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The Nexus between Rates of Return on Deposits of Islamic Banks and Interest Rates on Deposits of Conventional Banks in a Dual Banking System: A Cross Country Study

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ABSTRACT

The paper investigates the existence of a long-run relationship between conventional interest rates (IR) and rates of return on deposit of Islamic banks in the contemporary dual banking systems on a cross-country basis. The study employs autoregressive distributed lag (ARDL) modeling approach to cointegration analysis. The study finds the existence of the long run relationship between rates of return on deposits of Islamic banks and IR on deposits of conventional banks during the period 2007-2015. The study also finds a bidirectional causal relationship running between rates of return on deposits of Islamic banks and conventional IR. The study statistically provides empirical insight into the relationship between the rate of return on deposits of Islamic banks and the conventional IR on a cross-country basis using an ARDL model.

Keywords: Dual Banking, Co-integration, Autoregressive Distributed Lag, Malaysia, Indonesia, Bahrain
JEL Classification: G2

1. INTRODUCTION

Islamic financial system, given its ethical value propositions, is considered a more equitable alternative to the conventional financial system. It proposes risk and reward sharing system among the stakeholders as against risk-transfer system of the conventional financial system. This proposition is aptly captured in the axiom Al - ghunm bil ghurm (i.e., one is entitled to gain only if he assumes responsibility for risk) and also Al-kharaj bil dhaman (i.e., the gain must accompany liability for loss) (ISRA, 2013). This fundamental concept of Islamic finance underlines the principles of justice, fairness, and equity between surplus units and deficit units of financial markets. These principles explain the prohibition of interest as a "price" in economic and financial transactions under Sharia. However, there have been concerns towards the practice of Islamic Financial Institutions (IFIs) benchmarking many of their financial services on the conventional interest rates (IR). This is considered as being paradoxical to a genuine spirit

of the prohibition of IR under Sharia. El-Gamal (2003) observes that the bulk of Islamic financial services are benchmarked on IR such as London inter-bank offer rate. This becomes an issue of great concern as most Muslim deposit customers of Islamic banks keep their monies with Islamic banks to screen their wealth from the effects of IR. The concern is further reinforced by the saying of the Prophet (may peace be upon him) as reported by Abu Sa'id al-Khudri who reported Allah's Messenger (PBUH) as saying: "You would tread the same path as was trodden by those before you inch by inch and step by step so much so that if they had entered into the hole of the lizard, you would follow them in this also" Sahih Muslim: Book 34, (6448). Chong and Liu (2009) in their study on the rate of return (ROR) risk of Islamic financing in Malaysia concluded that Islamic banking system in Malaysia is not very different from the conventional banking system. This has been raising questions on the inherent capability of Islamic financial system as being a better alternative to the conventional financial system.

IFIs in dual banking systems such as in Malaysia, Indonesia, and Bahrain operate within the same economic and financial environments as their conventional counterparts. These operating environments are usually not structured by Islamic economic and financial norms and values. The IFIs therefore, have to compete not only among themselves but also with other conventional financial institutions. Given the reality of their operating environments and exigency of overriding business interest, IFIs undertake some financial services with reward systems akin to conventional services such as taking a deposit from customers and reward them in like manner as deposit customers in conventional banking system. Even though IFSA 2013 (Islamic Financial Services Act, 2013) in Malaysia has introduced some fundamental changes in the treatment of customers' investment deposit accounts in Islamic banks' balance sheet, it is imperative to investigate the relationship between the conventional IR and ROR on deposit of Islamic banks.

Asmadi and Zairani (2015. p. 25) espousing the position of Sharia on the issue of IR in Islamic financial transactions state that "An important feature of IFIs is that in line with the prohibition of payment and receipt of a fixed or pre-determined rate of interest, the ROR is not known and is not fixed. The ROR can be determined only ex-post or by the actual profit accrued from real sector activities." This presupposes that ROR on Islamic bank deposit which could only be determined ex-post should not have a relationship with the conventional IR which is usually predetermined. The prohibition of payment and receipt of the IR as captured above is anchored on the warning from Allah; see (Qur'an 2: 278-279). However, a number of studies have shown that countries like Malaysia and Turkey where both conventional and Islamic banking systems coexist, IR, albeit indirectly, influences the behavior of IFIs (Haron and Ahmad, 2000; Obiyathulla, 2004, 2008; Kaleem and Md Isa, 2008; Zainol and Kassim, 2012; Anuar et al., 2014; Ergec and Kaytanci, 2014).

The objective of the paper is to investigate the existence of a long run associations between conventional banks' deposit IR and rates of return on deposit of Islamic banks in the contemporary dual banking systems as is the case in Malaysia, Indonesia, and Bahrain. The study employs autoregressive distributed lag (ARDL) model to investigate the existence or otherwise of long run association between conventional IR and ROR on deposit of Islamic banks.

The paper is divided into five sections. Section one gives a brief introduction and followed by a review of the existing literature. The third section discusses the methodology while the fourth section shows the data analysis. The final section summarizes the main findings and concludes the paper.

2. LITERATURE REVIEW

Haron and Ahmad (2000) in their study of the effects of conventional IR and rate of profit on funds deposited with Islamic banking system in Malaysia find a negative relationship between the IR of conventional banks and the interest-free deposits in Islamic banks in Malaysia. This means that when conventional IR rises, deposit size of Islamic banks tends to fall. The study

adopted the adaptive expectation model to measure the effects of rate of profit declared by Islamic banks on deposits placed by their customers.

Obiyathulla (2004) concludes that though, Islamic banks operate on interest-free principles, the economic environment in a dual banking system inevitably exposes them to the problems of IR risk the way it affects the conventional banks. It was found that despite the fact that Islamic banks and conventional banks operate under different laws in Malaysia, there appears to be the interaction of forces between the two systems (Obiyathulla, 2008; Zainol and Kassim, 2012). Obiyathulla (2004) finds that a dual banking system such as in Malaysia provides an avenue for linkage and arbitrage between the two banking systems which are usually exploited particularly by non - Muslim customers who operate without hindrance in the two segments of the nation's financial market. Similarly, Cevik and Charap (2011) investigated the behavior of conventional and Islamic bank deposit returns in Malaysia and Turkey and found that between January 1997 and August 2010, the correlation between conventional bank deposit rates and Islamic banks' deposit rates of return were as high as 91% for Malaysia and 92% for Turkey. The study provides evidence that changes in Islamic banks' deposit rates of return are caused by changes in conventional bank deposit rates.

Kaleem and Md Isa (2008) in their study of the impact of fluctuation of the conventional IR on Islamic term deposit ROR confirm the relationship between conventional IR and ROR paid by Islamic banks on their deposit accounts. The study uses the interest offered by commercial banks, finance companies, and merchant banks. The study concludes that conventional deposit IR Granger causes deposit profit rate of Islamic banks. The study was however limited to Malaysian banking operating environment.

Kasri and Kassim (2009) also investigated determinants of savings in the Islamic banks in Indonesia and found an inverse relationship between conventional IR and deposits of Islamic banks. This means that when IR rises the deposit of Islamic banks falls. This suggests that investment deposit account holders in Islamic banks are also utility maximizers and, therefore, can be influenced by changes in conventional IR in their investment decisions just like conventional banks' depositors.

Zainol and Kassim (2012) also find that Islamic banks are sensitive to changes in the conventional IR because many Islamic banks' products are benchmarked against the conventional IR. They further assert that volatility of the conventional IR affects Islamic banks' incomes as well as the value of the banks' assets and liabilities. The study concludes that IR movements could lead to depositors switching their accounts in banks.

Sanwari and Zakaria (2013) in their study of the sensitivity of Islamic banks to macroeconomic conditions conclude that Islamic banks are sensitive to movements in IR. The study affirms that Islamic banks, to retain their customers often, face displaced commercial risk. In this case, they have no alternative than to increase the profit payable on deposits of investment account holders when the market IR goes up.

The findings of Anuar et al. (2014) corroborate the results of many of the previous studies that profit rates of Islamic banks are significantly influenced by the IR of the conventional banks both in the short and long run. The study determines the existence or otherwise of association between profit rates of Islamic banks and IR of conventional banks in Malaysia. The study employs VAR order selection procedure and Johansen cointegration test to determine the existence of a long-run relationship between Islamic profit rates and conventional bank IR in Malaysia. It also uses Granger-causality test to determine the direction of causality between the variables. Their findings suggest that the actual practice of Islamic banks in the area of profit rate determination is at divergence with the principle of Islamic finance which is to a large extent by profit-loss sharing principle. Similarly, Ergec and Kaytanci (2014) found causality running from conventional deposit IR to the ROR on deposit of Turkish Islamic banks.

However, contrary to the studies asserting the influence of conventional IR on Islamic ROR, a study on Indonesia by Affandi and Tamanni (2010) finds that Islamic banking deposits are not sensitive to the IR as an instrument of monetary policy changes in Indonesia. Also in this line of the argument, Ariffin and Tafri (2014) provide evidence that IR has no influence on the operations and particularly the quality of the assets of the IFIs.

From the literature, it is observed that most studies are mostly focused on Malaysia, Turkey, and Indonesia. This study, therefore, aims at further expanding and enriching the literature on the association between conventional IR and ROR on deposit of Islamic banks by extending the investigation to cross country dual banking operating environments. This allows for a broader view of the effect of conventional IR on the ROR of Islamic bank deposits. This study also employs a sophisticated econometric technique, ARDL approach to cointegration introduced by Pesaran and Shin (1999) and Pesaran et al. (2001). ARDL approach to cointegration is considered to have a greater advantage over the other approaches to cointegration because it is applicable even if the variables are integrated of different orders and allows assignment of the various optimum lags to variables in determining cointegration (Raji et al., 2014). Cointegration exists only when there is truly a relationship linking two variables becomes overriding requirement for any economic model using non-stationary time series data (Asteriou and Hall, 2007).

3. METHODOLOGY

3.1. Data Collection and Analysis
The data for the study are made of IR on deposit of conventional banks, the ROR on deposit of Islamic banks, money supply, and inflation. The ROR on deposit of Islamic banks is the dependent variable; IR is the key explanatory variable while real money supply and inflation serve as control variables. The study uses ROR on 3-month tenor deposits of Islamic banks and the IR on 3-month tenor term deposits of conventional banks for Malaysia, Indonesia, and Bahrain. It employs quarterly data from 2007 to 2015. The data are obtained from the Monthly Statistical Bulletins and other reports of the Central Banks of each of these countries.

3.2. Model
The study employs ARDL approach to cointegration otherwise called bound test to determine the long run association between ROR on deposits of Islamic banks and rate of interest of conventional banks. ARDL was introduced by Pesara and Shin (1999) and Pesaran et al. (2001).

The study also employs Granger-causality test to determine the direction of the causal effect of the variables. The following general equation is presented:

$$Y_t = \mu + \sum_{i=1}^{n} \alpha_i Y_{t-i} + \sum_{i=0}^{m} \beta_i X_{t-i} + U_t \tag{1}$$

The ARDL involves two stages. The first stage is to investigate the existence of long-run relationship between the variables by computing the F-statistics. F-statistics test the joint significance of the parameters. The computed value of F-statistics is compared with the two bounds I(0) and I(1) critical values. The existence of cointegration is established if the computed F-statistics is greater than the upper bound critical value. On the other hand, if the value of F-statistics is lower than the lower bound critical value, non-existence of cointegration is therefore established. However, if the value of F-statistics falls between the two bound critical values, the result is inconclusive.

We move to the second stage to estimate both long run information and how much of the adjustment to the long equilibrium takes place in each period. At this juncture the coefficients of the long term relations are estimated and error correction model associated with the long-run estimates obtained. The rule is that ECM must have a significant probability value with a negative coefficient.

$$\Delta Y_t = \mu + \sum_{i=1}^{n-1} \alpha_i \Delta Y_{t-i} + \sum_{i=0}^{m-1} \Delta X_{t-i} - \pi e_{t-1} + \varepsilon_t \tag{2}$$

The model specification is given as follows:

$$\Delta ROR_t = \beta_0 + \sum_{i=1}^{n} \beta_1 \Delta ROR_{t-i} + \sum_{i=0}^{n} \beta_2 \Delta IR_{t-i} + \sum_{i=0}^{n} \beta_3 \Delta LRM_{t-i}$$
$$+ \sum_{i=0}^{n} \beta_4 \Delta INF_{t-i} + \alpha_1 ROR_{t-1} + \alpha_2 IR_{t-1} \tag{3}$$
$$+ \alpha_3 LRM_{t-1} + \alpha_4 INF_{t-1} + U_t$$

ROR is the ROR on 3-month deposit of Islamic banks while IR is the IR on 3-month term deposit of conventional banks. Liquidity risk management (LRM) is a natural logarithmic form of the real money supply. The money supply used in this study is M2. INF represents Inflation rate and β_0, β_1, β_2, β_3, β_4, β_5 and α_1 α_2 α_3; α_4 are Parameters. Δ stands for the first difference operator while u_t is the error term

3.3. Granger Causality Test
Once the existence of long run association (cointegration) has been established among the variables, we then investigated causality between them.

$$\Delta ROR_t = \beta_0 + \sum_{i=1}^{n}\beta_1 \Delta ROR_{t-i} + \sum_{i=0}^{n}\beta_2 \Delta IR_{t-i} + \sum_{i=0}^{n}\beta_3 \Delta LRM_{t-i} \quad (4)$$

$$+ \sum_{i=0}^{n}\beta_4 \Delta INF_{t-i} + \alpha_1 ECT_{t-1+} u_t$$

4. EMPIRICAL FINDINGS

Augmented Dicky Fuller (ADF) test was applied to test for unit root in each of the variables. Table 1 shows the result of unit root test for ROR, IR LRM and INF in Malaysia, Indonesia and Bahrain. For Malaysia, the result indicates that ROR, IR, and LRM are not stationary at level. The ADF statistics for each of the variables are lower than the critical values at 5% significance level. Therefore, the null hypothesis that the variables have unit root at level cannot be rejected. However, they became stationary at the first difference I(1) While INF became stationary at level. In the case of Indonesia, ROR, IR LRM, and INF all became stationary only at first difference. As for Bahrain, IR and LRM were found to be stationary at the level, I(0) while ROR and INF became stationary at first difference, I(1). The fact that the variables are integrated of different orders suggests ARDL as the appropriate approach to cointegration in this study.

4.1. Existence of Long Run Relationship between ROR and IR using ARDL Bound Test

Results of bound test showing the long run relationship (co-integration) between the variables in the models for Malaysia, Indonesia and Bahrain are presented in Table 2. The rule is that existence of cointegration is established if the computed F-statistics is greater than the upper bound critical value. On the other hand, if the F-statistics is lower than the lower bound critical value, non-the existence of cointegration is therefore established. However, if F-statistics falls between the two bound critical values, the result is inconclusive.

In Malaysia, the result shows a high level of cointegration among ROR on deposits of Islamic banks, IR on deposits of conventional banks, real money supply (LRM) and inflation (INF). For example, when ROR is used as the dependent variable with IR, LRM and

INF as explanatory variables, the F-statistics value is 20.3830 which is higher than the upper bound critical value 4.049 at 5%. This means that IR, LMS, and INF have an adamant long run relationship with ROR. Each of the explanatory variables is made to take a turn as the dependent variable to determine the level of cointegration. By considering IR as the dependent variable, the result also shows a long run relationship between IR and ROR with F-statistics value of 5.1446. Also, cointegration is observed when inflation takes turn as the dependent variable with an F-statistics value of 9.8333. However, for LRM, the F-statistics value of 3.7216 falls between lower and upper bound critical values at 95%. This suggests the existence of cointegration but not conclusive at this stage.

The long run relationship between ROR and IR in Indonesia is similar to the situation reported above for Malaysia. The bound test result reported for ROR with F-statistics value of 8.5065 is greater than the upper bound critical value 4.049 at 5%. The F-statistics for IR when it takes a turn as dependent variable gives a value of 6.8772 which is also greater than the upper bound critical value at 5% significance level. This shows the strong long run relationship between ROR and IR in Indonesia as well. The long run relationship between LRM as the dependent variable with ROR, IR, and INF as explanatory variables exhibit the same characteristics of no conclusive cointegration as was observed in Malaysia. The F-statistics is 3.6566 and falls between lower and upper bound critical values at 95%. By considering INF as the dependent variable, it gives a high level of cointegration with ROR, IR and LRM with an F-statistics value of 17.0740 greater than the Bound critical value of 4.049 at 95%.

Similarly, the result of the bound test for Bahrain also shows a significant relationship between ROR and IR. The values of F-statistics 4.4550 for ROR and 22.0840 for IR respectively present a long-run relationship between the variables. In contrast to the non-existence of cointegration among the variables in Malaysia and Indonesia when LRM took a turn as the dependent variable, there is evidence of the existence of cointegration among the variables in Bahrain when LRM takes a turn as the dependent variable.

Table 1: Unit root test

Country	Variable	Model type	Level		First difference	
			ADF	Critical value	ADF	Critical value
Malaysia	ROR	C	−2.013008	−2.951125	−7.948531	−3.639407***
	IR	C	−1.225073	−2.981038	−5.732306	−3.711457***
	LRM	C	−0.134921	−2.948404	−4.416923	−3.639407***
	INF	C	−3.569899	−2.951125**	-	-
Indonesia	ROR	C	−2.118298	−2.948404	−5.356607	−3.639407***
	IR	C	−2.123151	−2.951125	−4.507241	−3.639407***
	LRM	C	−1.461570	−2.967767	−3.326400	−2.967767**
	INF	C	−0.210758	−2.948404	−4.794961	−3.639407***
Bahrain	ROR	C	−2.37992	−2.97185	−7.05815	−3.689194***
	IR	C	−6.00621	−3.670170***	-	-
	LRM	C	−4.960197	−3.661661***	-	-
	INF	C	−0.373713	−2.960411	−3.68626	−3.670170***

** and *** represent the critical value at 5% and 1% level of significance respectively.

4.2. Granger Causality

The results of Granger causality tests between the variables for Malaysia, Indonesia, and Bahrain, are shown in Table 3. A significance level of the Chi-square value obtained from the Wald test on the lagged explanatory variables determines the existence of short-run causality running from one variable to the other. The t-statistics associated with the lagged ECT on the other hand determines the significance of the causal impacts in the long run. For Malaysia, the result shows both short and long run bidirectional causality running between IR and ROR. Over the short term, causality runs between the two variables.

Table 2: Result of bound test

F-statistics	Bound critical values					
	@ 90%		@ 95%		@ 99%	
	(0)	I (1)	I (0)	I (1)	I (0)	I (1)
	2.425	3.574	2.850	4.049	3.817	5.122

Malaysia
F_{ROR} [ROR|IR, LRM, INF] = 20.3830***
F_{IR} [IR|ROR, LRM, INF] = 5.1446**
F_{LRM} [LRM|ROR, IR, INF] = 3.7216*
F_{INF} [INF|ROR, IR, LRM] = 9.8333***
Indonesia
F_{ROR} [ROR|IR, LRM, INF] = 8.5065**
F_{IR} [IR|ROR, LRM, INF] = 6.8772***
F_{LRM} [LRM|ROR, IR, INF] = 3.6566**
F_{INF} [INF|ROR, IR, LRM] =17.0740***
Bahrain
F_{ROR} [ROR|IR, LRM, INF] = 4.4550**
F_{IR} [IR|ROR, LRM, INF] = 22.0840***
F_{LRM} [LRM|ROR, IR, INF] = 4.2741**
F_{INF} [INF|ROR, IR, LRM] = 2.7194*

***, ** and * represent 99%, 95% and 90% level of significance respectively

The Chi-square obtained from Wald test performed on IR when ROR is the dependent variable is 5.9496 and significant at 5%. The chi-square value for ROR when IR is the dependent variable is 26.3851 which is significant at 1%. This means that there is short run bidirectional causality running between ROR and IR. There is also long-run causality running between ROR and IR as the coefficient of ECT (−1) for ROR model is −0.87313 and that of IR model is −0.48814 which are significant at 5% and 1% respectively. ECT (−1) indicates the speed at which residuals adjust to the long run equilibrium. This therefore, means that in addition to the existence of a long-run relationship between ROR and IR, as confirmed by bound test, ROR and IR could granger-cause each other in Malaysian banking sector. This suggests that the players in both the Islamic and conventional segments of the Malaysian banking sector do respond to changes in IR and rates of return on the deposit accounts of the customers of each other. This means that deposit customers of banks in Islamic banking sector react to and are influenced by IR movements in the conventional segment of the banking sector. Similarly, deposit customers of banks in the conventional segment also respond to and are also influenced by the circulation of the ROR in the Islamic banking segment.

Similarly, the result of the short run and long run causality tests to determine the pairwise causal relationship between ROR, IR LRM and INF in Indonesia, as presented in Table 3 shows the same trend as in Malaysia. The short and long run causal relationship tests between ROR and IR in particular also show a bidirectional relationship running from ROR to IR as well as from ROR to IR.

Likewise Malaysia and Indonesia, the short and long run causal relationship between ROR and IR in Bahrain is also bidirectional. This is because, the Chi-square obtained from the Wald tests

Table 3: Result of granger causality between pair of variables

Dependent variable	ΔROR	ΔIR	ΔLRM	ΔINF	ECT(-1)
Malaysia ΔROR	--	5.9496**	1.2249	555.4174***	−0.87313**
		[0.015]	[0.268]	[0.000]	[−2.4001]
ΔIR	26.3851***	--	4.4897**	292.60351***	−0.48814***
	[0.000]		[0.034]	[0.000]	[−3.2831]
ΔLRM	2048.0***	3661.9***	--	4446.0***	−010752**
	[0.000]	[0.000]		[0.000]	[−2.5235]
ΔINF	23.2947***	5.8201**	0.15947	--	−0.70963***
	[0.000]	[0.016]	[0.690]		[−6.6637]
Indonesia ΔROR	--	4.5203**	0.020128	6.8210***	−0.49704***
		[0.033]	[0.887]	[0.009]	[−3.4965]
ΔIR	45.65061***	--	1.52731	33.3096***	−0.17907***
	[0.000]		[0.217]	[0.000]	[−3.2877]
ΔLRM	59.4115***	40.9071***	--	171.6460***	--
	[0.000]	[0.000]		[0.000]	
ΔINF	2.0734	6.2286**	4.9738**	--	−0.68603**
	[0.150]	[0.013]	[0.026]		[−2.6340]
Bahrain ΔROR	--	15.8128***	5.1246**	5.7668**	−0.76840***
		[0.000]	[0.024]	[0.016]	[−3.9624]
ΔIR	229.5835***	--	0.017875	1.2523	−0.93089***
	[0.000]		[0.894]	[0.263]	[−7.0692]
ΔLRM	10544.2***	1632.3***	--	8.6640***	−0.34009**
	[0.000]	[0.000]		[0.003]	[−2.4717]
ΔINF	49700.8***	5261.0***	77.3394***	--	--
	[0.000]	[0.000]	[0.000]		

Chi-square in [ ] and t-statistics in ( ) are reported for variables and ect (-1) respectively. ** and *** represent 5% and 1% significance levels respectively.

performed on the two variables are significant even, at 1% significance level. The result, therefore, establishes a solid causal relationship between ROR and IR in Malaysia, Indonesia and Bahrain both in the short and long run.

4.3. Diagnostic Tests

The study applies some diagnostic tests to ensure the models' fitness and stability. The diagnostic tests reported are in respect of the models in which ROR serve as the dependent variable for each of the countries as reported in Table 4. The results show that the models are free from serial correlation and heteroscedasticity. The models are also found to be fit and stable.

4.4. Model Stability Test

Cumulative sum of recursive residuals and the aggregate sum of the square of recursive residuals present how steady and fit models are. Cumulative sum of recursive residuals was proposed by Galpin and Hawkins (1984) to check the assumption of normality and other aspects of model misfits. A model is considered fit and stable if the graph is in between the two straight lines representing upper and lower bounds at the 5% significance level. The result of the cumulative sum of recursive residuals and the aggregate sum of the square of recursive residuals for the models for ROR-IR relationship in which ROR stands as the dependent variable are presented in Figure 1a and b for Malaysia, Figure 2a and b for Indonesia and Figure 3a and b for Bahrain.

Figures 1a and b confirm the fitness and stability of the model in which ROR is used as a dependent variable for Malaysia. This is borne out by having the graphs in between the two straight lines. We also observe the stability of a similar model for Indonesia. This is presented in Figure 2a and b.

The stability and fitness of the ROR model for Bahrain are also considered fit and stable as shown in Figure 3a and b.

5. CONCLUSION AND RECOMMENDATIONS

In this study, we investigate the existence of long run relationship (cointegration) between the ROR on deposits of Islamic banks and IR on term deposits of conventional banks in Malaysia, Indonesia and Bahrain using ARDL approach to cointegration. We find the existence of both short and long run relationships between rates of return on deposit of Islamic banks and IR on deposits of conventional banks during the period 2007-2015. We also find that causality runs between IR on deposits of conventional banks and ROR on deposits of Islamic banks in Malaysia, Indonesia, and Bahrain. This finding is in agreement with those reported

Figure 1: Malaysia. (a) Plot of cumulative sum of recursive residuals. (b) Plot of cumulative sum of squares of recursive residuals
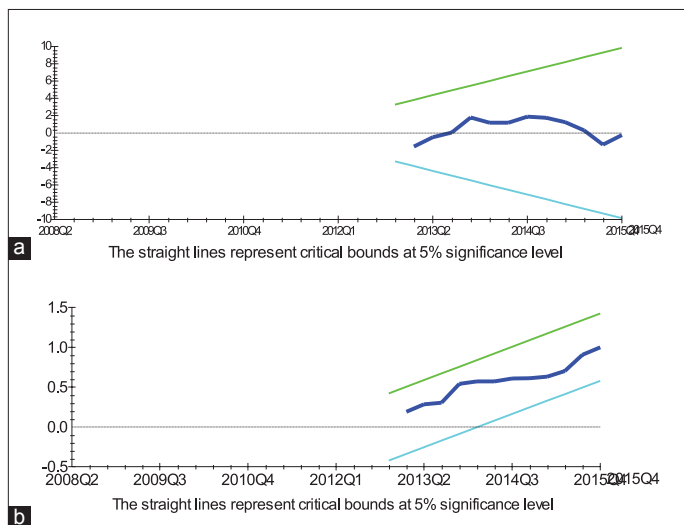

Figure 2: Indonesia. (a) Plot of cumulative sum of recursive residuals. (b) Plot of cumulative sum of squares of recursive residuals
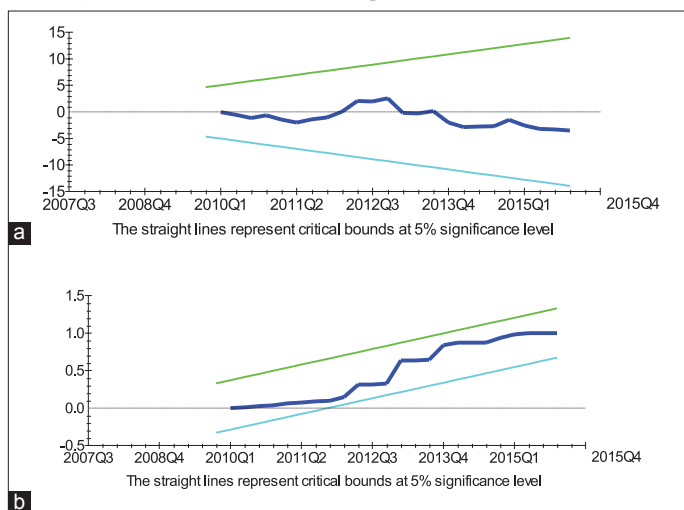

Figure 3: Bahrain. (a) Plot of cumulative sum of recursive residuals. (b) Plot of cumulative sum of squares of recursive residuals

Table 4: Diagnostic tests

Country	Test statistics	LM tests
Malaysia	Serial correlation	CHSQ (1) 1.7339 [0.188]
	Heteroscedasticity	CHSQ (1) 1.9019 [0.168]
Indonesia	Serial correlation	CHSQ (1) 2.6002 [0.107]
	Heteroscedasticity	CHSQ (1) 0.21760 [0.641]
Bahrain	Serial correlation	CHSQ (1) 0.059500 [0.807]
	Heteroscedasticity	CHSQ (1) 1.4766 [0.224]

The probability values are reported in the parenthesis [ ]
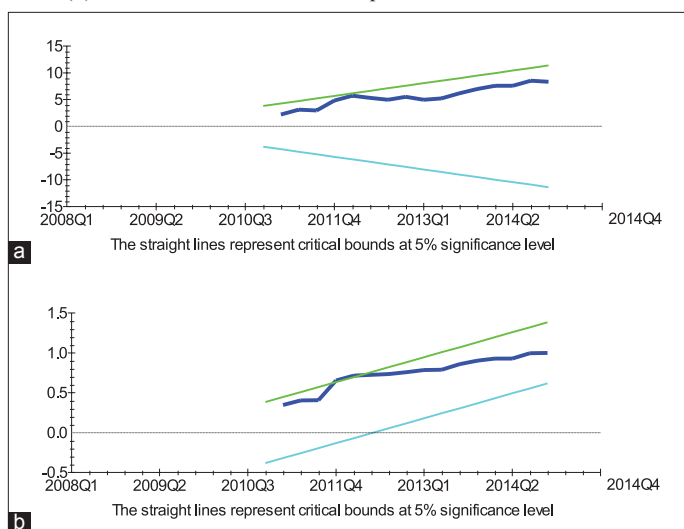
by (Obiyathulla, 2004, 2008; Haron and Azmi, 2008; Kasri and Kassim, 2009).

After more than three decades of impressive growth and development of Islamic financial system, there is a need for a paradigm shift from operational pragmatism to a truly Islamic finance by the true spirit of IR prohibition by Allah. There is, therefore, an urgent need to embark on intensive research on how to make profit and loss sharing (PLS) model of Islamic finance attractive in such a way that risks associated with information asymmetry could be minimized, and investors would find it profitable. Once the problems related to PLS are minimized, both IFIs and depositors would be certain of truly Islamic returns on their investments. Rates of return on deposits of Islamic banks would find their real levels which would in no doubt be at variance with the conventional IR at all times.

The results of this study are expected to contribute towards better understanding of the implications of continuing benchmarking Islamic banking services on conventional IR. This understanding is expected to stimulate increased efforts towards the search for alternative financial services that will not comply with Sharia requirements only in form but also in substance. The study has also further enriched the literature on the relationship between the ROR on deposits of Islamic banks and conventional IR in dual banking environments using a robust econometric technique.

REFERENCES

Affandi, A., Tamanni, L. (2010), Monetary policy shocks and Islamic bank deposits in Indonesia dual banking system after the financial crisis. (ICBE), 1, JFEKON.

Anuar, K., Mohamad, S., Shah, M.E. (2014), Are deposits and investment accounts in Islamic banks in Malaysia interest-free? JKAU Islamic Econ, 27(2), 27-55.

Ariffin, A.F., Tafri, F.H. (2014), International Conference on Business Sociology and Applied Sciences, Kuala Lumpur.

Asmadi, M.N., Zairani, Z. (2015), Islamic Banking Operations: Products and Services. Sintok: UUM Press.

Asteriou, D., Hall, S.G. (2007), Applied Econometrics. 2nd ed. Basingstoke: Palgrave Macmillan.

Cevik, S., Charap, J. (2011), The Behavior of Conventional and Islamic Bank Deposit Returns in Malaysia and Turkey. IMF Working Paper WP/11/156. International Monetary Fund.

Chong, B.S., Liu, M.H. (2009), Islamic banking: Interest-free or interest based? Pacific-Basin Finance Journal, 17(1), 125-144.

El Gamal, M. (2003), "Interest" and the paradox of contemporary Islamic law and finance. Fordham International Law Journal, 27(1), 108-149.

Ergec, E.H., Kaytanci, B.G. (2014), The causality between returns of interest-based banks and Islamic banks: The case of Turkey. International Journal of Islamic and Middle Eastern Finance and Management, 7(4), 443-456.

Galpin, J.S., Hawkins, D.M. (1984), The use of recursive residuals in checking model fit in linear regression. The American Statistician, 38(2), 94-105.

Haron, S., Azmi, W.N.W. (2008), Determinants of Islamic and Conventional Deposits in the Malaysian Banking System. Managerial Finance. 34 (9), 618-643.

Haron, S., Ahmad, N. (2000), The effects of conventional interest rates and rate of profit on funds deposited with Islamic banking in Malaysia. International Journal of Islamic Financial Services, 1(4), 1-7.

ISRA. (2013), Islamic Financial System: Principles & Operations. 2nd ed. Kuala Lumpur: International Shari'ah Research Academy for Islamic Finance.

Kaleem, A., Md Isa, M. (2003), Causal relationship between Islamic and conventional banking instruments in Malaysia. International Journal of Islamic Financial Services, 4(4), 2-4.

Kasri, R., Kassim, S.H. (2009), Empirical determinants of savings in the Islamic banking: Evidence from Indonesia. JKAU Islamic Econ, 22(2), 3-23.

Obiyathulla, I.B. (2004), Dual banking systems and interest rate risk for Islamic banks. The Journal of Accounting, Commerce, and Finance Islamic Perspective, 8(182), 1-42.

Obiyathulla, I.B. (2008), The Islamic interbank money market and dual banking system: The Malaysian experience. International Journal of Islamic and Middle Eastern Finance and Management, 1(3), 210-226.

Pesaran, M.H., Shin, Y. (1999), An autoregressive distributed lag modeling approach to cointegration analysis. In: Strom, S., editor. Paper Presented at Econometrics and Theory in the 20th Century: The Ragnar Frisch Centennial Symposium. Ch. 11. Cambridge: Cambridge University Press.

Pesaran, M.H., Shin, Y., Smith, R. (2001), Bound testing approach to the analysis of level relationships. Journal of Applied Econometrics, 16, 289-326.

Raji, J.O., Juzoh, J., Jatan, M. (2014), Real money supply, price and fiscal deficit in Nigeria: Evidence from multivariate Granger-causality tests. Journal of Economic Cooperation Development, 35(4), 85-112.

Hadith of the Prophet. Following the footsteps of the Jews. Sahih Muslim Book 34 (6448). Available from: www.Islamweb.net.

Sanwari, S.R., Zakaria, R.H. (2013), The performance of Islamic banks and macroeconomic conditions. ISRA - International Journal of Islamic Finance, 5(2), 83-98.

Zainol, Z., Kassim, S. (2012), A critical review of the literature on the rate of return - Risk in Islamic banks. Journal of Islamic Accounting and Business Research, 3(2), 121-137.