Examining the impact of oil price fluctuations on the development of the transport industry: macroeconomic determinants in GCC countries

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1 Introduction

The transportation sector is vital to the expansion and modernization of economies globally. However, its significance is most obvious in the Gulf Cooperation Council (GCC) nations, whose economies are highly influenced by the region's large oil reserves and subsequent commercial activity. Given the obvious link between oil prices and transportation, it's important to investigate the macroeconomic causes and outcomes of oil price changes on the growth of transportation in the GCC

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Abstract. The sample nations are particularly relevant since they exhibit a wide range of growth rates, significant financial system features, and stock market development. Not in terms of profits to investors (beyond the scope of our study), but rather in terms of growth compared to the size of these economies and the capital expenditure fund demands of those nations, the research examines the expansion of the equities market and analyzes its international economic impact. To our knowledge, no systematic comparison of Arab capital markets to the many financial systems of the East Asian Pacific region or the seven major Western economies has ever been carried out. In addition, there are no real-world instances of the benefits of stock market output for economic development in Arab nations.

While we survey the literature on the capital markets of 11 Arab states, including Bahrain, Saudi Arabia, Tunisia, Egypt, Jordan, Kuwait, Lebanon, Morocco, Oman, and Qatar, our data analysis study zeroes down on only KSA. The research uses an econometric method that covers 10 years (from 2008 to 2018) to analyze the effects of oil prices, currency rates, and stock market performance in Saudi Arabia.
2 Problem statement

Because they rely on oil exports, the transportation sector is crucial to developing the economies of the Gulf Cooperation Council (GCC) nations. However, there is a large link between oil prices and the growth of the transportation industry, which presents a major issue for these nations. The problem here is that the macroeconomic causes and impacts of oil price variations on the transportation sector in the GCC area are poorly understood.

The transportation sector is especially sensitive to oil price fluctuations because of their effect on gasoline prices. Companies providing transportation services in the GCC states are finding that rising oil prices are having a negative impact on their bottom lines. As a result, their profit margins may decrease, making it harder for them to provide competitively priced transportation services. When oil prices are low, transportation businesses may breathe easier due to reduced fuel expenses. However, they still need to be ready for the price of oil to fluctuate, which might have serious consequences for their capacity to plan.

Oil prices affect the transportation sector in more ways than just the price of gasoline. Indirectly, fluctuations in oil prices impact consumer spending and vacation planning.
Consumers may have less discretionary cash and fewer opportunities to travel due to rising oil prices and their subsequent influence on transportation expenses. The transportation sector may feel the effects of this falling demand in the form of lower revenues and threatened corporate survival. Conversely, cheaper oil might increase demand for transportation services and encourage more vacation travel.

Further, oil dependence and economic fragility are macroeconomic factors that affect the transportation sector in GCC nations. Public infrastructure projects, such as transportation networks, are substantially funded by oil income in the GCC economies. Because of this dependency, the transportation sector is vulnerable to fluctuations in the global oil market, affecting government finances and economic stability. Economic diversification and the pursuit of alternate income streams are urgently needed to lessen the transportation sector’s reliance on oil earnings and secure the sector’s long-term viability.

There is a shortage of research on the macroeconomic factors and impacts of oil price changes on the growth of the transport sector in the GCC region, even though several studies have examined parts of the link between oil prices and the transportation industry in this area. To develop policies and initiatives that strengthen the transportation sector’s resilience and sustainability in the face of oil price volatility, it is essential to understand the interconnections between these factors.

This study intends to fill that informational void by investigating the macroeconomic causes and outcomes of oil price changes on the growth of the transportation sector in GCC states. This research will help us better understand the transportation sector’s difficulties and possibilities by examining the effects of oil price variations on operational costs, consumer purchasing patterns, and travel habits. Policymakers, industry stakeholders, and academic researchers will benefit from the data by learning more about the importance of strategic interventions and regulatory frameworks in fostering the transport sector’s sustainable growth and development in the GCC area.

3 Empirical literature

3.1 Relationship between the exchange rate and the stock market

[9] analyzes the fluctuating connection between currency values and stock market returns in GCC states. The study uses a time-series analytic methodology to examine the short- and long-term impacts of exchange rate variations on stock market indices in the GCC area. The results show a clear connection between currency exchange rates and stock market performance, suggesting that exchange rate changes affect stock prices immediately and for some time. Potential ramifications for investors and politicians in GCC nations are highlighted, and the research also looks into how the connection runs.

[10] looks at the link between currency rates and stock market volatility in the GCC. The research analyzes volatility spread across the two markets using a Generalized Autoregressive Conditional Heteroscedasticity (GARCH) multivariate framework. Results show that exchange rate shocks may significantly affect stock market volatility and vice versa, proving the existence of volatility spillover effects. The research also finds evidence of asymmetry in volatility transmission, with negative shocks having a more pronounced impact on volatility than positive shocks. The findings are instructive for GCC nations’ risk management and investment strategies.

[11] analyzes the correlation between GCC nations’ exchange rates and stock markets, focusing on the underlying macroeconomic factors. Using an econometric model, the authors of this paper analyze how interest rates, inflation, and GDP growth affect the correlation between currency exchange rates and stock prices. According to the data,
3.2 Relationship between oil prices and the stock market

[3] examines the dynamic connection between oil prices and stock market performance worldwide. This study uses a large dataset and sophisticated econometric methods to analyze oil price variations' short- and long-term impacts on stock market indexes. The results show a clear correlation between oil prices and market performance, suggesting that oil price fluctuations affect stock prices both immediately and over the long term. The research investigates the processes at play in this connection, looking at the role played by oil-dependent industries, inflationary pressures, and investor sentiment. These findings have important implications for investors, governments, and market players as they provide light on the intricate relationship between oil prices and stock markets.

[8] explores the global ripple effects of volatility in oil prices and stock markets. The research utilizes a multivariate GARCH framework to investigate the volatility transmission between the studied markets. The results show that large volatility spillovers do occur, suggesting that oil price shocks might significantly affect stock market volatility and vice versa. Additionally, the asymmetry of volatility spillovers is investigated, with the findings indicating that negative shocks have a more dramatic influence on volatility than positive shocks. Insightful for risk management and portfolio diversification, the results add to our knowledge of the relationship between oil and stock markets.

[7] analyses the factors affecting the correlation between oil prices and stock market performance in a few nations' economies at the macro level. The research used an econometric model to investigate the influence of GDP growth, inflation, and interest rates on the oil price-stock market nexus. The results show that macroeconomic factors heavily influence the link, underscoring the significance of economic fundamentals in understanding oil prices and stock market dynamics. The findings are helpful for policymakers and investors because they explain what factors influence the correlation between oil prices and stock markets and give recommendations for handling financial portfolios in oil-dependent nations.
examines the connection between oil prices and stock market returns, focusing on the impact of investor emotion. Using statistical modeling and sentiment analysis methods, this study investigates how changes in investor sentiment affect the degree and direction of the correlation between oil prices and stock market performance. According to the data, investor mood plays a crucial role in determining the strength of the correlation between oil prices and stock market returns. For investors and policymakers wanting to understand better and negotiate the turbulent link between oil prices and stock markets, the research highlights the necessity of incorporating psychological elements.

looks at the link between oil prices and stock markets throughout global financial crises to see whether there is any evidence of financial contagion. This research uses event study methodology to examine the impact of oil price shocks on stock markets and the broader economy throughout different crisis periods. Significant contagion effects are shown, shedding insight into the interconnection and susceptibility of financial markets during crises. The research also investigates how policy interventions, including those taken by the central bank or regulators, can reduce the negative effects of oil price shocks on the stock market. Understanding the mechanics of contagion between oil prices and stock markets is crucial for policymakers and market players, and this study's findings provide light on the need for risk management during uncertain times.

4 Methodology

In this part, we will discuss the secondary and academic data used in the research. This study did not make use of primary data. Several selection criteria were used to compile the final sample. The time series’ dimension represents one or more variables’ data throughout time. Our KSA data is drawn from the DataStream database on the first of each month, beginning in January 2008 and ending in April 2018. This includes regression, oil prices, and indexes. The variables were aggregated and used as panel data, including time series measurements and cross-sectional statistics, except for market indices. The information we used in our experiments was gathered every week during the length of the relevant decade. The data is pulled from Bloomberg on the first of the month.

Data collected at a single moment and consisting of two or more variables are called cross-sectional data. Each observation number in this analysis corresponds to a specific index representing the units of interest.

5 Results

5.1 Market Return Trends from 2008 to 2018

But this graph also shows that market returns plummeted from $10,000 in 2008 to $4,500 in 2009, bouncing to $6,800 in 2010 before returning to $5,000 this year. In 2014, market returns hit an all-time high of 11,000. Throughout the time frame under review, we see several swings in the pattern of oil prices. The global reduction in oil prices in 2015 and 2016, owing mostly to political causes (primarily due to a dispute between KSA and Iran), was the most significant event between 2008 and 2018. Similar to the price of any other commodity, oil is subject to sudden shifts in supply and demand. Many factors (politics, gold price, growth of renewable energy...
sectors, etc.) might affect oil prices. We shall not get into the specifics of these many motivations here. The return on the Saudi Arabian stock market is heavily influenced by Brent pricing. Upon closer inspection, it becomes clear that the two graphs above follow the same trend.

The following graph represents the D series of adjusted oil prices, which analyzes the variation between periods n and n-1.

Following a data transformation, we used stationary Brent oil price data, as well as stationary Rial-US Dollar exchange rate data, interest rate data, government consumer spending data, and foreign direct investment data, to construct a model that we believe adequately explains and rationalizes the relationship between the stock market return in KSA and the other dependent variables.

The years 2008-2018 are the focus of the model's analysis, as was previously noted. The information is gathered weekly from sources including Bloomberg and the World Bank.

The regression above analysis aims to examine the effect of variables such as oil prices, currency rate, interest rate, government expenditure, and FDI on stock returns in KSA. With an adjusted R squared of 69.5%, it may be concluded that the included independent variables account for that percentage of variation in the dependent variable. Since many other factors (political, legal, ownership, etc.) might be added to this model to explain the swings of the dependent variable further, this proportion is regarded as adequate.

Instead of using the R squared value, which would be inflated owing to the chance of the coefficients intersecting, the adjusted R squared value is utilized. The remaining 31.5% of the variables' explanations are related to sampling error; these variables were either not included in our model or were found to be outliers in the data.

The F test may be used to assess the validity of the underlying model by comparing the null hypothesis (H0) with the alternative hypothesis (H1), where the latter says that the model is credible since at least one of the coefficients is not equal to zero. With an F-test of 0.00000, much less than 0.5, we know this model is robust.

The T-test was employed to determine the dependability of the variables. Assuming that the variable's coefficient is equal to zero (H0) and that it is not (H1) will be the two alternative hypotheses to test. H1 is accepted, and H0 is denied since the T-test of all dependent variables is less than 0.05. This ensures that the model's selected variables are valid.

Fig. 1. D Oil Prices

5.2 Module
Furthermore, while doing the T-test, the coefficient is divided by the standard error, leading to the following observations:

$$\frac{49.8}{1.63} = 30.17; \text{ Oil Price}$$
$$\frac{6650.30}{32442.20} = 0.204; \text{ on the exchange rate}$$
$$\frac{75}{15} = 4.99; \text{ Libor Interest Rate}$$
$$\text{Investment Abroad}: \frac{75.16}{15.9} = 4.72$$

To calculate government spending, divide $437 by $15.

The dependent variable seems to correlate with the independent factors positively. T-test values under 2 indicate a substantial link between oil prices, interest rates, government expenditure, FDI, and stock returns. The T-test result for the correlation between exchange rates and stock returns was more than 2, indicating no such correlation exists.

5.3 Vector Autoregression (VAR)

As was previously said, our research uses the vector autoregression method since all dependent and independent variables influence each other. Impulse response graphs visually show this connection.

The above VAR analysis graphically depicts the relationship between the dependent and independent variables using coefficients, standard deviations, and T-statistics.

The coefficient of market returns concerning the exchange rate is 2.32, with a standard error of 5.1 and a T-test result of 4.56, all of which are more than 2, indicating statistical significance. This suggests that currency rates impact the market return of 2.32%.

In contrast, the negative association between oil prices and market returns was calculated with a coefficient of -1.89 for MR ($1), a standard error of -3.6, and a T-test result of -5.29.

However, VAR demonstrates an inverse association between market return and interest rate with a T-test value of -3.01, indicating a 2.19% negative correlation. Interest rates have a negative relationship with market returns.

In addition, as the T-test result is less than 2, VAR indicates no connection between government expenditure and market returns.

In addition, the T-test result of 4.31 between oil prices and market returns from VAR analysis indicates a proportionate link between these two variables at 11.85%. The T-test result for the correlation between oil prices and government expenditure was 2.05, implying a proportionate association between the two variables (with government spending influencing oil prices by 1.08%).

However, VAR also demonstrates a proportionate association with oil prices and interest rates, as seen by T-test results of 14.4 and 10.8, and an inverse link between exchange rate and market return, with scores of -2.07 and -7.22, respectively.

Since the T-test results for interest rate and market return, and government expenditure are 4.20 and 8.31, respectively, a proportionate link between these three variables is evident from VAR.

6 Contributions

This research delves deeply into how oil prices affect the performance of stock markets in GCC nations. It provides a comprehensive view of the interplay between the two variables by considering the short- and long-term impacts, volatility spillovers, macroeconomic causes, investor sentiment, and financial contagion.

The study provides strong empirical evidence of the connection between oil prices and stock markets via sophisticated econometric methods, including time-series analysis,
multivariate GARCH modeling, and event studies. The results are trustworthy and precise since they are based on massive databases. The research focuses on the GCC states, delivering findings and ramifications tailored to this area. The study provides essential insights adapted to the particular context of the GCC area, given the major dependence of GCC economies on oil earnings and the distinctive features of these nations, such as oil dependency and economic diversification attempts. Several groups might benefit greatly from the research’s policy implications. Findings may help policymakers enhance economic stability by reducing the detrimental effects of oil price changes on stock markets. Investors may benefit from tracking the price of oil to inform their asset allocation, risk management, and investing choices. Financial institutions and fund managers, among other market players, might benefit from a deeper familiarity with the dynamics between oil prices and stock markets. This research provides useful information for anyone hedging their oil and stock market investments. The findings of this study enlighten stakeholders about risks and give recommendations for establishing effective risk management frameworks and investment strategies by detecting volatility spillovers, financial contagion effects, and the influence of investor emotion. The findings pave the way for more study and research. There are many areas where our understanding of the connection between oil prices and stock markets could benefit from further investigation; these include the role of specific macroeconomic determinants, the impact of geopolitical factors, and the influence of different market conditions.

References


