Determinants of Bank Liquidity: Evidence from Local, Foreign and Islamic Commercial Banks in Pakistan

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Abstract

The purpose of this paper is to investigate the effects of bank-specific variables (i.e. bank size, profitability, deposits, cost of funds and capital ratio) on liquidity of local, foreign and Islamic commercial banks in Pakistan. Data was obtained from the publications of SBP titled 'Financial Statement Analysis of Financial Firms'. Data of 26 banks found completed during 2007-2015 (i.e. 19 local banks, 02 foreign banks and 05 Islamic banks). Pooled OLS method used to analyze the effects of internal variables on liquidity. Descriptive statistics show that foreign banks are far better than local and Islamic commercial banks in terms of profitability and liquid assets. Alternatively, Islamic banks are in a better position than local conventional banks in terms of liquid assets, deposit ratio and capital ratio. In contrast, local conventional banks are better than Islamic banks in terms of size and profitability. More importantly, Islamic commercial banks are younger than local conventional banks but amazingly having higher deposit ratio due to strong equity-base and sufficient liquid assets. Notably, the trend toward Islamic banking is increasing day-by-day which posed threats to the conventional commercial banks, and resultantly a number of conventional banks have either introduced the 'window' of Islamic banking or completely started the Islamic banking operations. Regression results indicate that profitability is positively while bank size, deposits, cost of fund and capital ratio is negatively related to liquidity in a sample of all banks. Deposits are positively while cost of fund is negatively linked to liquidity in a sample of local banks. Finally, bank size is the only variable that is negatively linked to liquidity of foreign and Islamic commercial banks.

Keywords: Islamic Banks, Foreign Banks, Local Banks, Liquidity, Pakistan.

1. Introduction:

Banks act as financial intermediary between suppliers and demanders of funds. The core of banking business is to accept deposits for lending to others. The suppliers (i.e. depositors) and demanders (i.e. borrowers) of fund can be individuals, businesses and government. Finance text suggests that individuals are net suppliers of fund, while businesses and government are net demanders of fund. Based on expected inflows (i.e. deposits) and outflows (i.e. advances) the banks determine the amount of liquid assets that are needed to support the banking operations. The importance of liquidity management can be assessed with the fact that according to Circular No. 9 of 2006 issued by the Banking Supervision Department of SBP that all banks operating in Pakistan are required to maintain statutory liquidity reserves of 18 percent (excluding cash reserve requirements) of total time and demand liabilities. A few empirical studies have explored the determinants of bank liquidity however the results are mixed. For instance, Singh and Sharma[1] have analyzed the data of 59 banks in India during 2000-2013 to investigate the

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impact of bank-specific and macroeconomics variables on liquidity. Results show that bank size, profitability, deposits, and capital adequacy are some important bank-specific while gross domestic product and inflation are few important macroeconomic variables that have significant impact on liquidity. More specifically, results indicate that profitability, capital adequacy, and deposits are positively while bank size is negatively related to liquidity. Inflation is positively while gross domestic product is negatively related to liquidity. Finally, results show that bank ownership also affects the bank liquidity.[2] Have used the weekly data of banks working in Pakistan during 2005-2011 to investigate the drivers of excess interbank liquidity. They observed that financing to government to fill the gap of budget deficit by the central bank and nonbanks is an important determinant of excess liquidity. Furthermore, they found that monetary policy is less effective if banks hold excess liquidity for unexpected needs.[3] In an empirical study on Russian banks observed that low level of financial development in Russia is the root cause of low liquidity creation.[4] used the data of Czech commercial banks during 2001-2009 to investigate the determinants of bank liquidity. Results show that capital ratio, interest rate, non-performing loans and interbank transactions are positively linked to bank liquidity. In contrast, inflation rate, bank crises and business cycle is inversely linked to bank liquidity. In another empirical study on banks in Poland[5] observed that bank size, profitability and interest rate are inversely while capital ratio, interbank transactions and non-performing loans are directly linked to bank liquidity.[6] Has examined the data of Tanzanian commercial banks to explore the reasons of excess liquidity. Results show that cash preference, high cost of funds, volatility of depositors and credit risks are some important variables that contributes toward excess liquidity.[7] Have examined the data of banks in East Asian countries to identify the effects of ownership concentration on risk-taking behavior of banks. Results show that ownership concentration is a significant factor that affects the capital stability. More importantly, results suggest that concentrated ownership enrich the banks' liquidity. Finally, results show that financial crisis have no role to transform the fundamental relationship among capital adequacy, ownership concentration and liquidity.[8] Analyzed the data of Russian banks to investigate that how the introduction of deposit insurance scheme in Russia affects the relationship between bank capital and liquidity creation. In a sample of all banks, results show that deposits insurance has no significant impact on the relationship between bank capital and liquidity creation. However, in a sample of banks that were

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most affected by the introduction of deposit insurance scheme, results suggest a significant impact of deposit insurance on the relationship between bank capital and liquidity creation.

To the author's knowledge no study has yet explored the effects of internal variables on liquidity of local, foreign and Islamic commercial banks in Pakistan. Thus, a little research on determinants of bank liquidity in Pakistan and inconsistent results of prior empirical studies are two important reasons that provide rationale for this empirical study. In particular, the focus of this paper is to seek the answer of following research questions.

Q.1. Does bank-specific variables (e.g. size, profitability, deposits, cost of funds, and capital ratio) affect the liquidity of local, foreign and Islamic commercial banks in Pakistan?

Q.2. Does similar variables affect the liquidity of local, foreign and Islamic commercial banks in Pakistan?

It is expected that findings of this study not only mend a research gap but also lend-a-hand to chief financial officers (CFOs) of local, foreign and Islamic commercial banks to determine the level of liquid assets required to support the banking operations keeping in mind the statutory requirements of SBP and the impact of bank-specific variables on liquidity.

Remaining paper is structured as follows. Section 2 presents data and sample specification, operational definition of variables, and methodology. Section 3 presents summary statistics and regression results. Section 4 provides discussion on results. Section 5 provides conclusion and possible suggestions for future research.

2. Research Methodology:

2.1 Data and sample specification:

The core objective of this study is to investigate the effects of internal variables on liquidity of local, foreign and Islamic commercial banks in Pakistan. Data concerning liquidity and internal characteristics of banks was obtained from the publications of State Bank of Pakistan (SBP) titled 'Financial Statement Analysis of Financial Firms'. Although SBP has assembled the data of financial firms including local, foreign and Islamic commercial banks for other reasons than for this research however financial information reported in 'Financial Statement Analysis of Financial Firms' found useful for this study. Data of 26 banks found completed during 2007-2015 (i.e. 19 local banks, 02 foreign banks and 05 Islamic commercial banks). Resultantly, final sample consists of 234 observations pertains to 26 banks during the period of 9 years.

2.2 Variables:

Table 1 presents the operational definitions of variables. Operational definitions of dependent (i.e. liquidity) and internal variables (i.e. bank size, profitability, deposits, costs of funds and capital ratio) are adopted from earlier empirical studies relevant to determinants of bank liquidity.

Table 1: Definition of Variables

Variable	Symbol	Definition
Dependent variable		
Liquidity	LQ_{it}	Liquid assets / Total assets. Liquid assets are the sum of cash & balance with treasury banks and balances with other banks.
Bank-specific variables		
Profitability	ROA_{it}	Profit after taxes / Total assets.
Bank size	$SIZE_{it}$	Natural log of total assets.
Deposits	$DEPO_{it}$	Deposits / Total assets.
Cost of funds	COF_{it}	Markup paid or interest expensed / Total deposits
Capital Ratio	CR_{it}	Stockholders equity / Total assets. Stockholders equity is the sum of share capital + reserves + unappropriated profit + others.

2.3 Methodology:

Data relevant to different banks (i.e. cross sectional units) over a number of years (i.e. time series) making it panel data. Thus, panel data technique namely pooled ordinary least squares method used to analyze the impact of bank-specific variables on liquidity of local, foreign and Islamic commercial banks in Pakistan. The literature suggests that when there are no firm-specific and time-specific effects then pooled OLS method is most appropriate. The basic regression expressed as

$$Y_{it} = \alpha + X_{it}\beta + \upsilon_{it}$$

where *i* represent the cross sectional unit, *t* represent the time period. Y_{it} represent the dependent variable of *i* firm at *t* time period, α represent *y*-intercept, υ_{it} represent error term. Formal regression equation expressed as

$$LQ_{it} = \beta_0 + \beta_1 ROA_{it} + \beta_2 SIZE_{it} + \beta_3 DEPO_{it} + \beta_4 COF_{it} + \beta_5 CR_{it} + \xi_{it}$$

where LQ_{it} is liquidity of bank *i* at time *t*, ROA_{it} is profitability of bank *i* at time *t*, $SIZE_{it}$ is size of bank *i* at time *t*, $DEPO_{it}$ is deposits of bank *i* at time *t*, COF_{it} is cost of funds of bank *i* at time *t*, CR_{it} is capital ratio of bank *i* at time *t*, β_0 is *y*-intercept, ξ_{it} *is* error term, β_1-β_5 represent coefficients of relevant independent variables.

3. Empirical Results:

3.1 Summary statistics:

Table 2 presents the descriptive statistics of variables. Results show that foreign commercial banks on average hold more liquid assets (i.e. 39.14 percent) than Islamic (12.12%) and local commercial banks (i.e. 8.72%). More importantly, foreign commercial banks are more profitable than local and Islamic commercial banks. For instance, average return on assets of foreign banks is 1.86 percent while mean return on assets of local and Islamic banks are 0.59 percent and -0.12 percent respectively. Bank size is measured by taking natural log of total assets. Mean value of natural log of total assets indicate that local commercial banks are bigger than Islamic and foreign banks. This is interesting to note that currently 5 full-fledged Islamic banks are working in Pakistan, and some new Islamic banks have either started operations or in pipeline to start banking operations in Pakistan. Keeping in mind the increasing demand of Islamic banking in Pakistan a number of conventional banks have opened the 'window' of Islamic banking. The increasing trend toward Islamic banking in Pakistan can be determined through deposit ratio of Islamic banks. The mean deposit ratio of Islamic banks is 78.33 percent, while mean deposit ratio of local and foreign commercial banks is 73.93 percent and 39.76 percent respectively. Foreign commercial banks have low proportion of deposits than Islamic and local commercial banks because of limited operations in few major cities of Pakistan like Karachi, Lahore and Islamabad etc. Cost of fund is

measured as mark up paid or interest expensed scaled by total deposits. Results indicate that although profit/mark up paid by Islamic banks to its deposit holders is relatively low (i.e. 5.38 percent) than interest paid by local and foreign banks (i.e. 6.73 percent and 10.26 percent respectively) but their deposit ratio is amazingly high. The high deposit ratio may be due to inclination of depositors towards Islamic banking. Finally, capital ratio, measured as stockholders equity to total assets, of Islamic banks is 14.11 percent, while local and foreign commercial banks have capital ratio of 10.94 percent and 3.44 percent respectively. The capital ratio of Islamic banks is relatively high indicating their capacity to absorb losses before passing to investors. In sum, descriptive analysis suggests that foreign banks are better than local and Islamic commercial banks in terms of profitability and liquid assets. Alternatively, Islamic commercial banks are in a better position than local conventional banks in terms of liquid assets, deposits and capital ratio. In contrast, local conventional banks are better than Islamic banks in terms of size and profitability. Although Islamic banks have a dumpy history but they posed threats to conventional banks in Pakistan that is why several local conventional banks have taken initiative to open the 'window' of Islamic banking just to retain the depositors/customers.

Table 2: Summary Statistics

Variable	LQ_{it}	ROA_{it}	$SIZE_{it}$	$DEPO_{it}$	COF_{it}	CR_{it}
Local commercial banks						
Mean	0.0872	0.0059	19.171	0.7393	0.0673	0.1094
SD	0.0307	0.0169	1.2798	0.0888	0.0229	0.0785
Min	0.0443	-0.0640	15.803	0.4512	0.0223	0.0028
Max	0.1771	0.0371	21.520	0.8832	0.1422	0.5185
N	*171*	*171*	*171*	*171*	*171*	*171*
Foreign commerical banks						
Mean	0.3914	0.0186	16.410	0.3976	0.1026	0.0344
SD	0.1462	0.0171	0.5070	0.1433	0.0356	0.0124
Min	0.2075	0.0013	15.516	0.1705	0.0481	0.0160
Max	0.6440	0.0530	17.181	0.6340	0.1703	0.0483
N	*18*	*18*	*18*	*18*	*18*	*18*
Isalmic commercial banks						
Mean	0.1212	-0.0012	17.838	0.7833	0.0538	0.1411
SD	0.0511	0.0115	1.0199	0.1074	0.0185	0.1056
Min	0.0633	-0.3029	15.739	0.4216	0.2004	0.0480
Max	0.2776	0.0150	20.091	0.8871	0.1143	0.5331
N	*45*	*45*	*45*	*45*	*45*	*45*
Overall sample of banks						
Mean	0.1172	0.0055	18.702	0.7215	0.0674	0.1098
SD	0.0960	0.0166	1.4565	0.1361	0.0259	0.0851
Min	0.0443	-0.0640	15.516	0.1705	0.0200	0.0028
Max	0.6440	0.0530	21.520	0.8871	0.1703	0.5331
N	*234*	*234*	*234*	*234*	*234*	*234*

3.2 Regression results:

Table 3 presents the effects of internal variables on liquidity of local commercial banks. Regression results indicate that deposits are significant and positively related to liquidity. In contrast, cost of fund is significant and negatively related to liquidity. Return on

assets, bank size and capital ratio is positively related to liquidity but the relationship is insignificant. Table 4 presents regression results pertain to foreign commercial banks. Bank size is the only internal variable that is statistically significant and negatively related to liquidity. Deposits and cost of funds are positively while profitability and capital ratio are negatively linked to liquidity however the relationship is insignificant. Table 5 presents the effects of internal variables on liquidity of Islamic commercial banks. Results indicate that bank size is the only variable that is significant and negatively related to liquidity. Return on assets and deposits are positively while costs of fund and capital ratio are negatively related to liquidity but the relationship is insignificant. Finally, Table 6 presents the regression results of cumulative sample of banks. Results indicate that return on assets (i.e. profitability) is statistically significant and positively related with liquidity. In contrast, bank size, deposits, cost of funds, and capital ratio is statistically significant and negatively related to liquidity. In sum, regression results indicate that bank-specific variables have substantial effects on liquidity of commercial banks in Pakistan.

Table 3: Effects of firm-specific variables on liqudity
(Local commercial banks)

Variable	Coeff.	SE	*t*-statistic	Prob.
C	-0.0093	0.0537	-0.17	0.8620
ROA_{it}	0.1014	0.1647	0.62	0.5390
$SIZE_{it}$	0.0001	0.0020	0.00	0.9990
$DEPO_{it}$	0.1489	0.0332	4.48	0.0000
COF_{it}	-0.2614	0.1261	-2.07	0.0400
CR_{it}	0.0318	0.0367	0.87	0.3880
R^2	0.2751	*f*-statistic		12.52
Adj. R^2	0.2532	Prob.		0.0000
RMSE	0.0265	*N*		171

ROA_{it} = Return on assets, $SIZE_{it}$ = Bank size, $DEPO_{it}$ = Deposits, COF_{it} = Cost of fund CR_{it} = Capital ratio

Table 4: Effects of firm-specific variables on liqudity
(Foreign commercial banks)

Variable	Coeff.	SE	*t*-statistic	Prob.
C	5.1725	1.1572	4.47	0.0010
ROA_{it}	-1.9030	1.2881	-1.48	0.1650
$SIZE_{it}$	-0.2940	0.0733	-4.01	0.0020
$DEPO_{it}$	0.3804	0.2414	1.58	0.1410
COF_{it}	0.1764	0.6506	0.27	0.7910
CR_{it}	-2.5863	2.0889	-1.24	0.2390
R^2	0.8283	*f*-statistic		11.58
Adj. R^2	0.7568	Prob.		0.0003
RMSE	0.0721	*N*		18

ROA_{it} = Return on assets, $SIZE_{it}$ = Bank size, $DEPO_{it}$ = Deposits, COF_{it} = Cost of fund CR_{it} = Capital ratio

Table 5: Effects of firm-specific variables on liqudity
(Islamic commercial banks)

Variable	Coeff.	SE	*t*-statistic	Prob.

C	0.7651	0.4005	1.91	0.0630
ROA_{it}	0.3217	0.8588	0.37	0.7100
$SIZE_{it}$	-0.0388	0.0171	-2.26	0.0290
$DEPO_{it}$	0.1326	0.2715	0.49	0.6280
COF_{it}	-0.6932	0.4303	-1.61	0.1150
CR_{it}	-0.1265	0.2983	-0.42	0.6740
R^2	0.1641	*f*-statistic		1.53
Adj. R^2	0.0569	Prob.		0.2026
RMSE	0.0496	*N*		45

ROA_{it} = Return on assets, $SIZE_{it}$ = Bank size, $DEPO_{it}$ Deposits, COF_{it} = Cost of fund CR_{it} = Capital ratio

Table 6: Effects of firm-specific variables on liqudity
(Overall sample of banks)

Variable	Coeff.	SE	*t*-statistic	Prob.
C	1.0192	0.0698	14.6	0.0000
ROA_{it}	0.5238	0.3009	1.74	0.0830
$SIZE_{it}$	-0.0269	0.0036	-7.43	0.0000
$DEPO_{it}$	-0.4058	0.0428	-9.48	0.0000
COF_{it}	-0.6977	0.2068	-3.37	0.0001
CR_{it}	-0.5580	0.0542	-10.2	0.0000
R^2	0.5821	*f*-statistic		63.51
Adj. R^2	0.5729	Prob.		0.0000
RMSE	0.0627	*N*		234

ROA_{it} = Return on assets, $SIZE_{it}$ = Bank size, $DEPO_{it}$ = Deposits, COF_{it} = Cost of fund CR_{it} = Capital ratio

4. Discussion on Results:

In general, a bank is required to maintain sufficient liquid assets for planned as well as unplanned payments. Finance text suggests that cash pays no interest, so liquid assets maintained by banks contain some opportunity cost. However, as per statutory liquid reserve requirement fixed by SBP, banks are bound to maintain liquid assets to support banking operations and to satisfy the contractual claims on demand. Regression results pertaining to all banks indicate that return on assets (i.e. profitability) is positively related to liquidity. The positive relationship indicates that profitable banks hold more liquid assets than less profitable banks because of good earnings prospects, and to maintain creditability by making payments on demand.

Bank size is negatively related to liquidity. The inverse relationship between size and liquidity indicates that large banks hold less liquid assets than small banks because of retained profits and reasonable inflow of deposits. More importantly, large banks can raise funds either from inter-bank market or from other external sources that is why they prefer to hold less liquid assets to manage the opportunity cost which in turn positively affects the performance. Deposits are negatively related to liquidity. Since deposits are the life blood of any bank, and inflow of cash through deposits diminishes the need to hold more liquid assets. Cost of fund is inversely linked to liquid assets. In other words, low cost of funds leads to high liquidity while high cost of funds leads to low liquidity. Thus, when banks collect deposits at low cost then they prefer to maintain more liquid assets however when they collect deposits at high cost then they prefer to hold less liquid assets. Finally, capital ratio is inversely related to liquidity. The inverse relationship indicates that when capital ratio is high then banks hold less liquid assets due to strong equity- base however when capital ratio is low then banks hold more liquid assets to maintain their creditability in the market.

The notable finding of this study is that regression results relevant to local banks indicate that deposits are positively related to liquidity. Descriptive statistics presented in Table 2 indicates that local commercial banks are bigger in size (have low probability of default due to investment in diversified assets) than foreign and Islamic commercial banks. Generally, individuals and businesses prefer to deal in those banks that have strong asset base and a nationwide branch network etc., so that they can settle a transaction quickly and paying minimum service charges. Owing to these reasons local banks with strong deposit-base hold more liquid assets to satisfy the contractual claims on demand.

In synopsis, all bank-specific variables i.e. size, profitability, deposits, cost of funds and capital ratio have significant effects on liquidity in a cumulative sample of banks. More importantly, Islamic commercial banks are younger than conventional commercial banks but amazingly having a higher deposits ratio due to strong equity-base and sufficient liquid assets. More importantly, the trend toward Islamic banking is increasing day-by-day which posed threats to conventional commercial banks, and resultantly a number of conventional banks have either introduced the 'window' of Islamic banking or completely started Islamic banking operations.

5. Conclusions:

The objective of this paper is to investigate the effects of bank-specific variables on liquidity of local, foreign and Islamic commercial banks in Pakistan. Data was obtained from the publications of State Bank of Pakistan titled 'Financial Statement Analysis of Financial Firms'. Pooled OLS method used to estimate the effects of internal variables namely bank size, profitability, deposits, cost of funds and capital ratio on liquidity of local, foreign and Islamic banks. Descriptive statistics show that foreign banks are in a better position than local and Islamic commercial banks in terms of profitability and liquid assets. Alternatively, Islamic banks are better than local conventional banks in terms of liquid assets, deposit ratio and capital ratio. In contrast, local banks are better in terms of size and profitability than Islamic banks. More importantly, Islamic commercial banks are younger than conventional commercial banks but amazingly having higher deposit ratio due to strong equity-base and sufficient liquid assets. More importantly, the trend toward Islamic banking is increasing day-by-day which posed threats to conventional commercial banks, and resultantly a number of conventional banks have either opened the 'window' of Islamic banking or started Islamic banking operations like MCB Bank has just inaugurated MCB Islamic Bank.

The answer to the first question posed in introduction section is that bank-specific variables have substantial effects on liquidity of commercial banks in Pakistan. For instance, in overall sample of banks, profitability is positively while bank size, deposits, cost of fund and capital ratio is negatively related to liquidity. The answer to the second question is that some variables have shown consistent impact on liquidity regardless of the classification of banks while other variables have shown different impact on liquidity. For instance, deposits are positively while cost of funds is negatively related to liquidity of local commercial banks. Bank size is the only variable that is significant and negatively related to liquidity of foreign and Islamic commercial banks. I am sure that results of this study lend-a-hand to enlighten the vision of CFOs regarding the effects of internal variables on liquidity, and resultantly they may manage the liquid assets in a better way by keeping in mind the statutory requirements set by SBP. Owing to data limitations this study has analyzed the impact of a limited set of bank-specific variables on liquidity. For in depth analysis, the effects of advances, non-performing loans, non-interest revenue and cash flow from operations etc. on bank liquidity can also be explored.