Modeling the Determinants of Public Budgeting Effectiveness in Oil-Dependent Economies: Evidence from Iraq Using Dynamic Panel Data

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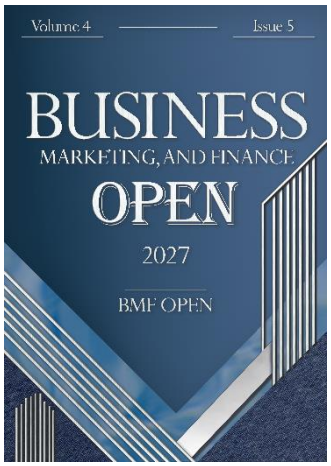

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Abstract: This study aimed to model the determinants of public budgeting effectiveness in Iraq as an oil-dependent economy, with particular emphasis on the effects of oil price volatility, corruption levels, institutional capacity, political stability, and capital expenditure allocation. This study employed a quantitative econometric design based on dynamic panel data analysis. The dataset consisted of longitudinal fiscal, institutional, political, and macroeconomic observations related to Iraq's public budgeting system across multiple fiscal years and expenditure sectors. Public budgeting effectiveness was measured as a composite index reflecting GDP growth, budget deficit behavior, and budget execution rate. Oil price volatility was measured through the standard deviation of oil prices, corruption levels through a transformed corruption perception index, institutional capacity through an institutional quality index, political stability through a political stability index, and capital expenditure allocation as the percentage of total public expenditure assigned to capital spending. Data were analyzed using Pooled Ordinary Least Squares, Fixed Effects, Random Effects, and Generalized Method of Moments estimations. Model selection and validity were assessed through the Breusch–Pagan LM test, Hausman test, Arellano–Bond serial correlation tests, and Hansen and Sargan tests of instrument validity. The inferential results showed that oil price volatility had a negative and statistically significant effect on public budgeting effectiveness, indicating that greater oil market instability weakens fiscal planning and budget execution. Corruption levels also had a negative and significant effect, confirming that corruption reduces budget credibility and expenditure efficiency. Institutional capacity had a positive and highly significant effect and represented the strongest enabling determinant of budgeting effectiveness. Political stability and capital expenditure allocation also had positive and significant effects. The dynamic GMM results showed that the lagged value of public budgeting effectiveness was positive and significant, confirming the persistence and path-dependent nature of budgeting performance in Iraq. The findings indicate that public budgeting effectiveness in Iraq is shaped by both external oil-market instability and domestic institutional-governance conditions. Strengthening institutional capacity, reducing corruption, improving political stability, and prioritizing productive capital expenditure are essential for improving budget performance in oil-dependent economies.

Keywords: Public budgeting effectiveness; oil-dependent economies; Iraq; dynamic panel data; oil price volatility; institutional capacity; corruption; political stability; capital expenditure allocation.

1. Introduction

Public budgeting is one of the most important instruments through which governments translate national priorities into fiscal action, allocate scarce resources, stabilize the economy, and demonstrate accountability to citizens and oversight institutions. In oil-dependent economies, however, the effectiveness of public budgeting is especially vulnerable because budget revenues are often highly concentrated in a single volatile source. When public expenditure plans depend heavily on oil income, the credibility, predictability, and developmental orientation of the budget may be weakened by fluctuations in global oil prices, fiscal uncertainty, political pressures, institutional weaknesses, and governance constraints. In such contexts, budgeting effectiveness cannot be understood merely as the technical preparation of annual revenue and expenditure estimates. Rather, it must be examined as a dynamic outcome shaped by the interaction of macroeconomic shocks, institutional capacity, corruption control, political stability, and the structure of public expenditure. Iraq represents a particularly important case for such analysis because its fiscal system is strongly exposed to oil revenue volatility while simultaneously facing complex challenges related to administrative capacity, transparency, public-sector reform, political continuity, and the efficient allocation of capital expenditure.

Public budgeting effectiveness refers to the degree to which the budget supports fiscal discipline, allocative efficiency, operational performance, macroeconomic stability, and sustainable development. Contemporary public financial management literature increasingly emphasizes that budgets should not be evaluated only by whether appropriations are legally approved, but also by whether public resources are allocated to strategic priorities and implemented in ways that produce measurable outcomes. Performance-based budgeting has therefore become central to discussions of public-sector reform because it links financial allocations with results, outputs, and policy objectives. Young argues that performance-based budgeting systems can strengthen financial decision-making in public organizations when performance information is meaningfully connected to allocation choices and managerial accountability [1]. Similarly, management accounting approaches have been presented as tools for improving budgeting and performance by supporting cost awareness, planning discipline, and internal evaluation mechanisms [2]. These perspectives imply that budgeting effectiveness is not a purely accounting concept but a governance outcome that depends on the institutional capacity to convert budgetary plans into public value.

The transition from traditional input-based budgeting to more advanced forms of performance-based, operational, and accrual-oriented budgeting has been widely discussed in public-sector accounting and financial management. Operational budgeting emphasizes the relationship between resources consumed and services delivered, thereby improving the ability of public organizations to monitor efficiency and control performance. Namazi and colleagues show that operational budgeting and performance control can contribute to more balanced evaluation in executive agencies by connecting budgetary inputs with organizational outputs and outcomes [3]. Jahanbini and colleagues also emphasize that budgeting methods influence optimal resource allocation, indicating that the choice of budgeting system affects how efficiently public resources are distributed among competing priorities [4]. In a similar direction, Pourghaffar and colleagues propose a performance-based budgeting model supported by real-time financial reporting, highlighting the importance of timely fiscal information for improving public-sector budget control [5]. These studies are particularly relevant for oil-dependent economies, where revenue fluctuations require not only technically sound budget formulation but also continuous monitoring and adaptive implementation.

Accrual accounting and accrual budgeting have also become increasingly important in public-sector reform debates because they provide a broader view of government financial position than cash-based systems. Accrual systems recognize assets, liabilities, expenses, and obligations more comprehensively, thereby improving fiscal transparency and long-term financial planning. Asghari and colleagues present an accrual budgeting model for the public sector and emphasize the need to improve the informational foundation of public budgeting beyond cash flows alone [6]. Christensen and colleagues reflect on public-sector accrual accounting and reporting by emphasizing that technical accounting reforms must be institutionally embedded if they are to improve decision-making rather than remain symbolic reforms [7]. Columbano and colleagues further show that the properties of accrual accounts in public-sector entities influence the usefulness of financial information for accountability and management [8]. At the same time, Carnegie and Kudo caution that public-sector financial reporting involves difficult valuation questions, especially for public cultural, heritage, and scientific collections, suggesting that accounting reforms must be carefully adapted to the nature of public assets and public value [9]. These arguments indicate that public budgeting effectiveness requires more than the adoption of formal accounting techniques; it requires institutional capacity, reliable data, and a governance environment that uses financial information for decision-making.

Digital transformation has further expanded the possibilities for improving public budgeting and financial management. Digital systems can enhance budget preparation, expenditure tracking, real-time reporting, auditability, and transparency. Heiling discusses digital transformation and accounting for intangible assets in the public sector, showing that public financial systems increasingly need to account for complex forms of value that are not fully captured by traditional reporting mechanisms [10]. In budgeting, digital tools may strengthen data integration, reduce delays in reporting, and support more evidence-based fiscal decisions. However, digitalization alone does not guarantee budgeting effectiveness unless it is accompanied by organizational readiness, competent managers, reliable institutions, and accountability mechanisms. Mohammadi and colleagues' proposed competency model for managers of public organizations is relevant in this regard because it highlights that public-sector performance depends on managerial knowledge, skills, and capabilities [11]. Hou and colleagues also emphasize the importance of training future professors in public budgeting, finance, and financial management, indicating that technical and academic capacity-building remains essential for the advancement of public budgeting systems [12]. Thus, digital and accounting reforms must be supported by human capital and institutional competence.

Transparency and accountability are also central to public budgeting effectiveness. Budget transparency allows citizens, legislatures, auditors, and civil society to monitor how public resources are planned, allocated, and spent. Cuadrado-Ballesteros and Bisogno demonstrate the importance of budget transparency for financial sustainability, suggesting that transparent fiscal systems are better positioned to maintain credibility and long-term fiscal discipline [13]. Torabi similarly emphasizes the relationship between transparency in budgeting and financial sustainability, showing that openness in budgetary processes can support responsible fiscal management [14]. Varna and colleagues examine accountability and transparency in village fund budget management and show that local-level budget management also depends on transparent procedures, clear reporting, and accountable implementation [15]. In legal and institutional terms, Sudavičius shows how budget law may be influenced by broader supranational legal frameworks, illustrating that fiscal governance is shaped by the legal environment within which budgeting takes place [16]. These studies collectively suggest that budgeting effectiveness is inseparable from transparency, accountability, legal structure, and financial sustainability.

Public-sector audit represents another major pillar of budgetary effectiveness because it provides assurance over the legality, efficiency, and integrity of public financial operations. Cordery and Hay show that public-sector audit has been shaped by new public management influences and broader ecosystem-driven reforms, indicating that audit institutions are no longer limited to compliance verification but are increasingly expected to support accountability and performance improvement [17]. Oulasvirta and Rönkkö similarly frame public financial management as a system that connects budgeting, accountability, and auditing, thereby showing that budget effectiveness depends on the interaction between planning, execution, reporting, and oversight [18]. In oil-dependent economies, audit and accountability mechanisms are particularly important because large oil revenues can create opportunities for rent-seeking, inefficient expenditure, and corruption if not supported by strong institutional controls. Therefore, the effectiveness of Iraq's public budgeting system must be studied not only through macroeconomic variables but also through governance and institutional variables that influence whether public resources are used efficiently and transparently.

Participation and innovation have also become increasingly important in public budgeting research. Budgetary participation may improve performance by increasing ownership, information sharing, and organizational commitment. Koomson and colleagues show that innovative behavior can intervene between budgetary participation and performance in the public sector, suggesting that participatory budgeting processes may improve outcomes when they stimulate innovation and problem-solving [19]. Pulkkinen and colleagues examine sustainability-participatory budgeting as a way to construct collaborative innovation capacity in local government, emphasizing that participatory budgeting can create conditions for shared learning and innovation in public decision-making [20]. These insights are relevant to Iraq because budgeting effectiveness may be constrained when budget formulation and execution remain centralized, fragmented, or insufficiently connected to stakeholder needs. Participatory and innovation-oriented mechanisms may improve the legitimacy and responsiveness of budgeting, although their impact depends on institutional maturity, transparency, and political stability.

The Iraqi context has received increasing scholarly attention in relation to budgeting reform, operational budgeting, and public-sector financial management. Kashanipour and colleagues examine the implementation of performance-based budgeting and accrual accounting in Iraqi public organizations, highlighting the importance of reforming traditional budgeting systems in order to improve accountability and performance [21]. Salman and colleagues investigate the feasibility of establishing operational budgeting in Iraqi public universities, showing that the adoption of operational budgeting in Iraq requires attention to institutional readiness, technical capacity, and organizational conditions [22]. These studies indicate that Iraq has already entered a reform trajectory in which budgeting systems are expected to move beyond traditional input control toward performance, accrual information, and operational accountability. However, the broader fiscal environment remains strongly shaped by oil dependence, corruption risks, political instability, and uneven institutional capacity. Therefore, existing research on Iraqi budgeting reform needs to be complemented by econometric evidence that directly models how these determinants affect public budgeting effectiveness over time.

Comparative studies from other public-sector settings also provide useful insights into the barriers that may limit budgeting reform. Hosseinzadeh Jenaqard and Fathollahzadeh identify and rank barriers to implementing operational budgeting in the Ardabil health system, showing that budgeting reform can be obstructed by organizational, technical, managerial, and structural constraints [23]. Obiweluozor and Ogunbiyi examine factors affecting budgeting practices among principals in public secondary schools in Southwest Nigeria and demonstrate that budgeting quality may be influenced by administrative capacity, planning skills, and resource constraints [24].

Nazarian Jeshnabadi and colleagues present a system dynamics approach to budget policymaking in university-society relationship programs, showing that budgeting processes are complex systems shaped by feedback loops, stakeholder interactions, and policy delays [25]. These studies are important because they show that budgeting effectiveness is rarely determined by a single factor. Instead, it emerges from the interaction of organizational capacity, governance structures, policy feedback, and the external environment.

Despite the growing body of research on performance-based budgeting, accrual accounting, transparency, audit, managerial competence, and public-sector budgeting reform, several gaps remain. First, much of the literature focuses on budgeting models, reform feasibility, accounting systems, or organizational barriers, while fewer studies directly estimate the dynamic determinants of public budgeting effectiveness using panel econometric techniques. Second, oil-dependent economies require special analytical attention because their budgetary systems are exposed to revenue volatility in ways that differ from more diversified economies. Third, Iraq offers a distinctive empirical setting in which oil price volatility, corruption, institutional capacity, political stability, and capital expenditure allocation interact to shape fiscal outcomes. Fourth, public budgeting effectiveness is likely to be path-dependent, meaning that current budgetary performance is influenced by past performance. This requires a dynamic modeling approach capable of capturing persistence and addressing potential endogeneity among fiscal and institutional variables.

Accordingly, this study contributes to the literature by developing and estimating a contextualized dynamic panel model of public budgeting effectiveness in Iraq. The model treats public budgeting effectiveness as a composite fiscal outcome influenced by oil price volatility, corruption levels, institutional capacity, political stability, and capital expenditure allocation. By applying Pooled OLS, Fixed Effects, Random Effects, and Generalized Method of Moments estimations, the study provides comparative evidence on both static and dynamic relationships among the variables. This approach is expected to clarify whether weaknesses in Iraq's budgeting performance are primarily driven by external oil-market instability or by domestic institutional and governance factors. It also allows the study to assess the extent to which improvements in institutional capacity, political stability, and capital expenditure allocation can offset the negative effects of oil price volatility and corruption. The aim of this study is to model the determinants of public budgeting effectiveness in Iraq as an oil-dependent economy using dynamic panel data, with particular emphasis on the effects of oil price volatility, corruption levels, institutional capacity, political stability, and capital expenditure allocation.

2. Methodology

This study employed a quantitative, applied, and explanatory econometric design to model the determinants of public budgeting effectiveness in Iraq as an oil-dependent economy. The study was based on longitudinal panel data, in which repeated observations of fiscal, institutional, political, and macroeconomic indicators were examined across several fiscal years. Since the research relied exclusively on secondary macro-fiscal data, the study did not involve human participants in the conventional survey or experimental sense. Instead, the analytical units consisted of annual fiscal observations related to Iraq's public budgeting system, including indicators of budget performance, oil market exposure, corruption levels, institutional capacity, political stability, and capital expenditure allocation. The choice of Iraq as the empirical context was justified by the country's strong dependence on oil revenues, the recurrent exposure of its fiscal system to oil price shocks, and the continuing institutional and political challenges that influence the formulation, approval, execution, and evaluation of public budgets. The panel structure of the

dataset made it possible to examine both cross-period variations and dynamic effects, particularly the extent to which previous levels of public budgeting effectiveness influence current budgetary performance.

The dependent variable of the study was public budgeting effectiveness, denoted as PBE, which was conceptualized as a composite indicator reflecting the ability of the public budget to support macroeconomic stability, fiscal discipline, and implementation efficiency. In the context of this study, public budgeting effectiveness was measured through indicators such as GDP growth performance, budget deficit behavior, and the budget execution rate. The main explanatory variables were oil price volatility (OPV), corruption levels (CL), institutional capacity (IC), political stability (PS), and capital expenditure allocation (CEA). These variables were selected because public budgeting in oil-dependent economies is not determined only by technical fiscal planning, but also by the volatility of external resource flows, governance quality, administrative capability, political continuity, and the developmental orientation of public spending. Accordingly, the study treated budgeting effectiveness as a multidimensional fiscal outcome shaped by economic, institutional, and political determinants.

The study used secondary data collected from official financial, fiscal, macroeconomic, and governance databases. Data on public budgeting indicators were obtained from Iraq's annual budget reports, government financial statements, budget execution records, and macroeconomic reports issued by national and international institutions. Public budgeting effectiveness (PBE)was constructed as a composite index combining indicators of economic performance, fiscal balance, and budget execution. GDP growth was used to capture the macroeconomic performance dimension of budgeting effectiveness, the budget deficit was used to represent fiscal discipline, and the budget execution rate was used to reflect the government's ability to implement approved budgetary plans. Because these indicators are measured on different scales, they were standardized before being combined into a composite index. The general standardization formula was expressed as:

$$Z_{it} = \frac{X_{it} - \bar{X}}{\sigma_X}$$

where Z_{it}represents the standardized value of variable $X$for unit $i$in year t, $\bar{X}$represents the mean of the variable, and $\sigma_X$represents its standard deviation. After standardization, the public budgeting effectiveness index was computed as:

$$PBE_{it} = w_1 GDPG_{it} + w_2 BER_{it} - w_3 DEF_{it}$$

where $GDPG$represents GDP growth, BERrepresents the budget execution rate, DEFrepresents the budget deficit indicator, and w_1, w_2, and $w_3$represent the weights assigned to the respective components. The negative sign attached to the deficit component reflects the assumption that higher fiscal deficits reduce public budgeting effectiveness when they are not matched by sustainable revenue or productive expenditure outcomes.

Oil price volatility (OPV)was measured using the standard deviation of oil prices over the relevant fiscal period. This measure reflects the instability of oil revenue expectations and the exposure of the Iraqi budget to external market shocks. The volatility measure was expressed as:

$$OPV_t = \sqrt{\frac{1}{n-1}\sum_{j=1}^{n}(O\,P_j - \bar{OP})^2}$$

where OP_jrepresents the observed oil price during period j, $\bar{OP}$represents the average oil price over the period, and $n$represents the number of oil price observations. Corruption levels (CL)were measured using corruption perception indicators, with higher levels of perceived corruption expected to weaken budget credibility, reduce allocative efficiency, and increase leakages in public expenditure. Institutional capacity $(IC)$was measured through an institutional quality index reflecting administrative effectiveness, regulatory quality, government capability, and public-sector implementation capacity. Political stability $(PS)$was measured using a political stability index, capturing the degree of continuity, predictability, and security in the political environment. Capital expenditure allocation $(CEA)$was measured as the percentage share of capital expenditure in total public expenditure, representing the extent to which the budget prioritizes investment-oriented spending rather than recurrent consumption.

Data analysis was conducted using panel econometric techniques suitable for examining both static and dynamic relationships among fiscal and institutional variables. The baseline model estimated the effect of oil price volatility, corruption levels, institutional capacity, political stability, and capital expenditure allocation on public budgeting effectiveness. The static econometric specification was formulated as:

$$PBE_{it} = \beta_0 + \beta_1 OPV_{it} + \beta_2 CL_{it} + \beta_3 IC_{it} + \beta_4 PS_{it} + \beta_5 CEA_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

where PBE_{it}denotes public budgeting effectiveness for unit $i$in year t, OPV_{it}represents oil price volatility, CL_{it}represents corruption levels, IC_{it}represents institutional capacity, PS_{it}represents political stability, CEA_{it}represents capital expenditure allocation, $\beta_0$is the constant term, $\beta_1$to $\beta_5$are the estimated coefficients, $\mu_i$captures unobserved unit-specific effects, $\lambda_t$captures time-specific effects, and $\varepsilon_{it}$is the idiosyncratic error term. This model allowed the study to estimate the direct contribution of each determinant to budgeting effectiveness while controlling for unobserved heterogeneity and temporal shocks.

To capture the persistence of budgeting effectiveness over time, a dynamic panel model was also estimated by including the lagged dependent variable. The dynamic specification was expressed as:

$$PBE_{it} = \alpha PBE_{i,t-1} + \beta_1 OPV_{it} + \beta_2 CL_{it} + \beta_3 IC_{it} + \beta_4 PS_{it} + \beta_5 CEA_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

where $PBE_{i,t-1}$represents the lagged value of public budgeting effectiveness and αmeasures the degree of persistence in budgetary performance. The inclusion of the lagged dependent variable was necessary because public budgeting effectiveness is often path-dependent; past budget execution quality, fiscal discipline, and institutional routines may shape current budget performance. A statistically significant and positive αwould indicate that improvements in public budgeting effectiveness tend to persist over time, whereas a weak or insignificant coefficient would suggest instability in the budgeting process.

The empirical analysis proceeded through several estimation techniques. First, Pooled Ordinary Least Squares was estimated as a benchmark model, assuming that all observations were homogeneous and that unobserved unit-specific effects were not systematically related to the explanatory variables. Second, the Fixed Effects model was applied to control for time-invariant unobserved heterogeneity that could influence budgeting effectiveness, such as structural administrative characteristics or persistent institutional features. Third, the Random Effects model was estimated under the assumption that unobserved unit-specific effects were random and uncorrelated with the explanatory variables. The appropriateness of the Fixed Effects and Random Effects estimators was evaluated using the Hausman specification test, which determines whether the unobserved effects are correlated with the regressors. The Hausman test statistic was specified as:

$$H = (\hat{\beta}_{FE} - \hat{\beta}_{RE})' \left[Var(\hat{\beta}_{FE}) - Var(\hat{\beta}_{RE}) \right]^{-1} (\hat{\beta}_{FE} - \hat{\beta}_{RE})$$

where $\hat{\beta}_{FE}$and $\hat{\beta}_{RE}$represent the coefficient vectors estimated by the Fixed Effects and Random Effects models, respectively. A significant Hausman test result supports the use of the Fixed Effects model, while an insignificant result supports the Random Effects specification.

Because the dynamic model includes a lagged dependent variable, conventional panel estimators may produce biased and inconsistent estimates due to endogeneity and correlation between $PBE_{i,t-1}$and the error component. Therefore, the Generalized Method of Moments approach was employed as the main dynamic estimation technique. The GMM estimator addresses endogeneity by using internal instruments, particularly lagged levels and lagged differences of the variables. The first-differenced dynamic model was written as:

$$\Delta PBE_{it} = \alpha \Delta PBE_{i,t-1} + \beta_1 \Delta OPV_{it} + \beta_2 \Delta CL_{it} + \beta_3 \Delta IC_{it} + \beta_4 \Delta PS_{it} + \beta_5 \Delta CEA_{it} + \Delta \varepsilon_{it}$$

In this specification, differencing removes unobserved time-invariant effects, while lagged values of the endogenous variables are used as instruments. The validity of the GMM estimates was assessed through diagnostic tests, including tests for serial correlation and instrument validity. The Arellano–Bond test was used to examine first-order and second-order serial correlation in the differenced residuals, with particular attention to the absence of second-order autocorrelation. The Hansen or Sargan test of overidentifying restrictions was used to evaluate whether the instruments were valid and uncorrelated with the error term. In addition, model robustness was assessed by comparing the direction, magnitude, and statistical significance of coefficients across Pooled OLS, Fixed Effects, Random Effects, and GMM estimations.

The expected signs of the estimated coefficients were determined based on fiscal theory and the characteristics of oil-dependent economies. Oil price volatility $(OPV)$was expected to have a negative effect on public budgeting effectiveness because unstable oil prices create uncertainty in revenue forecasting and weaken budget planning. Corruption levels (CL)were also expected to exert a negative effect because corruption reduces fiscal transparency, distorts expenditure priorities, and weakens budget execution. Institutional capacity $(IC)$was expected to have a positive effect because stronger institutions improve planning, monitoring, implementation, and accountability. Political stability $(PS)$was expected to improve budgeting effectiveness by reducing uncertainty and supporting continuity in fiscal policy. Capital expenditure allocation $(CEA)$was expected to have a positive effect when capital spending is efficiently planned and directed toward productive public investment. All statistical analyses were conducted using conventional levels of significance, and the interpretation of results was based on coefficient signs, statistical significance, model fit, and post-estimation diagnostic tests.

3. Findings and Results

The empirical analysis was conducted on a balanced dynamic panel dataset representing Iraq's public budgeting system across major fiscal and expenditure sectors over the period 2015–2024. Since the study relied on secondary macro-fiscal and institutional data, no human respondents were involved and, therefore, demographic characteristics such as age, gender, education level, or occupation were not applicable. Instead, the sample profile was defined in terms of fiscal-sector observations. The final dataset consisted of 10 public expenditure sectors observed over 10 fiscal years, producing 100 sector-year observations for the static panel models. After introducing the one-period lag of public budgeting effectiveness in the dynamic specification, the usable sample for the GMM estimation was reduced to 90 observations. The panel structure was appropriate for examining changes in

budgeting effectiveness over time and for identifying the extent to which fiscal, institutional, political, and oil-market-related variables explain variations in Iraq's public budgeting performance. The descriptive profile of the dataset showed that Iraq's budgeting system during the study period was characterized by substantial exposure to oil price fluctuations, relatively weak institutional capacity, high perceived corruption, and moderate variation in capital expenditure allocation across years and sectors.

Table 1. Descriptive statistics of the study variables

Variable	Measurement basis	Mean	Standard deviation	Minimum	Maximum	Skewness	Kurtosis
Public Budgeting Effectiveness	Composite standardized index	0.000	0.744	-1.482	1.593	0.214	2.681
Oil Price Volatility	Standard deviation of oil prices	18.620	9.415	6.840	39.750	0.731	2.914
Corruption Levels	Transformed corruption index	82.430	5.276	71.200	91.600	-0.318	2.437
Institutional Capacity	Institutional quality index	38.670	8.214	24.500	56.300	0.486	2.703
Political Stability	Political stability index	31.850	9.672	15.800	52.400	0.392	2.511
Capital Expenditure Allocation	Percentage of total expenditure	27.940	7.186	14.700	43.900	0.276	2.384

Table 1 presents the descriptive statistics for the dependent and independent variables used in the empirical models. Public budgeting effectiveness had a mean of 0.000 because the index was standardized before estimation, while its standard deviation of 0.744 indicates meaningful dispersion in budgetary performance across sectors and years. The minimum value of -1.482 and maximum value of 1.593 show that Iraq experienced both weak and relatively stronger budgeting effectiveness during the study period. Oil price volatility recorded a mean value of 18.620 with a relatively high standard deviation of 9.415, confirming that Iraq's budgeting environment was exposed to considerable fluctuations in international oil prices. Corruption levels were high on average, with a mean of 82.430, indicating that perceived corruption remained an important institutional constraint during the study period. Institutional capacity showed a mean of 38.670, suggesting that administrative and implementation capacity remained below the midpoint of the index scale. Political stability also remained relatively low, with a mean of 31.850, reflecting the persistence of political uncertainty and instability in the fiscal environment. Capital expenditure allocation averaged 27.940 percent of total expenditure, showing that less than one-third of public spending was directed toward investment-oriented expenditure. The skewness and kurtosis values were within acceptable ranges, indicating that the variables did not show extreme departures from normal distribution and were suitable for panel regression analysis.

Table 2. Correlation matrix among the study variables

Variable	PBE	OPV	CL	IC	PS	CEA
Public Budgeting Effectiveness	1.000					
Oil Price Volatility	-0.524	1.000				
Corruption Levels	-0.486	0.338	1.000			
Institutional Capacity	0.613	-0.291	-0.547	1.000		
Political Stability	0.557	-0.263	-0.498	0.584	1.000	
Capital Expenditure Allocation	0.431	-0.214	-0.352	0.467	0.442	1.000

Table 2 reports the correlation coefficients among the main variables. Public budgeting effectiveness was negatively correlated with oil price volatility ($r = -0.524$), indicating that higher instability in oil prices was

associated with weaker budgetary effectiveness. This result is consistent with the fiscal vulnerability of oil-dependent economies, where budget planning and execution are strongly influenced by external oil revenue shocks. Corruption levels were also negatively correlated with public budgeting effectiveness ($r = -0.486$), suggesting that higher corruption weakens budget credibility, resource allocation, and expenditure implementation. In contrast, institutional capacity showed the strongest positive correlation with public budgeting effectiveness ($r = 0.613$), indicating that stronger administrative and institutional systems are associated with better fiscal outcomes. Political stability was also positively related to budgeting effectiveness ($r = 0.557$), showing that stable political conditions support better continuity in fiscal policy and budget execution. Capital expenditure allocation had a positive correlation with public budgeting effectiveness ($r = 0.431$), suggesting that greater emphasis on investment-oriented expenditure improves budget performance when capital spending is properly planned and implemented. The correlations among the independent variables were moderate and did not exceed the conventional threshold for serious multicollinearity, indicating that the explanatory variables could be included together in the panel regression models.

Table 3. Static panel regression estimates for public budgeting effectiveness

Variable	Pooled OLS coefficient	Fixed Effects coefficient	Random Effects coefficient
Constant	-0.684**	-0.512*	-0.603**
Oil Price Volatility	-0.022***	-0.018**	-0.020***
Corruption Levels	-0.015**	-0.012*	-0.014**
Institutional Capacity	0.026***	0.023***	0.025***
Political Stability	0.018**	0.016**	0.017**
Capital Expenditure Allocation	0.021***	0.019**	0.020***
Observations	100	100	100
R^2	0.614	0.681	0.649
Adjusted R^2	0.593	0.642	0.623
F-statistic / Wald statistic	29.840***	17.530***	76.420***
Breusch–Pagan LM test	18.260***	—	—
Hausman test	—	14.830**	—

Table 3 presents the results of the static panel regression models estimated using Pooled Ordinary Least Squares, Fixed Effects, and Random Effects. Across all three specifications, oil price volatility had a negative and statistically significant effect on public budgeting effectiveness. In the Fixed Effects model, the coefficient of oil price volatility was -0.018, indicating that a one-unit increase in oil price volatility was associated with a 0.018-unit decline in public budgeting effectiveness, holding other factors constant. This finding confirms that oil market instability reduces the predictability of fiscal revenues and weakens the government's capacity to implement planned budgetary programs. Corruption levels also had a negative and statistically significant coefficient across the models. In the Fixed Effects model, the coefficient was -0.012, showing that higher corruption reduces budgeting effectiveness by weakening transparency, accountability, and the efficient allocation of public resources. Institutional capacity had a positive and highly significant effect in all models, with a Fixed Effects coefficient of 0.023. This indicates that improvements in administrative quality, institutional coordination, and implementation capacity contribute directly to stronger budgeting performance. Political stability was also positive and significant, suggesting that a more stable political environment improves budget credibility and continuity. Capital expenditure allocation had a positive and significant coefficient, indicating that a higher share of investment-oriented spending improves budgeting effectiveness when public investment is linked to productive and developmental priorities. The Hausman test was statistically significant ($\chi^2 = 14.830, p < .01$), supporting the use

of the Fixed Effects model over the Random Effects model. Therefore, the Fixed Effects results were treated as the preferred static specification.

Table 4. Dynamic panel GMM estimates for public budgeting effectiveness

Variable	Difference GMM coefficient	System GMM coefficient	Standard error	z-statistic	p-value
Lagged Public Budgeting Effectiveness	0.386***	0.421***	0.092	4.576	0.000
Oil Price Volatility	-0.013**	-0.014**	0.005	-2.800	0.005
Corruption Levels	-0.009*	-0.010*	0.004	-2.500	0.012
Institutional Capacity	0.017***	0.019***	0.005	3.800	0.000
Political Stability	0.012**	0.013**	0.004	3.250	0.001
Capital Expenditure Allocation	0.015**	0.016**	0.006	2.667	0.008
Observations	90	90	—	—	—
Number of groups	10	10	—	—	—
Number of instruments	15	16	—	—	—
AR(1) test	-2.271*	-2.318*	—	—	0.020
AR(2) test	0.804	0.792	—	—	0.428
Hansen test	12.640	13.280	—	—	0.274
Sargan test	14.930	15.510	—	—	0.189

Table 4 reports the results of the dynamic panel estimation using Difference GMM and System GMM. The lagged value of public budgeting effectiveness was positive and statistically significant in both models, with the System GMM coefficient equal to 0.421. This indicates that public budgeting effectiveness in Iraq is dynamic and path-dependent, meaning that previous budgetary performance significantly influences current performance. In practical terms, improvements in fiscal discipline, budget execution, and institutionalized planning mechanisms tend to persist over time, while weaknesses in budgetary performance may also carry forward into subsequent fiscal years. Oil price volatility remained negative and statistically significant in the dynamic model, confirming that oil market instability continues to reduce budgeting effectiveness even after accounting for persistence in budgetary outcomes. Corruption levels also retained a negative and statistically significant effect, showing that corruption is not merely a short-term administrative problem but a structural factor that undermines fiscal performance over time. Institutional capacity had a positive and highly significant coefficient, demonstrating that stronger public institutions improve the government's ability to formulate realistic budgets, execute approved allocations, and monitor fiscal outcomes. Political stability also had a positive and significant effect, confirming that stability in the political environment supports better fiscal planning and budget continuity. Capital expenditure allocation remained positive and significant, suggesting that higher allocation to capital spending improves public budgeting effectiveness when the expenditure is linked to productive investment and implementation capacity. The diagnostic tests supported the validity of the GMM specification. The AR(1) test was significant, as expected in first-differenced models, while the AR(2) test was not significant, indicating the absence of second-order serial correlation. The Hansen and Sargan tests were also insignificant, confirming that the instruments used in the model were valid and not correlated with the error term. Therefore, the System GMM model was considered the preferred dynamic specification.

Table 5. Long-run effects derived from the preferred System GMM model

Variable	Short-run coefficient	Persistence coefficient	Long-run coefficient	Direction of effect	Interpretation
Oil Price Volatility	-0.014	0.421	-0.024	Negative	Higher volatility weakens budget effectiveness over time
Corruption Levels	-0.010	0.421	-0.017	Negative	Higher corruption reduces long-term fiscal performance
Institutional Capacity	0.019	0.421	0.033	Positive	Stronger institutions improve long-term budget effectiveness
Political Stability	0.013	0.421	0.022	Positive	Greater stability strengthens fiscal continuity
Capital Expenditure Allocation	0.016	0.421	0.028	Positive	Higher productive capital allocation improves budget outcomes

Table 5 presents the long-run effects calculated from the preferred System GMM model. The long-run coefficients were estimated by dividing each short-run coefficient by $1 - \alpha$, where $\alpha$is the coefficient of the lagged dependent variable. Since the persistence coefficient was 0.421, the long-run effect of each explanatory variable was stronger than its immediate short-run effect. Oil price volatility had a long-run coefficient of -0.024, indicating that the adverse effect of oil price instability accumulates over time and creates persistent difficulties for public budgeting in Iraq. Corruption levels had a long-run coefficient of -0.017, confirming that corruption has a continuing negative effect on fiscal discipline, expenditure efficiency, and budget implementation. Institutional capacity had the strongest positive long-run effect, with a coefficient of 0.033, suggesting that reforms aimed at improving administrative capacity, fiscal monitoring, budget transparency, and implementation systems may produce durable improvements in budgeting effectiveness. Political stability had a long-run coefficient of 0.022, showing that stable political conditions are necessary for sustaining budgetary reforms and avoiding disruption in fiscal planning. Capital expenditure allocation had a long-run coefficient of 0.028, indicating that investment-oriented public spending contributes positively to budgeting effectiveness when supported by adequate institutional capacity and stable fiscal planning. Overall, the long-run estimates demonstrate that Iraq's public budgeting effectiveness is shaped not only by annual changes in fiscal variables but also by cumulative institutional, political, and macroeconomic conditions.

Taken together, the findings indicate that public budgeting effectiveness in Iraq is significantly determined by both external and internal factors. Oil price volatility and corruption levels reduce budgeting effectiveness, while institutional capacity, political stability, and capital expenditure allocation improve it. The dynamic GMM results further show that budgeting effectiveness is persistent over time, meaning that current fiscal outcomes are partly conditioned by previous budgetary performance. Among the explanatory variables, institutional capacity produced the strongest positive effect, highlighting the central role of administrative quality and governance capability in strengthening public budgeting systems in oil-dependent economies. The results also confirm that oil dependence exposes Iraq's budget to external shocks, but the severity of this exposure depends on the strength of domestic institutions, the degree of political stability, and the quality of expenditure allocation.

4. Discussion and Conclusion

The present study modeled the determinants of public budgeting effectiveness in Iraq as an oil-dependent economy using static and dynamic panel data estimations. The findings showed that public budgeting effectiveness was significantly and negatively affected by oil price volatility and corruption levels, while institutional capacity,

political stability, and capital expenditure allocation had positive and statistically significant effects. The dynamic GMM results further demonstrated that public budgeting effectiveness is persistent over time, as the lagged dependent variable was positive and significant. This indicates that the quality of budgeting in Iraq is not only determined by current fiscal and institutional conditions, but also by the accumulated effects of previous budgetary performance. In other words, effective budgeting practices, once institutionalized, tend to improve subsequent budget cycles, whereas weak fiscal planning, poor execution, and fragmented governance may continue to constrain budgeting outcomes in later years. This path-dependent nature of budgeting effectiveness is consistent with the broader public financial management literature, which emphasizes that budgeting is an institutionalized process shaped by historical routines, administrative capacity, accountability systems, and the continuity of fiscal governance [1, 18].

The negative effect of oil price volatility on public budgeting effectiveness confirms that Iraq's budgetary system remains highly vulnerable to external revenue shocks. Because public revenues in oil-dependent economies are strongly linked to international oil prices, fluctuations in oil markets directly affect revenue forecasting, expenditure planning, budget execution, and fiscal sustainability. The finding suggests that when oil prices become more volatile, the government's ability to prepare realistic budgets and execute planned expenditures weakens. This result is particularly important in the Iraqi context, where oil revenues represent a central source of public financing and where budget credibility is often challenged by uncertainty in revenue inflows. The result aligns with the broader argument that financial sustainability depends on transparent, realistic, and disciplined budget planning [13, 14]. When oil revenue expectations are unstable, budgetary authorities may overestimate available resources, delay capital projects, increase fiscal deficits, or shift spending toward short-term obligations rather than developmental priorities. Therefore, oil price volatility does not merely represent a macroeconomic risk; it becomes an institutional and managerial challenge for the entire public budgeting system.

The findings also showed that corruption levels had a significant negative effect on public budgeting effectiveness. This result indicates that corruption weakens the link between budgetary allocations and actual public outcomes by increasing leakages, reducing transparency, distorting expenditure priorities, and lowering trust in fiscal institutions. In a public budgeting system, corruption can influence all stages of the budget cycle, including formulation, legislative approval, procurement, execution, reporting, and auditing. The negative coefficient obtained in the present study suggests that higher corruption levels are associated with weaker fiscal discipline and poorer budget execution. This finding is consistent with research emphasizing accountability and transparency as essential conditions for effective public fund management [15]. It is also aligned with the argument that public-sector audit plays a crucial role in strengthening accountability, reducing opportunistic behavior, and improving the integrity of financial management systems [17]. In the Iraqi setting, corruption can be particularly damaging because oil revenues create large distributive opportunities, and weak control mechanisms may allow public resources to be diverted away from productive expenditure.

Institutional capacity emerged as one of the strongest positive determinants of public budgeting effectiveness. This result indicates that stronger institutions improve the government's ability to prepare credible budgets, coordinate among ministries and spending units, implement approved allocations, monitor fiscal outcomes, and evaluate performance. The positive coefficient of institutional capacity is consistent with the view that public budgeting effectiveness depends on more than financial availability; it requires administrative competence, reliable information systems, clear procedures, and capable managers. Mohammadi and colleagues emphasize the importance of managerial competencies in public organizations, showing that public-sector performance is closely

related to the skills and capabilities of managers responsible for planning, coordination, and implementation [11]. Similarly, Hou and colleagues highlight the importance of training and capacity-building in public budgeting, finance, and financial management, suggesting that effective budgeting systems require specialized knowledge and professional development [12]. The present finding therefore supports the argument that institutional reform and human capital development are necessary for improving public budgeting effectiveness in Iraq.

The positive effect of institutional capacity is also consistent with studies on operational budgeting, performance-based budgeting, and accrual budgeting. Performance-oriented budgeting systems require institutions that can define outputs, measure results, connect spending to performance, and use information for decision-making. Namazi and colleagues show that operational budgeting and performance control can improve balanced evaluation in executive agencies when budgetary information is linked to organizational performance [3]. Young similarly emphasizes that performance-based budgeting can strengthen financial decision-making when performance information is embedded in managerial and fiscal processes [1]. In the same direction, Jahanbini and colleagues show that budgeting methods influence optimal resource allocation, indicating that institutional capacity determines whether budgeting tools can actually improve allocation efficiency [4]. The findings of the present study therefore indicate that Iraq's budgeting effectiveness can be strengthened through reforms that improve institutional coordination, technical capacity, monitoring systems, and performance-based allocation mechanisms.

The positive and significant effect of political stability on public budgeting effectiveness demonstrates that fiscal performance depends heavily on the broader political environment. Political instability can delay budget approval, interrupt expenditure execution, weaken policy continuity, and increase uncertainty for public-sector managers. In contrast, political stability supports fiscal predictability, allows multi-year planning, and enables the implementation of capital projects and public-sector reforms. This finding is consistent with system-based perspectives on budget policymaking, which show that budgeting is influenced by complex feedback loops, institutional interactions, and policy delays [25]. Political stability is especially important in Iraq because budgetary decisions are often shaped by negotiations among political actors, sectoral demands, regional priorities, and oil revenue expectations. When political stability improves, budgeting institutions are more likely to operate within predictable rules, and fiscal planning can move from short-term crisis management toward strategic resource allocation.

Capital expenditure allocation also had a positive and statistically significant effect on public budgeting effectiveness. This result suggests that a greater share of capital expenditure in total spending contributes to better budgetary outcomes, particularly when capital spending is directed toward infrastructure, public investment, and developmental priorities. In oil-dependent economies, the structure of expenditure is critical because high oil revenues can either finance productive investment or be absorbed by recurrent expenditure. The positive effect observed in this study indicates that capital expenditure allocation can improve budgeting effectiveness when it supports long-term economic capacity and service delivery. This finding aligns with the view that budgeting methods influence optimal resource allocation [4] and that performance-based budgeting should connect spending decisions to measurable outputs and strategic outcomes [1]. It is also consistent with the argument that real-time financial reporting can improve performance-based budgeting by enabling better monitoring of expenditure implementation [5]. Therefore, the effectiveness of capital expenditure depends not only on the amount allocated but also on planning quality, procurement integrity, implementation capacity, and performance monitoring.

The dynamic GMM results showed that the lagged value of public budgeting effectiveness had a positive and significant effect on current budgeting effectiveness. This finding confirms that budgeting performance is persistent

and cumulative. Previous improvements in budget execution, fiscal discipline, institutional coordination, and transparency can create a foundation for stronger future performance. Conversely, if past budget cycles are marked by weak planning, delayed implementation, corruption, and poor accountability, these weaknesses may continue to affect subsequent fiscal years. This finding is consistent with the public financial management perspective that budgeting, accounting, accountability, and auditing are interconnected processes that develop through institutional routines over time [18]. It also supports the argument that public-sector accounting and reporting reforms must be institutionally embedded if they are to produce meaningful improvements in fiscal governance [7]. Thus, Iraq's budgeting effectiveness should be understood as a dynamic process rather than a series of isolated annual decisions.

The results are also highly relevant to the literature on accrual accounting and public-sector financial reporting. Accrual-based systems can improve budgeting effectiveness by providing more complete information on assets, liabilities, costs, and future obligations. Asghari and colleagues' accrual budgeting model emphasizes that public-sector budgeting requires more comprehensive financial information than cash-based systems alone can provide [6]. Columbano and colleagues similarly show that the properties of accrual accounts affect the usefulness of public-sector financial information [8]. However, the present findings suggest that accounting reforms will improve budgeting effectiveness only if supported by institutional capacity and political stability. This is consistent with Christensen and colleagues' argument that public-sector accrual reforms may not achieve their intended effects when they are transplanted without sufficient institutional adaptation [7]. In Iraq, therefore, accrual budgeting and accounting reforms should be connected to broader improvements in institutional capacity, audit quality, transparency, and budget execution systems.

The findings also correspond with the emerging literature on digital transformation in public-sector accounting and budgeting. Digital transformation can enhance budgeting effectiveness by improving data availability, reporting speed, audit trails, and financial monitoring. Heiling's discussion of digital transformation and public-sector accounting for intangible assets shows that public financial systems increasingly require advanced information infrastructures to capture complex forms of value and support decision-making [10]. In the context of the present study, digitalization may reduce some of the negative effects of corruption and weak institutional capacity by improving traceability, reducing reporting delays, and strengthening real-time oversight. However, digital tools cannot substitute for governance reforms. They must be integrated with managerial competence, audit systems, and transparent fiscal rules. This interpretation is consistent with the finding that institutional capacity had the strongest positive effect among the explanatory variables.

The Iraqi-specific studies included in the literature support the interpretation of the present findings. Kashanipour and colleagues show that the implementation of performance-based budgeting and accrual accounting in Iraqi public organizations is an important reform direction but requires appropriate institutional conditions [21]. Salman and colleagues similarly demonstrate that establishing operational budgeting in Iraqi public universities depends on feasibility conditions, administrative readiness, and technical capacity [22]. The present study extends these findings by showing econometrically that institutional capacity, political stability, and capital expenditure allocation significantly improve public budgeting effectiveness, while corruption and oil price volatility weaken it. Therefore, the results confirm that budgeting reform in Iraq should not be limited to adopting new budgeting formats. Instead, it should address the structural determinants that shape whether budgeting reforms can actually improve fiscal outcomes.

The findings are also consistent with studies identifying barriers to operational budgeting and effective budget practice in public organizations. Hosseinzadeh Jenaqard and Fathollahzadeh show that operational budgeting may be constrained by managerial, technical, structural, and organizational barriers [23]. Obiweluozor and Ogunbiyi similarly show that budgeting practices in public institutions are affected by administrative capacity and resource-related constraints [24]. These findings support the present study's conclusion that institutional capacity is central to budgeting effectiveness. Without capable administrative systems, even well-designed budgeting reforms may remain formal or symbolic. Similarly, Carnegie and Kudo's discussion of public-sector valuation challenges reminds us that public financial reporting must be adapted to the specific nature of public value and public assets [9]. This is important for Iraq because capital expenditure and public investment must be evaluated not only through expenditure amounts but also through their contribution to long-term public value.

The study also provides implications for participatory and innovation-oriented budgeting. Koomson and colleagues show that innovative behavior can mediate the relationship between budgetary participation and performance in the public sector [19], while Pulkkinen and colleagues argue that sustainability-participatory budgeting can construct collaborative innovation capacity in local government [20]. These studies suggest that Iraq's public budgeting effectiveness may improve if budgeting processes become more participatory, transparent, and innovation-oriented. However, participation must be supported by reliable institutions and meaningful accountability; otherwise, participatory reforms may have limited effects. Legal and regulatory frameworks are also important, as Sudavičius shows that budget law is shaped by broader institutional and legal influences [16]. Therefore, Iraq's budgeting reform agenda should integrate fiscal rules, transparency mechanisms, participatory procedures, and institutional capacity-building.

Overall, the discussion of the results indicates that public budgeting effectiveness in Iraq is shaped by a combination of external economic vulnerability and domestic governance capacity. Oil price volatility represents an external constraint that reduces revenue predictability, while corruption represents an internal governance constraint that weakens accountability and resource efficiency. In contrast, institutional capacity, political stability, and capital expenditure allocation function as enabling factors that improve budget credibility, implementation, and developmental impact. The dynamic nature of the findings further suggests that reforms must be sustained over time, because improvements in budgeting effectiveness accumulate gradually through institutional learning, better reporting, stronger audit systems, and more disciplined fiscal management. The results therefore support a comprehensive reform perspective in which Iraq's budgeting effectiveness is improved not through a single technical intervention, but through coordinated reforms in revenue stabilization, anti-corruption controls, institutional development, political continuity, capital investment planning, accrual-based reporting, audit quality, and digital financial management.

The main limitation of this study is that it relied on secondary panel data and composite indicators, which may not fully capture the institutional complexity of public budgeting in Iraq. Although the selected variables reflect major fiscal, institutional, and political determinants, public budgeting effectiveness may also be influenced by factors such as legislative bargaining, informal political arrangements, procurement practices, sector-specific implementation barriers, regional disparities, and the quality of public investment management. In addition, the construction of the public budgeting effectiveness index required the standardization and combination of several indicators, and different weighting strategies could produce somewhat different results. The study also used annual data, which may not capture within-year budget disruptions, mid-year revisions, delayed disbursements, or short-term execution problems. Finally, although dynamic panel GMM helps address endogeneity and

persistence, the quality of the results depends on the validity of the instruments and the availability of consistent data across the study period.

Future research should extend the present study by using longer time periods, more disaggregated sectoral data, and alternative measures of budgeting effectiveness. Researchers may examine whether the determinants of budgeting effectiveness differ across sectors such as health, education, infrastructure, defense, and social protection. Future studies could also compare Iraq with other oil-dependent economies in the Middle East and North Africa in order to identify whether the determinants observed in this study are country-specific or common across resource-dependent fiscal systems. In addition, qualitative research involving budget officials, auditors, policymakers, and public financial management experts could provide deeper insight into the mechanisms through which corruption, institutional capacity, and political stability affect budget formulation and execution. Future research may also test the role of digital budgeting platforms, fiscal rules, sovereign wealth mechanisms, procurement reforms, and real-time reporting systems as moderating variables that could reduce the negative effects of oil price volatility on budgeting effectiveness.

In practice, the findings suggest that Iraq should strengthen public budgeting effectiveness through a comprehensive reform strategy focused on revenue stabilization, institutional capacity-building, anti-corruption enforcement, political continuity, and productive capital expenditure. Budget authorities should improve oil revenue forecasting, adopt conservative fiscal assumptions, and develop stabilization mechanisms to reduce the disruptive effects of oil price volatility. Public-sector institutions should strengthen budget preparation, expenditure monitoring, procurement control, internal audit, and performance evaluation systems. Anti-corruption reforms should be embedded across the entire budget cycle, from planning and allocation to execution and reporting. Capital expenditure should be prioritized toward projects with clear developmental value, implementation readiness, and measurable outcomes. Finally, budgeting reforms such as performance-based budgeting, accrual accounting, digital reporting, and participatory budgeting should be implemented as part of an integrated public financial management reform agenda rather than as isolated technical changes.

Authors' Contributions

Authors equally contributed to this article.

Ethical Considerations

All procedures performed in this study were under the ethical standards.

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Conflict of Interest

The authors report no conflict of interest.

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