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FACTORS SHAPING LIQUIDITY DYNAMICS IN THE BANKING SECTOR OF PAKISTAN

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ABSTRACT

Purpose: This study aims to investigate the liquidity creation determinants in the banking sector of Pakistan.
Design/Methodology: Panel data from 24 banks is used for the period of 12 years (2011-2022). The impact of macroeconomic variables (economic growth and inflation) and bank-specific variables (income diversification, bank capital and bank size), is checked on liquidity creation. Liquidity creation is measured by the BB technique introduced by Berger and Bouwman (2009). The generalized Method of the moment (GMM) is used as a statistical technique to test the causal relationship among the variables of interest.
Findings: The outcomes of this study show that among three bank-specific variables two variables; bank capital and size are significantly linked with liquidity creation. Inflation and economic growth are also significantly related to liquidity creation. The relationship between income diversification and liquidity creation is insignificant.
Implications: This research will help to propose changes in current banking regulations and economic factors to improve liquidity creation. This research will also help the policymakers and managers of banks in developing policies and making decisions regarding the creation of liquidity.
Originality: To the best of the author's knowledge this is the first study that emphasizes the determinants of liquidity creation in the banking sector of Pakistan.
Keywords: : *Liquidity Creation, Economic Growth, Inflation, Income Diversification, Bank Size, Bank Capital, GMM.*
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INTRODUCTION

The most crucial financial intermediaries are banks because they provide funds to those who need them to finance investment opportunities from those who have extra funds but lack investment opportunities. The overall process of fund transfer is the main strength of commercial banks, that not only increases the income of the individual banks but also enhances the growth of the economy (Umar & Sun, 2016; Poudel, 2018).

According to Umar & Sun (2016), economies do not perform well if banks do not perform well. A bank's liquidity is quite important for the economy to function smoothly and to keep the wheel of the economy revolving. The theory of financial intermediation claims that banks perform two fundamental functions in the economy first is the creation of liquidity and the second is risk transformation. Investigating the function of the bank as a liquidity creator and motivating economic growth has a long history since Adam Smith (Berger & Bouman 2009). The financial intermediation theory states that banks create liquidity by following two methods. Firstly, by the transformation of illiquid assets into liquid liabilities (Diamond & Rajan,2000,2001) and secondly, by off-balance-sheet activities (Kashyap et al.,2002). Although liquidity creation is very important, the risk transformation role of banks was largely considered by financial literature and it is astonishing, that limited empirical studies conducted to study the factors determining the creation of liquidity in banks. Until 2009, liquidity creation was only consigned to theoretical concept due to the lack of its measure (Berger & Bouwman, 2009; Fungacova et al., 2017; Dang, 2021; Berge & Sedunov, 2017; Mazioud et al., 2018)

In 2009 Berger and Bouwman first time created an inclusive measure of "liquidity creation" by dividing balance-sheet and off-balance-sheet activities into liquid, illiquid, and semiliquid activities. As the creation of liquidity is the most important function executed by banks in the economy and considering the significance of liquidity creation for the economy, it is essential to search for the role of liquidity creation intensely by exploring its determining factor (Sahyouni et al., 2021). The primary reason for the existence of banks is liquidity creation (Tran, 2020). However, from a research point of view, liquidity creation extends the bank output concept beyond providing loans and proposes interesting new ways for research (Davydov et al.,2018).

This research is designed to check the determinants of liquidity creation in the banking sector of Pakistan. The Pakistani banking sector has made significant

improvements in global and domestic businesses. Due to its strategic and geographical position globalization and increasing regional connectivity has amplified the prominence of the banking sector of Pakistan in the whole world (Ali & Puah, 2018). The Pakistani banking sector has become more important for regulators, financial institutions and investors in other countries but still, there is a lack of research on determinants of liquidity creation in the banking sector of Pakistan. Therefore, this research is designed to investigate the determinants of liquidity creation in the banking sector of Pakistan.

Literature Review and Hypothesis Development

Bank-Specific Variables and Liquidity Creation

Hackethal et al. (2010) studied the determinants of the creation of liquidity in the savings banks of Germany from 1997 to 2006. The researchers used some macroeconomic indicators such as Unemployment, Interest Rate, Savings Quota, Yield Curve Spread and some bank-specific like bank size, profitability, provision to interest rate and loan size. Using GMM researchers found that macroeconomic variables are significantly associated with the creation of liquidity but no bank-specific variable has a significant relationship. The second study was conducted by Umar & Sun (2016) studied determinants in BRICS nations for the period of 2002 to 2014. The researchers used bank size, ratio of operating profit to total assets, return on equity, gross national savings rate, unemployment rate, market interest rate, inflation rate, and population change in terms of percentage. Researchers found that all variables have a significant association with the creation of liquidity except bank size. Income diversification reduces the creation of liquidity diversification of banks may diffuse the resources of managers and stability of operations, which may fail to fulfill the demand of clients for liquidity and destroy the creation of liquidity in financial institutions (Berger et al., 2010; Choi et al.,2013; Hou et al., 2018; Dang, 2021).

Meslier et al. (2014) explored that diversification of bank income may result in more creation of liquidity provided that strong financial fundamentals fulfill the withdrawing demand of depositors and give borrowers off-the-balance sheet liquidity. Kinini et al. (2023) used unbalanced data from Kenyan banks from 2001 to 2022 and found that diversifying in non-interest activities improves the creation of liquidity of financial institutions. Tran & Nguyen (2023) checked the impact of banking competition and income diversification on a bank's liquidity creation. The researcher found that income diversification has a positive effect on a bank's liquidity creation and it's a crucial driver of off-balance sheet creation of liquidity.

Capital regulation is considered the main determinant of the creation of liquidity and the study of current literature on these two variables found its origins in two opposite hypotheses. "Financial fragility crowding out hypothesis (FFCH)" and "The risk absorption hypothesis (RAH)" (Berger and Bouwman, 2009). According to the FFCH, the creation of liquidity is negatively influenced by capital regulation, signifying that a greater requirement of capital condensed the creation of liquidity (Diamond & Rajan, 2000, 2001). In opposite to this, RAH assumed a positive relationship between them. Higher capital ratios increase the risk tolerance ability of financial institutions and thus improve the creation of liquidity (Repullo, 2004; Von Thadden, 2004; Bhattacharya & Thakor, 1993).

Lei & Song (2013) found a negative association between bank capital and the creation of liquidity. Horvath et al. (2014) claim a negative association between two variables in the small banking industry. Toh (2019) checked the impact of bank capital on the creation of liquidity and business diversification. Researchers found that capital hurts the liquidity creation function of banks. Researchers also claimed that small banks produce more liquidity. Baradwaj et al. (2016) claimed that there is a positive relationship between bank size and liquidity creation. Huynh (2024) used the sample of Vietnamese commercial banks for the time period of 2007 to 2019 and found that size has a positive impact on liquidity creation.

Chaabouni et al. (2018) found a negative relationship between the size of banks and liquidity creation. Kinini et al. (2023) checked the impact of bank capital on the creation of liquidity using data from Kenya banks from 2001 to 2020. Researchers found that bank capital results in the reduction of liquidity creation and has a negative association with liquidity creation. Bawuah (2024) checked the effect of bank capital on the creation of liquidity with the moderating role of institutional quality in Sub-Saharan Africa for the period of 2010-2022. Researchers found that bank capital has a positive influence on the creation of liquidity.

So based on these studies, it is hypothesized that;

H1: Bank-specific variables have a significant impact on liquidity creation.

Macroeconomic Determinants of Liquidity Creation

Umar & Sun (2016) checked factors of liquidity creation in BRICS countries and found that inflation hurts liquidity creation. Inflation has an insignificant impact on the creation of liquidity for small banks but for large banks, the impact is negative and significant. Dang (2021) found that the link between inflation and the creation of liquidity is significant and positive. Sahyouni et al. (2021) also claimed that inflation has a significant and negative influence on the creation of liquidity it only has a positive influence on the liability side

of the creation of liquidity but the impact is insignificant. Pham et al. (2021) checked the monetary policy tools impact on the creation of liquidity and found an insignificant association between the creation of liquidity and inflation. Gyeke-Dako et al. (2021) also found that inflation and liquidity creation are negatively associated and claimed that an increase in inflation reduces purchasing power and as a result creation of liquidity in financial institutions reduces.

Casu et al. (2019) found that low GDP growth and high unemployment reduce the creation of liquidity. From 2003 to 2009 economic growth had a positive influence on the creation of liquidity but after the 2008 financial crisis, the effect became negative when only a cat fat measure was used for the creation of liquidity. Moreover, the positive influence of economic growth on the creation of liquidity is more prominent in fewer liquidity creators but economic growth reduces the creation of liquidity for large banks (Diaz and Huang, 2017). Chaabouni et al. (2018) claimed a positive association between economic growth and the creation of liquidity for all measures of liquidity creation. Fu et al. (2016) found a positive association between economic growth and the creation of liquidity. Researchers measured the business cycle by using the GDP growth rate as a measure of the business cycle for all specifications showing that banks increase the supply of credit when in economic boom.

Tan (2023) used the Chinese banks' data from 2007-2021 and found that GDP hurts liquidity creation. Moreover, the researcher also claimed that GDP moderates the association between internal control and liquidity creation. Viverita et al. (2023) found that GDP has a positive and insignificant impact on liquidity creation when the cat-fat measure of liquidity creation is used. It also has a negative and significant impact when the cat-nonfat measure of liquidity creation is used. Fang et al. (2023) used a sample of Chinese banks from 2007 to 2021 and found that GDP and inflation have a positive influence on liquidity creation. Huynh (2024) used the sample of Vietnamese commercial banks for the time period of 2007 to 2019 and found that economic growth has a negative impact on liquidity creation.

Sinha & Grover (2021) checked the factors of liquidity creation in Indian banks between 2005 and 2018 and found that the border measure of creation of liquidity (cat-fat) is determined by the GDP growth rate. Toh & Jiya (2021) studied the factors influencing the creation of liquidity in conventional and Islamic financial institutions in Malaysia. And found that on the balance sheet creation of liquidity is more affected by GDP growth and macroeconomic factors have less influence on overall liquidity creation. So based on these studies, it is hypothesized that;

H2: Macroeconomic variables have a significant influence on liquidity creation

METHODS

Sample's Description

Annual Financial statements of 24 banks for the period of 2011-2022 are used for data collection. Data is collected from the financial statements. The financial statements are obtained from the website of each bank. The sample consists of Islamic banks and conventional banks. Foreign banks are also included in the sample. After removing outliers 274 observations are used for analysis. The list of banks is given in Appendix B. The data on the macroeconomic variables is collected from the databank of the World Bank. After data smoothening a quantitative research design is applied on a balanced panel data set to test the hypothesis of the study.

The causal relationship among dependent and independent variables is unlocked through GMM. This specific statistical technique is used because it deals well with the endogeneity issue of the panel data set. GMM is developed by Arellano & Bover (1995) and Blundell & Bond (1998). In comparison to simple OLS methods, the GMM controls the endogeneity of variables and it also deals with the problem of heteroskedasticity (Bikker & Vervliet, 2017). GMM can effectively deal with small-time constraints and large cross-sections. GMM can also deal better with a dynamic model as compared to fixed effect and random effect. Due to the absence of defects in the GMM model results can be nonbiased, effective, and normally distributed (Pham et al.,2021).

VARIABLE MEASUREMENT

Liquidity Creation

Financial intermediation theory states that banks generate liquidity by following two methods. Firstly, by transforming liquid liabilities into illiquid assets (Diamond & Rajan,2000, 2001) and secondly, by off-balance-sheet activities (Kashyap et al.,2002). Creation of liquidity by banks is a different concept from bank liquidity but it also relates to it. Traditional indicators of banks' liquidity measure, how liquid banks are. These indicators are simple ratios that consist of a few liabilities and assets. In distinction, the liquidity creation of banks measures how much banks create liquidity for their customers, making the bank illiquid in this practice (Berger & Bouwman, 2017).

To measure "liquidity creation", this research followed Berger & Bouwman (2009); Hou et al. (2018) and Sahyouni & Wang (2019). BB method follows a step by step process. In the very first step, they classified items of the balance sheet (equity liabilities and assets) and off-balance sheet activities into liquid, illiquid and semi-liquid, and then researchers gave them different weights based on the assumptions of liquidity creation theory. In the third and final step, they created these measures of liquidity creation "Cat_fat" and "Cat_nonfat". Here "Cat_fat" means categories of balance sheet items including off-balance sheet activities, whereas "Cat_nonfat" means categories of balance sheet items excluding off-balance sheet activities. Details regarding the categorization of balance sheet activities and assigning weights are presented in Appendix A. The mathematical formulas of both these measures are as follows:

$$Cat_{Fat} = +\frac{1}{2} * \text{illiquid assets} + 0 * \text{semiliquid assets} - \frac{1}{2} * \text{liquid assets} + \frac{1}{2} * \text{liquid liabilities} + 0 * \text{semiliquid liabilities} - \frac{1}{2} * \text{illiquid liabilities} - \frac{1}{2} * \text{equity} + \frac{1}{2} * \text{illiquid off}_{\text{activities}} + 0 * \text{semiliquid off}_{\text{activities}} \quad \text{(eq.1)}$$

$$Cat_{nonFat} = +\frac{1}{2} * \text{illiquid assets} + 0 * \text{semiliquid assets} - \frac{1}{2} * \text{liquid assets} + \frac{1}{2} * \text{liquid liabilities} + 0 * \text{semiliquid liabilities} - \frac{1}{2} * \text{illiquid liabilities} - \frac{1}{2} * \text{equity} \quad \text{(eq.2)}$$

Income Diversification

Diversification of income sources into the fee, underwriting and trading activities has turned out to be the main form of income diversification in the banking sector decreasing their reliance on traditional intermediation activities (Sharma & Anand, 2018).

Following Alhassan (2015); Chen & Lai (2017) income diversification of banks is measured by using Herfindahl Hirschman Index (HHI). The income diversification is measured as:

$$HHI_{div_{it}} = 1 - \left[\left(\frac{non}{totinc}\right)^2 + \left(\frac{net}{totinc}\right)^2\right] \quad \text{(eq.3)}$$

Where Totinc shows the bank's total income, Non is the bank's non-interest income and Net is the bank's net interest income of banks. 0 value shows no

diversification in banking income and 0.5 value of the income diversification symbolizes complete diversification of income.

Bank Capital

Elizalde & Repullo (2007) defined regulatory capital as the least amount of capital mandatory by the regulatory authorities, which is recognized with the capital charges in the Basel II internal-ratings-based (IRB) approach.

The capital requirement of the bank is measured by using the capital ratio. Following Berger & Bowman (2009); and Chaabouni et al. (2018), this research measures the bank capital as follows.

$$Bank\ Capital_{it} = \frac{Total\ Equity}{Total\ Asset} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (eq.4)$$

Bank Size

Bank size is defined as a natural log of total assets. Following Toh (2019); and Dang (2021) this study used the Natural logarithm of total assets as a measure of size.

Inflation

Khan & Hanif (2020) defined inflation as the consumer price index growth rate. Persistent increases in goods and services prices above a specific benchmark are called inflation (Adaramola & Dada, 2020).Following Khan & Hanif (2020) and Adaramola & Dada (2020) inflation is measured using the consumer price index.

Economic Growth

The worth of finished products and services manufactured in the nations during one year is called Gross Domestic Product (Shahid,2014). Following Pham et al. (2021) and Umar & Sun (2016) economic growth is measured by using the GDP growth rate.

Econometric Model

$LC_{it} = \beta o + \beta_1 LC_{it-1} + +\beta_2 DIV_{it} + \beta_3 CAP_{it} + \beta_4 SIZE_{it} + \beta_5 GDP_t + \beta_6 INF_t + \varepsilon_{it}$…….eq (5)

Where in above equation number 5, LC represents the liquidity creation measure with two proxies' cat-fat and cat-nonfat. LCit-1 showed the lag value of liquidity creation. DIV represents income diversification. CAP represents bank capital. SIZE represents the size of the bank GDP represents economic growth and INF represents inflation. i represent banks and t represents time.

RESULTS AND DISCUSSION

Firstly, descriptive statistics is calculated for all variables. Table 1A shows the descriptive statistics of variables which include mean, standard deviation, minimum and maximum values for each variable.

The results of this table show the mean values of "liquidity creation" of both proxies (with and without off-balance sheet activities). The mean value of the "cat fat" measure of LC is greater than "cat nonfat" which indicates that the inclusion of off-balance sheet activities creates more liquidity in Pakistani banks (0.2619749 > 0.0677903). This means off-balance sheet activities play an important role in the creation of liquidity or banks do exploit off-balance sheet opportunities to create liquidity in the economy. The mean value of income diversification (DIV) is 0.3682208 which indicates that among the sample, most Pakistani banks diversified their income into interest and non-interest income activities. The average value of capital is 0.075324 shows that on average banks in Pakistan use 7.5% of equity to finance their assets. The mean value for size is 8.616272 and on average GDP growth rate in Pakistan is 4.17%. The average inflation rate in Pakistan is 8.3%.

Table 1A: Descriptive Statistics of the Variables Used to Estimate the Model of the Study (2011-2022).

Variable name	Mean	Standard deviation	Minimum	Maximum	No of obs
LC_catfat	0.2619749	0.1669616	-0.1929059	0.9020329	274
LC_catnonfat	0.0677903	0.1060714	-0.2572231	0.3814293	274
DIV	0.3682208	0.0802908	0.0932671	0.4999969	274
CAP	0.075324	0.0340665	0.0211506	0.2608527	274
SIZE	8.616272	0.5302123	7.208179	9.719366	274
GDP	0.0417372	0.0201933	-0.0127409	0.0648709	274
INF	0.0831253	0.0441867	0.0252933	0.1987386	274

LC_catfat and LC_catnonfat represent liquidity creation measures with two proxies catfat and catnonfat. DIV represents income diversification. CAP represents bank capital measured as total equity/total asset. SIZE represents size measure as a natural log of assets GDP represents economic growth measure as GDP growth rate and INF represents inflation measure as a consumer price index.

Correlation is a necessary condition for claiming a causality, so the correlation is also calculated among variables of the model and results are presented in Table 1B. The

result of the correlation indicates that multicollinearity is not present in the independent variable. This table also indicates the direction of the association between the variables. If we focus on the "cat fat" measure of LC we can observe that all the variables have positive associations except the "CAP" and "INF". All the correlation coefficients are significant at a 5 percent significance level.

Table 1B. Correlation Matrix of all variables of the study (2011-2022).

LC_catfat	LC_catnonfat	DIV	CAP	SIZE	GDP	INF
LC_catfat	1.000					
LC_catnonfat	0.6534	1.000				
DIV	0.1833	0.0968	1.000			
CAP	-0.1466	-0.2340	-0.2345	1.000		
SIZE	0.0364	-0.1626	0.1228	-0.4295	1.000	
GDP	0.0838	0.0466	0.1040	-0.1117	0.0570	1.0000
INF	-0.1459	-0.1213	-0.3329	-0.0421	0.1565	1.000

LC_catfat and LC_catnonfat represent liquidity creation measures with two proxies cat_fat and cat_nonfat. DIV represents income diversification. CAP represents bank capital measured as total equity/total asset. SIZE represents size measure as a natural log of assets GDP represents economic growth measure as GDP growth rate and INF represents inflation measure as a consumer price index.

The results computed by the GMM model are presented in Table 2. The variable of interest "liquidity creation" is measured by Cat_nonfat in model 1 and Cat_fat in model 2.

Table 2. Determinants of Liquidity Creation in the Banking Sector of Pakistan (2011-2022).

Dependent Variable		Model 1 LC_catnonfat		Model2 LC_catfat
	Coeff	Standard Error	Coeff	Standard Error
Constant	-1.29244	1.64678	-4.72656*	2.35316
LC-1	0.25175***	0.089964	0.29379***	0.08048
Div	0.00385	0.11208	0.14038	0.19087
Cap	-1.22364*	0.60251	-2.20*	1.04
SIZE	-0.366***	0.11227	-0.60***	0.19352
GDP	4.25409***	1.51388	9.78004***	2.68219
INF	1.66827*	0.74322	3.35063**	1.30048
Sargan Test P Value	0.68		0.249	
AR1	0.0047		0.0008	
AR2	0.7432		0.9279	

LC_catfat and LC_catnonfat represent liquidity creation measures with two proxies cat_fat (off-balance sheet activities included) and cat_nonfat (off-balance sheet activities excluded). DIV represents income

diversification. CAP represents. LC_catfat and LC_catnonfat represent liquidity creation measures with two proxies cat_fat (off-balance sheet activities included) and cat_nonfat (off-balance sheet activities excluded). DIV represents income diversification. CAP represents bank capital measured as total equity/total asset. SIZE represents size measure as a natural log of assets GDP represents economic growth measure as GDP growth rate and INF represents inflation measure as a consumer price index. GMM is used for analysis asterisk means the variable coefficient is insignificant whereas *, **, and *** indicate that the coefficient is statistically significant at 10%,5%, and 1% respectively.

To mitigate the issue of endogeneity lag values of independent variables are used as instrumental variables. In Table 2 the p-value for the Sargan test for model 1 is 0.6847 and for model 2 is 0.2490 which shows that lag values of independent values are valid instruments. The autocorrelation test also showed that second-order autocorrelation is not present (AR2).

Table 2 also presents coefficients of independent variables under both models (1,2). The very first variable is "DIV" (Diversification of income) which has a positive and insignificant influence on bank liquidity creation in both model 1 and model 2. This shows that income diversification does not influence liquidity creation in Pakistan.

The bank capital "CAP" is negatively and significantly associated with the creation of liquidity at a 10% significant level in Table 2. These results are consistent with both liquidity creation theory and financial fragility-crowding out hypothesis. This hypothesis assumes that a rise in bank capital shrinks the capability of banks to create liquidity due to a decrease in financial fragility and crowding out effect of depositors, with high capital liquidity creation decreases in Pakistan. This negative association is also observed in some studies like Horvath et al. (2014); Chaabouni et al. (2018) and Le (2019).

The "SIZE" of banks significantly and negatively influences the creation of liquidity at a 1% significance level. The results of this study are consistent with Toh (2019) and Chaabouni et al. (2018). The small bank's liquidity creation is higher than big banks because small banks based on soft information have a relative advantage in accepting lending technology. In comparison to big banks small banks provide more personalized financial services while big banks mostly concentrate on arm's length transactions (Toh, 2019). Moreover, Berger & Bouwmen (2017) also claimed that large banks create more liquid assets which may destroy liquidity.

The impact of "GDP" on the creation of liquidity is positive and significant in Pakistani banks. The relationship is significant at a 1% significant level. The results are consistent with Chaabouni et al. (2018) and Niu (2022). The results suggest that during economic growth banks provide more loans which intensifies the creation of liquidity. The creation of liquidity increased during the economic boom. Thaker, et al. (2013) also showed that economic growth positively impacts bank credit which shows that during an economic boom, both lenders and borrowers become confident about loan repayment and investment opportunities. So, demand and supply of loans increase which enhances the creation of liquidity by banks. The impact of inflation on creation of liquidity is also significant and positive at 10% in model 1 and 5% in model 2. These results are surprising as Umar and Sun (2016); Sahyouni et al. (2021) and Gyeke-Dako et al. (2021) found a negative association between these two variables

however, results are consistent with Dang (2021) who found a positive relationship. Thaker et al. (2013) also showed a positive influence of inflation on bank credit and claimed that during inflation purchasing power decreases and people demand more money. Due to inflation expenditure increases and demand for money increases which may increase liquidity creation.

Conclusion

This research investigated the liquidity creation determinants in the Pakistani context. Data from 2011 to 2022 is used for this study. The outcomes of this study supported the financial fragility-crowding out hypothesis. The outcomes showed that among three bank-specific variables two variables; bank capital and size (CAP, SIZE) are significantly linked with liquidity creation. Whereas one variable (DIV) income diversification shows an insignificant relation with liquidity creation. By following the majority rule, the H1 hypothesis is accepted. Further both the macroeconomic indicators inflation and economic growth (INF, GDP) showed a significant relationship with liquidity creation which also leads to the acceptance of H2. The outcomes of this study recommend that bank management and regulatory authorities who force banks to intensify their bank capital to ensure their financial stability should also consider the most important function of the banking sector the liquidity creation. Fidrmuc et al. (2015); and Berger & Sedunov (2017) found that liquidity creation strengthens economic growth. Therefore, bank management and authorities should make a compromise between the role of the bank in creating liquidity and bank stability. Bank management also focuses on more personalized financing as bank size shows in comparison to large banks small banks create more liquidity.

Considering the role of liquidity creation in economic growth this study also highlights some critical areas for future researchers. Firstly, the same study can be done with a larger sample size and a study period for emerging economies. Next researchers should use other techniques such as cointegration to check the bidirectional relationship between the creation of liquidity and economic growth. Lastly, researchers can also use other bank-specific and macroeconomic variables along with these variables to provide a deep understanding of liquidity creation.

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APPENDIX A

Illiquid assets (weight=1/2)	**Semiliquid assets(weight=0**	**Liquid assets(weight=-1/2)**

Corporate and commercial loans from banks	Other mortgage loans	Cash and due
Fixed assets other banks	Other consumer/retail loans	Balance with
Intangible assets Available-for-sale securities	Reverse Repos and cash collateral	
Other assets securities		Trading
Other securities		
Liquid liabilities(weight=1/2) liabilities plus equity weight=-1/2)	**Semiliquid liabilities weight=0)**	**Illiquid**
Customer deposits- current debt	Saving deposits	Subordinated
Bills payable		Deferred taxes
Borrowing from financial Inst. liabilities (included only repo and call)	Borrowing from banks	Other
Time Customer deposits	Total equity.	
Illiquid Off-balance-sheet activities (weight=1/2)		**Semiliquid Off-balance-sheet activities (weight=0)**
Commitment in respect of forward lending exposure to securitizations		Other off-balance-sheet
Commitments in respect of Forward Exchange Contract reported off-balance-sheet		Managed securitized assets
Commitments in respect of Operating Lease		
Other commitments		
Contingent liabilities and guarantees		

Liquidity creation is calculated by Authors using Berger & Bouwnman's (2009) method of distribution of assets, liabilities and equity.

APPENDIX BList of Banks

Meezan Bank Ltd	Bank Al-Habib Ltd.
Bank Islami (Pakistan) Ltd	Samba Bank Limited.
Dubai Islamic Bank Pakistan	Habib Metropolitan Bank Ltd.
Al Baraka Bank (Pakistan) Ltd	MCB Bank Ltd.
Allied Bank Ltd	United Bank Ltd.
Askari Bank Ltd.	Soneri Bank Ltd
Bank Alfalah Ltd	JS Bank Ltd.
Habib Bank Ltd.	Faysal Bank Ltd

Silk Bank Ltd.	Standard Chartered Bank (Pakistan) Ltd
Summit Bank Ltd.	National Bank of Pakistan
Sindh Bank Ltd	**Zarai Tarqiati Bank Ltd**
The Bank of Punjab	The Bank of Khyber