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Volatility of Islamic Stock Markets and Developed Stock Markets of G6 Countries

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ABSTRACT

The objective of this to measure and compare Volatility of Islamic stock markets with equity markets of developed(G6) countries by taking daily values for period 2000-2016. The technique of Augmented fuller test (ADF), Heteroscedasticity test, ARCH (1,0), GARCH (1,1), TARCH and E-GARCH are applied. The results show Islamic stock markets shows positive returns as compare to previous day return but the Developed equity markets (G6) shows negative returns as compare to previous day return expect span and Poland equity market. The study explored that in all the stock markets the previous day volatility transfers in the next day volatility and there are many other factors affect the stock market volatility. The study is helpful in building stock portfolio for individual or institutional investor and for policy maker in decision making.

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1. Introduction

Commonly it is considered that only strong economy markets can lead toward higher return with lower risks, while weak economy markets would not give fruitful return to investors. There are many stock markets in the world having different nature, some shows the higher volatility style or behavior and other show contrast style. The Islamic markets are distinguished from other equity markets due to the existence of Islamic organizations who following the Sharia based rules in day to day business. so, the Islamic countries markets and developed countries markets have different volatility level one of the major cause the lot of Islamic sharia based organization exist in Islamic country equity markets. volatility is a risk about investors security. Before investment in stocks investors and decision makers have certain level of risk about the securities at which they want to invest their asset. Speculators always try to invest their funds and asset in those markets which have higher value of beta, to get the fruitful return. For investor point of view the portfolio should be minimum risk and

maximum return. When volatility of Islamic and G6 markets is lower, situation is ripe for stock prices to rise in value, lead to increases the return in an investment portfolio (Yusof & Majid 2013). The investors who make investment in Islamic countries markets with developed countries markets has aim to evade or hedge the risk of securities. Changes in security prices of Islamic and developed countries markets influence the behavior of investors regarding investment. Research tenacity is to quota the volatility of Islamic and developed regions markets and analyze stock volatile risk, which Islamic and developed counties markets faces due to different economic and political situation.

The word “Volatility” means ability to change rapidly and unpredictably. Stock market volatility means the behavior or responses of stock markets. The previous studies explore the volatility in stock return of different markets during previous lags among Pakistan, India, japan and Hong Kong(Subhani 2009) but focus on interest rate. Movement of stock market prices can be predicted on focusing of changing primary and secondary trends (DOW theory 2003). Stock market prices moves in cyclic manner; market continuously unfold in the form of waves (Elliot wave theory 2004). sometimes stock markets prices move up and sometime move down either in the form of cyclic or crest & trough.

No empirical work has been done yet on volatility of Islamic countries markets with developed markets. Both type of markets showing some nature of volatility. The goal of this study is to analyze that which markets are more volatile (Islamic countries markets or developed countries markets). The current study is attempting to find the stock return of different markets during previous lags by focusing on volatility of Islamic countries markets with developed markets. All these equity markets have different economic environment. This will help the investors or financial institutions to solve the problem of investing funds & asset in stock markets regarding stock return. Research purpose is to measure the volatility of Islamic and developed counties markets and analyze stock volatile risk, which Islamic and developed counties markets faces due to different economic and political situation.

2. Litratue Review:

Chukwuogor and Feridun (2007) measured and compared the stock returns volatility of emerging stock markets and developed stock markets. Secondary data during the 1947 to 2004 was collected. ARCH and GARCH technique were used for data analysis purpose. They found that emerging markets are more volatile and offer more return than developed economies markets.

Albaity (2011) examined the effect of monetary policy instrument on Islamic market stock returns by collecting data for period 1992-2000. The study used the GARCH model to check the volatility of index (KLSI) and DJIMI. The result reveals that model M1, M3, inflation rate and GDP influencing KLCI volatility. Moreover, they concluded that conventional stock market affected by interest rate, while this effect is not observed on volatility of Islamic markets.

Volatility of Islamic and G6 market affect the future cash flow and the study of both markets is compulsory before making any investment decision. Aksoy et al., (2011) studied the association ship among Turkey, Egypt and Israel stocks exchanges. Data was collected during the period of 2002 to 2010 on weekly basis. Study used Co integration, Engle Granger test and GARCH model for data analysis purpose. They found that co-integration and volatility exited among these countries market. These markets provide diversification opportunities to international investors.

Ergun and Nor (2010) examined the volatility existence and dynamic relationship between Turkish stock market and USA stock market with reference to Turkey’s association to EU. For study

purpose they choose Istanbul Stock Exchange from Turkey and NASDAQ from USA. Daily data for the period of 1988 to 2008 was collected and Bi-variate co integration, ECM and CGARCH techniques were employed for analysis purpose. Result showed that dynamic linkage existed between Turkish stock market and American stock market. Study also found that significant volatility run from USA stock market to Turkey stock market after the entrance of Turkey in Custom union Agreement with European Union. Alper and Yilmaz (2004) used Generalized Autoregressive conditional Heteroskedasticity (GARCH) to measure the stock return volatility infection from financial centers and emerging markets to the Istanbul stock market. Funding indicated existence of volatility contagion from emerging market and financial centers to Turkish stock exchange market.

Ahmed and Suliman (2011) investigated the stock returns volatility in Khartoum Stock Exchange of Sudan. For research purpose data was collected during 2005-2010. GARCH model was used to measure the stock return volatility. It was found that during sample period high volatility of index returns exists in Khartoum stock market of Sudan. Emenike (2011) examined the behavior of stock return volatility in Nigerian by using GARCH model. Data collected on monthly basis during the period of 1999 – 2008 about All share Induces of Nigeria Stock Exchange. The GARCH model results showed that volatility clustering is existed in NSE stock returns series. Parvaresh and Bavaghar (2012) found that GARCH Model had a power to forecast stock returns volatility in Tehran Stock Market. Wu et al.,(2004) examined the volatility of Chinese Stock markets by using series of ARCH models. Two different Chinese stock markets are chosen and different ARCH models are applied on these markets. They found that no volatility transmission prevailing between Shenzhen stock market and Shanghai stock market in China.

- H1:** The stock return volatility of current period predicts on previous stock return volatility.
H2: Islamic equity markets are less volatile than developed equity markets.

3. Methadology

This study focus on daily stock prices indexes of Islamic markets and developed market for the period 1st week of January-2000 to last week of March-2016. The data was collected from the sources of yahoo. Finance and investing.com. This study applied ADF(Augmented Dickey fuller test), Heteroscedasticity test, ARCH, GARCH, TARARCH and E-GARCH methods are used to measures volatility of selected markets. ARCH test tells us about nature of volatility, that how periods of low volatility are followed by periods of high volatility when we deal stock markets. While GARCH model used to forecast the return of current investments and E-GARCH gives the information about size and bad or good news effect.

4. Results

Table 1:Unit root (Augmented Dicky fuller test)

	France	UK	Italy	Spain	Indo	PAK	Oman	POL	Tur	Ger
ADF	-	-	-	-30.242	-56.353	-	-	-	-	-
level	31.792	31.383	66.355			55.554	13.302	35.985	64.567	65.37
T-stat										
Critical Values										
1%	-3.431	-3.431	-3.431	-3.431	-3.431	-3.431	-3.431	-3.431	-3.431	-

level										3.431
5%	-2.862	-2.862	-2.862	-2.862	-2.862	-2.862	-2.862	-2.862	-2.862	-
level										2.862
10%	-2.567	-2.567	-2.567	-2.567	-2.567	-2.567	-2.567	-2.567	-2.567	-
level										2.567

To check the volatility of equity markets through the ARCH family its necessary that the Data should be stationary to fulfill this condition to check the unit root ADF test applied. The results indicate that all the stock markets returns are stationary at level.

Table 2 (Heteroscedasticity Test)

States	F-stat	P.F(1,3867)	r^2	Chi- ² (1)	Result
Turkey	395.2543	0.000	361.0344	0.000	Significant
Pakistan	344.4611	0.000	316.4507	0.000	Significant
Indonesia	130.8135	0.000	126.6599	0.000	Significant
Oman	192.9044	0.000	183.6537	0.000	Significant
France	153.426	0.000	148.0185	0.000	Significant
Germany	174.33	0.000	163.22	0.000	Significant
Spain	2.512781	0.1133	2.511384	0.113	Insignificant
Italy	160.5918	0.000	154.6917	0.000	Significant
United Kingdom	188.6912	0.000	178.5913	0.000	Significant
Poland	2.128501	0.1448	2.128291	0.1446	Insignificant

Residuals Graphs:

France

Italy

Spain **Indonesia**

Pakistan **Oman**

Germany

The Residuals Graphs also verified that the periods of low volatility is followed by periods of low volatility for prolonged period. While the periods of high volatility is followed by periods of high volatility for prolonged period. This pattern confirms that of this study can apply ARCH family for the on the data.

For all markets, the data result represents coefficient of Heteroscedasticity are significant, except Spain and Poland. Results of heteroscedasticity confirm that F value is 395 and p value is less than 0.05 means model is significant. This reflect model is fit to explain volatility of Islamic and G6 stock market.

Table 3: ARCH (Autoregressive conditional heteroskedasticity Test)

	ME			VE		
	Var	Coef.	P	Var	Coef.	P
Turkey	BIST (-1)	0.05053	0.0061	RSD(-1)	0.000352	0.002616
Pakistan	KSE(-1)	0.092316	0.005	RSD(-1)	0.44368	0.0078
Indonesia	JKSE(-1)	0.063044	0.03	RSD(-1)	0.324728	0.005
Oman	MSM30(-1)	0.662313	0.04	RSD(-1)	5.231318	0.0036
France	CAC40 (-1)	-0.03043	0.0001	RSD(-1)	0.255074	0.0034
Germany	DAX (-1)	0.00254	0.0272	RSD(-1)	0.293061	0.0084
Spain	IBEX35(-1)	0.010906	0.0081	RSD(-1)	0.089133	0.01
Italy	FTSE MIB(-1)	-0.05544	0.00	RSD(-1)	0.277024	0.00
United Kingdom	FTSE100(-1)	-0.06851	0.00	RSD(-1)	0.407659	0.00
Poland	WIG (-1)	0.00207526	0.0289	RSD(-1)	0.379285	0.007

In the Mean equation of ARCH the positive value of coefficient of explain that the today returns of BIST (-1) 5.05% , KSE (-1) 9.235%, JKSE(-1) 6.30%, MSM30(-1) 66.23%, DAX(-1) 0.25%, IBEX35(-1) 1.09% and WIG(-1) 0.20% is higher than the previous day return respectively. While the negative value of coefficient of CAC40(-1) 3.04%, FTSE MIB(-1) 5.54% and FTSE 100(-1) 6.85% is less than the previous day return.

In variance equation of ARCH (1), the P value of RESID (-1) of BIST (-1) is 0.02% , KSE (-1) 0.07%, JKSE(-1) 0.05%, MSM30(-1) 0.03%, DAX(-1) 0.84%, IBEX35(-1) 0.1% and WIG(-1) 0.07%, CAC40(-1) 0.34%, FTSEMIB(-1) 0.00% and FTSE 100(-1) 0.00% is significant which shows that today's volatility can be explained on the basis of past price behavior. Further the value of coefficient of residual is positive which shows that BIST (-1) is 0.03% , KSE (-1) 44.36%, JKSE(-1) 32.47%, DAX(-1) 29.30%, IBEX35(-1) 8.91% and WIG(-1) 37.92%, CAC40(-1) 25.50%, FTSEMIB(-1) 27.70% and FTSE 100(-1) 40.76% today volatility is high as compare to previous day volatility..

Table: 4 GARCH (Generalized autoregressive conditional heteroscedasticity Test)

Country	Index	Variable	Coff	P.
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Turkey	BIST	GARCH (-1)	0.90271	0.0000
Pakistan	KSE	GARCH (-1)	0.784363	0.0000
Indonesia	JKSE	GARCH (-1)	0.84176	0.0000
Oman	MSM30	GARCH (-1)	0.911238	0.0000
France	CAC40	GARCH (-1)	0.901624	0.0000
Germany	DAX	GARCH (-1)	0.899111	0.0000
Spain	IBEX35	GARCH (-1)	0.895964	0.0000
Italy	FTSE MIB	GARCH (-1)	0.911216	0.0000
UK	FTSE100	GARCH (-1)	0.879403	0.0000
Poland	WIG	GARCH (-1)	0.442037	0.0000

The P-value of GARCH (-1) in all the stock markets are significant which indicates that today's volatility is affected due to the previous day volatility. Further the coefficient of GARCH (-1) is positive for all the stock market indices which shows that for BSIT(Turkey)90.27%,KSE(Pakistan) 78.43%, JKSE(Indonesia) 84.17%,MSM30 (Oman) 91.12%,CAC40(France) 90.16%, DAX(Germany) 89.91%,IBEX35(Spain) 89.59%,FTSE MIB(Italy) 91.12%, FTSE100(UK) 87.94% and WIG(Poland) 44.20% last day volatility transfer in next day respectively in the stock market returns.

Table:5 TARCH (Threshold Autoregressive conditional heteroskedasticity Test)

Country	Index	Variable	Coff	P.
Turkey	BIST	RESID(-1) ² *(RESID(-1)<0)	0.168008	0.1084
Pakistan	KSE	RESID(-1) ² *(RESID(-1)<0)	0.103537	0.01
Indonesia	JKSE	RESID(-1) ² *(RESID(-1)<0)	0.112983	0
Oman	MSM30	RESID(-1) ² *(RESID(-1)<0)	-0.41254	0

		$1)^2 * (\text{RESID}(-1) < 0)$		
France	CAC40	$\text{RESID}(-1)^2 * (\text{RESID}(-1) < 0)$	0.168008	0
Germany	DAX	$\text{RESID}(-1)^2 * (\text{RESID}(-1) < 0)$	-0.01011	0.001
Spain	IBEX35	$\text{RESID}(-1)^2 * (\text{RESID}(-1) < 0)$	0.180215	0.9526
Italy	FTSE MIB	$\text{RESID}(-1)^2 * (\text{RESID}(-1) < 0)$	0.114682	0.003
UK	FTSE100	$\text{RESID}(-1)^2 * (\text{RESID}(-1) < 0)$	0.169848	0.0000
Poland	WIG	$\text{RESID}(-1)^2 * (\text{RESID}(-1) < 0)$	0.24596	0.0025

Table 5 E-GARCH (Exponential Generalized autoregressive conditional heteroscedasticity Test)

ME			VE		
	Coff	P	Var	Coff	P
Turkey	BIST (-1)	0.01235	0.4195	C3	-0.24308
				C4	0.177352
				C5	0.986133
				C6	0.1093
Pakistan	KSE (-1)	0.107219	0.01	C3	-1.03999
				C4	0.329807
				C5	-0.10188
				C6	0.911223
Indonesia	JKSE (-1)	0.087187	0.000	C3	-0.5198
				C4	0.258321
				C5	0.962633
				C6	0.1456
Oman	MSM30(-1)	0.257143	0.000	C3	-0.25435
				C4	0.179865
				C5	0.103305

France	CAC40 (-1)	-0.03553	0.0319	C6	0.991951	0.000
				C3	-0.24234	
				C4	0.089875	
				C5	-0.13921	
Germany	DAX (-1)	-0.00665	0.6914	C6	0.980483	0.000
				C3	-0.26941	
				C4	0.119166	
				C5	-0.11918	
Spain	IBEX35(-1)	0.028353	0.4318	C6	0.97978	0.1169
				C3	-0.3219	
				C4	0.029621	
				C5	-0.12041	
Italy	FTSE MIB (-1)	-0.03606	0.0303	C6	0.966011	0.000
				C3	-0.22553	
				C4	0.112316	
				C5	-0.10135	
United Kingdom	FTSE100(-1)	-0.04158	0.0103	C6	0.12054	0.000
				C3	-0.27981	
				C4	0.117176	
				C5	-0.12239	
Poland	WIG (-1)	0.179882	0.000	C6	0.979677	0.000
				C3	-1.87097	
				C4	0.348826	
				C5	-0.10041	
				C6	0.806545	

In the Analysis of E GARCH results the C3 value explains that there should be other factors become part of the equation or not. In the above table C3 value are significant, which means there are many other factors which effect Islamic and developed market volatility. Further the C4 values of all the stock market returns are significant and their coefficients are Positive which means the stock market shows size effect. Positive coefficient means all the stock market shows high volatility in response of Large size news as compared to low size news. C (5) value In the E GARCH shows the sign effect. The stock markets of Turkey, Indonesia and Oman shows the C5 values are positive and significant which explains that if the good news comes its effect dominant as compare to bad news but the Pakistani, French, Germans, Spanish, Italian, Poland and British Equity markets shows significant and negative values of C(5) is significant and negative which indicates that the bad news have dominant effect as compared to good news in the stock market. In the results Value of C(6) is 10.93%,91.12%,14.56%,99.19%,98.04%,97.97%,96.60%,12.05%,97.96% and 80.65% for Turkey, Pakistan, Indonesia, Oman, France, Germany, Spain, Italy, UK and Poland significant and positive which means that in all the stock markets the previous day volatility persists.

In the Table 6 below explain the which test is best fitted Test from the ARCH family for stock markets to analyses the data. The criteria are where the value of AIC and SC is low the test is best fitted. The results indicate that the Turkish stock returns have -5.10922, -5.10006, Indonesian, stock returns -5.91829, -5.90871, UK stock market returns have -6.43277, -6.42374 low AIC & SC value when the TARCH is applied. While other countries stock markets have lower AIC and SC value when the EGARCH is applied. So, for the TARCH is best fitted model for Turkish, UK and Indonesian equity market volatility while EGARCH is best for the German, Pakistani, Spanish, Poland, Oman, Italian and French equity markets in this period to find

out volatility of equity market.

Table 6: Comparison AIC (Akaike info criterion) and SC (Schwarz criterion)

Country	Test	AIC	SC	Country	Test	AIC	SC
Turkey	ARCH	-	-	Germany	ARCH	-5.57097	-5.56485
		4.89407	4.88797				
	GARCH	-5.10086	-		GARCH	-5.84943	-5.84177
			5.09323				
	TARCH	-5.10922	-		TARCH	-5.88835	-5.87916
Pakistan			5.10006	Spain			
	EGARCH	-5.08991	-		EGARCH	-5.89022	-5.8795
			5.08075				
	ARCH	-5.95297	-5.9465		ARCH	-5.83099	-5.81005
	GARCH	-6.10005	-		GARCH	-5.88717	-5.861
Indonesia			6.09196	Italy			
	TARCH	-6.11078	-6.10107		TARCH	-5.83684	-5.81066
	EGARCH	-6.10159	-		EGARCH	-5.9399	-5.9085
			6.10785				
	ARCH	-5.76854	-5.76215		ARCH	-5.56442	-5.55833
Oman	GARCH	-	-	United Kingdom	GARCH	-5.84256	-5.83494
		5.90854	5.90056				
	TARCH	-5.91829	-		TARCH	-5.87447	-5.86533
			5.90871				
	EGARCH	-5.90771	-		EGARCH	-5.88076	-5.87162
France			5.89972	Poland			
	ARCH	-11.5797	-11.5732		ARCH	-6.10072	-6.09469
	GARCH	-12.7858	-12.7775		GARCH	-6.38983	-6.3823
	TARCH	-12.7748	-		TARCH	-6.43277	-6.42374
			12.7649				
	EGARCH	-12.7984	-		EGARCH	-6.43273	-6.42219
			12.7886				
	ARCH	-5.62344	-5.61733		ARCH	-5.51256	-5.49672
	GARCH	-5.8819	-		GARCH	-5.53706	-5.51726
			5.87434				
	TARCH	-5.93075	-		TARCH	-5.54699	-5.52323
			5.92159				
	EGARCH	-	-		EGARCH	-5.55761	-5.53385
		5.93998	5.93081				

5. Conclusion

This study concluded that the all the Islamic stock markets shows positive returns as compare to previous day return but the developed stock market shows negative returns as compare to previous day return expect span and Poland equity market. This study further explored that the Pakistan stock market shows 44.36% high volatility and Turkish stock market shows 0.0.3% low volatility as compare to previous day return among the Islamic equity markets. While the UK equity market explains 40.76% higher volatile

and Spanish equity market explains 8.91% lower volatile as compare to previous day returns. The study explored that in all the stock markets the previous day volatility transfers in the next day volatility. The E-Garch Test in this study indicated that there are many other factors are persisting which effect the stock market volatility which should be the part of the equation. So, study motivate to the researchers and market players to find out other factors which effect stock market volatility. The study further investigated that the all the stock markets volatile per the size of the news. So, the investors whose investing in these equity markets should be aware that big news may affect the stock market returns largely either positively or negatively the wealth. Finally, this study concluded that in all the Islamic equity markets except Pakistan good news effect dominantly as compare to bad news. While in all the developed equity markets the bad news, effect is dominant as compare to good news. Investors should focus on country expected economic, political and social news etc. which can affect the stock market returns positively or negatively. This study also helps to researchers and investors that which model of ARCH family is best fitted in the analysis of different equity markets. This study assists the all type of investors including Risk Averse, Risk Indifference, Risk seekers, individual or institutional investors and portfolio managers in understanding the behavior of Islamic and developed equity markets behavior.

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