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THE IMPACT OF OIL PRICES ON THE TRANSPORTATION INDUSTRY STOCK RETURNS: THE CASE OF THE TURKISH EQUITY MARKET

Petrol Fiyatlarının Ulaştırma Sektörü Hisse Senedi Getirilerine Etkisi: Türkiye Hisse Senedi Piyasası Örneği

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Keywords:
Stock Returns, Crude Oil, ARDL Bound Test, Transportation Industry

JEL Codes:
D53, E44, G11

Abstract

This study examines the impact of crude oil prices on Turkey's transportation sector stock returns. For this purpose, ARDL Bound Test approach is utilized to investigate both long-run and short-run impacts. Research findings show that crude oil prices have an adverse impact on stock returns in the short-run since oil is a crucial input for transportation firms. However, in the long-run, increasing oil prices enhance stock returns in the sector. The oligopolistic market structure of the industry can explain this result. This study also investigates the impact of other factors on stock returns, such as macroeconomic activity, aggregate stock market performance, and global economic policy uncertainty. The results imply that transportation sector returns are also highly sensitive to macroeconomic and aggregate stock market performances. On the other hand, global economic policy has no significant impact on stock returns in the sector. Besides its academic contribution to the literature, the findings of this research offer precious practical implications for financial investors, industry stakeholders, and policymakers.

Anahtar Kelimeler:
Hisse Senedi Getirisi, Ham Petrol, ARDL Sınır Testi, Ulaştırma Sektörü

JEL Kodları:
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Öz

Bu araştırmanın amacı ham petrol fiyatlarının Türkiye'de ulaştırma sektörü hisse senedi getirileri üzerindeki etkisini incelemektir. Çalışma kapsamında ARDL sınır testi kullanılmış olup hem uzun dönem hem de kısa dönem etkiler irdelenmiştir. Araştırma bulguları, petrol fiyatlarının ulaştırma firmaları için en önemli girdilerin başında gelmesi nedeniyle kısa dönemde hisse senedi getirilerini olumsuz etkilediğini göstermektedir. Öte yandan, uzun dönemde artan petrol fiyatları sektördeki hisse senedi getirilerini artırmaktadır. Bu sonuç, sektörün oligopolistik piyasa yapısı ile açıklanabilir. Bu çalışmada ayrıca makroekonomik aktivite, hisse senedi piyasalarının performansı ve küresel ekonomik politika belirsizliği gibi diğer faktörlerin hisse senedi getirileri üzerindeki etkisini de araştırılmıştır. Bulgular, ulaştırma sektörü getirilerinin makroekonomik ve endeks performanslarına da oldukça duyarlı olduğuna işaret etmektedir. Öte yandan, küresel ekonomik politika belirsizliğinin sektör getirileri üzerinde anlamlı bir etkisi görülmemektedir. Yazına akademik katkısının yanı sıra, bu araştırmanın bulguları finansal yatırımcılar, sektör paydaşları ve politika yapıcılar için de önemli pratik çıkarımlar sunmaktadır.

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1. Introduction

Oil continues to be a major energy source in the world, accounting for %29 of energy consumption as of 2021, despite the rising proportion of natural gas, coal, and renewable energy sources (Enerdata, 2022). Due to the importance of oil, several studies have examined how oil price changes affect basic macroeconomic indicators.

Many studies examined in the literature have concluded that the shock in oil prices has a significant impact on the economy (Hamilton, 1983; Burbidge and Harrison, 1984; Gisser and Goodwin, 1986; Bohi, 1991; Mork, 1994; Goldfajn and Werlang, 2000; Hooker, 2002; Hamilton, 2003; Choudhri and Hakura, 2006; Kilian, 2008; Ilhan and Akdeniz, 2020). However, investigating how oil price changes affect financial markets is relatively recent (Catık et al., 2020; Akdeniz et al., 2021; Songur, 2021; Caporale et al., 2022; Kok ve Nazlioglu, 2022).

An increase in oil prices impacts production activity and corporate profitability, which impacts asset prices since higher oil prices raise production costs (Tsai, 2015). Hamilton (2008) described two primary channels of shock transmission when an oil price shock occurs in the market. The first channel is concerned with increasing marginal costs. According to this channel, an increase in the oil price results in increased production costs, lowering firm profitability and market prices. Higher energy costs, on the other hand, decrease oil consumption, affecting labor and capital productivity and reducing production (Tsai, 2015). The second channel is decreasing household demand for a firm's products or services. The increased energy cost affects household disposable income and, in particular, limits the amount that can be spent on goods and services. Therefore, the reduced consumption has a negative impact on the firm profitability for the high-energy consumer producers.

In line with the framework of Hamilton (2008), many studies find that the impact of crude oil prices on the stock market and returns is negative and statistically significant (Lee et al., 1995; Jones and Kaul, 1996; Sadorsky, 1999; Ciner, 2001; Hammoudeh and Choi, 2007; Bachmeier, 2008; Driesprong et al., 2008; Miller and Ratti, 2009). Although the mainstream view suggests that oil prices and equity values are adversely related, depending on the type of industry, the effect of oil prices on stock prices at the industry level is likely to vary due to many other factors (Mohanty and Nandha, 2011; Aggarwal et al., 2012). According to whether a certain industry is a net producer or consumer of oil, the impact of oil shocks on that industry may be beneficial or negative (e.g., Hammoudeh and Li, 2005; Nandha and Faff, 2008; Nandha and Brooks, 2009; Tsai, 2015; Catık et al., 2020). Aggarwal et al. (2012) noted that this impact is usually determined by the position of an industry's cost-side and demand-side dependence on oil (e.g., Gogineni, 2010). For instance, because oil is a major input, an increase in oil prices will decrease the profitability and cash flows of the transportation industry. In this situation, on the other hand, oil producers benefit from price increases through increasing revenues and cash flows. To conclude, the same situation may breed various effects for different industries.

The main motivation of this paper is to investigate the impacts of oil prices on Turkish transportation sector returns by examining long-run and short-run dynamics by utilizing an Autoregressive Distributed Lagged Model (ARDL) Bound Test approach of Pesaran et al. (2001). Turkey offers an interesting case for understanding oil prices and financial markets nexus. Firstly, as of 2018, above %87 of Turkey's domestic supply consists of importing (Catık et al., 2020). Among other emerging markets, the Turkish economy is highly dependent on oil imports. Secondly, the transportation industry is relevant to investigating the interaction between crude oil prices and the stock market. The transportation sector is one of the main energy users, especially oil-based energy (Aggarwal et al., 2012). So, it is an important industry where its input costs are highly dependent on crude oil prices. Thus, we believe that the transportation industry should reflect oil prices' impact on stock returns better than other net consumer industries.

Although this study aims to examine the impact of crude oil on transportation sector returns, some other variables may affect financial markets. Thus, we also add these variables to the research model to avoid omitted variable bias. Since the pioneering study of Sharpe (1964) on the Capital Asset Pricing Model (CAPM), the literature on finance theory suggests that aggregate stock market performance influences firm or industry returns.

Secondly, according to numerous studies, macroeconomic factors are significant in affecting stock prices (see Ewing et al. (2003) for further literature review). The most influential study on this topic was conducted by Chen et al. (1986) and it investigates the impact of macroeconomic variables on stock market returns. Their study shows that the changes in macroeconomic variables, especially output, are reflected in stock market returns. Stokes and Neuburger (1998) also confirm that macroeconomic activity plays a crucial role in asset pricing in the stock market.

Thirdly, the transportation industry is the main means of import and export; thus, it is expected that it should be highly related to global trade and economic conditions. Economic policy uncertainty causes instability in macroeconomic indicators, which affects stock prices (Riaz et al., 2018). According to Scott et al. (2016), economic policy uncertainty is one of the main reasons for declining investment, output, and employment in the US. Aizenman and Marion (1993) exhibit that macroeconomic performance is adversely influenced by policy uncertainty in developing countries. So, in line with the theoretical framework above, we also test the impact of the aggregate stock market, macroeconomic activity, and global economic policy uncertainty on stock returns.

2. Review of Literature

A few studies in the literature examine the impact of crude oil prices on stock returns in the transportation industry. For instance, Hammoudeh and Li (2005) analyzed the effect of oil price risk on US transportation industry stock returns. The findings show that oil price shocks have an adverse impact on stock return in the industry.

McSweeney and Worthington (2008) conducted a similar study on industry level data for Australia stock market. By using linear time series regression models, they analyzed how oil prices impact industry stock returns in Australia. The results show that oil prices positively influence on energy sector returns whereas negative impacts are observed for other industries such as banking, transportation, and retailing. A similar study on the US market is also conducted by Narayan and Sharma (2011). They provide evidence for the impact of oil prices on firm-level stock returns in 14 sectors in the US. The study of Narayan and Sharma shows that the direction and the level of oil price sensitivity of stock returns are industry-dependent in the US market. While energy and transportation sector firms get the most benefit from increasing oil prices, firms in other industries damaged from oil price volatility.

Nandha and Brooks (2009) conducted an international study that examined the relationship between oil price changes and transportation industry returns in 38 countries. Nandha and Brooks' study shows that increasing oil prices negatively influences transportation sector returns.

Interestingly, the results of Mohanty and Nandh's (2011) study show that the impact of oil prices on transportation firms in the US has a time and cross-section varying structure. According to Mohanty and Nandha (2011), oil shocks can have different effects on stock returns for a variety of reasons, including variations in cost structures, financial policies, diversification efforts, and hedging tactics among firms. Aggarwal et al. (2012) investigated the effect of oil price changes on US transportation firms. Their study confirms the inverse relationship between transportation sector returns and oil prices.

The study conducted by Catık et al. (2020) examined the time-varying impact of oil prices on 12 sectoral stock-market returns in Turkey. They used structural break tests and time-varying state-space models in their research. The findings of Catık et al. (2020) display that crude oil prices adversely influence stock returns in the transportation industry.

Kang et al. (2021) examine the impact of oil prices and economic policy uncertainty on US air transportation sector stock returns. They use both industry-level and firm-level data for analysis. By using a structural vector autoregressive model, Kang et al. (2021) show that oil prices and economic policy uncertainty have a negative influence on the returns of the air transportation sector.

Caporale et al. (2022) studied the dynamic impact of oil price shocks on sectoral stock returns in BRICS-T countries. They used structural break tests and state-space models with time-varying parameters. The results show that oil prices have a positive impact on energy sector stock returns. On the other hand, oil prices are adversely related to transportation sector returns in Turkey, China, India, and South Africa.

The abovementioned studies are rather valuable in understanding the nexus between crude oil prices and stock returns in the transportation sector. However, their main problem is that these studies only focus on the short-run impact of crude oil prices and ignore long-term relationships. Therefore, this study contributes to the literature by investigating both the long-run and short-run effects of crude oil prices on the sector.

3. Research Methodology

3.1. Data

This study uses monthly data of transportation sector stock market index returns (XULASR) as the dependent variable and four independent variables, which are average global crude oil prices (CO), industrial production index (IPI), global economic policy uncertainty (EPU), and national stock market index (XU100R), from January 2010 to June 2022. This study utilizes IPI as a proxy of macroeconomic activity, CO as oil prices, EPU as global economic policy uncertainty, and XU100 as the aggregate stock market. XULASR and XU100R are considered as logarithmic returns, while other variables are taken as natural logarithms. For CO, this study uses IMF's primary commodity prices database while Davis's (2016) estimation of the global economic uncertainty index is used for EPU. Lastly, IPI data is collected from the Turkish Statistical Institute database.

3.2. Econometric Models

Modeling time series data is problematic for econometrics because the existence of non-stationarity causes spurious regression problems. As a solution to this problem, many econometricians utilize differencing data in order to get stationary series. However, this act causes another problem which is called losing long-run relationships. Thus, cointegration is a useful tool for time series modeling that preserves the long-run information and examines the long-term relationships between integrated variables (Tokmak, 2020). In the econometrics literature, there exists a group of cointegration models such as Engle-Granger (1987), Johansen (1991), and Johansen (1995). However, these frequently-used cointegration test requires integration of order one, I(1), between series. Pesaran et al. (2001) offered a cointegration test, which is known as the ARDL Bound Test, that gives robust results and enables us to model the series that are either I(0) or I(1). For this reason, this study utilizes the methodology of Pesaran et al. (2001) cointegration test. Additionally, it is useful to generate an error-correction model using a straightforward linear transformation on the ARDL model since this approach enables us to model an unrestricted error-correction model without losing long-run information (Aslan, 2013).

ARDL Bound Test approach consists of three steps. The first step utilizes an Unrestricted Error Correction Model (UECM) to test whether a long-run relationship exists. This model is given below in Equation 1. The first equation tests the null hypothesis H_0: $\alpha_6 = \alpha_7 = \alpha_8 = \alpha_9 = \alpha_{10} = 0$ where there is not enough evidence to claim that a long-run relationship between the independent and dependent variables exists.

$$\begin{aligned} \Delta XULASR_t = \alpha_0 &+ \sum_{i=1}^{q} \alpha_{1i} \Delta XULASR_{t-i} + \sum_{i=0}^{p} \alpha_{2i} \Delta XU100R_{t-i} + \sum_{i=0}^{p} \alpha_{3i} \Delta \ln CO_{t-i} \\ &+ \sum_{i=0}^{p} \alpha_{4i} \Delta \ln IPI_{t-i} + \sum_{i=0}^{p} \alpha_{5i} \Delta \ln EPU_{t-i} + \alpha_6 XULASR_{t-1} \\ &+ \alpha_7 XU100R_{t-1} + \alpha_8 \ln CO_{t-1} + \alpha_9 \ln IPI_{t-1} + \alpha_{10} \ln EPU_{t-1} + \varepsilon_t \end{aligned} \tag{1}$$

The symbols in the equations above are explained as follows: q represents the autoregressive order of the dependent variable, p stands for maximum lags of independent variables, Δ holds for first order difference operator and λ symbol holds the error correction term. Lastly, the model parameters (e.g. $a_1, a_2, \ldots, a_n$) with difference operator represents short-run relationships where the others correspond to the long-run dynamics.

The second step of the ARDL Bound test approach starts after the rejection of the alternative hypothesis above. At this step, this study uses the model given in Equation 2 for determining long-run coefficients.

$$XULASR_t = \alpha_0 + \sum_{i=1}^{q} \alpha_{1i} XULASR_{t-i} + \sum_{i=0}^{p} \alpha_{2i} XU100R_{t-i} + \sum_{i=0}^{p} \alpha_{3i} \ln CO_{t-i} + \sum_{i=0}^{p} \alpha_{4i} \ln IPI_{t-i} + \sum_{i=0}^{p} \alpha_{5i} \ln EPU_{t-i} + \varepsilon_t \quad (2)$$ (2)

The third step is to estimate short-run dynamics. For this purpose, Pesaran et al. (2001) recommended an error correction method based on the ARDL model. So, the error correction model in 3 estimates short-run coefficients by adding error correction terms, which are basically lagged residuals of the estimated ARDL model above.

$$\Delta XULASR_t = \alpha_0 + \sum_{i=1}^{q} \alpha_{1i} \Delta XULASR_{t-i} + \sum_{i=0}^{p} \alpha_{2i} \Delta XU100R_{t-i} + \sum_{i=0}^{p} \alpha_{3i} \Delta \ln CO_{t-i} + \sum_{i=0}^{p} \alpha_{4i} \Delta \ln IPI_{t-i} + \sum_{i=0}^{p} \alpha_{5i} \Delta \ln EPU_{t-i} + \alpha_6 \lambda_{t-1} + \varepsilon_t \quad (3)$$ (3)

3.3. Preliminary Analysis

Before estimating econometric models, this part of the study exhibits preliminary analysis such as descriptive statistics, graphical presentation, and stationarity tests. For this, Table 1 and Table 2 present descriptive statistics and unit root tests, while Figure 1 exhibits sample graphics. According to Table 1, in the sample period, the transportation sector index outperformed the aggregate stock market in Turkey. However, the sector has experienced higher risk than general stock market. Turkey's macroeconomic performance seems to have exhibited relatively lower volatility in the sample period. On the other hand, crude oil prices and economic uncertainty worldwide have been very volatile and experienced severe shocks. Figure 1 also confirms this perspective with the European Debt Crisis (2010-2015), the Oil Market Crash of 2014, and lastly, the recent global pandemic of COVID-19 (2020-Ongoing) periods.

Table 1. Descriptive Statistics and Unit Root Tests

	CO	EPU	IPI	XU100R	XULASR
Mean	4.240400	5.137829	4.614267	0.010733	0.017733
Median	4.240000	5.088367	4.630000	0.010000	0.010000
Maximum	4.760000	6.080493	4.990000	0.170000	0.320000
Minimum	3.130000	4.442002	4.150000	-0.17	-0.29
Std. Dev.	0.355690	0.378218	0.197920	0.066858	0.110758
Skewness	-0.42009	0.340245	-0.14301	-0.08901	-0.0215
Kurtosis	2.474313	2.159628	2.408971	2.517658	3.160213
Jarque-Bera	6.138941	7.308067	2.694542	1.652160	0.171976
Probability	0.046446	0.025886	0.259949	0.437762	0.917605
Observations	150	150	150	150	150

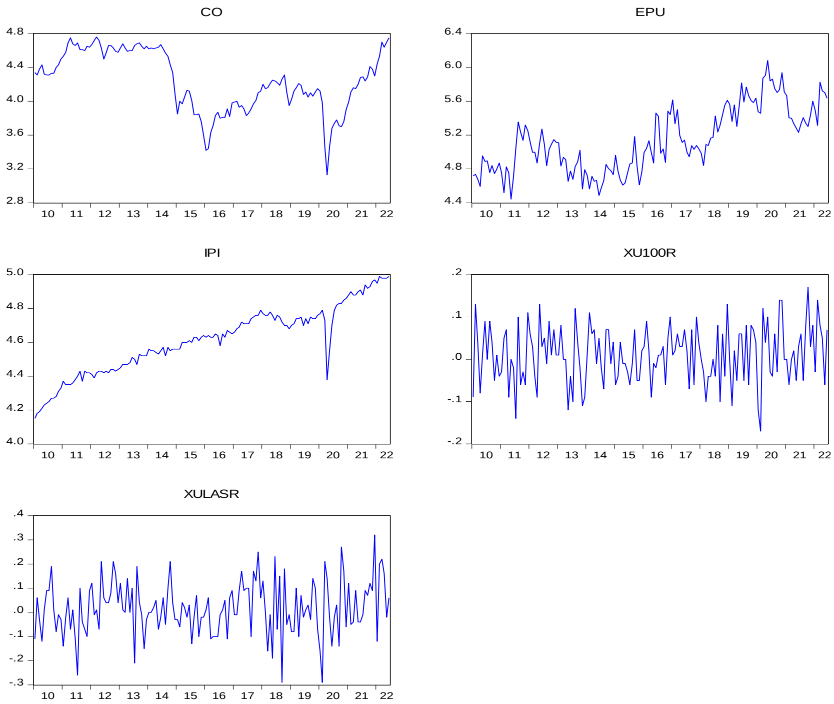

Figure 1. Sample Graphs

One of the most important assumptions of the ARDL Bound Test model is that the variables should not have an integration order higher than I(2). All research variables should either be I(0) or I(1). So, to test this assumption, this study utilizes the ADF unit root test of Dickey and Fuller (1979) and the PP unit root test of Phillips and Perron (1988). Test results in Table 2 show that research variables are either I(0) or I(1), and none of the variables have integration of order two.

Table 2. Unit Root Tests

Unit Root Test Table (PP)						
Level						
		CO	**EPU**	**IPI**	**XU100R**	**XULASR**
With Constant	t-Statistic	-1.5841	-2.7285	-1.4622	-12.678	-12.1496
	Prob.	0.4882	0.0716*	0.5501	0.0000***	0.0000***
With Constant & Trend	t-Statistic	-1.3636	-4.375	-4.4945	-12.92	-12.1885
	Prob.	0.8676	0.0032***	0.0021***	0.0000***	0.0000***
Without Constant & Trend	t-Statistic	0.1947	0.7776	3.8430	-12.266	-11.9361
	Prob.	0.7414	0.8802	1.0000	0.0000***	0.0000***
First Difference						
		d(CO)	**d(EPU)**	**d(IPI)**	**d(XU100R)**	**d(XULASR)**
With Constant	t-Statistic	-8.2307	-19.729	-19.699	-63.088	-103.51
	Prob.	0.0000***	0.0000***	0.0000***	0.0001***	0.0001***
With Constant & Trend	t-Statistic	-8.2095	-19.642	-20.154	-63.988	-102.868
	Prob.	0.0000***	0.0000***	0.0000***	0.0001***	0.0001***
Without Constant & Trend	t-Statistic	-8.2581	-19.163	-13.768	-63.512	-103.22
	Prob.	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***

Table 2. Continued

Unit Root Test Table (ADF)						
Level						
		CO	**EPU**	**IPI**	**XU100R**	**XULASR**
With Constant	t-Statistic	-1.5944	-1.6755	-1.0712	-5.14	-7.5286
	Prob.	0.4829	0.4416	0.7262	0.0000***	0.0000***
With Constant & Trend	t-Statistic	-1.309	-3.7509	-4.7129	-5.3302	-12.1629
	Prob.	0.8818	0.0220**	0.0010***	0.0001***	0.0000***
Without Constant & Trend	t-Statistic	0.1333	0.7290	2.6122	-4.6603	-3.814
	Prob.	0.7231	0.8711	0.9979	0.0000***	0.0002***
First Difference						
		d(CO)	**d(EPU)**	**d(IPI)**	**d(XU100R)**	**d(XULASR)**
With Constant	t-Statistic	-9.0325	-9.8482	-8.5232	-5.7047	-8.9524
	Prob.	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***
With Constant & Trend	t-Statistic	-9.0692	-9.8112	-8.499	-5.7503	-8.9388
	Prob.	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***
Without Constant & Trend	t-Statistic	-9.0578	-9.8218	-9.2037	-5.715	-8.9809
	Prob.	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***

Notes: (*) Significant at 10%; (**) Significant at 5%; (***) Significant at 1%.

4. Findings and Discussion

Table 3 summarizes bounds cointegration test results. Model specification is made according to Akaike Information Criterion and the most optimal order is determined as ARDL (1,0,1,0,0). The F-test statistic is higher than the upper bound (I(1)) at %1 significance level which implies that the null hypothesis is rejected. Bound cointegration test results show that there exists a long-run relationship between transportation sector returns and independent variables.

Table 3. Bound Cointegration Test Results

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	**Value**	**Sig.**	**I(0)**	**I(1)**
		10%	2.55	3.64
F-statistic	89.061	5%	3.01	4.22
k	4	1%	4.1	5.51

Since the existence of cointegration is exhibited, further ARDL Bound Test methodology procedures can be applied. The long-run and short-run coefficients are estimated and presented in Table 4. Before mentioning model findings, some diagnostic tests should be conducted.

First of all, three mostly used stability diagnostic checks are utilized. Ramsey's test (1969) results for specification problems show that the research model does not suffer from omitted variable bias (t-statistics: 1.70 with prob.: 0.0899 and F-statistics: 2.91 with prob.: 0.0899). After Ramsey's test, CUSUM and CUSUM of Squares tests are also conducted at %5 significance levels. Again, the results do not exhibit any consistent stability problem in the research model. Secondly, for the normality check of residual terms, the Jarque-Bera statistic is calculated, and the results show that model residuals are normally distributed (Jarque-Bera statistics: 2.27 with prob. 0.32). Thirdly, the existence of serial correlation is checked by using Breusch (1978) and Godfrey (1978) Serial Correlation LM Test and test results imply no autocorrelation between lagged values of error terms (F-statistics: 0.084 with prob. 0.919). The last diagnostic test is about the heteroscedasticity problem and is checked by utilizing Breusch-Pagan-Godfrey test (Breusch and Pagan, 1979; Godfrey, 1978). The test results on the heteroscedasticity check imply that model residuals have constant variance (F-statistics: 0.87 with prob.: 0.51).

Table 4. Long-run and Short-run Coefficients

Levels Equation (Long-Run Coefficients)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
lnXU100R	1.20767	0.1246	9.69125	0
lnCO	0.04236	0.0205	2.06693	0.041
lnIPI	0.08711	0.0425	2.05093	0.042
lnEPU	-0.00713	0.0226	-0.31496	0.753
ECM Regression (Short-Run Coefficients)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	-0.5251	0.0254	-20.6724	0
Δ (lnCO)	-0.1292	0.0644	-2.00558	0.047
λ	-0.9727	0.0455	-21.3974	0

Error correction term (λ) ensure two main assumptions. Firstly, it should be negative and this necessity is checked. Secondly, for evaluation of significance, error correction term should also be tested with a bound test as well. For this, t-test statistics belongs to lambda term is calculated as -21.39 and evaluated at %1 significance level. This value is higher than upper bound -4.6 in the absolute sense. So, the error correction model provides the necessary conditions and the error correction term is statistically significant.

Starting with long-run coefficients, the results show that global economic policy uncertainty has no significant effect on transportation sector returns in Turkey. These findings on the EPU variable indicate that global economic risks do not influence the stock returns of Turkey's transportation industry. These findings may be a signal for the industry's low degree of globalization, and the sector's characteristics may have shaped more nationalist rather than globalist. Thus, global economic uncertainty may not have any effect on stock returns since the firms in this industry perform their operations mostly on a national scale rather than a global scale.

Secondly, the results exhibit that IPI and XU100R variables have a positive and statistically significant impact on stock returns. Unsurprisingly, better macroeconomic performance enhances transportation stock returns in Turkey. Increasing macroeconomic activity creates more demand for the transport of goods and services. So, with the increasing demand for transport, both transportation fees and operational activity in this sector tend to rise. As a result, firm profitability and cash flows of the firms' increase, and afterward, this increased performance is also reflected in stock market returns. The findings on the IPI variable can also be supported by the impact of the XU100R variable on stock returns. As it is expected, aggregate stock market performance has a positive impact on stock returns in the transportation sector. The coefficient of this variable is estimated as 1.207. According to CAPM theory, since the beta coefficient is higher than one, it can be commented that the sector has a high sensitivity to overall stock market performance. To sum up, stock returns in the transportation sector have a positive and significant relationship with aggregate macroeconomic and stock market performance in the long-run.

The main purpose of this paper is to evaluate the impact of crude oil prices on stock returns in the transportation sector of Turkey. Crude oil is the most important factor among the research variables since it is the only variable affecting stock returns in the long- and short-run. The findings on crude oil-stock return nexus confirm previous findings in the literature which were discussed at the beginning. The previous literature mostly focused on short-run effects because many studies on crude oil-transportation stock return relationships utilized econometric models which are based on simultaneous effects. These studies found that crude oil prices adversely impact stock returns in the sector. The findings on the error correction model confirm the previous studies in the literature. As expected, in the short-run, the rising crude oil prices negatively influence stock returns in the transportation sector. The sector is the top net consumer of oil among other sectors. Oil consists of most of the operating costs of transportation firms. So, the increment in oil prices directly causes low firm profitability and operation results. Financial market actors behave proactively and reflect these expected unsatisfying performances to stock prices as fast as possible.

Now, turning the perspective from short-run dynamics to long-run cointegration relationships between crude oil and stock returns in the transportation sector, the results contradict with general views. According to Table 4, an increase in crude oil prices positively and significantly impact the stock returns of transportation firms. This finding may be explained in the following way. In the short-run, the negative effect of crude oil prices on stock returns is mostly inevitable due to the proactive behavior of investors described above and the production cost pressure of crucial inputs. However, these firms may be able to reflect their increased energy costs to service fees successfully or even unrestrainedly. Therefore, these increasing input costs benefit transportation firms in the long-run. Even so, this hypothesis requires further investigation, which is far beyond this paper's scope; the industry's market structure may explain it. The transportation industry has an oligopolistic structure. Cantos-Sanchez and Moner-Colnoques (2006) define the transportation sector as an oligopoly between private and public operators. In his study, Friedman (2001) points out the oligopolistic structure of the transportation sector with high barriers to entry, only a few corporates, and their oligopolistic pricing structure. There also exist contractionary views of neoliberalists such as Meyer (1964), who claims that with the liberalization process, the transportation industry will no longer be called a “natural monopolistic” industry in market economies. However, considering the high market entry barriers, the transportation sector can be called a natural oligopoly.

5. Conclusion

Despite the increasing popularity of natural gas, coal, and renewable energy, oil continues to be the top energy source in the world. Therefore, oil has been considered an important factor in macroeconomics and financial markets. Oil is one of transportation firms' most important inputs and sources of operation costs. Therefore, oil prices inevitably impact firm profitability and cash flows, hence, stock returns in the sector.

This study investigates the impact of oil prices on stock returns in the transportation industry with an ARDL Bound Test approach of Pesaran et al. (2001). The results show that crude oil prices adversely influence stock returns in the short-run whereas increments in oil prices enhance stock returns in the long run. The positive impact of crude oil prices in the long run could emerge because the transportation industry has high barriers to entry and thus, the market has an oligopolistic structure. This study also examines the effects of macroeconomic activity and aggregate stock market performances on stock returns. It concludes that both variables positively influence transportation sector returns in the long run.

This study offers precious practical implications for financial investors, industrial stakeholders, and policymakers. At first, the financial performance of transportation firms is highly sensitive to domestic economic conditions and national stock market performance. Therefore, financial investors should keep up with economic expectations more carefully and shape their portfolio investments. Since crude oil prices negatively influence stock returns in the short run, it will be wise to hedge this risk with crude oil derivatives. Traders may choose to control their risks continuously in this way. On the other hand, long-term portfolio investors do not need to apply these hedging strategies as their crude oil has a positive long-term impact on the sector returns.

This study analyzed stock return and crude oil price interaction at the industry-level. For further studies, the impact of crude oil prices on stock returns can be examined at the firm level. There could be some firm-specific factors that may shape these effects differently. Besides, the effect of transportation modes (airline, road, maritime, rail, pipeline, etc.) may also differentiate the relationships examined in this study. For instance, land transportation requires less fixed asset investments and has lower market entry barriers. Thus, the results of long-run interactions between stock return and the crude oil market may not be observed in this mode of transportation.

Declaration of Research and Publication Ethics
This study which does not require ethics committee approval and/or legal/specific permission complies with the research and publication ethics.

Researcher's Contribution Rate Statement
The authors declare that they have contributed equally to the article.

Declaration of Researcher's Conflict of Interest
There is no potential conflicts of interest in this study.

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