

Impact of Economic Volatility on Students' Academic Achievement in Secondary Schools in Plateau State: The Moderating Role of School Infrastructure and Resources

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Abstract

This study examined the impact of economic volatility on Students' Academic Achievement in secondary schools in Plateau State, with particular emphasis on the moderating role of School Infrastructure and Resources. Economic volatility was measured using Inflation Rate, Unemployment Rate, Exchange Rate and Government Spending, while Teacher Qualifications and Teacher Experience were included as control variables. A quantitative survey research design was adopted, and data were collected from 357 secondary-school teachers across the three senatorial zones of Plateau State using a structured questionnaire. The data were analysed using descriptive statistics and Partial Least Squares Structural Equation Modelling. The findings showed that Inflation Rate, Unemployment Rate, Exchange Rate and Government Spending had no significant direct effects on Students' Academic Achievement. However, School Infrastructure and Resources and Teacher Experience had positive and statistically significant effects on Students' Academic Achievement. The moderating analysis revealed that School Infrastructure and Resources significantly strengthened the relationship between Government Spending and Students' Academic Achievement, while its interactions with Inflation Rate, Unemployment Rate and Exchange Rate were insignificant. The study concludes that school-level resources and teacher experience are more important direct determinants of academic achievement than broad economic volatility indicators. It recommends increased investment in school infrastructure, effective targeting of government education expenditure and retention of experienced teachers.

Key Words: *Inflation, exchange rate, unemployment, government spending, students' academic performance, Plateau State*

Introduction

Education remains a fundamental instrument for human capital development, social mobility and sustainable economic progress, while students' academic achievement constitutes one of the principal indicators of the effectiveness of the educational system. At the secondary-school level, academic achievement reflects the extent to which students acquire expected knowledge, skills and competencies through the teaching and learning process. However, achievement is not determined solely by students' personal abilities; it is also influenced by teachers, school conditions, household circumstances and the wider economic environment. Hanushek et al. (2019) emphasised the importance of teacher cognitive skills in explaining differences in students' performance, while Adeoti and Yinusa (2016) established that teachers' characteristics are associated with the academic performance of secondary-school students. Economic conditions may also shape educational outcomes because schools and households depend on financial resources to provide the inputs required for effective learning. Echor and Lohor (2022) observed that economic recession has implications for secondary education, teachers, students and households. Similarly, Marchand and Weber (2019) demonstrated that changes in local economic conditions can influence school finance, teacher quality and students' achievement. Economic volatility may therefore constitute an important external condition affecting Students' Academic Achievement (SAA) in secondary schools.

Economic volatility generally manifests through instability in major macroeconomic indicators such as Inflation Rate (INF), Unemployment Rate (UNE), Exchange Rate (EXC) and Government Spending (GVS). Inflation can reduce household purchasing power and increase the cost of textbooks, transportation, feeding, school uniforms and other learning requirements, thereby placing additional financial pressure on students and their families. Ashraf et al. (2019) noted that socioeconomic and financial conditions influence the effectiveness of educational personnel, suggesting that broader economic pressures can affect the environment within which learning takes place. Exchange-rate depreciation may further increase the cost of imported books, computers, laboratory equipment and other educational technologies, especially in economies that depend substantially on imported educational materials. Iwu et al. (2018) stressed the importance of adequate resources and supportive conditions for effective educational delivery. Unemployment may also weaken household income, increase dependency burdens and limit parents' capacity to finance their children's education. Nagler et al. (2020) showed that changes in labour-market conditions can influence the quality of educational inputs through their effects on the teaching profession. These economic pressures may consequently affect students' attendance, access to educational materials, concentration and overall academic achievement. Seminar To be submitted 12062026

Government Spending (GVS) represents another important dimension of economic conditions affecting education because the provision and maintenance of secondary education depend substantially on public resources. Adequate government expenditure can facilitate the construction and rehabilitation of classrooms, provision of instructional materials, recruitment and remuneration of qualified teachers, professional development and acquisition of educational technologies. Papay et al. (2020) demonstrated that investment in teachers' professional development and workplace learning can improve job-related skills, while García and Han (2022) linked teachers' remuneration to academic outcomes. However, periods of economic instability may place pressure on public finances and reduce the real value of resources allocated to education. Marchand and Weber (2019) observed that changes in local revenue can affect school finances, teacher quality and students' achievement, although

additional financial resources do not automatically translate into improved outcomes unless effectively utilised. Accordingly, the relationship between government spending and academic achievement may depend on the extent to which available resources are translated into effective school inputs, instructional materials, teacher support and an enabling learning environment. Students' Academic Achievement may also be influenced by Teacher Qualifications (TQS) and Teacher Experience (TEP), which are incorporated as control variables in the study. Teachers with appropriate academic and professional qualifications are more likely to possess relevant subject knowledge, pedagogical competence and instructional skills required for effective classroom delivery. Adeoti and Yinusa (2016) found that teacher qualifications and teaching experience are significantly associated with students' academic performance. Hartiwi et al. (2020) also established that teacher certification influences teachers' performance, while Kanya et al. (2021) found teacher competence to be an important determinant of performance. Experience can further enhance a teacher's ability to manage classrooms, understand learners' differences, select appropriate teaching methods and respond effectively to instructional challenges. Hanushek et al. (2019) equally demonstrated that the quality of teachers' knowledge and skills has important implications for students' performance. Controlling for TQS and TEP is therefore necessary in order to separate the effects of economic volatility from variations in teacher-related characteristics that may independently influence Students' Academic Achievement. School Infrastructure and Resources (SIR) are particularly important because they provide the physical and instructional environment within which teaching and learning occur. Adequate classrooms, laboratories, libraries, textbooks, digital facilities, electricity, sanitation, teaching aids and other educational resources can facilitate lesson delivery, student participation and effective learning. Iwu et al. (2018) identified the work environment and institutional conditions as important elements of educational effectiveness, while Lopes and Oliveira (2020) demonstrated that school-level conditions contribute to important teacher and educational outcomes. School infrastructure may become even more important during periods of economic instability because adequately resourced schools may be better positioned to maintain teaching and learning when households and governments are under financial pressure. Kanya et al. (2021) further showed that organisational and professional conditions influence teacher performance, while Okere and Wike (2022) associated declining economic conditions with challenges in the management and effectiveness of secondary education. Thus, SIR is conceptualised in this study not only as a direct determinant of academic achievement but, more importantly, as a moderating variable that may strengthen or weaken the relationship between economic volatility and Students' Academic Achievement. Despite the growing literature on economic conditions, teacher characteristics and educational outcomes, important gaps remain. Many studies have examined economic recession, teachers' socioeconomic conditions, job satisfaction, teacher competence and students' performance separately rather than integrating major indicators of economic volatility with students' academic achievement within a single empirical framework. Ashraf et al. (2019) concentrated largely on socioeconomic characteristics and teachers' job performance, whereas Okere and Wike (2022) considered declining economic conditions in relation to teachers' effectiveness. Bacher-Hicks et al. (2019) focused on measures of teacher quality, while Rahman et al. (2023) emphasised the influence of socioeconomic factors on educational outcomes. Furthermore, although teacher qualifications, teaching experience and school resources have received considerable attention, limited emphasis has been placed on whether school infrastructure and resources alter the relationship between economic volatility and students' academic achievement. The problem is particularly important in Plateau State because variations in school resources and socioeconomic conditions may mean that students do not experience economic instability in the same manner. The study therefore addresses a contextual

and methodological gap by examining economic volatility, students' achievement, teacher characteristics and school infrastructure within an integrated framework. Seminar To be submitted 12062026

The study is anchored on Human Capital Theory, principally associated with Schultz (1961) and Becker (1964). The theory views education, knowledge, skills and training as investments that enhance individual capabilities, productivity and future economic outcomes. Within this framework, Students' Academic Achievement represents an important outcome of human-capital formation, while Teacher Qualifications, Teacher Experience and School Infrastructure and Resources constitute important inputs into the educational production process. Schultz (1961) argued that investment in education improves the quality of human resources, while Becker (1964) maintained that education and training enhance individuals' productive capacities. The application of the theory is strengthened by Hanushek et al. (2019), who showed that teacher cognitive skills are associated with student performance, and Papay et al. (2020), who demonstrated that professional learning can improve teachers' job skills. The study is therefore justified because economic volatility may constrain the resources required for effective human-capital development, while adequate school infrastructure and resources may reduce the extent to which such economic pressures translate into poor academic outcomes. Its contribution lies in shifting attention directly to Students' Academic Achievement, integrating INF, UNE, EXC and GVS as indicators of economic volatility, controlling for TQS and TEP, and determining whether SIR moderates the relationship between economic volatility and academic achievement. The findings are expected to provide useful evidence for educational planning, resource allocation and policies aimed at protecting learning outcomes during periods of economic instability. Seminar To be submitted 12062026

Research Objectives

The main objective of the study is to examine the impact of economic volatility on Students' Academic Achievement in secondary schools in Plateau State. The specific objectives include to:

- i. Assess the effect of economic volatility on Students' Academic Achievement in secondary schools in Plateau State.
- ii. Determine the moderating role of School Infrastructure and Resources in the relationship between economic volatility and Students' Academic Achievement in secondary schools in Plateau State.

Research Questions

- i. To what extent does economic volatility influence Students' Academic Achievement in secondary schools in Plateau State?
- ii. What is the moderating role of School Infrastructure and Resources in the relationship between economic volatility and Students' Academic Achievement in secondary schools in Plateau State?

Research Hypotheses

The research hypotheses are stated in null form as follows:

H₀₁: Economic volatility has no significant effect on Students' Academic Achievement in secondary schools in Plateau State.

H₀₂: School Infrastructure and Resources do not significantly moderate the relationship between economic volatility and Students' Academic Achievement in secondary schools in Plateau State.

Methodology

The study will adopt a quantitative survey research design to examine the impact of economic volatility on Students' Academic Achievement (SAA) in secondary schools in Plateau State and to determine the moderating role of School Infrastructure and Resources (SIR). The survey design is appropriate because it permits the collection of standardised quantitative information from respondents concerning inflation, unemployment, exchange rate, government spending, teacher characteristics, school resources and students' academic achievement. This follows the approach adopted in the seminar paper, which employed a survey design for examining economic volatility within the secondary-school system in Plateau State.

Population, Sample Size and Sampling Technique

The population of the study will comprise 3,313 secondary-school teachers drawn from the three senatorial zones of Plateau State: Plateau South, Plateau Central and Plateau North. The sample size will be determined using the Taro Yamane (1967) formula at a 5% margin of error, giving a sample of 357 respondents. The sample will be proportionately distributed as 134 respondents from Plateau South, 107 from Plateau Central and 116 from Plateau North. A proportionate stratified random sampling technique will first be used to ensure adequate representation of the three senatorial zones, after which simple random sampling will be applied in selecting individual respondents within each zone. Taro Yamane (1967) statistical formula is stated:

$$n = \frac{N}{(1+N(e)^2)} \quad 3.1$$

where n = Sample size, N = population, 1 = statistical constant and e = the margin of error of 0.05. Note: $400 \leq N \leq 10,000$

$$\text{Plateau South} = \frac{3313}{(1 + 3313 (0.05)^2)} = \frac{3313}{(1 + 3313 (0.0025))} = \frac{3313}{(1 + 8.2825)} = \frac{3313}{(9.2825)} \\ = 357 \text{ approx}$$

Table 1 Population and Sample Distribution

S/No	Senatorial Zones	Population	Sample Share
1	Plateau South	1245	$\frac{1245}{3313} * 357 = 134$
2	Plateau Central	987	$\frac{987}{3313} * 357 = 107$
3	Plateau North	1081	$\frac{1081}{3313} * 357 = 116$
Total		3313	357

Source: Plateau State Ministry of Education, Jos

Instrument and Method of Data Collection

Primary data will be collected using a structured questionnaire administered to secondary-school teachers in the selected schools. The instrument will contain two sections. Section A will obtain respondents' demographic information, while Section B will contain items measuring Students' Academic Achievement (SAA), Inflation Rate (INF), Unemployment Rate (UNE), Exchange Rate (EXC), Government Spending (GVS), Teacher Qualifications (TQS), Teacher Experience (TEP), and School Infrastructure and Resources (SIR). Responses will be measured using a five-point Likert scale, ranging from Strongly Disagree (1) to Strongly Agree (5). Although the seminar paper contains references to both four-point and five-point scales, the revised study adopts the five-point scale stated in its instrument description for consistency.

Technique for Data Analysis

Data collected for the study will be analysed using descriptive and inferential statistical techniques. Frequencies, percentages, means and standard deviations will be used to summarise respondents' demographic characteristics and questionnaire responses. Descriptive statistics are appropriate for presenting survey data in a clear and interpretable form and are widely used in quantitative educational research (Creswell & Creswell, 2017). Questionnaire-based studies such as Ashraf et al. (2019) have similarly employed descriptive statistical techniques in examining socioeconomic conditions and educational outcomes. Seminar To be submitted 12062026 The inferential analysis will employ Partial Least Squares Structural Equation Modelling to estimate both direct and moderating relationships among the study variables. The measurement model will be assessed using indicator loadings, Cronbach's alpha, composite reliability, average variance extracted and discriminant validity, while multicollinearity will be examined using the variance inflation factor. The structural model will be evaluated using path coefficients, t-statistics, probability values and the coefficient of determination, while bootstrapping will be applied to determine the statistical significance of the estimated effects at the 5 per cent level. Hair et al. (2019) emphasised the importance of reliability, validity and explanatory power in multivariate analysis, while Layek and Koodamara (2024) and Joshi et al. (2024) demonstrate the usefulness of Structural Equation Modelling in education-related studies. Seminar To be submitted 12062026 For the first objective, economic volatility will be represented by Inflation Rate, Unemployment Rate, Exchange Rate and Government Spending, while Teacher Qualifications and Teacher Experience will be included as control variables. For the second objective, interaction terms between School Infrastructure and Resources and each indicator of economic volatility will be introduced to determine whether the availability and quality of school resources alter the strength or direction of the relationship between economic volatility and Students' Academic Achievement. Thus, the analysis will estimate the direct effect of economic volatility on Students' Academic Achievement and the moderating effect of School Infrastructure and Resources, while controlling for Teacher Qualifications and Teacher Experience. This approach is consistent with the application of interaction effects in multivariate analysis for examining conditional relationships among variables (Hair et al., 2019).

Table 2: Questionnaire Distribution

Senatorial Zone	Distributed	Returned	Percentage (%)
Plateau South	134	133	37.36%
Plateau Central	107	107	30.06%
Plateau North	116	116	32.58%
Total	357	356	100%

Source: Author's Compilation, 2026

Results and Discussion

Table 2 shows the distribution and return rate of questionnaires across the three senatorial zones of Plateau State. Out of 357 questionnaires distributed, 356 were successfully returned, indicating a very high response rate. Plateau South recorded 133 returned questionnaires, representing 37.36% of the total responses. Plateau Central returned 107 questionnaires, accounting for 30.06%, while Plateau North returned 116 questionnaires, representing 32.58%. The distribution shows that responses were fairly drawn from all three zones, with Plateau South having the highest share and Plateau Central the lowest.

Construct Reliability and Validity**Table 3 Construct Reliability and Validity**

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
EXC	0.687	0.803	0.785	0.451
GVS	0.715	0.632	0.747	0.406
INF	0.753	0.857	0.807	0.499
SAA	0.898	0.905	0.926	0.717
SIR	0.815	0.87	0.86	0.555
TEP	0.845	0.864	0.89	0.619
TQS	0.908	0.937	0.931	0.729
UNE	0.811	0.778	0.834	0.51

Author's Computation

Table 3 indicates that the measurement model demonstrates generally acceptable reliability and convergent validity, although a few constructs require caution. Cronbach's alpha values exceed the recommended 0.70 threshold for GVS, INF, SAA, SIR, TEP, TQS and UNE, while EXC records a slightly lower value of 0.687, which may still be regarded as marginally acceptable in an exploratory study. Composite reliability (rho_c) values for all constructs are above 0.70, confirming satisfactory internal consistency, although GVS records a relatively low rho_a value of 0.632. In terms of convergent validity, SAA, SIR, TEP, TQS and UNE all have Average Variance Extracted values above 0.50, indicating adequate convergence. INF records an AVE of 0.499, which is essentially at the acceptable threshold, whereas EXC and GVS have lower AVE values of 0.451 and 0.406 respectively, suggesting weaker convergent validity. Overall, the measurement model is largely reliable and valid, but the indicators measuring EXC and particularly GVS may require further examination or refinement before interpreting the structural model.

Questions Research One: To what extent does economic volatility influence Students' Academic Achievement in secondary schools in Plateau State?**Table 4 Economic Volatility and Student's Performance**

Paths	Original sample	Sample mean	Confidence Interval		Standard deviation	T statistics	P values
			2.50%	97.50%			
EXC -> SAA	0.096	0.101	-0.096	0.299	0.101	0.95	0.342
GVS -> SAA	-0.017	-0.03	-0.342	0.267	0.169	0.098	0.922
INF -> SAA	0.098	0.068	-0.2	0.307	0.134	0.735	0.462
SIR -> SAA	0.299	0.293	0.096	0.456	0.092	3.269	0.001
TEP -> SAA	0.597	0.609	0.172	1.073	0.25	2.39	0.017
TQS -> SAA	-0.138	-0.112	-0.298	0.082	0.098	1.416	0.157
UNE -> SAA	-0.012	-0.007	-0.144	0.119	0.064	0.191	0.848

Source: Author's Computations

Table 4 presents the direct effects of economic volatility indicators and related educational factors on Students' Academic Achievement in secondary schools in Plateau State. Exchange Rate has a positive but statistically insignificant effect on Students' Academic Achievement, with a coefficient of 0.096, t-statistic of 0.950 and p-value of 0.342. Its confidence interval

ranges from -0.096 to 0.299 and includes zero, confirming the absence of a statistically significant effect. Government Spending also records an insignificant effect, although the coefficient is negative at -0.017 , with a t-statistic of 0.098 and p-value of 0.922 . The confidence interval of -0.342 to 0.267 equally includes zero. These results indicate that neither Exchange Rate nor Government Spending significantly explains variations in Students' Academic Achievement at the 5 per cent level.

Inflation Rate records a positive coefficient of 0.098 , suggesting that increases in perceived inflation are associated with a slight increase in Students' Academic Achievement; however, the effect is statistically insignificant, with a t-statistic of 0.735 and p-value of 0.462 . The confidence interval of -0.200 to 0.307 includes zero, further confirming the lack of statistical significance. Similarly, Unemployment Rate has a negative but negligible coefficient of -0.012 , with a t-statistic of 0.191 and p-value of 0.848 . Its confidence interval of -0.144 to 0.119 also includes zero. Therefore, Inflation Rate and Unemployment Rate do not exert statistically significant direct effects on Students' Academic Achievement in the estimated model. Among the school- and teacher-related variables, School Infrastructure and Resources have a positive and statistically significant effect on Students' Academic Achievement, with a coefficient of 0.299 , t-statistic of 3.269 and p-value of 0.001 . Its confidence interval of 0.096 to 0.456 excludes zero, indicating a reliable positive effect. Teacher Experience also has a strong positive and significant effect, with a coefficient of 0.597 , t-statistic of 2.390 and p-value of 0.017 , implying that greater teaching experience is associated with improved Students' Academic Achievement. In contrast, Teacher Qualifications have a negative but statistically insignificant effect, with a coefficient of -0.138 , t-statistic of 1.416 and p-value of 0.157 . This suggests that, after accounting for the other variables in the model, Teacher Qualifications do not independently explain variations in Students' Academic Achievement at the 5 per cent significance level. With respect to H_{01} : Economic volatility has no significant effect on Students' Academic Achievement in secondary schools in Plateau State, the results show that all four indicators of economic volatility—Exchange Rate, Government Spending, Inflation Rate and Unemployment Rate—have p-values greater than 0.05 . Accordingly, H_{01} cannot be rejected. The finding implies that economic volatility does not have a statistically significant direct effect on Students' Academic Achievement in the sampled secondary schools at the 5 per cent level. However, the significant positive effects of School Infrastructure and Resources and Teacher Experience indicate that school-level resources and teacher-related characteristics are more important direct predictors of Students' Academic Achievement within the estimated model.

Research Question Two: What is the moderating role of School Infrastructure and Resources in the relationship between economic volatility and Students' Academic Achievement in secondary schools in Plateau State?

Table 6: Economic Volatility, Students' Performance and the Moderating Impact of School Infrastructure and Resources

	Original sample	Sample mean	Confidence Interval		Standard deviation	T statistics	P values
			2.50%	97.50%			
EXC -> SAA	0.025	0.038	-0.135	0.214	0.088	0.288	0.774
GVS -> SAA	0.122	0.102	-0.259	0.468	0.196	0.62	0.535
INF -> SAA	0.057	0.039	-0.201	0.272	0.124	0.463	0.644
SIR -> SAA	0.183	0.179	-0.008	0.342	0.089	2.057	0.040
TEP -> SAA	0.521	0.537	0.131	0.992	0.24	2.168	0.030
TQS -> SAA	-0.077	-0.063	-0.259	0.167	0.108	0.715	0.475
UNE -> SAA	0.178	0.149	-0.087	0.336	0.104	1.713	0.087

SIR x INF -> SAA	0.115	0.093	-0.113	0.266	0.096	1.202	0.229
SIR x UNE -> SAA	-0.083	-0.07	-0.228	0.139	0.094	0.891	0.373
SIR x EXC -> SAA	-0.089	-0.07	-0.222	0.106	0.082	1.09	0.276
SIR x GVS -> SAA	0.374	0.362	0.201	0.548	0.087	4.283	0.000

Source: Author's Computation

Table 6 shows that School Infrastructure and Resources have a positive and statistically significant direct effect on Students' Academic Achievement, with a coefficient of 0.183, t-statistic of 2.057 and p-value of 0.040. Teacher Experience also records a positive and significant effect, with a coefficient of 0.521, t-statistic of 2.168 and p-value of 0.030. By contrast, the direct effects of Exchange Rate, Government Spending, Inflation Rate and Teacher Qualifications are statistically insignificant at the 5 per cent level, while Unemployment Rate is only marginally significant at the 10 per cent level with a p-value of 0.087. These results suggest that school-level resources and teacher experience are more important direct predictors of Students' Academic Achievement than most of the macroeconomic variables in the moderated model. Focusing on the moderating effects, the interaction between School Infrastructure and Resources and Government Spending is positive and statistically significant, with a coefficient of 0.374, t-statistic of 4.283 and p-value of 0.000. This indicates that School Infrastructure and Resources significantly strengthen the relationship between Government Spending and Students' Academic Achievement. However, the interaction between School Infrastructure and Resources and Inflation Rate is positive but insignificant, with a coefficient of 0.115 and p-value of 0.229. The interaction with Unemployment Rate is negative and insignificant, with a coefficient of -0.083 and p-value of 0.373, while the interaction with Exchange Rate is also negative and insignificant, with a coefficient of -0.089 and p-value of 0.276. Therefore, the moderating influence of School Infrastructure and Resources is supported only in the relationship between Government Spending and Students' Academic Achievement, but not in the relationships involving Inflation Rate, Unemployment Rate or Exchange Rate. With respect to H₀₂: School Infrastructure and Resources do not significantly moderate the relationship between economic volatility and Students' Academic Achievement in secondary schools in Plateau State, the result provides partial evidence against the null hypothesis. Since only the interaction between School Infrastructure and Resources and Government Spending is statistically significant at the 5 per cent level, H₀₂ cannot be rejected in an overall sense. However, for the specific Government Spending interaction, the null hypothesis is rejected because School Infrastructure and Resources significantly moderate that relationship. In practical terms, the findings indicate that the moderating role of School Infrastructure and Resources is selective rather than general across all dimensions of economic volatility.

Stability Tests

Table 6 indicates that multicollinearity is generally not a serious problem in the moderated model, as most Variance Inflation Factor values are below the conventional threshold of 5. The values for Exchange Rate, Government Spending, Inflation Rate, School Infrastructure and Resources, Teacher Qualifications, Unemployment Rate, and all four interaction terms range from 1.895 to 3.982, suggesting acceptable levels of collinearity. However, Teacher Experience records a Variance Inflation Factor of 5.726, which exceeds the usual threshold and therefore indicates some potential multicollinearity concern for this variable. The coefficient of determination of 0.787 shows that the explanatory variables and interaction terms jointly

account for 78.7 per cent of the variation in Students' Academic Achievement, while the adjusted coefficient of determination of 0.760 indicates that the model retains strong explanatory power after adjusting for the number of predictors.

With respect to overall model fit, the Standardised Root Mean Square Residual of 0.148 is above the commonly accepted benchmark of 0.08, indicating weak model fit. Similarly, the Normed Fit Index values of 0.213 for the saturated model and 0.214 for the estimated model are substantially below the preferred threshold of 0.90, also suggesting poor overall fit. The d_{ULS} , d_G and chi-square statistics further provide information on discrepancy between the observed and model-implied structures, but their interpretation is more meaningful when compared with corresponding bootstrap reference values. Overall, the model demonstrates strong explanatory capacity but weak global fit, while the elevated Variance Inflation Factor for Teacher Experience suggests that this variable should be examined carefully for possible overlap with other predictors.

Table 6 Stability Tests

VIF					Saturated model	Estimated model
EXC	->	2.609	UNE -> SAA	2.686	SRMR	0.148
SAA						0.148
GVS	->	3.982	SIR x INF ->	2.051	d_{ULS}	17.865
SAA			SAA			17.861
INF	->	2.842	SIR x UNE ->	2.112	d_G	40.634
SAA			SAA			40.475
SIR	->	2.338	SIR x EXC ->	1.917	Chi-square	6728.936
SAA			SAA			6725.4
TEP	->	5.726	SIR x GVS ->	1.895	NFI	0.213
SAA			SAA			0.214
TQS	->	2.491	R-square	0.787	R-square Adjusted	0.76
SAA						

Source: Author's Computation

Discussion of Findings

The findings show that the direct effects of the major indicators of economic volatility—Exchange Rate, Government Spending, Inflation Rate and Unemployment Rate—on Students' Academic Achievement are statistically insignificant at the 5 per cent level. Consequently, the first null hypothesis cannot be rejected, indicating that economic volatility does not independently explain significant variations in students' achievement in the sampled secondary schools. This finding differs somewhat from Echor and Lohor (2022), who reported that economic recession adversely affected secondary education, teachers, students and households, and from Marchand and Weber (2019), who established that changes in local economic conditions can influence school finances, teacher quality and student achievement. It also contrasts with the broader expectation that inflation, exchange-rate instability and unemployment should impair educational outcomes through reduced purchasing power, higher costs of instructional materials and weaker household financial capacity. However, the result is compatible with Nagler et al. (2020), whose evidence suggests that the effects of macroeconomic conditions on education may operate through indirect channels, particularly changes in teacher quality and labour-market conditions, rather than through an immediate direct effect on students' achievement. A particularly important finding is the positive and statistically significant effect of School Infrastructure and Resources on Students' Academic

Achievement. The direct model produced a coefficient of 0.299 with a probability value of 0.001, indicating that improvements in school facilities and instructional resources are associated with better academic achievement. Teacher Experience also exerted a positive and significant effect, with a coefficient of 0.597 and a probability value of 0.017. These findings are consistent with the empirical literature emphasising the importance of the immediate school environment in determining educational outcomes. Adequate classrooms, textbooks, laboratories, digital facilities and other resources provide the conditions necessary for effective teaching and learning, while experienced teachers are better positioned to employ appropriate instructional strategies and classroom-management techniques. Adeoti and Yinusa (2016) similarly found teaching experience and teacher characteristics to be significant determinants of students' academic performance, while Kanya et al. (2021) reported that teacher competence and organisational conditions significantly influence teacher performance. The result therefore suggests that school-specific human and physical resources may have a more immediate influence on academic achievement than broad macroeconomic conditions.

The insignificant effect of Teacher Qualifications deserves particular attention because it differs from some earlier empirical findings. Teacher Qualifications recorded a negative coefficient of -0.138 and a probability value of 0.157 in the direct model and remained statistically insignificant in the moderated model. Adeoti and Yinusa (2016), however, found that teacher qualifications and teaching experience were significantly related to students' academic performance, while Hanushek et al. (2019) established a strong relationship between teacher cognitive skills and student performance across countries. Kanya et al. (2021) also identified teacher competence as an important determinant of performance. The difference may indicate that formal academic qualifications alone are insufficient to improve students' achievement unless they are complemented by practical teaching experience, instructional competence and an enabling school environment. This interpretation is reinforced by the present finding that Teacher Experience remains significant whereas Teacher Qualifications do not, suggesting that accumulated classroom exposure and practical teaching skills may be more directly related to students' academic outcomes in the sampled schools.

Regarding the moderating objective, the findings reveal that School Infrastructure and Resources do not uniformly moderate the relationship between all dimensions of economic volatility and Students' Academic Achievement. The interactions with Inflation Rate, Unemployment Rate and Exchange Rate are statistically insignificant, whereas the interaction between School Infrastructure and Resources and Government Spending is positive and significant, with a coefficient of 0.374, t-statistic of 4.283 and probability value below 0.001. Thus, the second null hypothesis cannot be rejected in an overall sense, although it is rejected specifically for the Government Spending interaction. This finding is consistent with Marchand and Weber (2019), who showed that increased public revenue does not automatically improve educational outcomes unless resources are effectively directed towards relevant educational inputs. It also corresponds with the view that government expenditure influences education more effectively when it translates into classrooms, instructional materials, technologies, teacher support and other school-level resources. The result therefore suggests that the effectiveness of Government Spending in improving Students' Academic Achievement depends partly on the quality and availability of School Infrastructure and Resources rather than on the amount of expenditure alone.

The findings provide partial support for Human Capital Theory, which anchors the study. Schultz (1961) and Becker (1964) conceptualise education, training, knowledge and skills as investments that enhance human productive capacity. From this perspective, the positive effects of School Infrastructure and Resources and Teacher Experience support the proposition that effective human-capital formation depends on sustained investment in both physical

educational inputs and accumulated skills. The strong effect of Teacher Experience suggests that knowledge gained through ongoing classroom practice constitutes valuable human capital that can improve students' learning outcomes. The significant interaction between School Infrastructure and Resources and Government Spending further supports the theory because public investment in education produces stronger academic outcomes when financial resources are converted into productive educational assets. However, the insignificant effects of Teacher Qualifications and most macroeconomic indicators indicate that investment inputs do not automatically generate improved achievement merely by their existence; their effectiveness depends on how they are utilised within the teaching and learning process. This interpretation is consistent with Human Capital Theory's emphasis on education, training, experience and professional skills as productive investments that enhance educational performance (Becker, 1964; Schultz, 1961).

Conclusion

The study concludes that economic volatility, represented by Inflation Rate, Unemployment Rate, Exchange Rate and Government Spending, does not exert a statistically significant direct effect on Students' Academic Achievement in secondary schools in Plateau State, as the first null hypothesis could not be rejected. However, School Infrastructure and Resources and Teacher Experience were found to have significant positive effects on Students' Academic Achievement, indicating the importance of the immediate school environment and accumulated teaching experience in promoting better educational outcomes. The moderating analysis further shows that School Infrastructure and Resources do not generally moderate the relationship between economic volatility and Students' Academic Achievement, although a significant positive moderating effect was established for Government Spending. Accordingly, the second null hypothesis could not be rejected overall, but was rejected specifically for the interaction between Government Spending and School Infrastructure and Resources. The findings therefore suggest that improvements in academic achievement depend less on broad macroeconomic conditions alone and more on how available public resources are translated into adequate school facilities, instructional materials and supportive learning environments, alongside the utilisation of experienced teachers.

Recommendations

- i. Government and education authorities should prioritise investment in School Infrastructure and Resources, particularly classrooms, laboratories, libraries, digital facilities, electricity, sanitation and instructional materials, since these facilities have a significant positive influence on Students' Academic Achievement.
- ii. Resource allocation policies should give attention to schools with inadequate infrastructure, particularly those in disadvantaged or poorly resourced locations, in order to reduce disparities in learning conditions and improve Students' Academic Achievement across Plateau State.

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