THE IMPACT OF OIL PRICE CHANGES ON THE STOCK MARKET OF AN OIL EXPORTING COUNTRY

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Abstract. The impact of oil prices on financial markets is particularly crucial for oilexporting countries like Russia. Understanding this relationship is essential for economic stability and investment decision-making. This study aims to analyze the impact of Brent crude oil price changes and adjustments in the Central Bank of Russia's key interest rate on the Moscow Exchange index (MOEX).

The research utilized daily data from June 14, 2023, to June 14, 2024. Methods applied included correlation analysis, regression analysis (OLS), ARIMA, GARCH modeling, and stationarity tests (Augmented Dickey-Fuller test).

A weak positive correlation (0.13) was observed between oil price changes and the MOEX index dynamics. Regression analysis confirmed the significance of oil price changes on the MOEX index, albeit with a low coefficient of determination ($R^2=0.017$). ARIMA and GARCH models supported the significant impact of oil price fluctuations on both dynamics and volatility of the MOEX index at a 10% significance level. However, incorporating changes in the key interest rate did not significantly improve the model.

Changes in Brent crude oil prices affect Russia's stock market, though this influence is not the primary determinant of the MOEX index fluctuations. The low explanatory power (R^2) indicates the need to include additional factors for a more precise analysis. These findings are valuable for investors, analysts, and economists focused on forecasting the Russian stock market dynamics and studying the impact of macroeconomic indicators.

Keywords: oil prices, stock market, Moscow Exchange index, MOEX, volatility, key interest rate, macroeconomic indicators, Russia.

Introduction. In recent years, oil has remained an important factor for the Russian economy and stock market. The purpose of this paper is to study the impact of changes in Brent oil prices and the key rate of the Central Bank of the Russian Federation on the Moscow Exchange Index (MOEX).

The analysis covers the period from June 14, 2023 to June 14, 2024, using data on Brent futures, the key rate and the MOEX index. Correlation, OLS, ADF test, ARIMA and GARCH

were applied. The results are useful for investors and analysts assessing the impact of oil and Central Bank policy on the market.

Literature Review. The impact of oil prices on stock markets has been extensively studied, especially considering the differences between exporting and importing countries. The approaches and findings in the literature vary, highlighting the multifaceted nature of the topic.

For example, a study (Yudong Wang, 2013) examines how oil shocks affect stock markets in nine importing and seven exporting countries. Using a structural VAR model, the author concludes that an increase in aggregate and precautionary demand for oil increases the synchronicity of stock markets in exporters, while this effect is almost not evident in importing countries.

In another paper, (George Filis, 2011) analyses the time variability of the correlation between oil prices and stock markets in six countries using the DCC-GARCH-GJR model. The author shows that, in general, oil has a negative impact on stock markets, with the exception of the 2008 crisis, when a positive relationship was observed. However, it should be taken into account that the period covered (1987–2009) limits the relevance of the results.

An interesting approach is demonstrated by (Shabir Mohsin Hashmi, 2021), using QARDL and NARDL models to estimate the short- and long-term impact of oil prices on stock markets in eight countries. His work highlights the asymmetric nature of market reactions, depending on the phase (bullish or bearish) and direction of the oil shock.

Two studies by Mokni pay special attention to the dynamics of impact. In the first (Mokni, 2020), he applies SVAR and time-varying regression, finding that stock market reactions to oil shocks vary by shock type and are amplified during crisis periods. In the second study (Mokni, 2020), using a TV-AQR model, the author shows that negative oil shocks cause stronger stock market reactions, especially during times of financial instability.

The paper (Syed Abul Basher, 2018) focuses on the types of oil shocks and their impact on exporting countries. Using the SVAR model and the Markov switching regime, he identifies four types of shocks (demand, supply, speculative and idiosyncratic). The findings show that their impact depends on the structure of the economy: for example, in Russia, demand and speculative shocks are especially significant, while in the UK, only supply shocks are significant.

An analysis (Lendewig, 2013) covering 31 countries confirms that oil prices have a more significant impact on stock markets than on interest rates, with the effect being particularly pronounced in importing countries. The study is based on VAR, VECM and Granger tests.

The particular role of external shocks is demonstrated by a study (Mohd Atif, 2022), which examines the changing relationship between oil and stock markets before and after COVID-19. Based on a panel VAR model, the author shows that the pandemic has increased the impact of oil prices, especially in exporting countries.

Finally, a study (Mohamed El Hédi Arouri, 2010) focuses on the GCC countries. Using the Konya panel approach, the author finds bidirectional causality between oil and the stock market only in Saudi Arabia, while in other countries in the region, oil affects stocks but not vice versa.

The paper (Terver Theophilus Kumeka, 2022) examines the tripartite relationship between oil, stock, and currency markets in 12 oil-producing countries. The analysis is performed using a panel VAR model on weekly data from January 2018 to August 2020, divided into two periods - before and after the onset of the COVID-19 pandemic.

Thus, the literature emphasizes that the impact of oil prices on stock markets depends on the type of country (importer or exporter), the source of the shock, the market phase, and the economic structure. Models of varying complexity, from VAR and GARCH to SVAR and TV-AQR, allow for more precise accounting of these differences.

Empirical study.

Hypotheses:

• Main hypothesis. Changes in Brent crude oil prices have a significant impact on the dynamics of the Moscow Exchange Index (MOEX).

• Additional hypothesis. Changes in the key rate of the Central Bank of Russia also have a significant impact on the dynamics of the Moscow Exchange Index (MOEX).

Data. The analysis uses daily data on changes in Brent crude oil futures (Investing.com, n.d.), the Moscow Exchange Index (MOEX) (Investing.com, n.d.) and changes in the Bank of Russia key rate (Central Bank of Russia, n.d.) for the period from June 14, 2023 to June 14, 2024, excluding weekends (Saturday and Sunday) and holidays.

Correlation analysis

At the first stage, the correlation between changes in the Moscow Exchange index and Brent oil futures was estimated. The indicator was 0.13, which indicates a weak connection and shows that oil prices are only one of the factors influencing the index.

Next, an OLS regression model was built, where the dependent variable was the change in the Moscow Exchange index, and the independent variable was the change in Brent oil futures. The determination coefficient (R²) was 0.17371, which indicates a weak explanatory value of the model: oil prices explain only a small part of the index fluctuations, which is expected due to the influence of other factors.

Conclusions. The analysis showed that changes in Brent oil prices affect the Moscow Exchange index, but are not the main factor. Low R² values indicate the need to include additional variables. Adding a change in the key rate did not improve the model, which may indicate a weak impact or the need to use the rate level. The results require further study and can be refined by expanding the set of economic variables and analyzing additional literature.

Conclusion. The study analyzed the relationship between changes in Brent oil prices and the Moscow Exchange Index for the period from June 14, 2023 to June 14, 2024, taking into account the influence of the key rate of the Central Bank of the Russian Federation.

Key findings:

1. The correlation between changes in oil prices and the Moscow Exchange index was 0.13 — there is a connection, but it is weak.

2. The OLS model showed a low R^2 (0.17371), which indicates a weak explanatory power of the model.

3. The ADF test confirmed the stationarity of the time series.

4. The ARIMA model showed the significance of oil prices at the level of 10%: a 1% increase increases the index by 0.0466%.

5. The GARCH model revealed that a 1% increase in oil prices increases the volatility of the index by 0.039%.

6. The key rate did not show a significant impact: correlation -0.132, impact in regression — insignificant.

Thus, oil prices influence the Moscow Exchange index, but do not determine its behavior. Low R² values indicate the need to include other factors: macroeconomic indicators, political events, international capital flows, etc.

Recommendations for further research:

• Add additional variables for a more complete model.

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- Consider alternative modeling methods (nonlinear, with lags, etc.).
- Increase the time range of the analysis to account for long-term effects.

The results may be useful for investors, analysts, and researchers seeking to better understand the impact of the oil market and monetary policy on the Russian stock market.

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