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## Article

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# Effect of interest rate on bank deposits: Evidences from Islamic and non-Islamic economies

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## Abstract

Banking sector is the backbone of any country's economy and bank deposits are the major tool of success for banking sector. Bank deposits are also a major part and determinant of country's saving. According to economic theories and practical considerations, interest rate is considered one of the major elements that can affect savings as well as bank deposits. But as we know that in Islam interest is considered forbidden and Muslims try to avoid interest income, so the basic purpose of this study is to know the fact that either religious factors have any effect on Muslim's decision while keeping their saving in banks. We used panel ARDL (Autoregressive Distributed Lag) method by using 23 non-Islamic and 23 Islamic countries data from 1999 to 2014 for this study. Results showed that in Islamic countries interest rate doesn't have any impact on bank deposits both in long run and short run. But in the case of non-Islamic countries interest rate has positive significant impact on bank deposits. Hence there is need of Islamic banks in countries with more Muslim population and there should be different economic policies for Islamic countries as religious factor affects decision of Muslims and interest rate doesn't have any impact on bank's deposits.

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**Keywords:** Interest rate; Bank deposits; Islamic; Panel data

## Introduction

Interest is an inseparable part of today's economic activities and it is also the main reason of fluctuation and hurdles in economic development because of interest rate money is considered as commodity rather than medium of exchange and it creates unequal distribution of wealth within the society as concentration of money remains in few hands hence rich becomes richest and poor becomes poorer (Farooq, 2012).

If we define interest rate then it is the amount of money that lender receives or borrower pays in excess of actual money or we can say it cost of capital.

However Islam is against all such practices of usury and riba. Riba is an Arabic word which means increase or addition. Allah Almighty as a creator of human beings wants peace and justice, In Holy Quran Allah clearly says:

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“O you who believe! Be mindful of God and give up what remains of al-riba if you are believers. If you do not do so, then receive a declaration of war from God and his Messenger. But if you repent, you shall have your capital sums (ru'us alamwal). You do not deal unjustly and you are not dealt with unjustly (2:278–279)”.

“God brings riba to destruction, but gives increase (yurbi) to sadaqah. God loves not anyone ungrateful and wicked. (2:276)”.

Prophet Muhammad (PBUH) in his last sermon eliminated this evil and denounced interest from society, Prophet said:

“All interest and usurious dues accruing from the times of ignorance stand wiped out. And the first amount of interest that I remit is that which Abbas ibn Abd-al Muttalib had to receive. Verily, it is remitted entirely.”

Interest rate affects all sectors of economy but it has a major impact on banking sector because they directly deal with money. Bank deposits are considered as major part of any country's saving and has major impact on any country's economic performance, bank deposits are defined as the amount of money that a customer of bank keeps in his account either in form of cash, cheque or sent through a wire transfer. In return bank pays some amount of interest according to prevalent rate to the customer. The basic purpose for this study was to investigate the impact of interest rate on banking sector's deposits. As deposits are back bone of banking sector, interest rate is an effective tool to attract customers. In this study we tried to investigate the fact that in countries where Muslim population is in majority, what is the response of Muslims towards interest rate while depositing their money in to any bank. Whether they considered interest income while depositing or their purpose of keeping money in banks is just for business or saving purpose not for earning interest income.

Bank deposit is a type of saving hence all theories related to saving will be true for banks deposits. As interest rate is prohibited in Islam so Muslims should not consider interest rate as a major factor while placing their money in any place for saving purpose that's why there should be a big different between Muslims and non-Muslims behavior towards interest rate. Muslims savings in bank should not be affected by interest rate so by doing this study we want to see that either Muslims considers interest rate as an important factor which affect their savings in banks or the purpose of keeping their money in banks is just for saving purpose and not for earning interest income. We are expecting insignificant effect of interest rate on bank deposits in Muslim countries however positive significant effect in non-Muslim countries.

This study is conducted by using panel data after categorizing countries into Muslims and non-Muslims on the basis of population by religion. We used banks deposits to GDP (%) as proxy of banks deposits.

In literature there are many studies about significance of Islamic banks, their comparison with conventional banks, and their deposit determinants etc., but this is the first study which considered effect of Muslims religious factor on their decision of depositing money in banks. As interest is forbidden in Islam, so Muslims deposits should not effect by interest rate fluctuations.

Mushtaq and Siddiqui (2016) did study on same concept using GMM and Random effect model but their study was about real interest rate, saving and investment relationship in the presence of other independent variables but in this study we are only considering relationship between interest rate and bank deposits without any other variable, and also studying long term and short term relationship between interest rate and bank deposits in Muslim populated and Non-Muslim populated countries groups separately which was not considered before in literature by any researcher.

The organization of paper is Section 1: introduction, Section 2: review of literature, Section 3: empirical analyses and Section 4 conclusion and recommendation.

## Review of literature

Interest rate is a function of saving according to classical economist. There are two effects of interest rate on saving, income effect leads to inverse relationship between interest rate and saving and substitution effects leads to direct relationship between interest rate and saving. Usually substitution effect dominates the income effect so we are expecting positive relationship between interest rate and bank deposits.

Keynes (1936) described saving as remaining part of income after consumptions but Jalaluddin (1992) defines saving is not just remaining part of income but according to him there is some social and ethical values that are

attached with saving. The purpose of Muslim's saving can be because of certain responsibilities toward Allah, family and for himself.

Although economic literature is rich with saving and interest rate relationship and there are a lot of studies available about different aspects of saving and its determinants in economic literature but there are very few studies that covers bank deposits and interest rate relationship.

According to [Tariq and Masih \(2016\)](#) interest rate doesn't have any significant impact on level of risk based Islamic bank deposits.

[Hassan et al. \(2016\)](#) did study in Nigeria which is a Muslim populated country and concluded that interest rate does not have any significant impact on commercial bank's deposits in Nigeria.

According to [Mobin and Masih \(2014\)](#) religious beliefs can have a significant impact on banking related decisions of Muslim customers.

[Kassim, Majid and Yosuf \(2009\)](#) did study in Malaysia and concluded that Islamic banks are more stable as compare to conventional banks because they are not affected by interest rate.

[Mushtaq and Siddiqui \(2016\)](#) studies interest rate impact on saving and investment in 17 Islamic and 17 non-Islamic countries. They concluded that interest rate has positive insignificant impact on saving in case of Islamic countries while it has positive significant relationship with saving in case of non-Islamic countries. Furthermore they suggested that there is a need of different policies for Islamic countries because people's religious factor affects the relationship between interest rate and saving in Islamic countries because according to Muslim's religion interest rate is forbidden.

[Hakan and Gulumser \(2011\)](#) conducted research in Turkey “impact of interest rate on Islamic and conventional Banks” and concluded that changes in interest rate will impact both conventional and Islamic banks.

Some researchers found positive relationship between saving and interest rate some studies are discussed below:

[Loayza and Shankar \(2000\)](#) concluded that there is positive effect of real interest rate, Per capita income and the share of agriculture in GDP on saving and there is negative effect of financial development, inflation and dependency ratio on saving in India.

[Athukorala and Tsai \(2003\)](#) concluded that inflation has negative impact on saving while rate of interest has positive effect on saving.

[Nathanael and Eriemo \(2014\)](#) found that interest rate and previous price level have positive significant impact on bank deposits in Nigeria.

[Ojeaga et al. \(2013\)](#) concluded that interest rate and income has strong positive impact on bank deposits in Nigerian Banking sector.

[Ostadi and Sarlak \(2014\)](#), studied that interest rate and money supply positively and significantly impact bank deposits however inflation have significant negative impact on bank deposits.

[Mashamba et al. \(2014\)](#), found positive relationship between deposit interest rate and bank deposits in Zimbabwe.

However according to some researchers there is inverse relationship between saving and interest rate and they discussed this relationship in their studies.

[Sukmana and Kassim \(2010\)](#) studies that any shock in interest rate will negatively impact the Islamic bank's deposit.

[Haron and Azmi \(2006\)](#) work on deposit determinants of commercial banks in Malaysia. They used co integration technique. They concluded that rate of profit of Islamic bank, rate of interest on deposits; Base lending rate, Kuala Lumpur Composite Index, Consumer Price Index, Money supply and Gross Domestic Product have significant impact on deposits. They further determined that return on deposit and inflation has negative impact on bank deposits. While composite index and money supply have positive impact on bank deposits.

[Orji Anthony \(2012\)](#) concluded that there is positive impact of GDP per capita, Financial Deepening, Interest rate spread on the size of private domestic saving and negative impact of Real interest rate and inflation rate on the size of private domestic saving. They also concluded that there is positive relationship between the lagged value of total private saving, private sector credit, public sector credit, interest rate spread, exchange rates and economic growth. They suggested that government should take step to reduce unemployment rate in Nigeria and try to increase saving in order to enhance economic growth in the country.

[Siaw and Lawer \(2015\)](#) did study on determinants of bank deposits in Ghana and concluded that in long run deposit interest rate, inflation has negative impact on bank deposits however growth in money supply has positive

impact. But in short run both inflation and growth in money supply has significant negative impact in determining bank's deposits.

Muhammad, Khizer and Shama (2011) found negative impact of inflation and base lending rates on bank deposits.

So there is combination of different views about interest rate and deposits or saving relationship in the economic literature.

Table 1  
Results of Panel Unit Root Test.

Test		Islamic countries			Non-Islamic countries		
		Bank's deposits		Real interest rate	Bank's deposits		Real interest rate
		Level	1st differenced	level	level	1st differenced	Level
Levin, lin and chu	Individual effect	-1.16 (0.12)	-13.23 (0.00)	-10.96 (0.00)	-1.21 (0.11)	-7.34 (0.00)	-11.11 (0.00)
	Ind. effect and trend	-4.01 (0.00)	-11.75 (0.00)	-11.70 (0.00)	-3.84 (0.00)	-7.65 (0.00)	-13.90 (0.00)
	None	4.02 (1.00)	-13.37 (0.00)	-6.15 (0.00)	5.03 (1.00)	-9.07 (0.00)	-5.59 (0.00)
Im, Pesaran and Shin W-Stat	Individual effect	1.80 (0.96)	-10.24 (0.00)	-9.74 (0.00)	0.79 (0.78)	-5.85 (0.00)	-8.97 (0.00)
	Ind. effect and trend	-1.32 (0.09)	-7.79 (0.00)	-7.65 (0.00)	-1.14 (0.12)	-3.94 (0.00)	-8.44 (0.00)
	None						
ADF-Fisher Chi-Square	Individual effect	41.13 (0.67)	180.20 (0.00)	176.91 (0.00)	60.17 (0.07)	112.27 (0.00)	169.91 (0.00)
	Ind. effect and trend	60.82 (0.07)	137.44 (0.00)	140.53 (0.00)	60.38 (0.07)	85.82 (0.00)	146.85 (0.00)
	None	24.10 (0.99)	245.57 (0.00)	207.88 (0.00)	9.45 (1.00)	190.04 (0.00)	117.30 (0.00)
PP-Fisher Chi-Square	Individual effect	42.78 (0.61)	165.57 (0.00)	207.14 (0.00)	67.89 (0.01)	125.40 (0.00)	186.69 (0.00)
	Ind. effect and trend	35.81 (0.86)	145.69 (0.00)	190.89 (0.00)	44.47 (0.53)	102.49 (0.00)	148.46 (0.00)
	None	23.01 (0.99)	242.13 (0.00)	226.28 (0.00)	7.57 (1.00)	196.08 (0.00)	153.04 (0.00)

## Empirical analysis

The basic purpose of this study was to know the impact of interest rate on bank's deposits in Muslim countries and compare results with non-Muslim countries as there should be different behavior of Muslims towards interest rate while depositing their money as compare to non-Muslims because of religious restrictions. We used Panel ARDL model for Islamic and non-Islamic countries separately.

The subsections of this section include data and Methodology Framework, Unit Root Test, Panel ARDL and Results and Discussion.

### *Data and methodology framework*

Panel data of 23 Muslim and 23 Non-Muslim countries (list of countries are in [Appendix](#)) from the year 1999 to 2014 have been used for real interest rate annual % AND Bank deposit % of GDP in this study. Country with more than 61% of Muslim population has been categorized as Muslim country however Muslim countries in this study has average 80–90% Muslim population. For consistency World Bank income level classification of countries have been used and countries have been selected from all income levels such as high income, upper middle, lower middle and lower income. So it is expected that our data will represent all countries.

Data was collected from [World Bank Development Indicators \(WDI\) \(various issues\)](#). Data unavailability for few countries especially Islamic countries having sizable Muslim population and for earlier years was a big limitation for this study. Due to this limitation we dropped out many Muslim countries. Furthermore because of this our data spans the years 1999 to 2014.

### *Unit Root Test*

We started by checking the stationary properties of data. The panel unit root summary test shows that real interest rate data is stationary at level however Bank deposits data series is non-stationary at level but after first differencing it becomes stationary and none of the data series is integrated of order 1(2). So we can use ARDL method to check long term and short term relationship between the variables with error correction term because both variables are integrated at different order of stationary.

The results of panel unit root summary test are in [Table 1](#).

### *Panel ARDL*

Panel ARDL is superior to conventional panel co-integration method to analyze short and long run relationship among variables.

[Pesaran, Shin and Smith \(1997, 1999\)](#) generated new techniques that are PMG, MG and DFE, these techniques assumes that across countries there are heterogeneous parameters.

[Pesaran and Smith \(1995\)](#) developed Mean group method, which allows heterogeneity for all parameters. It estimates individual regression for each country and computes averages of country-specific estimated coefficients for all countries through ARDL method which is as under

$$Y = \phi_i + \phi_i Y_i, \quad t + \gamma_i X_i, t + \epsilon_{it} \dots \dots \dots (1)$$

where  $i$ , is countries sign i.e.  $i = 1, 2, \dots, N$ , and  $i$ th country long run parameter is

$$\theta_i = \frac{\gamma_i}{\phi_i} \dots \dots \dots (2)$$

Furthermore, In Mean group approach we analyzes heterogeneous coefficients in long run and short run. However large dimension of data is needed for consistency of MG approach. In long run this approach provides consistent estimator, even the regressors have 1(1) integration level ([Pesaran et al., 1999](#)). Following equation can compute MG

estimator for panel data.

$$\theta_i = \frac{1}{N} \sum_{i=1}^N \theta_i \dots \dots \dots (3)$$

Pesaran et al. (1999) also developed PMG approach, which assumes slopes coefficients in short run including speed of adjustment and intercepts which differs across countries.

Another methodology named Dynamic Fixed effect assumes homogeneity in long run for all slop coefficients. In short run DFE permits the speed of adjustment and coefficients to be similar. However DFE allows different intercepts across groups.

Equation for the unrestricted ARDL can be as under:

$$Y_{it} = \sum_{j=1}^m \psi_{ij} Y_{i,t-j} + \sum_{j=0}^m \gamma_{ij} X_{i,t-j} + \mathcal{U}_i + \varepsilon_{it} \dots \dots (4)$$

where  $X_{i,t-j}$  is explanatory variable's vector for group  $i$ ,  $\mathcal{U}_i$  denotes fixed effects.  $M$  and  $n$  are lags which vary across countries because of unbalanced panels. For VECM system, we can write above model as:

$$\Delta Y_{it} = \theta_i(Y_{i,t-1} - \delta X_{i,t-1}) + \sum_{j=1}^{m-1} \psi_{ij} \Delta Y_{i,t-j} + \sum_{j=0}^{n-1} \gamma_{ij} X_{i,t-j} + \mathcal{U}_i + \varepsilon_{it} \dots \dots (5)$$

where,  $\delta$  is long run parameters;  $\theta_i$  are parameters of correction.  $Y$  is dependent variable which is bank deposits % of GDP while  $X$  is independent variable which is real interest rate annual %.  $\psi$  and  $\gamma$  are short run coefficients. Furthermore,  $\theta_i$  is long run equilibrium speed of adjustment,  $i$  show countries and  $t$  is for time periods. The parameters on right side of parenthesis are short run dynamics and parameters in the parenthesis are long run dynamics.

We have used MG, PMG and DFE approaches and Hausman test have been performed to select the appropriate methodology among MG, PMG and DFE.

Table 2  
Results of Panel ARDL estimation.

Variables	Islamic countries			Non-Islamic countries		
	PMG	MG	DFE	PMG	MG	DFE
<b>Long Run</b>						
<b>RIR</b>	2.41 (0.00)	0.37 (0.71)	1.16 (0.00)	0.07 (0.00)	-0.29 (0.08)	0.39 (0.05)
<b>Hausman Test</b>	3.71 <sup>a</sup> (0.045)	5.80 <sup>b</sup> (0.02)	2.87 <sup>c</sup> (0.04)	0.03 <sup>a</sup> (0.85)	5.71 <sup>b</sup> (0.01)	0.25 <sup>c</sup> (0.62)
<b>Short Run</b>						
<b>RIR</b>	0.03 (0.64)	0.02 (0.68)	0.01 (0.83)	0.06 (0.11)	0.09 (0.11)	0.03 (0.02)
<b>ECT</b>	-0.11 (0.00)	-0.11 (0.00)	-0.22 (0.00)	-0.17 (0.00)	-0.18 (0.00)	-0.08 (0.00)
<b>Constant</b>	7.96 (0.00)	4.33 (0.04)	10.45 (0.00)	6.21 (0.00)	7.79 (0.00)	3.47 (0.00)

Note: values in parenthesis are probability values. All tests of MG, PMG and DFE have been performed in stata. For all variables lag structure used in ARDL is (1). Hausman Test has been performed to check preferred efficient estimator over others.

<sup>a</sup>PMG is efficient estimator than MG under null hypothesis.

<sup>b</sup>PMG is efficient estimator than DFE under null hypothesis.

<sup>c</sup>DFE is efficient estimator than MG under null hypothesis.



## Results and discussion

The results of MG, PMG and DFE models have been reported in [Table 2](#).

The results shows that in non-Islamic countries real interest rate has positive and significant impact on bank's deposits both in long run and short run however in Islamic countries real interest rate has positive insignificant impact on bank's deposits in short run and long run.

In order to select appropriate model among MG, PMG and DFE models Hausman test was performed which confirms that DFE model is more efficient and consistent over MG and PMG in case of non-Islamic countries, and MG model is efficient over PMG and DFE in case of Islamic countries.

Value of ECT is significant and negative shows that equilibrium convergence is higher.

## Conclusion and recommendation

This study conclude that interest rate which is forbidden in Islam have significant positive impact on banks deposits in non-Muslim countries both in long run and short run, however in Muslim countries because of religious restriction on interest rate in long run and short run people don't care about increase or decrease in interest rate while depositing in banks. This result is similar to [Hassan et al. \(2016\)](#), they concluded interest rate have insignificant effect on commercial bank's deposits and [Mushtaq and Siddiqui \(2016\)](#), they concluded interest rate have insignificant effect on saving in Islamic countries while significant positive impact on saving in non-Islamic countries. But no one considered long run and short run impact of interest rate on saving or bank deposits this study covers this aspect.

So there is need of Islamic banks in countries where Muslim population is in majority because people although putting their saving in conventional banks but their savings are insensitive of interest rate variations meaning that they keeps their money in banks only for saving or for precautions against any uncertain condition or for future need and not for the purpose of earning through interest income. This result is consistent with [Mobin and Masih \(2014\)](#) opinion which says religious beliefs can effect banking related decisions of Muslim customers.

Moreover government of Muslim countries should not consider interest rate as an important determinant of bank's deposits in policies and should make policies to develop Islamic banking within the economy by considering the need of Muslims depositing behavior.

On the other hand policy makers of non-Muslim countries should try to increase real interest rate by making favorable economic policies in order to increase bank's deposits in non-Muslim countries.

### *Limitation and scope for future research*

This study opens the new door for future research on the topic population's religious factor impact on the economic decisions. This concept can be expanded by adding new variables, with different countries set or with different time frame. But data unavailability for certain variables, countries and for certain years poses a major hurdle for research in this topic.

## Annexures

### *Countries List: (Appendix 1)*

#### *Lists of 23 non-Muslim countries used in this study*

Angola, Antigua and Barbuda, Armenia, Australia, Belarus, Bolivia, Botswana, Brazil, Bulgaria, Burundi, Chile, China, Colombia, Costa Rica, Czech Republic, Estonia, Georgia, Guatemala, Haiti, Kenya, Madagascar, Malawi, Uganda.

#### *List of 23 Muslim countries used in this study: (Muslim population is more than 61% of total population)*

Albania, Algeria, Azerbaijan, Bahrain, Bangladesh, Brunei Darussalam, Comoros, Djibouti, Egypt Arab Rep., Indonesia, Jordan, Kuwait, Kyrgyz Republic, Lebanon, Libya, Malaysia, Maldives, Oman, Qatar, Sierra Leone, Tajikistan, Gambia The, Yemen, Rep.



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