



Short Run and Long Run Relationships between Saudi Stocks

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ABSTRACT

The main objective of this study is to know whether short and long run relationships exist between stock values in the Saudi market. For that purpose, the authors extracted daily stock value data from five distinct Saudi economic sectors. Using modern statistical techniques through MGARCH (DVEC) and error correction models, the authors estimated the stock return variances and concluded that stock values are correlated. On this basis, stocks were found to be stable and safe and detained larger effects on the rest of stocks (Rajhi, banking sector), some were unstable (Bahri, the national shipping carrier), some have moderate effects (Etisalat, Telecommunication) and others have no effects such as Almarai (Food industries) and Sabic (petrochemicals). Overall, this study concludes that the Saudi market is stable and safe.

Keywords: Error Correction Model, M GARCH-VEC, Saudi Market

1. INTRODUCTION

Exchange stock markets are among the main indicators of the situations of economic sectors. Accordingly, governments as well as investors look deeply at market indices to thoroughly, manage internal and external transactions now and into the future. Expectations about economic life are fundamentally based on stock movements. Stock market upswings or downswings could have serious impacts on global economic status. In order to gain people confidence and involvement, they should be safe and stable.

In order to insure safety and stability conditions over stock markets and to allow governments as well as private corporates carrying out accurate economic plans, short and run relationships among stock values should be scrutinized. This study examines this issue regarding the Saudi stock market. This choice is motivated by the importance of the Saudi stock market in the gulf region and its undoubted influence of its economy over neighboring and distant countries.

The main question this study asks is about short and long relationships between stock values in the Saudi exchange

market. The authors also explore whether the directions of these potential effects vary or not over the time range. This study provides detailed information on stock stability, contributes to the body of knowledge about the Saudi market situation and enlightens decision makers about the best strategies they could implement regarding stock value variations. From a technical standpoint, this study sheds light on modern techniques such as MGARCH and error correction models to assess and predict stock return returns.

2. LITERATURE REVIEW

Univariate ARCH/GARCH models were proved to explain stylized facts of univariate time series in a satisfactory manner. However, these models fail to perform a simultaneous examination of multivariate time series. For that, multivariate time series were proposed. Multivariate generalized autoregressive conditional heteroscedasticity models describe correlation volatilities for time-varying features. They allow dynamic processes for whole time varying variance –covariance matrix of time series and thus jointly study first and second moments. The main applications of these models are portfolio management and hedging.

Two alternatives for modeling variance-covariance matrix are highlighted. The first multivariate GARCH model for conditional variance-covariance matrix is general, but very difficult to implement in practice. Bollerslev (1990) introduced a simplified version of VEC model which largely reduces the number of parameters. Engle and Kroner (1995) proposed the BEKK as a restricted version of the VEC model.

Cointegration can study potential long-run relationships between many series. Co-integration relationships are more consistent than cross-section or stationary time series data regression since they provide more consistent least squares and parameter estimations (Stock, 1987). However, cointegration tells little about short run dynamics. Accordingly, error correction models are integrated to cointegration to provide comprehensive models that combine short and long run dynamics. The result of such integration states that the change in Y in any period depends on the change in X , the discrepancy between Y_{t-1} , and the predicted value by cointegration. The last term is the error correction mechanism which is the effect of the term that reduces the discrepancy between Y_t and its cointegrating level. Its size is proportional to this discrepancy.

Bley and Saad (2015) assessed the forecasting ability of two sets of models for the estimation idiosyncratic risk of individual Saudi Arabian stocks. The first contains historical volatility-based models. The second is about other conditional volatility-based models. The results show that forecasts are sensitive to the choice of error statistics and that historical volatility-based models appear to be superior. The model employed to generate the underlying idiosyncratic return series incorporates higher moments.

Chowdhury et al. (2017) investigate the autocorrelation structure of stock and portfolio returns in a unique market setting of Saudi Arabia. The authors examined if return autocorrelation of the Saudi Arabian stock market is related to factors such as the day of the week, stock trading, performance on the preceding day and volatility. The methodology of Säfvenblad (2000) investigated the autocorrelation structure of individual stock and index returns. The study also used the methodology proposed by Sentana and Wadhvani (1992) to test the presence of feedback traders in the Saudi stock market. Results show that there is a positive autocorrelation in individual stock, size portfolio and market returns. Size portfolio and market returns are also always shown to be larger than individual stocks. The study reveals again that return autocorrelation is negatively correlated with firm size. Overall, findings suggest that the possible reason for positive autocorrelation in stock returns could be the presence of negative feedback traders who are engaged in frequent profit-taking activities.

Jouini (2013) investigated the links between world oil price and stock sector markets in Saudi Arabia over weekly periods from January 10, 2007 to September 28, 2011. This study applies the VAR-GARCH process developed by Ling and McAlee (2003) to address return and volatility spillovers among time series. Empirical findings confirm the existence of return and volatility transmission between oil price and stock sectors. Spillover effects are unidirectional from oil to some sectors for returns, and bidirectional for volatility patterns with more evident paths from sectors of oil.

Almohaimed and Harrathi (2013) investigated the volatility transmission effect and conditional correlations among crude oil, stock market and sector stock indexes in Saudi Arabia. Using daily data from January 3, 2009 to March 21, 2012 and VAR-BEKK specification, the authors found significant volatility transmission between oil prices and the Saudi stock market. Sector stock returns are also shown to significantly react to oil price changes. In addition, except the Telecom sector, volatility transmission between the stock market and sector stock market returns were substantiated. These results have crucial implications on market participants whose optimal portfolio decisions and risk management policies depend on the characteristics and behaviors of conditional volatility.

3. METHODOLOGY

This study examines the period involving 5-year plan (2011-2016), an important phase in the Saudi economic history. The authors gathered daily information about stock returns from the Saudi stocks market database. One stock was selected from the most important sectors in the Saudi market and economy. These stocks are: Sabic (basic materials), Rajhi (Banking), Etisalat (telecommunication), Maraie (food industries) and Bahri (sea transport). Data from selected stocks are shown in Table 1.

Variances of stock returns and cointegration tests (unrestricted Co-integration Rank Test-Trace test and Max Eigen value tests) were proceeded using the multivariate GARCH model (MGARCH-DVEC). Findings confirmed the existence of long run relationships between stock return variances. The last step is tackling the estimation of the error correction model. In the paper fold different results concerning short run and long run relationships between stocks along with the speed of adjustment of each stock in its interaction with the rest stocks (Table 2).

In the short run, all stocks, except for Rajhi, has constant terms of return variances close to zero. Rajhi stock return variance is accordingly steady stable compared to other stocks. As for the

Table 1: Some information about sample stocks of the study

Financial indicators	Sabic	Rajhi	Etisalat	Maraie	Bahri
Nominal value (SAR)	10	10	10	10	10
Market value (millions SAR)	293,400	101,562	149,600	63,520	1,313,156
Book value (SAR)	52.20	32.99	30.52	16.70	23.43
Book value multiplier	1.88	1.89	2.43	4.73	1.42
Stock profitability (SAR)	4.94	5.37	4.75	3.37	2.99
Profitability multiplier	16.5	11.53	15.11	31.54	11.14

Table 2: Method of estimate DVEC - scalar restriction error correction model

Independent variables	Dependent variables				
	Bahri	Maraie	Etisalat	Rajhi	Sabic
Independent variables (short run)					
Constant	0.00000003 (0.009)	0.000000007 (0.0017)	0.00000001 (0.0043)	-0.000000008 (-0.00341)	0.000000021 (0.00797)
Bahri (D)-1	-0.0015 (-0.056)	0.133347 (4.74981)	0.134181 (7.73198)	0.224711 (13.4659)	0.187075 (9.50305)
Maraie (D)-1	-0.0574 (-2.185)	-0.0727 (-2.647)	-0.01521 (-0.89568)	-0.008746 (-0.53564)	-0.008122 (-0.42161)
Etisalat (D)-1	0.0094 (0.216)	0.04923 (4.7498)	0.008874 (0.31594)	0.105318 (3.89944)	0.034738 (1.09028)
Rajhi (D)-1	0.1001 (2.132)	0.000179 (0.00364)	0.007714 (0.25441)	0.087277 (2.99348)	0.152214 (4.42553)
Sabic (D)-1	-0.0169 (-0.407)	0.04369 (1.0081)	-0.0031112 (-1.16117)	-0.122380 (-4.74996)	-0.139883 (-4.60238)
Independent variables (long run)					
Constant	-0.0012	-0.00006	-0.0001	0.000015	-0.000042
Bahri(-1)		0.04522 (0.4791)	0.082301 (0.4817)	-0.01218 (-0.48226)	0.034333 (0.50612)
Maraie(-1)	22.11 (8.144)		1.819954 (8.0813)	-0.269341 (-8.26158)	0.75923 (8.12281)
Etisalat(-1)	12.15 (2.85)	0.54947 (2.8145)		-0.147993 (-2.89655)	0.41717 (2.86136)
Rajhi(-1)	-82.10 (-15.65)	-3.71276 (-15.7666)	-6.757055 (-15.873)		-2.81884 (-17.4123)
Sabic(-1)	29.13 (7.6)	1.31712 (7.26711)	2.397104 (7.35073)	-0.354756 (-8.16279)	
Speed of adjustment	0.00028 (0.638)	-0.04428 (-4.40086)	-0.006324 (-1.85039)	-0.260052 (-11.7111)	-0.018414 (-1.98145)

long run, constant terms of returns variances are again close to zero with negative trends except for Rajhi stocks. These results confirmed the stability of the stocks in KSA market.

Bahri stock is affected negatively by the variances of the rest of stocks except Rajhi stock in the short run, while in the long run, the stock is affected positively by the stock variances except for Rajhi. Maraie stock is affected positively by the rest stocks variance in the short and long run except Rajhi stock. Etisalat stock is affected positively in the short run by Bahri and Rajhi stocks while it is negatively affected by Maraie and sabic stocks. The opposite of this relation holds in the long run. Rajhi stock is affected positively by Bahri and Etisalat stocks in the short run, while in the long run, all stocks negatively affected Rajhi stock. Sabic stock is affected negatively by Maraie stock in the short run, while the rest of stocks positively affected it. In the long run the stock is affected positively by all stocks except for Rajhi. Rajhi positively affected the rest of stocks in the short run and negatively in the long run.

The stocks are more sensitive to Bahri stock in the short run while their sensitivity tends to Rajhi in the long run. On other hand, these stocks are less sensitive to Maraie stock in the short run while in the long run their rigidity tend to Bahri stock. The speed of adjustment is negative and less than one for all stocks except for Bahri stock which is positive. This means that if the equilibrium relationship between Bahri and the rest of the stocks deviated, it could not return to its normal state. Rajhi stocks have the most rapid speed of adjustment compared to other stocks, while the lowest speed of adjustment exists in Etisalat stock. Except for the Rajhi stocks, in the short and long run, all stocks alternate their effect to each other. This relation could not hold for Etisalat stock which affects the rest of stocks positively in the short and long run.

4. DISCUSSION

While all stocks show constant steady rate in the long run as reflected by constant term signs, Rajhi stocks seem to be fortified from short term disturbances. The direction of the effects of other stocks on Rajhi stock is constant in the short and long run. This

proves the stability and domination of this stock over the rest of the stocks. At the same time Rajhi stock reduces the variability of other stocks when its variability is positive. Etisalat stock is assessed to be the most unstable stock as it positively contributes to return variability of the rest stocks in the short and long run.

Maraie and Sabic stocks return variabilities are stable in the short run and less stable in the long run. The counterpart of this relation can hold for Bahri which proves its high sensitivity to the rest of stocks. This result combat with the sign of speed of adjustment of Bahri stock which is positive. Rajhi stock is the most stable stock in the market as shown by the magnitude and the sign of its speed of adjustment. The speed of adjustment for Maraie stock exceeds Etisalat and sabic stocks and this confirms its stability. Except for Rajhi stock, Etisalat stock return variability move in the same direction with the variabilities of the other stocks which insured its constant effect on other stocks in the short and long run and this could confirm the minor role it plays in the market.

5. RESULTS AND CONCLUDING REMARKS

The return variability of the Saudi stocks market is comparatively stable as it is shown by the sample stock of the study (decreasing steady rate in the long run). Rajhi stock is dominant in the market and hence the most stable and safe among studied stocks. Bahri stock return variability relationships with other stocks is not stable in the long run, which may characterize its return by low stability and safety. Etisalat stock has constant effects on other stocks in the short and long run this may rationalize its minor role in the market. Maraie and Sabic stand at an equal distance from the rest stocks in the market except for Rajhi. Accordingly, they can be classified as neutral stocks in the market, this relation hold in the existence of return variability interaction within the Saudi market.

Finally, the overall results of this study agree with results from previous researches used similar data with different approaches and confirmed the stability and safety of Saudi stock market. Moreover, the validity of study data is assured along with the transparency of the Saudi stock market.

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