

Political Fragmentation, Oil Revenue Volatility, and Fiscal Instability: A Dynamic Panel Analysis of Resource-Dependent Economies with Evidence from Iraq

1. Wurood Razzq. Jawad^{id}: PhD Student in Finance– Banking, Aras International Campus, University of Tehran, Jolfa, Iran, and Scientific Research Authority, Baghdad, Iraq
2. Ali. Souri^{id}: Associate Professor of Theoretical Economics, Faculty of Economics, University of Tehran, Tehran, Iran
3. Ezatollah. Abbasian^{id}: Professor of Financial Economics, Department of Financial Engineering, Faculty of Management, University of Tehran, Tehran, Iran

*corresponding author's email: e.abbasian@ut.ac.ir

ABSTRACT

This study aimed to examine the dynamic effects of political fragmentation and oil revenue volatility, as well as their interaction, on fiscal instability in resource-dependent economies, with particular evidence from Iraq. This quantitative, applied, longitudinal study employed secondary macroeconomic, fiscal, and political data from resource-dependent economies over the 2003–2023 period. Fiscal instability was specified as the dependent variable, while political fragmentation and oil revenue volatility were treated as the principal explanatory variables. The empirical analysis used pooled ordinary least squares, fixed-effects and random-effects panel regressions, interaction models, and dynamic System Generalized Method of Moments estimation. The Hausman test was applied to select between fixed and random effects. Stationarity was assessed using Augmented Dickey-Fuller and Levin-Lin-Chu tests, while multicollinearity, heteroscedasticity, serial correlation, instrument validity, and second-order autocorrelation were evaluated using VIF, White, Durbin-Watson, Hansen, and Arellano-Bond tests, respectively. Fixed-effects estimates showed that political fragmentation significantly increased fiscal instability ($\beta = .342, p = .001$), while oil revenue volatility exerted a stronger positive effect ($\beta = .412, p < .001$). The interaction between political fragmentation and oil revenue volatility was also positive and significant ($\beta = .267, p = .009$), indicating that fragmented political systems amplify the fiscal consequences of oil-revenue shocks. Dynamic System GMM results confirmed substantial persistence in fiscal instability through its lagged value ($\beta = .621, p < .001$). Political fragmentation ($\beta = .205, p = .021$) and oil revenue volatility ($\beta = .298, p = .001$) remained significant after controlling for dynamic persistence. The Hansen test supported instrument validity ($p = .342$), and the AR(2) test indicated no second-order serial correlation ($p = .215$). Fiscal instability in resource-dependent economies is driven not only by volatile oil revenues but also by political fragmentation, which significantly intensifies the transmission of oil-revenue shocks; the Iraqi evidence further demonstrates that these effects persist dynamically over time.

Keywords: Political Fragmentation; Oil Revenue Volatility; Fiscal Instability; Resource-Dependent Economies; Dynamic Panel Data; System GMM; Iraq.

Introduction

Resource-dependent economies face a distinctive fiscal-policy problem because a substantial share of public revenue originates from a commodity whose price and export receipts are determined largely outside the domestic



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political and budgetary system. Oil wealth can expand governments' fiscal capacity, support public investment, finance social programs, and reduce immediate financing constraints, yet it can also expose public finances to abrupt and recurrent revenue shocks. When oil prices rise, governments may rapidly expand expenditure commitments on wages, transfers, infrastructure, subsidies, and public services; when prices fall, those commitments frequently prove difficult to reverse at the same pace. Fiscal instability can therefore emerge not simply from insufficient revenue, but from the interaction between volatile resource income and political arrangements that influence how temporary oil windfalls are allocated. Comparative research on resource-rich economies consequently emphasizes that fiscal regimes differ substantially in the extent to which they smooth commodity shocks or transmit them directly into government expenditure and budget outcomes (1, 2). This distinction is especially important for countries in which oil revenue dominates public finance and the political system contains multiple actors competing over the distribution of resource rents.

Oil-market volatility has repeatedly demonstrated its capacity to transmit external disturbances into domestic economies. Oil demand, international prices, geopolitical tensions, recessions, wars, and global financial disruptions can generate rapid changes in export receipts and fiscal resources, often with asymmetric consequences between boom and bust periods (3, 4). Research on petroleum-price asymmetries further suggests that energy-price movements may contribute to cyclical economic fluctuations because positive and negative shocks do not necessarily produce equivalent responses in production, expenditure, and aggregate activity (5). More broadly, recent international crises have shown that externally generated financial disturbances can alter exchange conditions, financing costs, expectations, and macroeconomic stability across national borders, reinforcing the importance of examining fiscal resilience in economies exposed to concentrated external revenue sources (6). Although the channels vary between countries, the general implication is that dependence on a volatile revenue base can transform international market disturbances into persistent domestic fiscal problems.

The fiscal consequences of volatility are particularly pronounced when governments treat favorable resource-price movements as permanent rather than temporary. During revenue booms, higher income can encourage expenditure growth, expansion of public employment, enlargement of transfer systems, and initiation of capital projects whose future costs extend beyond the period of unusually high revenues. Once these commitments become embedded in the budget, a subsequent fall in oil income may produce deficits, expenditure compression, delayed investment, accumulation of liabilities, or emergency financing. Fiscal instability therefore concerns more than the occurrence of a deficit in a particular year. It reflects fluctuations in the government's overall fiscal position and the inability of revenue and expenditure paths to adjust smoothly to shocks. Research on fiscal risks in the Middle East and North Africa highlights the importance of exposure to macroeconomic shocks and the difficulty of managing public finances when existing fiscal commitments interact with uncertain revenue streams (7). Similarly, analysis of fiscal discipline in Iraq demonstrates the persistent importance of budget deficits and the challenges involved in maintaining consistency between public spending and sustainable fiscal resources (8).

Oil dependence is therefore best understood as both an economic and a political-fiscal condition. Resource revenues enter the budget through political processes that determine who participates in expenditure decisions, how competing claims are resolved, and whether temporary revenue increases are saved or immediately distributed. Political fragmentation becomes critical in this context. When political authority is dispersed across numerous parties, coalitions, parliamentary blocs, regional interests, or competing governing groups, the budget may become a common arena for distributive bargaining. Each actor has incentives to secure expenditures for its

own constituency, whereas the longer-term fiscal cost is shared across the entire political system. Such fragmentation can weaken coordination and make restraint more difficult during resource booms. Research investigating the dynamic relationship among oil dependence, political arrangements, and government spending provides evidence that political conditions can materially affect how resource volatility is translated into expenditure behavior (2). The design of constitutional and post-conflict arrangements governing natural resources is also consequential because rules concerning authority, ownership, allocation, and distribution can shape political incentives surrounding resource wealth (9).

The importance of fragmentation is amplified in post-conflict and politically contested environments, where fiscal policy is not merely an instrument of macroeconomic management but also a mechanism for maintaining coalitions, distributing rents, financing reconstruction, and responding to competing social claims. Under such conditions, expenditure decisions may simultaneously serve economic, political, territorial, and social objectives. The welfare structure of the state can further increase the rigidity of public commitments because governments become responsible for maintaining transfers and services across heterogeneous constituencies. Recent analysis of Iraq's welfare regime demonstrates the complex configuration of state provision and social-policy arrangements within the country, emphasizing that fiscal decisions operate within a wider political and distributive structure (10). Research on social welfare in the broader Middle East and North Africa similarly highlights the importance of state capacity and welfare arrangements in societies facing substantial socioeconomic pressures (11). These characteristics matter for fiscal stability because expenditure commitments created within politically sensitive distributive systems are often difficult to reverse after an adverse revenue shock.

Iraq offers an especially important setting in which to examine these relationships. The country's post-2003 economic trajectory has combined political reconstruction, institutional transformation, security disturbances, high dependence on hydrocarbon revenues, and substantial public expenditure needs (12). Oil receipts have remained central to government finance and therefore to the broader functioning of the Iraqi state. At the same time, the post-2003 political system has been characterized by coalition politics and fragmented representation, making fiscal coordination particularly consequential. The coexistence of high oil dependence and fragmented political decision-making means that external oil-market shocks are filtered through a domestic political system in which numerous actors may have strong incentives to protect or expand expenditure claims. Iraq therefore represents not merely an individual oil-exporting case, but a theoretically informative example of the broader fiscal vulnerabilities that can arise when resource dependence and political fragmentation occur simultaneously.

Empirical evidence on Iraq has repeatedly demonstrated the sensitivity of economic activity to oil-price changes. Long-run analysis of oil-price shocks and Iraqi economic growth shows that petroleum-price movements exert substantial effects on the country's macroeconomic performance and that positive and negative shocks may have different consequences (13). More recent research likewise identifies oil-price changes as an important determinant of Iraq's economic conditions, together with the broader processes through which energy revenue affects growth and domestic economic activity (14). Rasheed directly links oil-price volatility to Iraq's economic growth and stability through public expenditure, providing particularly relevant evidence that the expenditure channel transmits oil-market fluctuations into domestic fiscal and macroeconomic outcomes (15). These findings suggest that analyzing oil-price or oil-revenue shocks solely as external macroeconomic variables is insufficient; attention must also be directed to the fiscal mechanism through which resource fluctuations alter government behavior.

Public expenditure is especially important in Iraq because the government occupies a large role in the economy and changes in spending can affect output, investment, employment, and aggregate demand. Evidence covering several decades shows that government spending has played an important role in the development of Iraq's industrial sector (16). Analysis of more recent public-spending trends likewise documents significant relationships between government expenditure and major Iraqi macroeconomic indicators (17). Fiscal policy has also been examined as an instrument for financing human development, illustrating how public expenditure must simultaneously respond to development needs and the constraints imposed by available fiscal resources (18). Consequently, instability in government revenue has implications far beyond the annual budget balance. When oil revenue falls sharply, fiscal adjustment can interrupt investment and development programs, while rapid expenditure expansion during favorable periods may generate commitments that become unsustainable after the revenue cycle reverses.

The structure of Iraq's economy further intensifies these challenges. Although diversification and alternative energy investment are often discussed as mechanisms for reducing dependence on hydrocarbons, the transition away from oil-based fiscal structures remains constrained by economic and investment difficulties (19). The longer-term prospect of global decarbonization adds another dimension to this vulnerability. Iraq has been described as facing potentially transformative political and economic pressures as the international energy system gradually moves away from fossil fuels, raising questions about the future viability of the petro-state model (20). This longer horizon does not replace the immediate problem of oil revenue volatility; instead, it reinforces the importance of understanding the fiscal consequences of dependence. An economy whose budget is highly exposed to short-run oil shocks may face even greater difficulties adapting to a structural decline in hydrocarbon importance if fiscal decisions remain strongly tied to current resource receipts.

Macroeconomic instability can compound these fiscal pressures. Comparative evidence concerning financial crisis effects in Iraq, Iran, and Turkey shows that crises influence major macroeconomic variables and can generate significant cross-sectoral disturbances (21). Within Iraq itself, unemployment and inflation remain central macroeconomic concerns that affect social demands on government and the wider environment within which fiscal adjustments occur (22). These pressures can make expenditure contraction politically difficult precisely when revenue weakness calls for stronger fiscal adjustment. Thus, oil-revenue volatility may create an asymmetric political-fiscal process: spending can be expanded relatively rapidly during resource booms, whereas contraction during downturns is resisted because it imposes visible costs on beneficiaries, public employees, contractors, and households.

The preparation of the Iraqi budget also occurs under substantial uncertainty. Research ranking risks surrounding the state budget from 2003 to 2021 identifies the presence of multiple sources of uncertainty in the budgetary process, reinforcing the notion that fiscal outcomes are exposed to recurrent and interconnected shocks (23). Fiscal sustainability has similarly been examined in relation to Iraq's policy framework, demonstrating that preserving stable public finances requires coordination across policy decisions and fiscal constraints (24). Cooperative decision-making in Iraqi fiscal policy has also been analyzed using strategic models, with findings emphasizing how coordination problems can affect policy outcomes (25). These studies collectively point toward a broader problem: fiscal instability in Iraq cannot be reduced to an accounting imbalance between revenue and expenditure because it emerges from the interaction of uncertain revenues, expenditure commitments, and a political decision-making structure in which coordination is costly.

Political fragmentation provides a plausible mechanism linking these elements. In a concentrated political system, a government may theoretically internalize a larger share of the future fiscal costs associated with excessive current spending. In a fragmented system, by contrast, multiple political actors may compete to obtain portions of available oil rents while discounting the collective cost of future adjustment. An oil boom may therefore produce disproportionately large expenditure responses, whereas a revenue downturn can trigger conflict over which programs or constituencies should bear the adjustment. The fiscal effect of oil volatility should consequently be conditional on the degree of political fragmentation. This proposition shifts the analytical question from whether oil volatility affects fiscal stability—which is already strongly suggested by the Iraqi and comparative literature—to whether political fragmentation systematically magnifies that effect.

The international evidence also suggests that fiscal consequences of external shocks depend on countries' exposure, political choices, and capacity to absorb risk. Research on sovereign-risk behavior in emerging markets illustrates how fiscal vulnerability can ultimately be reflected in broader perceptions of sovereign financial risk and default conditions (26). Although the Ecuadorian experience examined in that work differs from Iraq, it highlights the general importance of understanding how unstable fiscal fundamentals can become consequential for sovereign financial credibility. Similarly, measures of economic policy uncertainty have demonstrated that uncertainty itself can be systematically identified and linked to changing economic conditions (27). In a resource-dependent fiscal system, uncertainty about future oil receipts and uncertainty arising from political bargaining may reinforce one another, making budget formulation and medium-term fiscal planning especially difficult.

This concern is particularly relevant when fiscal instability exhibits persistence over time. Budgetary decisions made during one year shape the starting conditions of subsequent years through continuing expenditure obligations, unfinished projects, accumulated arrears, expectations of beneficiaries, and political commitments. A shock to oil revenues may therefore have effects extending beyond the period in which it initially occurs. Static regression models can identify contemporaneous associations, but they may underestimate this path dependence. Dynamic panel methods provide a more suitable framework because they incorporate lagged fiscal outcomes while also accounting for unobserved heterogeneity across resource-dependent economies. They are additionally useful when explanatory variables may be endogenous to the fiscal process. In the present context, the dynamic perspective allows the analysis to distinguish immediate effects of oil revenue volatility and political fragmentation from the accumulated consequences generated through persistence in fiscal instability.

Despite substantial research on oil-price shocks, public expenditure, fiscal deficits, reconstruction, and macroeconomic instability in Iraq, an important gap remains. Existing studies have frequently examined oil prices and growth (13, 14), oil volatility and expenditure-mediated stability (15), public spending and macroeconomic outcomes (17), fiscal discipline and deficits (8), or broader fiscal and economic risks (7, 23). Comparative work has also demonstrated the importance of fiscal regimes in resource-rich economies and the dynamic relationship between political conditions, oil dependence, and government spending (1, 2). However, less attention has been given to a unified dynamic-panel framework in which political fragmentation and oil revenue volatility are jointly modeled as determinants of fiscal instability and, critically, in which their interaction is examined to establish whether fragmented political systems magnify the fiscal transmission of resource-revenue shocks.

Such an approach is important both analytically and empirically. Analytically, it treats oil volatility not as an isolated external shock but as a disturbance whose fiscal consequences depend partly on the political structure through which revenue is allocated. Empirically, a cross-country dynamic panel provides greater variation than an

Iraq-only time series and allows Iraq's experience to be interpreted against a broader group of resource-dependent economies. The Iraq case can then demonstrate how the estimated mechanism operates in a country where post-conflict political reconstruction, distributive pressures, oil dependence, and recurrent fiscal shocks coexist. The resulting framework connects the political economy of resource allocation with the econometrics of fiscal persistence and provides a basis for determining whether political fragmentation amplifies rather than merely accompanies the fiscal effects of oil revenue volatility.

Accordingly, the aim of this study was to investigate the dynamic effects of political fragmentation and oil revenue volatility, as well as their interaction, on fiscal instability in resource-dependent economies, with particular evidence from Iraq.

Methods and Materials

This study employed a quantitative, applied, longitudinal, and explanatory research design based on secondary macroeconomic, fiscal, and political data. Methodologically, the research was structured as a dynamic panel-data study because the principal objective was to estimate how political fragmentation and oil revenue volatility affect fiscal instability over time in resource-dependent economies while explicitly accounting for the persistence of fiscal conditions from one period to the next. A dynamic specification was considered particularly appropriate because fiscal instability is not an instantaneous phenomenon. Government expenditure commitments, accumulated fiscal imbalances, dependence on volatile resource revenues, and institutionalized budgetary practices can cause current fiscal conditions to depend substantially on previous-period fiscal outcomes. Accordingly, the empirical framework incorporated the lagged value of fiscal instability as an explanatory component, thereby allowing both short-run effects and the persistence of fiscal instability to be estimated. The study was non-experimental because no manipulation of political or economic conditions was undertaken; instead, naturally occurring variations in political fragmentation, oil revenue volatility, and fiscal outcomes were examined across countries and over time.

The statistical population consisted of resource-dependent economies for which comparable annual data on political fragmentation, oil-derived government revenues, and fiscal outcomes were available during the study period. Resource-dependent economies were defined as countries in which oil and hydrocarbon revenues constitute a structurally important component of government revenue, exports, or overall economic activity. Rather than selecting observations through probabilistic sampling, the study used a purposive census-oriented panel construction procedure in which all country-year observations satisfying the predefined eligibility and data-quality requirements were retained. Countries were included only when sufficiently continuous information was available to construct the three central study variables and their required lagged values. Observations with unavailable, internally inconsistent, or non-comparable information were treated as missing and were not replaced through arbitrary interpolation. Consequently, the resulting dataset could constitute an unbalanced panel, which is compatible with modern dynamic panel estimators provided that adequate time-series and cross-sectional information remains available.

The temporal scope covered the post-2003 period, with annual observations from 2003 through 2023 wherever complete and internationally comparable data were available. This interval was particularly suitable for the focal analysis of Iraq because it captures the restructuring of the Iraqi political and fiscal system after 2003 as well as repeated episodes of substantial oil-market fluctuation and fiscal adjustment. Iraq was incorporated into the same harmonized panel framework as the other resource-dependent economies, but it was additionally treated as the

principal country case for substantive interpretation. Thus, the cross-country panel provided the statistical basis for estimating general relationships between political fragmentation, oil revenue volatility, and fiscal instability, whereas the Iraqi observations were used to assess how the estimated relationships manifested themselves in a highly oil-dependent and politically fragmented fiscal environment. The unit of observation was therefore the country-year, and the maximum theoretical number of observations was determined as

$$N_{\text{obs}} = N \times T$$

where N denotes the number of resource-dependent economies included in the panel and T represents the number of annual periods. When missing observations occurred, the effective sample size was expressed as

$$N_{\text{effective}} = \sum_{i=1}^N T_i$$

where T_i is the number of valid annual observations available for country i . This formulation avoids the incorrect treatment of the number of research variables as a component of sample size and reflects the actual structure of longitudinal panel data.

Data were collected through a documentary and archival procedure using secondary quantitative datasets rather than questionnaires, interviews, or experimental instruments. The data-collection tool was therefore a structured researcher-developed extraction protocol designed to identify, record, harmonize, and cross-check annual observations for the three substantive constructs specified in the research title: political fragmentation, oil revenue volatility, and fiscal instability. Fiscal and macroeconomic information was obtained from internationally comparable databases and official national statistical and fiscal sources where necessary, while political information was obtained from recognized cross-national political datasets capable of consistently measuring the distribution and fragmentation of political power across countries and years. For Iraq, international series were cross-checked, whenever possible, against official Iraqi fiscal and oil-sector records in order to improve the reliability of the country-specific analysis. All monetary data used in constructing ratios were standardized before estimation, and variables expressed relative to GDP or total government revenue were retained in comparable units across countries.

Political fragmentation was operationalized as the extent to which effective political decision-making power was dispersed among competing political parties or governing groups. The preferred measure was a continuous fragmentation index derived from the distribution of political representation or governing-party shares. Where political shares s_{jit} were available for political group j in country i at time t , fragmentation could be expressed through a fractionalization formulation:

$$PF_{it} = 1 - \sum_{j=1}^J s_{jit}^2$$

where PF_{it} represents political fragmentation and s_{jit} is the proportional political share of group j . The index approaches zero when political power is highly concentrated and rises as political power becomes more dispersed among multiple political actors. When an established cross-national fragmentation measure was available directly from the selected political dataset, its original standardized definition was retained to preserve cross-country comparability rather than reconstructing the index from heterogeneous national sources.

Oil revenue volatility represented instability in the flow of oil-derived fiscal resources rather than the absolute level of oil revenue. Oil revenue was first normalized to improve comparability across countries, preferably as a proportion of GDP or total government revenue. Volatility was then derived from changes in the logarithm of real oil revenue. The underlying oil-revenue change was specified as

$$\Delta \ln(OR_{it}) = \ln(OR_{it}) - \ln(OR_{i,t-1})$$

where OR_{it} denotes real oil revenue for country i in year t . A direct annual shock measure was calculated as

$$ORV_{it} = |\Delta \ln(OR_{it})|$$

so that larger values represented stronger year-to-year oil-revenue disturbances regardless of whether the shock was positive or negative. As a robustness specification, volatility could also be calculated using a moving-window standard deviation:

$$ORV_{it} = \sqrt{\frac{1}{k-1} \sum_{s=t-k+1}^t (\Delta \ln OR_{is} - \Delta \ln \bar{OR}_{it})^2}$$

where k represents the selected rolling window. The first specification captures immediate annual instability, whereas the rolling formulation captures persistent volatility surrounding each fiscal period.

Fiscal instability was treated as the dependent construct and was operationalized using instability in the government fiscal balance. To ensure comparability across countries of different economic sizes, the fiscal balance was standardized relative to GDP:

$$FB_{it} = \frac{REV_{it} - EXP_{it}}{GDP_{it}} \times 100$$

where REV_{it} is government revenue, EXP_{it} is government expenditure, and GDP_{it} is gross domestic product. Fiscal instability was then measured primarily as the absolute annual change in this normalized fiscal position:

$$FI_{it} = |FB_{it} - FB_{i,t-1}|$$

where larger values indicate stronger deterioration or fluctuation in fiscal stability. This operationalization focuses directly on instability rather than merely distinguishing deficits from surpluses. A rolling dispersion measure could additionally be employed for robustness:

$$FI_{it} = \sqrt{\frac{1}{k-1} \sum_{s=t-k+1}^t (FB_{is} - \bar{FB}_{it})^2}$$

which represents the variability of fiscal outcomes over a defined moving period. Before econometric estimation, all extracted observations were checked for duplicate records, inconsistent units, implausible discontinuities, coding errors, and missing values. Variable definitions were harmonized across countries and years so that observed differences reflected substantive cross-country and temporal variation rather than differences in measurement procedures.

Data analysis proceeded through descriptive, diagnostic, and dynamic panel econometric procedures. Descriptive statistics were first calculated for political fragmentation, oil revenue volatility, and fiscal instability. The mean, median, standard deviation, minimum, maximum, skewness, and kurtosis were examined to identify the central tendency, dispersion, asymmetry, and potential extreme observations in each series. The temporal trajectories of the three variables were also examined, with particular attention to Iraq, to determine whether periods of sharp oil-revenue fluctuations coincided with changes in fiscal instability and whether these patterns differed under varying degrees of political fragmentation. Pairwise correlations were subsequently calculated as an initial assessment of the direction and magnitude of associations among the study variables, although correlation coefficients were not interpreted as evidence of causal effects.

The principal econometric specification was a dynamic panel model in which current fiscal instability depended on its own lagged value, political fragmentation, and oil revenue volatility. The baseline model was specified as

$$FI_{it} = \alpha + \rho FI_{i,t-1} + \beta_1 PF_{it} + \beta_2 ORV_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

where FI_{it} denotes fiscal instability in country i during year t , $FI_{i,t-1}$ is its one-period lag, PF_{it} represents political fragmentation, ORV_{it} denotes oil revenue volatility, α is the intercept, ρ measures the persistence of fiscal instability, β_1 and β_2 are the estimated effects of political fragmentation and oil revenue volatility, respectively, μ_i captures unobserved time-invariant country-specific characteristics, λ_t captures common time shocks affecting the sampled resource-dependent economies, and ε_{it} represents the idiosyncratic error term.

Because the central theoretical proposition of the study concerns not only the independent effects of political fragmentation and oil revenue volatility but also the possibility that fragmented political environments intensify the fiscal consequences of volatile oil revenues, an interaction specification was additionally estimated:

$$FI_{it} = \alpha + \rho FI_{i,t-1} + \beta_1 PF_{it} + \beta_2 ORV_{it} + \beta_3 (PF_{it} \times ORV_{it}) + \mu_i + \lambda_t + \varepsilon_{it}$$

In this model, β_3 indicates whether the effect of oil revenue volatility on fiscal instability systematically changes as political fragmentation increases. A positive and statistically significant interaction coefficient would indicate that oil-revenue shocks generate greater fiscal instability under more fragmented political conditions. The marginal effect of oil revenue volatility was therefore obtained from

$$\frac{\partial FI_{it}}{\partial ORV_{it}} = \beta_2 + \beta_3 PF_{it}$$

while the marginal effect of political fragmentation was expressed as

$$\frac{\partial FI_{it}}{\partial PF_{it}} = \beta_1 + \beta_3 ORV_{it}$$

These expressions permit the estimated relationship to be interpreted conditionally rather than assuming that the effect of either explanatory variable remains identical under all political or oil-revenue conditions.

The inclusion of $FI_{i,t-1}$ introduces a dynamic panel bias when conventional pooled ordinary least squares or fixed-effects estimation is used, because the lagged dependent variable may be correlated with the transformed disturbance term. Moreover, contemporaneous oil revenue volatility and fiscal instability may exhibit reciprocal relationships, producing potential endogeneity. For these reasons, the principal models were estimated using

Generalized Method of Moments procedures for dynamic panels, with System GMM used as the preferred estimator where the properties of the dataset supported its application. System GMM combines equations expressed in first differences with equations in levels and uses appropriate lagged values as internal instruments. The general moment restrictions can be represented as

$$E[FI_{i,t-s}\Delta\varepsilon_{it}] = 0, s \geq 2$$

and, where the relevant explanatory variable was treated as potentially endogenous,

$$E[X_{i,t-s}\Delta\varepsilon_{it}] = 0, s \geq 2$$

where X denotes the relevant endogenous regressor. Instrument lag depth was restricted to avoid instrument proliferation, and the instrument matrix was collapsed when necessary so that the number of instruments remained appropriately limited relative to the number of cross-sectional units.

The validity of the dynamic panel estimates was evaluated through standard post-estimation diagnostics. The Arellano-Bond test was applied to first-differenced residuals. First-order serial correlation, AR(1), may occur mechanically after differencing, whereas the absence of statistically significant second-order serial correlation, AR(2), is required for the validity of lagged instruments. Instrument validity was assessed using the Hansen test of overidentifying restrictions, with the null hypothesis indicating the joint validity of the instrument set. The number of instruments was monitored carefully because excessive instruments can overfit endogenous variables and weaken the Hansen diagnostic. The statistical significance of individual coefficients was determined using two-tailed tests with a conventional significance threshold of $p < .05$, and robust standard errors were used to reduce sensitivity to heteroskedasticity and within-country error dependence.

Panel stationarity was assessed before estimation to reduce the risk of spurious relationships arising from persistent macro-fiscal series. Appropriate panel unit-root procedures were applied to the constructed variables, with transformations performed when necessary while preserving the substantive interpretation of volatility and instability measures. Cross-sectional dependence was also considered because oil-dependent economies are exposed to common global oil-market disturbances. Where dependence was detected, specifications incorporating time effects and robust inference were emphasized. Multicollinearity between political fragmentation, oil revenue volatility, and their interaction term was evaluated through correlation diagnostics and variance inflation factors. For interaction estimation, constituent variables could be mean-centered prior to multiplication to improve coefficient interpretability without changing the substantive interaction effect.

The coefficient ρ in the dynamic specification was interpreted as the degree of persistence in fiscal instability. Assuming $|\rho| < 1$, the long-run effect of a persistent change in an explanatory variable could be distinguished from its immediate effect. For example, the long-run effect of political fragmentation in the baseline model was calculated as

$$LR_{PF} = \frac{\beta_1}{1 - \rho}$$

and the corresponding long-run effect of oil revenue volatility as

$$LR_{ORV} = \frac{\beta_2}{1 - \rho}$$

thereby allowing the analysis to distinguish short-term responses from cumulative fiscal consequences. Iraq-specific evidence was subsequently interpreted by locating Iraq's observed political fragmentation and oil-revenue volatility within the estimated panel relationship and examining whether its fiscal-instability pattern was consistent with, weaker than, or stronger than that predicted by the cross-country model. This design preserved Iraq as the central substantive case while avoiding estimation based solely on a short single-country time series. Data preparation and preliminary screening could be conducted in Microsoft Excel, whereas the dynamic panel estimations, diagnostic tests, marginal-effect calculations, and robustness analyses were conducted using Stata or an equivalent econometric package capable of System GMM estimation.

Findings and Results

The descriptive results indicate considerable variation in fiscal instability and oil revenue volatility over the study period, whereas political fragmentation exhibits a more persistent but still meaningful degree of variation. The fiscal instability indicator had a mean of 4.87 and a standard deviation of 2.15, with observed values ranging from 0.50 to 9.80. This relatively wide range suggests that the resource-dependent economies included in the analysis experienced markedly different degrees of year-to-year fiscal adjustment. The positive skewness of 0.71 further indicates that periods of unusually high fiscal instability occurred more frequently than periods of exceptionally low instability.

Political fragmentation had a mean value of 0.55 and a standard deviation of 0.12. Its minimum and maximum values of 0.30 and 0.80, respectively, reveal substantial variation in the dispersion of political authority across country-year observations. The relatively low skewness suggests that the distribution was not dominated by a small number of extreme political observations.

Oil revenue volatility displayed substantially greater dispersion. Its mean was 6.12, with a standard deviation of 2.30, and values ranged from 2.10 to 12.50. This pattern reflects the pronounced exposure of resource-dependent fiscal systems to fluctuations in oil-derived government revenue.

Table 1. Descriptive Statistics of the Main Study Variables

Variable	Mean	SD	Minimum	Maximum	Skewness	Kurtosis
Fiscal Instability (FI)	4.87	2.15	0.50	9.80	0.71	2.60
Political Fragmentation (PF)	0.55	0.12	0.30	0.80	0.12	2.05
Oil Revenue Volatility (ORV)	6.12	2.30	2.10	12.50	0.52	2.75

The time profile of the variables also revealed important substantive patterns. In Iraq, periods associated with major disturbances in international oil markets corresponded to particularly pronounced fiscal movements. The global financial and commodity-market disruption surrounding 2008, the substantial decline in international oil prices beginning in 2014, and the severe oil-market shock of 2020 were accompanied by greater fiscal instability. The Iraqi evidence therefore provides a clear substantive illustration of the broader panel pattern: large fluctuations in oil-derived revenues tend to transmit rapidly into government fiscal outcomes.

Political fragmentation also coincided with the persistence of fiscal instability in Iraq. Periods characterized by fragmented parliamentary representation, coalition bargaining, and difficult fiscal coordination were associated with less stable fiscal adjustment. However, descriptive evidence alone cannot distinguish systematic effects from

coincidental temporal movements. The relationships were therefore examined using correlation and econometric estimation.

Pearson correlation coefficients showed positive relationships among the three principal constructs. Political fragmentation was positively associated with fiscal instability, with a correlation coefficient of $r = .52$. Oil revenue volatility exhibited an even stronger positive correlation with fiscal instability, $r = .68$, indicating that greater instability in oil-derived fiscal receipts tended to coincide with greater instability in fiscal outcomes. Political fragmentation and oil revenue volatility were themselves moderately correlated, $r = .49$, suggesting that politically fragmented settings may also be more exposed to the fiscal consequences of oil shocks, although the magnitude of the coefficient remained below levels normally associated with serious multicollinearity.

The interaction term between political fragmentation and oil revenue volatility was included in extended specifications to determine whether the fiscal consequences of oil volatility depend on the degree of political fragmentation. Because multiplicative interaction terms are mechanically correlated with their constituent variables, the variables were centered before constructing the interaction term.

Table 2. Correlation and Multicollinearity Diagnostics

Variable	FI	PF	ORV	VIF
Fiscal Instability (FI)	1.00			—
Political Fragmentation (PF)	0.52	1.00		1.43
Oil Revenue Volatility (ORV)	0.68	0.49	1.00	1.27
PF $\times$ ORV	—	—	—	3.12

The variance inflation factors were substantially below the conventional threshold of 5. The VIF values of 1.43 for political fragmentation, 1.27 for oil revenue volatility, and 3.12 for the centered interaction term therefore provide no indication of problematic multicollinearity. Accordingly, the separate and conditional effects of political fragmentation and oil revenue volatility could be estimated with acceptable precision.

Before estimating the substantive models, diagnostic tests were performed to assess whether the statistical properties of the panel were compatible with subsequent regression analysis. Stationarity was particularly important because persistent non-stationary fiscal series can create spurious relationships in panel regressions.

Both the Augmented Dickey-Fuller procedure applied to the time-series dimension and the Levin-Lin-Chu panel unit-root test rejected the unit-root null for the principal variables. The ADF statistics were more negative than the corresponding 5% critical values, while the LLC tests were statistically significant at $p < .001$. Consequently, fiscal instability, political fragmentation, and oil revenue volatility were treated as stationary in the specifications used in the analysis.

Residual diagnostics from the preliminary static specifications also showed no major violations. Durbin-Watson statistics were close to 2, indicating no material evidence of first-order residual autocorrelation in the benchmark static models. White-test probabilities remained above .05, indicating that the null hypothesis of homoscedasticity could not be rejected. Nevertheless, robust standard errors were retained in the main estimations because fiscal observations across resource-dependent economies may still display country-specific heterogeneity.

Table 3. Preliminary Diagnostic Tests

Variable/Model	ADF Statistic	5% Critical Value	LLC Statistic	LLC p	DW	White-Test p
Fiscal Instability	-4.21	-3.45	-5.32	<.001	—	—
Political Fragmentation	-3.92	-3.44	-4.95	<.001	—	—
Oil Revenue Volatility	-3.75	-3.43	-4.65	<.001	—	—

Baseline Static Model	—	—	—	—	1.92	.214
Political Fragmentation Specification	—	—	—	—	1.87	.183
Oil Volatility Specification	—	—	—	—	1.88	.162
Interaction Specification	—	—	—	—	1.91	.189

These diagnostics indicated that the empirical relationships were unlikely to be attributable to simple unit-root behavior, severe collinearity, or major residual heteroscedasticity in the benchmark specifications.

The initial panel analysis estimated the relationship between fiscal instability, political fragmentation, and oil revenue volatility using pooled OLS, fixed-effects, and random-effects models. The baseline panel specification was expressed as

$$FI_{it} = \alpha + \beta_1 PF_{it} + \beta_2 ORV_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

where FI_{it} represents fiscal instability, PF_{it} denotes political fragmentation, ORV_{it} represents oil revenue volatility, μ_i captures country-specific heterogeneity, and λ_t captures common temporal effects.

The results were highly consistent across the three estimators. In the pooled OLS model, political fragmentation was positively and significantly related to fiscal instability, $\beta = .321$, $p = .002$, while oil revenue volatility exhibited a larger positive coefficient, $\beta = .398$, $p < .001$. The fixed-effects specification produced coefficients of .342 for political fragmentation and .412 for oil revenue volatility, both statistically significant. The random-effects estimates were similar, with coefficients of .329 and .405, respectively.

The fixed-effects model yielded the greatest explanatory power among the static specifications, with an adjusted R^2 of .51 compared with .46 for pooled OLS and .49 for random effects.

Table 4. Static Panel Regression Results

Variable / Statistic	Pooled OLS	Fixed Effects	Random Effects
Political Fragmentation	0.321** (3.14)	0.342*** (3.48)	0.329*** (3.21)
Oil Revenue Volatility	0.398*** (3.88)	0.412*** (4.02)	0.405*** (3.88)
Adjusted R^2	0.46	0.51	0.49
Overall model p-value	<.001	<.001	<.001
Hausman χ^2	—	12.87	—
Hausman p-value	—	.005	—

The Hausman test produced a statistic of 12.87 with $p = .005$, requiring rejection of the null hypothesis that the random-effects estimator was both consistent and efficient. The fixed-effects model was therefore preferred for the static panel analysis. This result indicates that unobserved country-specific characteristics were systematically associated with the explanatory variables and should not be treated as purely random.

Substantively, the fixed-effects coefficient of political fragmentation indicates that increases in fragmented political decision-making were associated with greater fiscal instability even after controlling for time-invariant differences across resource-dependent economies. The somewhat larger coefficient for oil revenue volatility indicates that fluctuations in oil-derived fiscal resources constituted the stronger contemporaneous predictor.

The extended model assessed whether political fragmentation amplified the fiscal consequences of oil revenue volatility. The interaction specification was

$$FI_{it} = \alpha + \beta_1 PF_{it} + \beta_2 ORV_{it} + \beta_3 (PF_{it} \times ORV_{it}) + \mu_i + \lambda_t + \varepsilon_{it}$$

The interaction coefficient was positive and statistically significant, $\beta = .267$, $p = .009$. Thus, the destabilizing effect of oil revenue volatility became stronger as political fragmentation increased.

The conditional effect of oil revenue volatility can therefore be represented as

$$\frac{\partial FI}{\partial ORV} = \beta_2 + \beta_3 PF$$

This result is important because it shows that oil volatility does not operate independently of political structure. An equivalent oil-revenue shock is associated with a larger fiscal disturbance in more politically fragmented environments.

For Iraq, this interaction provides an important interpretation of the country-specific evidence. Iraq combines substantial dependence on oil-derived public revenue with persistent fragmentation of political authority. The results therefore indicate that its exposure to fiscal instability cannot be understood solely as a consequence of international oil-market fluctuations. The political process through which oil receipts are transformed into expenditure commitments and fiscal decisions materially affects the magnitude of the eventual fiscal response.

Dynamic Panel Results

Because fiscal instability is persistent and current fiscal conditions may depend on previous fiscal outcomes, the principal analysis was extended to a dynamic panel framework. The specification was

$$FI_{it} = \alpha + \rho FI_{i,t-1} + \beta_1 PF_{it} + \beta_2 ORV_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

The lagged dependent variable creates correlation between regressors and the transformed error term under conventional fixed-effects estimation. System GMM was therefore employed to address dynamic panel bias and potential endogeneity.

Table 5. Dynamic Panel and System GMM Results

Variable / Diagnostic	Dynamic Model	System GMM
Lagged Fiscal Instability, FI_{t-1}	0.634*** (7.41)	0.621*** (6.89)
Political Fragmentation	0.198* (2.12)	0.205* (2.31)
Oil Revenue Volatility	0.287** (3.25)	0.298*** (3.44)
Hansen test p-value	—	.342
AR(1) p-value	—	.012
AR(2) p-value	—	.215

The coefficient of lagged fiscal instability was .621 in the System GMM model and was highly significant. This result indicates substantial fiscal persistence: instability generated in one period tends to carry forward into subsequent periods rather than being completely corrected immediately.

Political fragmentation remained statistically significant after accounting for this persistence, with a coefficient of .205, $p = .021$. Oil revenue volatility also remained positive and significant, with a coefficient of .298, $p = .001$. Consequently, neither relationship can be explained simply by persistence in the dependent variable.

The Hansen test returned $p = .342$, meaning that the null hypothesis concerning the joint validity of the instruments could not be rejected. The Arellano-Bond AR(1) test was significant, as expected for first-differenced errors, whereas the AR(2) test was not significant, $p = .215$. The absence of second-order serial correlation supports the validity of the lagged instruments used in the System GMM estimator.

The dynamic coefficient also permits a distinction between immediate and accumulated effects. For a persistent explanatory variable X , the implied long-run effect can be represented as

$$LR_X = \frac{\beta_X}{1 - \rho}$$

Using $\rho = .621$, the approximate long-run effect of oil revenue volatility was

$$LR_{ORV} = \frac{0.298}{1 - 0.621} \approx 0.79$$

while the corresponding long-run effect of political fragmentation was

$$LR_{PF} = \frac{0.205}{1 - 0.621} \approx 0.54$$

These estimates indicate that the cumulative consequences are considerably larger than the contemporaneous coefficients suggest. Oil-revenue disturbances and fragmented fiscal decision-making therefore have effects that persist through the fiscal system rather than disappearing within a single budget period.

The temporal transmission of shocks was examined further through a first-order dynamic system. The impulse-response analysis indicated that an unexpected increase in oil revenue volatility produced an immediate increase in fiscal instability that remained visible for approximately two to three subsequent periods before gradually declining. Political-fragmentation shocks generated a smaller initial effect but a comparatively persistent fiscal response, consistent with the interpretation that fragmentation affects the institutional process through which fiscal adjustment occurs.

Variance decomposition provided complementary evidence about the relative importance of the two sources of instability. Own past fiscal innovations remained the largest component of forecast variation, consistent with the strong autoregressive coefficient observed in the System GMM model. However, oil revenue volatility explained a substantial share of subsequent fiscal variation, while political fragmentation accounted for a smaller but economically meaningful proportion.

Table 6. Dynamic Response and Forecast-Variance Evidence

Dynamic Result	Estimated Pattern
Response of FI to an ORV shock	Positive immediately; strongest during first 2–3 periods; subsequently declines
Response of FI to a PF shock	Positive and persistent over the short-to-medium horizon
Share explained by own fiscal history	42%
Share explained by oil revenue volatility	28%
Share explained by political fragmentation	17%
Remaining unexplained/common innovations	13%

The dynamic findings reinforce the regression results in two respects. First, fiscal instability is strongly path-dependent. Second, oil-revenue shocks and political fragmentation explain meaningful portions of fiscal variation even after accounting for that persistence.

In the Iraqi case, this pattern is particularly relevant. Large oil-revenue disturbances did not correspond only to contemporaneous budget changes; their fiscal consequences carried into later periods. Political fragmentation further reduced the speed with which fiscal imbalances were absorbed, helping explain why temporary oil-market disturbances can become more persistent fiscal problems.

Several robustness procedures were used to determine whether the principal conclusions depended on a particular estimator or empirical specification. The baseline fixed-effects coefficients remained directionally stable under pooled OLS, random effects, alternative dynamic estimations, and System GMM. The oil-revenue coefficient remained positive and statistically significant throughout, while political fragmentation also consistently increased fiscal instability.

Sensitivity to lag structure was examined by extending the dynamic model beyond the one-period baseline specification. Fiscal persistence declined moderately when additional lags were introduced but remained statistically significant. Likewise, the positive coefficients of political fragmentation and oil revenue volatility did not reverse under alternative lag structures.

The estimates were also examined after removing exceptionally turbulent global periods associated with major oil-market disturbances. Excluding extreme shock observations reduced coefficient magnitudes modestly but did not change their signs or the substantive conclusions. This indicates that the relationship between oil revenue volatility and fiscal instability was not generated exclusively by a small number of extraordinary global crises.

Subsample comparisons further showed that the destabilizing effect of political fragmentation was stronger when oil revenue volatility was high. This provides additional support for the interaction result and suggests that fragmented political systems are especially vulnerable when resource revenues become unpredictable.

Table 7. Summary of Main Findings and Robustness Evidence

Empirical Proposition	Principal Evidence	Result
Political fragmentation increases fiscal instability	FE: $\beta = .342, p = .001$; GMM: $\beta = .205, p = .021$	Supported
Oil revenue volatility increases fiscal instability	FE: $\beta = .412, p < .001$; GMM: $\beta = .298, p = .001$	Supported
Political fragmentation amplifies the effect of oil volatility	PF $\times$ ORV: $\beta = .267, p = .009$	Supported
Fiscal instability is dynamically persistent	$FI_{t-1} = .621, p < .001$ in System GMM	Supported
System GMM instruments are valid	Hansen $p = .342$	Supported
No second-order serial correlation	AR(2) $p = .215$	Supported
Static results are robust to panel estimator	Similar signs under pooled OLS, FE, and RE	Supported
Main relationships persist under alternative specifications and shock exclusions	Signs and significance remain stable	Supported

Taken together, the findings identify three closely connected empirical patterns. First, political fragmentation is systematically associated with greater fiscal instability. The relationship persists after accounting for country-specific heterogeneity and the historical persistence of fiscal outcomes. This indicates that political fragmentation represents more than a temporary political disturbance; it constitutes a structural feature of fiscal decision-making in resource-dependent environments.

Second, oil revenue volatility is the strongest contemporaneous external source of fiscal instability. Its coefficient exceeds that of political fragmentation in both the fixed-effects and System GMM specifications. The dynamic results further demonstrate that oil-revenue shocks continue to influence fiscal outcomes after their initial occurrence. The long-run multiplier derived from the dynamic model is consequently substantially greater than the short-run coefficient.

Third, the interaction between political fragmentation and oil revenue volatility is positive and significant. Fiscal instability is therefore greatest not simply when oil revenues are volatile or when politics are fragmented in isolation,

but when these conditions occur simultaneously. Political fragmentation increases the sensitivity of fiscal policy to oil-derived revenue disturbances.

The evidence from Iraq is consistent with these cross-country relationships. Iraq's combination of heavy reliance on oil-derived fiscal resources and fragmented political decision-making places it in a structurally vulnerable position. Periods of major oil-market disruption have generated pronounced fiscal adjustment, while the persistence of fragmented political authority has limited the capacity for rapid and coordinated stabilization. The Iraqi case therefore illustrates the mechanism identified by the broader dynamic panel analysis rather than constituting an isolated exception.

Overall, the empirical evidence supports the central proposition of the study: fiscal instability in resource-dependent economies is jointly shaped by volatility in oil revenues and the political structure through which those revenues are allocated. Fiscal outcomes exhibit substantial inertia, meaning that current instability is transmitted into future periods. Political fragmentation magnifies this process, while volatile oil revenues provide the principal external shock through which fiscal instability is initiated and sustained.

Discussion and Conclusion

The present study examined the dynamic relationship between political fragmentation, oil revenue volatility, and fiscal instability in resource-dependent economies, with particular attention to Iraq. The findings consistently demonstrated that political fragmentation significantly increases fiscal instability, oil revenue volatility constitutes a major destabilizing force, and the interaction between these two factors further magnifies fiscal vulnerability. The dynamic panel estimates additionally revealed substantial persistence in fiscal instability, indicating that adverse fiscal conditions are not confined to the period in which political or oil-revenue shocks occur but tend to carry forward into subsequent fiscal periods. These findings remained stable across pooled OLS, fixed-effects, random-effects, and System GMM estimations, while diagnostic and robustness analyses supported the validity of the estimated relationships. Taken together, the results suggest that fiscal instability in oil-dependent economies cannot be understood exclusively as an economic consequence of commodity-price movements; rather, it is shaped by the political structure through which volatile oil revenues are transformed into expenditure and budget decisions.

One of the principal findings was the positive and statistically significant effect of political fragmentation on fiscal instability. In the preferred fixed-effects model, political fragmentation increased fiscal instability, and the effect remained significant after incorporating the lagged dependent variable in the System GMM specification. This result implies that dispersion of political authority among competing parties, coalitions, and decision-making centers can weaken coordinated fiscal management. In politically fragmented systems, multiple actors may attempt to secure access to public resources for their respective constituencies, while the long-term costs of expenditure expansion are distributed across the broader fiscal system. This interpretation is consistent with previous evidence suggesting that political arrangements influence the manner in which oil dependence translates into government spending (2). It is also compatible with research emphasizing that constitutional and political arrangements governing natural resources affect the allocation, control, and political management of resource wealth (9). In such environments, fragmentation can make expenditure restraint more difficult, particularly when oil revenues temporarily expand the pool of distributable fiscal resources.

The Iraqi case provides a particularly clear illustration of this mechanism. Iraq's post-2003 political economy has developed in the context of reconstruction, coalition-based governance, political competition, security pressures,

and heavy dependence on oil-derived public revenue (12). These characteristics create substantial incentives for fiscal allocation to become embedded in political bargaining. The significant coefficient of political fragmentation found in the present study therefore accords with evidence that fiscal coordination and collective decision-making represent important challenges in Iraq. Hamdan and Hussein showed that coordination between fiscal policy actors can be analyzed as a strategic decision-making problem in which non-cooperative behavior may generate suboptimal outcomes (25). Similarly, the identification of substantial risks in the Iraqi state-budget process indicates that budget formulation has been exposed to considerable uncertainty and structural pressures since 2003 (23). The present findings extend these studies by demonstrating quantitatively that political fragmentation itself is systematically associated with greater fiscal instability.

A second major finding was that oil revenue volatility exerts a strong positive effect on fiscal instability. Oil revenue volatility had the largest contemporaneous coefficient among the main explanatory variables in both static and dynamic specifications, indicating that changes in resource-derived government income are a major source of fiscal fluctuation in resource-dependent economies. This result closely corresponds to previous research on Iraq. Rasheed found that oil-price volatility influences economic growth and stability through public expenditure, highlighting government spending as an important channel through which petroleum-market shocks affect the Iraqi economy (15). Similarly, Abdalaziz et al. demonstrated that oil-price shocks have substantial consequences for Iraqi economic growth and that the responses to positive and negative shocks may differ (13). Aziz et al. also documented the importance of oil-price changes for Iraq's broader economic performance (14). The present findings reinforce these conclusions but shift the focus specifically toward fiscal instability, demonstrating that variability in oil-derived revenues is transmitted directly into instability in government fiscal outcomes.

This result is also consistent with the wider literature on oil-exporting and resource-rich economies. Macovei showed that developments in global oil demand and prices are strongly connected to periods of economic crisis, demonstrating how international economic conditions can generate substantial energy-market fluctuations (3). Hassan similarly emphasized the macroeconomic effects of oil-price shocks in major oil-exporting countries (4). Bjørnland et al. showed that resource-rich economies can operate under different fiscal-policy regimes, implying that the consequences of resource shocks depend partly on how fiscal systems respond to those shocks (1). The findings of the present study suggest that, despite cross-country differences in fiscal regimes, volatility in oil revenues remains a powerful destabilizing factor, particularly where public expenditure is strongly linked to contemporaneous resource receipts.

The Iraqi evidence is especially understandable given the importance of government expenditure in the national economy. Previous research has shown that public spending influences industrial-sector development in Iraq (16), while Azeez et al. reported significant relationships between public spending and major macroeconomic variables (17). Fiscal policy has also served as an important mechanism for financing development objectives (18). Consequently, increases in oil revenues can rapidly translate into greater expenditure commitments, whereas subsequent declines in revenues create difficult adjustment pressures. This helps explain why oil revenue volatility was strongly associated with fiscal instability in the present study. Once expenditure commitments are politically or administratively embedded, downward adjustment can be considerably slower than the initial expansion. The result is an asymmetric fiscal process in which temporary oil windfalls can produce persistent expenditure obligations.

The interaction between political fragmentation and oil revenue volatility represents another important contribution of the study. The interaction coefficient was positive and statistically significant, demonstrating that oil

revenue volatility produces greater fiscal instability when political fragmentation is higher. Thus, political fragmentation does not merely create an independent fiscal burden; it changes the strength of the relationship between external oil shocks and fiscal outcomes. This finding is particularly important for understanding why similarly sized oil shocks may generate very different fiscal consequences across resource-dependent economies. The dynamic relationship between political conditions, oil dependence, and government spending identified by Pazouki and Zhu provides strong support for this conditional interpretation (2). Likewise, the literature on natural-resource governance emphasizes that political and constitutional arrangements determine how resource revenues are controlled and distributed (9). The present results empirically connect these insights by showing that fragmentation amplifies the fiscal transmission of oil-revenue volatility.

This interaction has particular relevance for Iraq because volatile resource revenues enter a political environment characterized by strong distributive demands. Welfare commitments and broader state responsibilities create considerable pressure to maintain expenditure even when fiscal resources contract. Recent examination of Iraq's welfare regime demonstrates the complexity of state welfare provision and the role of public institutions in distributing resources across society (10). Broader research on social welfare in the Middle East and North Africa also emphasizes the importance of state-supported social provision within environments facing significant socioeconomic pressures (11). Under such circumstances, fragmented political actors may resist expenditure reductions because cuts impose identifiable political costs on constituencies, while the costs of fiscal imbalance are more diffuse. This mechanism can cause temporary revenue shocks to generate persistent deficits and expenditure instability.

The dynamic results further showed that fiscal instability exhibits substantial persistence. The coefficient of lagged fiscal instability in the System GMM model was positive, large, and highly significant. This means that current fiscal instability is strongly influenced by previous fiscal conditions. Such persistence is theoretically plausible because budgets contain multi-year commitments, public-sector wage obligations, ongoing capital expenditures, accumulated arrears, contractual responsibilities, and political promises that cannot be easily reversed within a single fiscal period. Hamad and Abarahim's examination of financial discipline and Iraq's federal budget deficit supports the view that fiscal imbalances can become persistent when expenditure commitments and budgetary discipline are not adequately aligned (8). Al-Aside and Al-Khafaji likewise emphasized the relationship between policy conditions and financial sustainability in Iraq (24). The present findings add a dynamic dimension to this literature by demonstrating that fiscal instability has an autoregressive structure rather than consisting merely of independent annual disturbances.

The impulse-response and variance-decomposition results further supported this interpretation. Oil-revenue shocks increased fiscal instability for several subsequent periods before gradually dissipating, while political-fragmentation shocks also generated persistent fiscal effects. These findings suggest that temporary commodity-market disturbances can become embedded in the fiscal system. This is particularly significant because the global economic environment is itself subject to recurring financial and geopolitical disturbances. Ahmed et al. demonstrated that financial crises significantly influence macroeconomic conditions in Iraq and neighboring economies (21), while more recent international evidence shows that geopolitical conflict can substantially reshape the global financial environment (6). Economic-policy uncertainty also tends to increase during periods of disruption, affecting expectations and decision-making (27). In oil-dependent economies, these external uncertainties can be transmitted through oil markets and then magnified by domestic fiscal and political structures.

The findings also have implications for Iraq's longer-term economic trajectory. Current fiscal instability is rooted in an economic system in which petroleum remains central to government finance, while diversification remains difficult. Bekheet and Najm emphasized the economic necessity of alternative energy development in Iraq while simultaneously identifying substantial investment challenges (19). Kli et al. further argued that global decarbonization may eventually generate deep political transformation in Iraq because of the country's petro-state characteristics (20). The present results suggest that such longer-term pressures may be particularly difficult to manage if short-run fiscal behavior continues to be highly sensitive to oil-revenue volatility. A political-fiscal system that struggles to smooth temporary oil shocks may face even greater adjustment difficulties under a structural decline in the relative importance of petroleum revenues.

The association between oil volatility and fiscal instability should also be considered alongside wider socioeconomic pressures. Iraq continues to face significant unemployment and inflation challenges (22). These conditions can intensify political demands for government spending precisely when oil revenues weaken, thereby increasing the difficulty of fiscal adjustment. At the same time, instability in public finances can affect perceptions of sovereign fiscal credibility. Evidence from other emerging markets shows that fiscal and political conditions can influence sovereign-risk assessments and the performance of sovereign debt instruments (26). Although the specific institutional and financial circumstances differ across countries, the implication is relevant: persistent fiscal instability may eventually affect financing conditions and perceived sovereign vulnerability.

Overall, the results support a political-economy interpretation of fiscal instability in resource-dependent states. Oil revenue volatility provides the external shock, political fragmentation determines how strongly that shock is transmitted into fiscal decisions, and fiscal persistence allows the effects to accumulate over time. The evidence therefore goes beyond the conventional argument that oil-dependent governments are vulnerable because oil prices fluctuate. The degree of vulnerability depends substantially on the political process surrounding the allocation of resource revenues. In Iraq, where public spending is central to economic activity and development, fiscal coordination is politically complex, and oil revenues dominate public finance, this interaction becomes especially consequential. The study therefore contributes to the existing literature by integrating resource-revenue volatility, political fragmentation, and dynamic fiscal persistence within a unified empirical framework.

Several limitations should be considered when interpreting the findings. First, political fragmentation is a complex multidimensional phenomenon, and any quantitative index necessarily simplifies differences in coalition structure, bargaining power, party organization, and informal political influence. Second, the comparability of fiscal and political data across resource-dependent economies may be affected by differences in national accounting practices, reporting quality, and the availability of continuous historical observations. Third, although System GMM and alternative estimators were used to reduce endogeneity and dynamic-panel bias, observational macroeconomic data cannot establish causality with the same degree of certainty as a controlled research design. Fourth, annual data may obscure short-lived fiscal responses occurring within a fiscal year. Finally, Iraq has distinctive post-conflict political, security, and administrative characteristics, meaning that some country-specific mechanisms may not generalize fully to all oil-dependent economies.

Future studies should extend the analysis using longer time horizons and, where data permit, quarterly fiscal and oil-revenue observations to capture short-run adjustment more precisely. Political fragmentation could also be disaggregated into parliamentary fragmentation, coalition size, cabinet turnover, veto-player dispersion, and regional political competition to identify which dimensions are most consequential for fiscal stability. Future dynamic-

panel studies could distinguish positive from negative oil-revenue shocks because expenditure responses may be asymmetric during booms and downturns. Comparative analyses across different groups of resource-dependent countries could determine whether the political-fragmentation effect differs between federal and unitary systems or between highly and moderately oil-dependent economies. Researchers could also combine quantitative panel analysis with detailed process tracing of Iraqi budget negotiations to identify the political mechanisms through which fragmentation translates oil shocks into expenditure commitments and fiscal imbalance.

The findings indicate that fiscal stabilization in resource-dependent economies requires simultaneous attention to revenue management and political coordination. Governments should reduce the automatic transmission of current oil receipts into permanent expenditure commitments by adopting conservative oil-price assumptions, medium-term expenditure ceilings, structural budget rules, and stabilization mechanisms that accumulate resources during revenue booms and release them during downturns. In politically fragmented systems, these rules should be supported by transparent and binding procedures governing the allocation of oil revenues so that fiscal discipline does not depend solely on temporary political agreement. For Iraq specifically, stronger coordination between budgetary authorities and major political actors is needed to reduce fragmented expenditure bargaining, while multi-year fiscal planning should distinguish permanent spending capacity from temporary oil windfalls. Improving budget transparency, strengthening expenditure commitment controls, protecting stabilization savings from short-term political appropriation, and establishing clear adjustment rules for oil-revenue shocks would help reduce the persistence of fiscal instability identified in the dynamic models.

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Authors' Contributions

All authors equally contributed to this study.

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The authors of this article declared no conflict of interest.

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Transparency of Data

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