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US ECONOMIC POLICY UNCERTAINTY AND GCC STOCK MARKET PERFORMANCE

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Abstract:

The study evaluates the effect of economy policy uncertainty of US on gulf cooperation council (GCC) countries' stock market returns. The GCC countries are Saudi Arabia, Qatar, UAE, Kuwait, Bahrain and Oman. Granger Causality Tests (GCT) was done primarily to evaluate if economy policy uncertainty granger cause on GCC stock market returns. The analysis established that oil prices granger cause stock market returns for Saudi Arabia, Kuwait and UAE; the same is not true on changes in economic policy uncertainty of US cause on the stock market returns. Changes in economy policy uncertainty in US granger causes on stock market returns of Bahrain. On the other hand, economy policy uncertainty in US does not cause stock market returns in Qatar, UAE, Kuwait and Saudi Arabia. Vector Autoregression (VAR) analysis establishes that economy policy uncertainty in US negatively responds to the stock market returns of the GCC countries.

Key words: *GCC, EPU, Granger Causality Test, Vector Autoregression (VAR)*

1. Introduction

There has been a booming economic growth among the Gulf Cooperation Council countries (GCC). According to institute of international finance (IIF) forecasts, the overall economic growth rate in GCC countries is forecasted as 2.3% and 2.7% in 2018 and 2019 respectively. The positive economic growth is attributed by rise in oil prices and increased government spending. According to Duenwald and Tamirisa (2018), increase in oil production in the GCC countries the overall economic growth is forecasted at 2.9% in the year 2019. The positive economic growth induces strong trade ties between the US and GCC countries.

Furthermore, IIF attests that there is high expectations of nonhydrocarbon growth in the GCC countries that will accelerate economic growth to 3.2% by 2020 (Saxena & Al-Hadrami, 2017). In this case the fiscal positions among the GCC countries are expected to incur improvement due to increase in oil production. For this reason, oil prices play a significant role in explaining variations in the GCC stock markets. The booming economic growth among the GCC countries plays a significant role in enhancing trade ties between the US and GCC economies (Aloui, Hammoudeh, & Hamida, 2015). Additionally, economic integration among the GCC countries has significantly led to the increase in

trade ties with US. According to Boughanmi, Al-Shammakhi & Antimiani, (2016) GCC is the most organized and large sub regional trade integration in the MENA region and also globally. The major aim that led to formation of GCC integration in the region was to initiate free trade in goods primarily to initiate high levels of cross-national labor and mobility in capital.

Several macroeconomics have documented key roles of spillovers from the US economy to the global economy. US economy is the world largest single economy (Bjørnland, & Zhulanova, 2018). Evidently, US economy accounts approximately a quarter of the global gross domestic product at market exchange rate. Additionally, the US economy accounts for a fifth of the global foreign direct investment and more than 33% of the market capitalization. According to Gay (2016), confirms that a surge in US growth rate substantially affects global economy. The surge can result from application of monetary policies to the US economy. In this case, shocks from the US economy are equally transmitted to the rest of world economies through three potential ways (Bekaert et al., 2014). To begin with, fast economy growth in the US economy effectively lifts growth of the trading partners through massive import demands and strengthening spillovers embedded in the trading acts. Secondly, the act leads to financial market development that in turn has positive financial implications to the global markets. US bond and equity markets are widely used globally alongside with the US dollar as the globally recognized currency. Some of the eminent equity market is between US and UK. According to Ahmed, Coulibaly, & Zlate, (2017) provides rich evidence on the contemporaneous spillover effects between the USA and UK equity markets. Thirdly, US is the leading gas and oil consumer globally. When shocks occur in the US economy ultimately are transmitted to the other equity markets.

Studies confirm that there is a rich history of trading cooperation between US and GCC countries. Evidently, the trading relationship dates back to 1700s years when Americans seemingly enjoyed commercial activities from the Sultanate of Oman (Commins, 2015). The trading activities were sometimes marred with challenges like wars in the gulf region. However, formation of international bodies like UN has enabled for the restoration. Additionally, formation of gulf council cooperation (GCC) equally enhanced trading ties between US and GCC countries. Oil commodity is another aspect that has led to strong trading ties between US and GCC countries. According to Al-Maamary, Kazem, & Chaichan, (2017), GCC countries are the greatest oil producers while US is the largest oil consumer thus great oil importer from GCC countries. Concomitant to GCC countries selling oil and USA purchasing oil, this translates to annual billions of dollars to the both parties. This greatly seals the presence of strong economic ties between the US and GCC countries.

Researches have demonstrated effect of macroeconomic variables stock returns and on several financial assets in the global market. According to Mahedi (2012), testifies for the both long and short term relationships among the various macroeconomic variables and stock returns using Johansen Cointegration tests using stock returns from German and UK markets. However, this leaves a room to investigate the casual relationships among the macroeconomic variables using simple correlation analysis. An empirical study conducted by Mohamed Arouri & Christophe Rault & Frédéric Teulon, (2014) confirm that

economic policy uncertainty affects stock markets in USA, Europe, China and GCC countries. In the study panel data was equally applied to attest for the effect of economic uncertainty on the stock markets. In their research they discovered that increase in EPU negatively affects the stock returns.

The primary aims of the study are to evaluate the effect of variations in economic policy uncertainty in USA on the stock markets of gulf cooperation council countries (GCC). The GCC countries are Saudi Arabia, Kuwait, UAE, Qatar, Bahrain and Oman. Secondly, the study evaluates how the stock market of the GCC countries responds to the changes in EPU of USA. Thirdly, the study evaluates whether changes in economic policy uncertainty may affect the stock market returns of the six GCC countries using granger Casuality test.

2. Method and Data

The data for the variables "oil prices (Brent) and monthly returns" for the six GCC countries are for the period 1/31/2010-8/31/2018 are sourced from Bloomberg. Data for the economy policy uncertainty (EPU) are obtained from the official online site of EPU located at http://www.policyuncertainty.com.

The main analysis methodology is time series OLS regression model. The response variable is set as stock market of the GCC countries. On the other hand, the explanatory variables included in the analysis are changes in economic policy uncertainty of the US and oil prices (Brent). Equations 1 and 2 are the most preferred models for the analysis to respond to the study objectives.

$$R_{it} = \alpha + \beta \Delta EPU_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

$$R_{it} = \alpha + \beta \Delta EPU_{it} + \delta OP_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where;

R_{it} is the return on a country's market stock index in month t

ΔEPU_{it} is change in USA economic policy uncertainty index in month t

OP_{it} is the return on oil price index in month t

ε_{it} is the error term in the model

The variable oil prices (Brent)" are used as control variable primarily to control the effect of Oil price effects on GCC stock markets.

3. Results

The illustration on table 1 displays descriptive statistics of the GCC countries' stock market and the control variable, Oil Price. Table 2 displays correlation analysis for the stock market variables and the control variable. Evidently, there is lack of relationship among the variables. The first aspect in the analysis was to check whether the series are indeed stationary using ADF tests shown in the appendix section. It was evaluated that the series were indeed non stationary and therefore single differencing was therefore necessary to make the series stationary before OLS regression models are evaluated. The regression models attest for the effect of US economic policy uncertainty to the stock

markets for the GCC countries. The F-statistics in the respective time series OLS models are used to test whether the fitted models are of good fit for the data. In this regard, hypothesis is set as follows;

$$H_0: \beta_1=\beta_2=\ldots=\beta_i=0 \text{ for } i=1, 2, 3\ldots$$

Against

$$H_1: \beta_1\neq\beta_2\neq\ldots\neq\beta_i\neq0 \text{ for } i=1, 2, 3\ldots$$

The illustration on table 3 displays OLS regression output for the first equation where changes in USEPU index is regressed on the 6 GCC stock markets. The analysis establishes that Saudi Arabia-(F(1,103)=0.3595), Kuwait-(F(1,103)=1.416), UAE-(F(1,103)=0.1564), Qatar-(F(1,103)=0.8938), Bahrain-(F(1,103)=0.0662) are statistically insignificant at 0.05 alpha level. However, this does not bar the researcher from evaluating the effect of the oil prices and changes in US economic policy uncertainty to the respective GCC economies. OLS without control variable shows that results for the 6 GCC countries are statistically insignificant at 0.05 alpha level.

US economic policy uncertainty has negative effect on the stock markets for Saudi Arabia, Kuwait, UAE, Qatar, Oman and Bahrain. The illustration on table 3 displays the effect of USEPU on the various stock market returns. The analysis establishes that the coefficients for the models are Saudi Arabia-(β1=-0.9708), Kuwait-(β1=-1.2298), UAE-(β1=-0.2626), Qatar-(β1=-1.8831), Bahrain-(β1=-0.0347) and Oman-(β1=-1.5460).

To control the effect of Oil Price, the stock markets are regressed on the changes in US economic policy uncertainty, and oil price returns using equation 2. The illustration on table 4 reveals results for Saudi Arabia. The variables "USEPU, and Brent" has coefficients of -3195 (p-value=0.838)) and 28.5026 (p-value<0.010) respectively. Oil prices have significant effects at 0.05 alpha level. Oil prices (Brent) has positive effect on the stock market. Table 10 reveals results for Kuwait. The analysis establishes that variables "USEPU and Brent" has coefficients of -1.1182 and 4.8861 respectively. The variables are statistically insignificant at 0.05 alpha level. Only oil prices reveal positive effect on Kuwait stock market. Based on table 4, the analysis establishes that the variables "USEPU and Brent" has coefficients of -0.1639 and 4.3215 respectively on UAE stock market. Table 4 illustrates analysis on Qatar stock market. The variables "USEPU and Brent" has coefficients of -1.4398 and 19.4040 respectively. The effect of oil prices is statistically significant at 0.05 alpha level (p-value=0.062). Additionally, the variables "USEPU and Brent" has coefficients of -0.0106 and 1.0550 respectively on Bahrain stock market. USEPU and oil prices reveals statistical insignificance at 0.05 alpha level (p-value>0.05). Lastly, it is established that the variable USEPU has statistical significant effect of -1.3336 on Oman stock market (p-value=0.0848) at 10% significance level. On the other perspective, the variable "oil prices (Brent)" has a positive coefficient of 9.2990 that is statistically significant at 0.05 alpha level (p-value<0.010). Basically, OLS results with oil prices as control variable for the stock markets Oman, Qatar and Saudi Arabia are statistically significant at 0.05 alpha level. On the other hand, OLS results for UAE, Kuwait and Bahrain stock markets are statistically insignificant at 0.05 alpha level.

Vector autoregression analysis is performed to attest how the control and explanatory variables responds to the stocks of 6 GCC countries. According to Juselius (2006), VAR model is a stochastic model that assist in capturing linear interdependencies

in various time series. In the analysis, VAR modelling is applied to capture interdependencies among the respective stock markets, the control variable and changes in US economy policy uncertainty. The control variable is oil prices (Brent). Results for VAR analysis results for the 6 GCC countries are displayed in the appendix. The illustrations on tables 23, 24, 25, 26, 27 and 28 reveals VAR results for Saudi Arabia, Kuwait, UAE, Qatar, Bahrain and Oman respectively. Evidently, the variables "Oil prices and **Δ**EPU" negatively respond to the GCC stock markets. Granger Casuality test is performed to test whether respective variables have predictive power to the GCC stock markets (Bai, Cui, & Zhang, 2018). Granger Casuality analysis technique is applied to test the following hypothesis:

$H0: The\ variables\ \ Oil\ prices\ and\ \Delta EPU\ do\ not\ granger\ cause\ on\ the\ stock\ market$

Against;

$Ha: The\ variables\ Oil\ prices\ and\ \Delta EPU\ do\ granger\ cause\ on\ the\ stock\ market$

The stated null hypothesis is rejected when p-value is statistically significant (set p-value=0.05). The illustration on table 5 reveals granger Casuality analysis for Saudi Arabia stock market. The p-values for the variables "oil prices and **Δ**EPU" are statistically insignificant at 0.05 alpha level. In this case, the stated null hypothesis is not rejected thus oil prices and **Δ**EPU granger causes on Saudi Arabia stock market. Secondly, the illustration on table 6 reveals granger Casuality test for Kuwait stock market. Evidently, oil prices granger causes on the stock market and also USEPU granger cause on Saudi Arabia stock market returns. The illustration on table 7 reveals granger Casuality test on UAE stock market. Oil prices granger do not granger cause on the stock market (p-value>0.05) and likewise to **Δ**USEPU (p-value=0.183) do not cause on UAE stock market. The illustration on table 8 reveals Granger Casuality analysis on Qatar stock market. The variables oil prices and **Δ**USEPU do not granger cause on the UAE stock market returns. Furthermore, the illustration on table 9 reveals granger Casuality test for Bahrain stock market returns. The variables oil prices and USEPU do not granger cause on the Bahrain stock market returns. Lastly, illustration on table 10 reveals granger Casuality test analysis on Oman stock market returns. The variables oil prices and **Δ**USEPU do not granger cause on the Oman stock market returns. Since the p-values are statistically insignificant at 0.05 alpha level.

Table 1: Descriptive Analysis

Variables	Mean	Std. Dev.	Obs
Bahrain	1285.845	132.7379	104
Kuwait	6522.611	733.6524	104
Oman	5958.577	682.3126	104
Qatar	9633.359	1684.787	104
Saudi Arabia	7403.959	1194.965	104
UAE	3779.906	946.3606	104
Brent	82.5693	26.70555	104
ΔEPU	128.2324	35.24104	104

Table 2: Correlation Analysis

	ΔEPU	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	Brent
ΔEPU	1.0000							
Bahrain	-0.2176	1.0000						
Kuwait	-0.2559	0.4928	1.0000					
Oman	-0.1401	0.4332	0.5308	1.0000				
Qatar	-0.6095	0.1921	0.1173	0.3688	1.0000			
Saudi Arabia	-0.5518	0.3680	0.4852	0.7704	0.7704	1.0000		
UAE	-0.7770	0.2125	0.1359	-0.0333	0.7678	0.6249	1.0000	
Brent	0.3957	-0.1076	0.3680	0.3532	-0.2163	0.1185	-0.5578	1.0000

Each of the GCC stock market monthly return is regressed on US EPU using a time series regression model shown below as:

$$Rit = \alpha + \beta \boldsymbol{\Delta EPUit} + \varepsilon it$$

For n=104: 1/31/2010-8/31/2018

Table 3: OLS Regression Analysis

Country	Coefficient	Std. Err.	t	Sig.	R^2
Panel: 2010:M7-2018:M8 (n =104)					
Bahrain	-0.03468	0.1348	-0.2573	0.7975	0.000655
Kuwait	-1.2298	1.0333	-1.1902	0.2368	0.013831
Oman	-1.5460	0.78700	-1.9645	0.0522	0.03680
Qatar	-1.8831	1.9918	-0.9454	0.3467	0.008772
Saudi Arabia	-0.9708	1.6191	-0.5996	0.5501	0.003547
UAE	-0.2626	0.6641	-0.3955	0.6933	0.001546

In this case, the analysis applies the variables "oil prices" as a control variable primarily to have control over the US stock markets. Each GCC stock market is set as response variable and regressed on changes in EPU and oil price returns.

$$Rit = \alpha + \beta \boldsymbol{\Delta EPUit} + \boldsymbol{\delta OPit} + \varepsilon it$$

Table 4: OLS with Control Variable

Country	Coefficient	Std. Err.	t	Sig.	R^2
Panel: 2010:M7-2018:M8 (n =104)					
Bahrain	-0.01057	0.1340	-0.0789	0.9372	
Brent	1.05497	0.5874	1.79611	0.0755	0.031887
Kuwait	-1.1182	1.0378	-1.077510	0.2853	0.025083

Brent	4.8861	4.5481	1.0743	0.2838	
Oman	-1.3336	0.76608	-1.74078	0.0848	
Brent	9.2990	3.357	2.7697	0.0067	0.1054
Qatar	-1.4397	1.9625	0.7336	0.4649	
Brent	19.4040	8.6010	2.2560	0.0262	0.056778
Saudi Arabia	-0.3195	1.5003	-0.2130	0.8318	
Brent	28.5027	6.5763	4.3342	0.0000	0.1611
UAE	-0.1639	0.6635	-0.24700	0.8054	
Brent	4.3215	2.9077	1.4862	0.1404	0.023123

Table 5: Granger Casuality Test Saudi Arabia

Null Hypothesis:	**Obs**	**F-Statistic**	**Prob.**
DIFFUSEPU does not Granger Cause DIFFSAUDI	101	0.32179	0.7256
DIFFSAUDI does not Granger Cause DIFFUSEPU		2.14343	0.1228
DIFFBRENT does not Granger Cause DIFFSAUDI	101	1.37395	0.2580
DIFFSAUDI does not Granger Cause DIFFBRENT		4.80557	0.0103
DIFFBRENT does not Granger Cause DIFFUSEPU	101	1.19929	0.3059
DIFFUSEPU does not Granger Cause DIFFBRENT		0.73998	0.4798

Table 6: Granger Casuality Test Kuwait

Null Hypothesis:	**Obs**	**F-Statistic**	**Prob.**
DIFFBRENT does not Granger Cause DIFFKUWAIT	101	0.48738	0.6157
DIFFKUWAIT does not Granger Cause DIFFBRENT		0.68763	0.5052
DIFFUSEPU does not Granger Cause DIFFKUWAIT	101	0.41678	0.6604
DIFFKUWAIT does not Granger Cause DIFFUSEPU		1.75252	0.1788
DIFFUSEPU does not Granger Cause DIFFBRENT	101	0.73998	0.4798
DIFFBRENT does not Granger Cause DIFFUSEPU		1.19929	0.3059

Table 7: Granger Casuality Test UAE

Null Hypothesis:	Obs	F-Statistic	Prob.
DIFFBRENT does not Granger Cause DIFFUAE	101	0.19730	0.8213
DIFFUAE does not Granger Cause DIFFBRENT		0.25080	0.7787
DIFFUSEPU does not Granger Cause DIFFUAE	101	0.40465	0.6683
DIFFUAE does not Granger Cause DIFFUSEPU		2.73093	0.0702
DIFFUSEPU does not Granger Cause DIFFBRENT	101	0.73998	0.4798
DIFFBRENT does not Granger Cause DIFFUSEPU		1.19929	0.3059

Table 8: Granger Casuality Test Qatar

Null Hypothesis:	Obs	F-Statistic	Prob.
DIFFBRENT does not Granger Cause DIFFQATAR	101	0.95536	0.3883
DIFFQATAR does not Granger Cause DIFFBRENT		0.24722	0.7815
DIFFUSEPU does not Granger Cause DIFFQATAR	101	1.48142	0.2325
DIFFQATAR does not Granger Cause DIFFUSEPU		2.75027	0.0690
DIFFUSEPU does not Granger Cause DIFFBRENT	101	0.73998	0.4798
DIFFBRENT does not Granger Cause DIFFUSEPU		1.19929	0.3059

Table 9: Granger Casuality Test Bahrain

Null Hypothesis:	Obs	F-Statistic	Prob.
DIFFBRENT does not Granger Cause DIFFBARAIN	101	0.10881	0.8970
DIFFBARAIN does not Granger Cause DIFFBRENT		0.68772	0.5052
DIFFUSEPU does not Granger Cause DIFFBARAIN	101	0.31465	0.7308
DIFFBARAIN does not Granger Cause DIFFUSEPU		1.04238	0.3566
DIFFUSEPU does not Granger Cause DIFFBRENT	101	0.73998	0.4798
DIFFBRENT does not Granger Cause DIFFUSEPU		1.19929	0.3059

Table 10: Granger Casuality Test Oman

Null Hypothesis:	Obs	F-Statistic	Prob.
DIFFBRENT does not Granger Cause DIFFOMAN	101	0.86744	0.4233
DIFFOMAN does not Granger Cause DIFFBRENT		0.29531	0.7450
DIFFUSEPU does not Granger Cause DIFFOMAN	101	1.15704	0.3188
DIFFOMAN does not Granger Cause DIFFUSEPU		1.37438	0.2579
DIFFUSEPU does not Granger Cause DIFFBRENT	101	0.73998	0.4798
DIFFBRENT does not Granger Cause DIFFUSEPU		1.19929	0.3059

4. Conclusion

The primary goal of the study was to analyze the effect of changes in economy policy uncertainty of the US to GCC countries' stock market returns. The study has applied time series OLS regression and vector autoregression analysis. The VAR has demonstrated that changes in economy policy uncertainty of US negatively responds to the GCC stock market returns. Additionally, Granger Casuality analysis was done to confirm whether economic policy uncertainty of US and oil prices granger cause on the GCC stock markets. The granger Casuality test has confirmed that changes in economic policy uncertainty of US cause the returns on the Bahrain stock market. However, this is not true on Saudi Arabia, Kuwait, UAE, Qatar and Oman stock markets. The control variable oil prices cause on the UAE and Kuwait stock markets while this cannot be said on Saudi Arabia, Qatar, Bahrain and Oman stock markets. The study is important for policymakers to better understaind how stock markets react to US policy uncertainty. The finding also will help investors in stock markets in the GCC countries.

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Appendix

Table 11: Saudi Arabia GCC

Dependent Variable: DIFFSAUDIARABIA
Method: Least Squares
Date: 11/26/18 Time: 10:55
Sample (adjusted): 1 103
Included observations: 103 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-15.96543	41.33486	-0.386246	0.7001
DIFFUSEPU	-0.970768	1.619119	-0.599566	0.5501

R-squared	0.003547	Mean dependent var	-16.46311
Adjusted R-squared	-0.006319	S.D. dependent var	418.0994
S.E. of regression	419.4184	Akaike info criterion	14.93484
Sum squared resid	17767089	Schwarz criterion	14.98600
Log likelihood	-767.1443	Hannan-Quinn criter.	14.95556
F-statistic	0.359479	Durbin-Watson stat	1.738374
Prob(F-statistic)	0.550138		

Table 12: Kuwait GCC Stock Market

Dependent Variable: DIFFKUWAIT
Method: Least Squares
Date: 11/26/18 Time: 10:56
Sample (adjusted): 1 103
Included observations: 103 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.062596	26.38028	0.040280	0.9679
DIFFUSEPU	-1.229839	1.033336	-1.190163	0.2368

R-squared	0.013831	Mean dependent var	0.432102
Adjusted R-squared	0.004067	S.D. dependent var	268.2225
S.E. of regression	267.6766	Akaike info criterion	14.03666
Sum squared resid	7236727.	Schwarz criterion	14.08782
Log likelihood	-720.8881	Hannan-Quinn criter.	14.05738
F-statistic	1.416488	Durbin-Watson stat	1.685124
Prob(F-statistic)	0.236772		

Table 13: UAE GCC Stock Market

Dependent Variable: DIFFUAE
Method: Least Squares
Date: 11/26/18 Time: 10:57
Sample (adjusted): 1 103
Included observations: 103 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-22.71498	16.95341	-1.339847	0.1833
DIFFUSEPU	-0.262617	0.664078	-0.395460	0.6933

R-squared	0.001546	Mean dependent var	-22.84961
Adjusted R-squared	-0.008340	S.D. dependent var	171.3107
S.E. of regression	172.0236	Akaike info criterion	13.15237
Sum squared resid	2988804.	Schwarz criterion	13.20353
Log likelihood	-675.3469	Hannan-Quinn criter.	13.17309
F-statistic	0.156389	Durbin-Watson stat	2.324530
Prob(F-statistic)	0.693337		

Table 14: Qatar GCC Stock Market

Dependent Variable: DIFFQATAR
Method: Least Squares
Date: 11/26/18 Time: 10:58
Sample (adjusted): 1 103
Included observations: 103 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-31.34527	50.84968	-0.616430	0.5390
DIFFUSEPU	-1.883135	1.991822	-0.945433	0.3467

R-squared	0.008772	Mean dependent var	-32.31068
Adjusted R-squared	-0.001042	S.D. dependent var	515.6953
S.E. of regression	515.9639	Akaike info criterion	15.34918
Sum squared resid	26888090	Schwarz criterion	15.40034
Log likelihood	-788.4826	Hannan-Quinn criter.	15.36990
F-statistic	0.893844	Durbin-Watson stat	2.310149
Prob(F-statistic)	0.346694		

Table 15: Bahrain GCC Stock Market

Dependent Variable: DIFFBAHRAIN
Method: Least Squares
Date: 11/26/18 Time: 10:53
Sample (adjusted): 1 103
Included observations: 103 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.378266	3.441593	0.400473	0.6897
DIFFUSEPU	-0.034683	0.134810	-0.257274	0.7975

R-squared	0.000655	Mean dependent var	1.360485
Adjusted R-squared	-0.009240	S.D. dependent var	34.76109
S.E. of regression	34.92131	Akaike info criterion	9.963298
Sum squared resid	123169.3	Schwarz criterion	10.01446
Log likelihood	-511.1098	Hannan-Quinn criter.	9.984020
F-statistic	0.066190	Durbin-Watson stat	1.355015
Prob(F-statistic)	0.797491		

Table 16: Oman GCC Stock Market

Dependent Variable: DIFFOMAN
Method: Least Squares
Date: 11/26/18 Time: 11:00
Sample (adjusted): 1 103
Included observations: 103 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	21.30610	20.09156	1.060450	0.2915
DIFFUSEPU	-1.546044	0.787002	-1.964473	0.0522

R-squared	0.036803	Mean dependent var	20.51350
Adjusted R-squared	0.027267	S.D. dependent var	206.7034
S.E. of regression	203.8659	Akaike info criterion	13.49203
Sum squared resid	4197692.	Schwarz criterion	13.54319
Log likelihood	-692.8395	Hannan-Quinn criter.	13.51275
F-statistic	3.859153	Durbin-Watson stat	2.006368
Prob(F-statistic)	0.052223		

Table 17: Saudi Arabia

Dependent Variable: DIFFSAUDIARABIA
Method: Least Squares
Date: 11/26/18 Time: 11:01
Sample (adjusted): 1 103
Included observations: 103 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-14.65001	38.11622	-0.384351	0.7015
DIFFUSEPU	-0.319544	1.500537	-0.212953	0.8318
DIFFBRENT	28.50267	6.576250	4.334182	0.0000

R-squared	0.161130	Mean dependent var	-16.46311
Adjusted R-squared	0.144352	S.D. dependent var	418.0994
S.E. of regression	386.7471	Akaike info criterion	14.78211
Sum squared resid	14957333	Schwarz criterion	14.85885
Log likelihood	-758.2788	Hannan-Quinn criter.	14.81319
F-statistic	9.603957	Durbin-Watson stat	2.011597
Prob(F-statistic)	0.000153		

Table 18: Kuwait

Dependent Variable: DIFFKUWAIT
Method: Least Squares
Date: 11/26/18 Time: 11:02
Sample (adjusted): 1 103
Included observations: 103 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.288095	26.36100	0.048864	0.9611
DIFFUSEPU	-1.118201	1.037764	-1.077510	0.2838
DIFFBRENT	4.886137	4.548104	1.074324	0.2853

R-squared	0.025083	Mean dependent var	0.432102
Adjusted R-squared	0.005585	S.D. dependent var	268.2225
S.E. of regression	267.4725	Akaike info criterion	14.04460
Sum squared resid	7154155.	Schwarz criterion	14.12134
Log likelihood	-720.2971	Hannan-Quinn criter.	14.07569
F-statistic	1.286411	Durbin-Watson stat	1.694348
Prob(F-statistic)	0.280792		

Table 19: UAE

Dependent Variable: DIFFUAE
Method: Least Squares
Date: 11/26/18 Time: 11:02
Sample (adjusted): 1 103
Included observations: 103 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-22.51554	16.85339	-1.335965	0.1846
DIFFUSEPU	-0.163880	0.663474	-0.247002	0.8054
DIFFBRENT	4.321501	2.907742	1.486205	0.1404

R-squared	0.023123	Mean dependent var	-22.84961
Adjusted R-squared	0.003586	S.D. dependent var	171.3107
S.E. of regression	171.0033	Akaike info criterion	13.14994
Sum squared resid	2924214.	Schwarz criterion	13.22668
Log likelihood	-674.2217	Hannan-Quinn criter.	13.18102
F-statistic	1.183533	Durbin-Watson stat	2.351624
Prob(F-statistic)	0.310447		

Table 20: Qatar

Dependent Variable: DIFFQATAR
Method: Least Squares
Date: 11/26/18 Time: 11:03
Sample (adjusted): 1 103
Included observations: 103 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-30.44975	49.85204	-0.610803	0.5427
DIFFUSEPU	-1.439795	1.962545	-0.733636	0.4649
DIFFBRENT	19.40401	8.601049	2.256005	0.0262

R-squared	0.056778	Mean dependent var	-32.31068
Adjusted R-squared	0.037914	S.D. dependent var	515.6953
S.E. of regression	505.8249	Akaike info criterion	15.31895
Sum squared resid	25585881	Schwarz criterion	15.39569
Log likelihood	-785.9260	Hannan-Quinn criter.	15.35003
F-statistic	3.009798	Durbin-Watson stat	2.334140
Prob(F-statistic)	0.053789		

Table 21: Bahrain

Dependent Variable: DIFFBAHRAIN
Method: Least Squares
Date: 11/26/18 Time: 11:03
Sample (adjusted): 1 103
Included observations: 103 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.426954	3.404390	0.419151	0.6760
DIFFUSEPU	-0.010579	0.134022	-0.078936	0.9372
DIFFBRENT	1.054975	0.587365	1.796116	0.0755

R-squared	0.031887	Mean dependent var	1.360485
Adjusted R-squared	0.012524	S.D. dependent var	34.76109
S.E. of regression	34.54273	Akaike info criterion	9.950965
Sum squared resid	119320.0	Schwarz criterion	10.02770
Log likelihood	-509.4747	Hannan-Quinn criter.	9.982047
F-statistic	1.646841	Durbin-Watson stat	1.338318
Prob(F-statistic)	0.197839		

Table 22: Oman

Dependent Variable: DIFFOMAN
Method: Least Squares
Date: 11/26/18 Time: 11:04
Sample (adjusted): 1 103
Included observations: 103 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	21.73525	19.45979	1.116932	0.2667
DIFFUSEPU	-1.333581	0.766082	-1.740782	0.0848
DIFFBRENT	9.299058	3.357428	2.769697	0.0067

R-squared	0.105428	Mean dependent var	20.51350
Adjusted R-squared	0.087536	S.D. dependent var	206.7034
S.E. of regression	197.4492	Akaike info criterion	13.43753
Sum squared resid	3898620.	Schwarz criterion	13.51427
Log likelihood	-689.0330	Hannan-Quinn criter.	13.46862
F-statistic	5.892639	Durbin-Watson stat	2.056431
Prob(F-statistic)	0.003809		

Table 23: Saudi Arabia VAR Analysis

Vector Autoregression Estimates
Date: 11/26/18 Time: 11:16
Sample (adjusted): 3 103
Included observations: 101 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	DIFFSAUDIA...	DIFFUSEPU	DIFFBRENT
DIFFSAUDIARABIA(-1)	0.085301	-0.010241	0.003227
	(0.11016)	(0.00641)	(0.00147)
	[0.77432]	[-1.59742]	[2.18980]
DIFFSAUDIARABIA(-2)	-0.174673	0.002506	-0.003159
	(0.11369)	(0.00662)	(0.00152)
	[-1.53642]	[0.37874]	[-2.07662]
DIFFUSEPU(-1)	0.124462	-0.293039	-0.008212
	(1.72424)	(0.10034)	(0.02307)
	[0.07218]	[-2.92045]	[-0.35598]
DIFFUSEPU(-2)	-1.061742	-0.247509	0.021356
	(1.70990)	(0.09951)	(0.02288)
	[-0.62094]	[-2.48737]	[0.93353]
DIFFBRENT(-1)	10.50060	-0.405538	0.129905
	(8.12154)	(0.47263)	(0.10866)
	[1.29293]	[-0.85805]	[1.19556]
DIFFBRENT(-2)	6.728202	0.193877	0.101315
	(7.92276)	(0.46106)	(0.10600)
	[0.84922]	[0.42051]	[0.95583]
C	-12.74189	0.396947	0.042229
	(41.9729)	(2.44257)	(0.56155)
	[-0.30357]	[0.16251]	[0.07520]
R-squared	0.059192	0.157002	0.132043

Table 24: Kuwait VAR Analysis

Vector Autoregression Estimates
Date: 11/26/18 Time: 11:18
Sample (adjusted): 3 103
Included observations: 101 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	DIFFKUWAIT	DIFFUSEPU	DIFFBRENT
DIFFKUWAIT(-1)	0.160441	-0.015941	-0.000136
	(0.10337)	(0.00935)	(0.00225)
	[1.55212]	[-1.70421]	[-0.06071]
DIFFKUWAIT(-2)	-0.016534	-0.002814	-0.002315
	(0.10561)	(0.00956)	(0.00230)
	[-0.15656]	[-0.29443]	[-1.00867]
DIFFUSEPU(-1)	0.018012	-0.319209	-0.005081
	(1.10695)	(0.10017)	(0.02406)
	[0.01627]	[-3.18669]	[-0.21121]
DIFFUSEPU(-2)	1.060900	-0.275617	0.023396
	(1.10774)	(0.10024)	(0.02407)
	[0.95772]	[-2.74954]	[0.97190]
DIFFBRENT(-1)	3.322553	-0.606970	0.172030
	(4.72695)	(0.42775)	(0.10272)
	[0.70290]	[-1.41899]	[1.67470]
DIFFBRENT(-2)	3.095637	0.259865	0.054158
	(4.75899)	(0.43065)	(0.10342)
	[0.65048]	[0.60343]	[0.52367]
C	4.705591	0.627270	0.053757
	(26.8609)	(2.43068)	(0.58372)
	[0.17518]	[0.25806]	[0.09209]
R-squared	0.047957	0.161522	0.058028

Table 25: UAE VAR Analysis

Vector Autoregression Estimates
Date: 11/26/18 Time: 11:19
Sample (adjusted): 3 103
Included observations: 101 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	DIFFUAE	DIFFUSEPU	DIFFBRENT
DIFFUAE(-1)	-0.155653	-0.029480	0.001891
	(0.10369)	(0.01447)	(0.00351)
	[-1.50111]	[-2.03780]	[0.53874]
DIFFUAE(-2)	0.051128	0.004239	0.001963
	(0.10741)	(0.01499)	(0.00364)
	[0.47599]	[0.28289]	[0.53981]
DIFFUSEPU(-1)	0.221352	-0.292359	0.000837
	(0.71830)	(0.10022)	(0.02431)
	[0.30816]	[-2.91729]	[0.03442]
DIFFUSEPU(-2)	-0.495965	-0.250855	0.028050
	(0.70576)	(0.09847)	(0.02389)
	[-0.70274]	[-2.54765]	[1.17426]
DIFFBRENT(-1)	1.033615	-0.536739	0.167380
	(3.06317)	(0.42737)	(0.10368)
	[0.33743]	[-1.25593]	[1.61442]
DIFFBRENT(-2)	1.248891	0.194302	0.032752
	(3.06911)	(0.42819)	(0.10388)
	[0.40692]	[0.45377]	[0.31529]
C	-22.66030	-0.008558	0.115779
	(17.5980)	(2.45522)	(0.59563)
	[-1.28767]	[-0.00349]	[0.19438]
R-squared	0.040570	0.173370	0.052274

Table 26: Qatar VAR Analysis

Vector Autoregression Estimates
Date: 11/26/18 Time: 11:19
Sample (adjusted): 3 103
Included observations: 101 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	DIFFQATAR	DIFFUSEPU	DIFFBRENT
DIFFQATAR(-1)	-0.174292	-0.008517	-7.62E-06
	(0.10407)	(0.00496)	(0.00120)
	[-1.67483]	[-1.71824]	[-0.00633]
DIFFQATAR(-2)	-0.098923	-0.007544	-0.000699
	(0.10537)	(0.00502)	(0.00122)
	[-0.93881]	[-1.50294]	[-0.57375]
DIFFUSEPU(-1)	3.894616	-0.328253	-0.004276
	(2.09937)	(0.10000)	(0.02426)
	[1.85514]	[-3.28248]	[-0.17623]
DIFFUSEPU(-2)	1.489603	-0.246668	0.025651
	(2.10924)	(0.10047)	(0.02438)
	[0.70623]	[-2.45509]	[1.05222]
DIFFBRENT(-1)	1.966686	-0.475586	0.176922
	(9.15016)	(0.43586)	(0.10576)
	[0.21493]	[-1.09115]	[1.67294]
DIFFBRENT(-2)	13.69991	0.309210	0.054260
	(9.11853)	(0.43435)	(0.10539)
	[1.50242]	[0.71189]	[0.51485]
C	-31.09661	0.112106	0.023060
	(50.8652)	(2.42292)	(0.58789)
	[-0.61135]	[0.04627]	[0.03923]
R-squared	0.088102	0.172292	0.050749

Table 27: Bahrain VAR Analysis

Vector Autoregression Estimates
Date: 11/26/18 Time: 11:20
Sample (adjusted): 3 103
Included observations: 101 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	DIFFBAHRAIN	DIFFUSEPU	DIFFBRENT
DIFFBAHRAIN(-1)	0.309185	0.050663	-0.019649
	(0.10543)	(0.07604)	(0.01823)
	[2.93259]	[0.66627]	[-1.07759]
DIFFBAHRAIN(-2)	-0.016430	-0.136396	0.012552
	(0.10654)	(0.07684)	(0.01843)
	[-0.15421]	[-1.77505]	[0.68119]
DIFFUSEPU(-1)	-0.104255	-0.286967	-0.003112
	(0.13746)	(0.09914)	(0.02377)
	[-0.75846]	[-2.89462]	[-0.13090]
DIFFUSEPU(-2)	-0.061898	-0.259863	0.026174
	(0.13738)	(0.09909)	(0.02376)
	[-0.45055]	[-2.62263]	[1.10157]
DIFFBRENT(-1)	0.193869	-0.785412	0.202054
	(0.60503)	(0.43637)	(0.10464)
	[0.32043]	[-1.79990]	[1.93094]
DIFFBRENT(-2)	-0.265876	0.355182	0.031415
	(0.60645)	(0.43739)	(0.10489)
	[-0.43841]	[0.81204]	[0.29952]
C	1.605581	0.710157	0.047779
	(3.37658)	(2.43530)	(0.58398)
	[0.47550]	[0.29161]	[0.08182]
R-squared	0.106120	0.160916	0.060072

Table 28: Oman VAR Analysis

Vector Autoregression Estimates
Date: 11/26/18 Time: 11:20
Sample (adjusted): 3 103
Included observations: 101 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	DIFFOMAN	DIFFUSEPU	DIFFBRENT
DIFFOMAN(-1)	-0.005530	-0.015711	-0.000971
	(0.10744)	(0.01259)	(0.00301)
	[-0.05147]	[-1.24814]	[-0.32279]
DIFFOMAN(-2)	-0.056321	0.005043	-0.001796
	(0.10803)	(0.01266)	(0.00303)
	[-0.52134]	[0.39842]	[-0.59360]
DIFFUSEPU(-1)	0.950029	-0.306164	-0.005131
	(0.86973)	(0.10190)	(0.02436)
	[1.09232]	[-3.00469]	[-0.21062]
DIFFUSEPU(-2)	-0.632824	-0.236874	0.025520
	(0.87248)	(0.10222)	(0.02444)
	[-0.72531]	[-2.31736]	[1.04425]
DIFFBRENT(-1)	3.890391	-0.513075	0.184094
	(3.78783)	(0.44377)	(0.10610)
	[1.02708]	[-1.15617]	[1.73511]
DIFFBRENT(-2)	2.342338	0.189498	0.058755
	(3.79664)	(0.44480)	(0.10635)
	[0.61695]	[0.42603]	[0.55249]
C	24.09067	0.801142	0.098006
	(21.1681)	(2.47999)	(0.59293)
	[1.13806]	[0.32304]	[0.16529]
R-squared	0.041686	0.148526	0.051862

ADF Tests

Augmented Dickey-Fuller Unit Root Test on BAHRAIN

Null Hypothesis: BAHRAIN has a unit root
Exogenous: None
Lag Length: 1 (Automatic - based on SIC, maxlag=12)

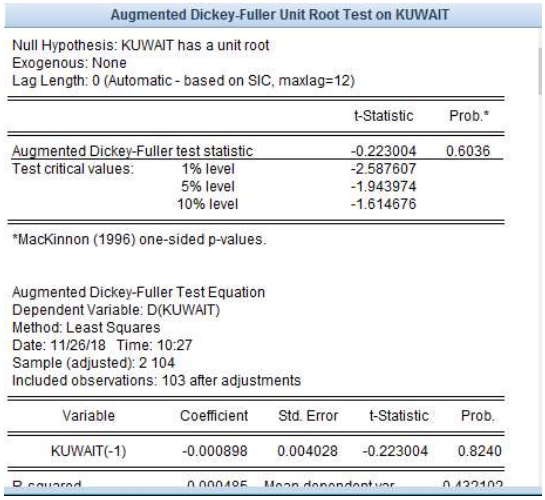
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.659171	0.4293
Test critical values:	1% level	-2.587831	
	5% level	-1.944006	
	10% level	-1.614656	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(BAHRAIN)
Method: Least Squares
Date: 11/26/18 Time: 10:24
Sample (adjusted): 3 104
Included observations: 102 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BAHRAIN(-1)	-0.001670	0.002534	-0.659171	0.5113
D(BAHRAIN(-1))	0.316604	0.094123	3.363713	0.0011

Figure 1: Bahrain ADF Test



Augmented Dickey-Fuller Unit Root Test on KUWAIT

Null Hypothesis: KUWAIT has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=12)

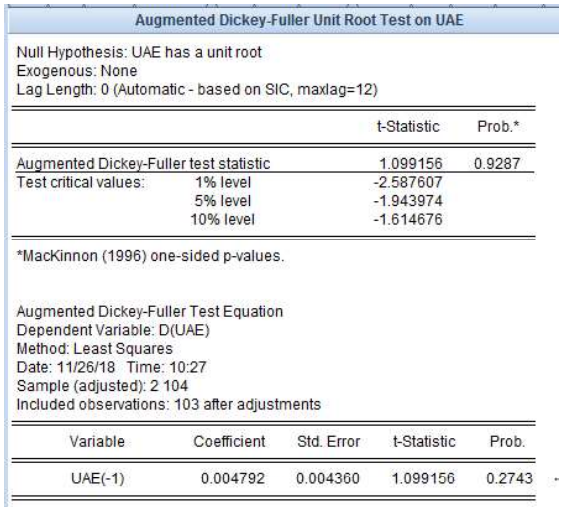
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.223004	0.6036
Test critical values:	1% level	-2.587607	
	5% level	-1.943974	
	10% level	-1.614676	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(KUWAIT)
Method: Least Squares
Date: 11/26/18 Time: 10:27
Sample (adjusted): 2 104
Included observations: 103 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
KUWAIT(-1)	-0.000898	0.004028	-0.223004	0.8240
R-squared	0.000486	Mean dependent var		0.432102

Figure 2: Kuwait ADF Test



Augmented Dickey-Fuller Unit Root Test on UAE

Null Hypothesis: UAE has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=12)

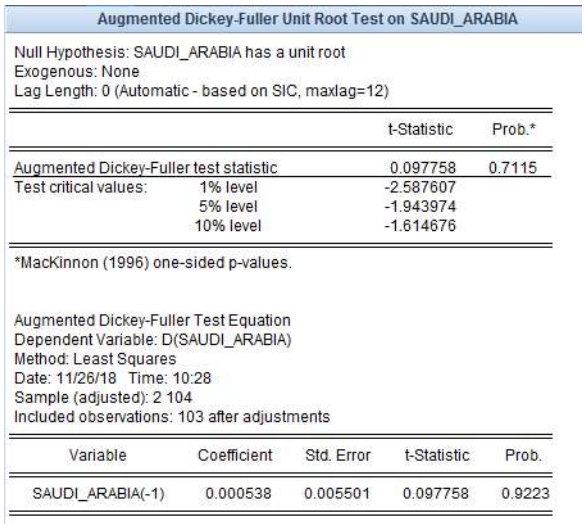
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		1.099156	0.9287
Test critical values:	1% level	-2.587607	
	5% level	-1.943974	
	10% level	-1.614676	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(UAE)
Method: Least Squares
Date: 11/26/18 Time: 10:27
Sample (adjusted): 2 104
Included observations: 103 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UAE(-1)	0.004792	0.004360	1.099156	0.2743

Figure 3: UAE ADF Test



Augmented Dickey-Fuller Unit Root Test on SAUDI_ARABIA

Null Hypothesis: SAUDI_ARABIA has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.097758	0.7115
Test critical values:	1% level	-2.587607	
	5% level	-1.943974	
	10% level	-1.614676	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SAUDI_ARABIA)
Method: Least Squares
Date: 11/26/18 Time: 10:28
Sample (adjusted): 2 104
Included observations: 103 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SAUDI_ARABIA(-1)	0.000538	0.005501	0.097758	0.9223

Figure 3: Saudi Arabia ADF Test

Augmented Dickey-Fuller Unit Root Test on QATAR

Null Hypothesis: QATAR has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.268223	0.7619
Test critical values:	1% level	-2.587607	
	5% level	-1.943974	
	10% level	-1.614676	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(QATAR)
Method: Least Squares
Date: 11/26/18 Time: 10:29
Sample (adjusted): 2 104
Included observations: 103 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
QATAR(-1)	0.001396	0.005206	0.268223	0.7891

Figure 4: Qatar ADF Test

Augmented Dickey-Fuller Unit Root Test on OMAN

Null Hypothesis: OMAN has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.093078	0.2472
Test critical values:	1% level	-2.587607	
	5% level	-1.943974	
	10% level	-1.614676	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(OMAN)
Method: Least Squares
Date: 11/26/18 Time: 10:30
Sample (adjusted): 2 104
Included observations: 103 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
OMAN(-1)	-0.003701	0.003386	-1.093078	0.2769

Figure 5: Oman ADF Test

Augmented Dickey-Fuller Unit Root Test on US_EPU

Null Hypothesis: US_EPU has a unit root
Exogenous: None
Lag Length: 3 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.650984	0.4329
Test critical values:	1% level	-2.588292	
	5% level	-1.944072	
	10% level	-1.614616	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(US_EPU)
Method: Least Squares
Date: 11/26/18 Time: 10:32
Sample (adjusted): 5 104
Included observations: 100 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
US_EPU(-1)	-0.011507	0.017677	-0.650984	0.5166

Figure 6: USEPU ADF Test

Augmented Dickey-Fuller Unit Root Test on BRENT

Null Hypothesis: BRENT has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.252787	0.5928
Test critical values:	1% level	-2.587607	
	5% level	-1.943974	
	10% level	-1.614676	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(BRENT)
Method: Least Squares
Date: 11/26/18 Time: 10:32
Sample (adjusted): 2 104
Included observations: 103 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BRENT(-1)	-0.001678	0.006640	-0.252787	0.8009

Figure 6: Brent (Oil Prices) ADF Test

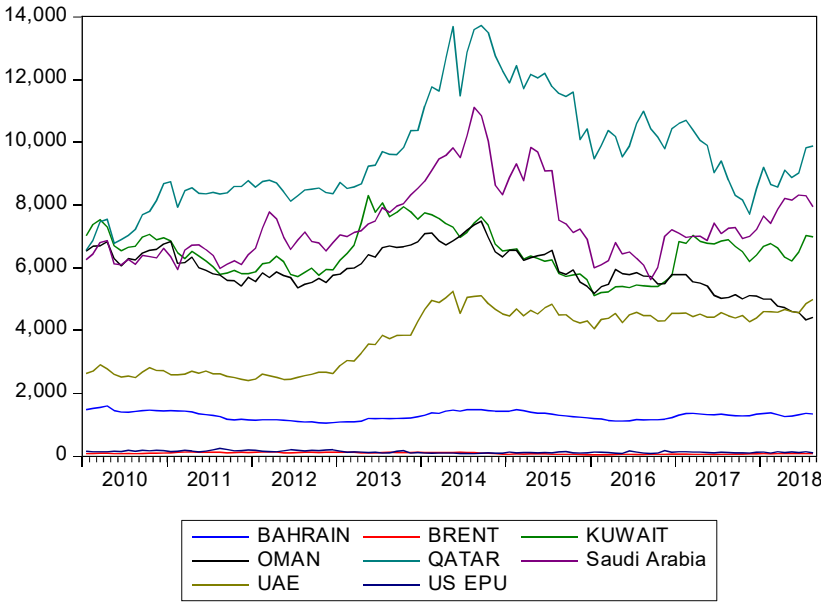


Figure 7: Multiple Line Plot