МРНТИ: 06.52.45
JEL Classification: Q43, Q41, E32, C32
DOI: https://doi.org/10.52821/2789-4401-2026-4-36-48

OIL PRICE SHOCKS AND ENERGY CONSUMPTION EFFECTS ON MACROECONOMIC VULNERABILITY IN KAZAKHSTAN

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ABSTRACT

Purpose – this article develops an empirical framework for examining how oil price movements and domestic energy consumption influence macroeconomic vulnerability in Kazakhstan. The study contributes to the energy-growth literature by assessing the short-run dynamics and long-run relationship between energy-related factors and economic performance in a resource-dependent economy.

Methodology – the empirical analysis employs the Autoregressive Distributed Lag (ARDL) approach using annual data for Kazakhstan over the period 2000-2024. Augmented Dickey-Fuller unit root tests are conducted to determine the order of integration, followed by ARDL estimation. Bounds cointegration testing, and diagnostic and stability tests to evaluate model adequacy and robustness.

Originality/value – the study extends the energy-growth nexus literature by examining Kazakhstan as a non-OPEC, resource-dependent transition economy, linking oil price dynamics and domestic energy consumption with macroeconomic vulnerability. Unlike conventional bivariate energy-growth studies, the analysis considers the dynamic interaction of energy-related variables within a broader macroeconomic context.

Findings – the empirical results reveal significant short-run dynamic relationships between oil prices, energy consumption, and economic growth. Economic growth exhibits strong persistence, while oil price shocks affect output with a delayed response, Domestic energy consumption has a statistically significant contemporaneous impact accompanied by lagged adjustment effects. However, the Bounds Test does not confirm the existence of a long-run cointegrating relationship, indicating that Kazakhstan's macroeconomic vulnerability is driven primarily by short-run adjustments to external energy shocks rather than by a stable long-run equilibrium.

Keywords: oil-price shocks, energy-growth nexus, energy consumption, macroeconomic vulnerability, resource dependence, ARDL.

Acknowledgment: This research was conducted within project IRN AP25796469, " Energy vulnerability and economic resilience: analyzing the impact of oil revenues and energy conservation policies on Kazakhstan's macroeconomic indicators ", funded by the Science Committee of the Ministry of Science and Higher Education of the Republic of Kazakhstan.

INTRODUCTION

The relationship between energy consumption and economic growth remains one of the most debated questions in energy economics. There were numerous empirical investigations have attempted to determine whether energy consumption stimulates economic activity or merely responds to it. Despite decades of research, no universal consensus has emerged because the direction and magnitude of the relationship appear to depend on countries' economic structures, stages of development, institutional quality and energy mix. Consequently, empirical findings often differ across developed and developing economies, energy exporters and importers, and across different time periods.

The literature usually distinguishes four hypotheses: the growth hypothesis, according to which energy is a production-enabling input. It argues that energy is an essential production input and that restrictions on energy use may constrain economic growth. The conservation hypothesis, according to which output drives energy

demand but energy-saving measures need not reduce growth. It suggests that economic growth drives energy demand, implying that energy-saving policies can be implemented without substantial losses in output. The feedback hypothesis, which implies bidirectional causality. It assumes causality between energy consumption and economic growth, indicating mutual dependence between the two variables. Finally, the neutrality hypothesis, under which energy and output are statistically weakly connected. It proposes that energy consumption and economic activity are only weakly related, so that changes in one variable have little effect on the other [1-3]. These hypotheses are analytically useful, but their explanatory power depends strongly on the structure of the economy under consideration. For resource-dependent exporters, energy is not only a production input, it is also a source of export revenue, fiscal receipts, exchange-rate pressure and external vulnerability.

For countries heavily dependent on oil exports, energy represents considerably more than a production factor. Oil and gas revenues constitute major sources of fiscal income, export earnings and foreign exchange reserves, while fluctuations in global commodity prices directly affect exchange rates, public finances and external balances. Consequently, the energy-growth relationship in these economies is inseparable from macroeconomic stability and vulnerability. External oil-price shocks may simultaneously influence economic growth, government expenditure, inflation, investment decisions and current account dynamics, creating complex transmission mechanisms that extend beyond conventional energy-growth theories.

Kazakhstan is a relevant case because its macroeconomic dynamics combine domestic energy intensity with oil export dependence and exposure to global commodity cycles. The country's energy system is still dominated by fossil fuels, with coal, oil and natural gas accounting for the overwhelming majority of primary energy supply, while renewable energy remains comparatively small [3]. At the same time, official and international assessments continue to identify extractive-sector reliance as a constraint on diversification, productivity and fiscal resilience [4]. This dual character makes Kazakhstan a theoretically interesting and policy-relevant case for revisiting the energy-growth nexus through the lens of macroeconomic vulnerability.

The central research problem is not whether energy consumption and output are correlated in a mechanical sense. Rather, the issue is whether Kazakhstan's growth model becomes more fragile when domestic energy demand, oil export revenues and global oil prices move together. High oil prices may support GDP, fiscal spending and external balances, however, the same mechanism can amplify downturns when oil prices fall or when export logistics are disrupted. This asymmetry is well documented in the broader oil-shock literature and is especially relevant for economies where the oil sector remains a major source of foreign exchange and public revenue [5,6].

MAIN BODY

Literature review. The relationship between oil price fluctuations, energy consumption and macroeconomic performance has received considerable attention in the energy economics literature. Theoretical and empirical studies generally recognize that oil price shocks influence economic activity through multiple transmission channels, including export revenues, fiscal balances, exchange rates, inflation, investment and energy demand. For resource-dependent economies, these channels are particularly important because hydrocarbons simultaneously represent production inputs, fiscal resources, and the principle source of foreign exchange earnings. Consequently, macroeconomic vulnerability depends not only on the magnitude of the oil price shocks but also on the structure of domestic energy consumption and the degree of economic diversification.

As it was mentioned earlier, the literature proposes four competing hypotheses regarding the relationship between energy consumption and economic growth the growth hypothesis, conservation hypothesis, feedback hypothesis and neutrality hypothesis. However, recent reviews argue that these theoretical frameworks cannot be generalized across countries because the direction and magnitude of causality largely depend on economic structure, institutional quality and energy dependence. Dokas et al. (2023) conclude that GDP growth, inflation, monetary policy, geopolitical uncertainty, and macroeconomic shocks all influence energy prices through multiple channels. At the same time, energy prices and energy consumption feedback into macroeconomic performance, creating dynamic bidirectional relationships. Nevertheless, the review emphasized that the dominant transmission mechanisms differ substantially between energy-exporting and energy-importing countries, suggesting that country-specific analyses remain essential [7].

The first stream of literature investigates how fluctuations in world oil prices affect Kazakhstanis macroeconomic performance. These studies consistently demonstrate that oil price shocks are transmitted through different channels (fiscal, monetary, external-sector).

Akhmedov (2019) employs a VAR framework to estimate the impact of world oil price shocks on Kazakhstan's macroeconomic indicators. The study reports statistically significant responses of output, exchange rates, inflation and other macroeconomic variables to oil price fluctuations. More importantly, the analysis reveals that the response of Kazakhstan's economy to the post-2014 oil price collapse became considerably faster than during 2008 crisis, implying that the country's dependence on oil revenues has intensified rather than diminished despite diversification policies. The study further shows that oil shocks affect macroeconomic variables over distinct adjustment periods, emphasizing the dynamic nature of external vulnerability [5].

Nurmakhanova (2020) reaches similar conclusions using Bayesian time-series techniques for the period 2020-2017. The author demonstrates that oil prices significantly influence GDP, fiscal revenues, the real effective exchange rates and domestic prices. One of the transmission mechanisms operate through exchange-rate appreciation during periods of high oil prices, followed by inflationary pressures and declining competitiveness of the non-oil sector. Consequently, oil booms generate short-term economic expansion while simultaneously reinforcing Dutch disease effects and increasing long-run macroeconomic vulnerability [6].

More recent studies extend this literature by emphasizing nonlinear and asymmetric responses. Baisholanova et al. (2025), using a nonlinear ARDL model, show that positive and negative oil-related shocks affect Kazakhstan's industrial and agricultural production differently. Industrial production responds mainly in the short run, whereas agricultural production exhibits both short-and long run asymmetric effects. These findings suggest that oil dependence propagates beyond the energy sector and affects broader structural transformation within the economy [8].

Similarly, Baimaganbetova (2025) argues that Kazakhstan's export structure remains insufficiently diversified despite steady expansion of the service sector. Her comparative analysis between Kazakhstan and European Union demonstrates that fluctuations in world oil prices continue to exert substantial influence on inflation, exports, and macroeconomic policy formation in Kazakhstan, while diversified economies display considerably greater resilience to commodity-price volatility. The study therefore emphasizes the importance of fiscal buffers and structural diversification for reducing macroeconomic vulnerability [4].

The second major stream of literature investigates the relationship between energy consumption and economic growth. Unlike studies focusing on external oil shocks, this literature emphasizes the domestic mechanisms linking energy demand to economic performance.

Mudarissov and Lee (2014), who analyze Kazakhstan during 1990-2008 using a Vector Error Correction Model, provide one of the earliest country-specific studies. Their findings support the feedback hypothesis but reveal important differences between long run and short-run dynamics. In the long run, energy consumption Granger-causes economic growth, indication that energy serves as a productive input essential for sustained economic expansion. In the short run, however, causality runs from GDP to energy consumption, implying that economic activity determines energy demand over shorter horizons. The authors therefore conclude that aggressive energy conservation policies could negatively affect long-run growth, whereas temporary efficiency improvements are unlikely to reduce economic performance [1].

Mukhtarov et al. (2020) broaden this framework by incorporating financial development into the energy-growth nexus. Using annual data from 1993-2014 and a VECM specification, they find that both financial development and economic growth significantly increase energy consumption, while rising energy prices reduce energy demand. Financial-sector expansion stimulates investment, industrial activity, and household consumption, thereby increasing energy use. The study demonstrates that macroeconomic vulnerability depends not only on oil revenues but also on domestic financial conditions that shape energy demand [2].

Recent evidence confirms that the relationship between energy use and economic growth remains robust despite structural transformation. Zhai et al. (2024) analyze Kazakhstan's development over three distinct economic periods (1992-2000, 2001-2013, and 2014-2023) and estimate that a 1% increase in GDP generates approximately a 0.40% increase in energy consumption. The authors argue that Kazakhstan's gradual transition toward a service-oriented economy has reduced, but not eliminated, the dependence of economic growth

on energy consumption. They further suggest that renewable-energy expansion, elimination of fossil-fuels subsidies, and improvements in energy efficiency can reduce energy intensity without significantly constraining economic growth [3].

A growing body of literature argues that macroeconomic vulnerability should be viewed more broadly than fluctuations in GDP or exchange rates. Energy affordability, financial risks, energy security, and environmental sustainability increasingly shape long-term resilience.

Smirnova et al. (2021) examine energy supply, financial risks and public welfare across Eastern Europe, the Caucasus and Central Asia. Their analysis identifies financial risk as the dominant determinant of household energy vulnerability in Kazakhstan, indicating that macroeconomic instability directly affects energy affordability and social welfare. The study emphasizes that energy security should not be viewed solely from the perspective of production but also through access, affordability and household resilience [9].

Environmental considerations have also become increasingly important. Kudabayeva et al. (2025) investigate asymmetric causal relationships between oil prices, oil consumption and CO2 emissions. While oil prices have little direct effect on domestic oil consumption, oil consumption significantly influences environmental degradation, and oil-price shocks affect emissions asymmetrically. These findings suggest that future energy policy should simultaneously address economic growth, environmental sustainability and macroeconomic resilience [10].

Overall, previous studies consistently demonstrate that Kazakhstan remains highly sensitive to fluctuations in global oil prices and that energy consumption continues to play a fundamental role in supporting economic growth. However, the existing literature has largely evolved along two separate research streams. One group of studies investigates the macroeconomic consequences of oil price shocks through fiscal, exchange rate, and output channels whereas another examines the relationship between energy consumption and economic growth. Research that is more recent extends these analyses by considering financial development, environmental sustainability, energy affordability, or structural diversification, yet these factors are typically analyzed in isolation.

Consequently, relatively little attention has been devoted to integrating oil price shocks and domestic energy consumption within a unified framework explaining macroeconomic vulnerability. Since oil-price, volatility influences the economy through external channels while energy consumption represents and internal transmission mechanism, examining both simultaneously provides a more comprehensive understanding of economic resilience in Kazakhstan. This study addresses that gap by jointly evaluating the effects of oil price shocks and energy consumption on Kazakhstan's macroeconomic vulnerability, thereby contributing to a more integrated perspective on resource dependence, energy security and sustainable economic development.

Data and Methodology. This study examines the impact of oil price shocks and energy consumption on macroeconomic vulnerability in Kazakhstan using the Autoregressive Distributed Lag (ARDL) modeling framework. The ARDL approach is particularly suitable for this research because it enables the simultaneous estimation of short-run dynamics and long-run equilibrium relationships among macroeconomic variables that may exhibit different orders of integration [11].

The concept of economic vulnerability has become increasingly important in development and macroeconomic literature as a framework for understanding why some economies are more susceptible to external shocks than others. Guillaumont (2009) defines economic vulnerability as the likelihood that a country's economic development will be hindered by unforeseen exogenous shocks beyond the control of domestic policymakers. Unlike short-term macroeconomic instability, vulnerability reflects structural characteristics of an economy rather than temporary policy failures. These structural factors determine the degree of exposure to external disturbances and the capacity of an economy to absorb their adverse effects [12].

To operationalize this concept, the UN Committee for Development Policy developed the Economic Vulnerability Index (EVI), which has been used since 2000 as one of the criteria for identifying Least Developed Countries. The EVI measures structural vulnerability through two broad dimensions: exposure to shocks and the magnitude of shocks. The exposure component includes indicators such as population size, remoteness from international markets, export concentration, the share of agriculture in GDP, and the proportion of the population living in low-elevation coastal areas [13]. However, for Kazakhstan there is no officially yearly

estimated Economic Vulnerability Index. Nevertheless, Curtis and McLellan (2023) extend the concept of vulnerability by emphasizing factors such as export dependence, customer diversification, carbon exposure, and the contribution of energy exports to GDP. Their framework suggests that countries heavily reliant on hydrocarbon exports, such as Kazakhstan, face additional vulnerabilities arising from oil price volatility, global decarbonization, and concentrated export structures, making energy-sector characteristics an essential dimension of macroeconomic vulnerability [14].

In this study, macroeconomic vulnerability is treated as multidimensional concept rather than as a directly observable single variable. GDP growth is used as the main outcome indicator in the empirical model, while oil prices and energy consumption capture two main external and structural channels through which vulnerability may emerge. To provide an initial visual assessment of the joint dynamics of these variables, Figure 1 presents their standardized values over the period 2000-2024. Standardization makes it possible to compare variables measured in different units on a common scale and to identify periods of divergence, co-movement and heightened volatility.

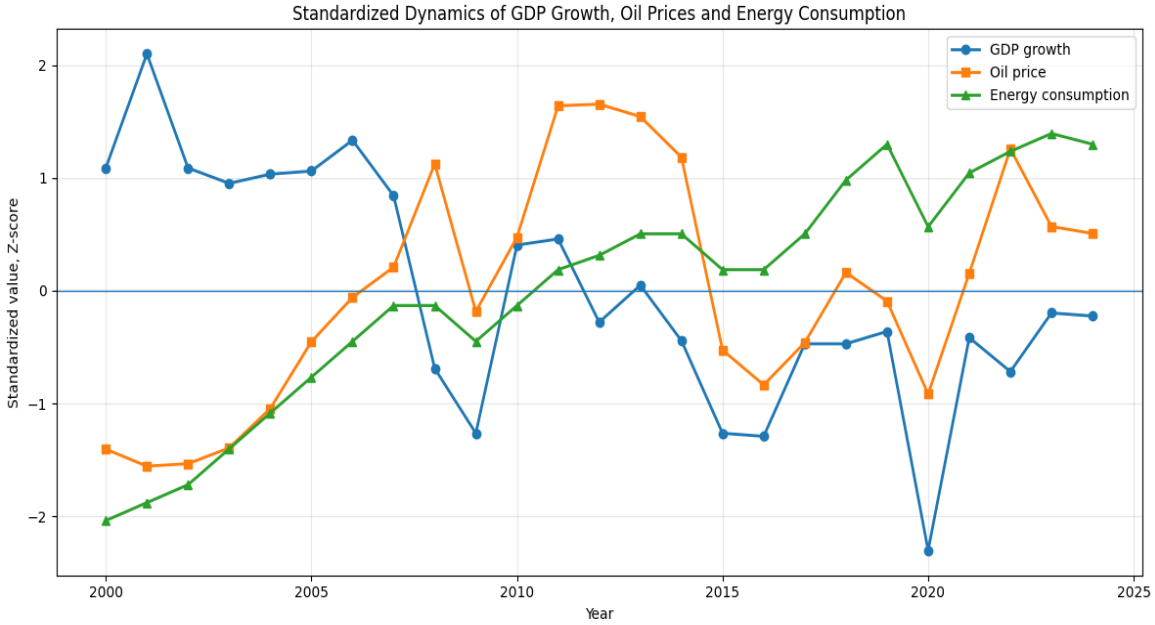


Figure 1 - Standardized dynamics of GDP growth,
oil prices and energy consumption in Kazakhstan, 2000-2024
Note – compiled by the author based on [15-17]

As shown in Figure 1. GDP growth displays considerably greater volatility than energy consumption, while oil prices exhibit pronounced cyclical fluctuations. Several major turning points coincide with periods of economic stress, particularly around the global financial crisis, the oil price decline of 2014-2016 and the COVID-19 shock in 2020. At the same time, the three series do not move proportionally throughout the entire period, suggesting that Kazakhstan's macroeconomic vulnerability cannot be explained by a simple contemporaneous relationship.

The empirical analysis is based on annual data for Kazakhstan covering the period 2000-2024. The model includes GDP growth as the dependent variable, while international oil prices and energy consumption are used as the main explanatory variables. GDP growth reflects fluctuations in overall macroeconomic performance, whereas oil prices capture external commodity-market shocks and energy consumption represents the domestic energy-use channel. Following Pesaran et al. (2001), the unrestricted ARDL error-correction representation is estimated as [11]:

$$GDP_t = \alpha + \Sigma_{i=1}^{p} \varphi_i \cdot GDP_{t-i} + \Sigma_{j=0}^{\varphi} \beta_j \cdot Oil_{t-j} + \Sigma_{k=0}^{r} \gamma_k \cdot Energy_{t-k} + \varepsilon_t \quad (1),$$

Where,

GDP_t – real gross domestic product and serves as a primary indicator of macroeconomic performance;

Oil_t denotes as international BRENT crude oil prices;

$Energy_t$ refers to domestic energy consumption, reflecting the role of energy use in supporting economic activity;

α – intercept;

β_1 and β_2 are the estimated coefficients;

ε_t is the random, error term.

Because economic variables often respond with time lags, the static specification is estimated using the ARDL approach, which incorporates lagged values of both dependent and explanatory variables [11]. In addition, Kazakhstan provides an ideal case for ARDL analysis because its economy has experienced structural changes over the sample period, including the global financial crisis of 2008-2009, the collapse in world oil prices in 2014-2016, exchange rate liberalization, the COVID19 pandemic and recent geopolitical disruptions affecting global energy markets [4-6]. These events have generated both short-term fluctuations and long-run structural adjustments in macroeconomic performance. Consequently, distinguishing between temporary responses and long-term equilibrium effects is essential for understanding the country's macroeconomic vulnerability.

In this study, the optimal lag structure selected according to the Akaike Information Criterion resulted in an ARDL (2,2,2) specification. Accordingly, the estimated empirical model can be written as follows:

$$GDP_t = \alpha + \varphi_1 GDP_{t-1} + \varphi_2 GDP_{t-2} + \beta_0 Oil_t + \beta_1 Oil_{t-1} + \beta_2 Oil_{t-2} + \gamma_0 Energy_t + \gamma_1 Energy_{t-1} + \gamma_2 Energy_{t-2} + \varepsilon_t \quad (2)$$

The model captures both the persistence of economic growth and the delayed effects of oil prices and energy consumption. The inclusion of lagged explanatory variables makes it possible to distinguish contemporaneous impacts from delayed responses and provides the basis for testing both short-run dynamics and potential long-run relationships.

Estimation Procedure. The empirical analysis was conducted in four sequential stages. First, the stationarity properties of all variables were examined using the Augmented Dickey Fuller (ADF) unit root test. This step is necessary because the ARDL methodology requires that the variables be integrated of order zero, I(0), or order one, I(1), while variables integrated of order two, I(2), are not permitted.

Second, after confirming the order of integration, the optimal lag structure was selected using the Akaike Information Criterion. The selected lag length minimizes information loss while maintaining a parsimonious model specification.

Third, the ARDL model was estimated to identify the short-run effects of oil prices and energy consumption on Kazakhstan's economic growth. The estimated coefficients allow both contemporaneous and lagged effects of the explanatory variables to be evaluated.

The existence of a long-run equilibrium relationship among the variables was examined using the Pesaran-Shin-Smith Bounds Test. If the calculates F-statistic exceeds the upper critical value, the null hypothesis of no cointegration is rejected. Conversely, if the statistic falls below the lower critical value, no long-run relationship is supported. Values between the critical bounds indicate an inconclusive result [11].

Empirical results. This section presents the empirical findings from the ARDL analysis.

The Table 1 below presents the descriptive statistics for the variables included in the empirical analysis.

Table 1 - Descriptive Statistics.

Variable	Obs	Mean	Std.Dev.	Min	Median	Max
GDP Growth	25	5.824	3.733	-2.600	5.000	13.500
Oil Price	25	66.732	27.763	24.400	65.100	111.700
Energy Consumption	25	2.542	2.542	1.900	2.600	2.980
Note – compiled by the author based on [15-17]						

Table 1 presents the descriptive statistics for the variables included in the empirical analysis, Kazakhstan's GDP growth averaged 5.82% over the 2000-2024 period, with a relatively high standard deviation of 3.73%. The minimum GDP growth rate of -2/6% indicates that the economy experienced at least one contraction during the sample period, whereas the maximum growth rate reached 13.5%.

The average oil price was 66.73 USD per barrel, with values ranging from 24.40$ to 111.70$. The comparatively large standard deviation of 27.76$ confirms the substantial volatility of global oil prices over the study period. Energy consumption displayed considerably lower variability, with a mean of 2.54 and a standard deviation of 0.32. Its values ranged from 1.90 to 2.98, suggesting a relatively gradual evolution of energy use compared with the pronounced fluctuations observed in GDP growth and oil prices.

Figure 2 presents the Pearson correlation matrix for GDP growth, oil prices, and energy consumption in Kazakhstan over the period 2000-2024. The color intensity reflects the strength and direction of the linear relationship between the variables, while the numerical values indicate the corresponding correlation coefficients.

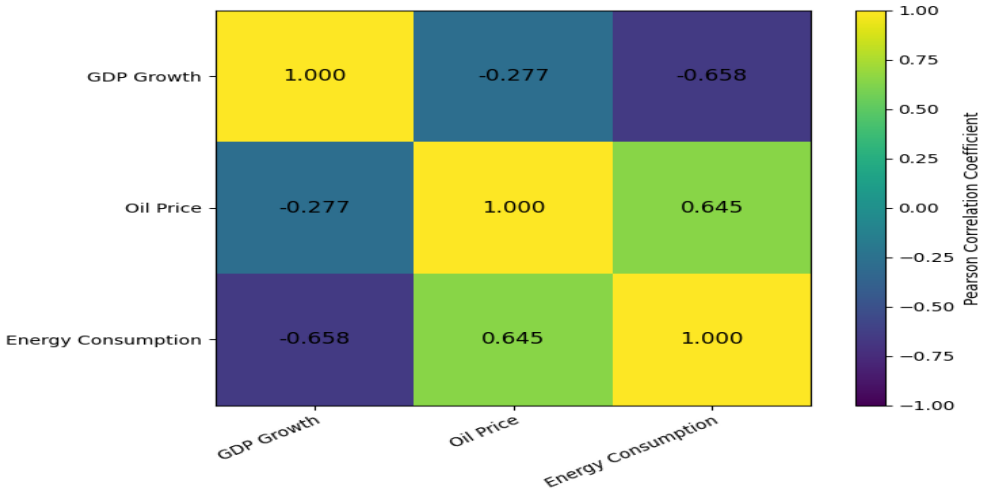


Figure 2 - Correlation Matrix of the Study Variables
Note – compiled by the author based on [15-17]

The results in matrix reveal a weak negative correlation between GDP growth and oil prices, suggesting that fluctuations in international oil prices are not strongly associated with annual economic growth in the sample period. A moderately strong negative correlation is observed between GDP growth and energy consumption. This relationship should be interpreted with caution, as pairwise correlations do not account for dynamic adjustments, lagged effects, or long-run equilibrium relationships. In contrast, oil prices and energy consumption exhibit a moderately strong positive correlation, indicating that higher oil prices generally coincide with higher levels of energy consumption. Overall, the correlation analysis provides preliminary evidence of linear associations and does not imply causality, Therefore, the ARDL approach is employed to examine both the short-run and long-run relationships among variables.

In the study, the Augmented Dickey-Fuller unit root test (Table 2) was also applied to determine the order of integration of the variables. The results indicate that GDP growth, oil prices, and energy consumption are non-stationary I levels, as the null hypothesis of a unit root cannot be rejected at the 5% significance level. However, after taking the first differences, all variables become stationary. Specifically, the ADF statistics for GDP growth, oil price, and Energy consumption are statistically significant ($p<0.01$). Therefore, all variables are integrated of order one, I (1), satisfying the requirements for the application of the ARDL bounds testing approach.

Table 2 - ADF-test

Variable	**Level p-value**	**First difference p-value**	**Order of Integration**
GDP Growth	0.1534	<0.001	I (1)
Oil Price	0.4750	0.0004	I (1)
Energy Consumption	0.9980	<0.001	I (1)
Note – compiled by the author based on [13, 15-17]			

ARDL (2,3,2),

Where
2 – lags of dependent variable of GDP growth;
3 – lags of Oil Price;
2 – lags of Energy Consumption.

Below, we have the reports of the estimated ARDL (2,3,2) model for Kazakhstan over the period 2000-2024. The autoregressive coefficients of GDP growth are statistically significant, indicating persistence in economic growth dynamics. The positive coefficient of GDP (-1) (0.878, p=0.011) suggests that higher growth in the previous year is associated with higher current growth, whereas the negative coefficient of GDP (-2) (-0.446, p=0.048) indicate partial mean reversion over time.

Table 3 - ARDL Estimation Results

Variable	Coefficient	p-value	**Significance**
GDP (-1)	0.878	0.011	**
GDP (-2)	-0.446	0.048	**
Oil	-0.034	0.192	ns
Oil (-1)	0.041	0.208	ns
Oil (-2)	0.033	0.236	ns
Oil (-3)	-0.054	0.022	**
Energy	24.438	<0.001	***
Energy (-1)	-46.595	0.001	***
Energy (-2)	18.136	0.098	*
Note – compiled by the author based on [13,15-17] ***p<0.01, **p<0.05; *p<0.10			

The contemporaneous and first two lagged oil price coefficients are statistically insignificant. However, the third lag of oil prices is negative and statistically significant (β= -45.595, p =0.001), while the second lag is positive and weakly significant (β= 18.136, p =0.098). These alternating coefficients indicate that the effect of energy consumption on economic growth is dynamic and distributed over time rather than constant.

Table 4 - Bounds Test Results

Statistic	**Value**
F-statistic	2.498
Lower p-value	0.136
Upper p-value	0.361
Note – compiled by the author based on [12, 15-17] Null hypothesis; No Cointegration	

Bounds test results indicate that the null hypothesis of no cointegration cannot be rejected. The calculated F-statistic equals 2.498, with lower- and upper-bound p-values of 0.136 and 0.361, respectively. Since the test statistic does not exceed the critical upper bound at conventional significance levels, the empirical evidence does not support the existence of a stable long-run equilibrium relationship among GDP growth, oil prices and energy consumption in Kazakhstan over the 2000-2024 period.

Consequently, the estimated ARDL coefficients should be interpreted primarily as capturing short-run dynamic relationships rather than long-run equilibrium effects. The results suggest that changes in oil prices and energy consumption influence economic growth mainly through lagged short-term adjustments rather than through a statistically significant long-run cointegrating relationship.

CONCLUSION

The study examined the relationship between oil price movements, domestic energy consumption, and macroeconomic vulnerability in Kazakhstan using annual data for 2000-2024 and an ARDL framework. The empirical findings indicate that economic growth is characterized by significant persistence and that energy-related factors influence output through dynamic short-run adjustments. Oil price effects emerge with a delay, while domestic energy consumption exhibits a statistically significant contemporaneous effect accompanied by subsequent adjustment effects. The Bounds Test does not provide evidence of a stable long-run cointegrating relationship among the variables, suggesting that the estimated relationships should be interpreted primarily in terms of short-run dynamics rather that long-run equilibrium effects.

These findings contribute to the energy-growth literature by jointly considering external oil price shocks and domestic energy consumption within the context of a resource-dependent economy. They suggest that Kazakhstan's macroeconomic vulnerability cannot be explained solely by fluctuations in global oil prices or by domestic energy demand in isolation. Instead, the interaction of these factors and their delayed transmission to economic activity is important for understanding the country's exposure to energy-related shocks.

From a policy perspective, the results highlight the importance of strengthening macroeconomic resilience through economic diversification, fiscal buffers, and improvements in energy efficiency. Policies aimed at reducing dependence on volatile commodity revenues should be complemented by measures that support productive energy use and mitigate the adverse effects of external shocks, At the same time, the absence of confirmed cointegration and the relatively small annual sample limit the interpretation of long-run effects. Future research could extend the analysis using higher-frequency data, additional macroeconomic indicators, and non-linear specifications to examine asymmetric oil price shocks and structural changes in greater detail.

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МҰНАЙ БАҒАСЫНЫҢ КҮЙЗЕЛІСІ ЖӘНЕ ЭНЕРГИЯ ТҰТЫНУДЫҢ ҚАЗАҚСТАНДАҒЫ МАКРОЭКОНОМИКАЛЫҚ ОСАЛДЫҚҚА ӘСЕРІ

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АҢДАТПА

Зерттеу мақсаты – бұл мақалада мұнай бағасының қозғалысы Мен ішкі энергия тұтынудың Қазақстандағы макроэкономикалық осалдыққа қалай әсер ететінін зерттеудің эмпирикалық негізі әзірленген. Зерттеу энергияға тәуелді экономикадағы энергиямен байланысты факторлар мен экономикалық көрсеткіштер арасындағы қысқа мерзімді динамика мен ұзақ мерзімді байланысты бағалау арқылы энергияның өсуі туралы әдебиеттерге үлес қосады.

Әдіснамасы – эмпирикалық талдау 2000-2024 жылдар аралығындағы Қазақстан бойынша жылдық деректерді пайдалана отырып, Авторегрессивті Үлестірілген Кідіріс (ARDL) тәсілін қолданады. Интеграция ретін анықтау үшін Дикки-Фуллер бірлігінің кеңейтілген түбірлік сынақтары ЖҮРГІЗІЛЕДІ, СОДАН кейін ARDL бағалауы жүргізіледі. Модельдің жеткіліктілігі мен беріктігін бағалау үшін коинтеграциялық тестілеуді, диагностикалық және тұрақтылық сынақтарын шектейді.

Зерттеудің бірегейлігі / құндылығы – зерттеу Қазақстанды ОПЕК-ке кірмейтін, ресурстарға тәуелді өтпелі экономика ретінде қарастыра отырып, мұнай бағасының динамикасы мен ішкі энергия тұтынуды макроэкономикалық осалдықпен байланыстыра отырып, энергия өсімінің өзара байланысы туралы әдебиеттерді кеңейтеді. Кәдімгі екі айнымалы энергия-өсу зерттеулерінен айырмашылығы, талдау кеңірек макроэкономикалық контексте энергиямен байланысты айнымалылардың динамикалық өзара әрекеттесуін қарастырады.

Зерттеу нәтижелері – эмпирикалық нәтижелер мұнай бағасы, энергияны тұтыну және экономикалық өсу арасындағы айтарлықтай қысқа мерзімді динамикалық байланыстарды көрсетеді. Экономикалық өсу айтарлықтай тұрақтылықты көрсетеді, ал мұнай бағасының күйзелісі өндіріске кешіктірілген реакциямен әсер етеді, Ал Ішкі энергияны тұтыну бір мезгілде статистикалық маңызды әсер етеді, сонымен бірге реттеудің кешеуілдеуімен бірге жүреді. Алайда, Шекара Сынағы ұзақ мерзімді интеграциялық қатынастардың бар екендігін растамайды, Бұл Қазақстанның макроэкономикалық осалдығы, ең алдымен, тұрақты ұзақ мерзімді тепе-теңдікке емес, сыртқы энергетикалық күйзелістерге қысқа мерзімді түзетулерге байланысты екенін көрсетеді.

Түйін сөздер: мұнай бағасының күйзелісі, энергияның өсуінің өзара байланысы, энергияны тұтыну, макроэкономикалық осалдық, ресурстарға тәуелділік, ARDL.

Алғыс: Осы зерттеу Қазақстан Республикасы Ғылым және жоғары білім министрлігінің Ғылым және жоғары білім комитеті тарапынан қаржыландырылды (AP25796469 «Энергия осалдығы және экономикалық тұрақтылық: мұнай кірістері мен энергия үнемдеу саясатының Қазақстанның макроэкономикалық көрсеткіштеріне әсерін талдау»)

КОЛЕБАНИЯ ЦЕН НА НЕФТЬ И ВЛИЯНИЕ ПОТРЕБЛЕНИЯ ЭНЕРГИИ НА МАКРОЭКОНОМИЧЕСКУЮ УЯЗВИМОСТЬ В КАЗАХСТАНЕ

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АННОТАЦИЯ

Цель – в данной статье разрабатывается эмпирическая основа для изучения того, как динамика цен на нефть и внутреннее потребление энергии влияют на макроэкономическую уязвимость в Казахстане. Исследование дополняет литературу по энергетическому росту, оценивая краткосрочную динамику и долгосрочную взаимосвязь между факторами, связанными с энергетикой, и экономическими показателями в ресурсозависимой экономике.

Методология – в эмпирическом анализе используется метод авторегрессии с распределенным лагом (ARDL) с использованием годовых данных по Казахстану за период 2000-2024 гг. Для определения порядка интегрирования проводятся расширенные тесты на единичный корень Дики-Фуллера, за которыми следует оценка ARDL. Ограничивает тестирование коинтеграции, а также диагностические тесты и тесты на стабильность для оценки адекватности и надежности модели.

Оригинальность/ценность – исследование дополняет литературу о взаимосвязи энергетики и экономического роста, рассматривая Казахстан как страну с переходной экономикой, не входящую в ОПЕК и зависящую от ресурсов, связывая динамику цен на нефть и внутреннее потребление энергии с макроэкономической уязвимостью. В отличие от традиционных двумерных исследований роста энергетики, в данном анализе рассматривается динамическое взаимодействие переменных, связанных с энергетикой, в более широком макроэкономическом контексте.

Выводы – эмпирические результаты показывают значительную краткосрочную динамическую взаимосвязь между ценами на нефть, потреблением энергии и экономическим ростом. Экономический рост характеризуется устойчивостью, в то время как скачки цен на нефть влияют на производство с запоздалой реакцией, внутреннее потребление энергии оказывает статистически значимое одновременное воздействие, сопровождающееся запаздывающими эффектами корректировки. Однако проверка границ не подтверждает существование долгосрочной взаимосвязи, указывающей на то, что макроэкономическая уязвимость Казахстана обусловлена в первую очередь краткосрочной адаптацией к внешним энергетическим шокам, а не стабильным долгосрочным равновесием.

Ключевые слова: шоки цен на нефть, взаимосвязь энергетики и экономического роста, потребление энергии, макроэкономическая уязвимость, ресурсозависимость, ARDL.

Благодарность: Данное исследование финансируется Комитетом науки и высшего образования Министерства науки и высшего образования Республики Казахстан (ИРН AP25796469 «Энергетическая уязвимость и экономическая устойчивость: Анализ влияния нефтяных доходов и политики энергосбережения на макроэкономические показатели Казахстана»).

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