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Does Greek Financial Crisis Affect Sukuk Markets? Experience from Gulf Countries

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Abstract: Many studies have been carried out to investigate the impact of recent European financial crises on the performance of financial instruments in other regions. Nevertheless, there have been insufficient studies explaining such impact on Islamic financial instruments. In particular, whether Greek Financial crisis have affected performance of Sukuk traded in Gulf Markets needs to be answered. This study is aimed at empirically investigating the causality of credit and liquidity risk on Sukuk Markets in Gulf economies in the period of Greek Financial Crisis (2010 to 2013). We analyzed the Sukuk data by employing Granger causality test, with all the associated vector auto-regression model procedures. To investigate different stages of the contagion impact, we carried out the analysis in three tests, i.e., using (i) full period data; (ii) pre-downturn data; and (iii) during-downturn data. Our findings show that Bahrain sukuk market is cointegrated with those of Qatar and UAE in the full period observations. Meanwhile, during the crisis, Qatar Sukuk market is cointegrated with those of UAE and Bahrain. We also find that Bahrain Sukuk triggers market shock in both Qatar and UAE Sukuk markets. Bahrain consistently causes changes in price and spread of UAE Sukuk, both in the context of the full period and the during-crisis period. The reverse is also true. There has been strong tie between Bahrain and UAE Sukuk markets

Keywords: Greek Financial crisis, Sukuk Markets, Gulf Countries

1. INTRODUCTION

Some scholars, like Stiglitz [10], believe that the Greece's financial crisis was a contagious impact from the US financial crisis. The crisis may have broadened to other regions outside Europe through similar process since financial products traded in the Greek market are also traded in other markets outside Europe, and investors have greater and easier opportunities to access overseas markets and form international portfolio. The nature of financial products and investor characteristics are, among others, factors that explained the smooth transmission of the calamity.

There have been many studies, such as Pragidis, Aielli and Schizas [9], carried out to investigate the transmission of crisis from the USA to Greece and from Greece to other regions. Kenourgios, Naifar, and Dimitriou [5] investigated the contagion effects of the global financial crisis (GFC) and Eurozone sovereign debt crisis (ESDC) on Islamic equity and bond markets. Nevertheless, there have been insufficient studies done to explore the impact of the Greek financial crisis on other financial markets particularly Gulf countries. This study aims to fill this gap. To be more particular, this study intends to assess the contagious impact of Greek financial crisis to Gulf market, especially in Sukuk markets. We propose an assessment of the contagion issue using data of Islamic financial/capital products, i.e., Sukuk, since this product is deemed to be shariah-compliant and therefore may be relatively immune to the impact of financial shocks [14].

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Based on the above concern, it is important to check whether there is cointegration and causality among markets in the same region, and which market is the entry gate of shock in the region. By answering these questions, we can showcase long run cointegration between markets in Gulf economies and its magnitude when Greek financial crisis enters the region. We also need to know whether there are pressures on price and bid-ask spread in a downturn environment since price and spread reflect investor trading behavior in particular financial product.

This paper consists of seven sections. After the introduction section, the second briefly describes the relevant literatures, as well as some earlier empirical studies related to cointegration and causality. We then explain data and research procedures in the third section, and elaborate the finding results and its analysis in the fourth and fifth section. We briefly discuss the result in the sixth section and summarize the study in the last section.

2. LITERATURE REVIEW

Khan [11] predicts that Islamic capital products and Islamic financial system will advance significantly, including Sukuk. Meanwhile, sukuk has been perceived to bear relatively lower risk than Bond [16]. Malaysia dominates international Sukuk market by seizing 71% market share. The amazing increase in Ijarah Sukuk trading volume in Malaysia is due to growing perception that Sukuk is immune to crisis. Bhala [15] explains that Sukuk is more flexible to anticipate the wave of crisis since Sukuk introduces lesse-lessor relationship instead of lender-borrower relationship. Such nature of Sukuk helps the holders face uncertainty in more flexible manner.

Nevertheless, that flexibility does not necessarily guarantee high transaction volume. Investors distinctively show various considerations and attitudes towards investment opportunities. Risk and return trade-off, for instance, may lead investors to different buy-sell strategy. Besides, Sukuk bears the issuer's default risk as unexpected event may occur [12].

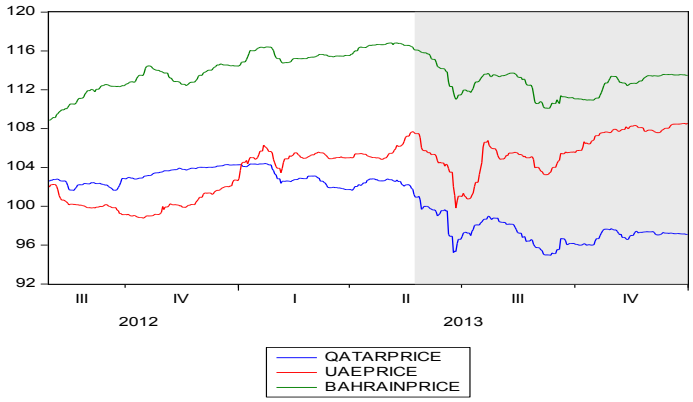
Some cointegration tests have been done to explain investment patterns [3]. Herwany and Febrian [1] have carried out empirical investigation to reveal cointegration among seven markets in Asia. In Latin America, Auyong, Gan and Treepongkaruna [8] proved causality and cointegration among markets, particularly in the crisis environment starting from Mexico (1994) to Asia (1997), Russia (1998) and Brazil (1999). Despite contra-argument introduced by Pragidis, Aielli and Schizas [9], who found no contagion effects from Greek financial crisis to other region, using volatility model, the impact of crisis in the long run can be inevitably identified through cointegration and causality test.

Meanwhile, Friewald, Jankowitsch and Subrahmanyam [13] conducted similar study using data of corporate bonds during the 2008 financial crisis. Aboody, Hughes and Ozel [4] also conduct a study evaluating contagion impact in bonds market during the crisis. Using Asia Bonds Market, Guillaumin [2] finds that financial integration is stronger in the post-crisis period than during the crisis. Similarly, a study by Shin and Kim [6] reveals the strong liquidity effect and credit risk in the post-crisis period.

In their study, Friewald, Jankowitsch and Subrahmanyam [13] also introduce the importance of liquidity, represented by bid-ask spread, to explain investor behavior and bonds price movement. Eventually, this study attempts to reveal the financial crisis contagion to Sukuk Gulf markets by assessing the associated price changes and its liquidity.

3. DATA AND METHODOLOGY

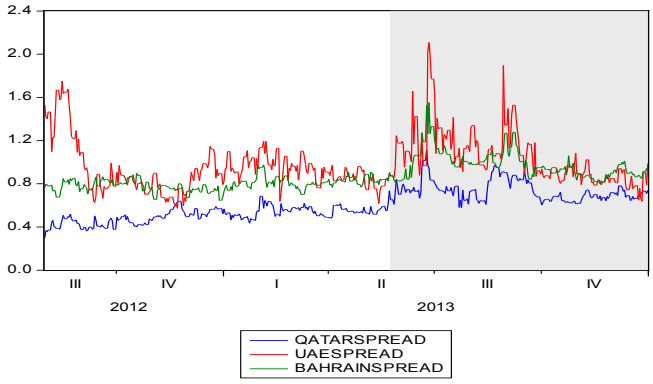
In this study, we employ data of Ijarah sukuk pre-dominantly issued by three Gulf countries, i.e., Qatar, United Arab Emirates and Bahrain. The data, obtained from Bloomberg, consist of sukuk price, bid price, and ask price. Spread figures are the difference between bids and ask prices. As Greek financial crisis had occurred during the period of 2009-2012, we then conducted the observation using data from July 2012 to December 2013. Thus, this study utilized 519 observations. Finally we divided the second observation period based on the decline of Sukuk price, in which the cut-off date is May 24, 2013 as can be seen on the Figure 1 and 2.



Source: Processed Data

Figure 1: Daily Price Series of Qatar, UAE, and Bahrain Sukuk

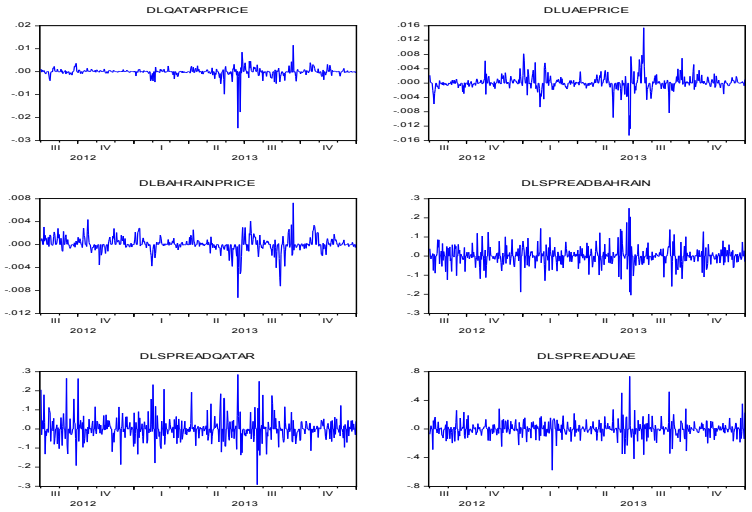
Figure 1 shows sharp decline in the Ijarah Sukuk price in the three observed economies, i.e., Qatar, UAE and Bahrain, starting from May, 24 2013. The prices recovered in the mid of the third quarter of 2013. The decline was followed by the increase in spread volatility of the Sukuk as depicted by Figure 2.



Source: Processed Data

Figure 2: Daily Spread Series of Qatar, UAE, and Bahrain Sukuk

Meanwhile figure 3 shows that both price and spread of Ijarah Sukuk experienced sharp and significant increase in volatility in 2013s particularly in Bahrain followed with UAE and Qatar. This would also indicate that Bahrain as the entry gate of financial shocks due to Greek Financial crisis.



Source: Processed Data

Figure 3: Price and Spread of Sukuk AL-Ijaraah

After describing the big picture of the raw data and particular movements of price and spread of Ijarah Sukuk in the three economies, we checked the correlation between the observed economies. We also conducted cointegration test to estimate the price movements in the long term using Cointegration model and Vector Error Correction Model (VECM), which followed VAR test and Augmented Dickey Fuller (ADF) Test.

In addition to the cointegration test, we also assess causality relationship among the three economies to reveal the impact magnitude of a shock occurring in one country to another. In this process, we followed Granger-Causality test procedure.

4. DESCRIPTIVE STATISTICS

The descriptive statistics is divided into two parts. The first part is related to price of Sukuk of the three economies. In general, the average price of UAE and Bahrain Sukuk is positive, while that of Qatar is negative. Price spread of Qatar Sukuk is the largest, as can be seen from its balance of maximum and minimum prices. Standard deviation of Qatar Sukuk price is also the highest as indicating the high risk.

Table1: Descriptive Statistics Price and Spread of Ijarah Sukuk

	QATAR PRICE	UAE PRICE	BAHRAIN PRICE	SPREAD BAHRAIN	SPREAD UAE	SPREAD QATAR
Mean	-0.000	0.000	8.04E-05	0.000	0.002	-0.001
Median	0.0000	0.0000	0.0000	0.000	0.000	0.000
Maximum	0.012	0.015	0.007	0.251	0.285	0.735
Minimum	-0.025	-0.015	-0.009	-0.205	-0.292	-0.576
Std. Dev.	0.002	0.002	0.001	0.047	0.060	0.107
Skewness	-4.764	-0.248	-1.083	0.171	0.764	0.450
Kurtosis	62.877	17.653	14.247	7.488	7.999	11.491
Jarque-Bera	7934	4639.5	2831.6	437.24	589.71	1573.6
Probability	0.000	0.000	0.000	0.000	0.000	0.000
Sum	-0.055	0.063	0.042	0.1769	0.905	-0.437
Sum Sq. Dev.	0.002	0.002	0.000	1.143	1.862	5.905
Observations	518	518	518	518	518	518

Source: Processed Bloomberg data

All the above sukuk data is in differencing and log. Spread is the balance between bid and ask price of Ijarah Sukuk.

On the other hand, Bahrain sukuk Price indicates the lowest risk (standard deviation of 0.0013). Based on the spread (Ask - Bid), Qatar Sukuk shows the highest risk level (0.1069).

Table 2: Correlation Matrix of Al Ijarah Sukuk

	QATAR PRICE	UAE PRICE	BAHRAIN PRICE	BAHRAIN SPREAD	QATAR SPREAD	UAE SPREAD
QATAR PRICE	1.000	0.460	0.615	-0.318	-0.272	-0.070
UAE PRICE	0.460	1.000	0.445	-0.178	-0.074	-0.207
BAHRAIN PRICE	0.615	0.445	1.000	-0.166	-0.109	-0.161
BAHRAIN SPREAD	-0.318	-0.176	-0.166	1.000	0.166	0.009
QATAR SPREAD	-0.272	-0.074	-0.109	0.166	1.000	0.006
UAE SPREAD	-0.070	-0.207	-0.161	0.009	0.006	1.000

Source: Processed Bloomberg data

All the above sukuk data is in differencing and log. Spread is the balance between bid and ask price of Ijarah Sukuk.

The above correlation matrix demonstrates that relationship of any two of the three observed economies indicates relatively low correlation with correlation coefficients ranging from 0.44 to 0.66. This implies that, in the short term, a portfolio diversification involving these sukuks might be less risky.

5. FINDING RESULTS

Before testing the causality, we run ADF test on Sukuk price and and Sukuk spread to check the data stationarity. The result of ADF test confirms that all the Sukuk time series is stationary at the first differencing with high ADF stat.

Table 3: ADF test

Ijarah Sukuk	ADF-Stat	Differencing
Price (QATAR)	-9.494***	1
Price (UAE)	15.007***	1
Price (BAHRAIN)	-13.916***	1
Spread (Qatar)	-25.964***	1
Spread (UAE)	-28.271***	1
Spread (BAHRAIN)	-28.778***	1

Source: Processed Bloomberg data

All the above sukuk data is in differencing and log. Spread is the balance between bid and ask price of Ijarah Sukuk.

Table 4 shows the results of VEC test in three observation periods, i.e., full period, crisis period and decline of sukuk price. The first column showcases the change of Qatar sukuk price. The lag 1 of the change of sukuk price of Qatar, UAE, Bahrain and the residual of the original equation becomes dependent variables.

The table invariably indicates that Bahrain Sukuk price consistently and significantly puts pressure on those of Qatar and UAE in the full period observation, with coefficients of 0.398 and 0.200, respectively. This pressure also continuously exists in the Crisis observation period and in the Price-Decline observation period.

Table 4: VEC Estimated Results Price of Full Period

Variables	ΔQatar	ΔUAE	ΔBahrain
FULL PERIOD			
ΔQatar (-1)	0.005	0.042	0.046
ΔUAE (-1)	0.099***	0.016	0.039**
ΔBahrain (-1)	0.398***	0.200***	0.053**
Res	1.108***	0.970***	0.936***
R^2-Adj	0.673	0.768	0.608
F-Stat	266.956	427.212	200.992
Log likelihood	2776.655	2828.312	2954.952
SIC	-10.680	-10.881	-11.371
CRISIS PERIOD			
ΔQatar (-1)	0.0181	0.109***	0.092***
ΔUAE (-1)	0.048***	0.007	0.021*
ΔBahrain (-1)	0.141***	0.073***	0.004
Res	1.004***	0.996	0.987***
R^2-Adj	0.891	0.945	0.901
F-Stat	598.877	1262.379	673.222
Log likelihood	1944.675	1917.355	1982.962
SIC	-13.088	-12.903	-13.347
DECLINE OF SUKUK PRICE			
ΔQatar (-1)	0.009	0.024	0.026
ΔUAE (-1)	0.105*	0.029	0.045
ΔBahrain (-1)	0.514***	0.277***	0.100
Res	1.183***	0.947***	0.894***
R^2-Adj	0.581	0.674	0.460
F-Stat	76.948	114.017	47.718
Log likelihood	1079.670	1114.331	1172.085
SIC	-9.693	-10.008	-10.533

Source: Processed data
*** at 1% level of Significance
** at 5% level of Significance
* at 10% level of Significance

Meanwhile, Table 5 demonstrates long-term equilibrium relationship which is obtained from the VEC model test. It can be seen that Bahrain sukuk price is cointegrated with those of Qatar and UAE, significant at 1%, in the full period observation. Meanwhile, in the crisis-period observation, Qatar Sukuk price is cointegrated with that of UAE and significant at 5% level and with that of Bahrain and significant at 1% level.

In the price-decline observation period, UAE Sukuk price cointegrates with that of Bahrain as well as cointegrates with that of Qatar at 1% level of significance. It can be inferred from the above results that Bahrain price consistently cointegrates with that of Qatar, meaning that Bahrain price provides the largest contribution to the change of the other two Sukuk prices. It can also be inferred from this empirical fact that the dominant market shock is Bahrain sukuk price.

Negative sign appearing in the influence of Bahrain sukuk price on that of Qatar means that there is a market shock moving in a direction against that of Qatar sukuk price. This situation also applies in the observed full period and the price-decline period to Bahrain-and-UAE context.

Table 5 and Table 6 illustrate diversity of the results. The pressure to Sukuk price is indicated by positive signs, while pressure to spread is indicated by negative signs. They imply that when a Sukuk price moves to a particular direction, the other Sukuk would move to the same direction. On the other hand, when a spread of a Sukuk price gets larger, and stimulates liquidity, the other Sukuk would experience smaller spread and enjoy liquidity.

Table 5: VEC Estimated Results Spread of Full Period

Variables	ΔQatar	ΔUAE	ΔBahrain
FULL PERIOD			
ΔQatar (-1)	0.009	-0.003	-0.015***
ΔUAE (-1)	0.008*	0.001**	0.002
ΔBahrain (-1)	-0.051***	-0.004***	-0.001
RES	1.000***	1.000***	0.999***
R^2-Adj	0.974	0.999	0.973
F-Stat	4752.323	1465155	4711.108
Log likelihood	1667.861	2838.548	1786.278
SIC	-6.392	-10.920	-6.850
CRISIS PERIOD			
ΔQatar (-1)	0.015	-0.025**	-0.009
ΔUAE (-1)	-0.008	-0.008	5.21E-05
ΔBahrain (-1)	-0.024*	0.021	-0.005
RES	0.999***	0.999***	1.000
R^2-Adj	0.972	0.989	0.975
F-Stat	2514.430	6339.700	2831.765
Log likelihood	943.365	954.658	1054.315
SIC	-6.299	-6.376	-7.052
DECLINE OF SUKUK PRICE			
ΔQatar (-1)	-0.010	0.021	-0.010
ΔUAE (-1)	0.024***	0.001	0.005
ΔBahrain (-1)	-0.081***	-0.065***	0.002
RES	0.996***	1.001***	0.999***
R^2-Adj	0.966	0.990	0.958
F-Stat	1549.261	5635.951	1245.039
Log likelihood	682.447	654.987	688.388
SIC	-6.081	-5.832	-6.135

Source: Processed data

*** at 1% level of Significance

** at 5% level of Significance

* at 10% level of Significance

Table 6 reveals causality between the observed markets in the full-period observation. Qatar sukuk price stimulates UAE market shock, both in price and spread terms. These evidences are significant at 10% and 5% significance level. The reverse is not true.

Bahrain Sukuk price triggers price shock in both Qatar and UAE Sukuk markets. Bahrain consistently causes changes in price and spread of UAE Sukuk, both in the context of the observed full period and the observed price-decline period. The reverse is also true. The causality and cointegration tests summarize the strong tie between Bahrain and UAE Sukuk markets meaning that any Sukuk portfolio involving these two Sukuks is relatively risky. Inclusion of Qatar Sukuk in such portfolio may induce risk-reduction. Moreover, none of the observed Sukuk triggers shock on other Sukuk during the crisis period.

Table 6: Engle Granger Causality Test of Price and Spread for Ijarah Sukuk

SUKUK	CAUSALITY	SIGNIFICANCE
Full Period		
Price of Sukuk	Qatar ----→ UAE	2.357*
	Bahrain ---→ Qatar	3.743**
Spread of Sukuk	UAE ---→ Bahrain	3.071**
	Bahrain --→ UAE	5.519***
	Qatar --→ UAE	3.147**
Crisis Period		
Price of Sukuk	-	-
Spread of Sukuk	-	-
Decline of Sukuk Price		
Price of Sukuk	Bahrain --→ UAE	2.685*
Spread of Sukuk		
	UAE -→ Qatar	4.573**
	Qatar -→ UAE	4.538**
	Bahrain -→ UAE	6.701***
	UAE -→ Bahrain	3.387**

Source: Processed data
*** at 1% level of Significance
** at 5% level of Significance
* at 10% level of Significance

6. FINDING ANALYSIS

Low correlation among the observed Gulf Sukuk markets does not prove good potential for forming low risk Sukuk portfolio using Gulf Sukuks, as the investigation results indicate significant cointegration coefficients, particularly in the longterm.

This study also reveals that Bahrain Sukuk market dominates its relationship with the other two Sukuk markets. Investors in Gulf Sukuk markets may want to avoid putting Bahrain Sukuk in their portfolio if they seek for low risk portfolio, as this market triggers price and spread changes in the other two markets. Furthermore, results of this study imply that external shock might enter Gulf economies through Bahrain Sukuk market.

Other interesting issue found is that the three Sukuk markets are vulnerable to financial crisis impact, especially in the long run. It is interesting to know that investors will switch to other Sukuks,

particularly of one of the Gulf Sukuks, if financial crisis hits or price of their Sukuks declines. The finding also suggests that investors focus more on Sukuk price rather than on liquidity represented by Bid-Ask spread.

7. CONCLUSION

This study aims to conduct empirical investigation to reveal the causality of credit and liquidity risk on Sukuk Markets in Gulf economies in the period of Greek Financial Crisis (2010 to 2013). We employed Granger causality test, with all the associated vector autoregression model procedures using the Sukuk data. We ran the analysis procedure through three observation periods, i.e., (i) full period observation; (ii) before-crisis data observation; and (iii) during-crisis data to show different stages of the contagion impact.

Our findings invariably show that Bahrain sukuk market is cointegrated with those of Qatar and UAE in the full period observation. Meanwhile, during the crisis, Qatar Sukuk market is cointegrated with those of UAE Bahrain. We also find that Bahrain Sukuk triggers market shock in both Qatar and UAE Sukuk markets. Bahrain consistently causes changes in price and spread of UAE Sukuk, both in the context of the full period and the during-crisis period. The reverse is true. There has been strong tie between Bahrain and UAE Sukuk markets

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