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RELATIONSHIP BETWEEN MUSCAT SECURITIES MARKET AND MACRO-ECONOMIC VARIABLES

Ms.Neelufer Aslam, Management Department, Waljat College of Applied Sciences, Muscat. neelufer.aslam@gmail.com, GSM:00-968-96174054

Dr. Soofi Asra Mubeen, Business Studies Department, University of Technology and Applied Sciences, Muscat. soofiam@rediffmail.com, GSM: 00-968-92746691

Ms.Qudsia Nazneen, Business Administration and Economics Department, Mazoon College,Muscat. qudsia702@gmail.com, GSM: 00-968-96378525

Abstract

The objective of this chapter is to examine the causal relationship between Muscat Securities Market performance (measured through MSM30 and Shariah Index) and selected macro-economic variables (Money Supply, Crude Oil Prices, Exchange Rate and Interest Rate) for the study period 1st January 2013 till 30th August 2019. The study employs the Auto Regressive Distributed Lag Model to examine the impact of Macro-economic variables on Stock market performance. Direction of causality is inferred through VAR based Granger Causality and Wald Coefficient restriction test. From the results, short run unidirectional causal effect from broad money supply and real oil prices on stock indices is inferred. The study also examined effect of innovations in macro-economic variables on the present and future values of MSM Indices and the percentage of unexpected variations in MSM indices due to shocks from macro-economic variables. The findings of the Variance Decomposition and Impulse Response Functions show that 100% of variations in MSM 30 and Shariah Index in period 1 are explained by the variables themselves and the response of MSM 30 and Shariah Index to its own innovation is positive where as it is negative to that of real oil prices and money supply.

Keywords: MSM, Macro-Economic Variables, ARDL, Granger Causality

Introduction

Capital markets refer to the institutional framework through which savings are mobilized for long-term, productive investment at reasonable cost. The capital market is segmented into two complementary markets- the primary or new issues market and the secondary market. The secondary market also referred to as the stock market or stock exchange which provides a venue for existing investors to disinvest and new investors to enter the market. It provides liquidity to the investors and channels funds to productive economic activities. Thus, a well-functioning stock exchange is a pre requisite to economic growth.

Stock prices are an indicator of the economic and political well-being of a country. As these prices react to economic and political changes, investors, policy makers and academicians keep a close watch on stock prices. The stock index is used as a yardstick to monitor changes in the stock market. In the premise that the stock index responds to the prevailing and anticipated economic conditions, a study to analyze the relationship between stock index and macro-economic variables is pertinent.

Oman is an open, oil-based economy striving towards diversification and sustainable development. In 2015, Oil prices slumped from 103.23$ per barrel in 2014 to 56.45$ per barrel. As a consequence of this steep decline, annual growth rate of GDP retarded to -15.2% and the fiscal deficit plummeted to -4,314 million OMR (Statistical Year Book, 2018) . Policies targeted at recovery and diversification to non-oil resources led to recovery and in 2018 the GDP grew at an annual rate of 12.3%. Money supply is an effective instrument through which the government can accelerate economic growth. By increasing money supply, the monetary authorities inject demand for consumer and investment goods in the economy. The monetary policy tools viz money supply and interest rates not only have an impact on the economy but also on stock prices. This study endeavors to examine the causal relationship between selected macroeconomic variables and the stock index.

The Muscat Securities Market (MSM) was established on 21st June 1988, by Royal Decree Number 53/88. In 2018, it provided 1.8 Billion RO of funding to the financial, industrial and service sector. The huge value of funding indicates that it has been successful in mobilization of savings. By contributing 34% to GDP at market prices, the capital market is a significant contributor to Oman's economy. The overall value of this sector was 18.18 Billion RO in 2018. The MSM Index was launched in 1992, with June 1990 as base date and base value of 100 points. In January 2004, the base value was changed to 1000 points and in July of the same year, it was renamed as MSM 30. The MSM 30 Index comprises of the thirty-best performing listed companies (Muscat Securities Market, 2018). Each of the three sectors, financial, industrial and services, contribute ten companies each. To measure the stock performance of shariah compliant companies the Shariah Index with 30th June, 2013 as the base date and 1000 as the base value was introduced. The Shariah Index includes fifteen best performing listed shariah compliant companies.

The objective of this chapter is to examine the causal relationship between Muscat Securities Market performance (measured through MSM30 and Shariah Index) and selected macro-economic variables (Money Supply, Crude Oil Prices, Exchange Rate and Interest Rate) for the study period 1st January 2013 till 30th August 2019.

This objective will be attained by answering the following research questions:

1. Is there a causal relationship between macroeconomic variables included in the study and stock market index?
2. How does the stock market index respond to shocks from macro-economic variables?
3. What is the effect of innovations in macro-economic variables on the present and future values of MSM Indices?

Review of Literature

The Random Walk (Kendall, 1953) model states that stock prices follow a random walk i.e. previous price trends are not useful to predict the current prices. Fama (1965) introducted the concept of Efficient Capital Market. He defined an efficient capital market as one in which stock prices fully reflect all the available information.In 1970, Fama (Fama, 1970) elaborated the

definition of efficient market to include the weak form (in which only historical stock price information) , semi-strong (where all publicly available information) and strong form (where all publicly and privately available information) is used to predict asset prices. An implication of this theory is that changes in macro-economic variables will not affect stock prices (Sibel, 2014) and only new "news" abouts the company policies will affect the value of the underlying stock. The Arbitage Pricing theory put forth by the economist Stephen Ross (Ross, 1976) states that a linear relationship exists between an asset's expected returns and the macro economic factors that affect the assets risk. The theory, however, dinot specify the number and type of macroeconomic variables to include.Empirical literture on the relationship between stock prices and macroeconomic variables have included varying number and type of variables.

Assagaf,et.al.,(2019) has aimed to analyze the effect of macroeconomic variables on the overall returns of the shares in a company which is an alternative in the composite stock price index changes. Multiple linear regression analysis technique has been used by taking secondary data for a twenty months period from November 2016 to June 2018 and found that there is a significant effect on companies of the Indonesia Stock Exchange on the macroeconomic variables which consist of Interest rates, Foreign exchange rates, stock returns, inflation rates and money supply.

Kitati,et.al.,(2015) examined the relationship between Nairobi Stock Index and selected macroeconomic variables from 2008 January to 2012 December. The macro economic variables included in the study were exchange rate, interest rate and inflation rate. The findings suggested that interest rate had a predominant effect on stock market price indices as compared to the other macroeconomic variables.

Gurloveleen K & Bhatia BS (2015) tried to analyze the impact of macroeconomic variables on the functioning of Indian stock market. The macro-economic variables selected for this study are money supply (M3), exchange rate (Rupee-Dollar rate), foreign exchange reserve (Total foreign exchange reserve in Billion Rs), foreign institutional investors (Net foreign investment in Billion RS), gross fiscal deficit (Gross Deficit in Billion Rs), index of industrial production and trade balance. The Indian stock market is proxied by BSE 500. The study tested the stationarity of the variables through the Augmented Dickey Fuller Test. Pair wise Granger causality test showed the absence of causal relation between stock index and macro economic variables.

Hunjra, et.al.,(2014) determined the impact of interest rate, exchange rate, and GDP and inflation rate on stock prices in Pakistan. The monthly data of eleven years ranges from 1st January, 2001 to December 31st 2011 was used for this research study. Granger causality and cointegration tests were applied on the data to estimate the possible impact of macroeconomic variables on stock prices and findings revealed that there is no relationship between dependent variable and explanatory variables in short run. The results also showed that there is strong relationship in long run. The study concluded that in long run there is significant relationship between macroeconomic variables on stock prices.

Mohanamani & Sivagnanasithi, (2014) investigated the impact of macroeconomic variables on the behaviour of Indian Stock market. Monthly data for the period of 2006:04 to 2013:07 of about six macro-economic variables such as BSE Sensex, Call Money rate, Exchange rate between Indian Rupees and US dollar, Foreign Institutional Investment, Industrial productivity, money supply and whole sale price index has been taken up for study. To test the relationship between stock market and the 6 macroeconomic variables Descriptive Statistics, Pearson's

correlation matrix, Unit root test and Granger Causality tests have been applied. The analysis reveals that Indian stock market is positively whole sale price index, money supply and industrial productivity. The exchange rate and inflow of foreign institutional investment are found to be insignificant to Indian Stock market. In the Granger Causality sense, whole sale price index and industrial productivity influence the stock market to a great extent.

Pathan, et.al.,(2013) studied the direction of causality between the stock market and macroeconomic variables of India. Monthly data of major macroeconomic variables which are interest rate, money supply, wholesale price index, exchange rate and Foreign Institutional investment has been taken for the study by using cointegrating relationship and Granger – causality test and provided the evidence of a stable long run equilibrium relationship between the stock market and economic growth in India. The study reconfirms the traditional belief that the real economic variables continue to affect the stock market in the post-reform era in India and also highlights the insignificance of certain variables with respect to stock market.

Ozcan,A.,(2012) made an attempt to know the significant relationship with ISE industry index with macroeconomic variables using monthly data for the period from 2003 to 2010. The selected macroeconomic variables for the study include interest rates, consumer price index, money supply, exchange rate, gold prices, oil prices, current account deficit and export volume. The Johansen's cointegration test is utilized to determine the impact of selected macroeconomic variables on ISE industry index. The result of the Johansen's cointegration shows that macroeconomic variables exhibit a long run equilibrium relationship with the ISE industry index.

Singh,et.al.,(2014) examine for Taiwan the casual relationship between index returns and certain crucial macroeconomic variable namely employment rate, exchange rate, GDP, Inflation and money supply. The analysis is based on stock portfolios rather than single stocks. In portfolio construction, four criteria are used: Market capitalization, price/earnings ratio (P/E ratio), PBR and yield. The purpose was to make a finer point with respect to the relationship between economic growth and stock market especially in terms of stock prices. Empirical findings revealed that exchange rate and GDP seem to affect returns of all portfolios, while inflation rate, exchange rate, and money supply were having negative relationship with returns for portfolios of big and medium companies.

Research Methodology and Data Analysis

The study examines the causal relation between MSM performance and macro-economic variable for the period January 2013 till August 2019. Stock market performance was measured through the MSM 30 Index and MSM Shariah Index. The MSM 30 Index measures the stock market performance of the thirty best companies listed on Muscat Securities Market. MSM30 objectively reflects the price tendency of listed shares. The MSM Shariah Index includes the stock performance of fifteen Shariah compliant companies. The Shariah compliance of these companies is reviewed quarterly and the sample is altered annually in May. Monthly data up till 2018 on these two Indices is sourced from Annual Statistical Bulletin published by Muscat Securities market. Data for 2019 is sourced from monthly price bulletins.

The macroeconomic variables included in the study are money supply, crude oil prices, exchange rate and interest rate. Broad Money Supply (M2) is used as a proxy for money supply. M2 includes currency and coins in circulation (M1) and near money assets which can be easily converted into cash. Data on average monthly crude oil prices per barrel was converted from US Dollar to Omani Rial and discounted for inflation to get real crude oil prices. The stock indices,

M2 and real crude oil price series were transformed into their logarithmic forms to avoid heteroskedasticity. The Real Effective Weighted Exchange Rate with base year as 1990 and the weighted time deposit rate were used as a proxy for exchange rate and interest rate respectively. The monthly data on macro-economic variables was sourced from the NCSI website.

Before starting with the econometric analysis, the characteristics features of the time-series were examined graphically and through summary statistics. The stationary properties of the variables were tested through the Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) test. As the variables were integrated of order one, the study adopted the Auto Regressive Distributed Lag (ARDL) model. In the ARDL, the independent and dependent variables can have different lag lengths. The study than determined the optimal lag length using the appropriate information criterion. After estimating the ARDL model, existence of long run relationship was verified through Long Run Form and Bounds test. The Direction of Causality was examined through Vector Auto Regression (VAR) based Granger Causality Test. The robustness of the model was tested through Jarque Bera test for Normality, Breusch-Pagan-Godfrey test for heteroskedasticity and Breusch-Godfrey Serial Correlation LM Test for autocorrelation. Parameter stability was assessed through CUSUM and CUSUM Squares test. To examine the percentage of unexpected variations in MSM indices due to shocks from macro-economic variables the Variance Decomposition of Forecast Error was used. Impulse Response Functions were used to trace the effect of innovations in macro-economic variables on the present and future values of MSM Indices. The analysis was carried out using E-views 10.

Trend of MSM Indices and Summary Statistics

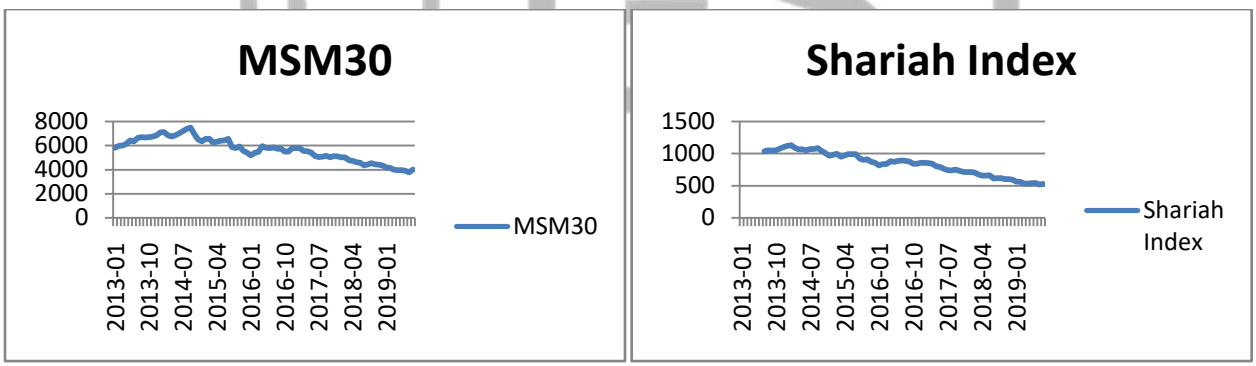


Table 1: Summary Statistics

	MSM30	SH-Index	M2	ROP	RIR	RER
Mean	5652.17	839.7047	14798.15	27.32488	1.844204	100.75
Median	5776.74	855.36	15483.8	24.44634	1.74142	101.8754
Skewness	-0.17938	-0.20992	-0.67536	0.388888	0.513993	-0.63404
Kurtosis	-0.8983	-1.11244	-0.75133	-1.24385	-0.64754	-0.99593
Maximum	7484.2	1131.75	17395.8	43.29941	3.577673	106.8509
Minimum	3760.6	517.16	11024.4	10.54689	0.431857	91.81554

Source: Authors own calculation using E-views 10
ROP: Real Crude Oil Prices, RIR: Weighted Time Deposit Rate and RER: Real Effective Weighted Exchange Rate

The above graph and table shows the trend in MSM 30 and Shariah Index. MSM 30 and Shariah Index reached its peak in September, 2014 and February, 2014 respectively, after which there is a steady decline. There is a considerable decline in stock prices in the years following

2014.Broad Money Supply (M2) follows an upward trend. Domestic Liquidity reached its peak in December, 2018 and the MSM 30 and Shariah Index fell by 2% and 1.75% respectively, indicating a plausible negative relation between them. Up till October 2014, crude oil prices hovered above the $100 per barrel mark, after which there is steep decline. Oil prices reached to a minimum of $27.4 per barrel in March 2016.During this period both, MSM 30 and Shariah Index increased by 1.34% and 0.42% respectively, indicating a possible negative relation between crude oil prices and stock index. Real interest rates and real exchange rates depict an upward sloping trend. The following table presents descriptive statistics of stock indices and macro-economic variables.

Stationary Status and Lag Order Selection

The stationary properties of the two Stock Indices and macro-economic variables were tested using the conventional Augmented Dickey Fuller (ADF) and Phillips –Perron (PP) test. The results of the test are tabulated as follows:

Table 2: Unit Root Test (ADF & PP)

	At Level		At First Difference		
	ADF	PP	ADF	PP	Inference
MSM 30	0.247369	0.195967	-7.985503***	-7.954276***	I(1)
SH-Index	-2.643727	-2.659710	-8.373167***	-8.375353***	I(1)
LM2	-1.449944	-1.271318	-10.79624***	-10.87069***	I(1)
RER	-1.972230	-1.998832	-8.730935***	-8.731247***	I(1)
ROI	-1.136390	-2.007320	-9.405827***	-15.32930***	I(1)
ROP	-1.815521	-1.501919	-6.216530***	-6.008041***	I(1)

Source: Authors own calculation using E-views 10

There is no sufficient evidence to reject the null hypothesis Ho: The series has at unit root at level data, but at first difference, the results of both the ADF and PP test statistic are significant. Thus it can be concluded that the variables are integrated at order one I (I).

After ascertaining the order of integration, the optimal lag length of each variable was determined using the information criterion. The following table presents the selected lag length by the information criterion for each variable:

Table 3: Optimal Lag Length

Variables	Lag	LogL	LR	FPE	AIC	SC	HQ
MSM 30	1	208.3488	246.4092*	0.000205*	-5.653393*	-5.590640*	-5.628385*
SH-Index	1	207.9317	283.0347*	0.000125*	-6.147215*	-6.081403*	-6.121173*
LM2	2	275.713	3.728049	3.33e-05*	-7.471588*	-7.37746	-7.434076*
RER	1	-107.663	177.3965*	1.181284*	3.004466*	3.067218*	3.029474*
ROI	3	-43.53547	8.064210*	0.215364*	1.302342*	1.427846*	1.352357*
ROP	2	136.8794	8.382556*	0.001495*	-3.667930*	-3.573801*	-3.630418*

Source: Authors own calculation using E-views 10
*indicates lag order selected by the criterion
LR: sequential modified LR test statistic: Final Prediction Error, AIC: Akaike Information Criterion, SC: Schwarz Information Criterion, HQ: Hannan – Quinn Information Criterion

The optimal lag length is one for MSM-30, Shariah Index and Real Effective Exchange Rate, two for money supply and real oil prices and three for real interest rates. After determining the

lag length, the study estimated the relation between stock market index and macro-economic variables using the Auto Regressive Distributed Lag Model (ARDL). Two ARDL models using MSM 30 and Shariah Index as dependent variables were estimated. The following section presents the results.

Relation between MSM 30 and Macro-economic Variables

The ARDL model with MSM 30 as the dependent variable is :
LMSM30 = C(1)*LMSM30(-1) + C(2)*LM2 + C(3)*LROP + C(4)*RER + C(5)*RIR + C(6)
and the estimated equation is : LMSM30 = 0.886567727864*LMSM30(-1) - 0.137605851327*LM2 - 0.0304076536671*LROP - 0.00113323637438*RER - 0.00284121544791*RIR + 1.1588860475

Akaike info criterion (AIC) selected one lag for the dependent variable and zero lags for the explanatory variables. The R-Squared and Adjusted R-Squared values are 0.972932 and 0.971078 respectively, implying that 97% of the variations in the model can be explained by money supply, real exchange rate, real interest rates and real oil prices. The F-statistic 524.7842 (p= 0.00) implies that jointly the independent variables are significant in explaining the dependent variables. The Durbin Watson statistic for the model is 1.984887 implying the absence of first order serial correlation in the error terms. The following table presents the estimated short run coefficients:

Table 4: ARDL Estimates (Dependent Variable-MSM 30)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
ΔLMSM30	0.886568***	0.043141	20.55039	0.00
LM2	-0.13761**	0.058666	-2.34558	0.0217
LROP	-0.03041*	0.015898	-1.91273	0.0597
RER	-0.00113	0.000716	-1.58363	0.1176
RIR	-0.00284	0.003255	-0.87291	0.3856
C	1.158886	0.340893	3.399558	0.0011

Source: Authors own calculation using E-views 10
***, **,* indicates statistically significant at less than 1%, 5% and 10% level respectively.

From the above table 4, it can be observed that the first lag of MSM -30 has a significant positive relation with its own self. Money supply and real oil prices have a significant negative relation.

Long Run relationship was examined through the Long Run Form and Bounds test. The F-statistic (F= 3.19, k = 4) and absolute value of the t-statistic (t= -2.63) lies between the 10% I (O) and I (1) bounds. Thus, there is no sufficient evidence to reject the null hypothesis Ho: No levels relationship.

The causal relationship among the variables is examined through the Vector Auto Regression Model (VAR) based Granger Causality Test. The results are presented in the following table:

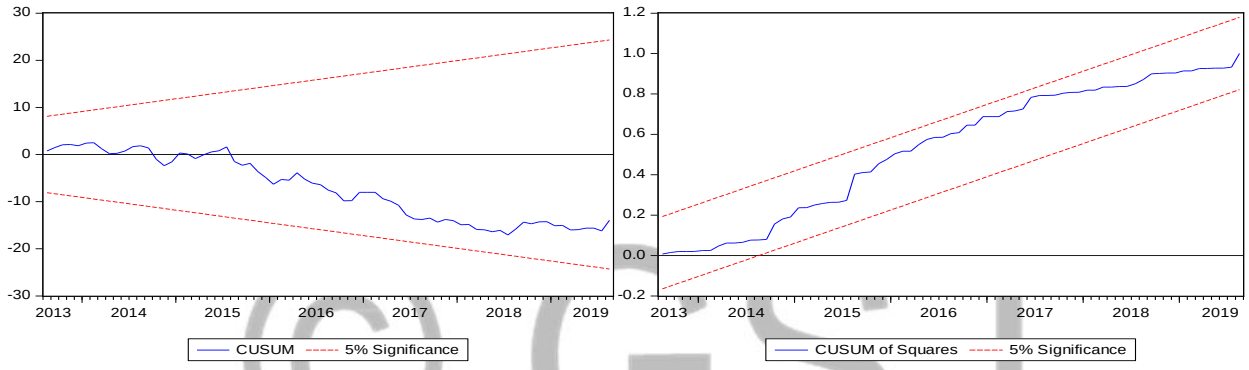
Table 5: VAR Granger Causality (MSM30 & Macro-economic Variables)

	Explanatory Variables				
Dependent Variable	LMSM30	LM2	LROP	RER	RIR
LMSM30	NA	8.308146***	5.489498***	1.447111	0.004020
LM2	0.142747	NA	0.208441	0.610170	0.509426
LROP	1.121907	0.896411	NA	12.21073	0.537748

RER	0.105205	1.958331	2.205403	NA	1.082365
RIR	11.44672***	1.785005	3.976342	0.074653	NA

Source: Authors own calculation using E-views 10
Reported values are Chi-Square Statistic
***, **,* indicates statistically significant at less than 1%, 5% and 10% level at 1 degree of freedom respectively.

Money Supply (M2) and Real Crude Oil Prices have a unidirectional causal effect on MSM 30. A 1% increase in M2 and Crude Oil Prices causes a 0.13% and 0.03% decrease in stock prices under ceteris paribus conditions. MSM 30 has unidirectional causal effect on real interest rate.
The robustness of the model was tested through normality of the residuals using the Jarque Bera Normality test, serial auto correlation among the residuals using Breusch-Godfrey Serial Correlation LM Test and hetroskedasticity among error terms was tested using Breusch-Pagan-Godfrey test. There is no sufficient evidence to reject the null hypothesis that the residuals are normally distributed (JB=1.08, p = 0.96), there is no serial correlation up to two lags F (2, 71) = 0.878233, P=0.42 and the model is homoscedastic F(5,73)= 0.954237, P= 0.42.Model stability was inferred from the CUSUM and CUSUM Squares graph presented below.



Relation between Shariah Index and Macro-economic Variables

The ARDL model LSHI = C(1)*LSHI(-1) + C(2)*LM2 + C(3)*LM2(-1) + C(4)*LROP + C(5)*LROP(-1) + C(6)*RER + C(7)*RIR + C(8) was estimated to examine the relationship between stock prices of Shariah compliant companies and macro-economic variables. The estimated equation is: LSHI = 0.91140326935*LSHI(-1) + 0.256019981826*LM2 - 0.467946336577*LM2(-1) + 0.0126433972484*LROP - 0.0522948872609*LROP(-1) - 0.000550135209455*RER - 0.00143541256314*RIR + 1.25221007221

Akaike info criterion (AIC) selected one lag for the dependent variable, money supply and real oil prices and zero lags for real exchange rate and real interest rate. The R-Squared and Adjusted R-Squared values are 0.990839 and 0.989853 respectively, implying that 99% of the variations in the model can be explained by money supply, real exchange rate, real interest rates and real oil prices. The F-statistic 1004.35, (p= 0.00) implies that jointly the independent variables are significant in explaining the dependent variables. The Durbin Watson statistic for the model is 2.20 implying the absence of first order serial correlation in the error terms. The following table presents the estimated short run coefficients:

Table 6: ARDL Estimates (Dependent Variable-SH-Index)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
ΔLSHI	0.911403***	0.033618	27.11096	0.00
LM2	0.25602	0.210337	1.217192	0.2279
ΔLM2	-0.46795***	0.201147	-2.32639	0.0231

LROP	0.012643	0.032106	0.393798	0.695
ΔLROP	-0.0523*	0.031293	-1.67115	0.0995
RER	-0.00055	0.000556	-0.98881	0.3264
RIR	-0.00144	0.002615	-0.54885	0.585
C	1.25221	0.370071	3.3837	0.0012

Source: Authors own calculation using E-views 10
***, **,* indicates statistically significant at less than 1%, 5% and 10% level respectively.

The Wald Coefficient Restriction test was used to ascertain the joint significance of money supply and its first lag, and real oil prices and its first lag. From the results of the Wald test for joint significance of money supply, F(2,65)=6.83, P=0.00 and Chi Square (2) =13.66, p =0.00, it can be concluded that that money supply has causal relationship with Shariah Index. Similarly, Real Oil price and its first lag has significant causal relationship with Sharia Index, F(2,65)=5.30, P=0.00 and Chi Square (2) =10.61, p =0.00.

The causal relationship among the variables is examined through the VAR based Granger Causality Test. The results are presented in the following table:

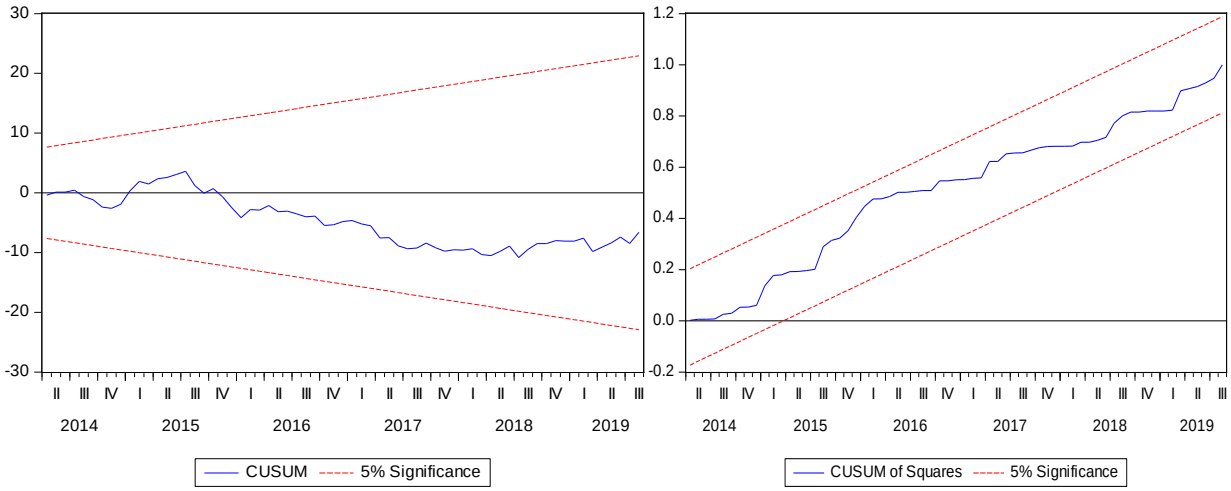
Table 7: VAR Granger Causality (Shariah Index & Macro-economic Variables)

	Explanatory Variables				
Dependent Variable	LMSM30	LM2	LROP	RER	RIR
LSH-I	NA	13.5742***	12.33562***	0.862128	0.190502
LM2	1.770250	NA	0.204713	0.539645	0.107939
LROP	2.220623	0.048789	NA	11.73414	1.350852
RER	0.194962	2.722204	3.308556	NA	0.803333
RIR	7.237823***	0.538026	2.452967	0.006949	NA

Source: Authors own calculation using E-views 10
Reported values are Chi-Square Statistic
***, **,* indicates statistically significant at less than 1%, 5% and 10% level at 1 degree of freedom respectively.

A unidirectional causal relationship exists between M2 and real oil prices and Shariah Index. Shariah Index has unidirectional causal effect on real interest rate.

The robustness of the model was tested through normality of the residuals using the Jarque Bera Normality test, serial auto correlation among the residuals using Breusch-Godfrey Serial Correlation LM Test and hetroskedasticity among error terms was tested using Breusch-Pagan-Godfrey test. There is no sufficient evidence to reject the null hypothesis that the residuals are normally distributed (JB=2.35, p = 0.31), there is no serial correlation up to two lags F (2, 71) = 0.873329, P=0.42 and the model is homoscedastic F(7,65)= 1.76, P= 0.11.Model stability was inferred from the CUSUM and CUSUM Squares graph presented below.



Variance Decomposition of Forecast Error

The relative impact of macro-economic variables on the stock market index was analyzed through VDC. In period 1, 100% of variations in MSM 30 and Shariah Index are explained by the variables themselves. As we move from period 1 to period 10, Money supply explains 14% and 22% of variation in MSM 30 and Shariah Index respectively. In the short run (period 1 to period 3), real oil prices explain 2.30% of variation in MSM 30. These findings are in line with the ARDL results which report a weakly significant effect of real oil prices on MSM 30.In the long run money supply and real oil prices have relatively greater impact on the Shariah Index than MSM 30. The results are presented in the following table:

Table 8: Variance Decomposition of MSM 30 & SH-Index

	Variance Decomposition of LMSM30					Variance Decomposition of LSHI				
Period	LMSM30	LM2	RER	RIR	LROP	LSHI	LM2	RER	RIR	LROP
1	100.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00
2	98.92	0.33	0.19	0.00	0.55	97.13	1.11	0.07	0.10	1.58
3	96.71	1.11	0.43	0.01	1.75	91.54	3.38	0.11	0.37	4.60
4	93.67	2.29	0.60	0.03	3.40	84.59	6.32	0.10	0.74	8.24
5	90.08	3.81	0.68	0.10	5.33	77.39	9.52	0.08	1.16	11.85
6	86.17	5.60	0.68	0.20	7.36	70.62	12.66	0.13	1.54	15.06
7	82.13	7.59	0.62	0.31	9.35	64.57	15.58	0.28	1.86	17.72
8	78.11	9.70	0.56	0.43	11.20	59.33	18.20	0.56	2.11	19.81
9	74.20	11.87	0.51	0.55	12.86	54.85	20.51	0.97	2.29	21.38
10	70.47	14.06	0.51	0.65	14.30	51.07	22.51	1.49	2.41	22.52

Source: Authors own calculation using E-views 10

Impulse Response Function

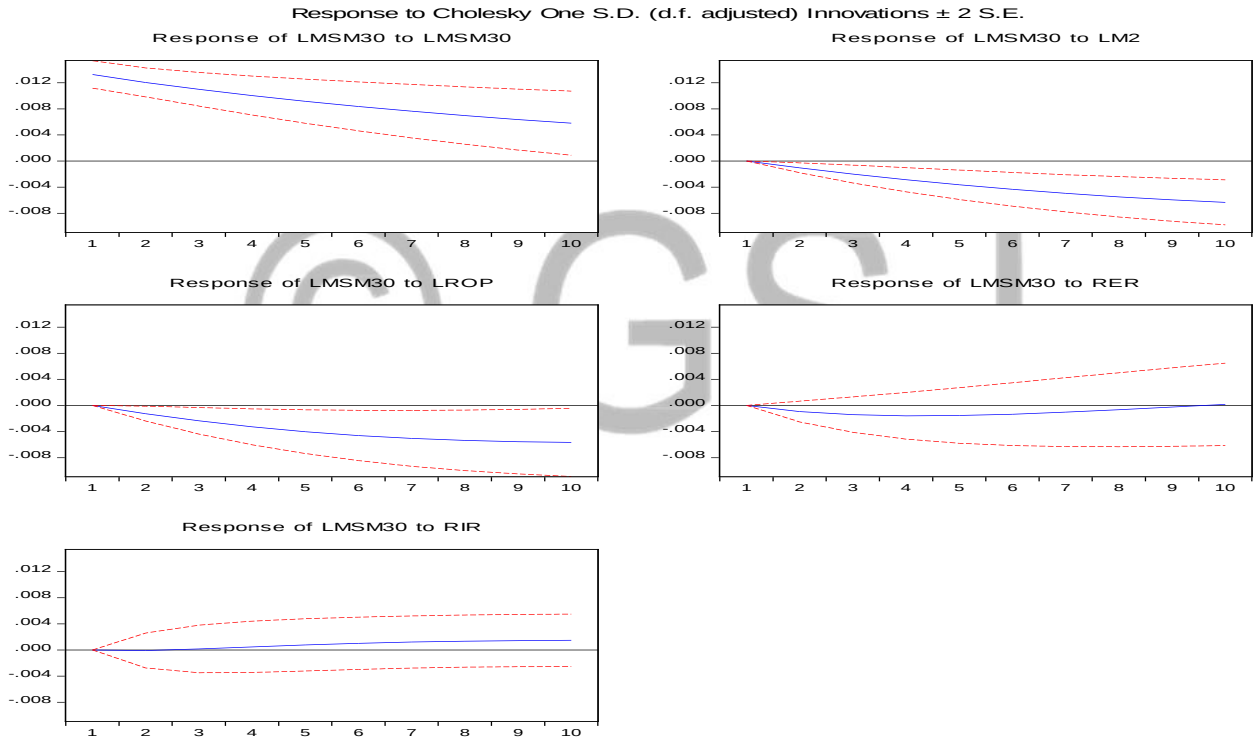
The response of MSM 30 and SH-Index to a one standard deviation shock is tabulated below. The response of MSM 30 and Shariah Index to its own innovation is positive where as it is negative to that of real oil prices and money supply. These findings validate the negative causal relationship reported by the ARDL model VAR based Granger Causality.

Table 9: Response of MSM 30 & SH-Index

Response of MSM 30						Response of SH-Index				
Period	LMSM30	LM2	RER	RIR	LROP	LSHI	LM2	RER	RIR	LROP
1	0.013	0.000	0.000	0.000	0.000	0.010	0.000	0.000	0.000	0.000
2	0.012	-0.001	-0.001	0.000	-0.001	0.009	-0.001	0.000	0.000	-0.002
3	0.011	-0.002	-0.001	0.000	-0.002	0.008	-0.003	0.000	0.001	-0.003
4	0.010	-0.003	-0.001	0.000	-0.003	0.007	-0.004	0.000	0.001	-0.004
5	0.009	-0.004	-0.001	0.001	-0.004	0.007	-0.004	0.000	0.002	-0.005
6	0.008	-0.004	-0.001	0.001	-0.005	0.006	-0.005	0.001	0.002	-0.005
7	0.008	-0.005	0.000	0.001	-0.005	0.006	-0.006	0.001	0.002	-0.006
8	0.007	-0.005	0.000	0.001	-0.005	0.005	-0.006	0.002	0.002	-0.006
9	0.006	-0.006	0.000	0.001	-0.006	0.005	-0.006	0.002	0.002	-0.006
10	0.006	-0.006	0.001	0.001	-0.006	0.005	-0.006	0.002	0.002	-0.006

Source: Authors own calculation using E-views 10

The Impulse response functions are graphically presented below:



Conclusion

The stock market is an important pillar of the economy and the stock prices are an indicator of the economic and political well-being of a country. This chapter examined the causal relationship between Muscat Securities Market performance and selected macro-economic variables (Money Supply, Crude Oil Prices, Exchange Rate and Interest Rate) for the study period 1st January 2013 till 30th August 2019. Muscat Securities Market performance was measured through MSM 30 and Shariah Index. Broad Money Supply (M2), average monthly crude oil prices per barrel, weighted time deposit rate and Real Effective Weighted Exchange Rate with base year as 1990 were used as proxies for money supply, crude oil prices, exchange rate and interest rate. Broad Money Supply and Oil prices had a significant negative unidirectional short run causal relation

with the stock market. The findings also suggest that, stock market performance has a unidirectional causal relation with real interest rate.

Results from the empirical analysis undertaken in this research confirm that the macroeconomic variables are not co-integrated with stock market performance in the long run but in the short run. The relationship between stock market performance and interest rate stems from the tendency of firms to borrow when cost of borrowing is low. It is therefore expected that a higher cost of borrowing will discourage borrowing and investments. When firms are discouraged from borrowing to finance organic investments, their performance gets hindered. Consequently, capital market performance start worsening.

Research study results indicate positive relationship between exchange rate and capital market performance. This result stems from the fact that currency depreciation will attract investment from foreign firms and individuals into a country. Hence, there will be a resultant positive effect on the performance of capital markets.

Another implication could be a dynamic relationship between inflation and stock market performance in the long run while the beneficial impact of growth in economic activities on stock market performance echoes a widely held view that stock market performance is strongly linked with economic performance.

Another implication could be in the form of empirical result that has also emerged from this study which reflect negative effect of trade on stock market performance. This is however not surprising given the fact that Sultanate of Oman is essentially a subsistence economy given its high dependency on proceeds from the export of crude oil. Also, a good number of listed firms are involved in the upstream and downstream sectors of the petroleum industry. Banks are also heavily involved in financing imports and exports. Thus, volatility in the international crude prices affect economic activity in the country, which will in turn result in a negative effect on the performance of listed firms, resulting in the worsening of the stock market performance.

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