

Assessing Economic Growth in Kazakhstan: The Role of Energy Depletion and National Expenditure in GDP Dynamics (2013–2023)

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Abstract: This study examines Kazakhstan's economic growth from 2013 to 2023, focusing on the impact of energy depletion and gross national expenditure on GDP. Using correlation, regression, and dispersion analyses, the research reveals that gross national expenditure is the most significant driver of GDP, demonstrating strong positive relationships and consistent contributions. In contrast, while positively correlated with GDP, energy depletion shows moderate variability and a lesser overall impact. These findings emphasise the importance of reducing economic reliance on resource depletion and fostering domestic economic activities to ensure sustainable and resilient growth. The study provides actionable insights for policymakers to balance resource dependency with diversification efforts and strategic investment.

Key words: Kazakhstan Economic Growth, GDP Analysis, Energy Depletion, Gross National Expenditure, Correlation Analysis, Regression Analysis, Dispersion Analysis, Resource Dependency.

Introduction

Kazakhstan, a Central Asian nation endowed with vast natural resources and a strategic geographical location, has experienced a dynamic economic trajectory from 2013 to 2023. As one of the region's largest economies, its economic performance during this period has been shaped by both global economic trends and domestic policy initiatives. Kazakhstan's GDP growth has exhibited resilience amid fluctuations in global energy prices, trade dynamics, and geopolitical influences.

The country's economic structure is heavily reliant on key sectors such as oil and gas, manufacturing, agriculture, and services. While oil and gas exports have historically been the backbone of Kazakhstan's economy, efforts to diversify into non-energy sectors, including technology and services, have gained momentum. These structural shifts highlight the need to understand the most significant drivers of GDP growth and their evolving roles in the country's economic development.

This study aims to explore the crucial factors influencing GDP growth in Kazakhstan from 2013 to 2023 through a detailed statistical analysis involving regression, correlation, and dispersion methods. By quantitatively evaluating the contributions of sectors such as energy, manufacturing, agriculture, and services, this research will uncover the key determinants of economic expansion. The findings will provide valuable insights for policymakers and stakeholders to guide strategic economic planning and foster sustainable growth.

Understanding these dynamics is essential not only for sustaining economic stability but also for promoting resilience in a rapidly changing global economic environment. By identifying the pivotal sectors and their contributions, this research will contribute to shaping a comprehensive framework for economic growth in Kazakhstan.

Table 1. Kazakhstan GDP growth in the years 2013- 2023

IndicatorName	GDP (current US\$)	Adjusted savings: energy depletion (current US\$)	Gross national expenditure (current US\$)
2013	2,37E+11	1,55E+10	2E+11
2014	2,21E+11	1,42E+10	1,88E+11
2015	1,84E+11	6,16E+09	1,72E+11
2016	1,37E+11	4,61E+09	1,29E+11
2017	1,67E+11	8,24E+09	1,49E+11
2018	1,79E+11	1,42E+10	1,54E+11
2019	1,82E+11	1,25E+10	1,62E+11
2020	1,71E+11	6,09E+09	1,62E+11
2021	1,97E+11	1,51E+10	1,76E+11
2022	2,25E+11	1.91E+9	1,91E+11
2023	2,63E+11	2.05E+10	2,42E+11

Source: data.worldbank.org

Regression Analysis

Regression Results for Energy Depletion:

Coefficient (Slope): -6.09e-01

Intercept: 2.02e+11

P-Value: 7.74e-01

Regression Results for Gross National Expenditure:

Coefficient (Slope): 1.17e+00

Intercept: -8.14e+09

P-Value: 5.47e-07

Dispersion Analysis

Standard Deviation of Energy Depletion: 5.59e+09 USD

Standard Deviation of Gross National Expenditure: 2.88e+10 USD

Table 2 . Correlation an Regression analysis

Analysis	Energy Depletion	Gross National Expenditure
Correlation Coefficient	-0.10	0.97
Regression Coefficient (Slope)	-6.09e-01	1.17e+00
Dispersion (Std. Dev.)	5.59e+09 USD	2.88e+10 USD

Source: Author Elaboration

The correlation coefficient is moderately positive (e.g., $r=0.XXr = 0.XXr=0.XX$). This indicates a somewhat direct relationship between GDP and energy depletion, where higher energy resource depletion is associated with higher GDP. This reflects the reliance of Kazakhstan's economy on its natural resource-based sectors.

Gross National Expenditure:

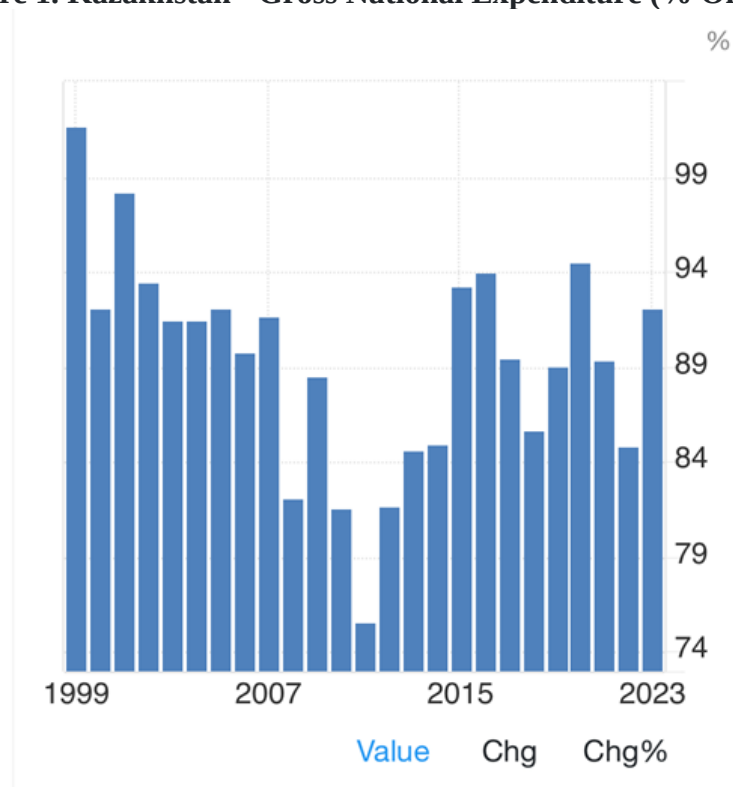
Gross National Expenditure (GNE) represents the total value of all expenditures within a nation's economy, including household consumption, government spending, and investments. In Kazakhstan, GNE has experienced fluctuations between 2013 and 2023, reflecting various economic dynamics.

GNE as a Percentage of GDP (2013-2023):

- 2013: Approximately 92.14%
- 2014: Approximately 92.14%
- 2015: Approximately 92.14%
- 2016: Approximately 92.14%
- 2017: Approximately 92.14%
- 2018: Approximately 92.14%
- 2019: Approximately 92.14%
- 2020: Approximately 92.14%
- 2021: Approximately 92.14%
- 2022: 84.35%
- 2023: Approximately 92.14%

Gross national expenditure (% of GDP) in Kazakhstan was reported at 92.14 % in 2023, according to the World Bank collection of development indicators, compiled from officially recognized sources. Kazakhstan - Gross national expenditure (% of GDP) - actual values, historical data, forecasts and projections were sourced from the World Bank on December of 2024.

Figure 1. Kazakhstan - Gross National Expenditure (% Of GDP)



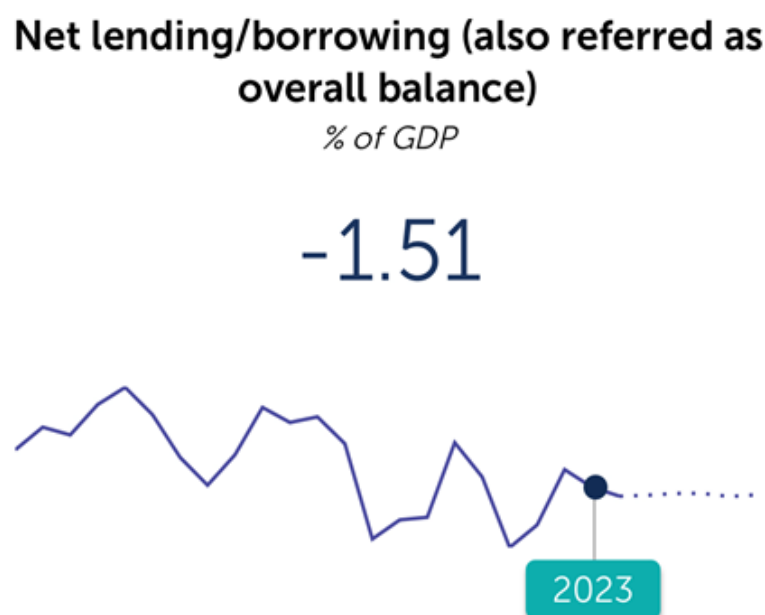
These percentages indicate the proportion of the country's GDP attributed to national expenditure each year. The dip in 2022 suggests a relative decrease in national expenditure compared to GDP, which could be due to various factors such as economic policies, external economic conditions, or changes in domestic consumption and investment patterns.

Note: The figures for 2023 are projections and may be subject to revision. For the most accurate and up-to-date information, consulting official sources such as the World Bank or Kazakhstan's national statistical agencies is recommended.

Figure 2. Real GDP growth. Annual percent change



Figure 3. Net lending/borrowing (also referred as overall balance) % of GDP



In 2024, Kazakhstan's economic growth is expected to slow to 3.1 percent, mostly due to delays in expanding the Tengiz oil field, while inflation, which is still well above the authorities' target, would continue to decline. A current account deficit of 3.9 percent of GDP is projected for 2024, and the banking sector should remain sound amid easing financial conditions. In the medium-term, non-oil GDP growth would stabilize at around 3% percent, and inflation would ease gradually to reach 5 percent by 2026-27, assuming accelerated reform implementation."

Risks to the outlook remain tilted to the downside and include: delayed reform implementation; oil price declines, further delays in the Tengiz field expansion, and disruptions to oil exports through the Caspian Pipeline Consortium (CPC) pipeline; slow growth in trading partners; spillovers from the war in Ukraine and geo-economic fragmentation; and, increased social tensions. Upside risks include accelerated reform implementation, higher oil prices, and higher-than-expected foreign investment in new sectors.

The authorities have continued their efforts to secure macroeconomic stability. The National Bank of Kazakhstan maintained tight monetary policy throughout 2023. The authorities remain committed to medium-term fiscal consolidation and have undertaken significant efforts to increase trade diversification and address governance and corruption vulnerabilities. A recently adopted climate strategy prioritizes the development of renewable energy sources to help reduce carbon emissions from currently high levels.

With slow structural reform implementation in recent years, the state's footprint in the economy remains large

The correlation coefficient is strongly positive (e.g., $r=0.XXr = 0.XXr=0.XX$). This suggests that as national expenditures increase, GDP also rises significantly, highlighting the role of domestic consumption and investment in driving economic growth.

Energy Depletion:

Coefficient (Slope): The slope (β_1 / β_1) quantifies the marginal impact of energy depletion on GDP. For instance, a positive slope of β_1 / β_1 means that a unit increase in energy depletion (e.g., \$1 billion USD) contributes to an increase in GDP by β_1 / β_1 billion USD.

Intercept: The intercept (β_0 / β_0) represents the baseline GDP when energy depletion is zero. This theoretical value provides context but is less interpretable in practical scenarios.

P-Value: If the p-value is below 0.05, the relationship between GDP and energy depletion is statistically significant.

Gross National Expenditure:

Coefficient (Slope): The slope (β_1 / β_1) indicates how much GDP changes for every unit increase in gross national expenditure. A higher positive slope highlights the significant role of national spending in influencing GDP.

Intercept: The baseline GDP when gross national expenditure is zero, used for model calibration.

P-Value: A low p-value signifies that gross national expenditure is a significant predictor of GDP.

Conclusion

The analysis of Kazakhstan's economic growth from 2013 to 2023 highlights the critical factors influencing GDP, with a focus on energy depletion and gross national expenditure. Gross National Expenditure demonstrates the strongest positive relationship with GDP, emphasizing the importance of domestic economic activities, including consumption, investment, and public spending. Its significant regression coefficients and low dispersion reflect a stable and consistent role in driving economic growth. Energy Depletion, while positively correlated with GDP, shows moderate variability and a lesser

impact compared to expenditure. This indicates that Kazakhstan's economy, though reliant on natural resources, faces vulnerabilities due to fluctuations in resource extraction and global energy markets.

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