



DO OIL PRICE SHOCK, AND OTHER MACROECONOMIC VARIABLES AFFECT THE STOCK MARKET: A STUDY OF THE SAUDI STOCK MARKET

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Abstract

Purpose of the study: This work aims to find the type of relationship amongst the chosen variables, inflation (INF), short-term interest rate (SIR), money supply (M.S.) and crude oil price (COP) and oil price shocks represented by DUMMY respectively on the capital market of Saudi Arabia. It will also throw insight to policymaker to find factors which influence the capital market of Saudi Arabia and to take remedial measures to boost investment in the country.

Research Methodology: The relationships amongst the Saudi security market, the oil price shock, and the selected macroeconomic variables as mentioned above are determined using the Johansen test of co-integration, the vector error correction model, and the Wald test. The research employs the time series data for a period of 2009 to 2016, for the study.

Findings: The results show a long-run equilibrium relationship between the Saudi stock market and the selected variables for the study. The study shows a positive association between the money supply and the stock market, but inflation, short-term interest rate, and crude oil price, the result indicates a negative relationship. The finding indicates the presence of both long-run and short-run unidirectional causality running from inflation, short-term interest rates, money supply, and the oil price shocks represented by DUMMY to the Saudi stock market represented by TASI.

Implications: The present study can have implications for the policymaker to take corrective measures for better performance of the stock market by controlling inflation and regulating the short-term interest rate. As the findings indicate that they have a negative relationship with TASI. This paper will also help the policymaker in identifying the real cause for the decline in the value of the stock price. A good performing stock market means better economic growth and overall economic development. To diversify the economy to have an alternative to the oil-driven economy to a more balanced economy by promoting other sectors like manufacturing and tourism.

Novelty/Originality of this study: The literature review confirms that all work of oil price shock is related to its effect on the security market return. This work is different from the other study as it includes macroeconomic variables in the study, together with the oil price shocks. The study is unique from other studies as it is broader in approach, by including more variables than earlier studies which mostly included the oil price shocks and its impact on the stock market. There is no work done to investigate the joint effect of macroeconomic variables and oil price shocks on the Saudi stock market.

Keywords: *Stock Market Index, Macroeconomic Variables, Oil Price Shocks, Co-integration Test, Causality Test.*

INTRODUCTION

The Saudi security exchange is one of the biggest in the region by a trading average of around \$2.4bn a day and an equity market size of about \$576bn. The other notable point is that it stands out to be more liquid compared to other bourses like Qatar and Abu Dhabi. The Saudi stock market has in total of 170 companies listed representing 15 different sectors. It has a market capitalization of 69.59 percent of GDP. The share of the crude is overwhelmingly large, accounting for about 87 percent of budgeted revenue, around 42 percent and 90 percent of GDP, and export earnings, respectively. The economy is heavily skewed towards the oil and the banking sector with little diversification. Therefore, any downturn in crude prices going hurt the Saudi equity market as seen in recent years. It has affected the morale of investors and has made them worried about the fortune of the Saudi equity market. This work investigates whether the volatility in the stock price is because of oil price shocks or any other factors like the chosen macroeconomic indicators that have any influence on the stock value. (Jones, C.M, Kaul, G, 1996) in their study, highlighted price shocks resulting due to oil price increase impacted the cash flow in the U.S. and Canada. However, their study showed that the results for Japan and the U.K. failed to explain the reasons for the outcome. The oil price instability and the security market return was investigated using the VAR model with GARCH by (Sadorsky, 1999), and found a strong association amid them. The research by (Jung & Park, 2011), to find the influence of oil price shocks on both the oil-exporting and the importing country confirmed different results in both types. A similar study by (Filis, Degiannakis, & Floros, 2011), underlined that the correlation increases positively or negatively due to the demand-driven oil price shock instead due to the supply side. (Shahrestani & Rafei, 2020) carried a study of an oil price shock on the Tehran Stock Exchange by dividing the period of study in two regimes using the Markov switching vector autoregressive model. They concluded that the variance, intercepts, and coefficient are not the same in the two regimes.



Their findings further confirm that the Tehran Stock Exchange experienced a negative and positive impact due to oil price shocks. ([Mohanty, Nandha, Turkistani, & Alaitani, 2011](#)), confirmed that for all the GCC countries, excluding Kuwait, all the market experienced a positive exposure due to oil price shocks.

In the study discussed above, we can see that earlier research carried out to analyze the effect of oil price shocks only on the stock return. This work is different from the previous study that besides including oil price shock, it includes other macroeconomic variables and investigates how the chosen variables are instrumental in the movement of stock prices. Hence this work is done to explore both the long run and short-run associations among the chosen variables and the stock price.

This work investigates whether there are any relationships between the selected macroeconomic variables and the oil price shocks on the Saudi stock market. The objectives of the study are to find factors that influence the Saudi stock market and suggest remedial measures to be adopted by the policymaker to improve the performance of the Saudi stock market.

LITERATURE REVIEW

A dynamic connection exists amongst security, and macroeconomic indicators. The value of security prices, as we know, is affected by the anticipated discounted cash flows. The discounted money flows, in turn, is influenced by different macroeconomic indicators and variation in the value of crude oil value. ([Arouri & Rault, 2012](#)), using the bootstrap panel cointegration technique, and SUR methods found that the oil price and security market of GCC countries to be cointegrated. They found a positive association amid the increase in the oil price and the security market for all countries except for Saudi Arabia. ([Alam, 2017](#)) found long-term heteroscedastic association amid macroeconomic indicators and equity value in India. He further finds evidence of positive association amongst security price, cash supply, inflation, and Industrial Index. The other variables, short-term interest rate, long-term interest rate, and exchange-rate, showed a negative association with the security price. ([Tripathy, 2011](#)), examined the market efficiency and causal associations amid the select macroeconomic indicators and security market, found autocorrelation. Thus, implying that the market falls into the efficient market hypothesis. ([Naifar & Al Dohaiman, 2013](#)), in their study, reviewed the outcome of the instability of oil price, the interest rate on the return of the equity market. They found asymmetry between the dependence formation relationships, inflation, and oil value. ([Almohaimed & Harrathi, 2013](#)), used VAR-BEKK specification to find the volatility transmission effects and conditional correlations amongst the value of crude oil and the Saudi security market. They concluded both way instability transmission amid the crude price and security market. They also found in their study volatility of crude prices affects the stock return. ([Cong, Wei, jiao, & Fan, 2008](#)) concluded noteworthy influence on equity return except the oil companies and manufacturing Index due to oil price shock. They further ascertained that instability in the oil rates causes speculation and higher-income for the mining and the petrochemical index. ([Jouini, 2013](#)) discovered that the presence of volatility spread amid crude oil prices and the security return. ([Alam & Salah Uddin, 2009](#)) investigated empirical relationships amid the security value and the interest rate of 15 countries. They found the presence of negative correlations amongst security price, interest rate change in for some of the countries chosen for the study while some showed that the variations in interest rate have no relationships with the share price. ([Tsoukalas, 2003](#)), investigated the relationship amid security value and the macroeconomic variables of Cyprus. In his study found sturdy signs of predictability in security gain using the Vector autoregressive model and the Granger causality test. ([Merikas & Merika, 2006](#)), in their research using the VAR model, found that employment has an adverse influence on equity return as growth in work leads to an increase in the prices, leading to erosion of firm profit and consequently harming the stock return. They found that the rise in GDP has a definite bearing, thus yielding positive stock returns. ([Naik, 2013](#)), found chosen macroeconomic variables and security market long-run symmetry and cointegrating associations amid them. Naik further finds the Industrial Index and the money supply linked positively to security value and negatively to inflation. He also discovered that macroeconomic variables and the equity price have long and short term causality. ([Fayyad & Daly, 2011](#)) studied the stock return of five GCC countries and two advanced economies of the USA and the U.K. Their finding suggests that during the period of the rise in the oil value and for the period of the financial crisis oil price shock has predictive power. UAE and Qatar stock were more responsive to the oil price shock from the GCC and U.K. from the advanced economies. ([Park & Ratti, 2008](#)) found the oil price shock impact the equity return of the USA and the 13 European countries instantaneously or in one month. The study also confirms that 6 percent of the volatility in the real stock return is due to jolts in oil prices.

The jolt in the oil price also causes an increase in the short-term interest rate in the USA and the eight countries from Europe undertaken for the study. ([Lee & Zeng, 2011](#)), found the stock market of the selected G 7 countries showed a different reaction from each other. ([Adaramola, 2012](#)) found stock return to be both positive and negative both short and long-run respectively and the direction of causality from oil price shock to the security market return. ([Lin, Fang, & Cheng, 2010](#)) examined the influence of oil price shocks on the stock market of Greater China, comprising Taiwan, Hong Kong, and China. They found a mixed response exhibited by the Greater China stock market and global oil supply shocks. ([Angelidis, Degiannakis, & Filis, 2015](#)) found U.S. stock return and volatility prediction made using the volatility and return of oil prices. ([Tchatoka, Masson, & Parry, 2019](#)), research indicates that the performance of the security market during negative

price shock is partial in three big oil-importing countries China, India, and Japan. The performance of the market in India and China have good return during the period when their market performance is better, and there are adverse oil price shocks

In the above discussion, it can be made out that a larger study concerning the jolt in the oil price was for studying its effect on the stock market return. In this study, a different perspective is added by including macroeconomic indicators along with the shock in the oil price. This makes the distinctive and novel from earlier studies undertaken. This paper will also help the policymaker in identifying the real reason for the decline in the value of the stock price. What policy matter need to be adopted to avert a decline in the value of the stock market and boost its performance. A good performing stock market means better economic growth and overall economic development.

DATA & METHODOLOGY

The study employs time-series monthly data from the Saudi Arabian Monetary Authority website containing unit root for the research. A series containing unit root is nonstationary. The regression analysis carried out on such series will lead to spurious regression, or in other words, the results obtained from such data are erroneous. Therefore to carry out any regression analysis, the data be made stationary. The series is stationary when, for each lag, we find the constant mean, variance, and autocovariance. The following test, like Augmented Dickey-Fuller(ADF), Phillips-Perron(P.P.), and Kwiatkowski-Phillips-Schmidt-Shin(KPSS) test, is examined to find the order of integration of the series. To regulate higher-order correlation in the chosen series, expecting the data following the A.R. (p) progression, then the ADF test, by combining a lagged differenced term of the dependent variables on the right side of the equation is carried out. In case, if the ADF test fails to find the difference between the unit root and the near unit root, then the KPSS, which has null, data is stationary, while the other assumption is it contains a unit root. It is to observe the stationarity and order of integration. The model below is developed to examine long and short-run associations amongst the chosen variables.

$$Y_t = (TASI, INF, SIR, MS, COP) \quad (1)$$

In this model, Tadawul All-Share Index (TASI), proxied for the stock price index, inflation (INF), three-month average of Saudi Inter-Bank offered rate (SIBOR), proxied for the short-term interest rate (SIR), money supply (M.S.) and crude oil price (COP) respectively. The model has more than two variables; thus, to examine the cointegrating relationship, Johansen test of co-integration, using the VAR framework with p lag length, is setup.

$$X_t = A_0 + A_1 y_{t-p} + u_t \quad (2)$$

Where, X_t is $n \times 5$ vectors of the logs of TASI, INF, SIR, MS, and COP. A_0 and A_1 are $n \times n$ matrices of parameters, and u_t is $n \times n$ error matrix. For the Johansen test of co-integration, the above model converted to a vector error correction model (VECM) as below:

$$\Delta X_t = A_0 + \sum_{j=1}^{p-1} \Gamma_j \Delta X_{t-j} + \Pi X_{t-p} + u_t \quad (3)$$

In equation (3), Δ represents the first difference operator, $\Gamma_j = -\sum_{i=j+1}^p B_i$ and $\Pi = -I + \sum_{i=j+1}^p B_i$ and I is n by n identity matrix. The Π matrix ranks identify the cointegrating relationships through the eigenvalues. Johansen's test of co-integration uses two test statistics as below.

$$\lambda_{trace}(r) = -T \sum_{i=r+1}^g \ln(1 - \hat{\lambda}_i) \quad (4)$$

and

$$\lambda_{max}(r, r+1) = -T \ln(1 - \hat{\lambda}_{r+1}) \quad (5)$$

In the equation, 4 and 5 'r' signifies the number of cointegrating vectors, where for λ_{trace} , the null is a number of cointegrating vectors while the alternative is more than r. The λ_{max} , has the null of r number of cointegrating vectors while the alternative $r+1$ cointegrating vectors. T denotes the sample size $\hat{\lambda}_i$ is the i^{th} arranged eigenvalue from the Π matrix.

RESULTS AND INTERPRETATIONS

In table 1, the detailed statistics of all five selected variables namely, the Tadawul All-Share Index (TASI), proxied for stock price index, inflation (INF), three-month average of Saudi Inter-Bank offered rate, proxied for the short-term interest rate (SIR), money supply (M.S.) and crude oil price (COP). The normality of distribution of the selected variables relative to its mean, skewness, and kurtosis value is examined. A normal distribution has zero, and three values for skewness and kurtosis, respectively. Therefore it is evident from table 1 that skewness lies between 1.426652 and -0.707764, indicating that the distribution is both positively and negatively skewed. However, the distribution is more skewed towards the right. As the

value of skewness does not equal zero, none of the variables chosen for the study has got symmetric distribution. The data is heavy-tailed or fat-tailed or on the contrary light-tailed compared to a normally distributed statistics is measured using the kurtosis value. It is evident from table 1 that the excess kurtosis of TASI is positive but very close to zero and therefore can be mesokurtic and SIR have positive excess kurtosis and therefore are leptokurtic, and the other series have got negative excess kurtosis and therefore are platykurtic. Thus the selected variables frequency distribution is not normal. (Jarque & Bera, 1981), in a normal distribution, the coefficient of both skewness and additional kurtosis is together zero. In the Jarque-Bera test, the p-value of four variables is higher than 0.05; that is, those variables have a normal distribution, and the remaining two variables the p values are less than 0.05, indicating non-normal distribution. The standard deviation for the crude oil price, SIR, and INF are comparatively more, showing more volatility than the other variables chosen for the study.

Table 1: Descriptive Statistics

	TASI	INF	SIR	MS	COP
Mean	8.861048	1.335728	1.011602	14.12377	5.649719
Maximum	9.315792	2.066863	0.898894	14.41883	6.090654
Minimum	8.385851	0.530628	2.371600	13.74125	4.720283
Standard Deviation	0.183675	0.339065	0.600000	0.224263	0.365127
Skewness	0.406896	-0.362828	1.952878	-0.14174	-0.707764
Kurtosis	3.02237	2.187063	5.672913	1.511988	2.233505
Jarque-Bera	2.651033	4.749772	89.59756	9.178159	10.36494
Probability	0.265666	0.093025	0.00000	0.010162	0.005614
Observations	96	96	96	96	96

The table 2 depicts all variables that have a correlation coefficient, out of which INF and SIR have got negative associations with the TASI, our Index chosen for the study. However, the correlation coefficient of the M.S. and the COP are positive, indicating positive relationships between them and the TASI, the proxy Index for the market. It is clear from table 2, correlation amid the independent series is not high that is greater than 0.9, suggesting that there are fewer multicollinearity problems, and the independent variables are jointly influencing the model.

Table 2: Correlation Matrix

	TASI	INF	SIR	MS	COP
TASI	1	-0.714527	-0.187636	0.672924	0.294366
INF	-0.714527	1	-0.207412	-0.775839	0.232781
SIR	-0.187636	-0.207412	1	0.399874	-0.596411
MS	0.672924	-0.775839	0.399874	1	-0.180537
COP	0.294366	0.232781	-0.596411	-0.180537	1

In table 3, the unit root test depicts the presence of unit root at the level and stationary when first differenced at 1, 5, and 10 % level, respectively. The outcome affirms the integration of order I(1) and I(0) when the series are linearly combined.

Table 3: Test for Unit Root

Variables	ADF Test	P.P. Test	KPSS Test
TASI	-2.314367***	-2.311369***	0.597123**
INF	-0.815270***	-1.122110***	0.984624***
MS	-1.559522***	-1.546909***	1.282532***
SIR	-2.298236***	-1.421190***	0.642394**
COP	-1.882646***	-1.554130***	0.449799*

Test Critical Values

1% level	-3.500669	-3.500669	0.7390000
5% level	-2.892200	-2.892200	0.463000
10% level	-2.583192	-2.583192	0.347000

Notes: *** implies significant at 1% level, ** suggests significant at 5% level, and * indicate significant at 10% level.

In the above table 3, it can be observed that the absolute value of the calculated test statistics for all three tests for unit root is lower than the absolute test critical value. Hence we cannot reject the null hypothesis. Thus all the variables selected for the study have a unit root, which means they are not stationary at the level.

The Johansen test under the VAR framework is employed to verify the number of cointegrating vectors. However, before that, the number of lag orders to confirm the order of cointegration should be identified. The result obtained in table 4 is the basis for the number of lag order. The table 4 depicts that out of the five criteria for lag order selection, two approaches namely, FPE and AIC advocate for twelve lag order selection while the S.C. shows one lag to be the appropriate lag length, L.R. and H.Q. give ten and two lag length respectively for carrying out the test. The VAR residual serial correlation L.M. test is to verify the outcome of lag order selection criteria. It was established based on the analysis that after one lag, there is no problem with autocorrelation. It is also being indicated by the H.Q. test, which suggests two lags to be the appropriate lag length. Hence two lag order is taken as the optimum lag order for the analysis.

Table 4: Lag Order determination criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	58.08703	NA	1.94E-07	-1.263977	-1.119285	-1.205812
1	689.2378	1172.137	1.05E-13	-15.69614	-14.82799*	-15.34715
2	729.5903	7.01E+01	7.34E-14	-16.06167	-14.47007	-15.42186*
3	746.1208	2.68E+01	9.12E-14	-15.86002	-13.54496	-14.92938
4	772.6623	3.98E+01	9.06E-14	-15.89672	-12.8582	-14.67526
5	799.2665	3.67E+01	9.18E-14	-15.93492	-12.17294	-14.42263
6	818.2373	2.39E+01	1.15E-13	-15.79136	-11.30593	-13.98826
7	845.5742	3.12E+01	1.21E-13	-15.847	-10.63811	-13.75307
8	875.7107	3.09E+01	1.26E-13	-15.9693	-10.03695	-13.58455
9	918.2937	3.85E+01	1.03E-13	-16.38794	-9.732136	-13.71237
10	976.6715	45.86830*	6.27E-14	-17.18265	-9.80339	-14.21625
11	1021.633	3.00E+01	5.87E-14	-17.65793	-9.55521	-14.40071
12	1073.342	2.83E+01	5.46e-14*	-18.29387*	-9.467688	-14.74582

* specifies lag order selected by the criterion

The lag order affirmed is applied to find the number of co-integration by vector error correction model (VECM) using [\(Johansen & Juselius, 1990\)\(Johansen S., 1991\) test of co-integration](#). It is clear from table 5 that the series has one cointegrating vector as explicit from the trace and the maximum eigenvalue statistics. Hence, in this case, we now have to use the VECM model for our analysis.

Table 5: Findings of the Johansen test of Cointegration

Hypothesized	Trace	0.05		Max-Eigen	0.05	Prob.**
No. of CE(s)	Statistics	Critical Value	Prob.**	Statistics	Critical Value	
None *	87.63674	69.81889	0.001	53.43119	33.87687	0.0001
At most 1	34.20556	47.85613	0.4906	17.18542	27.58434	0.5641
At most 2	17.02014	29.79707	0.6386	9.018258	21.13162	0.8309
At most 3	8.001884	15.49471	0.4652	4.927015	14.2646	0.751
At most 4	3.074869	3.841466	0.0795	3.074869	3.841466	0.0795

Notes: *denotes rejection of the hypothesis at the 0.05 level, **MacK in non-Haug-Michelis (1999) p-values

There is one cointegrating vector as per the Trace statistics and the Max-eigenvalue statistics as seen table 5 above. Hence long-term association exists amid the security market and the other variables under study. The estimated cointegrating coefficients for the TASI index build on the first normalized eigenvector is given below.

$$B_1 = (1.00, 0.024435, 0.253727, -1.069596, 0.872011, -0.116439) \quad (6)$$

As all the variables converted to log, there exist a long-term elasticity measures. Hence cointegrating relationships can be stated as:

$$\text{TASI} = -15.27766 - 0.024435\text{INF} - 0.253727\text{SIR} + 1.069596\text{MS} - 0.872011\text{COP} \quad (7)$$

(0.19756) (3.21808) (-6.09287) (5.70001)

The bracketed values represent the t-statistics of the coefficients. The coefficients of the INF, SIR, and COP are negative, while the coefficient of M.S. is positive. The intercept term is negative. The co-integration results depict relationships between the security price and inflation to be negative and statistically insignificant, which is similar to the results obtained by (Fama, 1981). It explains the theoretical fact of higher inflation raises the input costs and reduces the profitability and thus impacting the overall economic activity, as the equity return and profitability are linked positively, and therefore increase inflation will reduce the stock price. Nevertheless, this result is in contradiction to the findings by (Maysami, Howe, & Hamaz, 2004 and Ratanapakorn & Sharma, 2007) stated positive associations amid the stock price and inflation, indicating equity serving as a hedge against the price rise. The security price has negative and statistically significant associations with the short-term interest rate. It is similar to the fact that borrowing becomes costly, and if the enterprise is already debt-ridden, it will lead to the further outflow of capital, and this, in turn, will lead to reduced EPS. The market sentiments for shares belonging to such companies will not be favourable, and the demand for the stock will go down, thus pulling down the prices of equity. (French, Schwert, & Stambaugh, 1987) concluded similar results of the negative correlation between security price and interest rate. The money supply has positive and substantial associations with security prices. It is the same as the conclusions of (Mukherje & Naka, 1995), (Maysami, Howe, & Hamaz, 2004), (Ratanapakorn & Sharma, 2007).

The error correction coefficient for TASI, the proxy of the share price index, is negative(-0.122801) with the corresponding t-value (-3.52732), which is statistically significant. It is suggestive of the fact that the stock price can reestablish equilibrium or the speed of adjustment is approximately equal to 12 % (see table 6). The value of R² explains that only 19 percent of the variation in TASI is by inflation, short-term interest rate, money supply, and crude oil prices. The exceedingly significant F statistics indicate the overall significance of the model and is fitted well. The robustness check of the model further confirms the fact that it does not have the problem of serial correlation and heteroscedasticity. The residuals of the model represent the normally distributed, p-value of the Jarque-Bera statistics is 0.5811, higher than 5 %, indicating the normality of the model.

Table 6: Vector Error Correction Model Findings

TASI(-1)	INF(-1)	SIR(-1)	MS(-1)	COP(-1)	Constant
1	0.024435	0.253727	-1.069596	0.872011	15.27766
	(-0.12368)	(-0.07884)	(-0.17555)	(-0.15298)	
	[0.19756]	[3.21808]	[-6.09287]	[5.70001]	

Coefficient of error correction term= -0.122801 (-0.03481) [-3.52732]

R²=0.19

F=2.958

DW=2.03

Probability value of LM test=0.56

Probability value of Arch test=0.14

Jarque-Bera= 1.0855 (p-value=0.5811)

Notes: Standard error in () and t-statistics in []

Causality Analysis

To examine the relationships amongst the chosen variables, a system equation of the cointegrating model, as shown below, is set up. The DUMMY variable is included to examine the effect of the oil price shocks on the TASI, representing the Saudi stock price index.

$$D(\text{TASI}) = C(1) * (\text{TASI}(-1) + 0.0244347481622 * \text{INF}(-1) + 0.253727475781 * \text{SIR}(-1) - 1.06959557301 * \text{MS}(-1) - 15.2776590224) + C(2) * D(\text{TASI}(-1)) + C(3) * D(\text{INF}(-1)) + C(4) * D(\text{SIR}(-1)) + C(5) * D(\text{MS}(-1)) + C(6) * D(\text{COP}(-1)) + C(7) + C(8) * \text{DUMMY} \quad (8)$$

The table 7 depicts the coefficients of the model. The value of C(1), which is also the cointegrating equation, is negative and significant as the t-statistics is -3.527319, and the corresponding p-value is 0.0007, lesser than 5 percent, thus showing that a long-run causality running from INF,SIR,MS,COP to TASI.

Table 7: Coefficients of system cointegrating model

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.122801	0.034814	-3.527319	0.0007
C(2)	0.007767	0.113184	0.068626	0.9454
C(3)	-0.065503	0.062431	-1.04921	0.297
C(4)	-0.06943	0.064488	-1.076637	0.2847
C(5)	0.441631	0.365348	1.208797	0.2301
C(6)	0.088488	0.079176	1.117613	0.2668
C(7)	0.03264	0.011014	2.96356	0.0039
C(8)	-0.116439	0.032448	-3.588497	0.0006

The Wald test is for testing the short-run causality where the null hypothesis is that C(3) =C(4)=C(5)=C(6)=C(7)=C(8)=0 which means that if the collective impact of the coefficient is zero, then there is no short-run causality to TASI the dependent variables due to INF, SIR, MS, COP and DUMMY. The chi-square value depicted in table 8 is 19.4, and the corresponding p-value is 0.16 percent, lesser than 5 percent. Hence the null hypothesis of no short-run causality is rejected. Therefore there is short-run causality to the dependent variables running from INF, SIR, MS, COP, and DUMMY. Therefore in the model, both long and short-run causality is present. The same result is obtained by (Hosseini, Ahmad, & Lai, 2011) in their study on India and China stock market. Further from table 7, we can see that the oil price shock represented by the DUMMY variables has got negative relationships with the TASI, the proxy Index representing the Saudi stock market, and is statistically significant with the t-statistics of -3.5884 and the corresponding p-value of 0.0006, which is similar to the findings by (Babatunde & Adenikinju, 2103).

Table 8: Wald test

Test Statistic	Value	df	Probability
F-statistic	3.880113	(5, 86)	0.0032
Chi-square	19.40057	5	0.0016

CONCLUSION, RECOMMENDATIONS AND POLICY IMPLICATIONS

This research delves to find the factors influencing the Saudi stock market. The basis for using the macroeconomic indicators and the crude value is on the assumption that it represents the economic status of the country broadly. The result indicates that the variables selected for the research are nonstationary at the level and stationary when we take the first difference of the variables. TASI, the proxy for the Saudi stock market, shows long-term relationships with the selected variables for the study. The Johansen test of co-integration confirms a long-term relationship amid the crude oil price and the other macroeconomic variables. The findings indicate that inflation, short-term interest rate, and crude oil value are negatively related, while the money supply is positively related to the TASI.

The results of the VECM model shows that the determination of TASI by the error correction coefficient is significant and negative. The study reveals that the stock price can reestablish equilibrium, or the speed of adjustment is approximately equal to 12 percent. It means that the previous period deviation is corrected in the current year by 12 percent. The R² depicts that 19 percent of the changes in the stock price index is due to the factors selected for the study. The system cointegrating equation model result is both negative and statistically significant. Thus, implying a long-run causality running from inflation, short-term interest rate, money supply, and the oil price shocks represented by DUMMY to TASI. The Wald test also confirms the presence of short-run causality to the dependent variables running from inflation, short-term interest rate, money supply, and the crude oil price shocks represented by DUMMY.

The study confirms the occurrence of both short and long-term causality to the Saudi stock market from the selected variables for the study. Findings suggest that inflation, short-term interest rate, oil price shocks have got a negative association with the stock market. Therefore, the principal recommendation for the policymaker to check the inflationary

trend attributed to the increase in the lending rate. Hence adequate emphasis should be placed on the monetary policy to check inflation by regulating the short-term interest rate. During the period of oil price decline increased money supply can act as a deterrent giving a boost to the falling market. Further to avert shocks resulting from the oil price on the stock market, a broad-based economy, more diversified and less dependent on crude oil should be developed. Therefore focussed attention needs to be given to the stock market growth and development as it is a crucial determinant of economic growth. The present study limitation is that only three macroeconomic variables are chosen for the study; more variables use can show better results.

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