

Movement of Shariah Indices in Financial Crisis Period: Exploring Evidences from National Stock Exchange of India

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Abstract:

We attempted to reveal the co-movement and to model the risk and return of NIFTY 500 and NIFTY 500 Shariah of National Stock Exchange of India, with reference to global financial and euro zone crisis. Closing prices from 1st January, 2007 to 30th April 2015 are used to empirically measure the time varying effects. The sample is divided into six periods. Johansen Co-integration, Vector Auto-regression, and Granger Causality are calculated. GMM and E-GARCH Models are also employed.

Shariah indices earned more return only in half of the periods, but are lesser volatile. The tests do not show any long term association and causality between both indices. NIFTY 500 is affected by its own lag, but does not affect its Shariah counterparts. Euro and US dollar both are significant to estimate returns, except in some cases. Both indices show leverage effects.

This study is done with limited objectives and time period. Results may vary with other indices and time period. The study will help the portfolio managers and investors in revision of their portfolios, if they look to reduce the risk of the portfolios and earn relatively higher returns. As NIFTY 500 does not share any long term or short term relation with Shariah Index, so it is recommended for diversification even in crises.

Key Words: NSE, India, Shariah Indices, GMM, E-GARCH, Crises

JEL Classification: C36, C51, G01, G11

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1. Introduction

After some unproductive efforts to launch Shariah based financial institutions and products during the early sixties, the actual commencement of the same came into the picture at the time of mid-seventies. It is based on fundamental principles, justice, transparency, common interest and needs of people. Sharing of profit and loss, risk sharing, prohibition of interest, principle of asset backing and prohibition of excessive un-certainty are considered as fundamental attributes of Shariah based finance.

In current years, the Islamic finance industry has been accepted as a rapidly rising part of the financial sector as it has recorded tremendous increments in assets by 17.6% from 2009 to 2013 annually, and E&Y has also estimated 19.7% growth by the year 2018.

Broadly, three kinds of framework of Islamic finance are provided in India, namely Shariah based financing companies, mutual funds and indices.

In our study, we are concentrating on Shariah indices, which are a measurement of the value of Shariah compliant stocks. In India, NSE (National Stock Exchange) and BSE (Bombay Stock Exchange) both have provided measurement indices, namely NIFTY500 Shariah, NIFTYShariah, and BSETasis 50 respectively. The NIFTY 500 is India's first broad-based benchmark of the Indian capital market for comparing portfolio returns *vis-à-vis* market returns. It is computed using free float market capitalization method. The Nifty 500 Index is the parent index to Nifty 500 Shariah Index. This index does not have a fixed number of companies. Constituents of parent index, which are Shariah compliant, are part of Nifty 500 Shariah Index.

In this study, we have built a model of co-movement of NIFTY 500 and NIFTY 500 Shariah. With the help of this, investors and portfolio managers can avail the opportunity of diversification and higher returns.

2. Review of Literature

Review of literature is presented as under:

Akbar and Barkely (2015) compared the performance of the Dow Jones Islamic Market Index (DJIMI) with the Wilshire 5000 (W5000), FTSE All Share Index (ASX), and Shanghai Stock Exchange Composite Index (SSECI). Time period taken was between the year 2008 and 2011. It was concluded that lesser volatility was found in

DJIMI than the W5000, ASX and the SSE. The DJIMI could produce lesser annual returns, when compared to the W5000 but comparable to those of the SSE and ASX. Correlation was high, but no long-term relationships were found between the DJIMI and its international counterparts. Granger causality results suggest that the DJIMI is the least affected by the global contagion effects. Rashid et al. (2014) examined the effect on the conventional and Islamic stock indices in Malaysia due to the change in investor sentiment index and various macro economic factors. They used quarterly data from 2007 to 2013. This study reports that interest rates, currency index and FTSE Bursa Malaysia Composite Index pose greater influence on Islamic price index when compared to industrial production, consumer price index, money supply and investor sentiment indices. **Habib and Islam (2014)** studied the effectiveness of Shariah index and conventional index with the testimonials of the MSCI index of India and Malaysia for the period from 2003 to 2013. To quantify the productivity of these indices, monthly risk-adjusted return and raw return were calculated and standard deviation was used to identify the risk involved in market. The results exposed that Shariah index did perform well in India, but it showed better efficiency in Malaysia with the comparison of their conventional counterparts. Ashraf and Deo (2014) examined the presence of linearity in, NIFTY500 and S&P BSE TASI 50, from 01/January/2008 to 31/June/2013. Analysis rejected the existence of Independent Identical Distribution (IID), it was found that the non-linearity was caused by volatility clustering and GARCH effect, not by serial or linear dependence. This leads to the lack of market efficiency and further rejects the Random Walk Hypothesis.

Reddy and Fu (2014) also studied the same concept, but with the testimonials of Australian Stock Exchange for the period of 2001 to 2013. To study the behavior of conventional index and its Shariah counterparts, various econometric tools were used such as Multiple Regression Analysis, Risk Adjusted Return, Treynor ratio, Sharpe ratio, and Jensen alpha ratio. The outcomes showed that Shariah index performs slightly better than conventional one, but they move in same way for the particular sample period. To find out risk averse investment alternative, **Miniaoui, Sayani and Chaibi (2014)** compared Islamic and mainstream indices of GCC for the period of crisis. They examined mean and variance of six GCC Markets and Dow Jones Islamic Market index GCC by employing Augmented GARCH Model. They found the mixed results. The results display that mean returns of Bahrain only had been affected by financial crisis, else all countries were untouched and on the point of volatility, only

three countries (Qatar, Saudi Arabia and Oman) had been affected but Shariah indices were significantly unaffected. The study determined that Islamic indices are more unpredictable than conventional counterparts. **Khazali, Lean and Samet (2014)** also attempted to study the same concept by employing nine indices from Dow Jones family, namely Asia Pacific, Emerging Markets, Canadian, Developed Country, Japanese, UK, European, Global, and US DJI. They studied the same indices for the period of 1996 to 2012 by employing stochastic dominance analysis techniques. The study detects that conventional indices stochastically govern Islamic indices in all markets but not in European market. But at the time of global financial crisis period from 2007 to 2012, the Islamic indices of Europe and US lead the conventional counterparts. The study determined that Islamic indices had provided opportunity of diversification at the time of financial shocks. **Ho, Rahman, Yusuf and Zamzamin (2014)** also compared Islamic and conventional index to measure their efficiency with the evidence of 12 significant indices of 8 countries. They engaged various econometric analytical tools such as Sharpe ratio, Jensen alpha ratio, CAPM and Treynor ratio. They concentrated on two major financial crises, namely dotcom decline (2000 to 2002) and global financial crisis (2007-2008). The result showed that, at the time of financial shocks, Islamic indices are less risky and more profitable investment alternatives. In the same series **Jawadi, Jawadi and WaëlLouhichi (2014)** have also checked the performance of Islamic stock exchange and conventional one, for three major economies, namely USA, Europe, and combined World and the sample dated is taken as 2000 to 2011. To detect their behavior, performance and characteristics, authors had employed GARCH Model, CAPM and many other financial ratios. The result recommends Islamic indices, as better investment alternative. **Setiawan and Oktariza (2013)** studied the effects of financial crisis on risk and return of Islamic and Benchmark indices with the evidence of Stock Exchange of Indonesia (IDX) for the period of 2009 to 2011. The result exposed that both indices move in same direction or it can be said that there is no significant difference between both indices by using Auto regression Model, Sharpe ratio, Treynor ratio. **Albaity and Mudor (2012)** picked Hijra from Malaysia and DJIMI from US. KLCI was utilized as ordinary indices for Malaysia and DJINA for US. A duration of February 2007 to May 2011 was taken. The period was separated into four sub periods. They undertake Unit root test, Causality and co integration as statistical tools. The outcomes clarify that Islamic venture is lesser unstable and lesser risky in crisis period however it is not considered as a better speculation elective over the routine

counterparts. With same concept **Romli, Mohamad and Yusof (2012)** tried to find out risk averse alternative by comparing the volatility between Shariah and conventional indices with the reference of Malaysia. To examine, the consistency or stability of indices, CAPM model and ARCH Model were introduced in the study for the period of 2007-2009. The result disclosed that FTSE-BM Hijrah is more unstable than the benchmark index, which provides high degree of opportunity of diversification. In the same concept, **Lean and Parsva (2012)** also contributed their study by comparing both Islamic and business indices in reference of Malaysian Finance Industry. FTSE Bursa EMAS Index, FTSE Bursa Malaysia KLCI Index, and FTSE Malaysia 100 index represented business sector portfolio and for representing Islamic index, FTSE Bursa Malaysia Hijrah Shariah Index and FTSE Bursa Malaysia EMAS Shariah Index, were selected. The study is based on March 2007 to February 2011 as time frame. To estimate the efficiency of indices on the point of risk and return, the study employed capital assets pricing model. The study exposed that Islamic indices perform in better way in the period of financial crisis, but not after that. **Haq and Rao (2011)** tested for Co integration and Causality between the SENSEX and SHARIAH 50 of Bombay Stock Exchange (BSE) of India. Time period taken was from 2008 to 2012. Co integration was checked using Engle Granger Co integration method. The results suggested that both the indices are co integrated in the long run and there is feedback relationship. **In 2011, Hassan and Girard** also examined the efficiency of Shariah indices in the comparison of conventional counterparts with the evidence of seven indices of Dow Jones index family. The sample period is taken from January 1996 to December 2005. To expose the result, authors divided sample into two periods and used econometric test such as Sharpe, Treynor, Jensen ratio and co-integration test. The result came in light that, in first period Shariah indices performed better, but not in second period. Overall both indices provide opportunity of diversification for better returns. With the same concern, **Albaity and Ahmad (2011)** chose three Shariah indices viz. FTSEGI for UK, DJIMI for USA, and KLSI for Malaysia to compare them to their benchmark indices for the period of 1999 to 2007. E-GARCH and T-GARCH Models were used to analyze behavior of risk and return of underlying indices. The study recommends that there is no diversification opportunity is existed as both the indices, Islamic and Conventional, move in same direction. **Beik and Wardhana (2011)** examined the efficiency, co-movement and characteristics of Islamic indices with the comparison of

conventional ones. The study based on the prices of DJIMI, Jakarta Islamic index (JII) and Dow Jones Islamic Index of Malaysia for the period of 2006 to 2008. To support the objectives, authors used Co-integration test and Vector Autoregressive Model. The study reveals the absence of dynamic interaction between both indices of Indonesia, Malaysia and US for long term. JII is least risky for defined period.

Majid and Kassim (2010) studied the degree of integration between five Islamic stock markets, namely Malaysia, Indonesia, Japan, the UK and the US to explore the long-run equilibrium relationship and the dynamic causal linkages. Weekly closing stock indexes of the selected stock markets from 1 January 1999 to 31 August 2006 were taken for two-step estimation using the ARDL. The Vector Error Correction Model (VECM) based on the Generalized Method of Moments (GMM) was estimated. The study finds that investors can gain benefits by diversifying in the Islamic stock markets. Ergun and Nor (2009) investigated the comovements and linkages between select Organizations of the Islamic conference (OIC) stock markets. Multivariate cointegration test, VECM and Granger causality test were undertaken on the stock indices of Indonesia, Malaysia, Pakistan and Turkey, for the period spanning from the first day of January 01/01/2000 to 24/10/2008. They found the evidence of linkages between the markets of Indonesia, Malaysia, Pakistan and Turkey. Turkish stock market also granger cause the other sample countries' stock markets. **Girard and Hassan (2008)** endeavored to find out the variance between the performance of Islamic and conventional indices of FTSE by considering sample period from January 1996 to December 2006. The study exposed that both indices are integrated and provide similar opportunity of returns. As we have reviewed number of studies and found that outcomes are not appeared in single format, which means literature has produced inconsistent result. The results are varied according to country and time span. In earlier researches, analysis were constructed on Ordinary Least Square (OLS), the significant contribution of the present study is the incorporation of advanced model (GMM), which takes care of researcher earlier. Previous studies done on NSE and its Shariah indices also did not use unconventional modelling techniques.

So, it is needed to study whether the underlying and Shariah indices are associated or not, in relation to National stock exchange of India, using advanced models.

3. Research Method

3.1 Data

NSE is the most significant stock exchange in India with highest turnover. Therefore we have selected NIFTY 500 (coded as NF5) as parent index and NIFTY 500 Shariah (coded as NFS5) as underlying index. The sample period is taken from 1st January, 2007 to 30th April 2015, because this period includes global financial crisis, euro zone crisis and other notable external and internal financial shocks.

3.2 Empirical frame work

To quantify the basic attributes of indices, we have used descriptive statistics. To measure the effects of global financial crisis and euro zone crisis, the sample is divided into 6 six periods, which indicate major structural breaks by applying Bai and Perron test. To establish the relationship and co-movement in indices, Johansen Co-integration test, Vector Auto-regression Model, and Granger Causality test are used. Furthermore GMM and E-GARCH Models are also employed to achieve the objectives of study.

3.3 Objectives

Objectives of the study are:

1. To detect the comparative volatility of the NIFTY 500 and NIFTY 500 Shariah.
2. To ascertain long term and short term co-movement between the NIFTY500 and NIFTY 500 Shariah
3. To identify the impact of previous days and short term lags.
4. To find out the causality between NIFTY 500 and NIFTY 500 Shariah over each other.
5. To detect the leverage effect in NIFTY 500 and NIFTY 500 Shariah.
6. To reveal the effects of exchange rates of Euro and US Dollar on NIFTY 500 and NIFTY500 Sharia

4. ANALYSIS

4.1 Descriptive statistics

Descriptive statistics is used to measure the basic attributes of variables. Table 1 shows that NIFTY 500 Shariah earned more than NIFTY 500 in Period 1, Period 4 and Period 5, but not in Period 2, Period 3 and Period 6. But with having lesser standard deviations for all periods NIFTY 500 Shariah is considered as less volatile. NIFTY 500 and NIFTY 500 Shariah were negatively skewed for Period 1, Period 3, Period 5 and Period 6, showing higher probability of large decrease in returns, on the other hand indices are positively skewed in Period 2 but at the time of Period 4, NIFTY 500 Shariah is negatively skewed but its conventional counterpart is positively skewed

Table 1: Descriptive Statistics of NF5 and NFS5

	D_1NF5	D_1NFS5	D_2NF5	D_2NFS5	D_3NF5	D_3NFS5	D_4NF5	D_4NFS5	D_5NF5	D_5NFS5	D_6NF5	D_6NFS5
Mean	0.000201	0.000319	0.000291	5.53E-05	0.000265	0.000218	-4.44E-05	1.79E-05	0.00029	0.000469	0.001086	0.001021
Std. Dev.	0.018902	0.018205	0.025979	0.025897	0.010507	0.009669	0.011441	0.009772	0.009886	0.008413	0.008708	0.007688
Skewness	-0.763395	-0.674664	0.217233	0.296876	-0.294367	-0.185476	0.043287	-0.019779	-0.220609	-0.24112	-0.378301	-0.427959
Jarque-Bera	324.2187	236.9371	209.1743	240.1287	14.67306	8.724949	0.236363	1.063045	30.46079	31.68074	13.10463	12.78922
Probability	0	0	0	0	0.000651	0.012747	0.888535	0.587709	0	0	0.001427	0.001671

Source: calculated by auth

4.2 Unit root test

To testing the non-stationarity, unit root tests are applied. As we know that nonstationarity is necessary condition for estimating co-integration and further modelling, thus we have opted ADF (Augmented Dickey Fuller Test) and PP (Phillip Perron test) to test unit root in the series. Both tests are applied for all six periods with the null hypothesis (H_0) that NIFTY 500 and NIFTY 500 Shariah have a unit root or the variables are non-stationary. ADF and PP test results are shown in table 3A and 3B respectively. We can see in both tables that as the values of probabilities are more than 5% at level for all periods, shows that underlying indices are non-stationary at level. But after first differencing, indices become stationary as the values of probability are equals to zero.

4.3 Johansen Co-integration test:

To measure the long term association between NIFTY 500 and NIFTY 500 Shariah in all six periods, we have used Johansen Co-integration test. In this test, there are two statistics, Trace and Maximum Eigen values to determine the number of equations, which show the existence or non-existence of co-integration. Table 4 is representing the same.

By considering first i.e. Trace Statistics with null hypothesis that there is no equation ($r=0$), showing co-integration among the variables. Table 4 shows that in the trace test statistic for all six periods, value of probabilities are more than 5% thus the hypothesis is accepted and indicates no co-integrated equation. Same as second hypothesis is determined as at most one co-integration equation exists. But for all six periods hypothesis strongly rejected as the values of probability at $r \leq 1$ are greater than 0.05 and indicates that there is not a single equation which shows co-integration between NIFTY 500 and NIFTY 500 Shariah for all six periods.

Same result is revealed by Max Eigen Value test, that there is not a single equation which shows any long term association between both indices under any studied periods.

Table3: Unit Root Test for NF5 and NFS5

Augmented Dicky Fuller: 3A												
	1NF5	1NFS5	2NF5	2NFS5	3NF5	3NFS5	4NF5	4NFS5	5NF5	5NFS5	6NF5	6NFS5
At level	Lag length	1	0	0	0	0	0	0	1	0	1	1
	ADF Statistics	-1.469	-1.386	-0.65	-0.901	-1.992	-2.074	-2.109	-2.325	-0.832	-1.94	-1.661
	Probability	0.5483	0.589	0.855	0.787	0.291	0.2472	0.255	0.165	0.808	0.314	0.45
At first difference	Lag length	0	0	0	0	0	0	0	0	0	0	0
	ADF Statistics	-16.45	-16.95	-16	-16.39	-19.33	-16.17	-16.58	-15.88	-16.13	-14.52	-13.28
	Probability	0	0	0	0	0	0	0	0	0	0	0
Phillip Perron:3B												
	1NF5	1NFS5	2NF5	2NFS5	3NF5	3NFS5	4NF5	4NFS5	5NF5	5NFS5	6NF5	6NFS5
At level	Bandwidth	9	8	2	1	1	2	3	5	9	6	5
	PP Statistics	-1.438	-1.459	-0.73	-0.934	-2.05	-2.205	-2.218	-2.087	-0.856	-1.699	-1.494
	Probability	0.5639	0.553	0.836	0.777	0.265	0.1954	0.205	0.203	0.25	0.801	0.536
At first difference	Bandwidth	13	11	1	1	4	2	2	10	12	4	3
	PP Statistics	-16.36	-16.9	-16	-16.39	-19.38	-16.19	-16.59	-15.75	-16.02	-14.45	-13.22
	Probability	0	0	0	0	0	0	0	0	0	0	0

Source: calculated by authors

Table 4: Johansen Co-integration test

		Trace Statistics				Max Eigen Value			
		Period 1							
Hypothesized		Trace Statistic	Critical Value	Prob.**	Eigen value	Max-Eigen Statistic	Critical Value	0.05	
No. of CE(s)									
None		6.698954	15.49471	0.6129	0.012379	4.397129	14.2646		0.8152
At most 1		2.301825	3.841466	0.1292	0.0065	2.301825	3.841466		0.1292
		Period 2							
Hypothesized		Trace Statistic	Critical Value	Prob.**	Eigen value	Max-Eigen Statistic	Critical Value	0.05	
No. of CE(s)									
None		12.65626	15.49471	0.128	0.038316	11.87705	14.2646		0.1154
At most 1		0.779208	3.841466	0.3774	0.00256	0.779208	3.841466		0.3774
		Period 3							
Hypothesized		Trace Statistic	Critical Value	Prob.**	Eigen value	Max-Eigen Statistic	Critical Value	0.05	
No. of CE(s)									
None		11.28142	15.49471	0.1948	0.015507	6.892258	14.2646		0.502
At most 1		4.389159	3.841466	0.0362	0.009903	4.389159	3.841466		0.0362
		Period 4							
Hypothesized		Trace Statistic	Critical Value	Prob.**	Eigen value	Max-Eigen Statistic	Critical Value	0.05	
No. of CE(s)									
None		13.33375	15.49471	0.1031	0.022568	6.962044	14.2646		0.4936
At most 1		6.371702	3.841466	0.0116	0.020674	6.371702	3.841466		0.0116
		Period 5							
Hypothesized		Trace Statistic	Critical Value	Prob.**	Eigen value	Max-Eigen Statistic	Critical Value	0.05	
No. of CE(s)									
None		4.149247	15.49471	0.8911	0.012398	4.054661	14.2646		0.8535
At most 1		0.094586	3.841466	0.7584	0.000291	0.094586	3.841466		0.7584
		Period 6							
Hypothesized		Trace Statistic	Critical Value	Prob.**	Eigen value	Max-Eigen Statistic	Critical Value	0.05	
No. of CE(s)									
None		11.25185	15.49471	0.1965	0.019339	5.917035	14.2646		0.6239
At most 1		5.334819	3.841466	0.0209	0.017453	5.334819	3.841466		0.0209

Source: calculated by authors

4.4 Granger Causality test

To determine the causality between NIFTY 500 and NIFTY 500 Shariah, We have opted Granger Causality test, with Null Hypothesis (H0) as there is no causal relationship between series.

In table 5, it is observed that null hypothesis is accepted(H0) for all periods as values of probability is more than 5%, which shows that in all periods, the returns of NIFTY 500 do not have any cause and effect relationship with returns of NIFTY 500 Shariah.

Table 5: Granger Causality test

Granger Causality of NF5 and NFS5				
Lags: 2				
Null Hypothesis:		Obs	F-Statistic	Prob.
Period 1	D_1NFS5 does not Granger Cause D_1NF5	355	0.97092	0.3798
	D_1NF5 does not Granger Cause D_1NFS5		0.81562	0.4432
Period 2	D_2NFS5 does not Granger Cause D_2NF5	306	1.19604	0.3038
	D_2NF5 does not Granger Cause D_2NFS5		1.36405	0.2572
Period 3	D_3NFS5 does not Granger Cause D_3NF5	443	2.00498	0.1359
	D_3NF5 does not Granger Cause D_3NFS5		1.83202	0.1613
Period 4	D_4NFS5 does not Granger Cause D_4NF5	307	0.92601	0.3973
	D_4NF5 does not Granger Cause D_4NFS5		0.73781	0.479
Period 5	D_5NFS5 does not Granger Cause D_5NF5	327	1.60447	0.2026
	D_5NF5 does not Granger Cause D_5NFS5		0.65235	0.5215
Period 6	D_6NFS5 does not Granger Cause D_6NF5	305	0.11523	0.8912
	D_6NF5 does not Granger Cause D_6NFS5		1.26951	0.2825

Source: calculated by authors

4.5 Vector Auto regression model

As after analysing that there is no co-integration among indices, we have proceed further with VAR (Vector Auto-regression), by which we can find short term lagged effect of variable on each other. We have applied it on all six periods by considering null hypothesis (H0) as there is no significant effect of lag 1 and lag 2 of NIFTY 500 and NIFTY 500 Shariah.

4.5 Vector Auto regression model

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Table 6: Vector Auto regression model

	Period 1		Period 2		Period 3		Period 4		Period 5		Period 6	
	NF5	NF5S										
NF5(-1)	1.7382	0.1717	0.86305	-0.07704	1.42576	0.07203	1.24404	0.02053	1.09999	0.02207	1.126506	0.04533
Standard Error	-0.37502	-0.10889	-0.34602	-0.10326	-0.19306	-0.05165	-0.18296	-0.04659	-0.11658	-0.0304	-0.12313	-0.03309
t-statistics	[4.63499]	[1.57675]	[2.49424]	[-0.74606]	[7.38501]	[1.39453]	[6.79937]	[0.44065]	[9.43546]	[0.72604]	[9.14872]	[1.36990]
Probability	0	0.1153	0.0129	0.4559	0	0.1635	0	0.6596	0	0.4681	0	0.1712
NF5(-2)	-0.87335	-0.20854	0.15768	0.090016	-0.4104	-0.06097	-0.28203	-0.02362	-0.13146	-0.0281	-0.10538	-0.03313
Standard Error	-0.37802	-0.10976	-0.34336	-0.10246	-0.19329	-0.05171	-0.1822	-0.04639	-0.11643	-0.03036	-0.12342	-0.03317
t-statistics	[-2.31032]	[-1.89983]	[0.45923]	[0.87851]	[-2.12325]	[-1.17908]	[-1.54793]	[-0.50915]	[-1.12914]	[-0.92546]	[-0.85386]	[-0.99873]
Probability	0.0212	0.0579	0.6462	0.38	0.034	0.2387	0.1222	0.6108	0.2593	0.3551	0.3935	0.3183
NF5(-1)	-2.16598	0.50015	0.75361	1.311729	-1.36658	0.77158	-0.7518	0.96071	0.06021	1.0297	0.183663	1.10226
Standard Error	-1.29644	-0.37644	-1.161	-0.34646	-0.7247	-0.19388	-0.72095	-0.18358	-0.44756	-0.1167	-0.45087	-0.12117
t-statistics	[-1.67072]	[1.32863]	[0.64911]	[3.78604]	[-1.88572]	[3.97966]	[-1.04279]	[5.23330]	[0.13453]	[8.82346]	[0.40735]	[9.09651]
Probability	0.0952	0.1844	0.5165	0.0002	0.0597	0.0001	0.2975	0	0.893	0	0.6839	0
NF5(-2)	2.5952	0.61503	-0.8376	-0.35958	1.23905	0.16715	0.79294	0.01911	-0.05818	-0.031	-0.2848	-0.14981
Standard Error	-1.3079	-0.37977	-1.14977	-0.34311	-0.72546	-0.19409	-0.71901	-0.18308	-0.449	-0.11708	-0.44715	-0.12017
t-statistics	[1.98425]	[1.61947]	[-0.72849]	[-1.04799]	[1.70794]	[0.86122]	[1.10283]	[0.10438]	[-0.12958]	[-0.26482]	[-0.63693]	[-1.24662]
Probability	0.0476	0.1058	0.4666	0.2951	0.088	0.3894	0.2705	0.9169	0.8969	0.7912	0.5244	0.213

4.6 GMM Estimation

In order to estimate the value of dependent variable, we have applied GMM. In this model Euro and US Dollar (USD) are also introduced as additional independent variable to find out their effect on NIFTY 500 and NIFTY 500 Shariah.

Simultaneous Equations used are as under:

Period1	$1NF5 = \alpha_{11} + \beta_{12} * 1NFS5 + \beta_{13} * Euro + \beta_{14} * USD$ $1NFs5 = \varphi_{11} + \beta_{15} * 1NF5 + \beta_{16} * Euro + \beta_{17} * USD$
Period 2	$2NF5 = \alpha_{21} + \beta_{22} * 2NFS5 + \beta_{23} * Euro + \beta_{24} * USD$ $2NFs5 = \varphi_{21} + \beta_{25} * 2NF5 + \beta_{26} * Euro + \beta_{27} * USD$
Period 3	$3NF5 = \alpha_{31} + \beta_{32} * 3NFS5 + \beta_{33} * Euro + \beta_{34} * USD$ $3NFs5 = \varphi_{31} + \beta_{35} * 3NF5 + \beta_{36} * Euro + \beta_{37} * USD$
Period 4	$4NF5 = \alpha_{41} + \beta_{42} * 4NFS5 + \beta_{43} * Euro + \beta_{44} * USD$ $4NFs5 = \varphi_{41} + \beta_{45} * 4NF5 + \beta_{46} * Euro + \beta_{47} * USD$
Period 5	$5NF5 = \alpha_{51} + \beta_{52} * 5NFS5 + \beta_{53} * Euro + \beta_{54} * USD$ $5NFs5 = \varphi_{51} + \beta_{55} * 5NF5 + \beta_{56} * Euro + \beta_{57} * USD$
Period 6	$6NF5 = \alpha_{61} + \beta_{62} * 6NFS5 + \beta_{63} * Euro + \beta_{64} * USD$ $6NFs5 = \varphi_{61} + \beta_{65} * 6NF5 + \beta_{66} * Euro + \beta_{67} * USD$

Source: created by authors

As in Table 7, we can see that in first period all the independent variables have significant effect of NIFTY 500 and NIFTY 500 Shariah, as the values of probability are less than critical values. The model also reveals that NIFTY 500 is negatively associate with Euro and USD both, same as NIFTY 500 Shariah with USD, because of negative values of β_{13} , β_{14} and β_{23} respectively in first period. The same results can be seen in Period2 but NIFTY 500 Shariah is negatively associated with Euro only. In Period 3, all the independent variables are significant for both indices except USD has no significant effect on NIFTY 500 Shariah, US dollar and Euro are negatively associated with NIFTY 500 and NIFTY 500 Shariah respectively in the same period. Furthermore in Period 4, US dollar is insignificant for both indices as the value of probability of β_{44} and β_{47} are more than 5%. In period 5, it is seen that only US dollar is insignificant for NIFTY 500 Shariah, else all variables are significant. Euro and US dollar both are negatively associated with NIFTY 500 as the value of β_{53} and β_{54} are negative. At last, at the time of Period 6, it is observed that Euro is insignificant to estimate the value of NIFTY 500 Shariah. NIFTY 500 is negatively affected by both in this period.

Table7: GMM Estimation

		Dependent	Endogenous	Coefficient	Std. Error	t-Statistic	Prob.
Period 1	α_{11}	1NF5	C	127295.5	3833.227	33.20845	0.0000
	β_{12}		1NFs5	3.615241	0.013248	272.8901	0.0000
	β_{13}		Euro	-2.305742	0.950587	-2.425598	0.0155
	β_{14}		USD	-2876.309	86.69873	-33.1759	0.0000
	φ_{11}	1NFs5	C	56967.17	14183.76	4.016367	0.0001
	β_{15}		1NF5	0.295547	0.00237	124.6966	0.0000
	β_{16}		Euro	4.841509	0.712548	6.794638	0.0000
	\hat{a}_{17}		USD	-1290.115	320.9007	-4.020292	0.0001
Period 2	\hat{a}_{21}	2NF5	C	-1301.48	80.22773	-16.22232	0.0000
	β_{22}		2NFs5	3.552615	0.007186	494.3998	0.0000
	β_{23}		Euro	-7.239261	1.065657	-6.793235	0.0000
	β_{24}		USD	33.03811	1.222076	27.03441	0.0000
	φ_{21}	2NFs5	C	356.7918	23.26697	15.33469	0.0000
	β_{25}		2NF5	0.279081	0.000576	484.3451	0.0000
	β_{26}		Euro	2.495475	0.301296	8.28248	0.0000
	β_{27}		USD	-9.583371	0.326674	-29.33619	0.0000
Period 3	α_{31}	3NF5	C	-1140.33	112.8373	-10.10597	0.0000
	β_{32}		3NFs5	4.208933	0.009591	438.8235	0.0000
	β_{33}		Euro	7.038755	0.607762	11.58144	0.0000
	β_{34}		USD	-6.278902	2.567975	-2.445079	0.0147
	φ_{31}	3NFs5	C	350.8722	29.14399	12.03926	0.0000
	β_{35}	3NF5	3NF5	0.231614	0.000585	395.8696	0.0000
	β_{36}		Euro	-1.73709	0.152517	-11.38949	0.0000
	β_{37}		USD	0.403924	0.614519	0.6573	0.5112
Period 4	α_{41}	4NF5	C	202.215	138.887	1.455968	0.1459
	β_{42}		4NFs5	4.039191	0.026552	152.1246	0.0000
	β_{43}		Euro	-16.97188	3.191717	-5.317477	0.0000
	β_{44}		USD	2.42875	1.950451	1.245225	0.2135
	φ_{41}	4NFs5	C	89.59616	34.37499	2.606434	0.0094
	β_{45}		4NF5	0.229425	0.00135	169.9347	0.0000
	β_{46}		Euro	3.312377	0.773346	4.283176	0.0000
	β_{47}		USD	-0.699776	0.490477	-1.426725	0.1542
Period 5	α_{51}	5NF5	C	2689.712	115.1783	23.35259	0.0000
	β_{52}		5NFs5	3.112051	0.074043	42.03038	0.0000
	β_{53}		Euro	-10.50463	4.144888	-2.534358	0.0115
	β_{54}		USD	-27.19882	5.797398	-4.691557	0.0000
	φ_{51}	5NFs5	C	-413.3667	41.52576	-9.954465	0.0000
	β_{55}		5NF5	0.245198	0.00674	36.37922	0.0000
	β_{56}		Euro	9.212914	0.905752	10.17157	0.0000
	β_{57}		USD	-0.701415	1.436071	-0.488426	0.6254
Period 6	α_{61}	6NF5	C	5137.3	394.378	13.02633	0.0000
	β_{62}		6NFs5	3.552132	0.011715	303.2147	0.0000
	β_{63}		Euro	-3.765096	0.849604	-4.431587	0.0000
	β_{64}		USD	-87.6143	5.759174	-15.213	0.0000
	φ_{61}	6NFs5	C	-1228.362	108.7703	-11.29317	0.0000
	β_{65}		6NF5	0.275589	0.000887	310.81	0.0000
	β_{66}		Euro	0.136787	0.223451	0.612156	0.5407
	β_{67}		USD	22.87146	1.582067	+14.4567	0.0000

4.7 E-GARCH Estimation

E-GARCH is used to reveal the leverage effect in index returns. The results of E-GARCH model are presented in table 8 for all 6 periods.

Table 8: Result of conditional Volatility equations

		NF5		NF55	
		Coefficient	Probability	Coefficient	Probability
Period 1	E-GARCH				
	C	0.001072	0.1841	0.001092	0.125
	Variance Equation				
	Ω	-1.463919	0	-1.52987	0
	β 1	0.21991	0.0008	0.279412	0.0002
	Υ	-0.306276	0	-0.313045	0
Period 2	E-GARCH				
	C	0.000908	0.508	0.000943	0.4905
	Variance Equation				
	Ω	-0.621172	0.1172	-0.670151	0.0568
	β 1	0.144064	0.0927	0.165432	0.0752
	Υ	-0.06808	0.0995	-0.068253	0.1336
Period 3	E-GARCH				
	C	0.000347	0.4191	0.000265	0.5123
	Variance Equation				
	Ω	-1.192087	0.0001	-1.384341	0.0004
	β 1	0.127741	0.1046	0.096581	0.1933
	Υ	-0.229051	0	-0.223149	0
Period 4	E-GARCH				
	C	0.000327	0.6087	0.000119	0.8175
	Variance Equation				
	Ω	-5.09408	0.0051	-0.175729	0.185
	β 1	-0.12771	0.3276	0.062878	0.0865
	Υ	-0.26434	0.0031	-0.057333	0.0248
Period 5	E-GARCH				
	C	-0.00039	0.4063	7.99E-05	0.8595
	Variance Equation				
	Ω	-0.121482	0.0658	-0.114726	0.2838
	β 1	-0.000845	0.9821	0.053794	0.118
	Υ	-0.119591	0	-0.140795	0
Period 6	E-GARCH				
	C	0.001362	0.0104	0.001227	0.0055
	Variance Equation				
	Ω	-3.334913	0.0333	-1.847722	0.1567
	β 1	-0.105543	0.2233	0.164525	0.1098
	Υ	-0.121267	0.0415	-0.065698	0.2303
	β 2	0.641804	0.0001	0.824051	0

Source: calculated by authors

It is seen, in table 8, that E-GARCH is significant for the Period 1, Period 3, Period 4 and Period 5 as the value of (γ) is negative and less than 5%, for both indices NIFTY 500 and NIFTY 500 Shariah. Additionally in Period 6, NIFTY 500 has also leverage effect; it means that past returns negatively contribute in volatility of future returns. But in Period 2 for both indices and in period 6 for NIFTY 500 Shariah have no any leverage effects.

4. Summary And Conclusion

The main goal of the study was to build a suitable model for the projecting the returns and the volatility of NSE Shariah indices comparative to benchmark indices. It is remarked that Shariah indices earned more return than conventional one in Period 1, Period 4 and Period 5 but for period 2, period 3 and Period 6 Shariah index did not perform as good. But with having lesser standard deviations for all periods Shariah indices are considered as less volatile. All the indices were negatively skewed for Period 1, Period 3 Period 5 and Period 6, showing higher probability of large decrease in returns. The study also reveals that for all periods NIFTY 500 and NIFTY 500 Shariah are non-stationary at level but after first differencing indices become stationary. After applying Johansen co-integration test, we could find out that there is not a single equation which shows any long term association between both indices under any studied period. Further more it is revealed that returns of NIFTY 500 do not have any cause and effect relationship with the returns of NIFTY 500 Shariah. According to VAR, it is concluded that previous 1 day performance of NIFTY 500 affects itself but does not Shariah counterparts and two days previous performance affect only in Period 1 and 3. Similarly lag 1 of NIFTY 500 Shariah is not significant for its conventional counterparts. Its two day previous performance does not affect any indices for all periods except NIFTY 500 for period 1. After Estimating the GMM, it is exposed that Euro and US dollar both are significant to estimate NIFTY 500 and NIFTY 500 Shariah except some cases such as Euro is not significant to estimate NIFTY 500 Shariah in Period 6 and US dollar is not significant to estimate NIFTY 500 in period 4 and NIFTY 500 Shariah in period 6. In Period 1, Period 3, Period 4 and Period 5, both indices show leverage effects means that past returns negatively contributes in volatility of future returns.

The study will help the portfolio managers and investors to avail the opportunities of diversification. As NIFTY 500 Shariah perform better with respect of risk and return and it does not share any co-integration and causal relationship with conventional one, so Shariah index is recommended as better investment alternative.

References

1. Akbar, Z. and Daniel Barkely, "The Performance of Islamic Equity Indexes Global Capital Markets", *Journal of Islamic Economics, Banking and Finance*, Volume

- 11, Number 1, (January ,2015) :71-92
2. Albaity, Mohamed and Rubi Ahmad ,“Return performance, leverage effect, and volatility spillover in Islamic stock indices evidence from DJIMI, FTSEGII and KLSI”, *Investment Management and Financial Innovations*, Volume 8, Issue 3(January, 2011): 161-171.
 3. Albaity, M. Shikh and Hamdia Mudor, “Return performance, Cointegration and short run dynamics of Islamic and non-Islamic indices: Evidence from the US and Malaysia during the subprime crisis” *Atlantic Review of Economics*, Volume 1(June, 2012) : 1-22.
 4. Al-Khazali, Osamah, Hooi Hooi Lean and Anis Samet, “Do Islamic stock indexes outperform conventional stock indexes? A stochastic dominance approach”, *Pacific-Basin Finance Journal*, Volume 28 (June, 2014): 29-46.
 5. Ashraf,S. and MalabiaDeo “Non-Linear Dependence of Indian Shariah Market” *,Journal of Islamic Economics, Banking and Finance*, Volume 10, Number 2, (April ,2014) :87-101
 6. Beik, Irfan Syauqi and Wishnu Wardhana, “The Relationship between Jakarta Islamic index and other selected markets: Evidence from Impulse Response Function”, *Majalah Ekonomi*, Volume XXI , Issue 2 (August, 2011):100-109.
 7. Ergun, U. and Abu Hassan Shaari Mohd Nor ,”Comovements and Linkages of Emerging Stock Markets: A Case Study from OIC Member Countries”, *Journal of Economic Cooperation and Development*, Volume 30, Number 4 (October,2009):105-120
 8. Habib, Mohsina and Khalid ul Islam, “Performance of Shariah Compliant Index: A Comparative Study of India and Malaysia”, *International Journal of Interdisciplinary and Multidisciplinary Studies*, Volume 1, Issue 6 (June, 2014): 231-241.
 9. Hassan, M. Kabir and Girard, E.C. (2011), Faith-based Ethical Investing: The case of Dow Jones Islamic Indexes(April, 2011). Indiana State University, Scott College of Business, Networks Financial Institute, Working Paper No. 2011-WP-05. Available at http://www2.indstate.edu/business/nfi/leadership/papers/2011-WP-05_Hassan.pdf
 10. Haq, I. U . and Chandrashekara Rao, “Co integration and Causality in different Time Scales between SENSEX and SHARIAH 50 Indices in Indian Stock Markets”, *Journal of Islamic Economics, Banking and Finance*, Volume 7 Number 4, October, 2011):43-64
 11. Girard, Eric C. and M.Kabir Hassan, “Is There a Cost to Faith-Based investing: Evidence from FTSE Islamic Indices”, *The Journal of Investing*, Volume 17, Issue 4 (November, 2008):112-121.
 12. Ho, Catherine Soke Fun, Nurul Afiqah Rahman, Noor Hafizha Yusuf and Zaminor

- Zamzamin, "Performance of global Islamic versus conventional share indices: International evidence", *Pacific-Basin Finance Journal*, Volume 28(June, 2014): 110-121.
13. Jawadi, Fredj, Nabila Jawadi and Wael Louhichi, "Conventional and Islamic stock price performance: An empirical investigation", *International Economics*, Volume 137(May, 2014):73-87.
 14. Lean, Hooi Hooi and Parham Parsva, "Performance of Islamic Indices in Malaysia FTSE Market: Empirical Evidence form CAPM", *Journal of Applied Science*, Volume 12, Issue 12 (June, 2012): 1274-1281.
 15. Majid, M.S.A. and Salina Hj. Kassim, "Potential Diversification Benefits across Global Islamic Equity Markets", *Journal of Economic Cooperation and Development*, Volume 31, Number 4 (October, 2010):103-126
 16. Miniaoui, Hela, Sayani Hameedah and Chaibi Anissa, (2014), The Impact of Financial Crisis on Islamic and Conventional Indices of the GCC Countries (June, 2014), IPAG Business School, Working Paper no. 2014-401. Available at <http://econpapers.repec.org/paper/ipgwpaper/2014-401.htm>
 17. Rashid, M., Hassan, M.K. and Ng Yuen Yein, "Macroeconomics, Investor Sentiment, and Islamic Stock Price Index in Malaysia", *Journal of Economic Cooperation and Development*, Volume 35, Issue 4 (October, 2014): 219-234
 18. Reddy, Krishna and Mingli Fu, "Does Shariah Compliant Stocks Perform Better than the Conventional Stocks? A Comparative Study of Stocks Listed on the Australian Stock Exchange", *Asian Journal of Finance & Accounting*, Volume 6, Issue 2 (December, 2014): 155-170.
 19. Romli, Nurhanani, Ahmad Azam Sulaiman Mohamad and Mohd Faiz Mohamed Yusof, "Volatility analysis of FTSE Bursa Malaysia: Study of the problems of Islamic stock market speculation in the period 2007 to 2010", *African Journal of Business Management*, Volume 6, Issue 29 (July, 2012): 8490-8495.
 20. Setiawan, Chandra and Hesty Oktariza, "Syariah and Conventional Stocks Performance of Public Companies Listed on Indonesia Stock Exchange", *Journal of Accounting, Finance and Economics*, Volume 3, Issue 1(July, 2013): 51-64.

Other Internet Sources

<http://www.economist.com/news/finance-and-economics/21617014-market-islamic-financial-products-growing-fast-big-interest-no-interest>(Accessed on 30th March 2015)

http://www.globalislamicfinancemagazine.com/?com=news_list&nid=2942(Accessed on 30th March 2015)

<http://www.livemint.com/Politics/3m2AbbMjApgauCITdh3ReO/SBI-starts-Shariah-stock-fund.html>(Accessed on 10th July 2015)