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Tax Revenue, Inflation, and Economic Growth: A Ghanaian Perspective

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ABSTRACT

Over the years, Ghana's macroeconomic frameworks have led to slow economic growth. This necessitates the revision of policies for macroeconomic control and the pursuit of pragmatic policies that enhance economic growth, which policymakers should prioritize when framing economic plans. **This paper aim**s to explore the impact of key economic growth factors, such as tax revenue on economic growth in Ghana and the interactive effect of inflation on economic growth. We have used **the methods** of explanatory research and quantitative approaches to analyze the historical economic data for Ghana. This study examines the nexus between tax revenue and economic growth. In addition, it examines the multiplicative role of inflation in the relationship between tax revenue and economic growth in Ghana. The study uses secondary time series data collected for 19 years from 2005–2023 and employs the autoregressive distributed lag testing to cointegration estimation technique to analyze tax revenue growth, economic growth, foreign direct investment, policy rate, inflation, and government expenditure. **The results** showed that the tax revenue growth rate has a statistically significant positive relationship with economic growth in both the short and long run. In addition, the study revealed a statistically significant negative moderating effect of inflation in the relationship between tax revenue growth and economic growth in both the interim period and the long run. It was revealed that the impact of tax revenue on economic growth is more intense in the short run than in the long run. **The key conclusion** of the paper is that a rise in tax revenue facilitates economic growth more in the short run than in the long run in Ghana. Additionally, the rising cost of goods and services dampens economic growth, and inflation diminishes the enhancing effect of tax revenue on economic growth.

Keywords: ARDL; Ghana; economic growth; tax revenue; foreign direct investment; inflation

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ОРИГИНАЛЬНАЯ СТАТЬЯ

Налоговые поступления, инфляция и экономический рост: взгляд из Ганы

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АННОТАЦИЯ

Макроэкономическая политика Ганы на протяжении многих лет приводила к медленному экономическому росту страны. Необходимы пересмотр политики макроэкономического контроля и проведение прагматичной политики, способствующей экономическому росту, что должно стать приоритетом для полити-

ков при разработке экономических планов. **Цель** данной статьи — изучить влияние ключевых факторов, таких как налоговые поступления, на экономический рост в Гане и интерактивное влияние инфляции на экономику. Авторы использовали **методы** объяснительного исследования и количественные подходы для анализа исторических экономических данных по Гане. В данном исследовании рассматривается связь между налоговыми поступлениями и экономическим ростом. Кроме того, в нем анализируется мультипликативная роль инфляции во взаимосвязи между налоговыми поступлениями и экономическим ростом в Гане. В исследовании используются вторичные данные временных рядов, собранные за 19 лет, с 2005 по 2023 г., и применяется авторегрессионное тестирование с распределенным лагом и коинтеграционной оценкой для анализа роста налоговых поступлений, экономического роста, прямых иностранных инвестиций, учетной ставки, инфляции и государственных расходов. **Результаты** показали, что темпы роста налоговых поступлений имеют статистически значимую положительную связь с экономическим ростом как в краткосрочной, так и в долгосрочной перспективе. Кроме того, исследование выявило статистически значимый отрицательный сдерживающий эффект инфляции на взаимосвязь между ростом налоговых поступлений и экономическим ростом как в среднесрочной, так и в долгосрочной перспективе. Было показано, что влияние налоговых поступлений на экономический рост более интенсивно в краткосрочной перспективе, чем в долгосрочной. Основной **вывод** статьи заключается в том, что рост налоговых поступлений в Гане больше способствует экономическому росту в краткосрочной перспективе, чем в долгосрочной. Кроме того, рост стоимости товаров и услуг сдерживает экономический рост, а инфляция снижает усиливающий эффект налоговых поступлений на экономический рост.
Ключевые слова: ARDL; Гана; экономический рост; налоговые поступления; прямые иностранные инвестиции; инфляция

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Introduction

Tax revenue is the total amount of money collected by the government to run a country's administration [1, 2]. Inflation is ascribed to the rise in the general price of goods and services in a defined economy within a specific period [3, 4]. Economic growth, on the other hand, measures the expansion in the size of a country's economy within a specified accounting year [5]. Over the years, policymakers and researchers alike have endeavored to unravel the factors that can facilitate economic expansion, especially by assessing the impact of macroeconomic variables on economic growth. For instance, [1] examining the case in South Asian countries proved that tax revenue hurts economic growth. Similarly, a study on how statutory taxes on corporate income and personal income affect economic growth revealed that both taxes have an inverse relationship with economic growth in 25 wealthy OECD (Organisation for Economic Co-operation and Development) countries [6]. Notwithstanding, [7, 8] suggest that more tax revenue improves economic advancement. This demonstrates that a rise in tax revenue should propel economic growth. However, this has been an economic mirage in the Ghanaian narrative. For instance, Ghana's tax revenue grew from 6.9% to 7.1%, 7.4%, and 8% for the fiscal years 2017, 2018 and 2019. Notwithstanding, economic growth for the same periods was 8%, 6%, 6%, and 0.5%, respectively, contradicting the literature that supports growth in times of rising revenue [9, 10] but supports [11]. This shows that there is a problem that warrants empirical investigation.

We acknowledge that few studies have been conducted on the concepts; notwithstanding, these studies revealed inconsistent results. While some studies documented a negative relationship between tax revenue and economic growth [12, 7, 8], the opposing literature empirically adduced evidence of a positive association between tax revenue and economic growth [13, 9, 10]. Some of the existing studies concentrated outside Ghana [10, 1, 12, 8]. In addition, the dataset used in all the existing studies predates the inception of COVID-19, which can alter the known narrative. Moreover, since the concept is economically delicate as each country pursues different tax policies, for reliable results the concept must be explored from a specific country's perspective. Furthermore, no known study has explored the multiplicative role of inflation in the examined nexus. Addition-

ally, existing studies used mixed units to measure the concepts, such as the Ghana cedi to measure tax revenue, while the rate was used to measure economic growth. Examining the nexus among these measures does not intuitively reflect economic reality. This makes the use of a relative approach to assessing tax revenue growth and interacting inflation in the tax revenue-economic growth nexus in the literature using ARDL generally scarce on the global scene and non-existent in the Ghanaian narrative, which leaves a lacuna in literature and incites research.

The objectives for the study are:

1. To examine the effect of tax revenue growth on economic growth.

2. To examine the multiplicative role of inflation in the tax revenue growth-economic growth nexus in Ghana.

The paper focused on Ghana because the country has, over the years, experienced an upsurge in tax revenue through the introduction of new taxes such as the electronic transaction tax (E-Levy) without commensurate economic growth [14]. Also, we focused on Ghana because the country has, over the years, resorted to credit facilities from the International Monetary Fund (IMF), which have implications for its tax revenue since a portion of its revenue will be used to service debt interest, which dampens its growth strength. Moreover, the study focused on Ghana because the country is plagued with perennial vices such as illegal mining that has destroyed its vegetation and requires the government to implement an eminent initiative by employing youth to plant trees to restore its ecology dubbed youth in afforestation. This initiative takes a chunk of money from the country's consolidated fund that could have been used to finance development projects. The findings of the study will serve as a guide to the Ministry of Finance as a policymaker as to what pragmatic fiscal policies to pursue to ensure effective mobilization of tax revenue and its utilization while taxpayers would know the essence of paying tax to increase compliance. Again, the actual role of inflation in the examined nexus will direct policymakers like the central bank as to the kind of inflation-oriented policy to be pursued to put inflation under control while ensuring economic growth. Finally, the findings of the study will enrich literature.

The remaining part of the study is structured as follows: Section two is a literature review; Section three describes methodology; Sections four and five present results and discussion and conclusion and recommendation, respectively.

Literature review

Theoretical underpinning

The study draws its motivation from the public choice theory and the institutional economics theory.

Public choice theory. This theory elucidates how political dynamics and incentives impact the government's decisions regarding revenue mobilization and expenditure distribution [15]. Therefore, policies that increase government spending on the productive sectors of the economy along with taxation policies that lessen the tax burden on consumers and businesses to boost consumption and excite economic growth would be implemented by public officials who anticipate receiving incentives when the economy grows [16]. The theory is pertinent to the current topic since it emphasizes government expenditure and taxation, which are the notions used to measure fiscal policy in this study; therefore, the theory is relevant to the present discussion. Empirical studies [17, 16] have applied theory.

Institutional economic theory. This theory contends that an efficient legal system, along with the appropriate frameworks and structures, can carry out its supervisory function of keeping an eye on how companies and agencies behave, guaranteeing ethical business practices that support sustainable development [18]. According to the theory, the existence of strong institutions would result in the industry sectors being protected by suitable laws and regulations, which would increase investor confidence and draw in foreign companies to support the economy [18–20]. The theory considers institutional quality's role in sustainable growth as investigated by the study, making it pertinent to the current conversation. Existing studies [21, 20] applied this theoretical framework.

Economic growth theory. This theory suggests that expansion in an economy is mostly driven by capital injection, labor, and technological advancement in an economy over a period [22, 23]. The economic growth framework emphasizes that tax revenue can be pushed into infrastructure

development, human capital enhancement, and stimulating economic growth [24]. Nevertheless, overburdening the taxpayer with excessive tax can be a counterproductive and demeaning investment in the short and long run. On the other hand, if inflationary pressures are not put under control, it will reduce the purchasing power and distort economic stability in both runs [25, 21, 22]. In the Ghanaian case, striking the balance between tax revenue mobilization and calming inflation while ensuring growth is paramount for ensuring economic growth. Revenue from effective tax policies can finance developmental projects, whereas inflation can hamper these efforts. Therefore, Ghana's economic advancement depends on these dynamics. Studies [25, 26] have applied this theory.

Empirical review

On the empirical ground, diverse empirical studies have investigated the effects of taxes on economic growth. Results are far from being conclusive, varying across countries, methodologies, and fiscal variables involved. This study considers prior empirical works in this context. [21] investigated the relationship between taxation and economic growth in African countries using a dataset from 2004 to 2013. After subjecting the data to regression tests, it was revealed that tax revenue is positively related to gross domestic product (GDP) and promotes economic growth in Africa. The weakness of the study lies in its use of only a few African countries, neglecting Asia and other parts of the world. Also, the study failed to consider events after 2013. In a similar vein, an empirical investigation conducted by [10] that used multiple regression as a tool to analyze the effect of tax revenue on economic growth in Nigeria reported that tax revenues impact gross domestic product positively. This finding is consistent with the result of [21], who also reported a positive effect. The study is entangled with the limited dataset, which can lead to spurious results. In addition, [27] employed the least squares technique and recorded a positive relationship between tax revenue and economic growth. The study examined the impact of tax revenue on Nigeria's economic growth using Company Income Tax (CIT), value added tax (VAT), and petroleum profit tax (PPT) as referents for tax revenue and GDP for economic growth for 11 years.

Conversely, [7] employed the robust least-squares estimation method to explore how statutory tax on corporate income and personal income affects economic growth in 25 oil-wealthy OECD countries. The result showed that both taxes adversely affect economic growth, which contradicts the results of [21] and [9], who provided positive findings. Also, using a 20-year dataset from nine different countries in the Association of Southeast Asian Nations (ASEAN) and panel data estimation techniques to inquire about the relationship between an increase in taxes and economic growth, [10] discovered a positive relationship. The empirical findings showed that higher tax revenue could reduce the disadvantages of tax impacts to boost economic growth. However, due to a lack of data collection, the study is confined to examining the tax revenue ratio overview, which overlooks the tax structure. The negative result misaligns with the positive result adduced by [22, 10]. The weakness of the study is the use of limited scope making it lack generalizability. Similarly, a study by [28] on the effect of the value-added tax on economic growth in Kenya and [29] research using the auxiliary approach and the ordinary least squares estimation technique found a significant and negative relationship between value-added tax and economic growth. Similarly, [30] applied a dynamic panel threshold regression to examine the nonlinearities in the inflation-growth nexus in Africa and recorded the existence of significant nonlinearities in the inflation-growth nexus, which is opposed by the positive impact of inflation on economic growth [31].

Hypothesis development and priori

As reported by [21], there is a positive significant relationship between government expenditure, government revenue, and sustainable development. Findings indicated that tax revenue is positively related to GDP and promotes economic growth in Africa. It was significant at the 5% level. The study concluded that tax revenue has a significant positive relationship with gross domestic product. This study is supported by the account of [10], whose empirical study unveiled that both government expenditure and revenue positively affect sustainable economic growth. The study finds a positive impact of tax revenue on the gross domestic product of Nigeria and Ghana. Several studies have [21, 9, 7]

provided evidence that tax revenue positively affects economic growth. In contrast to the aforementioned findings, [5] discovered that there is a negative relationship between tax revenue and economic growth. The empirical findings showed that higher tax revenue could reduce the disadvantages of tax impacts to boost economic growth. A similar negative relationship between the tax burden and the rate of economic growth in Nigeria and South Africa was reported by [1]. [31] posited from their empirical inquiry that inflation positively impacts economic growth.

Therefore, based on the above discourse, the following hypotheses were formulated.

H_1: *Tax revenue growth significantly and positively affects economic growth.*

H_2: *Inflation significantly and negatively moderates the tax revenue growth-economic growth nexus.*

Methodology

The study used time series secondary data spanning from 2005 to 2023. The use of only secondary data in the research is a result of its accuracy, reliability, and standardized nature, other than primary data, as supported by [32–36]. This 18-year data period was considered appropriate based on the assertion by [37] that using a data period of ten years and above for statistical research is sufficient to yield reliable results, as confirmed by [38–41], who used a data period of ten years and above in their respective studies and reported reliable results. The adoption of the quantitative technique by the study was motivated by the approach's advantage of generalizing results to a larger population and its empirical use by studies [42, 43]. The data for the variables were extracted from the World Development Indicators (WDI) published in 2023). The reliance on WDI for data is anchored on the source's credibility in providing accurate data for several variables, as attested by studies [44, 45].

Model specification

The study employed the linear model with motivation from [46, 47]. Three models are spelled out for the study in three equations. Equation (1) is a functional form relating the regressors to the regressand in the model. Equation (2) is a vector form of the regressand and the regressors expressing the objective one of the study, the model incorporates the first lag of economic growth to know its impact on the current year's economic growth along with tax revenue and control variables. Equation (3) is a vector form expressing objective two, in this model the study multiplies inflation and tax revenue to serve as the interactive term together with control variables to examine its impact on the dependent variable.

$$GDPG_t = TRG_t, PR_t, GEG_t, FDII_t, IF_t, \quad (1)$$

$$GDPG_t = \alpha + \gamma_1 GDPG_{t-1} + \gamma_2 TRG_t + \gamma_3 PR_t + \\ + \gamma_4 GEG_t + \gamma_5 FDII_t + \gamma_6 IF_t + \mu_t, \quad (2)$$

$$GDPG_t = \alpha + \gamma_1 TRG_t * IF_t + \gamma_2 PR_t + \\ + \gamma_3 GEG_t + \gamma_4 FDII_t + \mu_t, \quad (3)$$

where *GDP* — Economic growth; *TRG* — Tax revenue growth; *PR* — Policy rate; GEG — Government expenditure growth; Foreign direct investment index, *IF* — Inflation; α — intercept; γ — elasticities; μ — stochastic error term; t — time series factor; *TRG*IF* — moderating factor. The notion behind exposited Models 2 and 3 is that variations in the tax revenue growth rate and inflation would impact economic growth.

Estimation technique

The study employed the Autoregressive Distributed Lag (ARDL) to the cointegration estimation approach, which is a time series estimation technique that alludes to the fact that both the lag of the dependent and the independent variables are contemporaneously related in the model [49]. The application of the ARDL is a result of certain peculiar strengths associated with the technique, which are that the ARDL is efficient in both small and large datasets, as confirmed by [5, 50]. Again, the ARDL can produce both long-run and short-run estimates of explanatory variables on the explained variable by substituting the lag and the error lag terms as supported by [51]. Also, the ARDL does not require a specific order of variables, making it applicable to variables with a mixed order of I (0 and 1). Moreover, the ARDL is efficient in addressing data's inherent problems, such as serial or autocorrelation, as confirmed [52]. Furthermore, the technique can estimate the error correction term through a linear transformation. Additionally, the appli-

cation of the technique by existing studies motivated its adoption by the study [37]. In inference, the study found the variables under consideration are of order I (0) and I (1), which serve as empirical justification. Mathematically, the assumptions of the technique are expressed as follows.

$$GDPG_t = \theta_1 \sum_{i=0}^{\rho} GDPG_{t-1} + \theta_2 \sum_{i=1}^{K} TRG_{t-1} + \theta_3 \sum_{i=1}^{K} PR_{t-1} + \theta_4 \sum_{i=1}^{K} GEG_{t-1} + \theta_5 \sum_{i=1}^{K} FDII_{t-1} + \theta_6 \sum_{i=1}^{K} IF_{t-1} + \\ + \sigma_1 GDPG_{t-1} + \sigma_2 TRG_{t-1} + \sigma_3 PR_{t-1} + \sigma_4 GEG_{t-1} + \sigma_5 FDII_{t-1} + \sigma_6 IF_{t-1} + \varphi. \quad (4)$$

Equation (4) gives the unrestricted lad estimation posited by the ARDL technique. The acronyms used are θ — elasticities of the lag variables estimating short-term effect whilst $\sigma_1 - \sigma_6$ is the slope long-run effect, $t - 1$ — lags. The ARDL posits long-run cointegration among the explained and the explanatory variables tested at a 5% level with the null of no cointegration expressed as $\boldsymbol{H_0}$: $P = K = K = K = K = K = K = K = K = 0$.

Error correction model

The error correction term can be used to measure the long-run variations in the model, while the elasticities of the lag variables measure the short-term effect of the variables (*Table 1*) [36], expressed as:

$$GDPG_t = \theta_1 \sum_{i=0}^{\rho} GDPG_{t-1} + \theta_2 \sum_{i=1}^{K} TRG_{t-1} + \theta_3 \sum_{i=1}^{K} PR_{t-1} + \\ + \theta_4 \sum_{i=1}^{K} GEG_{t-1} + \theta_4 \sum_{i=1}^{K} FDII_{t-1} + \theta_5 \sum_{i=1}^{K} IF_{t-1} + \omega ECT_{t-1} + \varepsilon t, \quad (5)$$

where ECT — Error correction term; εt — error term; θ — slope of the regressors; ω — slope of the ECT.

The inclusion of foreign direct investment as a control in the study is justified on the basis that foreign capital inflows boost economic growth through employment creation, which increases direct taxes such as pay-as-you-earn and corporate tax [53]. Government expenditure was incorporated in the study because rising government spending means an expansionary policy that pumps more money into productive and auxiliary sectors of the economy, such as paying contractors. When workers are paid, they get enough to spend, save, and invest, which stimulates economic activities and increases economic growth when inflation is controlled [5, 54]. The basis for incorporating policy rates in the study is that when policy rates are low, more businessmen can contract loans to expand their production capacities, which increases employment and consequently economic growth with ceteris paribus [55]. Inflation was incorporated in the study because rising prices of goods and services increased the cost of production and cost of living, dampened sales, and limited consumption which can adversely impact government revenue targets [56, 57].

Results

This section of the study presents and discusses the results obtained from the statistical tests.

Descriptive analysis

Per the descriptive results in *Table 2*, GDP recorded an average of 6.11%, depicting a steady expansion in the economy; nevertheless, a standard deviation of 3.0 indicates moderate dispersion from the average, and the positive skewness of 0.57 indicates a few periods of robust economic growth, while the probability of 0.37 shows a normal distribution. Tax revenue averaged approximately 8.81%, which shows a healthy revenue mobilization against a deviation of 2.30, indicating a minor variability around the average; a skewness of 1.85 demonstrates occasional surges in tax revenue. With a mean of approximately 39.32%, government spending has shot up significantly; on the other hand, a deviation of 10.73 indicates a moderate variability from the center of its distribution. A pos-

Table 1
Measurement and source of the variables

Variable	Measurement	Source
GDPG	Increase in the total production of goods and services	WDI (2023)[1]
TRG	Percentage growth of tax revenue for a fiscal year	WDI (2023)
PR	Benchmark interest rate	Bank of Ghana (2023)[2]
GEG	Percentage growth in government expenditure for a fiscal year	WDI (2023)
FDII	Net of foreign capital flows	WDI (2023)
IF	Consumer price index	WDI (2023)

Source: Author's construct (2025).

[1] *World bank (2023). World Development Indicators. URL: https//: www.databank.worldbank.org*

[2] *Bank of Ghana (2023). Monetary policy committee. URL: www.bog.gov.gh*

Table 2
Descriptive statistics

Variables	GDPG	TRG	GEG	IF	PR	FDII
Mean	6.1115	8.8053	39.3226	13.1542	18.8421	5.4184
Median	5.9735	8.0100	32.8000	11.6800	18.5000	5.5700
Maximum	14.0471	15.3100	58.3900	19.2500	27.0000	9.4700
Minimum	0.5139	6.9600	31.9000	7.1400	12.5000	1.3500
Std. Dev.	3.0003	2.3022	10.7333	3.9016	4.4129	2.4205
Skewness	0.5786	1.8504	1.0227	0.1493	0.4032	0.0471
Kurtosis	4.0515	5.2829	2.1424	1.6514	2.0569	1.9190
Jarque-Bera	1.9356	14.9685	3.8941	1.5104	1.2191	0.9322
Probability	0.3799	0.0806	0.1427	0.4699	0.5436	0.6275
Sum	116.1177	167.3000	747.1300	249.9300	358.0000	102.9500
S. Sq. Dev.	162.0371	95.4023	2073.6780	273.9985	350.5263	105.4553
Observation	19	19	19	19	19	19

Source: E-views estimate (2025).

Note. The acronyms have the following meanings: GDPG — Gross Domestic Product Growth; TRG — Tax Revenue growth; GEG — Government Expenditure Growth; IF — Inflation; PR — Policy Rate and FDII — Foreign Direct Investment Index.

itive skewness of 1.02 shows occasional surges in government spending with a non-normality of 0.14 over the years. The mean for inflation shows that prices of goods and services have been moderately high with a dispersion of 13.15 against a positive skewness and normal distribution. The policy rate and FDI index, on the other hand, registered moderate averages depicting a soar in the lending benchmark rate and foreign capital flows into Ghana alongside minor deviations and positive skewness for the policy rate, but FDI was skewed negatively. Data for PR and FDI were normally distributed.

Correlation analysis

The inquiry performed a pairwise correlation test to assess the presence of multicollinearity which previous studies adjudged is present if

Table 3
Pairwise correlation

Variable	GDPG	TRG	GEG	IF	PR	FDII
GDPG	1.0000					
TRG	0.4509	1.0000				
GEG	−0.2509	−0.1629	1.0000			
IF	−0.2971	−0.0281	−0.0146	1.0000		
PR	−0.2683	−0.4124	0.3217	0.2702	1.0000	
FDII	0.3944	−0.0618	−0.6338	0.0470	−0.3729	1.0000

Source: E-views estimate (2025).

Table 4
VIF test

Variable	VIF	1/VIF
GEG	1.79	0.487
FDII	2.05	0.557
PR	1.68	0.593
TRG	1.39	0.717
IF	1.13	0.882
Mean VIF		1.61

Source: E-views (2025).

there is a correlation coefficient of 0.7 and above [58]. Meanwhile, another strand of literature asserts that a correlation coefficient of above 8.0 indicates the presence of multicollinearity [59]. Per the correlation result in *Tables 3, 4* which shows the highest correlation of 0.451 recorded between TRG and GDPG, the investigation concludes the absence of multicollinearity in the series. This conclusion supports the account of [60] and [43] whose study reported a correlation coefficient of below 0.8 and concluded the absence of multicollinearity.

As a confirmatory measure, the study conducted a Variance Inflation Factor (VIF) test which assesses the correlation between a variable and the series. Per existing studies, a VIF value of 8 and above shows the presence of multicollinearity [5]. According to the test results, the highest VIF was 1.77 with an associated mean VIF of 1.54, since these values are less than the benchmark of 8.0 as asserted [60], we conclude the absence of severe multicollinearity which confirms the result of the pairwise correlation.

Stationarity analysis

To examine the presence of unit root in the series, the null hypothesis of the unit root was rejected at the level for IF and TRG while the null for the remaining variables was rejected at 1st difference. Based on this result as presented in *Table 5*, the study concludes the absence of random walk in the series with mixed order of I (0) and I (1) which justifies the use of ARDL estimation.

Lag length criteria and cointegration analysis

The paper conducted the bound testing to cointegration with the null hypothesis of no cointegration expressed as H_0: P = K = K = K = K = K. The F-statistics at 5% of the bound test for the two models were above the upper bound values, therefore we reject the null and conclude there is long-run cointegration, results are presented in *Table 6*. To determine the optimal lag length for the ARDL estimation the study based on the Akaike infor-

Table 5
Stationarity test

Variable	t-Statistic	Prob.	t-Statistic	Prob.	Order
d(GDPG)	−2.432	0.2324	−3.2301	0.0214**	(1)
d(TRG)	−3.2381	0.0317**	−4.8321	0.0133**	(0)
d(FDII)	−2.8361	0.324	−3.8371	0.2451**	(1)
d(GEG)	−1.0923	0.635	−4.8362	0.009**	(1)
d(IF)	−3.9280	0.032**	−1.2921	0.0232**	(0)
d(PR)	−1.2258	0.6112	−2.3216	0.0123**	(1)

Source: E-views (2025).

Note: ** denotes significance at 5%.

Table 6
Lag length criteria and long run bound testing to cointegration

Model	Bound Test F-statistics	5% Critical Value	Remarks
GDPG=f (TRG, IF, GEG, PR, FDII)	6	Upper (3.41) Lower (2.42)	Cointegration Exist
GDPG=f(TRG, TRG_IF, GEG, PR, FDII)	5	Upper (3.28) Lower (2.37)	Cointegration Exist

$H_{0:}$ no cointegration, accept if F< critical value for lower bound.

Source: E-views (2025).

mation criterion, Schwarzman information criterion, and final prediction error with the result demonstrating that the appropriate previous observation to be included in the estimation based on the selection criteria is lag 1.

Models 1 and 2 registered R-squares of 74.3% and 75.8% associated with Adjusted R-squares of 72.7% and 75.5% respectively. Based on this result, the regressors explained 74.3% and 75.8% variations in the regressand which is above the acceptable benchmark of 70% as shown in *Table 7*.

Error correction model

The error correction term shows the variations in the series in the short-run period and also represents the rate of adjustment to equilibrium when there are distortions in the series that empirically fall within −1 and 0. The estimations as represented in *Table 7* recorded ECT of (−0.243) significant at 0.0002*** for Model 1 and (−0.263) significant at 0.004*** for Model 2. This shows that distortions in economic growth are significantly restored to equilibrium at a moderate rate.

Discussion

Through the ARDL test results as presented in *Table 7*, a year lag of economic growth has a positive significant effect on economic growth in both models. This demonstrates that the previous year's economic expansion encourages growth in subsequent years. On objective one, which was to assess the effect of the rate of increase in taxes on economic growth, tax revenue growth registered a statistically significant positive relationship with economic growth for Model 1 and Model 2 in the short run and long run. Per this result, the study fails to reject $\mathbf{H_1}$ and concludes the existence of positive tax revenue on economic advancement. This implies that a rise in government revenue exerts a positive effect on economic growth both in the short and the long run. The positive result means that taxes mobilized by the government are invested in productive sectors of the Ghanaian economy which facilitates the production of goods and services for locals which expands the economy and for export which yields foreign exchange.

Table 7
ARDL result for economic growth

Variables	Long run		Short run	
	Model 1 gdpg=if≠trg_if	**Model 2 gdpg=trg_if≠if**	**Model 1 gdpg=if≠trg_if**	**Model 2 gdpg=trg_if≠if**
GDPG (–1)			1.432 (0.001***)	0.564 (0.014**)
TRG	0.072 (0.017**)	0.123 (0.041**)	0.342 (0.034**)	0.248 (0.034**)
GEG	–0.085 (0.051**)	–0.061 (0.033**)	–0.053 (0.234)	–0.074 (0.031**)
PR	0.043 (0.221)	0.024 (0.643)	0.053 (0.216)	0.062 (0.524)
FDII	0.814 (0.011**)	0.831 (0.024**)	0.847 (0.042**)	0.453 (0.022**)
IF	–0.292 (0.013***)		–0.847 (0.004***)	
TRG_IF		0.081 (0.061*)		0.082 (0.071*)
ECT			–0.243 (0.002***)	–0.263 (0.004***)
R-Squared			0.743	0.758
Adj. R-Squared			0.727	0.755
Durbin. W.			2.531	2.221
Prob(F-Stat)			0.009***	0.044**

Source: E-views estimate (2025).

Note: *, **, and *** denote significance at 10%, 5%, and 1%. NB: Figures in parenthesis are probabilities whilst those without are coefficients.

The ascertained result implies that when the government invests mobilized taxes in public infrastructure, education, healthcare, and other areas, it directly contributes to economic growth through job creation and improvement in productivity. The result is intuitional because when the government invests in productive sectors of the economy to create jobs, more laborers would be employed, which increases production, consumption, and savings. The positive result aligns with the public choice theory in that, in anticipation of incentive and response to taxpayers' preferences, mobilized taxes are invested in public goods and services that create an enabling environment for economic growth [14, 15]. Again, the finding sides with the institutional theory because effective supervision of revenue allocation would ensure taxes are allocated judiciously to areas needed to promote economic growth [17]. Similarly, the positive effect aligns with the classical economic growth theory [22, 23]; this is true in the sense that investing the mobilized taxes in infrastructure and technological investment can improve the business environment, which boosts revenue and increases the tax net [24]. Supporting traders and businessmen with capital encourages business expansion and consequently increases tax revenue [24, 26]. The positive result is consist-

ent with the findings of [12], who discovered a significant positive effect of tax revenue on economic growth in Nigeria. Again, [7] found that tax revenue exerts a positive impact on economic advancement. Conversely, the finding deviated from the account of [11], who unveiled that tax revenue harms economic growth in South Asian countries. Also, the positive result contradicts the negative effect found by [6] in OECD countries and [8], who found short-term taxes impede economic expansion.

Government expenditure recorded a significant inverse relationship with economic growth in the long run for Model 1 and Model 2, but insignificant in the short run for Model 2, which shows that a rise in government spending adversely impacts economic growth. The inverse finding means that rising government expenditures are not geared toward investment in productive sectors of the economy for the studied period. This result, though counterintuitive, is not surprising because in Ghana, a chunk of the government's annual appropriation bills are geared toward payment of emoluments and interest on debt. The policy rate, on the other hand, registered a positive yet insignificant impact on economic growth both in the short and long run for Model 1 and Model 2. This finding though counter-intuitional, can be ascribed to the fact that a chunk of businesses in Ghana do not seek loans from mainstream banks due to throat-cutting interest but rather resort to loans from non-bank financial institutions such as cooperative credit unions and microfinance with moderate interest. Foreign direct investment recorded a statistically significant positive effect on economic growth in the long and short-run periods in all models tested. The positive result implies that multinational corporations' investment in Ghana leads to expansion in the economy as a result of job creation and a rise in the production of goods and services for local consumption and export. This finding is intuitional in the Ghanaian case because the country has experienced a surge in foreign investment in the last decade, which includes the arrival of renowned automobile firms such as Nissan, Toyota, Sino Truck, and Renault, among others. Inflation hurt economic growth in both the long and short runs, respectively. The plausible reason is that a rise in prices of goods and services increases the cost of living, reduces consumption, and discourages saving for investment, which in turn contracts the economic expansion.

On objective two, which was to assess the moderating role of inflation in the nexus between tax revenue and economic growth, the study discovered inflation significantly and negatively moderates the relationship between tax revenue and economic growth in the interim and the long run; based on this result, the research fails to reject the $\mathbf{H}_2$. The reason for the ascertained result is that inflation erodes the real value of tax revenues and reduces the government's ability to finance essential services and projects. Also, high inflation creates uncertainty, contracts private investment, and impedes overall economic growth. This inverse moderating role of inflation in the examined nexus is in line with the institutional theory because rising inflation can interrupt the stableness and predictability of state economic institutions, which makes it daunting for businesses and households to plan and invest, hampering economic advancement [17, 19]. Moreover, in the context of institutional theory, eroded tax revenue may limit the ability of state institutions to extend essential services and ensure regulatory measures, further dampening economic growth [24]. This result agrees with the finding of [30] who concluded that there is a non-linear effect of inflation on economic growth. The non-linear findings imply inflation impedes economic advancement which is consistent with the ascertained negative moderation role. However, the negative moderating role does not support the positive impact of inflation on economic growth as adduced by [31].

Post estimation diagnostics

To ensure the robustness of the estimations, we performed diagnostics checks.

Heteroskedasticity check

To examine the presence of heteroskedasticity through the Breusch Pagan test which tests the null that the series is homoscedastic, the test result as presented in *Table 8* shows a p-value above 0.05 as failure to reject the null and concludes that the series is homoscedastic.

Autocorrelation

The paper assessed the possibility of autocorrelation through the Durbin-Watson test with

Table 8
Heteroskedasticity test: Breusch-Pagan-Godfrey

F-statistic	0.62544	Prob. F (5,11)	0.2510
Obs*R-squared	4.4179	Prob. Chi-Square (5)	0.5219
Scaled explained SS	0.7743	Prob. Chi-Square (5)	0.7743

Source: E-views estimate (2025).

results presented in *Table 7*. Since the Durbin-Watson statistics for the two models are above the threshold of 1.5 and above, we conclude that errors in the series are not carried on to the present year.

Model stability analysis

To assess the stableness of the Model used in estimating the results, the paper conducted a recursive estimate test through the CUSUM and CUSUMSQ tests. According to the recursive estimate tests, a stable model should have the series lying in between the 5% critical margin. The result presented in *Figure* shows that the series lies in between the 5% critical margins for both tests, we, therefore, conclude that the models are stable.

Conclusion

In most countries, especially in Africa and, for that matter, Ghana, tax revenue is the main source of income for the government to run its administration and undertake developmental projects to facilitate economic growth. Over the years, developing countries have recorded success stories in increments in tax revenue; however, economic growth has not moved in tandem with this rise in revenue, which challenges the narrative about the nexus between taxes and economic growth, which leaves a gap in literature. This study examined the nexus between tax revenue growth and economic growth and examined the multiplicative role of inflation in the tax revenue growth-economic growth nexus. The paper used secondary time series data collected over 19 years and employed the ARDL testing as a cointegration technique. First, the results revealed a statistically significant positive relationship between tax revenue growth rate and economic growth in the long and short run. It is therefore concluded that investing tax revenue in productive sectors of an economy significantly facilitates economic growth. This conclusion is intuitional and aligns with the public choice theory, economic growth theory, and institutional economic theory in that prudent allocation of tax revenue encourages economic expansion. The positive relationship is consistent with the literature that supports a positive significant relationship between tax revenue and economic growth. Second, the paper found a negative significant moderating role of inflation in the tax revenue growth and economic growth relationship. Based on this finding, the paper concludes that inflation exacerbates the cost of running business and contracting businesses, which erodes tax revenue and consequently dampens the positive impact of tax revenue in promoting economic growth. The conclusion is in agreement with the institutional economic theory because the rising cost of doing business reduces tax revenue and limits the capacity of state institutions in implementing robust policies which in turn undermine economic growth.

Our paper is the first of its kind to use tax revenue growth rate percentage estimates to assess its impact on economic growth, which has not been explored in tax and economic growth literature in Africa nor on the global scene.

We acknowledge the following limitations in our study. First, the data used for the study did not capture events that preceded 2005, which could have been included to increase the period. Second, the study used only Ghana for the analysis, which may limit the generalizability of the findings to other African countries. Third, the research dwelled solely on secondary data that were collected over different periods and may be subjected to differences in standard measures used over the years.

Based on the ascertained results in conjunction with appropriate interpretations, we recommend the following. To sustain the positive impact of the tax revenue growth rate on eco-

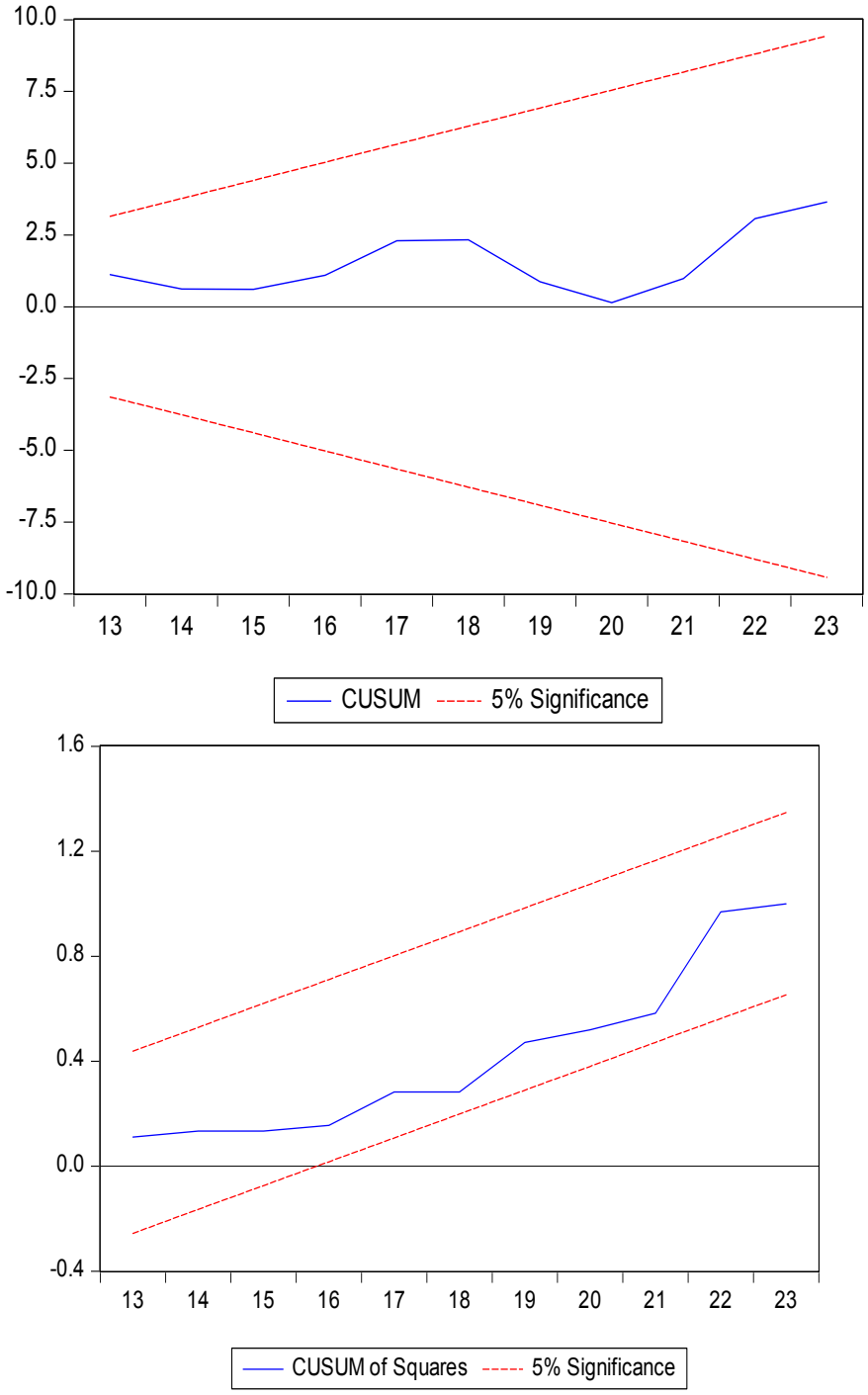

Fig. **Model stability**

Source: Developed by the authors.

nomic growth, the government should widen the tax net to involve more taxpayers to generate additional revenue to finance developmental projects. In addition, policymakers such as the Ghana Revenue Authority should close all loopholes to minimize tax evasion and tax avoidance to mobilize more tax revenue for the government. Also, policymakers should ensure that mobilized tax revenue is allocated to productive sectors of the economy to expand the economy through job creation. Moreover, to alter the negative moderating effect of inflation, policymakers should pursue inflation-mitigating strategies to reduce inflation. Finally, state institutions are implored to perform effective supervision to ensure allotted funds are properly utilized for the purpose allocated for. The study implores researchers to replicate the study in other neighboring countries, in Anglophone countries as well as Francophone countries in West Africa.

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