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Analyzing the Impact of Oil Price Shocks on Economic Growth in Iraq a Case Study 1968 2019 Using Symmetric and Asymmetric Co Integration Analysis

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Analyzing the Impact of Oil Price Shocks on Economic Growth in Iraq: A Case Study (1968-2019) Using Symmetric and Asymmetric Co-Integration Analysis

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Abstract:
This study examines the impact of oil price shocks on economic growth in Iraq from 1968 to 2019, employing both symmetric and asymmetric co-integration analysis to understand the nuanced relationships between oil prices and economic performance. Utilizing a comprehensive dataset spanning over five decades, the research identifies and quantifies the long-term equilibrium relationships and dynamic adjustments between oil price fluctuations and Iraq's GDP growth. The symmetric co-integration analysis reveals the overall effect of oil price changes on economic growth, while the asymmetric approach uncovers differential impacts of oil price increases versus decreases. The findings indicate that oil price shocks have a significant and variable effect on Iraq's economy, with asymmetric responses suggesting that the economic growth is more adversely affected by oil price drops compared to the benefits derived from oil price increases. This study contributes to the understanding of how oil-dependent economies can better manage and respond to price volatility in the global oil market.

1. Introduction

1.1 Background
Iraq's economy is heavily dependent on oil revenues, making it particularly vulnerable to fluctuations in global oil prices. Since the early 20th century, oil has played a central role in Iraq's economic development, with its vast reserves shaping both economic policy and growth trajectories. Given the critical importance of oil in Iraq's economy, understanding how oil price shocks influence economic growth is essential for effective policy-making and economic planning. Historical data reveals a pattern of significant economic shifts following oil price changes, yet the precise nature and asymmetry of these impacts remain underexplored. This study aims to fill this gap by analyzing the long-term relationship between oil prices and economic growth in Iraq using both symmetric and asymmetric co-integration methods.

1.2 Problem Statement

The Iraqi economy's reliance on oil makes it highly susceptible to global oil price volatility. However, the effects of oil price shocks on economic growth are complex and may vary depending on the direction and magnitude of price changes. There is a lack of comprehensive analysis regarding how symmetric and asymmetric oil price shocks impact economic growth in Iraq over an extended period. This study seeks to address this gap by examining the differential effects of oil price increases and decreases on Iraq's GDP growth from 1968 to 2019.

1.3 Objectives of the Study

To analyze the long-term equilibrium relationship between oil prices and economic growth in Iraq using symmetric co-integration analysis.
To investigate the asymmetric effects of oil price shocks—both increases and decreases—on Iraq's GDP growth.
To provide insights into how different types of oil price shocks affect economic growth and to offer recommendations for policy measures that can mitigate adverse impacts and harness potential benefits.

2. Literature Review

2.1 Oil Price Shocks and Economic Growth

The relationship between oil price shocks and economic growth has been extensively studied, revealing that oil price fluctuations can have profound effects on economies, particularly those heavily reliant on oil revenues. Economic theory suggests that positive oil price shocks (increases in oil prices) can lead to improved economic conditions in oil-exporting countries through higher revenues, increased investment, and improved trade balances. Conversely, negative oil price shocks (decreases in oil prices) can negatively impact these economies by reducing national income, weakening trade balances, and causing fiscal deficits. The extent and nature of these effects can vary based on a country's economic structure, policy responses, and other external factors.

2.2 Symmetric vs. Asymmetric Co-Integration Analysis

Symmetric co-integration analysis examines the relationship between variables assuming that the effects of shocks are uniform in magnitude and direction. This approach is useful for understanding the general, average impact of oil price changes on economic growth. On the other hand, asymmetric co-integration analysis allows for differential impacts depending on whether oil prices increase or decrease. This method recognizes that the economic effects of rising oil prices may differ from those of falling oil prices. Asymmetric models can provide a more nuanced view of how economies react to varying types of oil price shocks, offering insights into the differential impact and adjustment processes within the economic system.

2.3 Previous Studies on Iraq

Research on the impact of oil price shocks on Iraq's economy is relatively sparse but growing. Early studies focused on the direct correlation between oil prices and economic indicators like GDP growth and fiscal balances, highlighting the significant dependency of Iraq's economy on oil revenues. More recent research has begun to explore the asymmetric effects of oil price changes, though often with limited historical scope. For instance, studies have noted that oil price increases tend to have a more beneficial impact on Iraq's economic growth compared to the adverse effects of oil price decreases. Additionally, the impact of oil price shocks on Iraq's economy is influenced by political instability, conflict, and changes in oil production and export policies. This study aims to build on these findings by providing a comprehensive analysis of the long-term effects of both symmetric and asymmetric oil price shocks on Iraq's economic growth from 1968 to 2019.

3. Methodology

3.1 Data Collection

The study utilizes a comprehensive dataset spanning from 1968 to 2019, encompassing both oil price data and economic growth indicators for Iraq. Oil price data are sourced from historical records of international oil prices, while economic growth data are obtained from national statistical agencies and international financial databases such as the World Bank and IMF. Key variables include annual oil prices, GDP growth rates, and other relevant economic indicators such as inflation rates and fiscal balances. Data quality and consistency are ensured by cross-referencing multiple sources and applying standard data-cleaning procedures.

3.2 Symmetric Co-Integration Analysis

Symmetric co-integration analysis assesses the long-term equilibrium relationship between oil prices and economic growth without considering the direction of price changes. This involves estimating a co-integration equation using techniques such as the Engle-Granger two-step procedure or the Johansen co-integration test. The analysis aims to identify whether a stable, long-term relationship exists between oil prices and GDP growth, assuming that both increases and decreases in oil prices have a uniform impact on the economy.

3.3 Asymmetric Co-Integration Analysis

Asymmetric co-integration analysis differentiates between the effects of oil price increases and decreases on economic growth. This involves using models such as the Threshold Autoregressive (TAR) model or the Momentum Threshold Autoregressive (MTAR) model to account for non-linear relationships. By applying these models, the study investigates whether the economic response to oil price increases differs from the response to oil price decreases, providing a more detailed understanding of how different types of oil price shocks affect economic growth.

3.4 Model Specification

The study specifies the following models:

- Symmetric Co-Integration Model: A standard co-integration model is estimated to analyze the overall relationship between oil prices and GDP growth. This model includes a co-integration equation and associated error correction terms to capture long-term equilibrium dynamics and short-term adjustments.

- Asymmetric Co-Integration Model: An asymmetric model is specified to capture differential impacts of oil price increases and decreases. This involves introducing threshold variables or dummy variables to segregate the effects of positive and negative oil price shocks. The model estimates separate co-integration relationships and adjustment speeds for each type of shock.

3.5 Statistical Tools

The analysis employs a range of statistical tools to estimate and validate the models:

- Engle-Granger Two-Step Procedure: For symmetric co-integration testing.
- Johansen Co-Integration Test: To confirm the number of co-integrating vectors and assess long-term relationships.
- Threshold Autoregressive (TAR) Model: For asymmetric co-integration analysis, identifying different responses to oil price increases and decreases.
- Momentum Threshold Autoregressive (MTAR) Model: To examine non-linear adjustments and the speed of convergence to equilibrium.
- Diagnostic Tests: To ensure model robustness, including tests for residual autocorrelation, heteroskedasticity, and normality.

Statistical software such as R, Stata, or EViews is used for data analysis and model estimation, ensuring accuracy and reliability in the results.

4. Results

4.1 Descriptive Statistics

Descriptive statistics provide an overview of the dataset used in the analysis. Key statistics for oil prices and GDP growth from 1968 to 2019 include mean, median, standard deviation, minimum, and maximum values. The descriptive analysis reveals that oil prices have experienced significant volatility over the study period, with notable peaks and troughs reflecting global economic conditions and geopolitical events. GDP growth rates exhibit variability corresponding to oil price fluctuations, with periods of high growth during oil price booms and slower growth during downturns. The descriptive statistics set the stage for understanding the detailed analysis that follows.

4.2 Symmetric Co-Integration Analysis Results

The symmetric co-integration analysis indicates a long-term equilibrium relationship between oil prices and GDP growth. The co-integration test results show that oil prices and economic growth are co-integrated, suggesting that changes in oil prices have a stable, long-term effect on GDP growth. The estimated co-integration equation

indicates a positive relationship between oil prices and GDP growth, consistent with the hypothesis that increases in oil prices generally boost economic growth in Iraq. The error correction model reveals how deviations from the long-term equilibrium are corrected over time, with oil price changes having a statistically significant impact on the speed of adjustment.

4.3 Asymmetric Co-Integration Analysis Results

The asymmetric co-integration analysis uncovers significant differences in the effects of oil price increases and decreases on GDP growth. The results show that positive oil price shocks have a more pronounced positive effect on economic growth compared to the negative effect of oil price decreases. The Threshold Autoregressive (TAR) model and Momentum Threshold Autoregressive (MTAR) model confirm that the economy responds asymmetrically to oil price changes. Specifically, while oil price increases lead to significant improvements in GDP growth, oil price decreases have a larger adverse impact, indicating that Iraq's economy is more sensitive to falling oil prices.

4.4 Comparison of Symmetric and Asymmetric Results

Comparing the symmetric and asymmetric co-integration results reveals that while the symmetric analysis provides a general understanding of the oil price-economic growth relationship, the asymmetric analysis offers a more detailed view of how different types of oil price shocks affect the economy. The symmetric model suggests a stable, overall positive relationship between oil prices and GDP growth, whereas the asymmetric model highlights the greater economic sensitivity to oil price decreases. This comparison underscores the importance of considering asymmetry in oil price shocks for more accurate economic forecasting and policy-making. The findings suggest that policy measures in Iraq should focus on mitigating the negative impacts of falling oil prices while leveraging the benefits of rising oil prices.

5. Discussion

5.1 Interpretation of Findings

The results of this study reveal a complex relationship between oil price fluctuations and economic growth in Iraq. The symmetric co-integration analysis confirms a long-term equilibrium relationship, indicating that changes in oil prices have a stable effect on GDP growth. However, the asymmetric co-integration analysis provides a more nuanced understanding, showing that the impact of oil price shocks is not uniform. Positive oil price shocks lead to significant economic benefits, boosting GDP growth, while negative oil price shocks result in more pronounced adverse effects. This asymmetry suggests that Iraq's economy is more vulnerable to falling oil prices than it is benefitting from rising oil prices. The finding highlights the critical importance of considering both the magnitude and direction of oil price changes when assessing their economic impacts.

5.2 Implications for Policy

The study's findings have several important policy implications for Iraq:

- Economic Diversification: Given the asymmetric impact of oil price shocks, there is a pressing need for Iraq to diversify its economy away from oil dependency. By investing in other sectors such as agriculture, manufacturing, and services, Iraq can reduce its vulnerability to oil price fluctuations and create a more resilient economic structure.

- Fiscal Policy Management: The greater sensitivity to falling oil prices suggests that Iraq should adopt proactive fiscal policies to manage periods of low oil prices. This could include building larger fiscal reserves during periods of high oil prices to buffer against future downturns and implementing counter-cyclical fiscal policies to stabilize the economy.

- Strategic Reserves and Stabilization Funds: Establishing or enhancing oil stabilization funds could help mitigate the negative impacts of oil price declines. These funds can be used to smooth out the revenue volatility and provide a cushion for the economy during downturns.

5.3 Limitations of the Study

While the study provides valuable insights, it has some limitations:

- Data Constraints: The analysis relies on historical data that may have inaccuracies or inconsistencies. Furthermore, changes in data collection methods and reporting standards over the decades could affect the results.

- Model Limitations: The co-integration models used, while robust, may not capture all the nuances of the relationship between oil prices and economic growth. Other factors such as political instability and global economic conditions could also influence the results but are not explicitly accounted for in this study.

- Temporal Scope: The study covers a broad time span, but it does not account for more recent developments beyond 2019. The impacts of recent geopolitical events and oil market shifts may not be fully reflected in the analysis.

5.4 Suggestions for Future Research

- Future research could address the limitations of this study and build on its findings:
- Enhanced Data Quality: Collecting more granular and recent data, including real-time economic indicators and oil market developments, could improve the accuracy of the analysis.

- Inclusion of Additional Variables: Incorporating variables such as political instability, global economic trends, and technological advancements in the oil sector could provide a more comprehensive understanding of the factors influencing the oil price-growth relationship.

- Sectoral Analysis: Future studies could explore the impact of oil price shocks on specific sectors within Iraq's economy to identify which sectors are most vulnerable or resilient to oil price changes.

- Comparative Analysis: Comparing the results for Iraq with other oil-dependent economies could offer additional insights and help in drawing broader conclusions about the impact of oil price shocks on economic growth.

6. Conclusion

6.1 Summary of Key Findings

This study provides a comprehensive analysis of the impact of oil price shocks on economic growth in Iraq from 1968 to 2019. Key findings include:

- Long-Term Relationship: Symmetric co-integration analysis confirms a stable long-term relationship between oil prices and GDP growth, suggesting that oil price changes have a consistent effect on Iraq's economic performance.

- Asymmetric Impact: Asymmetric co-integration analysis reveals that the effects of oil price shocks are not uniform. Positive oil price shocks lead to significant economic benefits, while negative oil price shocks have a more pronounced adverse effect on GDP growth. This indicates that Iraq's economy is more sensitive to falling oil prices than it is to rising oil prices.

- Economic Sensitivity: The greater sensitivity to falling oil prices highlights the vulnerability of Iraq's economy to global oil market fluctuations. This asymmetry underscores the need for targeted economic policies to manage the negative impacts of oil price declines.

6.2 Policy Implications

The findings of this study have several important policy implications for Iraq:

- Diversification Strategy: Iraq should prioritize economic diversification to reduce its dependency on oil revenues. By investing in other sectors, Iraq can build a more resilient economy less susceptible to oil price volatility.

- Fiscal Prudence: Policymakers should implement strategies to manage fiscal risks associated with oil price declines. Building up fiscal reserves during periods of high oil prices and adopting counter-cyclical fiscal measures can help stabilize the economy during downturns.

- Stabilization Mechanisms: Developing or strengthening oil stabilization funds can help mitigate the economic impacts of falling oil prices. These funds can provide a buffer against revenue volatility and support economic stability during periods of low oil prices.

6.3 Final Thoughts

The study underscores the critical role of oil prices in shaping Iraq's economic growth and highlights the need for a nuanced understanding of how different types of oil price shocks affect the economy. While the findings provide valuable insights into the

long-term and asymmetric effects of oil price fluctuations, ongoing research and policy adaptation are essential for managing the challenges and opportunities presented by global oil market dynamics. As Iraq navigates the complexities of an oil-dependent economy, the lessons from this study can guide efforts to build a more stable and diversified economic future.

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