The different impact of conventional interest rates on Islamic stock market, Islamic banking and Islamic insurance: evidence from Malaysia

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Abstract

This paper seeks to close the gap of the lack of empirical evidence surrounding the different impact of conventional interest rates on Islamic finance components – Islamic stock markets, Islamic banking and Islamic insurance (called takaful). Such evidence remains imperative in order for the Islamic finance system to formulate effective countermeasures against changes in conventional interest rates. Using Malaysia as a case in point, this paper employs time-series techniques to establish long-run and causal relationships among an Islamic stock market, an Islamic bank stock, an Islamic insurance company stock, the overnight conventional interbank money market rate and several control variables. Results suggest the distinct interaction of each Islamic finance component with conventional interest rates – the positive long-run relationship and bidirectional causality between Islamic stock markets and conventional interest rates, the negative long-run relationship and bidirectional causality between Islamic banking and conventional interest rates, and the negative long-run relationship and unidirectional causality from Islamic insurance to conventional interest rates. Policymakers should remain concerned primarily with the impact of conventional interest rates on Islamic stock markets and Islamic banking due to the negative income gap of Islamic banks which expose the Islamic finance system to higher financial risk. Thus, policymakers should incentivize Islamic banks to convert the negative income gap into a positive income gap through imposing higher capital requirements on fixed-rate nominal assets.

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1. **Introduction**

The practice of Islamic finance revolves around, among other elements, the abstinence from interest based on a verse from the holy Quran – '… But Allah has permitted trade and has forbidden interest …' (Quran 2:275). Nevertheless, the recent emergence of Islamic finance within the predominantly conventional finance system operating on interest implies that interest may affect Islamic finance even if indirectly. Theories of the impact of interest rates on stock returns such as the Fama and French three factor model and the nominal contracting hypothesis reflect the pervasion of interest rates within the conventional finance system (Fama and French, 2004; Kessel, 1956; Bach and Ando, 1957). Furthermore, recent empirical studies such as Kim and Nguyen (2009), Fernandez-Perez et al. (2014), Kasman et al. (2011) and Papadamou and Siriopoulos (2014) demonstrate the impact of interest rates on stock returns of stock markets, banks and insurance companies. Despite the high probability, the extent to which the conventional interest rates affect Islamic finance receives minimal empirical evidence especially in the different impact of conventional interest rates on Islamic finance components – Islamic stock markets, Islamic banking and Islamic insurance (called takaful). Such lack of evidence disables Islamic finance from deliberating effective countermeasures against changes in conventional interest rates. Using time series techniques to obtain evidence from Malaysia, this paper finds the distinct interaction of each Islamic finance component with conventional interest rates – the positive long-run relationship and bidirectional causality between Islamic stock markets and conventional interest rates, the negative long-run relationship and bidirectional causality between Islamic banking and conventional interest rates, and the negative long-run relationship and unidirectional causality from Islamic insurance to conventional interest rates.

The paper is structured as follows. Section 2 discusses related literature. Section 3 describes the data and techniques used in the empirical analysis. Section 4 examines the empirical results. Section 5 concludes with a summary of key findings and a policy proposal.

2. **Literature review**

Interest rates serve as the cost of funds at which borrowing and lending occur throughout economies functioning on conventional finance. Since majority of individuals and organizations engage in debt transactions, changes in interest rates thus introduce favorable or unfavorable outcomes throughout the economy. Nevertheless, Islam prohibits the utilization of interest and thus the birth of Islamic finance stemmed from the need for permissible financing for Muslims. Despite the direct avoidance of interest rates within Islamic finance transactions, interest rates may still affect Islamic finance indirectly since Islamic finance functions alongside conventional finance. Before investigating the indirect impact conventional interest rates impose on Islamic

finance, an understanding of existing theoretical and empirical work which details the impact of conventional interest rates on returns of stock markets, banks and insurance companies should build familiarity with conventional interest rates.

The Fama-French three-factor model serves as theory which incorporates the impact of interest rates on stock returns. The three factors include the market return over the risk-free interest rate, the returns on diversified portfolios of small over big capitalization stocks and the returns on diversified portfolios of high over low book-to-market stocks (Fama and French, 2004). Since the model uses the risk-free interest rate to benchmark the risk premium of market returns and individual stock returns, changes to the risk-free interest rate hence result in changes to the expected risk premiums. Aside from the overarching three-factor model that explains stock returns, the nominal contracting hypothesis further details the impact of inflation and interest rates on stock returns. The hypothesis suggest that unexpected inflation, which impacts nominal assets and nominal liabilities of firms, can affect stock returns due to wealth redistribution from creditors to debtors (Kessel, 1956; Bach and Ando, 1957). Furthermore, the maturity composition of nominal assets and nominal liabilities affects the interest rate sensitivity of firms (Flannery et al., 1997).

Besides the two aforementioned theories, empirical research further documents the impact of interest rates on stock returns. Results from Kim and Nguyen (2009) indicate that majority of Asia-Pacific stock markets show significant negative returns and increased volatility in response to unexpected interest rate rises by the Federal Reserve (Fed) and the European Central Bank (ECB). The study employs EGARCH models on data spanning from January 1999 to December 2006 of Fed and ECB target interest rates and daily open and close prices of the stock indices in 12 Asia-Pacific countries – Australia, China, Hong Kong, Indonesia, Japan, Korea, Malaysia, New Zealand, the Philippines, Singapore, Taiwan and Thailand. In addition, Fernandez-Perez et al. (2014) find that the United States of America (U.S.A.) and Europe yield curves contain information which enhances the ability to forecast the probability of bear markets in the Spanish IBEX 35 stock index using a Probit model. Aside from data on the Spanish IBEX 35 stock index and sovereign debt yields from U.S.A and Europe, the Probit model uses monthly data from February 1991 to December 2009 of Spain sovereign debt yields and several financial and economic indicators. The varying analysis techniques and geographical coverage of both studies suggests the robustness on the influence of interest rates, specifically U.S.A and Europe interest rates, on stock returns.

Empirical studies also highlight the effect of interest rates specifically on banks and insurance companies. Using primarily GARCH models, Kasman et al. (2011) detect the significant and negative impact of interest rate and exchange rate changes on the conditional bank stock return in Turkey. Additionally, the study pinpoints interest rate and exchange rate volatility as major determinants of the conditional bank stock return volatility. Kasman et al. (2011) utilized daily data from 27 July 1999 to 9 April 2009 of interest rates measured as the 2-year Turkish government bond yields, exchange rates based on a simple basket equally weighting the US dollar and the Euro, closing stock prices of 13 Turkish commercial banks and

the closing price of the bank index. On a related note, Papadamou and Siriopoulos (2014) find that uncertainty in policy interest rates significantly affect short-term interest rate risk experienced by banks and life insurance companies in the United Kingdom. The authors obtain results by applying the GARCH-M methodology on monthly data of one month Treasury bill rates, four major British banks (Lloyds, HSBC, Barclays, Standard Chartered), four major life insurance companies (Prudential, St James's Place, Legal & General, Aviva), banking sector index, life insurance sector index and FT All Share Index. Despite the limited geographical coverage, the consistent results of both studies which use almost similar econometric techniques strongly emphasize the effect of interest rates on banks and insurance companies.

Aside from the impact of interest rates on stock returns, existing literature points out the interaction among stock markets, specifically between Islamic and conventional stock markets. Ajmi et al. (2014) find the significant linear and non-linear causality from the Islamic stock market to conventional stock markets, particularly for Europe and Asia. The study attributes the causality from the Islamic stock market to the aforementioned conventional stock markets due to the additional restrictions imposed when classifying stocks as Shariah-compliant and the level of advancement of Islamic finance in Europe and Asia. Ajmi et al. (2014) used heteroscedasticity-robust linear Granger causality and nonlinear Granger causality tests on daily data from January 4, 1999 to October 8, 2010, of the Dow Jones Islamic Market (DJIM) index, S&P stock market indices for the United States (SPUS), Europe (SPEU) and Asia (SPAS50), and several additional financial and risk factors. Although primarily focusing on the interaction among stock markets, the study generally implies the existing relationship between Islamic and conventional finance.

Theoretical and empirical work feature the impact of interest rates on returns of stock markets, bank stocks and insurance company stocks, and identify the relationship between Islamic and conventional stock markets. However, lack of evidence on the different impact of conventional interest rates on Islamic finance components – Islamic stock markets, Islamic banking and takaful – poses a gap in literature which this paper shall fill. Using Malaysia as a case in point, the empirical evidence gathered provides insight to the behavior of different Islamic finance components to changes in conventional interest rates and thus allows for formulations of effective countermeasures.

3. Data and methodology

In order to address the research objective through gathering evidence from Malaysia, this paper analyzes the impact of the overnight Kuala Lumpur Interbank Offer Rate (KLIBOR) on Islamic finance stock returns in Islamic stock markets, Islamic banking and takaful represented by the FTSE Bursa Malaysia EMAS Shari'ah Index, BIMB Holdings Bhd. stock and Syarikat Takaful Malaysia Bhd. stock respectively. The selection of the overnight KLIBOR as the interest rate arises from Bank Negara Malaysia's (BNM) stand on KLIBOR as the 'official indicator of the conditions in the interbank money market' (BNM, 2013). As for the chosen Islamic stock market, Islamic banking and takaful variables, the FTSE Bursa Malaysia EMAS Shari'ah Index,

BIMB Holdings Bhd. stock and Syarikat Takaful Malaysia Bhd. stock contain or are Shariah-compliant stocks approved by the Shariah Advisory Committee (SAC) of the Securities Commission Malaysia. When screening for Shariah-compliant stocks, the SAC applies business activity and financial ratio benchmarks which minimize the Shariah non-compliant activities and financing firms engage in (Securities Commission Malaysia, 2013).

Aside from the four focal variables, this paper incorporates Malaysia's consumer price index (CPI), the US 3-month Treasury bill, the ringgit to US dollar exchange rate and BNM's overnight policy rate (OPR) as variables to control for the impact of inflation, US interest rates, exchange rates and policy rates as described in Kessel (1956), Bach and Ando (1957), Kim and Nguyen (2009), Fernandez-Perez et al. (2014), Kasman et al. (2011) and Papadamou and Siriopoulos (2014). In addition, the paper includes the overnight Kuala Lumpur Islamic Rate of Return (KLIRR) to control for the impact of the Islamic Interbank Money Market (IIMM) on Islamic finance stock returns in Malaysia. Since KLIRR and Islamic finance stocks share the same Islamic principles, KLIRR from IIMM should impact Islamic finance stock returns more than KLIBOR from the conventional interbank money market. Thus, controlling for KLIRR remains important in order to isolate the impact of KLIBOR on Islamic finance stock returns.

Datastream serves as the source for all data except for the overnight KLIRR obtained from IIMM. All data collected are in daily frequency except for Malaysia's consumer price index, the US 3-month Treasury bill and the ringgit to US dollar exchange rate in monthly frequency. Due to the inconsistencies in frequencies, daily data undergo conversion into monthly frequency through averaging, resulting in all data spanning from November 2006 to December 2013. Table 1 displays the descriptive statistics for all four focal and five control variables. Subsequently, all data experience natural logarithmic transformation to achieve stationary variances except for overnight KLIBOR, OPR, US 3-month Treasury bill and overnight KLIRR already in percent form.

Table 1: Descriptive Statistics

Variables	Unit	Symbol	Mean	Median	Maximum	Minimum	Std. Dev.
Focal							
FTSE Bursa Malaysia EMAS Shari'ah Index	RM	EMAS	9490.262	9527.029	12862.109	5822.866	1738.764
BIMB Holdings Bhd. Stock	RM	BIMB	1.795	1.299	4.622	0.767	1.018
Syarikat Takaful Malaysia Bhd.	RM	TAKAFUL	2.765	1.492	10.267	1.225	2.438

Stock							
Overnight KLIBOR	%	KLIBOR_ON	2.924	2.970	3.510	1.990	0.500
Control							
Consumer Price Index	RM	CPI	100.409	100.350	108.900	91.700	4.800
US 3-month Treasury Bill	%	US_TBILL	1.011	0.135	5.010	0.010	1.676
Ringgit to US dollar Exchange Rate	RM/USD	EX_RM_US	3.264	3.237	3.708	2.962	0.193
Overnight Policy Rate	%	OPR	2.940	3.000	3.500	2.000	0.494
Overnight KLIRR	%	KLIRR_ON	2.870	2.910	3.475	1.883	0.495

The detection of existing theoretical, or long-run, relationships primarily among Islamic stock markets, Islamic banking, takaful and conventional interest rates begins with the identification of variables non-stationary in level form and stationary in first-differenced form based on the augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests. Subsequently, the selection of the order of vector autoregression (VAR) serves to minimize serial correlation in subsequent analysis. After passing the ADF and PP unit root tests, non-stationary variables in level form, which contain theoretical characteristics, undergo the Engle-Granger, Johansen and autoregressive distributed lag (ARDL) cointegration tests to identify the potential existence of theoretical relationships among the variables. As further support to the cointegration tests, long run structural modeling (LRSM) isolates the variables which truly possess theoretical relationships among each other through exact- and over-identification of restrictions.

Although capable in identifying theoretical relationships, the aforementioned tests require the use of more tests to establish causality. The vector error-correction model (VECM) indicates the exogeneity or endogeneity among the variables depending on the statistical significance of the error-correction term. The orthogonalized and generalized variance decomposition (VDC) then rank the variables from most exogenous to most endogenous by the level of dependence of a variable's forecast error variances on its own shocks represented in percent form. Finally, the orthogonalized and generalized impulse response functions (IRFs) portray variables' dynamic response paths due to a variable-specific one-period standard error shock while the persistence profile displays variables' response paths to a system-wide shock. Furthermore, the persistence profile reflects the speed of which the system returns to equilibrium after the system-wide shock. Thus, the theoretical tests establish the existence of long-run relationships while the causality tests suggest the relative exogeneity and endogeneity among Islamic stock markets, Islamic

banking, takaful and conventional interest rates while controlling for the impact of inflation, US interest rates, exchange rates, policy rates and Islamic money market rates.

4. Estimation results

Based on the ADF and PP unit root test results on Table 2 and Table 3 respectively, all variables appear non-stationary in level form and stationary in first-differenced form, hence allowing the possibility for cointegration. As for the order of VAR, the Akaike Information Criterion (AIC) recommends six while the Schwarz Bayesian Criterion (SBC) recommends zero as seen in Table 4. This paper decides to use neither zero nor one for the order of VAR because of the presence of autocorrelation indicated by AIC and to avoid econometric software shortcomings in running VECM using order of VAR as one. Furthermore, this paper abstains from selecting the order of VAR beyond three due to potential over-parameterization on limited data observations, specifically 86 observations, on nine variables. Since both AIC and SBC values appear higher for the order of VAR of two compared to that of three, this paper chooses two as the order of VAR.

The significant tau-statistics on Table 5 for two out of nine Engle-Granger cointegration tests on nine variables indicate the presence of cointegration while the insignificant tau-statistics of the remaining seven tests indicate the absence of cointegration. Fortunately, the Johansen cointegration tests, both maximal eigenvalue and trace statistics, suggest that all variables remain cointegrated up to at most three vectors as seen on Table 6. In addition, the ARDL test, inferred from VECM results on Table 10, indicate the presence of cointegration for all three cointegrating vectors since at least one out of nine variables appears endogenous in each cointegrating vector. Thus, the Engle-Granger, Johansen and ARDL cointegration tests collectively show the cointegration up to at most three vectors for all variables under analysis.

The LRSM exact-identification phase on Table 7 identifies the three cointegrating vectors and consequently pinpoints the distinct long-run relationships of FTSE Bursa Malaysia EMAS Shari'ah Index, BIMB Holdings Bhd. stock and Syarikat Takaful Malaysia Bhd. stock with overnight KLIBOR and the control variables. Such finding implies the varying behaviors of Islamic stock markets, Islamic banking and takaful. Nevertheless, the valid LRSM over-identifying restriction, as shown by the insignificant chi-square value in Table 8, indicates that the overnight KLIRR remains unrelated in the long-run to the Islamic stock market, Islamic bank stock and takaful company stock. Despite sharing Islamic principles, the absence of a long-run relationship between Islamic finance components and overnight KLIRR but the opposite for that between Islamic finance components and overnight KLIBOR potentially arises from the dominance of the conventional interbank money market over IIMM in Malaysia. Figure 1 shows the substantial difference in the trading volumes of the overnight KLIBOR over the overnight KLIRR. Subsequent causality tests still include the overnight KLIRR since cointegration tests identified at most three cointegrating vectors among all variables. Lastly, Table 9 displays

through using the ringgit to US dollar exchange rate as an example that any further over-identifying restrictions remain invalid based on the significant chi-square value.

Figure 1: Overnight KLIBOR and overnight KLIRR trading volume (in RM billion) from November 2006 to December 2013

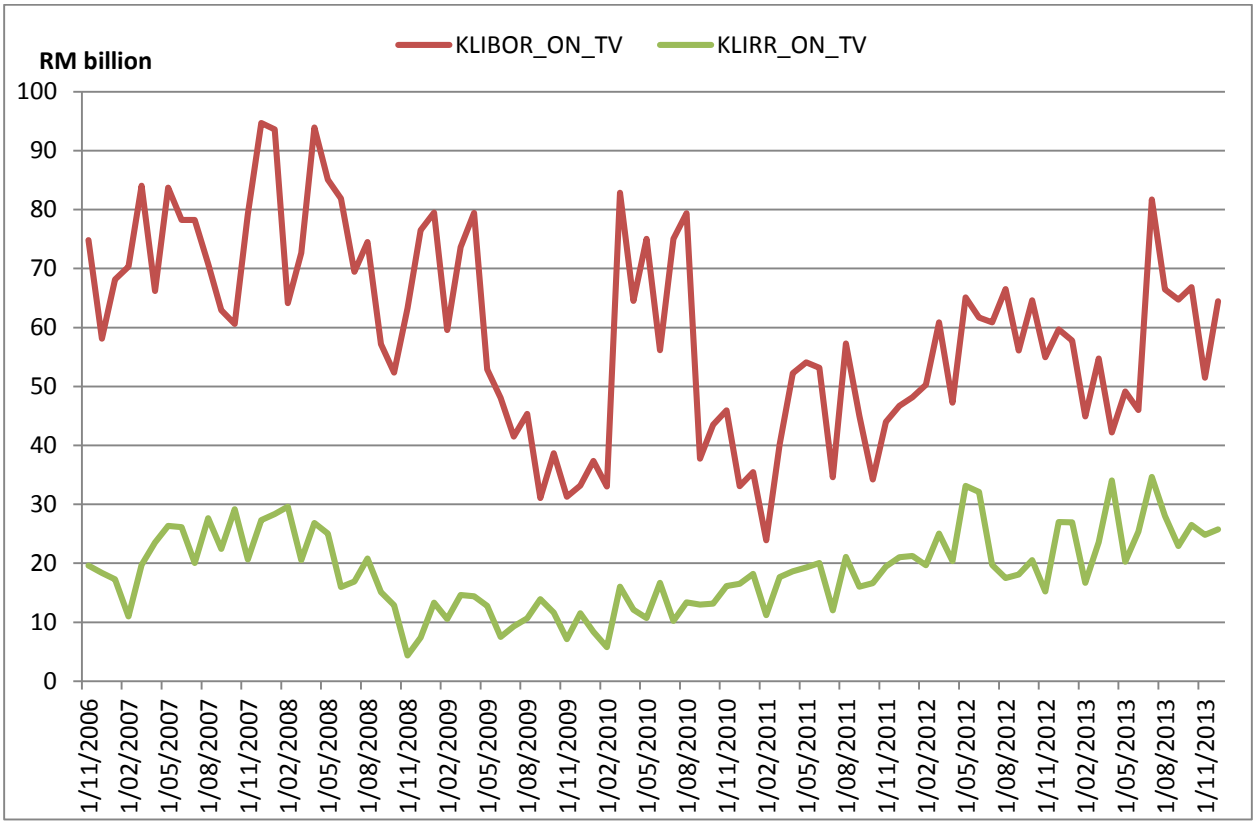


Table 2: Augmented dickey fuller (ADF) unit root tests

Variables	Level		First Difference	
	ADF Stat.	95% Crit.	ADF Stat.	95% Crit.
Focal				
LEMAS	-2.198	-3.467	-3.700**	-2.899
LBIMB	-1.374	-3.467	-3.804**	-2.899
LTAKAFUL	-1.015	-3.467	-4.361**	-2.899
KLIBOR_ON	-1.962	-3.467	-3.741**	-2.899
Control				
LCPI	-3.243	-3.467	-4.742**	-2.899
US_TBILL	-2.590	-3.467	-4.212**	-2.899
LEX_RM_US	-1.530	-3.467	-4.995**	-2.899
OPR	-1.998	-3.467	-3.773**	-2.899
KLIRR_ON	-1.899	-3.467	-3.523**	-2.899

Note: Both constant and trend terms are included in the tests of level variables while only the constant term is included in the tests of first-differenced variables. The table displays ADF(2) results based on the order of VAR of 2 selected from Table 4.

* Significance at 1% level.

** Significance at 5% level.

*** Significance at 10% level.

Table 3: Phillips-Perron (PP) unit root tests

Variables	Level		First Difference	
	PP Stat.	95% Crit.	PP Stat.	95% Crit.
Focal				
LEMAS	-2.092	-3.464	-6.273**	-2.896
LBIMB	-1.342	-3.464	-8.609**	-2.896
LTAKAFUL	-0.930	-3.464	-6.551**	-2.896
KLIBOR_ON	-1.551	-3.464	-4.118**	-2.896
Control				
LCPI	-2.558	-3.464	-5.570**	-2.896
US_TBILL	-1.356	-3.464	-7.087**	-2.896
LEX_RM_US	-2.017	-3.464	-9.641**	-2.896
OPR	-1.555	-3.464	-4.189**	-2.896
KLIRR_ON	-1.606	-3.464	-4.594**	-2.896

Note: Both constant and trend terms are included in the tests of level variables while only the constant term is included in the tests of first-differenced variables.
* Significance at 1% level.
** Significance at 5% level.
*** Significance at 10% level.

Table 4: Order of vector autoregression (VAR)

Order	LL	AIC	SBC
0	1404.2	1386.2	1364.9
1	1540.3	1441.3	1324.1
2	1604.3	1424.3	1211.0
3	1672.9	1411.9	1102.7
4	1800.0	1458.0	1052.8
5	1927.8	1504.8	1003.7
6	2090.3	1586.3	989.2

Note: AIC refers to the Akaike Information Criterion while SBC refers to the Schwarz Bayesian Criterion.

Table 5: Engle-Granger cointegration tests

Dependent variable	tau-statistic	p-value
Focal		
LEMAS	-4.495	(0.421)
LBIMB	-4.742	(0.311)
LTAKAFUL	-3.473	(0.865)
KLIBOR_ON	-4.412	(0.461)
Control		
LCPI	-5.710***	(0.059)
US_TBILL	-6.239**	(0.018)
LEX_RM_US	-5.211	(0.151)
OPR	-4.453	(0.442)
KLIRR_ON	-4.714	(0.323)

Note: p-values appear in parentheses.
* Significance at 1% level.
** Significance at 5% level.
*** Significance at 10% level.

Table 6: Johansen cointegration tests

Null hypothesis	Statistic	95% Crit.	90% Crit.
Maximal eigen value statistics			
None	91.57	61.27	58.09
At most 1	52.80	55.14	52.08
At most 2	50.69	49.32	46.54
At most 3	32.96	43.61	40.76
At most 4	23.52	37.86	35.04
At most 5	20.41	31.79	29.13
Trace statistics			
None	302.37	222.62	215.87
At most 1	210.80	182.99	176.92
At most 2	158.00	147.27	141.82
At most 3	107.31	115.85	110.60
At most 4	74.35	87.17	82.88
At most 5	50.83	63.00	59.16

Note: The statistics are based on cointegration with unrestricted intercepts

and restricted trends in the VAR. The order of VAR is set to 2.

Table 7: Long run structural modeling (LRSM) exact-identification of restrictions

Variables	Cointegrating Vector					
	(1)		(2)		(3)	
Focal						
LEMAS	1.000	[*NONE*]	0.000	[*NONE*]	0.000	[*NONE*]
LBIMB	0.000	[*NONE*]	1.000	[*NONE*]	0.000	[*NONE*]
LTAKAFUL	0.000	[*NONE*]	0.000	[*NONE*]	1.000	[*NONE*]
KLIBOR_ON	7.233	[5.388]	-13.221	[11.135]	-81.137	[59.999]
Control						
LCPI	-3.843	[7.643]	12.895	[15.489]	123.293	[85.067]
US_TBILL	-0.190	[0.130]	-0.073	[0.265]	1.787	[1.450]
LEX_RM_US	0.952	[0.932]	-1.633	[1.887]	-17.189	[10.369]
OPR	-6.856	[5.186]	10.431	[10.732]	74.148	[57.747]
KLIRR_ON	-0.114	[0.954]	2.621	[2.186]	2.710	[10.642]
Trend	-0.003	[0.011]	-0.053	[0.023]	-0.233	[0.128]
Log-Likelihood	1715.2					
Chi-Square	-					
	-					

Note: Standard deviations appear in square brackets.

The LRSM over-identification results on Table 8 indicate the positive long-run relationship between the overnight KLIBOR and the FTSE Bursa Malaysia EMAS Shari'ah Index but the negative long-run relationship between the overnight KLIBOR and both BIMB Holdings Bhd. and Syarikat Takaful Malaysia Bhd. stocks. Nevertheless, the magnitude of the overnight KLIBOR coefficients appear abnormally high along with OPR coefficients of which the magnitude seems close to that of overnight KLIBOR. Since BNM uses KLIBOR as the official indicator of Malaysia's interbank money market, BNM's monetary policy stance reflected by the OPR may directly target KLIBOR. Thus, the overnight KLIBOR and OPR coefficients should indicate a collective effect of conventional interest rates on Islamic finance in Malaysia, all else equal. After considering the sum of the overnight KLIBOR and OPR coefficients on Table 8 assuming all else equal, the Islamic stock market, Islamic bank and takaful company under analysis still exhibit the previously identified long-run relationships.

The negative long-run relationship between the overnight KLIBOR and the Islamic bank and takaful company stocks remains in line with Kasman et al. (2011). Based on Flannery et al. (1997), the negative impact of increases in interest rates potentially arises from the longer duration of nominal assets versus that of nominal liabilities. The duration mismatch further suggests the lower flexible-rate nominal assets versus that of nominal liabilities, hence the

Table 8: Long run structural modeling (LRSM) over-identification of restrictions – overnight Kuala Lumpur Islamic Rate of Return (KLIRR)

Variables	Cointegrating Vector					
	(1)		(2)		(3)	
Focal						
LEMAS	1.000	[*NONE*]	0.000	[*NONE*]	0.000	[*NONE*]
LBIMB	0.000	[*NONE*]	1.000	[*NONE*]	0.000	[*NONE*]
LTAKAFUL	0.000	[*NONE*]	0.000	[*NONE*]	1.000	[*NONE*]
KLIBOR_ON	7.172	[5.337]	-12.249	[8.777]	-79.942	[57.888]
Control						
LCPI	-3.656	[7.566]	10.820	[12.116]	120.196	[82.086]
US_TBILL	-0.187	[0.130]	-0.121	[0.209]	1.729	[1.410]
LEX_RM_US	0.945	[0.916]	-1.724	[1.471]	-17.171	[9.937]
OPR	-6.914	[5.132]	12.131	[8.453]	75.738	[55.657]
KLIRR_ON	0.000	[*NONE*]	0.000	[*NONE*]	0.000	[*NONE*]
Trend	-0.004	[0.011]	-0.052	[0.018]	-0.230	[0.123]
Log-Likelihood	1712.9					
Chi-Square	4.477					
	(0.214)					

Note: Standard deviations appear in square brackets while *p*-values appear in parentheses.

negative income gap, in the Islamic bank and takaful company. The negative income gap of the Islamic bank and takaful company may also explain the positive relationship between the overnight KLIBOR and the Islamic stock market. Since Shariah-compliant securities can only possess at most 33% conventional finance debt in firms' capital structures, such firms then carry Islamic finance debt sourced potentially, if not mainly, from Islamic banks. Since Islamic banks hold lower flexible-rate nominal assets versus that of nominal liabilities, firms indebted to Islamic banks benefit from an increasing interest rate environment since the majority of the debt financed at fixed rates imply that firms need not pay more for financing. Thus increases in

Islamic stock market returns may reflect the savings obtained from no additional financing costs in an increasing interest rate environment.

Since three cointegrating vectors exist and that the relationship with the overnight KLIBOR already differentiates the Islamic stock market from the Islamic bank and takaful company stocks, the relationship with the US 3-month Treasury bill further distinguishes Islamic banking from takaful. LRSM over-identification results on Table 8 shows a negative long-run relationship between BIMB Holdings Bhd. stock and US 3-month Treasury bill whereas displays a positive long-run relationship between Syarikat Takaful Malaysia Bhd. stock and the US 3-

Table 9: Long run structural modeling (LRSM) over-identification of restrictions – overnight Kuala Lumpur Islamic Rate of Return (KLIRR) and the ringgit to US dollar exchange rate

Variables	Cointegrating Vector					
	(1)		(2)		(3)	
Focal						
LEMAS	1.000	[*NONE*]	0.000	[*NONE*]	0.000	[*NONE*]
LBIMB	0.000	[*NONE*]	1.000	[*NONE*]	0.000	[*NONE*]
LTAKAFUL	0.000	[*NONE*]	0.000	[*NONE*]	1.000	[*NONE*]
KLIBOR_ON	35.873	[28.908]	14.068	[30.339]	66.087	[108.877]
Control						
LCPI	-26.428	[20.388]	-12.841	[19.067]	-17.537	[*NONE*]
US_TBILL	-0.534	[0.438]	-0.668	[0.455]	-1.953	[1.570]
LEX_RM_US	0.000	[*NONE*]	0.000	[*NONE*]	0.000	[*NONE*]
OPR	-35.040	[28.024]	-12.989	[29.390]	-61.720	[104.967]
KLIRR_ON	0.000	[*NONE*]	0.000	[*NONE*]	0.000	[*NONE*]
Trend	0.033	[0.032]	-0.019	[0.030]	-0.051	[*NONE*]
Log-Likelihood	1695.9					
Chi-Square	38.546					
	(0.000)					

Note: Standard deviations appear in square brackets while *p*-values appear in parentheses.

month Treasury bill. The negative relationship between Islamic banking and the US 3-month Treasury bill remains consistent with Kim and Nguyen (2009) and the negative income gap previously identified. On the other hand, the positive relationship between takaful and the US 3-month Treasury bill contradicts the negative income gap previously identified. The contrasting

relationship may emerge from the forecasted increase in collection of takaful contributions due to the market hedging against potential Islamic banking losses from increases in interest rates.

Aside from OPR and the US 3-month Treasury bill, the Malaysian consumer price index and ringgit to US dollar exchange rate exhibit long-run relationships with the Islamic finance components as seen in Table 8. Similar to the long-run relationship with overnight KLIBOR, the Islamic stock market behaves in an opposite manner compared to Islamic banking and takaful when interacting with the Malaysian consumer price index and ringgit to US dollar exchange rate in the long-run. The finding reinforces the varying characteristics of the Islamic stock market compared to Islamic banking and takaful, potentially due to the difference in sector involvement – real sector versus financial sector. Despite the extensive discussion of the LRSM results from Table 8 on the long-run relationships, causality tests such as VECM, VDC, IRFs and persistence profile serve to verify the relationships and corresponding rationale discussed.

VECM results in Table 10 show for the first and second cointegrating vectors respectively that FTSE Bursa Malaysia EMAS Shari'ah Index and BIMB Holdings Bhd. stock appear endogenous based on the significant error-correction terms. However, the insignificant error-correction term for the Syarikat Takaful Malaysia Bhd. stock in the third cointegrating vector suggests exogeneity. The results also indicate overnight KLIBOR's exogeneity only in the first cointegrating vector whereas signal endogeneity in the second and third cointegrating vectors. Furthermore, the significant error-correction terms for OPR in all three cointegrating vectors imply endogeneity. Besides the causality from takaful to overnight KLIBOR and OPR in the third cointegrating vector, the causalities in the first and second cointegrating vectors produce vague results, hence necessitating the use of VDC results to describe causality among the Islamic stock market, Islamic banking and conventional interest rates.

The variables rank in descending order of relative exogeneity from the ringgit to US dollar exchange rate, the Syarikat Takaful Malaysia Bhd. stock, the US 3-month Treasury bill, overnight KLIBOR, BIMB Holdings Bhd. stock, Malaysian CPI, FTSE Bursa Malaysia EMAS Shari'ah Index, OPR to overnight KLIRR based on orthogonalized VDC results on Table 11. However, generalized VDC results on Table 12 rank variables in descending order of relative exogeneity from the US 3-month Treasury bill, the ringgit to US dollar exchange rate, the Syarikat Takaful Malaysia Bhd. stock, Malaysian CPI, BIMB Holdings Bhd. stock, OPR, overnight KLIBOR, overnight KLIRR to FTSE Bursa Malaysia EMAS Shari'ah Index. Since orthogonalized VDC relies on the particular ordering of variables and silences responses of variables other than the variable shocked, this paper prefers the generalized VDC due to the absence of unrealistic assumptions present in orthogonalized VDC despite the potential minor influences of variables other than the variable shocked on generalized VDC results.

The US 3-month Treasury bill achieving most exogeneity among variables provides evidence to the assertion that Islamic banks and takaful companies behave differently. Increases in the US 3-month Treasury bill negatively affects Islamic banking due to the negative income gap whereas as positively affects takaful due to forecasted increases in takaful contribution collections from the market hedging against adverse conditions of Islamic banks. In addition, the

relative exogeneity of takaful and Islamic banking to overnight KLIBOR while the Islamic stock market displays relative endogeneity to overnight KLIBOR concludes further that Islamic stock markets operate differently from takaful and Islamic banking. Nevertheless, the causality from takaful and Islamic banking to conventional interest rates then to the Islamic stock market rejects the negative income gap rationale, which assumed causality from overnight KLIBOR to Islamic finance components, used to explain the long-run relationships with overnight KLIBOR in all three cointegrating vectors.

The causal chain from takaful and Islamic banking to conventional interest rates then to the Islamic stock market, when combined with long-run relationships identified in LRSM, implies that increases in takaful companies and Islamic banks stock returns results in decreases in conventional interest rates which in turn decreases returns of the Islamic stock market and vice versa. The increase in stock returns of takaful companies and Islamic banks may prompt conventional insurance companies and banks to lower the interbank money market rate, KLIBOR, in order to maintain competitiveness. However, firms listed as Shariah-compliant securities cannot obtain significant amounts of cheaper financing from conventional insurance companies and banks due to the financial ratio benchmark of at most 33% conventional debt set by the Shariah Advisory Committee (SAC) of the Securities Commission Malaysia (Securities

Table 10: Vector error-correction model (VECM)

Variables	DLEMAS	DLBIMB	DLTAKAFUL	DKLIBOR_ON	DLCPI	DUS_TBILL	DLEX_RM_US	DO
Focal								
DLEMAS(-1)	0.097	-0.481	-0.518	-0.211	0.027	1.600	0.059	-0.2
	(0.396)	(0.035)	(0.089)	(0.324)	(0.068)	(0.026)	(0.442)	(0.3
DLBIMB(-1)	0.028	0.089	0.238	0.043	0.001	-0.396	-0.050	0.0
	(0.701)	(0.534)	(0.216)	(0.752)	(0.943)	(0.378)	(0.309)	(0.7
DLTAKAFUL(-1)	-0.026	0.078	0.305	-0.009	-0.005	0.314	0.037	-0.0
	(0.593)	(0.413)	(0.019)	(0.922)	(0.431)	(0.294)	(0.259)	(0.9
DKLIBOR_ON(-1)	-0.812	-1.965	-0.647	0.581	-0.109	-0.017	0.374	1.0
	(0.053)	(0.018)	(0.555)	(0.454)	(0.043)	(0.995)	(0.181)	(0.2
Control								
DLCPI(-1)	1.598	-0.110	0.984	-0.236	0.310	13.619	-0.689	-0.6
	(0.107)	(0.955)	(0.705)	(0.898)	(0.016)	(0.027)	(0.297)	(0.7
DUS_TBILL(-1)	-0.012	0.018	0.022	-0.079	0.010	-0.014	-0.010	-0.0
	(0.612)	(0.700)	(0.717)	(0.072)	(0.001)	(0.921)	(0.537)	(0.2
DLEX_RM_US(-	-0.496	0.020	0.709	-0.453	0.000	1.491	-0.009	-0.4

1)								
	(0.014)	(0.959)	(0.176)	(0.221)	(0.989)	(0.223)	(0.943)	(0.2
DOPR(-1)	0.541	1.311	0.900	0.602	0.119	-0.167	-0.278	0.1
	(0.217)	(0.128)	(0.435)	(0.460)	(0.035)	(0.950)	(0.342)	(0.9
DKLIRR_ON(-1)	0.349	0.836	0.106	-0.649	0.001	0.201	-0.148	-0.6
	(0.031)	(0.009)	(0.802)	(0.032)	(0.961)	(0.838)	(0.169)	(0.0
Error-correction								
ECM1(-1)	-0.201*	-0.040	-0.079	0.176	0.011	-1.330*	-0.008	0.2
	(0.001)	(0.736)	(0.618)	(0.119)	(0.150)	(0.001)	(0.850)	(0.0
ECM2(-1)	-0.073**	-0.221*	-0.124	-0.127**	0.005	0.313	0.047**	-0.1
	(0.027)	(0.001)	(0.150)	(0.039)	(0.199)	(0.121)	(0.034)	(0.0
ECM3(-1)	-0.014**	0.013	-0.013	0.046*	-0.001	-0.109*	0.000	0.0
	(0.028)	(0.295)	(0.416)	(0.000)	(0.140)	(0.005)	(0.991)	(0.0
Diagnostic Tests								
Chi-square SC(1)	1.149	0.913	0.182	0.005	5.088	2.184	0.232	0.0
	(0.284)	(0.339)	(0.670)	(0.945)	(0.024)	(0.139)	(0.630)	(0.9
Chi-square FF(1)	0.009	5.191	2.449	24.757	5.959	12.544	0.995	20.2
	(0.926)	(0.023)	(0.118)	(0.000)	(0.015)	(0.000)	(0.318)	(0.0
Chi-square N(2)	14.372	29.579	22.790	75.249	1339.000	246.977	0.242	89.6
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.886)	(0.0
Chi-square Het(1)	0.338	0.034	1.655	18.246	30.476	14.116	0.191	14.5
	(0.561)	(0.854)	(0.198)	(0.000)	(0.000)	(0.000)	(0.662)	(0.0

Note: The *p*-values appear in parentheses.

* Significance at 1% level.

** Significance at 5% level.

*** Significance at 10% level.

Table 11: Orthogonalized variance decomposition (VDC)

Relative variance in (%)	LEMAS	LBIMB	LTAKAFUL	KLIBOR_ON	LCPI	US_TBILL	LEX_RM_US	OPR	KLIRR_ON
Horizon: 30									
LEMAS	**17.34**	3.66	0.92	17.63	7.40	33.88	0.49	14.96	3.72
LBIMB	6.60	**42.83**	5.44	5.19	0.64	31.70	1.83	5.13	0.63
LTAKAFUL	0.35	21.75	**67.18**	1.03	0.47	4.72	2.63	0.77	1.11
KLIBOR_ON	13.48	1.15	1.40	**46.48**	12.18	14.24	6.47	3.93	0.67
LCPI	23.62	1.08	0.54	37.08	**23.99**	7.55	0.09	4.20	1.85
US_TBILL	1.70	13.19	5.46	0.14	4.42	**62.06**	1.20	8.35	3.48
LEX_RM_US	5.27	1.01	5.71	2.66	13.64	0.46	**69.56**	0.49	1.21
OPR	13.42	1.07	1.37	46.09	11.46	14.69	6.65	**4.56**	0.69
KLIRR_ON	14.28	0.34	1.72	47.84	12.78	14.18	5.60	2.92	**0.34**
Horizon: 60									
LEMAS	**15.15**	3.48	0.54	16.81	6.36	36.89	0.43	16.33	4.03
LBIMB	6.33	**41.81**	5.79	4.91	0.64	32.56	1.84	5.60	0.52
LTAKAFUL	0.17	22.52	**66.02**	0.97	0.53	5.46	2.57	0.93	0.84
KLIBOR_ON	12.09	1.53	1.63	**44.90**	12.42	16.20	6.18	4.60	0.45
LCPI	23.92	1.20	0.63	36.74	**22.10**	8.51	0.07	4.73	2.10
US_TBILL	1.49	13.89	5.77	0.10	4.27	**60.97**	1.18	8.67	3.64
LEX_RM_US	5.99	0.61	5.56	1.79	14.44	0.38	**70.07**	0.26	0.90
OPR	12.02	1.43	1.60	44.48	11.70	16.69	6.35	**5.29**	0.46
KLIRR_ON	12.67	0.48	1.98	46.28	13.08	16.40	5.35	3.57	**0.18**
Horizon: 90									
LEMAS	**14.51**	3.43	0.43	16.56	6.06	37.77	0.41	16.73	4.12
LBIMB	6.25	**41.53**	5.89	4.83	0.63	32.81	1.84	5.73	0.49
LTAKAFUL	0.12	22.76	**65.65**	0.95	0.54	5.69	2.56	0.98	0.75
KLIBOR_ON	11.64	1.65	1.71	**44.39**	12.50	16.83	6.08	4.82	0.37
LCPI	24.02	1.23	0.66	36.63	**21.49**	8.82	0.06	4.90	2.18
US_TBILL	1.43	14.10	5.87	0.09	4.23	**60.64**	1.18	8.77	3.69
LEX_RM_US	6.25	0.46	5.51	1.48	14.72	0.36	**70.25**	0.18	0.79
OPR	11.57	1.54	1.67	43.96	11.77	17.32	6.25	**5.53**	0.39
KLIRR_ON	12.16	0.53	2.07	45.78	13.17	17.12	5.27	3.78	**0.13**

Note: Each row shows the variance decomposition of the variable in the row label attributable to
shocks in each variable in the system including itself for the horizon specified. The bolded

and
underlined percentages represent the dependence of a variable's forecast error variances on
its
own shocks whereby the higher the percentage relative to that of other variables the more exogenous.

Table 12: Generalized variance decomposition (VDC)

Relative variance in (%)	LEMAS	LBIMB	LTAKAFUL	KLIBOR_ON	LCPI	US_TBILL	LEX_RM_US	OPR	KLIRR_ON
Horizon: 30									
LEMAS	**13.81**	1.49	1.88	20.51	14.93	12.04	3.81	17.54	14.00
LBIMB	5.71	**22.56**	14.52	6.17	1.52	32.71	5.38	5.89	5.55
LTAKAFUL	0.25	14.06	**59.20**	2.62	7.74	11.45	1.56	2.07	1.06
KLIBOR_ON	4.88	2.10	2.50	**21.07**	15.27	11.26	3.31	21.87	17.73
LCPI	10.77	1.10	0.61	22.98	**22.97**	0.74	0.93	21.16	18.75
US_TBILL	1.60	7.64	9.56	0.20	7.73	**66.32**	6.01	0.21	0.72
LEX_RM_US	4.70	2.46	8.07	1.79	12.44	3.49	**63.53**	2.26	1.25
OPR	4.91	2.05	2.46	21.10	14.87	11.41	3.43	**22.02**	17.75
KLIRR_ON	5.10	1.28	2.22	21.56	15.17	10.88	2.79	22.15	**18.84**
Horizon: 60									
LEMAS	**13.03**	0.73	0.92	20.87	13.69	15.25	4.04	17.69	13.78
LBIMB	5.61	**21.64**	14.71	5.96	1.39	34.25	5.55	5.66	5.22
LTAKAFUL	0.13	14.21	**58.25**	2.43	7.91	12.47	1.65	1.94	1.02
KLIBOR_ON	4.44	2.32	2.75	**20.52**	15.61	12.50	3.01	21.38	17.47
LCPI	11.26	0.79	0.35	23.50	**22.07**	0.44	1.03	21.61	18.93
US_TBILL	1.41	8.10	10.14	0.11	7.74	**65.78**	5.91	0.14	0.68
LEX_RM_US	5.50	2.24	8.25	0.97	13.87	3.09	**63.88**	1.28	0.91
OPR	4.46	2.26	2.71	20.55	15.21	12.67	3.13	**21.52**	17.49
KLIRR_ON	4.59	1.45	2.46	21.00	15.54	12.23	2.51	21.66	**18.57**
Horizon: 90									
LEMAS	**12.77**	0.49	0.61	20.99	13.29	16.29	4.12	17.73	13.71
LBIMB	5.58	**21.38**	14.77	5.90	1.35	34.70	5.60	5.60	5.13
LTAKAFUL	0.09	14.25	**57.95**	2.37	7.97	12.79	1.68	1.90	1.01
KLIBOR_ON	4.29	2.39	2.83	**20.35**	15.72	12.91	2.91	21.22	17.38
LCPI	11.43	0.69	0.26	23.68	**21.77**	0.34	1.07	21.76	19.00
US_TBILL	1.36	8.24	10.31	0.08	7.75	**65.61**	5.87	0.12	0.67
LEX_RM_US	5.80	2.16	8.31	0.67	14.40	2.94	**64.02**	0.92	0.79
OPR	4.31	2.33	2.79	20.37	15.32	13.09	3.03	**21.36**	17.40
KLIRR_ON	4.42	1.50	2.54	20.81	15.66	12.68	2.42	21.50	**18.47**

Note: Each row shows the variance decomposition of the variable in the row label attributable to
shocks in each variable in the system including itself for the horizon specified. The bolded

and
underlined percentages represent the dependence of a variable's forecast error variances on its
own shocks whereby the higher the percentage relative to that of other variables the more exogenous.

Commission Malaysia, 2013). Thus, firms pay more for Islamic financing and hence experience lower profitability as reflected in the decrease in returns of the Islamic stock market.

On the other hand, the aforementioned causality also indicates that decreases in takaful companies and Islamic banks stock returns results in increases in conventional interest rates which in turn increases returns of the Islamic stock market. The decrease in stock returns of takaful companies and Islamic banks may prompt conventional insurance companies and banks to raise the interbank money market rate, KLIBOR, in order to attain additional profits while takaful companies and Islamic banks face adverse conditions specific to Islamic finance such as but not limited to substantial changes in Islamic banking and takaful policies. Subsequently, firms listed as Shariah-compliant securities funded mainly by Islamic financing, currently cheaper than conventional financing, thus enjoy higher profitability which appears in the increase in returns of the Islamic stock market.

As for the causality of control variables from generalized VDC results on Table 12, the causality from OPR to the overnight KLIBOR supports the claim that BNM's monetary policy as reflected by the OPR may directly target KLIBOR seen as the official indicator of the Malaysian interbank money market. Thus, the collective impact of OPR and overnight KLIBOR, when all else held constant, as utilized in explaining LRSM results on Table 8 remains applicable. In addition, the ringgit to US dollar exchange rate ranking second most exogenous among all variables may yield additional insight as to the international dimension of Islamic finance components when coupled with LRSM results from Table 8. The positive relationship between the exchange rate and the Islamic stock market suggests the firms comprising the Islamic stock market experience increased international competitiveness in exports, hence higher returns, due to the increases in the exchange rate or depreciation of the ringgit and vice versa. Conversely, the negative relationship between the exchange rate and Islamic banking and takaful indicate net foreign currency payables without hedging since increases in the exchange rate or depreciation of the ringgit implies the higher ringgit payable values and hence lower returns.

Despite evidence from VDC results, IRFs serve as robustness checks to the causality identified and explained. For all focal and control variables in the system, the orthogonalized IRFs appear from Figure 2(a) to Figure 2(i) while generalized IRFs appear from Figure 3(a) to Figure 3(i). Using the same results, Figure 4(a) to Figure 4(d) and Figure 5(a) to Figure 5(d) display the orthogonalized and generalized IRFs respectively except include only graphs of the focal variables. Similar to VDC, this paper prefers the generalized IRFs due to the absence of unrealistic assumptions, previously discussed, present in orthogonalized IRFs despite the

potential minor influences of variables other than the variable shocked on generalized IRF results. Based on Figure 5(a) to Figure 5(d), the generalized IRFs indicate, similar to that of generalized VDC results, the causality from Syarikat Takaful Malaysia Bhd. and BIMB Holdings Bhd. stocks to overnight KLIBOR then to FTSE Bursa Malaysia EMAS Shari'ah Index.

However, the generalized IRFs from Figure 5(a) to Figure 5(d) also suggest the causality from conventional interest rates to Islamic banking and from the Islamic stock market to conventional interest rates. The causality from conventional interest rates to Islamic banking supports the negative income gap previously considered whereby increases in interest rates negatively affect Islamic banks due to the higher fixed-rate nominal assets versus fixed-rate nominal liabilities and vice versa. On the other hand, the causality from the Islamic stock market to conventional interest rates, of which a positive long-run relationship exists based on LRSM results, whereby increases in returns of the Islamic stock market results in increases in conventional interest rates and vice versa opens a new discussion avenue for this paper.

Figure 2(a) to Figure 2(d): Orthogonalized impulse response functions (IRFs) – focal variables

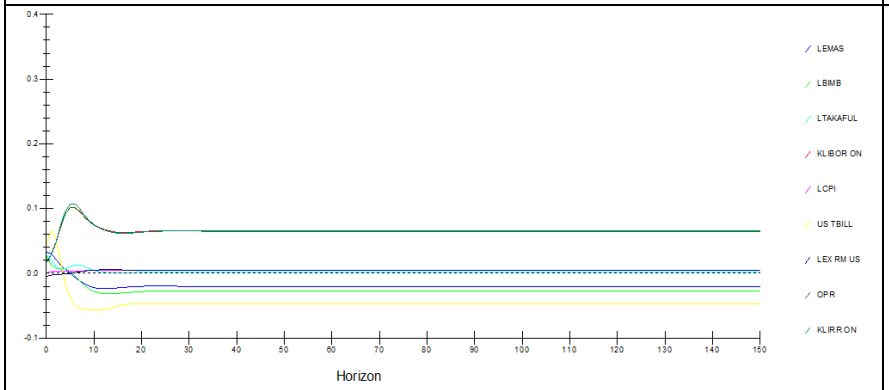
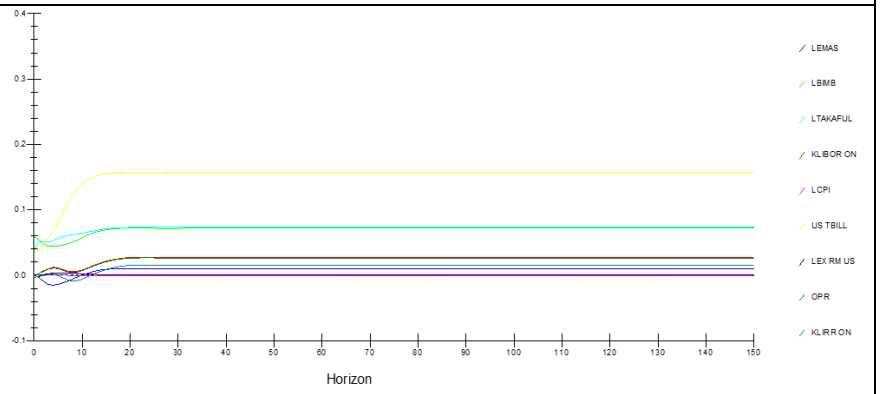
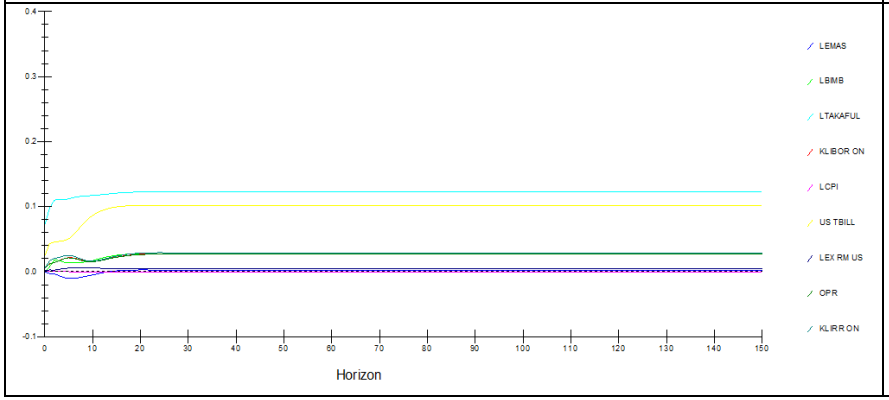
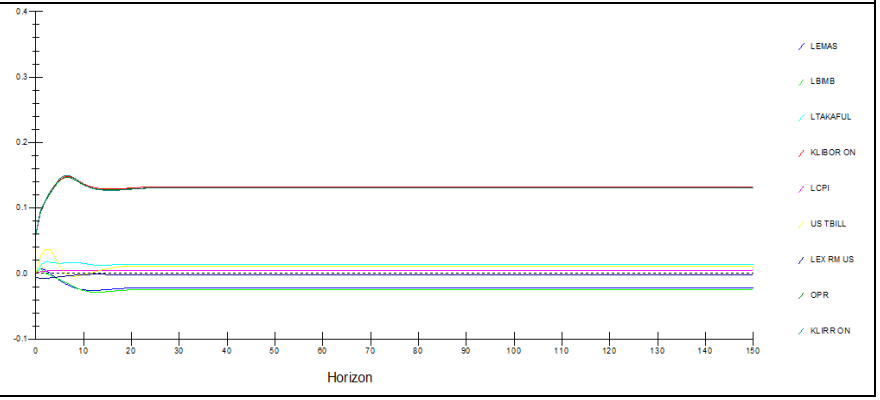
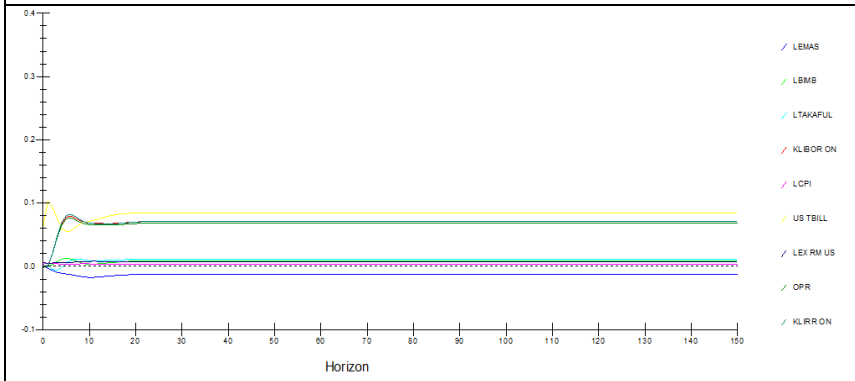
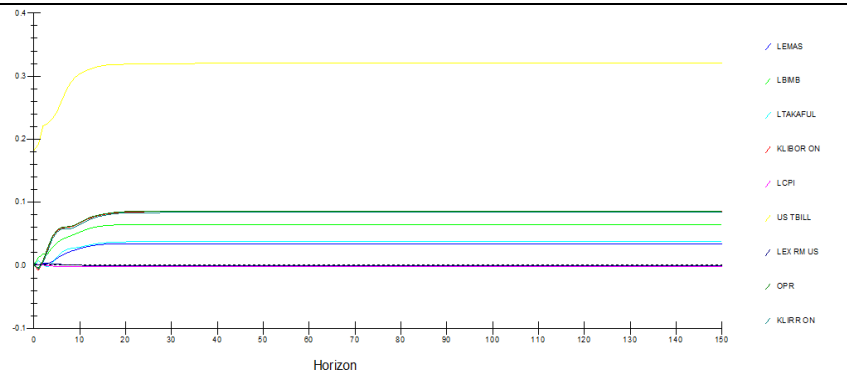
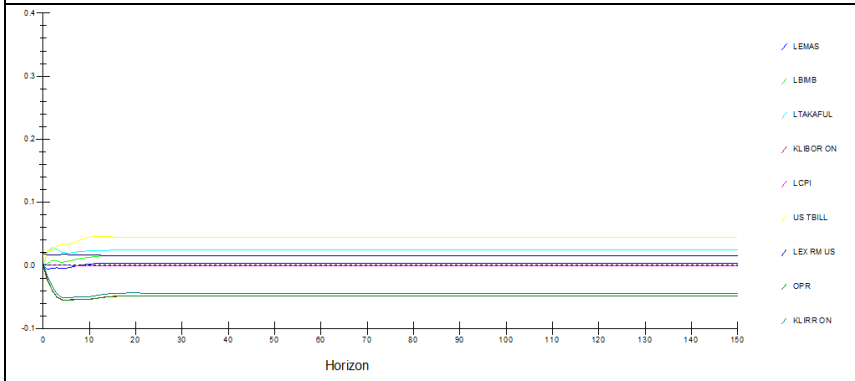
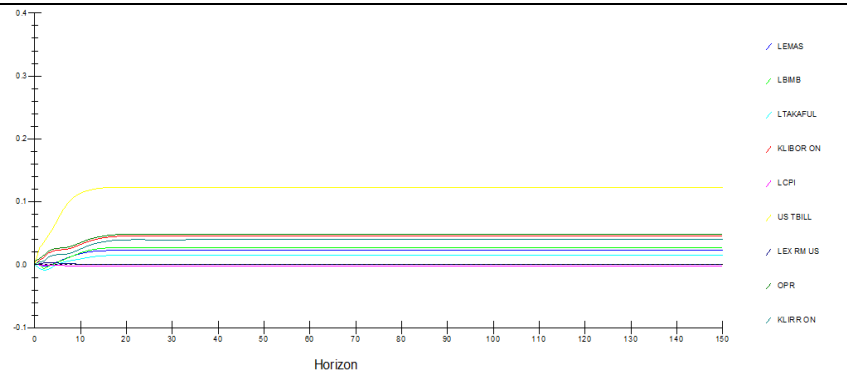
2(a): One standard error shock in the equation for LEMAS	2(b): One standard error shock in the equation for LBIMB
	
2(c): One standard error shock in the equation for LTAKAFUL	**2(d): One standard error shock in the equation for KLIBOR_ON**
	

Figure 2(e) to Figure 2(i): Orthogonalized impulse response functions (IRFs) – control variables

2(e): One standard error shock in the equation for LCPI	2(f): One standard error shock in the equation for US_TBILL
	
2(g): One standard error shock in the equation for LEX_RM_US	2(h): One standard error shock in the equation for OPR
	
2(i): One standard error shock in the equation for KLIRR	

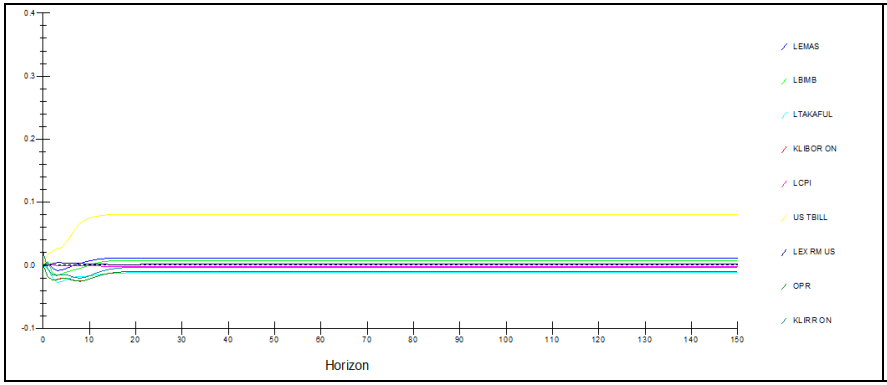

0.4
0.3
0.2
0.1
0.0
-0.1
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
Horizon
LEMAS
LBIMB
LTAKAFUL
KLIBOR ON
LCPI
US TBILL
LEX RM US
OPR
KLIRR ON

Figure 3(a) to Figure 3(d): Generalized impulse response functions (IRFs) – focal variables

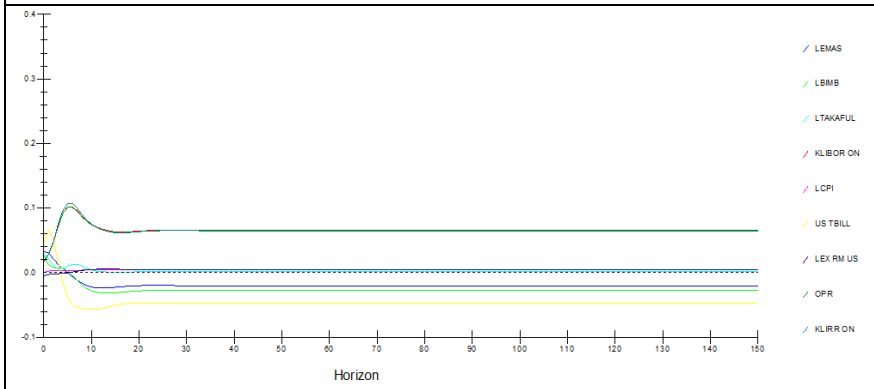
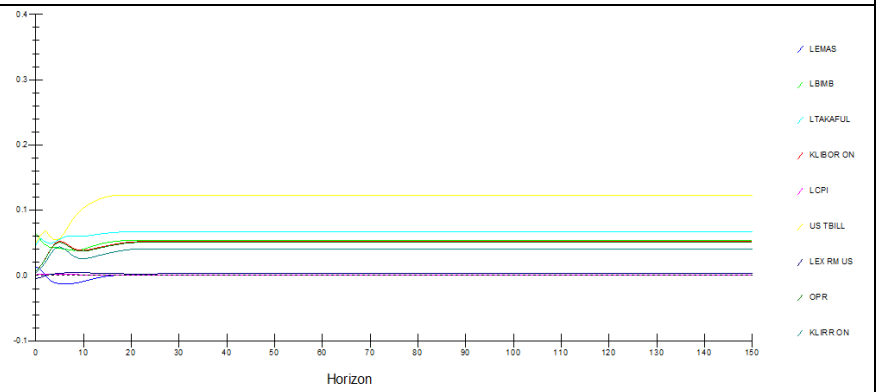
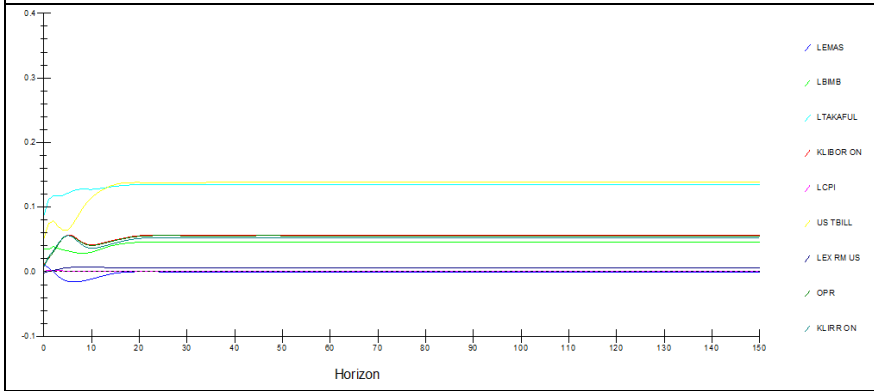
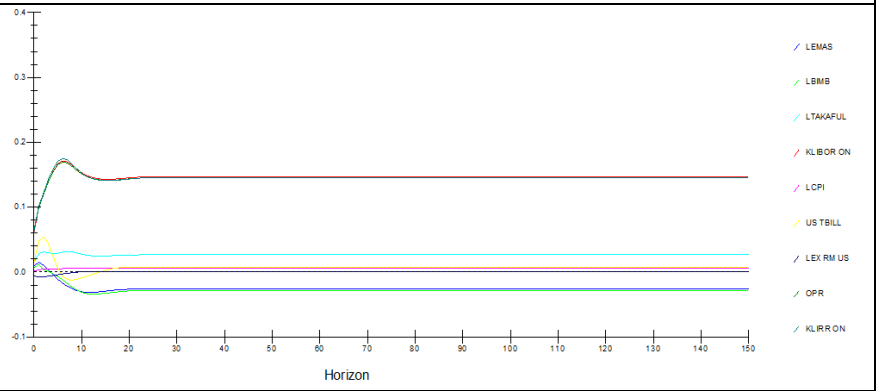
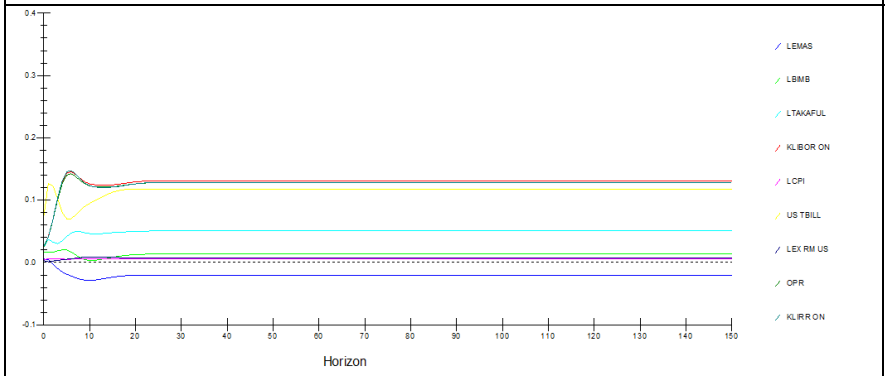
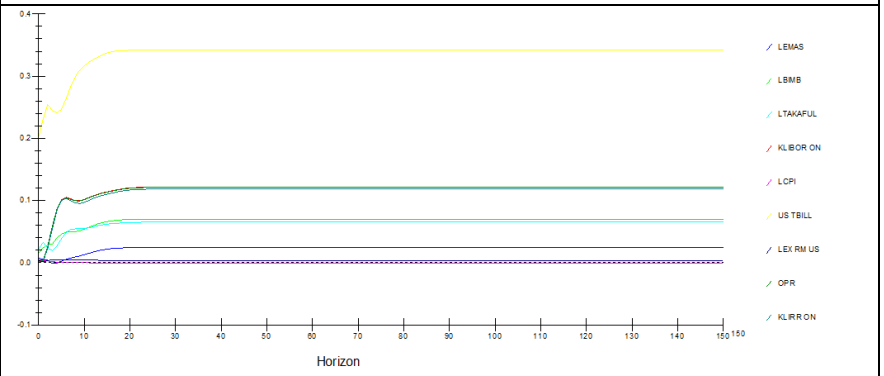
3(a): One standard error shock in the equation for LEMAS	3(b): One standard error shock in the equation for LBIMB
	
3(c): One standard error shock in the equation for LTAKAFUL	**3(d): One standard error shock in the equation for KLIBOR_ON**
	

Figure 3(e) to Figure 3(i): Generalized impulse response functions (IRFs) – control variables

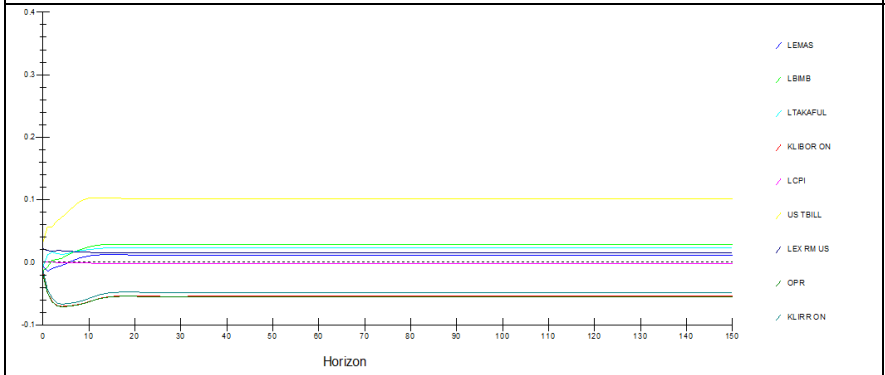
3(e): One standard error shock in the equation for LCPI



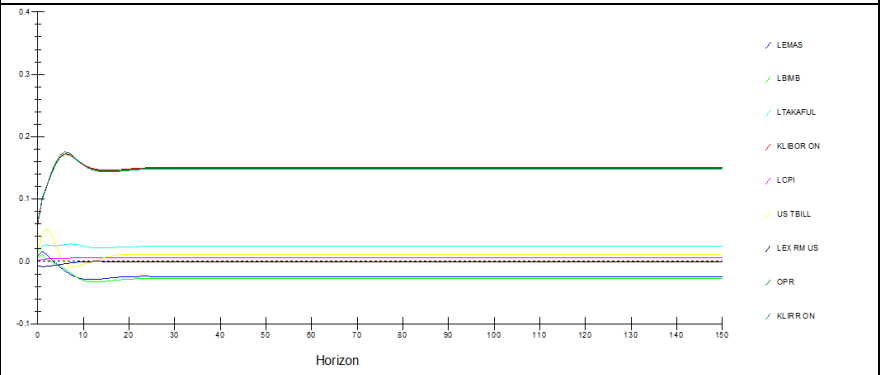
3(f): One standard error shock in the equation for US_TBILL



3(g): One standard error shock in the equation for LEX_RM_US



3(h): One standard error shock in the equation for OPR



3(i): One standard error shock in the equation for KLIRR

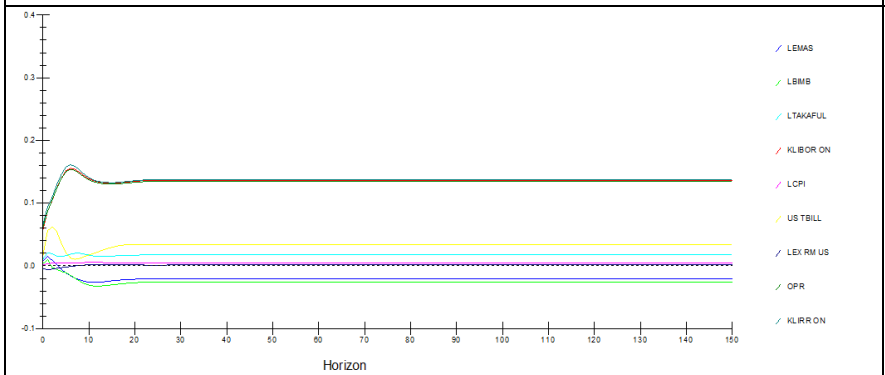


Figure 4(a) to Figure 4(d): Orthogonalized impulse response functions (IRFs) – focal variables

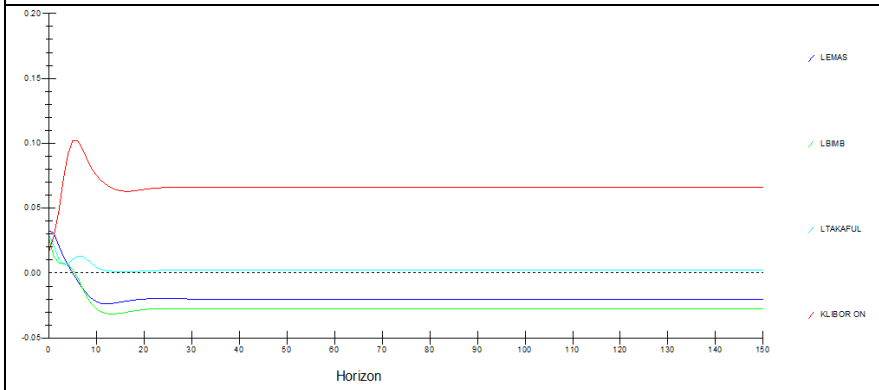
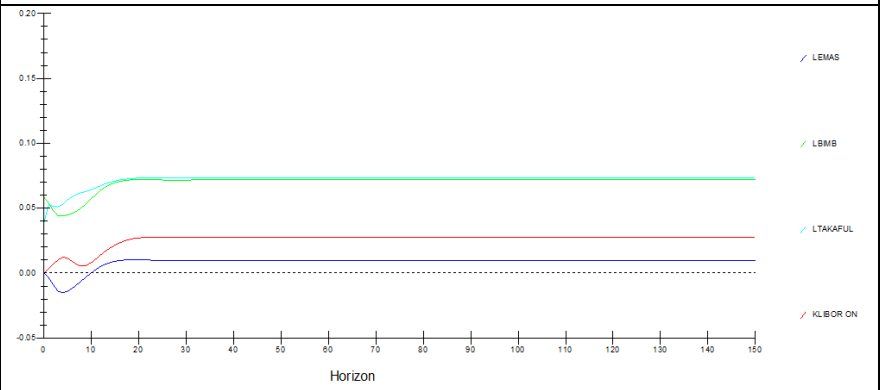
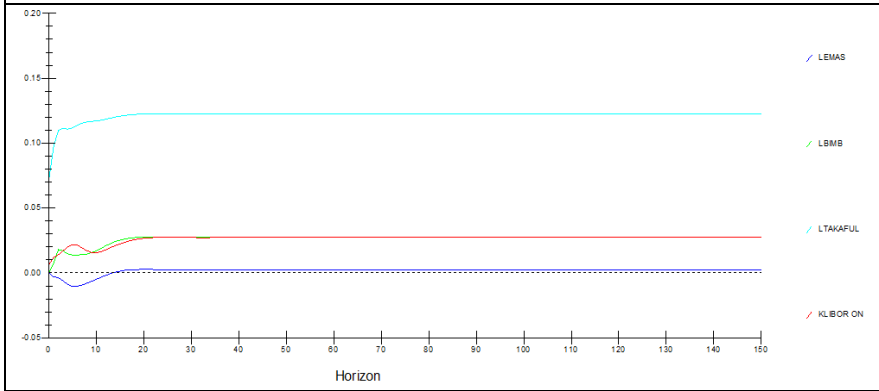
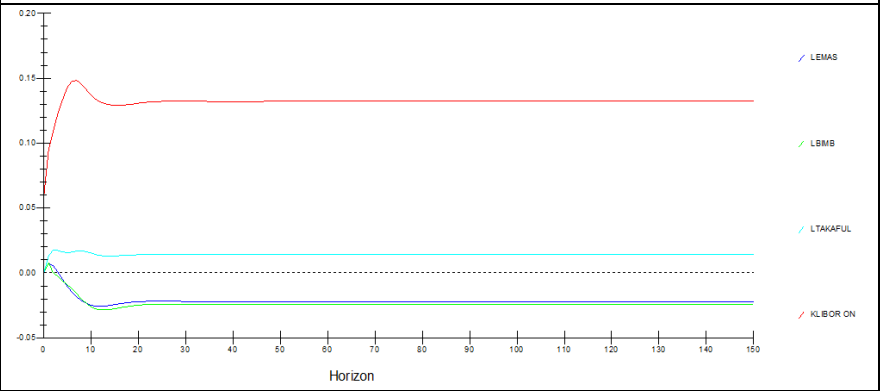
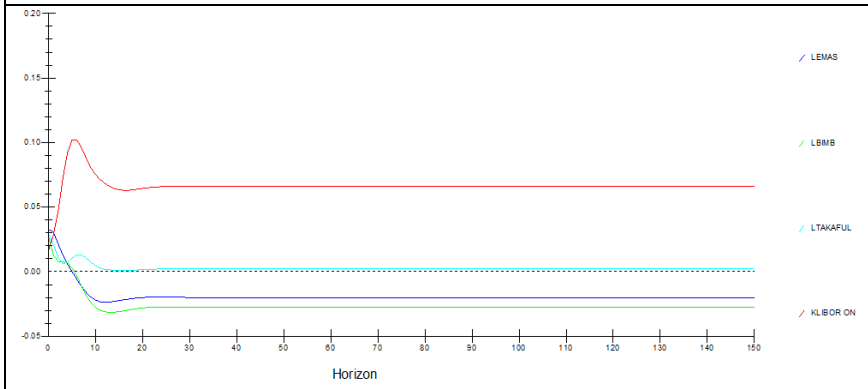
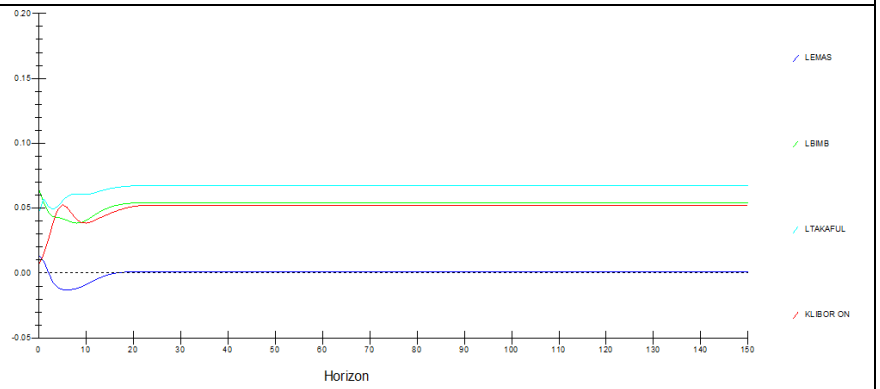
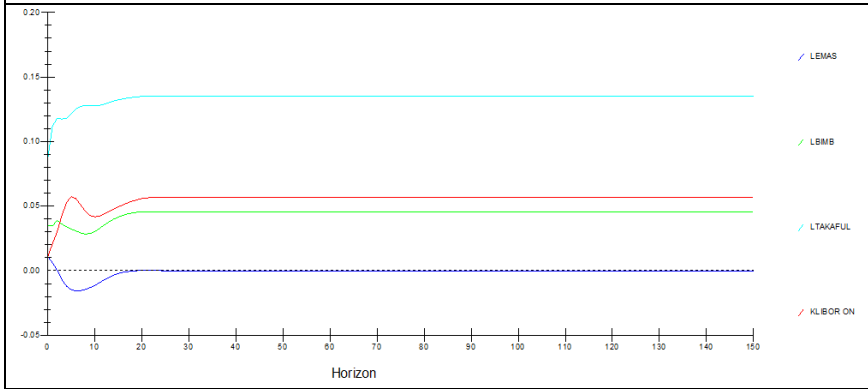
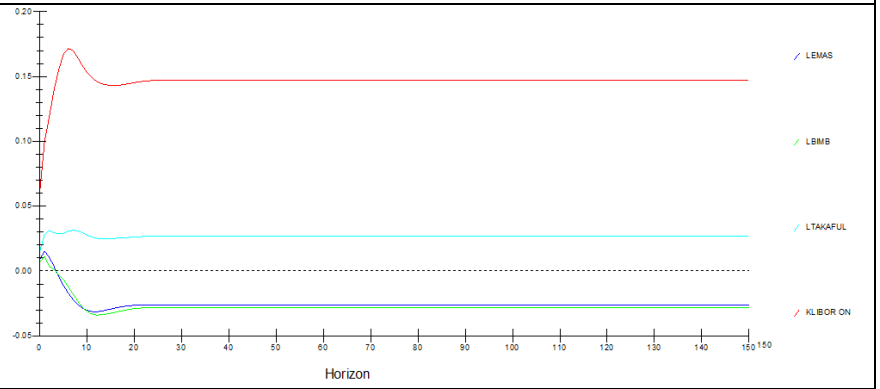
4(a): One standard error shock in the equation for LEMAS	4(b): One standard error shock in the equation for LBIMB
	
4(c): One standard error shock in the equation for LTAKAFUL	**4(d): One standard error shock in the equation for KLIBOR_ON**
	

Figure 5(a) to Figure 5(d): Generalized impulse response functions (IRFs) – focal variables

5(a): One standard error shock in the equation for LEMAS	5(b): One standard error shock in the equation for LBIMB
	
5(c): One standard error shock in the equation for LTAKAFUL	**5(d): One standard error shock in the equation for KLIBOR_ON**
	

Nevertheless, such causality remains plausible when accounting for OPR of which also exhibits causality from the Islamic stock market to OPR of approximately similar magnitude to that of overnight KLIBOR as shown by Figure 3(a).

Since BNM accounts for the condition of the domestic economy when deciding on the OPR which in turn may directly target KLIBOR, the Islamic stock market, although a subset of firms in the Malaysian economy, should generally exhibit the overall condition of the domestic economy (BNM, 2014). In addition, Figure 6 shows the lowering of the OPR, of which the overnight KLIBOR followed, in quarter 4 of 2008 after the decline of the FTSE Bursa Malaysia EMAS Shari'ah Index which started in quarter 1 of 2008 and continued up to quarter 4 of 2008. Consequently, Figure 6 also displays the raising of the OPR, of which the overnight KLIBOR followed, in quarter 1 of 2010 to quarter 2 of 2011 after the rise of the FTSE Bursa Malaysia EMAS Shari'ah Index which started in quarter 1 of 2009 and continued up to quarter 4 of 2013. Thus, BNM's observation of the domestic economic conditions, which include the Islamic stock market, when determining the OPR rationalizes the causality from the Islamic stock market to OPR which in turn explains the causality from the Islamic stock market to overnight KLIBOR.

The FTSE Bursa Malaysia EMAS Shari'ah Index, BIMB Holdings Bhd. stock and Syarikat Takaful Malaysia Bhd. stock cointegrating vectors return completely to equilibrium from a system-wide shock in 55, 52 and 48 months respectively. Nevertheless, the aforementioned Islamic stock market, Islamic bank and takaful company return approximately to equilibrium in 19, 17 and 18 months respectively based on the persistence profile in Figure 7.

Figure 6: FTSE Bursa Malaysia EMAS Shari'ah Index (in RM), overnight policy rate (OPR) and overnight KLIBOR (in %) from November 2006 to December 2013

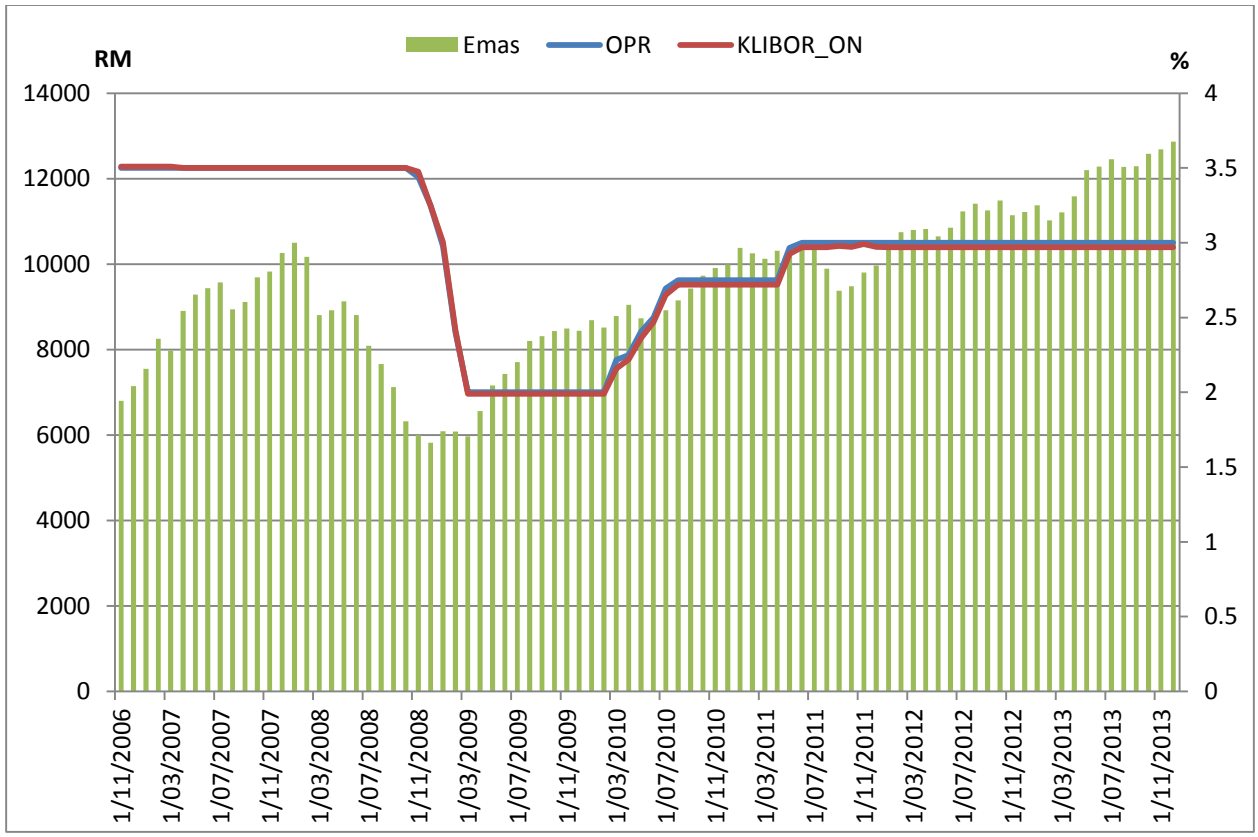
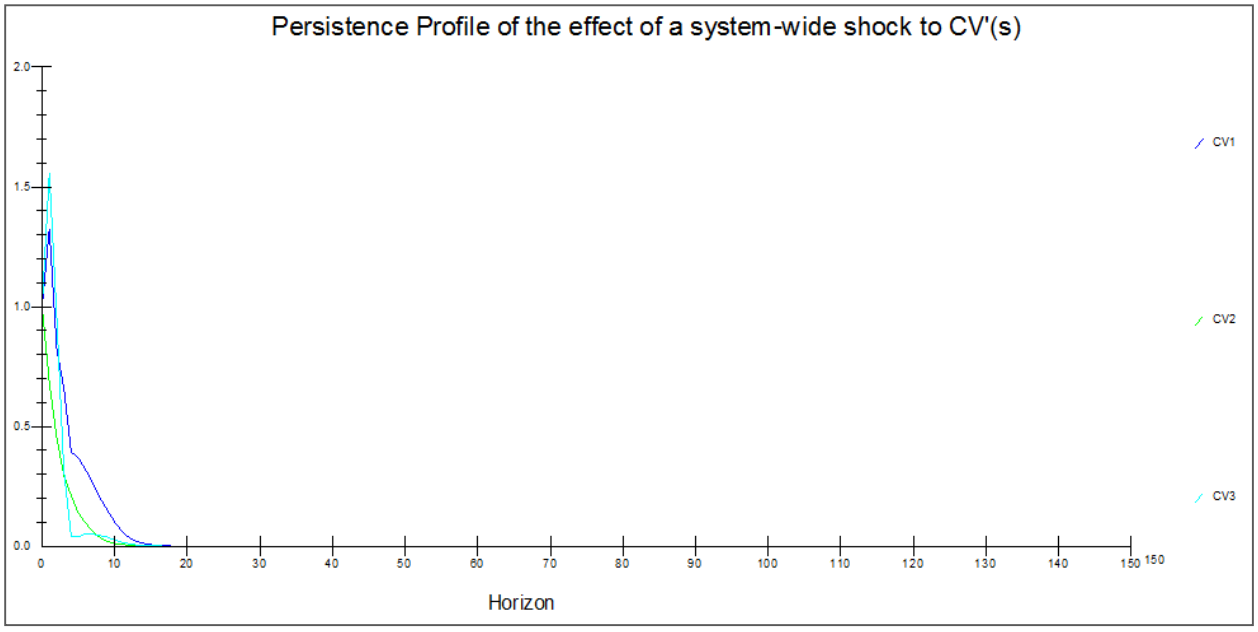


Figure 7: Persistence profile



The slightly faster return to equilibrium by Islamic banking and takaful compared to the Islamic stock market signals the faster recovery of the financial sector relative to the real sector. Such observation remains aligned with BNM's exercise of monetary policy on the financial sector,

especially banking, to influence the real sector. The assertion receives support from evidence such as the adjustment of the OPR based on the FTSE Bursa Malaysia EMAS Shari'ah Index as seen in Figure 6 and the response of Islamic banking to OPR shocks based on the IRF in Figure 3(h) indicating the transmission of monetary policy. Thus, the intervention of the central bank on the financial sector, particularly in banking, to influence the real sector signals the necessity to stabilize the financial sector prior to stabilizing the real sector as per persistence profile results.

5. **Conclusion**

This paper employs time series techniques to understand the different impact of conventional interest rates on Islamic stock markets, Islamic banking and Islamic insurance (called takaful) through obtaining evidence from Malaysia. Results suggest the distinct interaction of each Islamic finance component with conventional interest rates – the positive long-run relationship and bidirectional causality between Islamic stock markets and conventional interest rates, the negative long-run relationship and bidirectional causality between Islamic banking and conventional interest rates, and the negative long-run relationship and unidirectional causality from Islamic insurance to conventional interest rates.

Conventional interest rates exhibit causality towards Islamic stock markets and Islamic banking although demonstrating a positive long-run relationship with Islamic stock markets versus a negative long-run relationship with Islamic banking. The negative long-run relationship and causality from conventional interest rates to Islamic banking may arise from the negative income gap due to the lower flexible-rate nominal assets versus flexible-rate nominal liabilities held by Islamic banks. An increasing interest rate environment implies the increase of payments on nominal liabilities exceeding the increase of receipts from nominal assets, hence lowering Islamic banking profitability. Furthermore, the lower flexible-rate nominal assets of which may primarily finance firms listed as Shariah-compliant stocks translates into cheaper fixed-rate financing for the firms in the increasing interest rate environment, thus explaining the positive long-run relationship and causality from conventional interest rates to Islamic stock markets. However, a decreasing interest rate environment increases Islamic banking profitability from lower payments, or cost, on nominal liabilities exceeding lower receipts, or revenue, from nominal assets, whereas decreases Islamic stock market returns due to higher Islamic financing costs from mostly fixed-rate financing. Hence the impact of conventional interest rates on Islamic stock markets and Islamic banking stems from the negative income gap of Islamic banks.

Remarkably, causality from Islamic stock markets, Islamic banking and takaful to conventional interest rates exists although the impact of Islamic banking and takaful versus that of Islamic stock markets on conventional interest rates differs. On one hand, the negative long-run relationship and causality from Islamic banking and takaful to conventional interest rates indicates the reaction of conventional banking and insurance to maintain competitiveness against Islamic banking and takaful. Increases in Islamic banking and takaful returns motivate conventional banking and insurance to lower interest rates in order to attract more customers

through cheaper financing. Conversely, decreases in Islamic banking and takaful returns stimulate conventional banking and insurance to raise interest rates in order to attain additional profits in light of adverse conditions specific to Islamic finance such as but not limited to substantial changes in Islamic banking and takaful policies. On the other hand, the positive long-run relationship and causality from Islamic stock markets to conventional interest rates imply the incorporation of real sector conditions when the financial sector, especially central banks, decides on conventional interest rates. Such relationship illustrates the increase in interest rates during boom periods and the decrease in interest rates during bust periods of Islamic stock markets potentially to pace economic growth and minimize financing defaults respectively. The movements of interest rates based on the real sector, which includes Islamic stock markets, remain consistent with monetary policies pursued by central banks. Overall, results generally signal that Islamic finance – Islamic stock markets, Islamic banking and takaful – influences variations in conventional interest rates due to profitability pressures on conventional finance.

Policymakers should remain concerned primarily with the impact of conventional interest rates on Islamic stock markets and Islamic banking due to the negative income gap. The existence of the negative income gap in Islamic banks counteracts monetary policies by central banks both in boom and bust periods. An increasing interest rate environment exercised by central banks during boom periods to pace economic growth through controlling leverage promotes firms listed as Shariah-compliant stocks to lever up instead since such firms benefit from cheaper fixed-rate financing with Islamic banks. On the other hand, a decreasing interest rate environment implemented by central banks during bust periods to minimize financing defaults cannot affect the fixed-rate financing of firms listed as Shariah-compliant stocks with Islamic banks, hence increasing the probability of defaults of such firms. Thus the negative income gap of Islamic banks exposes the Islamic finance system to higher financial risk. Consequently, policymakers should incentivize Islamic banks to turn the negative income gap into a positive income gap through imposing higher capital requirements on fixed-rate nominal assets using financing contracts such as but not limited to murabahah and ijarah.

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