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Oil Price and Composite Risk Exposure within International Capital Asset Pricing Model: A Case of Saudi Arabia and Turkey

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Abstract: The aim of this study was to investigate and compare investment opportunities in the financial markets of Saudi Arabia, a net oil-exporting country, and Turkey, a net oil-importing country, in the Middle East. The international capital asset pricing model (ICAPM) was extended by considering local factors proxied by country risk (CR) and oil price risk exposures of the excess returns of Saudi Arabia and Turkey. In this study, we employed the extended ICAPM in a two-state Markov-switching setting for the sample period of January 2005 to December 2018 to explore whether the risk premium is time-varying. The results suggested that systematic risk is time-varying depending on the state of the financial markets and is affected by both global and local factors. Saudi Arabia offered higher excess returns during the high-volatility regime compared to that of the World Index and enjoyed higher returns during the low-risk regime from oil price shocks. Turkey was negatively affected by oil price shocks and was rather sensitive to the country's risk factor, which varied with both the state of the market and the time factor. These findings will be useful to international investors in diversifying their risks. This study differs from others in estimating the risk premium (beta) by taking into account both the local and global factors and the dynamic nature of systematic risk.

Keywords: international CAPM; Markov-switching model; oil price risk; country risk

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1. Introduction

The slowdown in global economic activity over the last two decades, particularly since the 2007–2008 global financial crisis (GFC), has accelerated the flow of funds towards financial markets with higher international investment opportunities. Thus, examining exposure to various risks plays an important role in correctly measuring the riskiness of an asset. Although a large body of literature has established a negative link between oil price shocks and economic activity, as pioneered by [1,2], the associated global relevance of energy commodities is largely responsible for the potential transmission of information within the market spectrum. According to the finance literature, asset prices are affected by factors that influence expected cash flows [3,4]. Therefore, an increase in crude oil prices will lead to an increased cost of production that will, in turn, lower profits and stock prices [5]. The empirical literature also distinguishes between net oil-exporting and net oil-importing countries with respect to the impact of oil price shocks. While an oil price shock (oil price increase) is expected to positively affect net oil-exporting countries through higher oil export revenues, the reverse is suggested for net oil-importing countries as aggregate output falls due to depressed consumption and investment [6–9]. On the other hand, according to [10], extra benefits accrued by oil-exporting countries due to higher oil prices can significantly be channeled elsewhere in the world.

Despite the recent economic, financial, and political distress, globalization and financial development have played an important role in directing portfolio investment towards emerging markets. The Middle East is one of such newly developing investment destination regions, on which the research is limited. Particularly, Saudi Arabia and Turkey attracted large capital flows during the sample period as their capital accounts have been gradually liberalized [11,12]; however, they have also exhibited some economic, political, and financial instabilities, characterized by their country-specific risk factors. As noted in [13], Saudi Arabia and Turkey are also two main powers in the Middle East which have strategic relations with the US, the European Union, Russia, and China. However, the sampled countries are segmented from developed and other emerging markets, which is an important feature of portfolio diversification in international investment decisions. In other words, according to the finance literature, although high risk is associated with higher expected returns, their low correlations with each other and other markets are important for portfolio diversification [14]. Based on these features of the sampled countries, in this study we augmented the Markov-switching international capital asset pricing model (MS-ICAPM) by including macroeconomic variables, oil price changes, and a composite country risk (CR) index to correctly measure the riskiness in these two emerging markets in the Middle East.

Consequently, in this study we investigated and compared the investment opportunities in Saudi Arabia, an important net crude oil-exporting country, and Turkey, a net oil-importing country, whose economic activity is largely dependent on oil imports. With this research, we aimed to fill the gap in the theoretical and empirical literature in several ways. First, we aimed to extend the conventional ICAPM via the inclusion of the oil price and the composite country risk factors in order to correctly measure the systematic risk. Second, we relaxed the assumption of a constant beta over time by employing a two-state Markov-switching model to allow for dynamic behavior of systematic risk over time based on the state of the economy and the financial markets. Third, we explored and compared the investment opportunities in these two countries which play important roles in the region. To the best to our knowledge, no other studies have addressed the oil price and country risk exposured of these countries in the Middle East from this perspective.

2. Literature Review

2.1. Link between Oil Price Movements and Stock Prices

Based on the theoretical finance literature, as mentioned above, asset prices are determined based on expected cash flows from the asset. Hence, any factor that affects the expected cash flows will be transmitted to the stock prices. An increase in oil price leads to a higher cost of production and lower profits and stock prices. There is a large body of empirical literature investigating the link between oil price movements and stock returns. Recent empirical findings on the relationship between oil price movements and stock returns have shown mixed results. Researchers reporting a negative relationship between oil price shocks and stock returns include [15–21]. In addition, the link between oil price shocks and stock markets in 22 emerging economies has been evidenced to be sensitive to the intensity of energy consumption; economies with higher levels of energy consumption were more sensitive to oil price shocks [22].

The literature also distinguishes between the origins of oil price shocks, classifying them as demand- or supply-side shocks [10]. Although there is a consensus among researchers that the origin of oil price shocks are important in the analysis of the link between oil price movements and stock prices, authors of [23] showed that only the precautionary-demand shocks have a negative impact on US stock returns and are more important than supply-side shocks. In contrast, they also revealed evidence of a positive association when the rise in oil prices originates from an unanticipated increase in global demand. Other research in support of this result include [24].

Many, other studies have also reported a positive association between oil price shocks and stock prices. For instance, a study on the Gulf Cooperation Council (GCC) countries that report a positive link between oil price shocks and stock returns include those presented in [25]. In addition, a positive effect of oil price shocks on the stock markets of GCC countries was reported, except for Saudi Arabia [26]. On the other hand, for the GCC countries, the authors in [27] report that a positive oil shock benefits most GCC markets. The authors also found that the largest portions of the total variations in GCC index returns came from countries' own domestic or regional shocks. With the exception of the oil price factor, which accounts for 19% of the stock market variation in Saudi Arabia, global factors account for a relatively small percentage of the variations based on variance decomposition analysis. In addition, a study reported that a portfolio strategy based on absolute risk exposure to oil price variations yielded significant positive returns in net oil-exporting countries, particularly in Saudi Arabia. [28]. In an assessment of the oil price risk exposures of the financial and non-financial subsectors, [29] found that the degree of oil price sensitivity was higher for non-financial subsectors than for financial sectors. In a sectoral analysis for Saudi Arabia, authors in [30] reported a positive impact of oil price shocks on the banking/financial and the agricultural/food sectors under a stable regime but a negative impact on the industrial sector under a recession regime. On the other hand, [31] was among the earliest works that could not establish a link among oil and stock returns.

2.2. Capital Asset Pricing Model

The capital asset pricing model (CAPM), first introduced in [32], provided a means of quantifying the tradeoff between risk and the expected return of an asset. Accordingly, the expected return of an asset over the risk-free rate must be positively and linearly related to the co-movement of its return with the return of the market portfolio, measured by beta, called the systematic risk. The model has been extensively used in empirical finance; however, it has provided mixed results, for which has been criticized for various drawbacks regarding aspects such as the efficiency of the estimated beta, the validity of the model's assumptions, its linearity, and its dependence on one factor, e.g., see [33–35]. Several proposed modifications include relaxing the underlying assumptions of the model and extending the model by adding firm-specific characteristics as explanatory variables, among many others. Recently, many researchers have attempted to improve the model by allowing beta to vary over time or space. For instance, [36] developed a new hierarchical methodology for estimating a multi-factor dynamic asset-pricing model. The author showed that their approach led to consistent estimators of the risk premiums and the factor loadings. Another study, presented in [37], argued that the stock market is an imperfect proxy for the true market portfolio as it excludes other components of wealth such as bonds, commodities, and properties, resulting in biased estimates of beta [38]. Another study investigated the perception of a low beta low risk relationship in the CAPM by testing whether the liquidity risk can explain the beta premium [39]. The authors provided evidence that liquidity risk has a significant role in explaining the beta premium for the cross section of stock returns and concluded that low-beta stocks may not necessarily be less risky if exposed to high liquidity risk. On the other hand, a recent research attributed the empirical findings indicating a low beta, high return relationship to omitted factors from the model [40].

Another important direction of extension of the CAPM model is the international capital asset pricing model (ICAPM), which is based on the assumption that international finance theory is a mirror image of domestic financial theory [41] The ICAPM augments the CAPM with each country's index returns, the world index returns, and the global risk free rates, thereby accounting for the world market portfolio rather than the domestic market portfolio. The modern portfolio theory shows that specific risks can be removed by considering the portfolio diversification strategy, whereas the systematic risk that can arise based on other factors such as war or economic recession cannot be avoided. With the same spirit, the ICAPM can be used in assessing the risk premiums across countries and help determine investable emerging markets for portfolio diversification. Therefore, in practical use, the ICAPM has become popular in stock selection and portfolio diversification, enabling investors to choose among two assets with similar characteristics in different countries.

The combination of the two strands of literature related to the link between oil price movements and stock returns and the ICAPM model, extended by means of macroeconomic models, may be useful in explaining the asset risk premium, as oil price fluctuations may influence the expected cash flows of assets. Furthermore, although the empirical evidence suggests various reasons for the inconclusive findings regarding oil price shocks and stock market premiums, one reason for this result may be the existence of a nonlinear relationship that depends on the state of the economy. This implies the inadequacy of the approaches used in such analyses. For instance, in the finance literature, researchers such as [42–44] argue that systematic risk (beta) may be time-varying rather than constant. Second, emerging markets may be exposed to other risk factors that were not accounted for in the analysis. For instance, authors of [45] claimed that political, financial, and economic risk components make up the country risk, and is the key source of local factors that can account for both projected gains and the variations in market performance between nations. Both [46,47] highlighted the importance of country-specific information in determining worth of persistent vulnerability.

3. Role of Oil Prices in Saudi Arabia and Turkey

Crude oil prices witnessed a radical change after the 1973 oil production cuts enforced by the Arab members of the Organization of Petroleum Exporting Countries (OPEC). The supply disruptions continued until 1990 and were triggered by political events in the region. There was unprecedented volatility in oil prices as a result of such supply disruptions, accompanied by an increase in demand for oil caused by numerous factors such as an increase in energy consumption; the growth of Asian markets, especially in China; and competition among oil-exporting nations. However, according to [10], the growing demand for oil was the major contributor to oil price fluctuations, rather than supply disruptions. Observing recent developments in the oil market, the International Energy Agency [48] reported that demand for oil showed a steady increase in 2018, whereas on the supply side, infrastructural constraints in the US, economic and political events in Venezuela, Libya, and Iran have been factors affecting oil supply. Additionally, attacks on oil tankers and processing infrastructure in the Middle East have been noted as important risk factors for oil supply in the Middle East. Owing to such developments, the demand for crude oil is relatively stable in the oil market, whereas the supply factor drives oil price volatility. For instance, in 2014, Brent crude oil was sold at a peak of USD 110 per barrel over a considerable period of time. The price declined to less than USD 30 per barrel in January 2016. A similar trend occurred in 2018, with the price of the commodity (Brent crude oil) that was traded at USD 86 per barrel in the month of October 2018 falling by about 40% at the end of the year. Oil prices began to rise again in 2019, following a substantial decrease in OPEC production.

Saudi Arabia is the world's leading exporter of crude oil and is a notable member of OPEC. The country's oil exports have consistently increased over the years, in parallel with increments in its crude oil output. For instance, its oil production in December 2017 was 6968.319 barrels per day, and it increased to 7371.537 barrels per day in December 2018 [49]. Moreover, in 2018, the share of oil production in Saudi Arabia was reported to be 42% of total production in the Middle East. As a major net oil-exporting country, historically, Saudi Arabia has relied heavily on crude oil as its main source of revenue, accounting for nearly 70% of the country's budget revenues. According to the Organization of Petroleum Exporting Countries (OPEC), the oil sector accounts for approximately 45 percent of the total GDP and 90 percent of the total export earnings of Saudi Arabia. Crude oil exports by Saudi Arabia in 2008 constituted 48% of its GDP, and the lowest share recorded was 17% in 2016. The deterioration of the share of oil exports within the GDP was related to the significant drop in crude oil prices that engulfed the international oil market in 2016.

Hence, in 2016, Saudi Arabia launched its 2030 vision to diversify its economy to reduce its dependence on oil fluctuations and to stabilize the economy [50].

Because of the Turkish economy's reliance on oil and natural gas imports, the country's economy has increasingly remained exposed to the volatility of lubricant and gas costs in the international marketplace [51]. Specifically, with the exception of oil consumption fluctuations between 2008 and 2011, oil consumption in Turkey has continued to increase since 2012 by thousands of barrels per day, thus yielding an increase of 3.8% between 2007 and 2017. Similarly, the oil consumption per day (in thousands of barrels) equally increased by 4.8% between 2007 and 2017 in Saudi Arabia [52]. However, the oil imports of Turkey were observed to be around 4.0 % and 2.8% of GDP for the years 2008 and 2010, respectively [53].

Nevertheless, in both cases of net oil-exporting and -importing countries, vis-à-vis, Turkey and Saudi Arabia, the impact of global oil price fluctuations and the respective composite country risk ratings cannot be overlooked.

4. Data and Methodology

4.1. Data

In this study, we examined the exposure of asset returns in Saudi Arabia and Turkey to oil price fluctuations and composite country risks in the assessment of investment opportunities in these emerging markets. We used monthly stock price indices for each country, the Brent crude oil price (spot price) index, the global stock price index, and the Morgan Stanley Capital International (MSCI) World Price Index, to provide a proxy for the market index, all of which were sourced from the Thomson financial datastream. The three-month United States Treasury Bill percentage, a representation of the zero-risk level, was attained from the FRED II database. These variables are calculated in US dollars to capture currency risk. The country risk variable is a composite risk rating, composed of a 50% influence of the vulnerabilities associated with politics, 25% of trade and industry, and 25% of monetary threat scores, which was obtained from a global risk source, i.e., the ICRG. The composite vulnerability rating was scaled from 0 to 100, with 100 representing a high level of creditworthiness and vice versa. The sample period was from January 2005 to December 2018. In addition, we included the VIX index, published by the Chicago Board Options Exchange (CBOE), which was applied to calculate the stock market instability derived from the option prices of the S&P 500 index. An increase in the VIX index indicates higher volatility or risk in financial markets. The equity market volatility index (VIX) was obtained from Yahoo Finance. Figure 1 presents the stock price indices of Saudi Arabia, Turkey, the World Price Index, and the Brent oil price, denominated in US dollars. The stock price index of Saudi Arabia showed a sharp and persistent increase at the beginning of 2006 and exhibited a volatile fall until 2009. For Turkey, although we observed a steady upward trend in its stock price index, it showed fluctuations over the entire sample period. The World Price Index showed a fluctuating upward trend after 2009. Oil prices fluctuated until 2007 and sharply increased in 2008. All the series were affected mainly by the GFC during 2008–2009.

As observed in Figure 2, the excess stock returns of Saudi Arabia, Turkey, and the World Price Index were highly volatile during the 2008–2009 financial crisis. Brent oil prices also exhibited high volatility over the sample period, with a sharp fall during the 2008–2009 period.

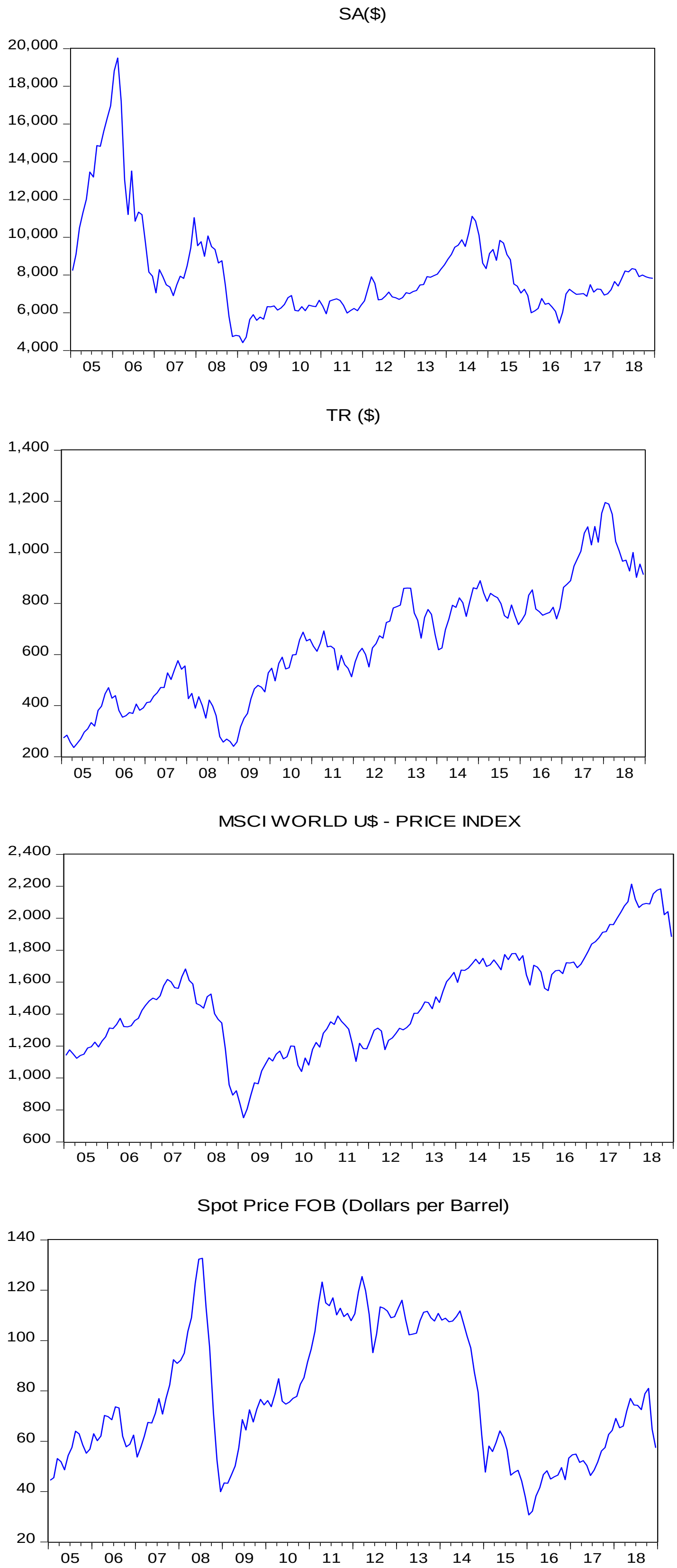
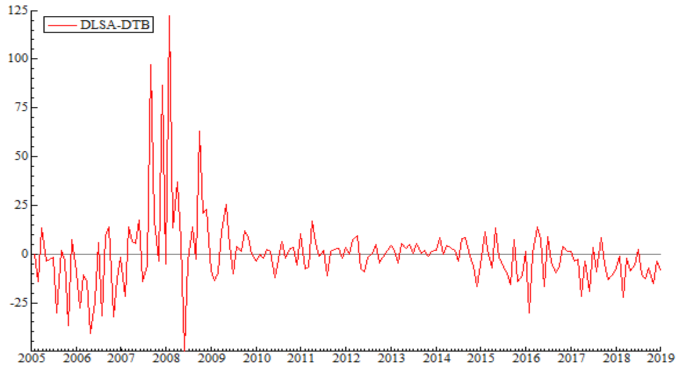
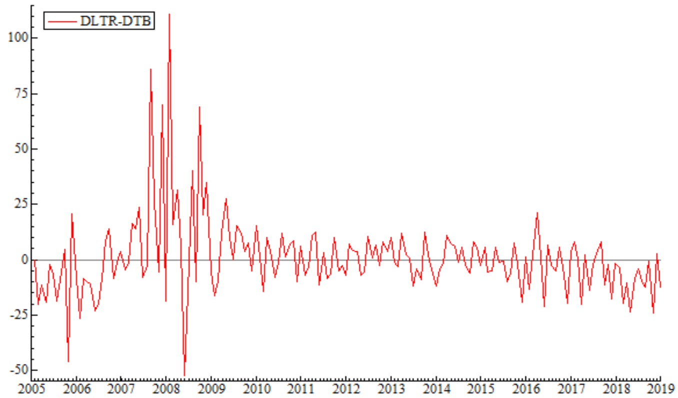


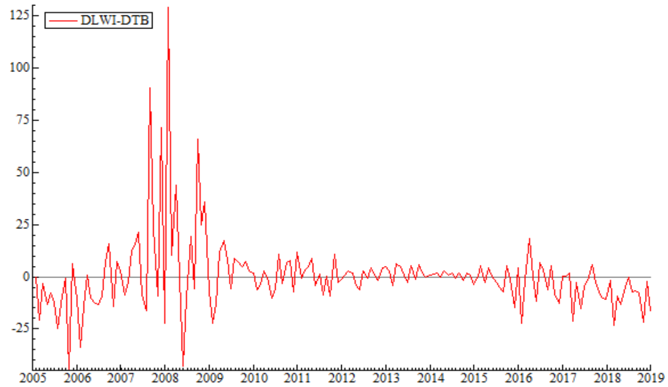
Figure 1. Stock price indices and the Brent Oil price: January 2005–December 2018.



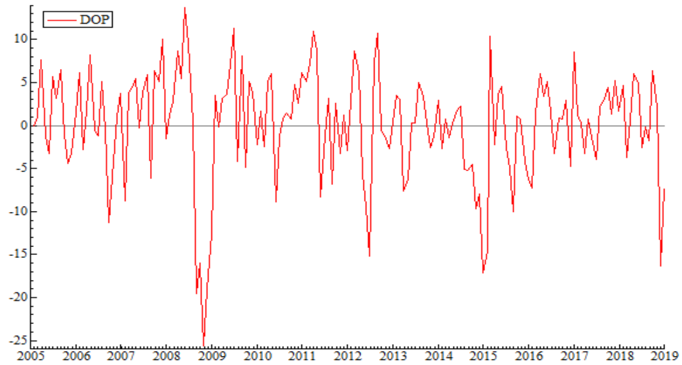
Saudi Arabia



Turkey



World Price Index



Brent Oil Price Changes

Figure 2. Stock price returns and Brent oil price changes: January 2005–December 2018.

4.2. Methodology

The basic ICAPM, first proposed in [41,54,55], was derived by calculating the excess returns of country *i* and the market rate over the risk-free rate, which can be expressed by the following model:

$$R_{it} - R_{ft} = \alpha_i + \beta_i \left(R_{mt} - R_{ft} \right) + \varepsilon_{it} \tag{1}$$

Thus $i = 1, 2 \ldots$ n, $t = 1, 2 \ldots$ T and $\varepsilon_{it} \sim iid$ N (0, σ^2). In this equation, R_{it}, R_{mt}, and R_{ft} denote the index return of country i, the market return represented by the world index return, and the zero-risk yield, respectively. Equation (1) can be compactly represented as follows:

$$r_{it} \;=\; \alpha_t + \beta_i r_{mt} + \varepsilon_{it} \tag{2}$$

where the coefficient of beta is the systematic risk of each country, which depends on high- and low-volatility regimes [56]. In order to allow switches between two regimes, we adopted the Markov-switching model of the ICAPM (MS-ICAPM), which can be represented in the simplest form as follows:

$$r_{it} \; = \alpha_{St} + \beta_{St} r_{mt} + \varepsilon_{it} \tag{3}$$

where $\varepsilon_{it} \sim N(0,\ \sigma^2_{St})$.

In (Equation (3)) S_t is the unobserved state variable that evolves according to the first-order Markov-switching process described by [57]. The coefficient of beta is the systematic risk of each country which depends of high and low volatility regimes [55,58].The following are the definitions of the stable and unstable financial markets' two systems:

$$\mathrm{S_t} = 0,\ 1 \;\; \begin{cases} if\ \ \mathrm{S_t} = 0 \\ \\ if\ \ \mathrm{S_t} = 1 \end{cases} \tag{4}$$

where the higher-volatility regime is determined based on the estimation of σ^2_{St} based on Equation (3).

The transition probabilities moving from state *j* in one period to state *i* in the next period depend on the previous state, as follows:

$$\mathrm{P_{i\,|\,j} = P[S_{t+1} = I\,|\,S_t = j],\ i{,}j = 0, \ldots\ S\text{-}1} \tag{5}$$

The transition matrix of probabilities for S = 2 is

$$P = \begin{pmatrix} P_{0|0} & P_{0|1} \\ P_{1|0} & P_{1|1} \end{pmatrix} \tag{6}$$

Thus, $0 \le \mathrm{P_{0\,|\,0,}}\ \mathrm{P_{1\,|\,1}} \le 1$ and the conditional probabilities in each column sum to 1. For instance, let $P[s_{t+1} = 0 | s_t = 0]\ = p$; then, $P[s_{t+1} = 1 | s_t = 0] = 1 - p$ and $P[s_{t+1} = 1 | s_t = 1]$ = q. Then, $P[s_{t+1} = 0 | s_t = 1]$ = $1 - q$. The Markov-switching pattern assessment process has been widely described in the literature [57,59,60].

For our purpose, we augmented the ICAPM in Equation (3) by including two factors, the oil price return and the composite country risk rating (CR), with the addition of the VIX index as a control variable for investors' perspectives about the financial markets:

$$r_{it} {=}\ \alpha_{st} {+} \beta_{st}\ r_{mt} {+} \gamma c_{st} Cr_{it} {+} \gamma o_{st} Oil_t + \delta_{st} VIX_t {+} \varepsilon_{it} \tag{7}$$

where $\varepsilon_{it} \sim iid\ N(0, \sigma^2_{st})$ and 'VIX' is the logarithmic first difference of the VIX index.

5. Empirical Results

Table 1 presents a summary of the descriptive statistics for both countries' stock prices and the World Price Index returns. The average monthly mean returns were negative for Saudi Arabia and positive for Turkey. This means that investors, on average, could expect a 3% loss per month in Saudi Arabia and a positive return of 72.2% per month in Turkey, which was well above the average return for the World Price Index. Based on the standard deviations of the returns, both markets exhibited similar volatility, indicating similar riskiness. However, the oil price index changes showed the highest volatility, with the highest standard deviation of 9.05. All stock market return series were negatively skewed, which indicates that the probability of losses was greater than the probability of positive returns. All series were confirmed to deviate from normality based on skewness, excess kurtosis, and the Jarque–Bera test statistics. The Ljung–Box Q-statistics of the price indices, Q (10), and their squares, $Q^2(10)$, at lag 10 showed the presence of autocorrelations, which were confirmed based on the ARCH-test statistics.

Table 1. Descriptive statistics for monthly return series (January 2005–December 2018).

Count	M	Std. D.	Skew.	Ex. Kur.	JB	Q (10)	Q^2 (10)	ARCH (10)
Saudi Arabia	−0.030	7.72	−0.643 ***	1.41 ***	12.1 **	20.3 * (0.0617)	55.5 *** (0.0000)	4.60 *** (0.0000)
Turkey	0.722	7.53	−0.402 ***	0.832	5.183 *	21.6 ** (0.0427)	58.6 *** (0.0000)	5.11 *** (0.0000)
World Index	0.297	4.33	−1.13 *	3.45 ***	26.79 ***	19.2 * (0.0852)	50.59 *** (0.0000)	4.30 *** (0.0000)
OP	0.152	9.05	−1.00 *	1.62 ***	26.039 ***	32.6 *** (0.0011)	70.4 *** (0.0000)	8.60 *** (0.0000)

Notes; M, Std. D, Skew, and Ex. Kur. denote the mean, standard deviation, skewness, and excess kurtosis, respectively. JB refers to Jarque-Bera statistics. Q (10) refers to Ljung–Box Q-statistics at lag 10 for rare returns, whereas Q^2 (10) refers to Ljung–Box Q-statistics of raw squared returns at lag 10; ***, **, and * denote the significance of coefficients at 1%, 5%, and 10%, respectively Numbers in parentheses are *p*-values.

Table 2 shows that Turkey was a riskier market than Saudi Arabia based on both the monthly mean and the minimum and the maximum country risk ratings. However, the standard deviations of the country risk ratings of the two markets were quite similar. The negative average changes in the CR ratings imply that both countries became riskier over the sample period.

Table 2. Descriptive statistics for monthly CR ratings.

Country	Mean	Min.	Max.	SD	Avg. Change
S. Arabia	62.5	53.88	82.25	8.21	−0.066
Turkey	52.1	41.88	68.75	8.25	−0.051

The preliminary statistics suggested that both countries were risky but yielded higher returns relative to the world markets. However, these statistics provide limited information and further analysis was conducted within the MS-ICAPM. The standard ICAPM utilizes excess returns as explained in Section 3 by means of Equation (1). We employed the extended model presented in Equation (7). The excess returns of each country and the World Price Index, as well as the oil price return series and CR changes, were tested for the presence of a unit root by employing the ADF and KPSS tests [61,62].

The results displayed in Table 3 indicated that all the return series and CR changes were stationary.

Table 3. Unit root test results of the variables.

Variables	ADF TEST	KPSS TEST [a]	ADF TEST	KPSS TEST [b]
	At Level	At Level	First Difference	First Difference
CRSA				
Intercept	−2.811 *	1.064 ***	−8.956 ***	0.170
Intercept and Trend	−3.165 *	0.773 ***	−9.059 ***	0.038
PSA				
Intercept	−2.303	1.062 ***	−10.943 ***	0.053
Intercept and Trend	−2.274	0.624 ***	−10.913 ***	0.051
CRTR				
Intercept	−2.139	1.466 ***	−12.195 ***	0.296
Intercept and Trend	−2.721	0.953 ***	−12.309 ***	0.071
PTR				
Intercept	−1.992	4.674 ***	−12.597 ***	0.059
Intercept and Trend	−3.034	0.196 **	−12.582 ***	0.032
PW				
Intercept	−1.451	0.989 ***	−10.648 ***	0.053
Intercept and Trend	−2.148	0.212 **	−10.615 ***	0.051
OP				
Intercept	−2.575	0.778 ***	−7.177 ***	0.127
Intercept and Trend	−2.506	0.693 ***	−7.186 ***	0.045
VIX				
Intercept	−3.071	0.872 ***	−11.095 ***	0.042
Intercept and Trend	−3.162	0.484 ***	−11.059 ***	0.043

Notes: The table reports the results of the augmented Dickey–Fuller (ADF) and Kwiatkowski–Phillips–Schmidt–Shin (KPSS) unit root tests. The null hypothesis for the ADF test was that the series was nonstationary, whereas it was stationary for the KPSS test. The optimal lag length for the ADF test was selected based on the Schwarz information criterion (SIC); the bandwidth for KPSS tests was selected with Newey–West estimator using the Bartlett kernel. [a] The asymptotic critical figures of KPSS assessment without the trend model were 0.739, 0.463, and 0.347 at 1%, 5%, and 10%, respectively. [b] The asymptotic critical figures of KPSS assessment with the trend model were 0.216, 0.146, and 0.119 at 1%, 5%, and 10%, respectively. ***, **, and * indicate significance at the 1%, 5%, and 10% levels.

Table 4 presents the correlation matrix of stock returns, which indicates whether these two financial marketplaces were interconnected with the international marketplace, as well as between themselves. The correlation value of the stock returns between Saudi Arabia and Turkey was approximately 0.30, whereas the stock returns of Saudi Arabia were correlated with that of the World Price index with a value of 0.37. However, over the sample period, the Turkish financial market exhibited a correlation value of 0.57 with the World Price Index, which was much larger than that of Saudi Arabia. Therefore, although these two markets were not highly correlated, the Turkish financial market showed considerable integration with the world market over the sample period.

Table 4. Correlation matrix for stock return series.

	SA	TR	WI
SA	1.0000		
TR	0.3047	1.0000	
WI	0.3690	0.5721	1.0000

First, we estimated a linear ICAPM with a single state and fixed variance. This allowed us to compare the estimates from the single-state model with the two-state model as a means of checking the model's specifications. Based on the diagnostic tests, if the single-state model with a fixed sigma value is adequate, there will be no need to estimate the Markov-switching model with two states, and one can decide that there were no regime changes, verifying the adequacy of the single-state model. The single-state model with fixed variance is presented in Table 5, both at no lag (Model 1) and at lag one (Model 2) for both countries.

Table 5. Estimates of ICAPM with composite risk ratings, oil prices, and VIX index values. Model $r_{it} = \alpha_t + \beta_t r_{mt} + \gamma c_t CR_{it} + \gamma o_t Oil_{it} + \delta_{st}\mathrm{VIX} + \varepsilon_{it}$.

Country	Saudi Arabia Model 1	Saudi Arabia Model 2	Turkey Model 1	Turkey Model 2
α_t	−0.3802 (0.494)	−0.4138 (0.448)	0.4478 (0.346)	0.4171 (0.371)
β_t	0.9576 *** (0.000)	0.9486 *** (0.0000)	0.9408 *** (0.0000)	0.9404 *** (0.000)
β_{t-1}		−0.0033 (0.912)		0.0248 (0.333)
γc_t	0.2404 (0.237)	0.2429 (0.224)	0.1130 (0.636)	0.1243 (0.598)
γc_{t-1}		−0.1047 (0.607)		−0.5361 ** (0.028)
γo_t	0.1029 (0.104)	− 0.1491 ** (0.033]	− 0.0215 (0.692)	0.0306 (0.609)
γo_{t-1}		0.0214 (0.746)		− 0.0745 (0.193)
δ_t	0.0621 ** (0.022)	0.0787 *** (0.005)	0.0201 (0.381)	0.0211 (0.371)
δ_{t-1}		0.0703 ** (0.016)		0.0142 (0.565)
sigma	7.1338 [0.3915]	6.999 [0.3841]	6.0914 [0.3343]	5.977 [0.3280]
LL	− 561.707	− 558.546	− 535.485	− 532.345
$Q(5)$	0.857 (0.9733)	0.9244 (0.9684)	8.3156 [0.1397]	6.5570 (0.2557)
$Q^2(5)$	58.485 *** (0.0000)	53.113 *** (0.0000)	5.1650 [0.3961]	4.7992 (0.4409)
$Q(10)$	6.196 (0.7980)	6.3001 (0.7894)	20.622 ** [0.0239]	18.4250 ** (0.0482)
$Q^2(10)$	74.065 *** (0.0000)	70.230 *** (0.0000)	9.2017 [0.5131]	9.0490 (0.5275)
ARCH (1–5) test	8.8861 *** (0.0000)	8.2009 *** (0.0000)	0.9584 [0.4454]	0.8183 (0.5385)
ARCH (1–10) test	4.7651 *** (0.0000)	4.5379 *** (0.0000)	1.09731 [0.3684]	0.9235 (0.5138)

Note: ***, **, and * denote that the coefficient was significant at 1%, 5%, and 10%, respectively; values placed in parentheses are p-values, with square brackets indicating standard errors. LL stands for the log-likelihood value.

The beta coefficients estimated at time ‘t’ were highly significant and close to one in all the models. The Saudi Arabian excess returns were negatively affected by the oil price changes in model 2 in the period under study, whereas the VIX index significantly and positively affected the excess returns in both models. This implies that worsening expectations for US financial markets increased the amount of excess returns in the Saudi Arabian financial market. However, the diagnostic test statistics indicated the inadequacy of the estimated models for SA; the Q-statistics for scaled squared residuals showed significant correlations at both lag five and at lag ten. In addition, we observed highly significant ARCH test statistics at both lags. In the case of Turkey, the country risk rating negatively and statistically affected the excess returns at lag 1 in Model 2. All other estimated parameters were statistically insignificant, implying that the risk premium was correctly specified and no other factor had any impact on the estimation of systematic risk, which seems unrealistic in line with the criticisms of the standard CAPM in the finance literature. Likewise, the Q (10) statistics for scaled residuals exhibited correlations, showing the inadequacy of the estimated models for Turkey as well. These correlations in the residuals may have occurred due to changes in the states over the sample period. Therefore, we estimated the results of the MS-ICAPM (as described by Equation (7)), which are presented in Table 6. The model was extended with lag 1 for the predictors. The lag length was selected based on the Akaike information criterion (AIC). The selection of the reported models was based on the log-likelihood values and the diagnostic test statistics of the estimated models, namely, the likelihood-ratio (LR) test of linearity, Q-statistics, and ARCH test results. After the initial estimations, we also employed a random search using random starting values to avoid local optima.

Table 6. Estimates of MS-ICAPM with oil prices, composite risk ratings, and VIX values. Model (2.1) $r_{it} = \alpha_{st} + \beta_{st}\, r_{mt} + \gamma c_{st}\, \mathrm{Cr_{it}} + \gamma o_{st} oil + \delta_{st}\, \mathrm{VIX} + \varepsilon_{it}$.

Parameters	Saudi Arabia	Turkey
α_t (0)	−5.2601	2.4898 ***
	(0.112)	(0.000)
α_t (1)	−0.0152	−0.2215
	(0.974)	(0.700)
β_t (0)	1.0185 ***	0.9905 ***
	(0.000)	(0.000)
β_t (1)	0.8795 ***	0.9439 ***
	(0.000)	(0.000)
β_{t-1} (0)	0.0952	−0.1275 ***
	(0.401)	(0.001)
β_{t-1} (1)	−0.0211	0.0627 **
	(0.695)	(0.030)
$\gamma c_t(0)$	−0.4346	−0.1404
	(0.570)	(0.112)
$\gamma c_t(1)$	0.3751 *	1.9526 **
	(0.071)	(0.035)
$\gamma c_{t-1}(0)$	−0.4131	−0.0147
	(0.540)	(0.918)
$\gamma c_{t-1}(1)$	−0.1193	−0.5961 **
	(0.499)	(0.052)
$\gamma o_t(0)$	−0.0537	0.0317
	(0.877)	(0.520)
$\gamma o_t(1)$	0.1797 ***	0.0763
	(0.003)	(0.304)
$\gamma o_{t-1}(0)$	0.1313	−0.1599 ***
	(0.729)	(0.002)
$\gamma o_{t-1}(1)$	−0.0392	−0.0671
	(0.478)	(0.333)
$\delta_t(0)$	0.2068	−0.0946 ***
	(0.264)	(0.000)
$\delta_t(1)$	0.0687 ***	0.0601 **
	(0.004)	(0.035)
$\delta_{st-1}(0)$	0.3086 *	0.0437 *
	(0.077)	(0.068)
$\delta_{st-1}(1)$	0.0404 *	0.0091
	(0.101)	(0.747)
Sigma(0)	10.6755	1.6425
	[1.544]	[0.2466]
Sigma(1)	5.1066	6.1283
	[0.0551]	[0.3877]

Table 6. *Cont.*

Parameters	Saudi Arabia	Turkey
p_{0∣0}	0.949	0.7878
	[0.0505]	[0.0831]
p_{1∣1}	0.991	0.9324
	[0.0094]	[0.0307]
LL	−533.48	−515.00
Linearity LR-test	50.128 ***	34.681 ***
	(0.0000)	(0.0000)
ARCH 1-5 test	0.7262	0.5907
	(0.6049)	(0.7071)
ARCH 1-10 test	0.6964	0.5186
	(0.7263)	(0.8745)
$Q(5)$	1.7378	4.4731
	(0.8841)	(0.4835)
$Q^2(5)$	4.5836	3.7366
	(0.4688)	(0.5879)
$Q(10)$	5.7493	12.979
	(0.8359)	(0.2248)
$Q^2(10)$	9.0046	7.7234
	(0.9520)	(0.6558)

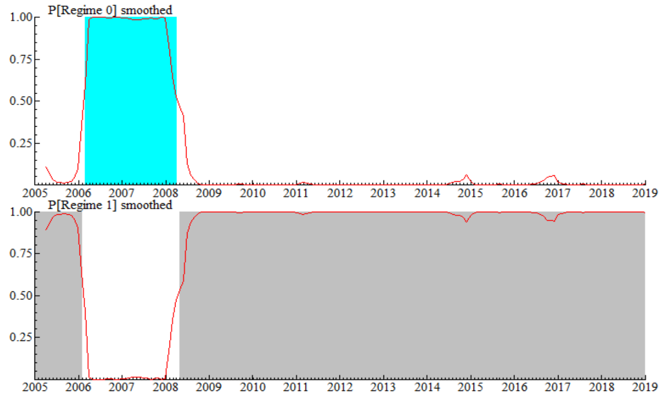
Note: ***, ** and * denote the significance of coefficients at 1%, 5%, and 10%, respectively; values in parentheses are p-values for the t-statistics, and those in square brackets are standard errors; LL is the log-likelihood value. The LR test was based on the p-values proposed in [63].

All the models in Table 6 achieved strong convergence. The LR-linearity test statistics based on [63], which approximated the upper bound for the p-values, strongly supported the nonlinearity of the models. In addition, the portmanteau test statistics at lags 5 and 10 indicated the absence of correlations in the scaled residuals and their second moments. The ARCH tests at alternative lags also revealed no ARCH effects in the estimated models. Regarding the parameter estimates, the estimated volatility parameter (sigma) was quite different in regimes zero and one for both countries, which confirms the inadequacy of the single-state, fixed-variance model presented in Table 5.

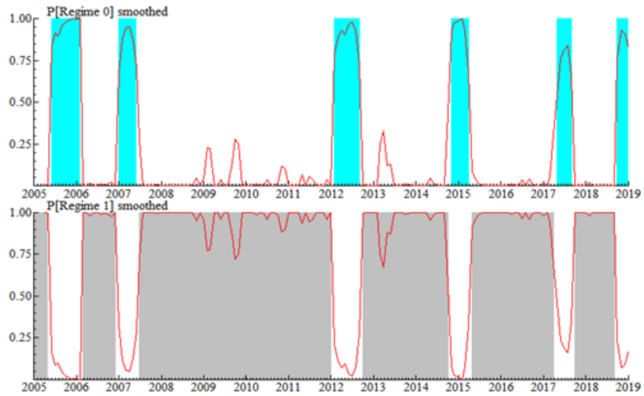
For Saudi Arabia, the value of sigma (10.67) in regime zero was slightly more than twice that estimated for regime one. This implies that the high-volatility regime was regime zero, whereas regime one was a low-volatility or stable regime. In the case of Turkey, the estimated value of sigma (1.64) in regime zero was almost one-quarter of the value (6.13) estimated for regime one, which indicates that regime one was a high-volatility (risky) regime, during which the excess returns showed more volatility compared to regime zero. The estimated value of beta (systematic risk) was highly significant at the 1% level of significance during both high- and low-volatility regimes in the time period under study in both markets after taking into account the CR rating, the oil price effect, and the VIX index in regard to excess returns. For Saudi Arabia, the coefficient of beta (1.018) exceeded 1 during the high-volatility regime, whereas the value estimated for Turkey was 0.99 during the low-volatility regime. Therefore, in general, investors could expect higher returns from their investments in Saudi Arabia than the average of the World Price Index return during a highly volatile (risky) regime. However, investment in the Turkish market was expected to yield, on average, the same as the World Price Index during the low-volatility or stable regime. Finally, although the world excess return had no predictive power for excess returns in Saudi Arabia at lag 1, it was highly significant and exhibited a negative impact at lag one during the low-volatility regime in Turkey. This implies that during the tranquil regime, investment in Turkey in the preceding month could be expected to lead to a loss in the next period, relative to the World Price Index average. During the high-volatility regime, although beta was positive at lag one, the coefficient was rather small, implying a much smaller yield on the Turkish equities compared to the average World Price Index. Comparison of the two markets showed that Saudi Arabia yielded higher excess returns by about 2% than the World Price Index during the high-volatilility regime, whereas Turkey provided a similar return to that of the World Price Index when its financial market was in a stable state.

The oil price risk factor positively and significantly affected excess returns in Saudi Arabia during the low-volatility regime in the period under study. In other words, when the market was stable in Saudi Arabia, oil price shocks had a positive impact on the excess returns of Saudi Arabia in the same month. However, in an unstable state in the Saudi Arabian market, the positive effects of oil price shocks disappeared. The CR rating index of Saudi Arabia was positive and marginally significant only during the low-volatility regime. This implies that when a country is more creditworthy, investors may expect higher excess returns during a stable regime in the current month. In addition, the VIX index was a highly and positively significant predictor for excess returns during the low-volatility regime. As investors developed negative expectations about the financial markets globally, the excess returns of SA stocks became higher. However, we observed that the VIX index exhibited a time effect during both regimes at the marginal level. This implies that investors may expect positive excess returns from their investments in SA when the VIX index signals fear in global markets. For Saudi Arabia, our findings can be summarized as follows: global factors, captured by the World Price Index and VIX, are important predictors of Saudi Arabian excess returns; however, the Saudi Arabian market yielded higher excess returns during its high-volatility regime relative to the global market. The VIX index had a highly significant positive impact on excess returns during the low-volatility regime at lag zero. Oil price shocks had a highly significant positive impact on excess returns in Saudi Arabian stock returns during the low-volatility regime. However, country-specific factors had a marginally positive impact on the excess returns of Saudi Arabia during its low-volatility regime.

In Turkey, oil price shocks had a negative impact on excess returns, as expected, since Turkey is a net importer. However, this effect was significant during the low-volatility regime (stable regime) at lag one. In other words, the reaction of stock prices to oil price risk exposure was effective after one month during the low-volatility regime period and had no predictive power for excess returns during the high-volatility regime period. However, country risk was found to be an important predictor of excess returns for Turkey. During the high-volatility regime in the period under study, the composite country risk rating (CR) was highly significant, with a large positive coefficient of 1.95. This implies that although the country was experiencing an unstable, high-volatility regime, investors could earn high excess returns as long as the country became more creditworthy. However, at lag one, during the same regime, the estimated coefficient became negative (-0.6), which implies that the increased country risk could only be compensated for by a higher risk premium during the high-volatility regime. Based on these results regarding the composite country risk ratings, we observed that investors were very sensitive to the conditions in the market and the country-specific vulnerability premium in Turkey over the sample period. In addition to the importance of local factors in predicting excess returns in the financial market of Turkey, the highly significant coefficients for the VIX index at lag zero observed for both low- and high-volatility regimes confirmed the relevance of global factors. As expected, when the markets were in a stable state, an increase in the fear gauge (VIX) negatively affected the amount of excess returns. However, when Turkey's markets were in an unstable state, this risk was compensated for by higher excess returns, as indicated by a highly significant positive coefficient of 0.06. As mentioned above, the diagnostic tests of the models confirmed the adequacy of the estimates. Figure 3 presents the smoothed transition probabilities of the estimated models for both markets. The regime changes between high- and low-volatility states were well captured: for instance, in the case of Saudi Arabia, the high volatility regime extended from March 2005 to April 2008, with an average duration of 38 months, covering 23% of the sample period. For the case of Turkey, regime changes were more frequent, and the high-volatility regime was persistent, with an average duration of 21.17 months that covered about 76% of the sample period.



Saudi Arabia



Turkey

Figure 3. Smoothed transition probabilities.

6. Conclusions and Discussion

In this study, we investigated and compared the investment opportunities in Saudi Arabia and Turkey by considering the oil price risk and country risk exposures of their stock prices. Saudi Arabia is an important net oil-exporting country and its economy relies on its oil export revenues. On the other hand, Turkey is a net oil-importing country in the region, and its economy is highly dependent on oil imports. Furthermore, both countries attracted large capital flows during the sample period. However, despite their important geopolitical role in the Middle East, they did exhibit some locally/regionally specific instabilities related to political, economic, and financial factors.

For the analysis, we employed a Markov-switching ICAPM, extended on the basis of oil price and country risk factors, as well as the VIX index. In this way, we allowed the systematic risk to vary across the two observed states in the form of high- and low-volatility regimes. Additionally, we were also able to assess the predictive power of oil risk and country-specific or regional risk factors in determining the equity premiums in these countries after controlling for the VIX index, a measure of investors' sentiments about the world financial market. The specifications of this model will help users to correctly measure systematic risk in the assessment of investment opportunities in these markets.

Our findings confirm that beta is not constant and changes according to states of low and high volatility. Both countries were significantly and positively affected by the excess World Price Index returns during both high- and low-volatility regime periods. The value of beta (1.02) indicated that investment in Saudi Arabia during the high-volatility regime was expected to yield higher excess returns than those observed in the world market. On the other hand, investment in Turkey yielded excess returns similar to the world average during the stable regime.

As a net oil-exporting country, Saudi Arabia enjoyed gains from oil price shocks during a low-volatility or stable regime. Studies in support of this finding include [25,26], whereas [64] reported a positive effect of oil for the GCC countries except for Saudi Arabia. However, as a net oil importer, oil price shocks negatively affected Turkey, with a time lag, during the low-volatilty or stable state. In other words, oil price shocks lead to lower excess returns in the market during a stable state with a lag. Country risk factors were demonstrated to play a marginal role in Saudi Arabia's excess returns during the low-volatility regime. On the other hand, country risk factors and local events were important predictors of the risk premium in Turkey. As the country became more creditworthy, the equity premium became higher during the high-volatility state, which had a time effect but the impact was reversed. The VIX index, which was highly significant and negative during the stable regime, indicated that as the global markets became riskier, the risk premium decreased for Turkish stocks during the stable regime, although this increased during the high-volatility regime. This implies that investors should earn higher yields to hold Turkish equities during the recession state. In general, excess returns in Turkey were revealed found to be very sensitive to the state of the market, oil prices, and country risk premiums over the sample period. This finding implies that both local and global factors are important predictors of excess returns in the Turkish financial market. In contrast, the VIX index was highly significant and positive during the stable regime in Saudi Arabia; when the global markets are risky, investors can invest in Saudi Arabia and obtain a higher premium when there is a stable regime in that country.

On a country basis, both markets were highly significantly affected by global factors, namely, the World Price Index and the VIX index. However, Saudi Arabia offered a better investment opportunity to international investors than Turkey as compared to the world market, which also benefited from oil price shocks. However, as Turkey is a net oil-importing country, it is negatively affected by oil price shocks. Finally, local factors were found to be more important for Turkey than for Saudi Arabia in predicting excess returns.

The findings of this study can provide important information for foreign investors in regard to their portfolio diversification decisions and for the policy-makers of these countries who seek to attract foreign investment and promote their economy. Therefore, governments should revise their regulations to make it easier to conduct business in order to attract foreign capital. Possible revisions include maintaining justice and democracy, lifting restrictions for foreign capital investment, relaxing government bureaucracy, and adopting programs encouraging the development of the production and services sectors. However, the recent global developments such as the impact of COVID-19 and the Ukranian war were not incorporated into this study, and this opens up the need for new research in order to extend this work in terms of the time period covered and through the inclusion of other emerging countries in the region.

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References

1. Hamilton, J.D. Oil and the macroeconomy since World War II. *J. Political Econ.* **1983**, *91*, 228–248. [CrossRef]
2. Hamilton, J.D. This is what happened to the oil price-macroeconomy relationship. *J. Political Econ.* **1996**, *38*, 215–220. [CrossRef]
3. Fisher, R.A. *The Genetical Theory of Natural Selection*; Clarendon Press: Oxford, UK, 1930.
4. Williams, S.B. Resistance to extinction as a function of the number of reinforcements. *J. Exp. Psychol.* **1938**, *23*, 506. [CrossRef]
5. Filis, G.; Degiannakis, S.; Floros, C. Dynamic correlation between stock market and oil prices: The case of oil-importing and oil-exporting countries. *Int. Rev. Financ. Anal.* **2011**, *20*, 152–164. [CrossRef]

6. Filis, G.; Chatziantoniou, I. Financial and monetary policy responses to oil price shocks: Evidence from oil-importing and oil-exporting countries. *Rev. Quant. Financ. Account.* **2014**, *42*, 709–729. [CrossRef]
7. Gomez-Loscos, A.; Gadea, M.D.; Montanes, A. Economic growth, inflation and oil shocks: Are the 1970s coming back? *Appl. Econ.* **2012**, *44*, 4575–4589. [CrossRef]
8. Kim, I.M.; Loungani, P. The role of energy in real business cycle models. *J. Monet. Econ.* **1992**, *29*, 173–189. [CrossRef]
9. Hooker, M.A. Are oil shocks inflationary? Asymmetric and nonlinear specifications versus changes in regime. *J. Money Credit. Bank.* **2002**, 540–561. [CrossRef]
10. Kilian, L. Not all oil price shocks are alike: Disentangling demand and supply shocks in the crude oil market. *Am. Econ. Rev.* **2009**, *99*, 1053–1069. [CrossRef]
11. IMF. *Advice to Capital Flows to Africa and the Middle East*; BP/20-02/11; IMF: Washington, DC, USA, 2020.
12. IMF. *Staff Country Report*; IMF: Washington, DC, USA, 2013; Volume 2013.
13. Mousavi Shafaee, S.M.; Golmohammadi, V. The Regional-Supremacy Trap: Disorder in the Middle East. *Middle East Policy* **2022**, *9*, 61–73. [CrossRef]
14. Harvey, C.R. Predictable risk and returns in emerging markets. *Rev. Financ. Stud.* **1995**, *8*, 773–816. [CrossRef]
15. Jones, C.M.; Kaul, G. Oil and the stock market. *J. Financ. Am. Financ. Assoc.* **1996**, *51*, 463–491. [CrossRef]
16. Ciner, C. Energy shocks and financial markets: Non-linear linkages. *Stud. Nonlinear Dyn. Econom.* **2001**, *5*, 203–212. [CrossRef]
17. Park, J.; Ratti, R.A. Oil price shocks and stock markets in the U.S. and 13 European countries. *Energy Econ.* **2008**, *30*, 2587–2608. [CrossRef]
18. Miller, J.I.; Ratti, R.A. Crude oil and stock markets: Stability, instability and bubbles. *Energy Econ.* **2009**, *31*, 559–568. [CrossRef]
19. Filis, G. Macroeconomy, stock market, and oil prices: Do meaningful relationships exist among their cyclical fluctuations? *Energy Econ.* **2010**, *32*, 877–886. [CrossRef]
20. Cunado, J.; de Gracia, F.P. Oil price shocks and stock market returns: Evidence for some European countries. *Energy Econ.* **2014**, *42*, 365–377. [CrossRef]
21. Kling, J.L. Oil price shocks and stock market behavior. *J. Portf. Manag.* **1985**, *12*, 34–39. [CrossRef]
22. Maghyereh, A. Oil price shocks and emerging stock markets: A generalized VAR approach. *Int. J. Appl. Econometr. Qnt. Stud.* **2004**, *1–2*, 27–40.
23. Kilian, L.; Park, C. The impact of oil price shocks on the US stock market. *Int. Econ. Rev.* **2009**, *50*, 1267–1287. [CrossRef]
24. Hamilton, J.D. *Causes and Consequences of the Oil Shock of 2007–2008*; Brooking Papers on Economic Activity; National Bureau of Economic Research: Cambridge, MA, USA, 2009.
25. Mohanty, S.K.; Nandha, M.; Turkistani, A.Q.; Alaitani, M. Oil price movements and stock market returns: Evidence from Gulf Cooperating Council (GCC) countries. *Glob. Financ. J.* **2011**, *22*, 42–55. [CrossRef]
26. Arouri, M.; Rault, C. Oil price and stock markets in GCC countries: Empirical evidence from panel analysis. *Int. J. Financ. Econ.* **2012**, *17*, 242–253. [CrossRef]
27. Hammoudeh, S.; Choi, K. Behaviour of GCC stock markets and impact of US oil and financial markets. *Res. Int. Bus. Financ.* **2006**, *20*, 22–44. [CrossRef]
28. Demirer, R.; Jategaonkar, P.C.; Khalifa, A.A.A. Oil price risk exposure and the cross-section of stock returns: The case of net exporting countries. *Energy Econ.* **2015**, *49*, 132–140. [CrossRef]
29. Komeil, S.; Adaoglu, J.; Katircioglu, S.T. Oil price exposure: A comparison of financial and non-financial sub-sectors. *Energy* **2016**, *109*, 712–723.
30. Wada, I.; Tuna, G. Crude oil price volatility and energy mix in Saudi Arabia, Energy Sources. *Part B Econ. Plan. Policy* **2017**, *12*, 526–532.
31. Chen, N.F.; Roll, R.; Ross, S. Economics forces and the stock market. *J. Bus.* **1986**, *59*, 383–403. [CrossRef]
32. Markowitz, H. *Portfolio Selection: Efficient Diversification of Investments*; John Wiley: New York, NY, USA, 1959.
33. Basu, S. Investment performance of common stocks in relation to their price-earnings ratios: A test of the efficient market hypothesis. *J. Financ.* **1977**, *32*, 663–682. [CrossRef]
34. Banz, R.W. The relationship between return and market value of common stocks. *J. Financ. Econ.* **1981**, *9*, 3–18. [CrossRef]
35. Fama, E.F.; French, K.R. Size and book-to-market factors in earnings and returns. *J. Financ. 1995. 50*, 131–155. [CrossRef]
36. Baillie, R.; Calonaci, F.; Kapetanios, G. Hierarchical time-varying estimation of asset pricing models. *J. Risk Financ. Manag.* **2022**, *15*, 14. [CrossRef]
37. Roll, R. A critique of the asset pricing theory's tests: Part I. *J. Financ. Econ.* **1977**, *4*, 129–176. [CrossRef]
38. Doeswijk, R.; Lami, T.; Swinkels, L. Historical returns of the market portfolio. *Rev. Asset Pricing Stud.* **2020**, *10*, 521–567. [CrossRef]
39. Gong, C.M.; Luo, D.; Zhao, H. Liquidity risk and beta premium. *J. Financ. Res.* **2021**. [CrossRef]
40. Giglio, S.; Xiu, D. Asset pricing with omitted factors. *J. Political Econ.* **2021**, *129*, 1947–1990. [CrossRef]
41. Adler, M.; Dumas, B. International portfolio choice and corporation finance: A synthesis. *J. Financ.* **1983**, *38*, 925–984. [CrossRef]
42. Chen, S.N. Beta nonstationarity, portfolio residual risk and diversification. *J. Financ. Quant. Anal.* **1981**, *16*, 95–111. [CrossRef]
43. Ferson, W.E.; Harvey, C.R. The variation of economic risk premiums. *J. Political Econ.* **1991**, *99*, 385–415. [CrossRef]
44. Huang, H.C. Test of regime-switching CAPM under price limits. *Int. Rev. Econ. Financ.* **2003**, *12*, 305–326. [CrossRef]
45. Erb, C.B.; Campbell, R.H.; Tadas, E.V. Political risk, economic and financial risk. *Financ. Anal. J.* **1996**, *52*, 29–46. [CrossRef]
46. Bekaert, G.; Campbell, R.H. Time-Varying World Market Integration. *J. Financ.* **1995**, *50*, 403–444. [CrossRef]

47. Bouoiyour, J.; Selmi, R.; Hammoudeh, S.; Wohar, M.E. What are the categories of geopolitical risks that could drive oil prices higher? Acts or threats? *Energy Econ.* **2019**, *84*, 104523. [CrossRef]
48. IEA and ICCT 2019 Fuel Economy in Major Car Markets IEA, Paris. Available online: https://iea.org/topics/transport/gfei/report/ (accessed on 27 January 2023).
49. IGU 2019 World LNGR International Energy Agency. *Oil Market Report*; International Energy Agency Report International Gas Union: London, UK, 2019.
50. Alabdulwahab, S. The linkage between oil and non-oil GDP in Saudi Arabia. *Economies* **2021**, *9*, 202. [CrossRef]
51. IEA. *Energy Efficiency 2018—Analysis and Outlooks to 2040*; Market Report Series; IEA: Paris, France, 2017; pp. 1–143.
52. Meierding, E. Over a Barrel? Oil Busts and Petrostate Stability. *Comp. Politics* **2022**, *54*, 671–694. [CrossRef]
53. Ozturk, I.; Arisoy, I. An estimation of crude oil import demand in Turkey: Evidence from time-varying parameters approach. *Energy Policy* **2016**, *99*, 174–179. [CrossRef]
54. Agmon, T. The relations among equity markets: A study of share price co-movements in the United States, United Kingdom, Germany and Japan. *J. Financ.* **1972**, *27*, 839–855. [CrossRef]
55. Solnik, B. The international pricing of risk: An empirical investigation of the world capital structure. *J. Financ.* **1974**, *29*, 365–378. [CrossRef]
56. Huang, H.C. Tests of regimes-switching CAPM. *Appl. Financ. Econ.* **2000**, *10*, 573–578. [CrossRef]
57. Hamilton, J.D.; Susmel, R. Autoregressive conditional heteroskedasticity and changes in regime. *J. Econ.* **1994**, *64*, 307–333. [CrossRef]
58. Kim, C.J.; Nelson, C.R. Has the US economy become more stable? A Bayesian approach based on a Markov-switching model of the business cycle. *Rev. Econ. Stat.* **1999**, *81*, 608–616. [CrossRef]
59. Hamilton, J.D. A new approach to economic analysis of nonstationary time series and the business cycle. *J. Econ. Soc.* **1989**, *57*, 357–384. [CrossRef]
60. Kim, C.J.; Nelson, C.R. *State-Space Models with Regime Switching*; MIT Press: Cambridge, MA, USA, 1999; pp. 16–20.
61. Dickey, D.A.; Fuller, W.A. Distribution of the estimators of autoregressive time series with a unit root. *J. Am. Stat. Assoc.* **1979**, *74*, 427–431.
62. Kwiatkowski, D.; Phillips, P.C.B.; Schmidt, Q.; Shin, Y. Testing the null hypothesis of stationarity against the alternative of a unit root: How sure are we that economic time series have a unit root? *J. Econom.* **1992**, *54*, 159–178. [CrossRef]
63. Davies, R.B. Hypothesis testing when a nuisance parameter is present only under the alternative. *Biometrica* **1987**, *74*, 33–43.
64. Ferson, W.E.; Harvey, C.R. The risk and predictability of international equity returns. *Rev. Financ. Stud.* **1993**, *6*, 527–566. [CrossRef]