CHAPTER 5

CONCLUSION

5.1. Conclusion

The main objective of this paper is to examine the transmission of information (first and second moment interdependencies) and correlation between Jakarta Islamic Index and Dow Jones International Market Index World. Using the bivariate VAR GJR-GARCH model to the daily return of these two indices, findings suggest that unidirectional transmission of information at both return and volatility levels propogate from the DJIMID to the JII. This shows that the DJIMID has an effect to the JII market. Therefore, market participants such as market analysts and investors should look at the Dow Jones International Market Index World in forecasting the market price movement and volatility of the Indonesian Islamic stock Market. In addition, the Indonesia Stock Exchange should also consider the U.S. stock market in setting its policy to control the volatility of Indonesian Islamic stock market as the source of volatility in the Indonesian market, not only from the market itself but also from the U.S. market. On the other hand, in controlling the volatility of Islamic U.S. market, Dow Jones should only implement a policy related to the U.S market since the source of volatility only comes from the local market. Author can conclude that VAR GJR-GARCH result supported both of the hypotheses that there are an information transmission at first and second moment interdependences from DJIMID to JII.

The findings highlight also that there are no asymmetric effects in the volatility transmission from the DJIMID to the JII. This indicates that neither good news nor bad news effect influence the volatility of both the U.S. and Indonesian Islamic stock markets. High volatility persistence is documented in both markets. However, the volatility of the DJIMID is more persistent than the volatility of the JII. This implies that the volatility of the DJIMID will take a longer time to revert to their normal volatility level as compared to the volatility of JII. The half-life of an information shock indicates that the U.S. Islamic stock markets take a longer time to revert to their normal level as opposed to the Indonesian Islamic stock markets. It takes 27.5 days for the DJIMID while the JII only takes 3.2 days. This would have important implications to policy makers since they do not need to implement long-range measures to reduce the impact of volatility persistence in these markets (Theodossious et al., 1997).

Last but not least, the paper also documented low correlation between the two Islamic Indices investigated. Therefore, this implies that the two markets offer potential diversification to investors who wish to create an Islamic portfolio investment. In addition, the conditional correlation is higher than the unconditional correlation. This finding presents evidence that the potential for diversification is overestimated if the international market interdependence between both U.S. and Indonesian market is not included in the modeling process. Results in this study advocate further research in this area. Further research may be conducted using different time period, data frequency and other

Islamic Indices. In addition, future research may be analyzed to compare the market interdependence of Islamic stock market in different economic conditions.

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APPENDICES

Appendix 1: Descriptive Statistics of DJIMID and JII

	JII	DJIMID
Mean	0.000107	8.69E-06
Median	0.000000	0.000815
Maximum	0.091013	0.088408
Minimum	-0.138577	-0.084828
Std. Dev.	0.018885	0.015616
Skewness	-0.580948	-0.456652
Kurtosis	9.612777	7.408184
Jarque-Bera	2184.445	982.0666
Probability	0.000000	0.000000
Sum	0.124875	0.010111
Sum Sq. Dev.	0.414408	0.283365
Observations	1163	1163

Appendix 2: Correlation Matrix

	JII	DJIMID
JII	1.000000	0.329853
DJIMID	0.329853	1.000000

Appendix 3: Unit Root Test for DJIMID

Null Hypothesis: DJIMID has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-29.77737	0.0000
Test critical values:	1% level	-3.435763	

	5% level	-2.863818
	10% level	-2.568033

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(DJIMID)
Method: Least Squares
Date: 03/11/13 Time: 12:48
Sample (adjusted): 12/03/2007 5/15/2012
Included observations: 1162 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DJIMID(-1)	-0.866439	0.029097	-29.77737	0.0000
C	1.07E-05	0.000454	0.023607	0.9812

R-squared	0.433232	Mean dependent var	3.19E-06
Adjusted R-squared	0.432743	S.D. dependent var	0.020565
S.E. of regression	0.015489	Akaike info criterion	-5.495646
Sum squared resid	0.278297	Schwarz criterion	-5.486940
Log likelihood	3194.970	F-statistic	886.6919
Durbin-Watson stat	1.985285	Prob(F-statistic)	0.000000

Appendix 4: Unit Root Test for JII

Null Hypothesis: JII has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-31.66188	0.0000
Test critical values:	1% level	-3.435763	
	5% level	-2.863818	
	10% level	-2.568033	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(JII)
Method: Least Squares
Date: 03/11/13 Time: 12:51
Sample (adjusted): 12/03/2007 5/15/2012
Included observations: 1162 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
JII(-1)	-0.927110	0.029282	-31.66188	0.0000
C	8.61E-05	0.000553	0.155758	0.8763

R-squared	0.463578	Mean dependent var	-2.40E-05
Adjusted R-squared	0.463115	S.D. dependent var	0.025720
S.E. of regression	0.018846	Akaike info criterion	-5.103328
Sum squared resid	0.411993	Schwarz criterion	-5.094623
Log likelihood	2967.034	F-statistic	1002.475
Durbin-Watson stat	2.007052	Prob(F-statistic)	0.000000

Appendix 5: Johansen Cointegration Test

Date: 07/02/12 Time: 22:31
Sample (adjusted): 12/04/2007 5/16/2012
Included observations: 1162 after adjustments
Trend assumption: Linear deterministic trend
Series: DJIMID JII
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.411281	1009.887	15.49471	0.0001
At most 1 *	0.287723	394.2526	3.841466	0.0000

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.411281	615.6348	14.26460	0.0001

At most 1 *	0.287723	394.2526	3.841466	0.0000

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

DJIMID	JII
-90.63629	66.25591
38.97035	51.97991

Unrestricted Adjustment Coefficients (alpha):

D(DJIMID)	0.006343	-0.008519
D(JII)	-0.009829	-0.008168

1 Cointegrating Equation(s): Log likelihood 6119.226

Normalized cointegrating coefficients (standard error in parentheses)

DJIMID	JII
1.000000	-0.731009
	(0.02868)

Adjustment coefficients (standard error in parentheses)

D(DJIMID)	-0.574897
	(0.04688)
D(JII)	0.890850
	(0.05125)

Appendix 6: Lag Length Criteria

VAR Lag Order Selection Criteria
Endogenous variables: DJIMID JII
Exogenous variables: C
Date: 03/11/13 Time: 12:53
Sample: 11/30/2007 5/16/2012
Included observations: 1153

Lag	LogL	LR	FPE	AIC	SC	HQ
0	6161.386	NA	7.85e-08	-10.68410	-10.67534	-10.68080
1	6243.071	162.9448	6.86e-08	-10.81886	-10.79258*	-10.80894
2	6254.728	23.21152	6.77e-08	-10.83214	-10.78834	-10.81561

3	6263.305	17.05159	6.72e-08	-10.84008	-10.77876	-10.81693*
4	6265.420	4.195587	6.74e-08	-10.83681	-10.75797	-10.80705
5	6275.576	20.11912	6.67e-08*	-10.84749*	-10.75113	-10.81112
6	6278.505	5.791120	6.68e-08	-10.84563	-10.73175	-10.80265
7	6280.560	4.056873	6.70e-08	-10.84225	-10.71086	-10.79266
8	6285.714	10.15563*	6.69e-08	-10.84426	-10.69534	-10.78805
9	6288.902	6.271428	6.70e-08	-10.84285	-10.67641	-10.78003
10	6290.616	3.365509	6.73e-08	-10.83888	-10.65492	-10.76945

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Appendix 7: Granger Causality Test

Pairwise Granger Causality Tests
Date: 03/11/13 Time: 12:59
Sample: 11/30/2007 5/16/2012
Lags: 8

Null Hypothesis:	Obs	F-Statistic	Probability
JII does not Granger Cause DJIMID	1158	1.86988	0.0968
DJIMID does not Granger Cause JII		41.8811	1.1E-39

Appendix 8: Vector Error Correction Model

Vector Autoregression Estimates
Date: 07/02/12 Time: 22:31
Sample (adjusted): 12/04/2007 5/16/2012
Included observations: 1162 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	DJIMID	JII
DJIMID(-1)	0.141366	0.452604
	(0.03079)	(0.03482)

	[4.59198]	[12.9997]
DJIMID(-2)	-0.048260	0.119923
	(0.03295)	(0.03727)
	[-1.46450]	[3.21787]
JII(-1)	-0.006509	-0.089222
	(0.02711)	(0.03066)
	[-0.24010]	[-2.90992]
JII(-2)	-0.016064	0.013413
	(0.02553)	(0.02887)
	[-0.62925]	[0.46459]
C	0.000129	0.000219
	(0.00045)	(0.00051)
	[0.28413]	[0.42680]
R-squared	0.021022	0.141031
Adj. R-squared	0.017638	0.138062
Sum sq. resids	0.275695	0.352619
S.E. equation	0.015436	0.017458
F-statistic	6.211226	47.49108
Log likelihood	3200.427	3057.447
Akaike AIC	-5.499875	-5.253782
Schwarz SC	-5.478111	-5.232018
Mean dependent	0.000134	0.000272
S.D. dependent	0.015574	0.018804
Determinant resid covariance (dof adj.)		6.57E-08
Determinant resid covariance		6.51E-08
Log likelihood		6316.352
Akaike information criterion		-10.85431
Schwarz criterion		-10.81078

Appendix 9: VAR GJR-GARCH

Dependent Variable: DJIMID
Method: ML - ARCH
Date: 02/12/13 Time: 17:15
Sample (adjusted): 12/03/2007 5/15/2012
Included observations: 1162 after adjustments
Convergence achieved after 13 iterations
Variance backcast: ON
GARCH = C(4) + C(5)*RESID(-1)^2 + C(6)*RESID(-1)^2*(RESID(-1)<0)
+ C(7)*GARCH(-1)

	Coefficient	Std. Error	z-Statistic	Prob.
C	0.134321	0.000341	-0.074455	0.0000
JII	0.104233	0.018116	11.51447	0.0000
AR(1)	0.002222	0.033979	2.443335	0.0000

Variance Equation

C	0.145924	4.17E-07	4.860472	0.0006
RESID(-1)^2	0.733252	0.009596	-4.441581	0.0000
RESID(-1)^2*(RESID(-1)<0)	0.072250	0.016196	9.834099	0.0000
GARCH(-1)	0.309999	0.008650	109.6923	0.0598

R-squared	0.103756	Mean dependent var	1.19E-05
Adjusted R-squared	0.099100	S.D. dependent var	0.015622
S.E. of regression	0.014828	Akaike info criterion	-5.999135
Sum squared resid	0.253952	Schwarz criterion	-5.968666
Log likelihood	3492.497	F-statistic	22.28514
Durbin-Watson stat	2.060570	Prob(F-statistic)	0.000000

Inverted AR Roots	.08

Dependent Variable: JII
Method: ML - ARCH
Date: 02/13/13 Time: 09:31
Sample (adjusted): 12/03/2007 5/15/2012
Included observations: 1162 after adjustments
Convergence achieved after 29 iterations
Variance backcast: ON
GARCH = C(4) + C(5)*RESID(-1)^2 + C(6)*RESID(-1)^2*(RESID(-1)<0)
+ C(7)*GARCH(-1)

	Coefficient	Std. Error	z-Statistic	Prob.
C	0.032753	0.000367	0.459996	0.1154
DJIMID	0.190738	0.024712	16.63568	0.0000
AR(1)	0.004115	0.031628	-2.690663	0.6996

Variance Equation

C	0.007223	1.04E-06	4.850498	0.2010
RESID(-1)^2	0.903852	0.012594	3.747251	0.0000
RESID(-1)^2*(RESID(-1)<0)	0.071341	0.018823	4.104278	0.0290

GARCH(-1)	-0.000423	0.008176	109.9691	0.6525

R-squared	0.109345	Mean dependent var	9.48E-05
Adjusted R-squared	0.104719	S.D. dependent var	0.018888
S.E. of regression	0.017872	Akaike info criterion	-5.482517
Sum squared resid	0.368903	Schwarz criterion	-5.452048
Log likelihood	3192.342	F-statistic	23.63315
Durbin-Watson stat	1.919019	Prob(F-statistic)	0.000000

Inverted AR Roots	-.09