities, with a special focus on the impact of municipal size. The major finding in the study shows that the Tuscan municipalities are inefficient in their spending.

Fonchamnyo and Sama (2016) used the non-parametric DEA approach to examine the effectiveness of public expenditure on education health, in three CEMAC nations (Cameroon, Chad, and Central African Republic) from 2000 to 2012. The empirical findings demonstrate that Cameroon is the most efficient in terms of public spending on education and health, whereas Chad is the least efficient in terms of public expenditure on education, despite spending more. Central African Republic is the least efficient in public spending on health.

Olanubi and Osode (2016) investigate the efficacy of public funding committed to human resource for health (HRH) in Nigeria over six government regimes from 1966 to 2014. The findings reveal that Nigerian government expenditure on HRH has been largely ineffective. Therefore, the government should devote more resources to the development of this critical health input. The therefore recommend more accurate assessment of health policies implemented under various government regimes.

Samut and Cafri (2015) evaluated hospital efficiency in 29 OECD countries between 2000 and 2010, the

efficiency scores of the hospitals were measured using data envelopment analysis (DEA) it was discovered that efficiency scores obtained after 2000 began to fall in 2004 and peaked in 2009 and 2010. Novignon (2015) examined the efficiency of public spending on the health for 45 countries in Sub-Saharan Africa between 2005 and 2011 using Data Envelopment Analysis (DEA) to determine the efficiency scores with average scores of around 0.5, the results reveal that health expenditure efficiency is low.

Using the Data Envelopment Analysis (DEA) method, Omankhanlen, Ogaga-Oghene, Obarisiagbon and Okorie, (2014) investigated the efficiency of government expenditure on human capital development in Nigeria, with an emphasis on education. Their research showed that Nigerian government investment on education has been ineffective since 1990. This is due to the false belief that adjustments to government spending will immediately result in changes to the outcome indicators for human capital, particularly in the areas of education and health.

Using the DEA technique, Hauner and Kyobe (2010) studied 114 nations between 1980 and 2006. DEA was used to calculate PSP and PSE, or performance and efficiency in the public sector. The results demonstrated that efficiency declines as spending increases. Results also demonstrated that government expenditure efficiency is considerably increased by accountability and the suppression of corruption. Using data from 1996 to 2002, Herrera and Pang (2005) studied efficiency spending for a sample of 140 developing nations. DEA and Free Disposable Hull (FDH) both estimated the boundary. The research discovered an efficiency rating of 0.9 on average. By employing the same level of input, health and education spending in underdeveloped nations could have increased by 10 percent. Between 1984 and 1995, Gupta and Verhoeven (2001) examined the effectiveness of governance in 37 African nations. The relative effectiveness of expenditure on health and education was examined in the paper using FDH. The findings indicated that African governments spend less effectively than those in Asia and the Western Hemisphere. Due to relatively high government salaries and the sector-specific allocation of government resources, Africa experiences inefficiencies.

3. Methodology

This study uses a non-parametric approach; Data Envelope Analysis (DEA) to calculate the efficiency of ECOWAS's countries public spending for a panel data of 15 ECOWAS countries from the year 2012 to 2024 based on the availability of data. Spending on health and education as a share of GDP are the two inputs considered. In terms of outputs; education, proxied by enrollment in secondary and primary schools; and health, life expectancy and infant mortality are the outputs considered. The World Development Indicator (2024) served as the data source.

DEA is a non-parametric technique that assesses the effectiveness of decision-making units. The method is often used in researches aiming at technological efficiency since it is not constrained by an a priori functional form and it allows for a variety of output technologies. DEA does not require distributional assumptions, it is adaptable to multiple-output and multiple-input systems, and does not assume a priori functional form design for production technology. Technical efficiency (TE) estimations from the DEA can either be input- or output-oriented. The goal of an input-oriented strategy is to determine how much of the input may be lowered while still achieving the same level of output. By using DEA is known to experience an issue with serial correlation, though. However, Simar and Wilson (2007) created a two-stage method to address the estimating issues brought on by non-parametric DEA. The method used by Simar and Wilson (2007) combines regression with DEA efficiency measurement. The regression against exogenous variables uses the DEA efficiency score as the dependent variable and institutional quality as independent variables. Using a two-step methodology, bias-free estimated standard errors and confidence intervals are produced.

According to Charnes, Cooper and Rhodes, (1978), in other to estimate efficiency, the equation is given below:

$$\alpha_i \lambda^{\varphi} Subject\ to\ -\gamma_i + Y\lambda \geq 0; \alpha_i x_i - X\lambda \geq 0 \quad (1)$$

M $n'1\lambda = 1$

i $\lambda \geq 0$

n Where;

α_i: lies between 0 and 1 and measures the TE. DMU is inefficient if α is less than a one (α < 1). Furthermore, DMU is efficient if α equals unity (α = 1); which means DMU is on the frontier.

λ: is a (n x 1) vector of values that measures the variation from frontier for each DMUs (Afonso & Kazemi, 2017).

$n'1\lambda$ = 1: imposes convexity of the frontier, responsible for variable returns to scale.

X: is input vector of dimension K by T that produces M outputs

Y: is a vector of outputs for the whole period.

The CRS is obtained when $\sum^{T} \lambda_{t} = 1$. CRS implies that if you increase input quantity by a given proportion then outputs quantity will increase by the same proportion. However, in the VRS an increase in input quantity by a given proportion will result to less or more proportionate increase in outputs quantity.

Simar and Wilson (2007) take into account three variables ρ_i, χ_i, and ψ_i for a sample of i = 1, …, N DMUs. represents a vector of inputs used in the production process, χ_i denotes a vector of output realized while ψ_i represents a vector of K exogenous variables that influence input-output combination. $\emptyset_i$ in output-oriented Ferrell (1957) measures the distance between each DMUs' output and the frontier. The inefficiencies by each DMUs is captured by $\emptyset_i$. Equation (2) gives Simar and Wilson data generating process for efficiency.

$\emptyset_i.\emptyset_i = \psi_i \boldsymbol{\beta} \boldsymbol{\mathcal{U}}_i$…….**2**

Where $\boldsymbol{\beta}$ is the column vector of parameter to be estimated. The disturbance term, $\boldsymbol{\mathcal{U}_i}$, is independently, truncated such that $\boldsymbol{\mathcal{U}_i} \sim (0, \delta)$.

This study uses a double-bootstrap approach suggested by Simar and Wilson (2007) to generate consistent inference on efficiency score. A number of environmental factors were taken into consideration, including institutional quality, primary and secondary enrolment, based on earlier studies (Levine & Renelt, 1992; Saleh & Harvie, 2005; Mankiw, Romer & Weil., 1992; Barro, 1991: Cebula, 2003).

In line with earlier research by Afonso and Kazemi (2017), output-oriented DEA was carried out because the government's top priorities are to raise the level of education, reduce child mortality, and offer health services that extend life expectancy.

4. Results and Discussion

4.1 Descriptive statistics

Statistical data are summarized in Table 1. Governments are regarded as DMUs since they use a variety of inputs (expenses) to produce outputs that are available to the general population. The average GDP share of education spending was 5.43 percent, and the highest GDP share was 12.22 percent. Some ECOWAS nations only dedicate 1.098 percent of their GDP to the education sector. The average health sector spending among ECOWAS countries is 3.705 percent of GDP, with 8.087 percent of GDP being the most spend by countries in the region. Average enrollment in primary schools is 95.043 percent, while secondary enrollment is 44.4 percent.

Between 2012 and 2024, the countries with the highest infant mortality had 111 per 1000 infants, compared to those with the lowest infant mortality, which was 12 per 1000 infants. Infant mortality was 58 infants per 1000 infants on average. The highest life expectancy in the region was 75 years while the lowest is 42 years, on the average, the life expectancy in the ECOWAS region is 59 years. Government effectiveness, political stability, rule of law, voice and accountability, control of corruption, and regulatory quality were all taken into account as aspects of institutional quality. Average values for each of the six composite measures were below 0, which indicates bad governance.

Table 1: Descriptive statistics

	Variable	Obs	Mean	Std.Dev.	Min	Max
Input	Education Expenditure	195	5.431	3.357	1.098	12.220
	Health expenditure	195	3.705	2.532	1.518	8.087
Output	Primary enrolment	195	95.043	23.215	38.539	139.271
	Secondary Enrolment	195	44.391	24.428	5.547	117.804
	Infant Mortality	195	58.694	24.588	12.800	111.000
	Life Expectancy	195	56.245	6.139	42.595	75.276
Environmental Variables	Government Effectiveness	195	-0.402	0.520	-1.740	1.030
	Political stability	195	-0.434	0.881	-2.570	1.180
	Rule of Law	195	-0.423	0.579	-1.730	1.050
	Voice and accountability	195	-0.335	0.617	-1.880	0.80
	Control of Corruption	195	-0.432	0.762	-1.410	1.350
	Regulatory quality	195	-0.358	0.471	-1.589	1.107

Source: Authors computation using Stata 17.0

4.2 Average Bootstrapped Efficiency Results (2012--2024)

Bootstrapped output-oriented (VRS) DEA efficiency model was run. The specification takes into account two inputs and four outputs. Primary enrollment, secondary enrollment, infant mortality, and life expectancy are the four outputs. The input sets included spending on health and education. Variable returns to scale (VRS) assumption was used to calculate all outcomes. The first-stage findings from both conventional and bootstrap are shown in Table 2.

The DEA models predict the ECOWAS nations' overall technical efficiency from 2012 to 2024. Results in Table 4 shows that the bias-corrected efficiency scores are greater than the original DEA efficiency scores. The findings indicate that the typical bootstrapped inefficiency is 47 percent, 33 percent was the lowest level of inefficiency in 2017 and 51 percent was the highest in 2013. The findings indicate that between 2012 and 2024, spending inefficiencies were significantly higher in ECOWAS countries.

Table 2: Technical efficiency scores

Conventional VRS model						**Bootstrap VRS model**					
Year	**Mean**	**Std,Dev**	**Min**	**Max**	**Ineff***	**Year**	**Mean**	**Std**	**Min**	**Max**	**Ineff***
2012	1.32	0.60	1	3.51	24percent	2009	1.53	0.66	1.04	3.98	34percent
2013	1.37	0.65	1	3.25	27percent	2010	1.70	0.80	1.02	3.85	41percent
2014	1.428	0.87	1	4.68	30percent	2011	1.705	0.98	1.022	5.336	41percent
2015	1.451	0.88	1	4.17	31percent	2012	1.737	0.98	1.074	4.924	42percent
2016	1.466	0.84	1	4.3	32percent	2013	2.041	1.27	1.013	6.605	51percent
2017	1.399	0.71	1	3.75	29percent	2014	1.876	0.98	1.079	5.111	47percent
2018	1.409	0.91	1	4.69	29percent	2015	1.932	1.47	1.004	7.224	48percent
2019	1.299	0.55	1	2.85	23percent	2016	1.529	0.65	1.011	3.068	35percent
2020	1.298	0.63	1	3.42	23percent	2017	1.496	0.62	1.004	3.529	33percent
2021	1.346	0.76	1	4.16	26percent	2018	1.762	1.08	1.018	5.753	43percent
2022	1.399	0.77	1	3.66	29percent	2019	1.715	0.93	1.045	4.488	42percent
2023	1.411	0.75	1	3.54	29percent	2020	1.822	1.00	1.043	4.813	45percent
2024	1.407	0.71	1	3.29	29percent	2021	1.793	0.9	1.033	4.168	44percent
Total	1.739	0.96	1	5.82	43percent	Total	1.917	1.04	1.061	6.268	47percent

Number of obs	= 195
Number of bootstr. Reps	= 2000
Wald chi2(14)	= 127.71
Prob> chi2(14)	= 0.0001

Source: Authors computation using Stata 17.0

4.3 Relative efficiency scores for government spending in ECOWAS countries

The study examined 15 ECOWAS nations' DEA output-oriented efficiency scores with VRS for the years 2012 to 2024. Given a fixed level of inputs, the output-oriented DEA model maximizes output. While dealing with limited public resources, governments' main objective is to maximize social welfare of the population through public supply of goods and services. In this study, 15 ECOWAS countries were used as DMUs to assess each one's relative effectiveness in terms of output variables, including life expectancy, infant mortality, primary enrollment, and secondary enrollment.

The output-oriented efficiency scores under the variable returns to scale (VRS) model are shown in Table 3. The ECOWAS countries could have boosted output levels by 37 percent by allocating the same spending, according to the average efficiency score of 0.63. This suggests that ECOWAS nations could enhance public administration without necessarily raising investment. The most effective nation is Guinea-Bissau, which is also the only nation performing on the efficiency boundary while all other nations are below it. The least efficient nation is Niger, where an increase in output of 73.6 percent could be achieved with the same number of resources and an average efficiency score of 0.264. Poor public financial management, political unpredictability, and high recurring expenditures in Niger are the causes of inefficient government spending (Adeniran, Ekeruche, Bodunrin, & Ali, 2018).

Between 2012 and 2024, Sierra Leone, Guinea, Guinea-Bissau, Nigeria, and Gambia exhibit efficient expenditure while Benin, Botswana, Burkina Faso, Cape Verde, Ghana, Niger, Senegal, Togo, and Mali constantly exhibit inefficient expenditure

Table 3: BCC Efficiency Scores (2012-2024) output oriented

Country	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Average	Rank
Benin	0.61	0.56	0.54	0.49	0.57	0.58	0.55	0.74	0.64	0.45	0.65	0.70	0.70	0.60	7
Burkina Faso	0.45	0.44	0.47	0.36	0.39	0.35	0.48	0.48	0.49	0.42	0.53	0.49	0.54	0.45	12
Cape Verde	0.40	0.46	0.48	0.49	0.56	0.56	0.58	0.66	0.73	0.73	0.69	0.75	0.89	0.61	6
Ghana	0.50	0.59	0.41	0.30	0.41	0.37	0.39	0.48	0.50	0.42	0.40	0.51	0.54	0.45	13
Guinea	0.81	0.88	0.98	1.00	1.00	1.00	1.00	1.00	0.82	0.61	0.81	0.67	0.68	0.87	3
Guinea-Bissau	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1
Niger	0.31	0.32	0.25	0.27	0.26	0.22	0.21	0.29	0.27	0.25	0.24	0.25	0.29	0.26	15
Mali	0.60	0.66	0.68	0.60	0.69	0.50	0.67	0.69	0.58	0.51	0.47	0.47	0.50	0.58	9
Gambia	0.48	0.53	0.75	0.67	0.84	0.75	0.72	0.89	1.00	0.93	1.00	0.93	0.88	0.80	5
Sierra Leone	1.00	0.95	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	2
Togo	0.33	0.43	0.47	0.38	0.42	0.39	0.42	0.59	0.55	0.39	0.43	0.41	0.35	0.43	14
Code D' Ivoire	0.57	0.70	0.51	0.49	0.52	0.46	0.50	0.58	0.74	0.46	0.59	0.56	0.40	0.54	10
Nigeria	1.00	1.00	0.64	0.60	0.71	0.48	0.61	1.00	1.00	1.00	1.00	1.00	1.00	0.85	4
Liberia	0.58	0.45	0.54	0.54	0.54	0.45	0.59	0.85	0.74	0.53	0.68	0.66	0.58	0.59	8
Senegal	0.47	0.48	0.49	0.34	0.42	0.48	0.46	0.61	0.66	0.54	0.58	0.53	0.47	0.50	11
Average														**0.63**	
Minimum														**0.26**	

Source: Authors Computation Using Stata 17.0

4.4. Determinant of efficiency

The two-step procedure was used to produce the truncated regression estimates' bias-corrected coefficients. Due to serial correlation in first stage efficiency scores, second stage estimations are unreliable and inaccurate (Simar & Wilson, 1999). This issue is solved via a bootstrap method. For the ECOWAS countries, Table 4 shows the bias-corrected coefficients of the truncated regression model, which assesses the causes of inefficiencies in government spending.

Table 4: Truncated bootstrapped two-stage regression (dependent variable: BCC index)

VARIABLES	Estimates
Primary enrolment	-0.0057
	(0.006)
Secondary enrolment	0.0649***
	(0.0223)
Government effectiveness	0.174
	(0.63)
Political stability	2.02**
	(0.25)
Rule of Law	-4.130***
	(0.774)
	-0.845**
Voice and Accountability	(0.342)
Corruption of corruption	0.703
	(0.570)
Regulatory quality	-0.865*
	(0.439)
Constant	4.242**
	(3.506)
Observations	195
Simar& Wilson (2007) eff. Analysis (algorithm #2)	
Number of obs = 195	
Number of bootstr. reps = 2000	
Wald chi2(14) = 127.71	
Prob>chi2(14) = 0.0001	

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

The rate of enrollment in primary and secondary schools was utilized as an education indicator. Enrollment in secondary schools greatly boosts the efficiency of government spending. The outcome supports research by Mankiw *et al*. (1992) and Barro (1991), which claimed that success in higher education increases spending efficiencies.

There are conflicting findings in the estimations for institutional quality indicators. The efficiency of government spending is positively impacted by government effectiveness, political stability, and control of corruption. Better expenditure effectiveness is directly correlated with increased political stability. Control of corruption and government effectiveness enhances efficient spending however insignificantly. Rule of law, voice and accountability, and regulatory quality all have a detrimental impact on efficiently public spending.

Institutions play a significant role in promoting growth, financial development, and cost effectiveness (Adeniran., *et al* 2018). The preservation of the rule of law has a considerable and advantageous impact on the effectiveness of government spending. However, the effectiveness of government expenditure is significantly harmed by voice and accountability. This goes against the a priori expectation of a positive

relationship the efficiency. It has been demonstrated that controlling for corruption improves effectiveness of spending (Hauner & Kyobe, 2010). The regression analysis revealed a strong correlation between expenditure efficiency and control of corruption.

4.5 Discussion and Conclusion

The efficiency of government expenditure in 15 ECOWAS countries from 2012 to 2024 was examined in this study, along with the environmental factors that contribute to inefficiency in government spending, to achieve this, two-step DEA bootstrap output- oriented was used. The results showed that between 2012 and 2024, the average bias-corrected inefficiency score was 47 percent, compared to 32.3 percent for the uncorrected inefficiency. The minimal spending inefficiency for ECOWAS countries was 33 percent in 2017 while the maximum was 51 percent in 2013. The study revealed that, averagely, ECOWAS countries are relatively inefficient. ECOWAS countries can achieve the same level of output with 47 percent fewer resources, more so, that government can improve efficiency without increasing spending. Country specific efficiency scores revealed a wide dispersion in performance. Guinea-Bissau proves to be the only efficient country.

5. Conclusion and Recommendations

Bias-corrected coefficients of the truncated regression estimates revealed that Secondary school enrolment enhances the efficiency of public spending in ECOWAS countries. Political stability also enhances the efficiency of spending significantly. Control of corruption also improves efficiency of a country spending though the effect is non-significant. However, the findings demonstrate voice and accountability and regulatory quality significantly distort spending efficiency of ECOWAS countries. Based on the findings, this study makes the following recommendations

I. Governments must implement measures to increase the effectiveness of expenditure on health and education in order to do this, they needs to enhance supervision of expenditure with strategies needed to achieve a desired goal.
II. The management of public resources has to be more transparent in ECOWAS countries.
III. The ECOWAS nations should place a higher priority on institutional attributes such political stability, the rule of law, and regulatory quality.
IV. Furthermore, there should be a well-planned political change that considers inclusivity. To handle property rights, it is important to develop powerful, independent organizations.

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