

Determinants of Depositors Behavior with Respect to Liquidity Risk Management in Islamic Banks of Pakistan

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Abstract

The determination of liquidity behavior of the depositors in order to control liquidity risk is considered vital therefore to analyze the depositors liquidity behavior is the aim of the study. The main concern of Islamic banks is the mismatch of deposits and withdrawals often called liquidity risk. The mismatch of liquidity is due to certain factors. These factors are dealt in the liability model that is primarily concerned with behavior of depositors for deposits and withdrawals. Therefore the liability model is adapted. The variable used was total Islamic deposits as dependent variable, and operational financing income, Return Sharing to Depositors Banking Operations costs, and Islamic deposits total lag were independent variables. The secondary data is collected from the annual income statements and balance sheets of Islamic banks from the year 2006-2015. Secondary data was used and different statistical tests were applied for examining the results. These were the descriptive i.e. S. deviation, Mode, Median, skewness and mean. In addition to that Fixed effect and Random effect was used for calculations of simple and multiple regressions. Diagnostic tests: Durbin- Watson Statistics, Hausman test, and cross dependence test are also used for ensuring accuracy of results. The findings indicate that the Islamic banks should enhance the return sharing that will draw more depositors to deposit in the bank as return sharing paid to depositors has positive effect on deposits. Secondly Islamic bank deposits can be increased from more investments in operational financing. Other factors that lead to increase in the deposits will be the customer referrals and satisfaction.

Keywords: Financial markets, Liquidity risk, Islamic banking, Liquidity reserves.

Introduction

Capitalization and entrepreneurship are the two major factors of production. Capitalists are usually entitled for the interest that is risk free and entrepreneur is entitled to earn profit. Hence Pakistani economy is based on two vital schools of thought i.e. Islamic and capitalist. The Islamic perspective is that the equity owner invests capital in some business and earns profits

along with risks of losses. The capitalistic schools of thoughts prefer fixed deposit and fixed mark-up i.e. interest. Therefore Islamic banks deals in Islamic economy where the investor receive reward in the form of profits and bears all losses as well whereas commercial banks deals with the capitalist economy in which the reward is awarded in the form of interest (riba). According to State Bank of Pakistan report (2011-2012) there are 574 full-fledged Islamic banks and 300 stand-alone branches in Pakistan. These stand-alone branches and full-fledged Islamic banks facilitate the fund management and potential investments for the regular and potential customers of Islamic Banks (Saeed, 2011).

The development of Islamic banking industry (IBI) was smooth from 2003 – 2015, both assets and deposits consequently increasing. Assets of IBI are increased by 1% - 11.3% from year 2003 – 2015. Also the deposits of IBI grew by 1% - 12.8% from 2003 – 2015. In 2003 the deposits were about 8 billion but in 2015 this amount was improved to 1281 billion rupees. At the same time investment financing of IBI improved by 1% - 10.2% from 2003 – 2015. It was 10 billion in 2003 but it increase to 891 billion in 2015.

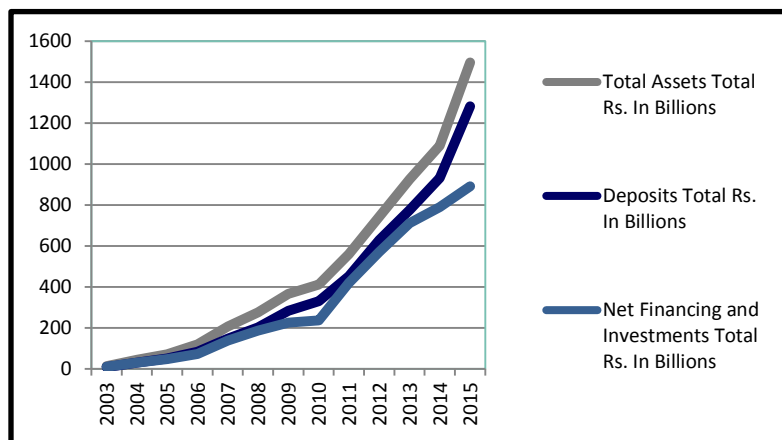


Figure 1. Islamic Banking Industry Trend.

Therefore, as the Islamic banking industry has developed robustly during the years, so according to Ismal (2010) the need for improved liquidity risk management is imminent. The main objective of the index study is to critically evaluate the liquidity behavior of Islamic bank depositors of Pakistan. The main obstacle in this type of study is the liquidity risk. Therefore, the significance lies in the factors affecting liquidity risk, analysis of liquidity behavior of customers, examination of the liquidity management system of Pakistani Islamic banks and consequent reduction of liquidity risk.

Literature Review

The Origin of Liquidity Risk in Banks

To understand the basics of liquidity risk, we can comply with the definition given by Ismal (2010) which states clearly that management of liquidity risk is a situation when the bank cannot fulfill the money demands of its customers or is unable to invest into its due assets except sustaining heavy losses. According to Hubbard (2002) this is a situation when all the depositors of the bank want to extract their money at one time and the bank fails to provide cash in the

required time period. Similarly, banks can also undergo situations when the borrowers do not pay back their loans in the proper time. Therefore, liquidity risk arises from the liability side of banks, when customers need their cash paid, or the assets side of banks when borrowers are unable to pay back their financial loans. According to Thakor (1996), the problems regarding liquidity are of two types – first when the borrower is unable to pay back when the bank wishes to terminate his loan, second when the bank is unable to return the cash deposited by its customer at the proper time.

Referring to the explanation provided by Zhu (2001), two kinds of situational gaps can arise in banking sector. As banks receive the liquid cash from liability side and invest that cash in long term assets, gaps occur firstly during cash demands of depositors and secondly during the asset side money attainment from the borrowers. The guidelines to overcome these gaps have been defined and liquidity risk arises when a bank is unable to minimize this gap. This liquidity related mismanagement can damage the reputation of the index bank and government bailouts. Both internal and external factors can be responsible for the liquidity related issues.

Asset Liability and Maturity Mismatches

Liquidity risk can occur in two situations – either the banks have increasing the cash flows in relation to liabilities or the liquid resources needed at asset side are more than the resources available at the liability side (Helmen *et al.*, 1994). Therefore these are the two main causes of liquidity risk, one being maturity mismatch and second is asset liability imbalance. Proper recognition and timely management of these two situations can subsequently reduce the liquidity risk of a bank. According to Sharma (2004) this can control the funds liquidity risk (when a bank arranges for cash for a depositor with withdrawal demand) and the marketing liquidity risk (when because of any issue in the economic structure, a liquid asset turns less liquid in nature).

Factors affecting the asset-liability imbalance and maturity mismatch risks

As mentioned before, the maturity mismatches and asset liability imbalance can prove to be problematic for the liquidity management system of banks. The first factor affecting these risks is when the depositors tend to create more current accounts or take the option for short timing cash deposits. The banks which rely on these short term current deposits can suffer from financial break down due to liquidity risks (Bleakley & Cowan, 2004). This occurs because when the banks receive more current deposits, they have to invest some of this cash to long term projects. This creates maturity mismatch or asset liability imbalance (Sharma, 2004). The second important factor is increase in the rates on cash deposits which brings in more depositors to further raise the rates. This process works up till no financial declines occur but if it does occur, the business breaks down as the borrowers become unable to return the loans. This obstructs the cash flow of banks and the banks fail to return cash to the depositors. In this way banks face serious cash and liquidity issues or return back to the main money markets to obtain funds.

The third main determinant of the maturity mismatch and the asset liability imbalance is when banks suffer from liquidity problems due to sudden cash withdrawal demand of the short term depositors of the corporate sector. This requirement of the depositors is their right but this creates financial pressure on the bank when a large cash amount is taken collectively from the bank. The fourth determinant has been elaborated by Greenbaum and Thakor (2015) and it is about the difficult situation which arises when there is an information imbalance between the different stakeholders of banks i.e. borrowers, depositor or regulators. In this scenario, every

stakeholder has an individual demand and it becomes difficult for the bank to predict it and fulfill it in the required time period. May be a depositor wants to withdraw cash and the bank needs to invest that cash and this creates mismanagement of liquidity. Furthermore this can incur imbalance between the stakeholders and the banks which ultimately imposes financial pressure on the bank.

According to Zhu, (2001) the final influencing factor relates to the downfall of the economy which affects the loan system of the banks in general. Due to this the cash flow of banks can be interrupted when there is inability to procure the sanctioned loans and interest from the stakeholders. This in turn causes damage to the liquidity management system of the banks. Liquidity flow is an important combating factor in the management systems of the banks as they need cash to maintain the continuous flow. The requirements of the depositors can be regular or irregular in nature and irregular demands can be predictable or non-predictable. According to BIS, (2008a) regular demands are as a result of daily ongoing corporate sector activities. Predictable irregular demand is due to any business activities under special circumstances such as maturity closure of long term deposit accounts, government withdrawals etc. Non predictable irregular requirements of cash arise due to emergency economic disasters, financial crises or political problematic issues.

Due to these reasons, all banks have established policies to maintain arrangements in hand so as to meet the requirements of its customers and hence keep a regular liquidity flow. This arrangement is basically a pool of cash maintained to provide liquidity when needed, provided that larger banks have to create large liquidity pools than smaller banks (BIS, 2008a). As elaborated by Helmen et al. (1994), the following is the composition of the liquidity pool of a bank:

- Foreign exchanges; banks have depositors who make foreign accounts and foreign exchange currency is required to meet their requirements.
- Central bank certifications and treasury bills regarding effective investment plans.
- Cash transfer from other banks in terms of short term deposits is also important as to make funds availability on short notice.
- Furthermore there is a pool of funds consisting of those cheques which are under process of clearing e.g. cheques of central or commercial banks which have yet produced no cash.

Liability side related liquidity management issues:

The exact kind of products offered by Islamic banks defines the most important issue of liquidity management in these banks. Most commonly, Islamic banks offer Qard Demand Deposits, Mudarabah time deposit and Mudarabah saving deposit. The Mudarabah time deposits are the kind in which bank creates its own investments and produces profits as these deposits are long term and the depositors have no fixed amount of profit promised to them. But the depositors often want a clear cut and consistent amount of future profits information in advance. This is the reason the bank requires to invest these deposits carefully in long term projects so as to meet the demands of customers. If the economic environment is not stable, there is a risk of fluctuation of profits on these investments. This is how the characteristics of offered products by an Islamic bank affects the liquidity risk management.

The other determinants on the liability side are the problem created when the bank suffers a loss on a long term investment project and it has to be sustained by the depositor. In the Islamic bank system the bank is the Mudarib and it offers a long term investment plan to the depositor known as the Mudarabah time deposit or the Mudarabah contract. Under any financial

disturbance, if the bank suffers a loss, it has to be tolerated by the depositor and in these cases the depositors tend to repel the loss and want profit on their invested cash. This situation creates problems for the Islamic banks and they tend to compensate for this loss by using a separate pool of funds known as investment risk reserve (IRR; IFSB, 2005:23).

Another scenario of liquidity risk in Islamic banks on liability side also concerns the characteristics of deposits provided by these banks. The banks have to deal with the demands of the depositors who do not want to bear losses on their invested money. For this issue banks are required to maintain a profit equalization reserve (PER) which is used to provide certain fixed and stable payments in form of return deposits. This is only needed because depositor wants to repel loss. If the Islamic bank investors fully realize the system operating their deposited money and cooperate with the bank, may be such a fund would not be required any more. At the end it has to be noted that most Islamic banks currently are offering a very limited range of products as compared to commercial banks. For the launching of any other products the bank has to assess the need of that product in the corporate sector economic markets. At this time most Islamic banks are only offering three types of products namely Qard demand deposits, Mudarabah saving deposits and Mudarabah time deposits.

Liability Management and Sharia Compliance

The liability management in Islamic banks is according to Shariah laws. When Mudarabah saving accounts are concerned, the cash is invested in long term Islamic projects and profits are shared with the depositors but not on a fixed basis. According to Obaidullah, (2005) Islamic banks do not pay the profits to the customer that holds the demand deposits. Therefore, Mudarabah time deposits work in two ways, one is restricted time deposit and other is unrestricted time deposits. In the restricted type, the Islamic bank just plays the role of non-participating Mudarib. According to El-Din (2004) the Bank has to ask permission of the depositor to mix these time deposits with their funds. On the contrary, the unrestricted time deposits allow the bank to use them independently and manage the funds accordingly. As elaborated by Grais and Pellegrini (2006) an agreement is signed which states that any occurring risk will be shared between the bank and the depositors.

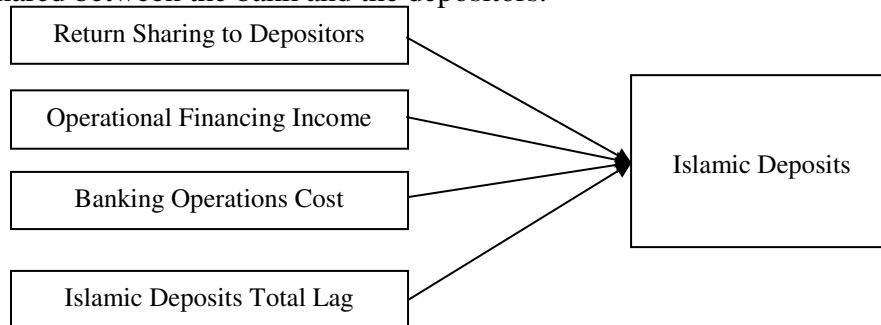


Figure 2. Conceptualization of Variables: Liability Model

The variable used was total Islamic deposits as dependent variable, and operational financing income, Return Sharing to Depositors Banking Operations costs, and Islamic deposits total lag were independent variables.

Research Methodology

Quantitative data were collected to testify liquidity liability model. This model investigates the liquidity behavior of depositors: liability model. The estimation of this part is conducted using E-Views and panel estimation technique using random and fixed effect is applied on this data in order to assess liquidity dynamics of Islamic banks in Pakistan.

Table1

Methodology of Research Studies

Research Method	Quantitative Data Analysis (Positivistic Paradigm)
Research Data	Financial Statements
Methods of Analysis	Fixed and Random Effect Model by Panel Data Econometrics

By and large, "quantitative research underscores on ordinal measures and numbers" (Gray *et al.*, 2007). In particular, "quantitative research strategy endeavors to build up formal connections between related variables. It is for the most part guided by positivist rationality" (Asutay, 2008). The worldview utilized is positivistic: "quantitative specialists by and large acknowledge the objective of building up an understanding that effectively reflects what is really occurring in reality, some quantitative analysts rather underline the objective of building up a bona fide comprehension of a social procedure or social setting" (Gubrium and Holstein, 1997). The panel data econometrics is used. The panel data can be related to countries, companies individuals etc over time. Panel data analysis leads to the data that change over time but this data do not provide cultural changes and different policies of business across companies. According to Gujarati (2009) the panel data provide less multicollinearity, data will be more variable and informative and degree of freedom will be additional. Furthermore according to Moulton (1986) to alleviate heterogeneity, instead of time series and cross sectional data, panel data is best suited.

For the panel data analysis it is vital to choose suitable regression model. Therefore for this study the fixed and random effects model of regression is applied.

Fixed effects Model

The following equation represents the fixed effects model;

$$Y_{it} = \beta_i X_{it} + \alpha_i + u_{it}$$

Dependent variable is represented by Y_{it} whereas t is representing time and i signify entity. Dependent variable is represented by X_{it} and coefficient of independent variable is shown as β_i . The unknown intercept in the analysis is represented by α_i . The error term in the above equation is shown by u_{it} .

Random Effects Model

The following equation represents the random effects model;

$$Y_{it} = \alpha + \beta X_{it} + \omega_{it}, \quad \omega_{it} = \epsilon_i + v_{it}$$

Explanatory variables vector is represented by Y_{it} . ϵ_i is representing the heterogeneity that occur among the cross sectional dimensions in random effect model. t representing the time period, v_i is the error term, βX_{it} is showing independent variable and σ_ϵ^2 is representing constant

variance according to Brooks (2014). If there are influencing factors on across entities on dependent variable then the random effect model is used.

Random effects VS fixed effects Model

According to Brooks (2014); Gujarati (2009); Hausman (1978); and Moulton (1987) the random effect model is used when time is small and cross-sections are large secondly if population is selected randomly from cross sections. The fixed effect model is considered as suitable if independent variables and ϵ_i error terms are correlated with each other secondly entire population is selected for analysis.

Model specification: Liability Model

$$SD = f(RPA, DFR, CO, LSD)$$

$$SD_{it} = \beta_0 + \beta_1(RAP_{it}) + \beta_2(DFR_{it}) + \beta_3(CO_{it}) + \beta_4(LSD_{it}) + \mu_{it}$$

Whereas:

RPA=Return sharing to depositors

DFR= Operational financing Income

CO= Banking operations cost

SD= Islamic deposits

$$\beta_1, \beta_2, \beta_3, \beta_4 = \text{Slop of coefficients} \quad \beta_0 = \text{Constant}$$

μ = error term ln = Natural logarithmic

Hausman Test

In 1978 Hausman built up a test which is known as Hausman test, the prime goal of this test was to choose between random effects or fixed effects show. Hausman test have null hypothesis which is random effects demonstrate is proper. In the event that likelihood esteem comes over 5% for this situation we apply random effects demonstrate. On the opposite side if likelihood esteem comes under 5% we apply fixed effects display" (Hausman, 1978).

Diagnostic Tests

Durbin- Watson Statistics. According to Gujarati (2009) "Durbin-Watson esteem is utilized to check serial autocorrelation in blunders from relapse investigation. Durbin-Watson Statistics has null hypothesis no serial relationship .The estimation of D-W fall in scope of 0-4 , if values exist close to 2,this demonstrate that there is no autocorrelation ,while values almost 0 speak to positive autocorrelation".

Correlation and Cross Dependence Test. If the multicollinearity is present then the results can be considered as biased therefore the multicollinearity is detrimental. Multicollinearity can be defined as a state where the variable correlate with each other. The cross dependence test is also used in this study. According to Phillips and Sul (2003) similar to multicollinearity, the cross sectional dependence is also detrimental.

Empirical Results and Analysis

Estimating Liability Model

The liability liquidity model has been econometrically analyzed and results are calculated. The descriptive analysis of the variables is made for liability model. Furthermore Hausmen test is used for selection of fixed and random effect model and panel data estimation is used by random and fixed effect model. The liability side represent liability model of liquidity management. The variable used was total Islamic deposits as dependent variable, and operational

financing income, Return Sharing to Depositors Banking Operations costs, and Islamic deposits total lag were independent variables.

Liability Model: Descriptives

Table 2: Descriptive Statistics: Liability Model

	lnSD	lnRPA	lnDFR	lnCO	lnLSD
Mean	17.262	13.743	14.424	13.934	16.941
Median	17.427	14.168	14.746	14.329	17.147
Maximum	19.757	17.023	17.715	16.191	19.485
Minimum	14.391	9.034	11.109	11.631	11.951
Std. Dev.	1.211	1.806	1.719	1.166	1.391
Skewness	-0.408	-0.809	-0.266	-0.405	-1.142
Kurtosis	3.060	3.296	2.255	2.284	5.427
Jarque-Bera	1.336	5.300	1.678	2.336	19.902
Probability	0.513	0.071	0.432	0.311	0.000

The table of descriptive statistics is 2 showing five variable descriptives. The variable lnSD is showing 17.262, 1.211, -0.408, 0.513 mean, std. deviation, skewness, and probability respectively. The second variable lnRPA is showing 13.743, 1.806, -0.809, 0.071 mean, std. deviation, skewness, and probability respectively. The third variable lnDFR is showing 14.424, 1.719, -0.266, 0.432 mean, std. deviation, skewness, and probability respectively. The fourth variable lnCO is showing 13.934, 1.166, -0.405, 0.311 mean, std. deviation, skewness, and probability respectively. The fifth variable lnLSD is showing 16.941, 1.391, -1.142, 0.000 mean, std. deviation, skewness, and probability respectively. The variables are all skewed left as the above data is reflecting. lnDFR and lnCO variables are platykurtic and leptokurtic are lnPDF, lnRPA as shown by Kurtosis statistic.

Liability Model: Fixed and Random Effect Model

The fixed effect model is quite good because adjusted R square is 0.73 that is representing 73% of the variation in variable of SD. Furthermore the model is good fit at significance level of 1% because the F-statistics is 15.4942.

Table 3: Fixed effects and Random effects estimation: Liability Model

Variables	Fixed effects model	Random effects model
	7.8763	7.7341
Constant	[1.1871] (0.0000)	[1.1719] (0.0000)
lnRPA	0.2654 [0.0695] (0.0006)	0.2603 [0.0682] (0.0005)
lnDFR	0.2848 [0.0642] (0.1542)	0.2841 [0.0617] (0.6029)
lnCO	-0.0029 [0.1089] (0.9788)	-0.0089 [0.1067] (0.9333)
lnLSD	0.1035 [0.0846] (0.023)	0.1193 [0.0825] (0.0156)
<i>R-squared</i>	0.7897	0.7151
<i>Adjusted R-squared</i>	0.7387	0.6843
<i>F-statistic</i>	15.4942	23.2245
<i>Prob. (F-statistic)</i>	0.0000	0.0000
<i>Durbin-Watson stat</i>	2.2840	2.5956

Note: Standard errors in [] & probability in ()

The table 3 is showing different statistics relating to fixed effect model. To begin with independent variable of the examination, return sharing paid to contributors (RPA) yielded a beta coefficient of 0.2654 alongside likelihood esteem 0.0006 inferring that effect of return sharing paid to investors on Islamic stores is noteworthy. A 1% expansion in lnRPA expands the Islamic store (SD) by 26%. Second independent variable of the model is wage from operational

financing (DFR) which yielded beta coefficient of 0.2848 alongside a likelihood estimation of 0.1542 inferring that this relationship is likewise immaterial. Third variable of the investigation is cost of activities (CO), which yielded a beta coefficient of - 0.0029 (prob. = 0.9788). This relationship is likewise irrelevant. In conclusion, variable of slack of Islamic stores yielded a positive effect on Islamic stores. The beta coefficient for this connection is 0.1035 and likelihood esteem is 0.023 demonstrating that effect of slack of Islamic stores on Islamic stores is critical at 5% level of essentialness. A 1% expansion in lnLSD increments Islamic store (SD) by 2.3%. The random effect show is very great on the grounds that balanced R square is 0.71 that is speaking to 71% of the variety in variable of SD. Moreover the model is solid match at importance level of 1% on the grounds that the F-insights is 23.2245

The table 3 is indicating distinctive insights. In the first place independent variable of the investigation is return sharing paid to investors (RPA), which was found to have a positive (beta coefficient = 0.2603) and noteworthy (prob. 0.0005) effect on the Islamic stores and this relationship was critical at 1% level of noteworthiness. It recommends that a 1% expansion in lnRPA leads more than 26% increment in Islamic store (SD). Second independent variable of model is pay from Operating accounts (DFR) which yielded a beta coefficient of 0.2841 alongside a t-insights of 0.6029 suggesting that the effect of wage from working funds on Islamic stores is inconsequential. Third variable of cost of saving money tasks (CO) was found to have a beta coefficient of - 0.0089 alongside a likelihood estimation of 0.9333, which suggests that the relationship is unimportant. Ultimately, slack of Islamic stores was found to have a positive (beta coefficient = 0.1193) and huge (prob. = 0.0156) effect on Islamic fund. This shows 1% ascend in lnLSD increments 11% in Islamic store (SD).

Table 4: Hausman Specification test: Liability Model

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f	Probability.	Decision
Cross-section random	0.837268	4	0.425	Random effects model

Table 4 indicating Hausman Test specifying that which model we have to choose i.e. fixed or random effect model. The probability value of 0.425 specifying beta coefficient difference and indicating that random effect model is more appropriate.

Diagnostic Tests

Table 5: Pearson’s correlation coefficient matrix for Multicollinearity

Correlation	lnSD	lnRPA	lnDFR	lnCO	lnLTID
Probability					

lnSD	1.000000				
lnRPA	0.650663*	1.000000			
lnDFR	0.679185*	0.381401*	1.000000		
lnCO	0.509277*	0.498212*	0.421761*	1.000000	
lnLTID	0.593801*	0.559168*	0.362888*	0.672262*	1.000000

* indicates significance at 5% level of significance

Table 5 is showing the values of correlation coefficients. If the values in the matrix are more than 0.800 then multicollinearity exist in model. But in this matrix all the values are less than 0.800 hence multicollinearity problem does not exist in the liability model

Table 6: Serial correlation, Null hypothesis: No serial correlation

Test	Fixed effects Model	Random effects Model
Durbin-Watson Statistics	2.28	2.59

Table 6 is showing Durbin-Watson Statistics. The rule indicate that negative serial correlation exist if Durbin-Watson value is 2 and if the value is near 0 then there will be positive correlation. For this model the values are 2.28 and 2.59 for fixed and random model respectively so serial correlation is negative hence we can rely on liability model findings.

Table 7: Residual Cross-Section Dependence Test, Null hypothesis: No cross-section dependence in residuals

Test	Statistic	d.f.	Prob.
Lagrange Multiplier (LM)	-0.354939	4	0.3061

Table 7 is showing that the probability value is 0.3061 that is greater than 0.05 hence there is no cross sectional dependence that was enviable for acceptance of results of liability model.

Conclusion

The findings indicate that the Islamic banks should enhance the return sharing that will draw more depositors to deposit in the bank as return sharing paid to depositors has positive effect on deposits. Secondly Islamic bank deposits can be increased from more investments in operational financing. Other factors that lead to increase in the deposits will be the customer referrals and satisfaction. However certain recommendations for depositors of Islamic banks are firstly the proper understanding of the system, products and basic concept of Islamic banks should be understood by the customers. In case of any ambiguity, they can obtain the required information from their banker to satisfy themselves. Secondly the minimization of liquidity risk is possible with proper cooperation of customers with the bank. This milestone can be achieved if the customers inform the bank prior to any large amount of cash needed.

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