

Oil Price Shocks and Energy Sector Resilience under Different Institutional Designs in Kuwait and Kazakhstan

Obby Phiri

o.phiri@westminster.ac.uk

University of Westminster

Research Article

Keywords: oil price shocks, hydrocarbon dependence, energy resilience, fiscal procyclicality, institutional adaptability, ARDL, VAR, Kuwait, Kazakhstan, energy transition

Posted Date: September 16th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-10751431/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Additional Declarations: No competing interests reported.

Abstract

Global oil-price volatility creates recurrent fiscal, inflationary and exchange-rate pressures in hydrocarbon-dependent economies, but the strength and persistence of these pressures depend on the institutional architecture through which energy revenues are transmitted. This study compares Kuwait and Kazakhstan using harmonised autoregressive distributed lag (ARDL) and vector autoregression (VAR) frameworks. Kuwait is analysed over 1975–2023 and Kazakhstan over 1993–2024, with government expenditure, inflation and the nominal exchange rate treated as the principal transmission channels. Both economies exhibit fiscal procyclicality, but their adjustment dynamics differ materially. In Kuwait, the long-run elasticity of government expenditure with respect to oil prices is 0.42 ($p < 0.05$), while the fiscal error-correction term is statistically insignificant, providing no evidence of systematic post-shock correction. Kazakhstan records a larger long-run fiscal elasticity of 0.55 ($p < 0.01$) together with significant error correction (-0.637 , $p < 0.01$). Oil prices also have significant long-run effects on Kazakhstan's inflation (0.218 , $p < 0.01$) and exchange rate (-0.369 , $p < 0.05$), whereas the corresponding long-run relationships are not supported for Kuwait. VAR impulse responses and variance decomposition reinforce this contrast. The paper develops an Energy-Shock Stability–Flexibility Framework that distinguishes shock insulation from post-shock adjustment capacity. Kuwait combines greater nominal insulation with weaker fiscal adaptability; Kazakhstan permits greater short-run transmission but exhibits stronger correction. The findings imply that energy-sector resilience in hydrocarbon exporters requires both credible revenue-stabilisation mechanisms and institutions capable of adaptive fiscal, monetary and exchange-rate adjustment. Such capacity is also important for protecting long-horizon diversification and energy-transition investment from volatile fossil-fuel revenues.

1. Introduction

Oil-price shocks are among the most consequential external disturbances confronting oil-importing and oil-exporting economies alike, with a long-established capacity to precede recessions and destabilise macroeconomic aggregates (Hamilton, 1983). For hydrocarbon-exporting economies specifically, they alter government revenues, liquidity conditions, inflationary pressures and external balances, while their persistence can reshape fiscal planning and private-sector expectations. Distinguishing demand-driven from supply-driven oil-price movements matters for how these effects propagate (Kilian, 2009). The central empirical puzzle is that countries exposed to broadly similar global oil-price movements frequently experience very different domestic outcomes. Oil dependence alone therefore cannot explain the magnitude, persistence or channel through which external commodity shocks enter the macroeconomy.

The literature offers several explanations for this heterogeneity. Resource-curse arguments emphasise the political and institutional incentives created by concentrated resource rents (Sachs & Warner, 1995; Ross, 2012; Badeeb et al., 2017). Fiscal-procyclicality research shows that commodity windfalls can generate expenditure expansions that are difficult to reverse (Céspedes & Velasco, 2014). Dutch-disease

theory highlights the real-exchange-rate and competitiveness effects of resource booms (Corden & Neary, 1982), while the commodity-currency literature shows that exchange-rate adjustment can become a major transmission channel in resource exporters (Chen & Rogoff, 2003). These literatures imply that the consequences of oil shocks depend not only on the shock itself, but also on the institutional and policy architecture through which it is absorbed.

Kuwait and Kazakhstan provide an analytically useful comparison. Both economies are materially dependent on hydrocarbon revenues, but they organise macroeconomic adjustment differently. Kuwait combines substantial sovereign financial buffers, extensive public expenditure commitments and a tightly managed currency arrangement. Kazakhstan, by contrast, is a post-Soviet transition economy that has progressively relied on a more flexible exchange-rate regime and has developed the National Fund of the Republic of Kazakhstan (NFRK) as a mechanism for managing resource revenues. The comparison therefore permits examination of a broader question: does macroeconomic resilience arise primarily from insulating the economy from shocks, or from enabling adjustment after shocks occur?

This paper develops the distinction between institutional stability and institutional adaptability. Stability refers to the capacity of policy arrangements to limit immediate fluctuations in nominal and fiscal variables. Adaptability refers to the capacity of the macroeconomic system to correct disequilibria and re-establish longer-run relationships after a disturbance. These dimensions need not move together. A regime can suppress short-run volatility while limiting adjustment, or allow greater short-run volatility while facilitating subsequent convergence. This stability–flexibility distinction provides the organising framework for the Kuwait–Kazakhstan comparison. Figure 1 integrates these theoretical mechanisms and shows how institutional filters condition the transmission of a common oil-price shock.

The study makes four contributions. First, it provides a harmonised comparative interpretation of ARDL and VAR evidence for a high-income Gulf rentier economy and a transition resource economy. Second, it separates shock insulation from post-shock adjustment, thereby avoiding the assumption that low observed volatility necessarily implies greater resilience. Third, it shows that the manifestation of Dutch-disease pressures is conditioned by the exchange-rate regime: nominal adjustment is muted in Kuwait but visible in Kazakhstan. Fourth, it provides a more cautious institutional interpretation of macroeconomic time-series evidence. Institutions are treated as conditioning structures rather than as formally estimated mediators; causal claims are therefore limited to what the econometric design can support.

The paper asks three questions: (1) how strongly do oil-price movements affect government expenditure, inflation and exchange rates in Kuwait and Kazakhstan; (2) how do the persistence and error-correction properties of these relationships differ across the two economies; and (3) what do these differences imply for the distinction between institutional stability and institutional adaptability in oil-dependent economies?

The remainder of the paper is organised as follows. Section 2 develops the theoretical framework and hypotheses. Section 3 explains the comparative ARDL–VAR design, variables and diagnostics. Section 4

reports the results. Section 5 interprets the findings through the stability–flexibility framework and the resource-curse and Dutch-disease literatures. Section 6 concludes with implications, limitations and policy priorities.

2. Literature Review and Theoretical Framework

2.1 Energy-price shocks, hydrocarbon dependence and resilience

Oil-price volatility is not simply a financial-market phenomenon for petroleum exporters. It is an energy-system shock that changes the value of national hydrocarbon production, the foreign-exchange earnings generated by energy exports and the fiscal resources available to governments. In economies where oil receipts finance a substantial share of public expenditure, an external price movement can therefore propagate rapidly from the energy sector to the budget, domestic demand, liquidity, inflation and the exchange rate. The magnitude of that propagation depends on the degree of hydrocarbon dependence, but dependence alone does not determine the outcome. Fiscal rules, sovereign wealth arrangements, monetary policy and exchange-rate regimes shape whether the initial energy shock is buffered, transmitted or corrected.

This perspective is consistent with the broad remit of contemporary energy-transition research, which increasingly treats governance and institutional capacity as part of energy-system performance rather than as an external political variable. Discover Energy explicitly includes the business, economic and policy dimensions of energy transformation within its scope (Tynan, 2021). Recent work in the journal likewise shows that the response to energy-price signals depends on governance quality and policy institutions. Nondo (2026), using CS-ARDL and DCCE-ARDL methods for G20 economies, finds that institutional quality materially conditions the relationship between energy prices and renewable-energy development. Mukanya and Semanya (2026) similarly frame energy resilience as a governance problem in low-carbon transitions. These contributions support a broader interpretation of resilience in which institutions affect how energy shocks are absorbed and how systems recover.

For hydrocarbon exporters, resilience has an additional intertemporal dimension. Oil-price booms expand fiscal space and can support infrastructure, human-capital investment, diversification and low-carbon projects. Oil-price downturns can reverse that space, forcing expenditure compression, drawing down financial buffers or increasing debt. If transition-related investment is highly procyclical, countries may underinvest precisely when sustained capital formation is needed to reduce long-run dependence on fossil-fuel revenues. The ability to smooth revenue and maintain credible adjustment mechanisms is therefore relevant not only to conventional macroeconomic stabilisation but also to the capacity to finance a gradual energy and economic transition.

The present study builds on this insight but does not treat energy transition as an outcome variable. Instead, it examines a prior condition for transition capacity: the macroeconomic resilience of

hydrocarbon-dependent states to oil-price shocks. This distinction is important. The analysis does not estimate whether Kuwait or Kazakhstan is transitioning faster to renewable energy. It asks whether their fiscal, inflation and exchange-rate systems exhibit the combination of insulation and adjustment that can protect long-horizon policy commitments from recurrent oil-market volatility.

2.2 Resource dependence and institutional conditioning

The resource-curse hypothesis proposes that natural-resource abundance can weaken long-run development through rent-seeking, governance distortions, volatility and under-diversification (Sachs & Warner, 1995; Ross, 2012). Empirical support for the strong form of this hypothesis is uneven, and evidence linking specific resource discoveries to disappointing growth outcomes is often more consistent with elevated expectations and premature spending than with resource abundance as such (Cust & Mihalyi, 2019). Later work has increasingly treated these outcomes as conditional rather than inevitable. Badeeb et al. (2017), for example, show that the resource-curse literature has evolved from deterministic accounts toward explanations centred on institutional quality and policy choices. For the present study, the important implication is that oil wealth is not expected to generate a uniform macroeconomic response across exporters.

Kuwait and Kazakhstan represent different institutional configurations rather than different degrees of exposure to a completely different shock. Kuwait's distributive fiscal structure makes government spending a central transmission channel, while its exchange-rate arrangement restricts nominal currency adjustment. Kazakhstan's fiscal framework remains sensitive to oil revenues, but the NFRK and a more flexible exchange-rate regime create mechanisms through which adjustment can occur after disturbances. The empirical question is therefore not whether one country has 'better' institutions in a general sense, but how different institutional arrangements condition the strength and persistence of specific macroeconomic channels.

2.3 Fiscal procyclicality and adjustment

Commodity exporters commonly display fiscal procyclicality because government revenues rise during commodity booms and political or administrative pressures convert windfalls into expenditure (Céspedes & Velasco, 2014). The long-run consequences depend on whether expenditure commitments can be reversed when commodity conditions change. In a highly distributive rentier system, wages, subsidies and transfers may become politically sticky. A sovereign resource fund can, in principle, separate current expenditure from current resource receipts, although its effectiveness depends on rules governing transfers and withdrawals.

H1 (Fiscal transmission)

Positive oil-price movements are associated with higher government expenditure in both Kuwait and Kazakhstan.

H2 (Fiscal adjustment)

Post-shock fiscal adjustment is weaker in Kuwait than in Kazakhstan, reflected in weaker evidence of error correction in the Kuwaiti expenditure model.

2.4 Inflation transmission and monetary insulation

Oil-price movements can affect inflation through cost channels, fiscal demand, liquidity creation and exchange-rate pass-through, with the strength of these channels depending materially on the systematic monetary policy response to the shock (Bernanke, Gertler, & Watson, 1997). The relative importance of these channels depends on administered prices, subsidies, monetary credibility and the exchange-rate regime. In Kuwait, price controls and exchange-rate management can dampen direct and exchange-rate pass-through. In Kazakhstan, greater nominal exchange-rate movement creates an additional route through which external shocks can affect domestic prices.

H3 (Inflation transmission)

Oil-price shocks have a more persistent inflationary effect in Kazakhstan than in Kuwait.

2.5 Exchange rates, commodity currencies and Dutch disease

Dutch-disease theory predicts that resource booms can appreciate the real exchange rate and weaken non-resource tradable sectors (Corden & Neary, 1982). Under a flexible nominal exchange rate, part of this adjustment can occur through currency appreciation; under a tightly managed regime, nominal adjustment is constrained and relative-price adjustment may instead occur through domestic prices. The commodity-currency literature similarly predicts a systematic relationship between commodity prices and currencies in resource exporters (Chen & Rogoff, 2003).

H4 (Exchange-rate transmission)

Oil-price movements have a stronger and more persistent effect on Kazakhstan's nominal exchange rate than on Kuwait's nominal exchange rate.

2.6 Energy-Shock Stability–Flexibility Framework

The preceding arguments motivate a two-dimensional conception of resilience. Shock insulation concerns the extent to which an institutional arrangement suppresses immediate movements in macroeconomic variables. Adjustment capacity concerns the extent to which deviations are corrected after the shock. These are analytically distinct. A country can display low short-run nominal volatility yet weak error correction, or substantial short-run volatility accompanied by stronger convergence. Figure 2 translates this theoretical logic into the empirical pathways tested in the ARDL–VAR analysis.

The framework distinguishes two functions that are often conflated in empirical discussions of energy resilience. The first is shock insulation: the ability of institutional arrangements to reduce the immediate effect of an external energy-price disturbance on domestic fiscal and nominal variables. Sovereign financial buffers, administered prices, subsidies, managed exchange rates and conservative budget assumptions can all contribute to insulation. The second is adjustment capacity: the ability of the economy to correct disequilibria once a shock has been transmitted. Adjustment can occur through expenditure changes, exchange-rate movements, monetary tightening, reserve accumulation or depletion, and changes in private demand.

These functions can generate different observed combinations. High insulation with low adjustment may produce an appearance of stability while allowing fiscal or structural imbalances to persist. Low insulation with high adjustment may produce visible short-run volatility while facilitating faster convergence. High insulation and high adjustment would represent the most robust configuration, because shocks are initially buffered without preventing necessary relative-price and fiscal correction. Low insulation and low adjustment would represent the most vulnerable configuration.

The framework is particularly useful for comparing Kuwait and Kazakhstan because their institutional differences affect the channels through which oil-price movements become observable. Kuwait’s tightly managed exchange-rate arrangement reduces nominal currency movement, while sovereign buffers and administered domestic prices can dampen immediate transmission. Yet large public-sector commitments can make expenditure adjustment politically and institutionally difficult. Kazakhstan’s more flexible exchange rate exposes the domestic economy more directly to external price and currency movements, but it also creates a mechanism through which relative prices can adjust. The NFRK provides an additional, though imperfect, fiscal buffer. The empirical analysis therefore evaluates not which country is simply 'more stable', but how each system distributes the costs of adjustment across time and macroeconomic variables.

Dimension	Kuwait: expected configuration	Kazakhstan: expected configuration
Fiscal channel	High exposure to oil revenues; sticky expenditure adjustment	High exposure to oil revenues; partial correction through evolving fiscal institutions
Inflation channel	Greater short-run insulation	Greater short- and long-run transmission
Exchange-rate channel	Low nominal adjustment under managed regime	Greater nominal adjustment
Resilience profile	Stability with limited flexibility	Flexibility with incomplete stability

3. Methodology

3.1 Why Kuwait and Kazakhstan?

Kuwait and Kazakhstan are selected as a structured comparative pair because they share meaningful exposure to global hydrocarbon markets while differing substantially in the institutions through which that exposure is managed. Both are oil exporters, both use sovereign resource-management arrangements, and both face the strategic problem of converting volatile hydrocarbon income into durable economic capacity. These commonalities make oil-price shocks a relevant external disturbance in each case. Kuwait in particular has an established country-specific literature documenting the transmission of oil-price fluctuations into its macroeconomic variables using VAR methods (Eltony & Al-Awadi, 2001), which this study extends with a harmonised ARDL–VAR comparison against a second hydrocarbon exporter.

The contrast is equally important. Kuwait is a high-income Gulf rentier economy with a long-established public distribution system, extensive fiscal buffers and a tightly managed exchange-rate arrangement. Kazakhstan is a post-Soviet transition economy with a shorter institutional history, greater nominal exchange-rate flexibility and a resource fund that operates within a different fiscal and monetary environment, one that continues to be shaped by the trade-off between exploiting hydrocarbon wealth and diversifying away from it (OECD, 2023). The countries therefore approximate a 'most-different institutional systems' comparison within a common context of hydrocarbon dependence.

This design is analytically useful because it shifts attention from whether oil shocks matter to how the same class of energy shock is transmitted under different policy architectures. The comparison does not imply that all observed differences are caused by institutions: geography, economic structure, trade patterns and geopolitical exposure also differ. Rather, it provides a disciplined setting for interpreting the country-specific dynamic estimates and for developing propositions about shock insulation and adjustment capacity that can be tested more broadly in future multi-country research.

3.2 Comparative research design

The study uses country-specific annual time-series models and then compares the estimated transmission patterns. Kuwait is observed over 1975–2023 and Kazakhstan over 1993–2024. The unequal sample periods reflect data availability and the fact that Kazakhstan became an independent state in 1991. The analysis does not pool the two countries. Instead, it applies comparable ARDL and VAR logic to each national system and interprets differences in coefficients, cointegration, error correction and impulse responses.

This design is appropriate for the research question because it preserves country-specific institutional structures while allowing comparison of common macroeconomic channels. It does not, however, identify a formal causal mediation effect of institutions. Institutional interpretation is therefore based on cross-case conditioning and is stated cautiously throughout.

3.3 ARDL specification

For each country, three dependent variables are considered in turn: government expenditure (GOVEXP), inflation (INF) and the nominal exchange rate (EXR), estimated using the autoregressive distributed lag

(ARDL) bounds-testing approach to cointegration (Pesaran & Shin, 1999; Pesaran, Shin, & Smith, 2001). The general ARDL(p,q) representation is:

$$Y_t = \alpha_0 + \sum_{i=1}^p \varphi_i Y_{t-i} + \sum_{j=0}^q \beta_j X_{t-j} + \gamma' Z_t + \varepsilon_t$$

where Y_t denotes the dependent macroeconomic variable, X_t denotes the oil-price variable, Z_t is a vector of domestic and external controls, φ and β are dynamic coefficients, and ε_t is a white-noise disturbance. Lag selection follows the Akaike Information Criterion (AIC), subject to the small annual samples.

Where the ARDL bounds test supports a level relationship, the corresponding error-correction representation is:

$$\Delta Y_t = c + \sum \lambda_i \Delta Y_{t-i} + \sum \delta_i \Delta X_{t-i} + \theta' \Delta Z_t + \psi ECT_{t-1} + u_t$$

A negative and statistically significant ψ indicates adjustment toward the estimated long-run equilibrium. An insignificant ECT is interpreted as an absence of evidence for systematic error correction; its sign alone is not treated as evidence of convergence or divergence.

3.4 VAR specification

The ARDL analysis is complemented by a reduced-form VAR estimated using stationary transformations of the variables:

$$W_t = c + A_1 W_{t-1} + \dots + A_k W_{t-k} + e_t$$

where W_t contains the oil-price measure and the relevant macroeconomic variables. Impulse response functions (IRFs) trace the response of inflation, government expenditure and the exchange rate to a one-standard-deviation oil-price innovation. Forecast error variance decomposition (FEVD) is used to assess the share of forecast variance associated with oil-price innovations over the reported horizon.

3.5 Variables and data sources

Variable	Role / definition	Kuwait source	Kazakhstan source
Oil price (L_WTI)	Log of WTI crude oil price; global oil-shock proxy	World Bank / IMF	U.S. EIA
Inflation (INF)	Annual CPI inflation	Central Bank of Kuwait	National Bank of Kazakhstan / World Bank
Government expenditure (L_GOVEXP)	Government expenditure measure used in national model	Central Bank of Kuwait	IMF Fiscal Monitor / World Bank
Exchange rate (L_EXR)	Nominal exchange-rate measure	Central Bank of Kuwait	IMF / National Bank of Kazakhstan
FDI (L_FDI)	Foreign direct investment control	World Bank	World Bank
Global GDP growth	External-demand control	IMF WEO	IMF WEO
Geopolitical risk (L_GPR)	Caldara–Iacoviello geopolitical risk index	GPR database	GPR database
Fuel exports	External-sector control	World Bank	World Bank
Domestic GDP	Real activity control	World Bank	National statistics / World Bank
Broad money (M2)	Liquidity control; Kazakhstan only	—	IMF IFS

Variables expressed in nominal monetary units were transformed into logarithms where appropriate, and nominal series were adjusted to real terms using deflators consistent with the underlying country models (World Bank, 2023). The dataset required limited linear interpolation for missing observations and 5th/95th percentile winsorisation for selected Kazakhstan observations. Because these treatments can affect inference in short annual samples, they should be interpreted as data-management choices rather than as substitutes for structural-break analysis. Future robustness work should report the exact interpolated observations and compare winsorised with non-winsorised estimates.

3.6 Stationarity, cointegration and diagnostics

Augmented Dickey–Fuller tests indicate a mixture of $I(0)$ and $I(1)$ variables and no $I(2)$ series, supporting use of the ARDL bounds-testing framework. In Kuwait, inflation and GDP are stationary at levels, whereas oil prices, government expenditure and the exchange rate are reported as $I(1)$. The Kazakhstan series similarly contain a mixture of $I(0)$ and $I(1)$ processes.

Bounds testing indicates a long-run relationship for Kuwait’s government-expenditure model but not for the Kuwait inflation or exchange-rate models. For Kazakhstan, cointegration is found across all three macroeconomic equations. Post-estimation checks include the Breusch–Godfrey LM test for serial

correlation, Breusch–Pagan–Godfrey heteroskedasticity testing, Jarque–Bera normality testing, and CUSUM/CUSUMSQ stability assessment. The reported models pass the stated diagnostic checks.

The long sample spans contain economically important episodes, including the Gulf War, the global financial crisis, the 2014 oil-price collapse (Arezki & Blanchard, 2014), COVID-19 and, for Kazakhstan, the post-2015 monetary/exchange-rate regime. Structural change is therefore treated as an important limitation throughout. A subsequent replication should add break-robust unit-root tests and explicit regime/break specifications rather than infer structural stability solely from conventional unit-root testing.

3.7 Robustness strategy and structural-change considerations

Oil-market time series are characterised by large shocks and regime changes. The samples used here encompass the Gulf War, the Asian and Russian crises, the global financial crisis, the 2014–2016 oil-price collapse, the COVID-19 shock and the energy-market disruption associated with the Russia–Ukraine war. Kazakhstan also experienced a major shift in exchange-rate and monetary arrangements around 2015. These episodes mean that conventional stationarity and parameter-stability assumptions require particular care.

The baseline estimates are retained because they permit direct comparison of the three transmission channels across both countries. However, three robustness priorities follow from the design. First, future replication should supplement ADF tests with break-robust unit-root procedures such as Zivot–Andrews and, where sample size permits, multiple-break methods. Second, the baseline should be compared with specifications that use alternative global oil-price benchmarks, particularly Brent, to demonstrate that the results are not specific to WTI. Third, raw Kazakhstan observations should be treated as the preferred baseline and winsorised estimates as sensitivity checks, because crisis-period extremes may contain substantive information about the energy shocks under investigation.

The same principle applies to interpolation. Any interpolated observation should be identified by variable and year, and sensitivity analysis should exclude those observations where feasible. These robustness checks fall outside the scope of the present comparative analysis and are set out here as priorities for a dedicated replication exercise.

A further extension would distinguish positive from negative oil-price movements using nonlinear ARDL methods. Such a specification is theoretically relevant because fiscal expansion during oil booms may be easier than expenditure retrenchment during oil busts. Evidence of asymmetric adjustment would provide a direct test of the fiscal-ratchet mechanism discussed in the institutional interpretation. The current linear ARDL estimates should therefore be read as average dynamic relationships across positive and negative movements rather than as evidence that both directions are symmetric.

4. Results

4.1 Cointegration and comparative adjustment

The central difference between the two countries is not simply the sign of the oil-price coefficients, but whether the estimated macroeconomic relationships exhibit systematic long-run correction. Kuwait shows cointegration only in the government-expenditure model. Kazakhstan shows reported cointegration in government expenditure, inflation and the exchange rate. This difference is consistent with a system in which Kazakhstan permits more observable macroeconomic adjustment, while Kuwait suppresses part of that adjustment through institutional and nominal anchors.

Relationship	Kuwait	Kazakhstan	Interpretation
Oil price → GOVEXP	+ 0.42 ($p < 0.05$)	+ 0.55 ($p < 0.01$)	Fiscal procyclicality in both economies
Oil price → inflation	No significant long-run relationship	+ 0.218 ($p < 0.01$)	Long-run inflation transmission concentrated in Kazakhstan
Oil price → exchange rate	No significant long-run relationship	-0.369 ($p < 0.05$)	Nominal currency adjustment concentrated in Kazakhstan
Fiscal ECT	+ 0.084 (ns)	-0.637 ($p < 0.01$)	No evidence of systematic fiscal correction in Kuwait; significant convergence in Kazakhstan

The Kuwait ECT requires careful interpretation. Because + 0.084 is statistically insignificant, the estimate does not establish that disequilibrium is actively amplified. It instead indicates that the model provides no evidence of a reliable restoring mechanism. This is consistent with fiscal persistence, but the institutional explanation remains interpretive rather than directly identified.

4.2 Government expenditure

Oil prices are positively associated with government expenditure in both countries, supporting H1. Kuwait's long-run elasticity is + 0.42 ($p < 0.05$), with a short-run effect of + 0.29 ($p < 0.05$). Kazakhstan's long-run elasticity is larger at + 0.55 ($p < 0.01$), while its short-run coefficient is + 0.38 ($p < 0.01$). Thus, Kazakhstan is not less procyclical in the immediate sense; indeed, the reported coefficient is larger. The key difference lies in adjustment after the shock.

For Kuwait, the fiscal ECT is + 0.084 and statistically insignificant. The result therefore provides no evidence of systematic convergence to a long-run fiscal equilibrium following a disturbance. For Kazakhstan, the ECT is -0.637 ($p < 0.01$), indicating that a substantial share of disequilibrium is corrected within the subsequent period. H2 is therefore supported in the narrower sense that Kazakhstan exhibits stronger estimated post-shock correction, even though both economies remain fiscally sensitive to oil prices.

Indicator	Kuwait	Kazakhstan
Long-run oil-price effect	+ 0.42 ($p < 0.05$)	+ 0.55 ($p < 0.01$)
Short-run oil-price effect	+ 0.29 ($p < 0.05$)	+ 0.38 ($p < 0.01$)
Error-correction term	+ 0.084 (ns)	-0.637 ($p < 0.01$)
Adjustment inference	No statistically reliable correction	Significant partial convergence

4.3 Inflation

Inflation results provide clearer evidence of cross-country asymmetry. In Kuwait, the reported short-run oil-price coefficient is + 0.14 ($p < 0.05$), but the bounds test does not support a long-run oil-price relationship. FDI has a negative coefficient (-0.09, $p < 0.05$), while the global GDP coefficient is statistically insignificant. These estimates are consistent with a system in which oil shocks can affect near-term demand and liquidity without generating a stable long-run oil-price/inflation relationship.

Kazakhstan displays both short- and long-run inflation transmission. The short-run oil-price coefficient is + 0.11 ($p < 0.05$) and the long-run coefficient is + 0.218 ($p < 0.01$). Broad money is also positive (+ 0.118, $p < 0.05$), while the ECT is -0.513 ($p < 0.01$). The coexistence of a significant long-run oil-price effect and significant error correction suggests that Kazakhstan both transmits and subsequently adjusts to oil-related disturbances. This pattern supports H3.

Indicator	Kuwait	Kazakhstan
Long-run oil-price effect	Not significant	+ 0.218 ($p < 0.01$)
Short-run oil-price effect	+ 0.14 ($p < 0.05$)	+ 0.11 ($p < 0.05$)
Broad money (M2)	—	+ 0.118 ($p < 0.05$)
FDI	-0.09 ($p < 0.05$)	Not significant
Global GDP	-0.05 (ns)	-0.06 ($p < 0.10$)
ECT	Insignificant	-0.513 ($p < 0.01$)

4.4 Exchange rate

The exchange-rate results strongly differentiate the two institutional regimes. Kuwait's oil-price coefficients are statistically insignificant in both the short and long run, consistent with a tightly managed nominal exchange rate. Kazakhstan's long-run coefficient is -0.369 ($p < 0.05$), while the short-run coefficient is -0.28 ($p < 0.10$). Given the exchange-rate definition used here, the negative long-run coefficient is consistent with tenge appreciation when oil prices rise and depreciation when they fall.

Kazakhstan's ECT is -0.472 ($p < 0.01$), indicating significant adjustment toward the long-run relationship. Geopolitical risk is positive (+ 0.07, $p < 0.05$), consistent with depreciation pressure during periods of

heightened external risk. Kuwait’s corresponding geopolitical-risk coefficient is statistically insignificant. These results support H4: nominal exchange-rate transmission is materially stronger in Kazakhstan.

Indicator	Kuwait	Kazakhstan
Long-run oil-price effect	Not significant	-0.369 (p < 0.05)
Short-run oil-price effect	Minor / temporary	-0.28 (p < 0.10)
Geopolitical risk	-0.03 (ns)	+ 0.07 (p < 0.05)
Global GDP	+ 0.04 (p < 0.10)	-0.06 (p < 0.05)
ECT	+ 0.058 (ns)	-0.472 (p < 0.01)

4.5 VAR impulse responses and variance decomposition

The VAR evidence is directionally consistent with the ARDL results. In Kuwait, a one-standard-deviation oil-price innovation produces a modest inflation response that dissipates within approximately one to two years, a more persistent government-expenditure response, and little exchange-rate movement. In Kazakhstan, inflation responds more strongly and decays over approximately three to four years; government expenditure rises rapidly before moderating; and the exchange rate displays a larger response followed by correction.

Variable	Kuwait IRF pattern	Kazakhstan IRF pattern
Inflation	Small, short-lived response (about 1–2 years)	Larger response with gradual decay (about 3–4 years)
Government expenditure	Immediate and persistent expansion	Rapid rise followed by medium-run moderation
Exchange rate	Near-zero / temporary response	Depreciation response followed by correction

The reported 10-year FEVD further distinguishes the systems. Oil-price innovations account for approximately 45–55% of the forecast variance of government expenditure in Kuwait and 55–65% in Kazakhstan. For inflation, the corresponding ranges are 8–12% and 22–35%. For the exchange rate, the oil-price contribution is below 5% in Kuwait but approximately 40–50% in Kazakhstan. These figures reinforce the conclusion that the fiscal channel is important in both countries, while nominal price and exchange-rate transmission is substantially stronger in Kazakhstan.

Variable	Kuwait: variance explained by oil shocks	Kazakhstan: variance explained by oil shocks
Inflation	8–12%	22–35%
Government expenditure	45–55%	55–65%
Exchange rate	< 5%	40–50%

4.6 Hypothesis assessment

Hypothesis	Evidence	Decision
H1: oil prices positively affect government expenditure in both countries	Positive significant short- and long-run coefficients in both	Supported
H2: fiscal adjustment is weaker in Kuwait	Kuwait ECT insignificant; Kazakhstan ECT negative and significant	Supported
H3: inflation transmission is more persistent in Kazakhstan	No Kuwait long-run cointegration; significant Kazakhstan long-run effect and ECT	Supported
H4: exchange-rate transmission is stronger in Kazakhstan	Kuwait insignificant; Kazakhstan long-run coefficient and ECT significant	Supported

4.7 Comparative synthesis: where the energy shock is absorbed

The combined ARDL and VAR evidence allows the three transmission channels to be interpreted as a system rather than as separate equations. In Kuwait, the dominant observable channel is fiscal. Government expenditure responds significantly to oil prices, while long-run inflation and exchange-rate relationships are not supported. This pattern indicates that a substantial part of the energy shock is absorbed through public finance and institutional buffers before it appears in nominal prices. The absence of a statistically reliable fiscal ECT, however, means that this insulation should not be confused with complete resilience. The fiscal system remains exposed to the revenue cycle even when nominal variables appear comparatively stable.

In Kazakhstan, the shock is distributed across a broader set of variables. Government expenditure is oil-sensitive, but oil prices are also associated with long-run inflation and exchange-rate movements. The FEVD results reinforce this wider transmission: oil-price innovations explain a much larger share of inflation and exchange-rate forecast variance than in Kuwait. At the same time, negative and significant ECTs indicate that the Kazakhstan equations possess stronger estimated restoring dynamics. The economy therefore bears more of the short-run adjustment through prices and the currency, but it also exhibits clearer evidence of post-shock convergence.

This comparison clarifies why a single volatility indicator would be misleading. If resilience were measured only by exchange-rate stability or low inflation pass-through, Kuwait would appear unambiguously more resilient. If it were measured only by the speed of estimated error correction, Kazakhstan would appear stronger. The stability–flexibility framework reconciles these apparently contradictory conclusions by treating resilience as a portfolio of institutional functions. The relevant policy question is how the burden of an energy shock is allocated across the budget, prices, the exchange rate and time.

The synthesis also helps explain why the same oil-price increase can have different implications for future energy investment. A fiscally dominated transmission system can preserve nominal predictability while allowing public expenditure to become increasingly tied to hydrocarbon income. A more flexible nominal system can impose immediate adjustment costs but provide stronger signals about changing external conditions. Neither configuration guarantees successful diversification. What matters is whether the institutional mix converts temporary oil windfalls into durable productive capacity while preventing downturns from destabilising essential investment.

5. Discussion

5.1 From institutional quality to institutional function

The results suggest that the relevant question for oil exporters is not simply whether institutions are 'strong' or 'weak', but what those institutions do when an external shock occurs. Kuwait's policy architecture is effective at limiting nominal exchange-rate movement and appears to dampen the persistence of inflation transmission. Yet the fiscal results provide no evidence of a systematic error-correction mechanism in the expenditure equation. Kazakhstan displays the opposite configuration: oil shocks pass more visibly into inflation and the exchange rate, but significant ECTs indicate stronger subsequent correction.

This distinction refines conventional resource-curse reasoning. The source of vulnerability is not resource abundance alone. It lies in the interaction between resource dependence and the institutions governing revenue allocation, nominal adjustment and policy correction. This interpretation is consistent with the broader evolution of the resource-curse literature toward conditional explanations (Badeeb et al., 2017).

5.2 Stability without flexibility

Kuwait illustrates the difference between observed stability and adjustment capacity. The exchange-rate arrangement suppresses nominal currency responses to oil-price movements, and the inflation equation does not display a stable long-run oil-price relationship. These outcomes can reasonably be described as insulation. However, the fiscal model indicates persistent sensitivity to oil prices without statistically reliable error correction. The macroeconomic system can therefore appear stable in nominal variables while remaining structurally dependent on a fiscal channel that is difficult to reverse.

The implication is not that Kuwait's institutions cause disequilibrium; the econometric design does not establish such causality. Rather, the combination of significant fiscal oil sensitivity, weak estimated fiscal correction and muted nominal adjustment is consistent with an institutional configuration that privileges short-run stability over rapid reallocation.

5.3 Flexibility without full stability

Kazakhstan's results reveal the costs and benefits of greater nominal adjustment. Oil prices are related to inflation and the exchange rate in both the short and long run, and the FEVD attributes a substantially larger share of inflation and exchange-rate variance to oil shocks than in Kuwait. This exposes households, firms and policymakers to more visible macroeconomic volatility.

At the same time, the negative and significant ECTs across the Kazakhstan equations indicate a stronger tendency for the system to move back toward estimated long-run relationships. The NFRK, monetary-policy reforms and exchange-rate flexibility provide plausible institutional context for this adjustment, but the present time-series models do not separately identify the contribution of each institution. The defensible conclusion is therefore that Kazakhstan's macroeconomic architecture is consistent with greater adjustment flexibility, not that any single reform causally generated the observed coefficients.

5.4 Dutch disease under different exchange-rate regimes

The comparison also clarifies how exchange-rate regimes alter the observable form of Dutch-disease pressures. In Kazakhstan, the significant negative oil-price/exchange-rate coefficient accords with the commodity-currency mechanism: stronger oil prices are associated with currency appreciation under the exchange-rate definition used here. In Kuwait, nominal exchange-rate adjustment is muted. This does not imply the absence of Dutch-disease pressures; it means that adjustment must occur through other channels, including domestic prices, fiscal demand and resource allocation.

Accordingly, the results favour a regime-conditioned interpretation of Dutch disease. A managed exchange rate can alter where adjustment appears without eliminating the underlying resource-allocation problem. This is consistent with the original Dutch-disease mechanism (Corden & Neary, 1982) and the commodity-currency literature (Chen & Rogoff, 2003).

5.5 Fiscal–monetary coordination and geopolitical exposure

The control variables suggest that external conditions interact differently with the two systems. Kazakhstan's positive geopolitical-risk coefficient in the exchange-rate model is consistent with heightened depreciation pressure during periods of external uncertainty. Broad money is positively associated with inflation, highlighting the importance of domestic liquidity in the transmission process. Kuwait's negative FDI coefficient in the inflation model suggests that external capital conditions may partly offset domestic price pressure, although this result should not be given a causal interpretation without a stronger identification strategy.

More generally, the results underscore the importance of coordination. Where nominal exchange-rate adjustment is constrained, fiscal policy bears a larger share of the stabilisation burden. Where the exchange rate is more flexible, monetary credibility and fiscal restraint become especially important because exchange-rate movements can feed into inflation.

5.6 Contribution to energy-economics and resilience research

The study contributes to energy-economics research in three ways. First, it treats oil-price volatility as an energy-system disturbance whose macroeconomic consequences depend on the institutional channels connecting hydrocarbon production to the rest of the economy. This moves beyond reduced-form statements that oil prices 'affect' growth or inflation and asks where the shock is transmitted and how long the effects persist.

Second, the comparison links classic resource-curse and Dutch-disease arguments to the newer energy-resilience literature. Resource dependence creates exposure, but resilience depends on the institutional capacity to buffer and subsequently correct that exposure. This complements recent Discover Energy research showing that governance conditions the effect of energy prices on renewable-energy outcomes (Nondo, 2026), and is consistent with emerging evidence that governance is integral to energy resilience during low-carbon transitions (Mukanya & Semanya, 2026).

Third, the paper highlights an intertemporal connection between fossil-fuel revenue management and transition capacity. Stable financing for diversification, grids, clean technologies and human capital is difficult when public investment follows the oil cycle. By identifying the fiscal, inflation and exchange-rate channels through which oil volatility enters two contrasting exporters, the study provides a macroeconomic foundation for future research that directly models how shock-management institutions affect renewable investment and transition performance.

5.7 Theoretical contribution: the stability–flexibility proposition

The principal theoretical contribution of the paper is the proposition that macroeconomic resilience has at least two separable institutional dimensions: insulation and adjustment. Insulation reduces the immediate transmission of shocks; adjustment restores equilibrium after transmission has occurred. Treating these dimensions separately helps explain why apparently stable systems can accumulate structural rigidity and why more volatile systems can nevertheless display stronger post-shock correction. Figure 3 summarises the resulting two-dimensional stability–flexibility matrix.

The Kuwait–Kazakhstan comparison therefore yields three propositions. First, low nominal volatility should not be equated automatically with high resilience. Second, greater flexibility can increase short-run transmission while improving the capacity for subsequent adjustment. Third, the appropriate

institutional objective is not maximum stability or maximum flexibility in isolation, but a combination of credible shock buffers and mechanisms that permit timely correction.

5.8 Implications for diversification and the energy transition

The stability–flexibility distinction has implications beyond short-run macroeconomic management. Hydrocarbon exporters are attempting to diversify economic activity at a time when the global energy system is undergoing structural change. This creates a financing problem: many diversification and low-carbon investments require long planning horizons, while the public revenues used to support them remain exposed to volatile fossil-fuel prices. A country that repeatedly expands and compresses public investment with the oil cycle may struggle to sustain the infrastructure, skills and regulatory capacity required for transition.

Recent Discover Energy research reinforces the importance of institutions in converting energy-market signals into structural change. Nondo (2026) shows that governance conditions the relationship between energy prices and renewable-energy development across G20 economies. Mukanya and Semanya (2026) emphasise governance and resilience in low-carbon transitions, Obanor et al. (2026) highlight the institutional and diplomatic dimensions of renewable-energy adoption, and Kafi, El Bayed, and Chaker (2026) show, using an ARDL approach for Morocco, that structural drivers of emissions are similarly conditioned by the pace and management of energy-sector transition. The present study complements this literature from the perspective of fossil-fuel exporters: before energy-price signals can support transformation, fiscal and monetary systems must be capable of managing the volatility those signals create.

For Kuwait, the key transition risk is that strong nominal insulation may reduce the immediate visibility of the adjustment problem. If public expenditure remains highly linked to oil income and adjustment is weak, low-carbon and diversification programmes can become dependent on favourable oil cycles. Protecting strategic investment therefore requires clearer separation between recurrent expenditure and long-horizon capital commitments, alongside fiscal rules that smooth oil revenues over time.

For Kazakhstan, the challenge is different. Greater exchange-rate flexibility assists external adjustment but can transmit oil-price movements into inflation and domestic financing conditions. Transition investment may therefore face higher currency and interest-rate uncertainty. Maintaining credible monetary policy, limiting procyclical liquidity expansion and strengthening the rules governing resource-fund transfers can reduce the risk that necessary nominal flexibility destabilises long-term energy investment.

These implications should not be interpreted as evidence that one exchange-rate regime is universally superior. The results instead suggest that transition readiness depends on institutional complementarity. Managed regimes need credible fiscal adjustment because the exchange rate cannot carry much of the burden. Flexible regimes need monetary and fiscal credibility because exchange-rate movements can

amplify domestic price pressures. In both cases, resilience requires institutions that protect strategic investment while allowing relative prices and budgets to adjust when hydrocarbon revenues change.

5.9 Policy implications

For Kuwait, the strongest evidence-based policy implication concerns fiscal governance. Because oil prices are significantly related to government expenditure while the fiscal ECT is insignificant, policy should prioritise mechanisms that reduce the persistence of oil-revenue-driven spending. Medium-term expenditure ceilings, transparent oil-price benchmarks and clearer countercyclical rules would directly address the channel identified in the results. Broader subsidy or tax reforms may be desirable, but their welfare effects are not estimated in this study and should therefore be treated as complementary policy options rather than direct econometric conclusions.

For Kazakhstan, the results support continued attention to the interaction between fiscal rules, monetary credibility and exchange-rate pass-through. The significant oil-price effects on inflation and the exchange rate indicate that flexibility carries domestic stabilisation costs. Stronger rules governing transfers from the NFRK, transparent monetary communication and policies that limit procyclical liquidity expansion would help preserve adjustment capacity while reducing inflationary amplification.

For both economies, diversification remains important because fiscal sensitivity to oil prices is significant in both models. Channeling resource revenues toward productive non-oil investment, human capital and lower-carbon infrastructure can reduce the long-run dependence that makes external oil shocks macroeconomically consequential. These priorities are compatible with SDG 8, SDG 9 and SDG 13, although the SDG link is a policy interpretation rather than an outcome directly tested by the econometric models.

6. Conclusion

This study compared the transmission of oil-price shocks in Kuwait and Kazakhstan using harmonised ARDL and VAR evidence. Both economies exhibit fiscal procyclicality, but they differ sharply in the channels through which oil shocks are transmitted and in the strength of post-shock correction. Kuwait shows significant oil sensitivity in government expenditure, short-run inflation effects and muted nominal exchange-rate transmission. Kazakhstan shows significant long-run oil-price relationships with government expenditure, inflation and the exchange rate, together with negative and significant error-correction coefficients.

These results support the paper's central stability–flexibility proposition. Kuwait illustrates a system with substantial short-run nominal insulation but limited evidence of fiscal adjustment. Kazakhstan illustrates a system in which shocks pass more visibly into prices and the exchange rate but are followed by stronger estimated convergence. Resilience, therefore, should not be reduced to low volatility. It also requires institutions that can correct imbalances after shocks occur.

The contribution to the resource-curse literature is consequently conditional rather than deterministic: oil dependence becomes more or less destabilising according to the fiscal, monetary and exchange-rate structures through which resource revenues are managed. The contribution to Dutch-disease analysis is similarly regime-sensitive: exchange-rate management changes the observable channel of adjustment but does not eliminate the underlying pressures generated by resource dependence.

The policy challenge is to combine the strengths of both configurations. Kuwait requires greater fiscal adaptability without sacrificing the credibility associated with nominal stability. Kazakhstan requires stronger inflation and fiscal anchors without eliminating the flexibility that enables external adjustment. For resource exporters more generally, sustainable macroeconomic resilience requires both shock absorption and post-shock correction. From an energy-transition perspective, the same principle applies to investment continuity: hydrocarbon revenues should be buffered sufficiently to protect long-horizon diversification and low-carbon programmes, but not in ways that prevent necessary fiscal and relative-price adjustment.

6.1 Limitations and directions for further research

Several limitations qualify the conclusions. First, the analysis uses annual data and country-specific sample periods, which constrain the number of observations and prevent perfect cross-country symmetry. Second, institutional conditioning is interpreted rather than directly estimated: no institutional mediation coefficient or interaction term is identified. Third, the source datasets contain limited interpolation and, for Kazakhstan, winsorisation, both of which should be documented observation by observation in a replication package. Fourth, the sample periods span major structural breaks. Future work should employ break-robust unit-root tests, explicit regime dummies or multiple-break methods and should test whether the post-2015 Kazakhstan regime differs significantly from the earlier period. Fifth, endogeneity between fiscal expenditure, GDP and oil-related revenues remains possible. Alternative identification strategies, including structural VARs or external instruments, could strengthen causal inference. Sixth, robustness should compare WTI with alternative oil-price benchmarks such as Brent and report non-winsorised and non-interpolated specifications.

These limitations do not invalidate the comparative patterns reported here, but they define the boundary of the claims that can be made from the current design. The study therefore interprets the estimates as evidence of differential transmission and adjustment rather than as definitive causal estimates of institutional effects.

Declarations

Competing interests

The author declare no competing interests.

Consent for publication

Not applicable.

Ethics approval and consent to participate

Not applicable. The study uses aggregate secondary macroeconomic data and does not involve human participants, personal data or human tissue.

Clinical Trial Number

Not applicable

Funding

The authors declare that no external funding was received for this research.

Author Contribution

OP: Conceptualization, methodology, formal analysis, investigation, data curation, validation, visualization, writing – original draft, writing – review and editing, and project administration. The author has read and approved the final manuscript.

Data Availability

All variables are based on secondary data from the sources identified below. Direct database links are as follows: World Bank World Development Indicators (WDI), <https://databank.worldbank.org/source/world-development-indicators>; IMF World Economic Outlook (WEO), <https://data.imf.org/Datasets/WEO>; IMF Fiscal Monitor (FM), <https://data.imf.org/Datasets/FM>; IMF Data portal for monetary and financial statistics, including series formerly distributed through International Financial Statistics (IFS), <https://data.imf.org/>; U.S. Energy Information Administration Cushing Oklahoma WTI Spot Price FOB annual series, <https://www.eia.gov/dnav/pet/hist/rwtca.htm>; Central Bank of Kuwait National Summary Data Page, <https://www.cbk.gov.kw/en/statistics-and-publication/nsdp>; National Bank of Kazakhstan Statistics and Analytics, <https://nationalbank.kz/en/page/data-and-analytics>; Bureau of National Statistics of Kazakhstan, <https://stat.gov.kz/en/>; and the Caldara–Iacoviello Geopolitical Risk Index database, <https://www.matteoiacoviello.com/gpr.htm>.

References

1. Arezki R, Blanchard O. (2014). Seven questions about the recent oil price slump. IMF Working Paper, WP/14/32.
2. Badeeb RA, Lean HH, Clark J. (2017). The evolution of the natural resource curse thesis: A critical literature survey. *Resources Policy*, 51, 123–134.
3. Bernanke BS, Gertler M, Watson M. (1997). Systematic monetary policy and the effects of oil price shocks. *Brookings Papers on Economic Activity*, 1997(1), 91–157.
4. Caldara D, Iacoviello M. Measuring geopolitical risk. *Am Econ Rev*. 2022;112(4):1194–225.
5. Céspedes LF, Velasco A. Was this time different? Fiscal policy in commodity republics. *J Dev Econ*. 2014;106:92–106.
6. Chen Y-C, Rogoff K. Commodity currencies. *J Int Econ*. 2003;60(1):133–60.
7. Corden WM, Neary JP. Booming sector and de-industrialisation in a small open economy. *Econ J*. 1982;92(368):825–48.
8. Cust J, Mihalyi D. Evidence for a resource curse? Oil discoveries, elevated expectations, and growth disappointments. *World Bank Economic Rev*. 2019;33(2):343–71.
9. Eltony MN, Al-Awadi M. Oil price fluctuations and their impact on the macroeconomic variables of Kuwait: A case study using VAR. *Int J Energy Res*. 2001;25(11):939–59.
10. Hamilton JD. Oil and the macroeconomy since World War II. *J Polit Econ*. 1983;91(2):228–48.
11. Kilian L. Not all oil price shocks are alike: Disentangling demand and supply shocks in the crude oil market. *Am Econ Rev*. 2009;99(3):1053–69.
12. OECD. *Economic Survey of Kazakhstan 2023: Managing volatility and diversification*. Paris: Organisation for Economic Co-operation and Development; 2023.
13. Pesaran MH, Shin Y. An autoregressive distributed-lag modelling approach to cointegration analysis. In: Strom S, editor. *Econometrics and Economic Theory in the 20th Century*. Cambridge University Press; 1999. pp. 371–413.
14. Pesaran MH, Shin Y, Smith RJ. Bounds testing approaches to the analysis of level relationships. *J Appl Econ*. 2001;16(3):289–326.
15. Ross ML. *The Oil Curse: How Petroleum Wealth Shapes the Development of Nations*. Princeton University Press; 2012.
16. Sachs JD, Warner AM. (1995). Natural resource abundance and economic growth. NBER Working Paper No. 5398.
17. World Bank. *World Development Indicators*. Washington, DC: World Bank; 2023.
18. Tynan GR. Discover energy inaugural editorial. *Discover Energy*. 2021;1:1. <https://doi.org/10.1007/s43937-021-00001-7>.
19. Nondo C. Determinants of renewable energy development in the G20 economies. *Discover Energy*. 2026;6:15. <https://doi.org/10.1007/s43937-025-00120-5>.
20. Mukanya R, Semanya K. (2026). Subnational energy governance and energy resilience in low-carbon transitions: A narrative review. *Research Square* (preprint, under review).

21. Obanor EI, Mogbolu NI, Olumide GE, et al. Energy diplomacy and its influence on renewable energy adoption and global energy transition. Discover Energy. 2026;6:16. <https://doi.org/10.1007/s43937-026-00124-9>.

22. Kafi S, El Bayed H, Chaker T. Drivers of greenhouse gas emissions during Morocco’s energy transition using an ARDL time series analysis. Discover Energy. 2026;6:36. <https://doi.org/10.1007/s43937-026-00146-3>.

Figures

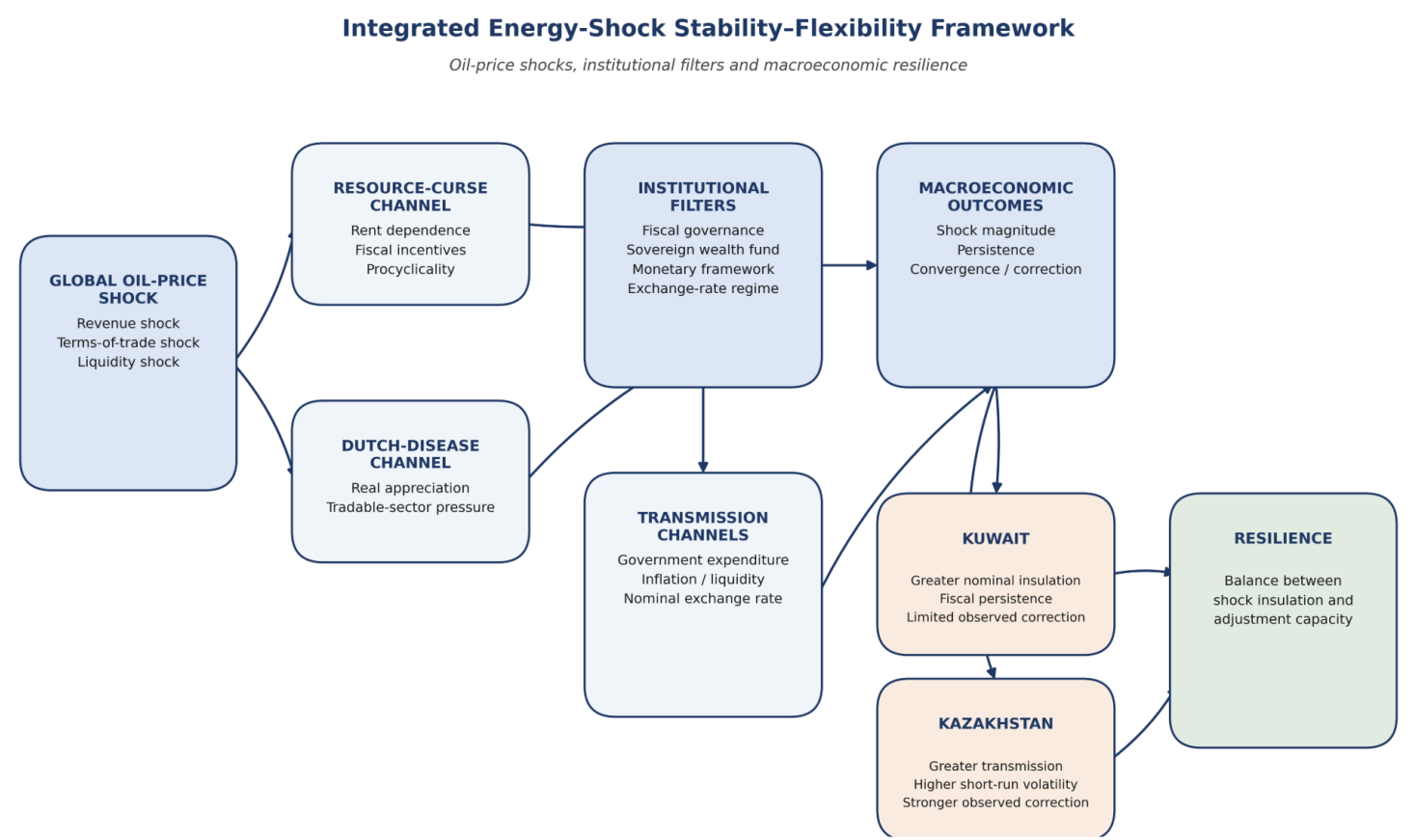


Figure 1

Integrated Energy-Shock Stability–Flexibility Framework linking oil-price shocks, institutional filters and macroeconomic resilience.

Integrated Energy-Shock Stability-Flexibility Framework

Oil-price shocks, institutional filters and macroeconomic resilience

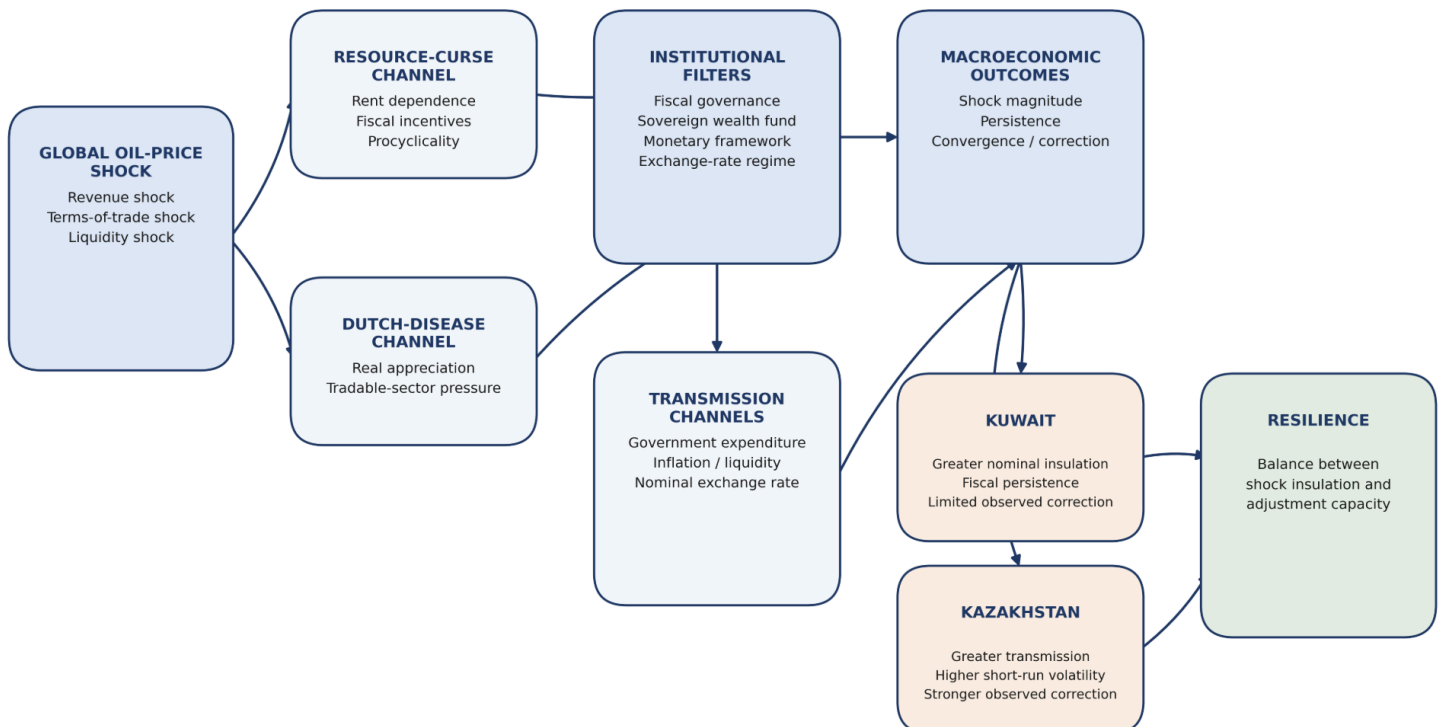


Figure 1

Integrated Energy-Shock Stability–Flexibility Framework linking oil-price shocks, institutional filters and macroeconomic resilience.

Conceptual Framework and Testable Transmission Pathways

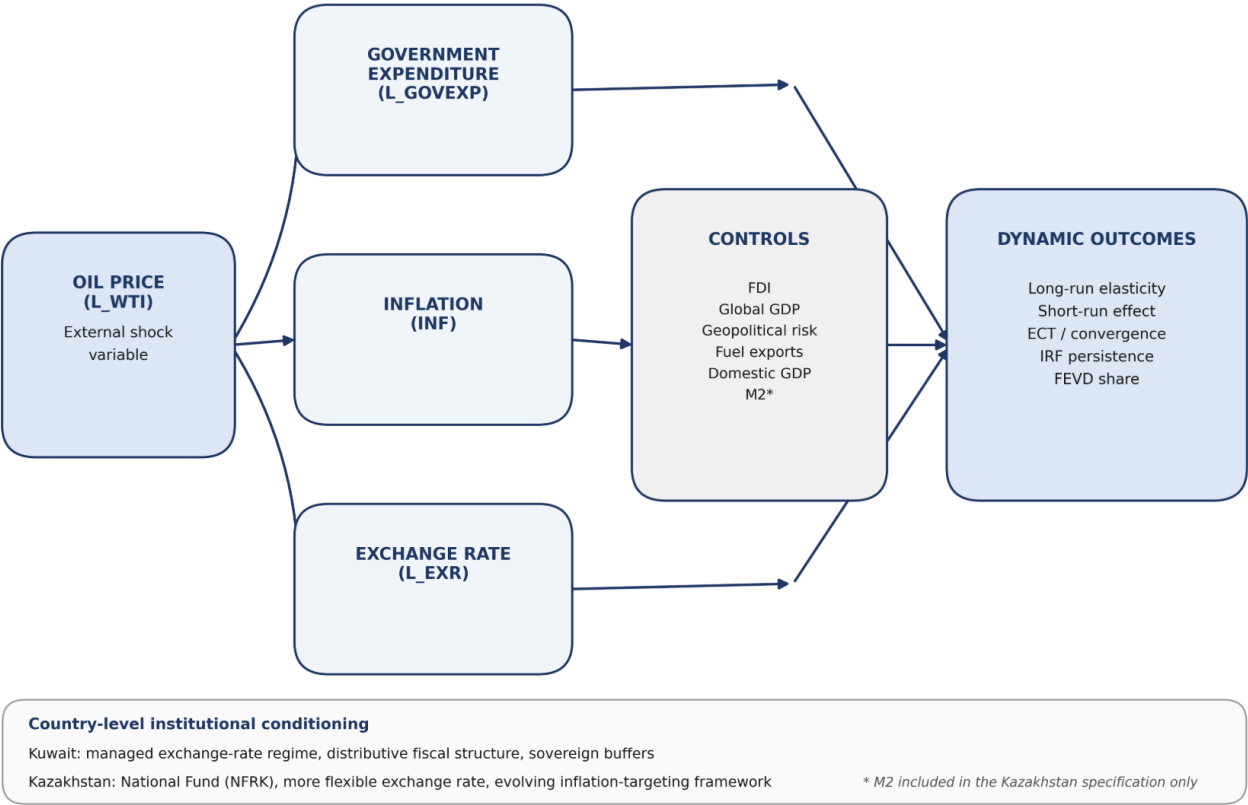


Figure 2

Conceptual framework for energy-price transmission through fiscal, inflation and exchange-rate channels.

Stability-Flexibility Matrix for Oil-Dependent Economies



Figure 3

Energy-Shock Stability–Flexibility Matrix positioning Kuwait and Kazakhstan by shock insulation and adjustment capacity.