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# DO OPEC OIL PRICES SHOCKS MATTER FOR THE TURKISH STOCK MARKET? EVIDENCE FROM THE BIST 100 INDEX (2010-2026)

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## ABSTRACT
**Purpose -** The aim of this study is to analyze the impact of the OPEC oil price shock on the performance of the BIST 100 index, which is regarded as a major indicator of the Turkish stock market. With regard to the energy dependence of Türkiye and the role of oil in economic activities, any changes in oil prices can greatly affect the performance of the Turkish stock market index. Therefore, this research attempts to investigate whether positive and negative OPEC oil price shocks have an asymmetric impact on the performance of the BIST 100 index.
**Methodology -** The NARDL model is utilized for analyzing the asymmetric impact of OPEC oil price shocks on the BIST 100 index in the short- and long-term periods. In particular, monthly time series data from January 2010 to March 2026 is used for the investigation. Besides oil price changes, the following variables are taken into consideration: USD/TRY exchange rates, Türkiye's 5-year sovereign credit default swap premium, and the U.S. Effective Federal Funds Rate (EFFR).
**Findings -** The results reveal an asymmetric relationship between OPEC oil price shocks and the BIST 100 index. In the long run, only negative oil price shocks significantly and positively influence the BIST 100 index. The positive oil price shocks have a weak positive lagged effect in the short run, while the negative oil price shocks have a significant negative lagged effect in the short run, confirming asymmetric responses of the BIST 100 market.
**Conclusion -** The findings confirm that the Turkish stock market responds asymmetrically to OPEC oil price shocks in both the long and short run. According to the research results, implementation of non-linear methods for such econometric relationships is required.

**Keywords:** OPEC oil price shocks, BIST 100 Index, Turkish Stock Market, NARDL model, asymmetric effects
**JEL Codes:** C22, G14, Q43

## 1. INTRODUCTION

As a net energy-importing economy, Türkiye is highly exposed to fluctuations in global oil prices, which are transmitted through inflation, exchange rates, and stock market performance through several channels. While arbitrage pricing theory, cash-flow theory, and behavioral finance all suggest that positive and negative oil price changes may affect firm valuations and investor behavior differently, most early empirical studies imposed a linear, symmetric relationship between oil prices and stock returns.

This study is motivated by Türkiye's heavy dependence on imported energy, which makes its financial markets particularly sensitive to OPEC oil price movements through exchange rate, inflation, and cost channels. Since prior research on the oil price–stock market relationship remains mixed—partly because linear models may obscure differing investor and firm responses to oil price increases versus decreases—this study examines whether positive and negative OPEC oil price shocks affect the BIST 100 Index asymmetrically, an issue of direct relevance to investors managing oil-related risk and to policymakers concerned with financial stability.

However, despite this growing body of evidence, the precise short-run versus long-run dynamics of this asymmetry for the Turkish stock market remain insufficiently explored, particularly once exchange rate, sovereign risk, and U.S. monetary policy conditions are taken into account. This research aims to fill this gap by analyzing whether positive and negative OPEC oil price shocks exert asymmetric short- and long-run effects on the BIST 100 Index over the period January 2010–March 2026, using the NARDL approach.

## 2. LITERATURE REVIEW

Degiannakis, Filis, and Arora (2018) show that the relationship between oil and stock markets depends on the level of data aggregation, whether a country is an oil importer or exporter, and whether oil price changes are modeled symmetrically or asymmetrically. They further conclude that oil price volatility generally spills over into stock markets. Attílio (2023) shows that positive oil shocks provoke stock market declines across six emerging economies—Brazil, Chile, Mexico, India, South Africa, and Türkiye—alongside currency devaluations in four of them. Bouslama (2023) documents fractional cointegration and significant bidirectional causality between oil and BRICS equity markets. By contrast, Chancharat and Sinlapates (2023) find only a low, statistically insignificant association between oil and ASEAN+6 stock markets; Guru, Pradhan, and Bandaru (2023) find no significant transmission between oil and stock markets across the G7 countries plus India and China for the full sample—though substantial bidirectional spillovers emerge during the COVID-19 sub-period; and Khan (2024) similarly finds a relatively limited role for oil as a shock source for equity markets in China, India, and Pakistan.

Another stream of literature has studied volatility transmission and connectedness mechanisms. Pan and Sun (2023) show that the conflict between Russia and Ukraine dramatically changed the leverage effect in the futures market for WTI, Brent, and Oman crude oil. Tiwari, Dam, Altıntaş, and Bekun (2025) decompose oil shocks into components and find that net transmitters of spillovers to emerging market returns are demand shocks and net receivers are supply and risk shocks.

The literature most relevant to the present study is two NARDL-based studies on Türkiye. Eissa, Al Refai, and Chortareas (2025) use NARDL and find that in Türkiye, both positive and negative oil price changes exert a significant positive effect on the stock market in the long run. İmamoğlu (2026) uses NARDL directly for Türkiye and Kazakhstan and finds that oil price increases have a significant negative impact on the BIST 100 Index.

Taken together, this literature confirms that the oil-stock market relationship is seldom linear, that asymmetric responses are well documented for Türkiye in particular, and that exchange rate and geopolitical risk channels need to be explicitly modeled in conjunction with oil price shocks, providing motivation for the present study's NARDL approach that incorporates these control variables.

## 3. DATA AND METHODOLOGY

The data used in this research work is the monthly time series data from January 2010 to March 2026. The BIST 100 Index (BIST100) was used as the dependent variable in the study. Investing.com is the source of the data. The independent variable of major interest in this case is the OPEC oil price (OIL). This is retrieved from the OPEC website. Then the data is split into positive and negative partial sums. To account for other financial variables that may influence the Turkish stock market, the other independent variables of interest are the exchange rate of USD/TRY (obtained from the St. Louis Federal Reserve Bank), Türkiye's five-year sovereign CDS premium (obtained from Investing.com), and the Effective Federal Funds Rate (EFFR, obtained from the St. Louis Federal Reserve Bank) as proxies for currency risk, sovereign credit risk, and U.S. monetary policy stance, respectively. All series are observed at a monthly frequency. These variables were chosen since these variables cover most of the macro-financial determinants for the Turkish stock market, which include energy price, exchange rate risk, sovereign risk, and global monetary condition.

To take into account any possible asymmetric impact of oil prices, the time series of OPEC oil prices is first separated into partial sums of positive and negative changes of OPEC oil prices according to the traditional NARDL decomposition technique:

$OIL_t = OIL_t^+ + OIL_t^-$

Where $OIL_t^+$ and $OIL_t^-$ are the positive and negative partial sums of changes of the OPEC oil price, respectively. The model can be written as:

$BIST100_t = \alpha_0 + \alpha_1 OIL_t^+ + \alpha_2 OIL_t^- + \alpha_3 USDTRY_t + \alpha_4 CDS_t + \alpha_5 EFFR_t + \varepsilon_t$

To estimate the relationship, the Nonlinear Autoregressive Distributed Lag (NARDL) approach will be used. The NARDL model enables estimating the short-run and long-run impacts of positive and negative changes of the oil price on the BIST 100 Index separately, an asymmetric effect that cannot be captured by linear models. Stationarity properties of all the series will be analyzed, implementing the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests for unit roots. It is necessary to prove that none of the variables are integrated of order two, I(2), since the NARDL/bounds testing procedure cannot be applied when variables are integrated of order two (I(2)). The optimum lag structure for the NARDL model will be chosen using the Akaike Information Criterion (AIC). The long-run cointegration relation between series will be checked using the bounds F-test. Moreover, the Wald test for asymmetry in the short run and long run, the CUSUM test for parameter stability, and diagnostic tests for autocorrelation and heteroskedasticity will be performed. Before the implementation of the analysis, unit root tests (ADF and PP) were performed. The ADF and PP tests were implemented since they are the most widely used complementary unit root tests in the literature and provide robust evidence on the stationarity properties of the variables. The use of these tests is standard practice before implementing the NARDL analysis.

**Table 1: ADF and PP Unit Root Test Results**

| Variable | ADF Level t-stat. (p) | ADF 1st Diff. t-stat. (p) | PP Level t-stat. (p) | PP 1st Diff. t-stat. (p) | Order of Integration |
|---|---|---|---|---|---|
| LBIST100 | 2.4869 (1.0000) | -9.2847 (0.0000)*** | -0.6988 (0.8434) | -37.6033 (0.0001)*** | I(1) |
| LCDS | -2.3745 (0.1504) | -13.9219 (0.0000)*** | -2.3280 (0.1642) | -14.0926 (0.0000)*** | I(1) |
| FED | -1.6239 (0.4684) | -3.7996 (0.0035)*** | -1.0892 (0.7200) | -6.0252 (0.0000)*** | I(1) |
| LOPEC | -2.7690 (0.0647)* | -9.8651 (0.0000)*** | -2.2533 (0.1884) | -9.0076 (0.0000)*** | I(1) |
| LUSD_TL | 1.4448 (0.9991) | -9.6232 (0.0000)*** | 1.6027 (0.9995) | -8.8995 (0.0000)*** | I(1) |

**Note.** The ADF is the Augmented Dickey–Fuller test, and the PP the Phillips–Perron test. All tests have a constant term . *** and * denote statistical significance at the 1% and 10% levels, respectively. All variables are integrated of order one, I(1).

From the unit root test result presented in Table 1, it can be observed that there is no variable that is I(2), and this condition fulfills the necessary prerequisite for the application of the NARDL modeling framework.

## 4. RESULTS

The results of the NARDL Wald tests are given in Table 2 below. It is evident from the above results that the hypothesis of symmetry has been rejected both in the long run and short run at a significance level of 10 percent and 1 percent, respectively. Moreover, the joint symmetry test has been rejected at a significance level of 1 percent, which implies that there exists joint asymmetry. This clearly indicates that OPEC oil price shock has asymmetric impacts on the BIST 100 index.

**Table 2: NARDL Wald Test Results for Asymmetry**

| Hypothesis | F-statistic | p-value |
|---|---|---|
| Long-run Symmetry | 3.2786 | 0.0719* |
| Short-run Symmetry | 6.8502 | 0.0096*** |
| Joint Symmetry | 5.6847 | 0.0041*** |

**Note.** The null hypothesis is symmetry. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Given the findings above, the NARDL(1, 0, 0, 3, 2) equation, chosen due to its lowest Akaike Information Criterion (AIC) value out of 2500 models, will be estimated to derive the long-run and short-run estimates shown in Table 3.

**Table 3: NARDL Estimation Results**

| Model | Variable | Coefficient | Std. Error | t-Statistic | p-value |
|---|---|---|---|---|---|
| Long-run | LCDS | -0.588484 | 0.082024 | -7.174539 | 0.0000*** |
| Long-run | LUSD_TL | 1.139597 | 0.178475 | 6.385190 | 0.0000*** |
| Long-run | FED(-1) | -0.008803 | 0.027259 | -0.322936 | 0.7471 |
| Long-run | LOPEC_POS | 0.120536 | 0.102984 | 1.170438 | 0.2434 |
| Long-run | LOPEC_NEG | 0.241596 | 0.069606 | 3.470904 | 0.0007*** |
| Long-run | Constant | 8.242977 | 0.727776 | 11.326250 | 0.0000*** |
| Short-run | D(FED) | 0.048418 | 0.181256 | 0.267126 | 0.7897 |
| Short-run | D(FED(-1)) | 0.189502 | 0.218059 | 0.869040 | 0.3860 |
| Short-run | D(FED(-2)) | 0.081603 | 0.231038 | 0.353202 | 0.7244 |
| Short-run | D(FED(-3)) | 0.534718 | 0.211979 | 2.522501 | 0.0125** |
| Short-run | D(LOPEC_POS) | 0.309690 | 0.332637 | 0.931014 | 0.3531 |
| Short-run | D(LOPEC_NEG) | -0.155274 | 0.314465 | -0.493772 | 0.6221 |
| Short-run | D(LOPEC_POS(-1)) | 0.592641 | 0.357403 | 1.658188 | 0.0991* |
| Short-run | D(LOPEC_NEG(-1)) | -0.363914 | 0.337404 | -1.078571 | 0.2823 |
| Short-run | D(LOPEC_POS(-2)) | 0.102857 | 0.357916 | 0.287377 | 0.7742 |
| Short-run | D(LOPEC_NEG(-2)) | -0.687630 | 0.339105 | -2.027780 | 0.0441** |

**Note.** ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

In the long term, only negative OPEC oil price shocks have a crucial influence on the BIST 100 index; positive OPEC oil price shocks do not show any statistical significance. In the short term, it is found that the results show asymmetric impacts; lagged positive and negative OPEC oil price shocks have a positive (weakly significant) and negative significant impact on the BIST 100 Index, respectively.

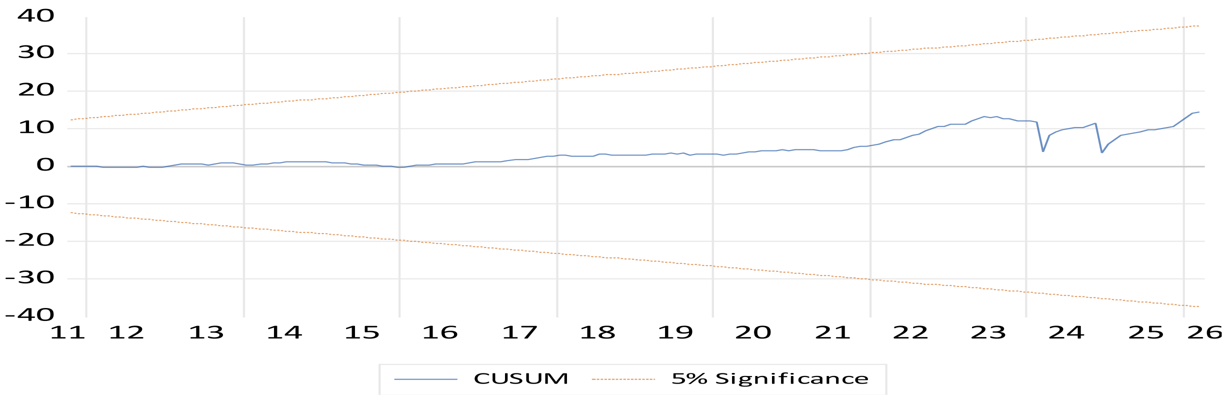
**Table 4: Cointegration and Diagnostic Test Results**

| Category | Test | Result | Conclusion |
|---|---|---|---|
| Cointegration | Bounds F-test | 22.56622*** | Cointegration confirmed |
| | ECM(-1) | -0.903522*** | Stable long-run adjustment |
| Diagnostics | Serial Correlation LM | p = 0.3843 | No serial correlation |
| | Heteroskedasticity Test | p = 0.3978 | No heteroskedasticity |

**Note.** *** indicates significance at the 1%.

The Bounds F-test (22.56622) proves the existence of long-run cointegration, and the negative and statistically significant coefficient of ECM (-0.903522) denotes stable adjustments to the equilibrium state after short-run shocks. It is found that there is no serial correlation (p = 0.3843) and heteroskedasticity (p = 0.3978) in the data (Table 4).

**Figure 1: CUSUM TEST**




The CUSUM test (Figure 1) provides evidence for the stability of the coefficients. According to the diagnostic test results, the robustness of the NARDL model is confirmed.

## 5. CONCLUSION

In this research work, it was explored whether positive and negative shocks in the OPEC oil prices have asymmetric effects on the BIST 100 Index from January 2010 to March 2026 through the use of the NARDL model. The findings show that OPEC oil price shocks have asymmetric impacts on the Turkish stock market in both the short run and the long run. In the long run, only adverse oil price shocks have a significant influence on the BIST 100 Index, whereas positive oil price shocks are statistically non-significant. In the short run, positive and negative oil price shocks exert asymmetric effects, with lagged positive oil price shocks weakly increasing the value of the index and lagged negative oil price shocks reducing the index significantly.

The results reveal that the effects of OPEC oil prices have an asymmetric impact on the BIST 100 index over the time horizon. In the long run, negative price movements are important while positive ones are not, which is supported by the fact that Türkiye is a net oil-importing country, and therefore the negative oil price changes are expected to bring an important change in the cost side of the country's current account balance, whereas positive price movements are seen as temporary and are fully absorbed. Part of this long-run asymmetry is consistent with Eissa, Al Refai, and Chortareas (2025), who also find significant long-run oil price effects on the Turkish stock market.

In view of the high sensitivity of BIST 100 to both positive and negative oil price changes in the short run, investors are advised to hedge their portfolios against such risks through the use of oil futures and options. Portfolio managers can also spread their holdings across sectors that are less sensitive to oil price movements to diminish financial risk. As negative shocks affect stock returns only in the long run, investors should pay particular attention to sustained oil price declines when making long-term allocation decisions. In addition, building on the existing Volatility-Based Precaution System, Borsa Istanbul, in coordination with the Capital Markets Board (SPK), the Central Bank of the Republic of Türkiye (CBRT), and the Banking Regulation and Supervision Agency (BDDK), could explore developing a market-wide early warning mechanism for BIST 100 that combines asymmetric GARCH-type models, capturing the differential volatility impact of positive and negative oil shocks, with a Kaminsky-Lizondo-Reinhart-style composite signal index built on oil prices, the exchange rate, the CDS premium, and the Federal Funds Rate in order to better anticipate periods of systemic market stress.

In the end, another possible venue for future research is to extend the model of short-term asymmetry to a sector-based or firm-based perspective to find which companies among the BIST 100 (for example, energy-consuming manufacturing vs. finance sectors) react more intensely to the oil shocks.

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